III. Completed Research Projects

"a summary of any research project completed in the preceding biennium;"

This section includes summaries of all projects completed, including research projects.

- The following documents are summaries of accomplishments for each appropriation year and short abstracts for all projects completed since the previous biennial report of January 15, 2011.
- The abstracts describe the general accomplishments of each project for completed projects.
  See http://www.lccmr.leg.mn
- Research projects have been marked as such in the description.
- Full final reports are available at the LCCMR, Room 65 - State Office Building. The abstracts are current as of 12/31/2012.
- Legal Citations
  - M.L. 2010, Chapter 362, Section 2
  - M.L. 2009, Chapter 143, Section 2
  - M.L. 2008, Chapter 367, Section 2
  - M.L. 2007, Chapter 20, Section 2
  - M.L. 2006, Chapter 243, Sec. 20
  - M.L. 2005, First Special Session, Article 1, Section 9

M.L. 2010 Projects Completed 2011-2012

MN Laws 2010, Chapter 362, Section 2

M.L. 2010 Projects Completed 2011-2012

M.L. 2010 Projects
MN Laws 2010, Chapter 362, Section 2 (beginning July 1, 2010)

NOTE: Below are short abstracts for projects funded during the 2010 Legislative Session and ending during 2011-2012. The final date of completion for these projects is listed at the end of the abstract. Final Reports for all completed projects are available at http://www.lccmr.leg.mn/projects/2010-index.html or by contacting the LCCMR office.

Subd. 03 Natural Resource Data and Information
03c Minnesota Breeding Bird Atlas
03d Integrated, Operational Bird Conservation Plan for Minnesota
03h Strategic Planning for Minnesota's Natural and Artificial Watersheds
03j Farmland Conservation in Minnesota

Subd. 04 Land, Habitat, and Recreation
04f Minnesota's Habitat Conservation Partnership Supplemental
04g Metropolitan Conservation Corridors Supplemental

Subd. 05 Water Resources
05f Evaluation of Dioxins in Minnesota Lakes - RESEARCH
05g Assessment of Shallow Lake Management - RESEARCH

Subd. 07 Renewable Energy
07d Demonstrating Sustainable Energy Practices at Residential Environmental Learning Centers (RELCs)

Subd. 08 Environmental Education
08c Connecting Youth with Nature
08h Project Get Outdoors
08k Online Field Trip of Minnesota River

SUBD. 03 NATURAL RESOURCE DATA AND INFORMATION

Minnesota Breeding Bird Atlas
Subd. 03c $372,000

PART 1 ($211,000)
Mark Martell
Audubon Minnesota
2357 Ventura Dr, Ste 106
St. Paul, MN 55125
Phone: (651) 739-9332
Email: mmartell@audubon.org
Fax: (651) 731-1330
Web: http://mnbba.org/

PART 2 ($161,000)

Gerald Niemi
Natural Resources Research Institute (NRRI) - University of Minnesota
5013 Miller Trunk Hwy
Duluth, MN 55811
Phone: (218) 720-4270
Email: gniemi@nrri.umn.edu
Fax: (218) 720-4328

Web: http://www.nrri.umn.edu

Appropriation Language
$372,000 is from the trust fund to continue development of a statewide survey of Minnesota breeding bird distribution and create related publications, including a book and online atlas with distribution maps and breeding status. Of this appropriation, $211,000 is to the commissioner of natural resources for an agreement with Audubon Minnesota and $161,000 is to the Board of Regents of the University of Minnesota for the Natural Resources Research Institute. The atlas must be available for downloading on the Internet free of charge.

PART 1: AUDUBON MINNESOTA

Overall Project Outcome and Results
The Minnesota Breeding Bird Atlas is a statewide survey of the breeding distribution of Minnesota's birds. The project combines efforts, coordinated by Audubon Minnesota, of volunteers and multiple partners to obtain detailed information on breeding status of Minnesota's birds, with systematic and habitat based abundance data, coordinated by the Natural Resources Research Institute at the University of Minnesota-Duluth. The combination of these two efforts represents a powerful addition to understanding the distribution, relative abundance, and habitat use by Minnesota's breeding birds.

Over 800 volunteers have participated in the project and have reported over 22,000 hours of donated time. Twenty-nine individuals act as regional coordinators helping to recruit, train, and monitor volunteers. Our database has 207,000 observations on 245 species and confirmed breeding by 226 species around the state. Data has been reported from 5,596 blocks, including 2,166 priority blocks (there is one priority block per township) which gives us data from 92% of the state.

Final products will include a book and on-line atlas, including distribution maps, species breeding status, and conservation and historical information. Products will be available to the public as well as conservation agencies and organizations. Information gathered during this project is at the sub-township level and will provide spatial detail more compatible with contemporary remote sensing imagery available for vegetation, water, and development. Data will be useful to a wide variety of organizations including federal agencies, many state agencies such as the MN DNR and MPCA, county land management agencies, and both regional and local organizations to highlight tourism opportunities. Data will also be of great utility for use in agency decision-making regarding the dedicated funding legislation associated with land acquisition and water quality protection. These types of spatially-intensive data sets are essential to make wiser decisions about land use allocations for energy development, transportation networks, and other residential or industrial development.

Project Results Use and Dissemination
The primary form of information dissemination to date has been through the Minnesota Breeding Bird Atlas website (mnbba.org). Because our data collection is not complete, and we have not subjected all of the data to quality control we have not made efforts to disseminate the information to a wider audience at this time but plan to do so in future efforts.

Project completed: 6/30/2012

PART 2: NRRI

Overall Project Outcome and Results
This project is the third and fourth years of a four-year effort in the development of the Minnesota Breeding Bird Atlas - the first comprehensive assessment of Minnesota's breeding birds. The overall project is divided into two parts: 1) volunteer observations organized by Audubon Minnesota and 2) systematic surveys of Minnesota's breeding birds organized by the University of Minnesota (summarized here). Objectives were to gain uniform statewide coverage for all Minnesota's birds, estimate breeding bird populations by habitat type, and contribute to a nationwide network of bird atlases. Data gathering was primarily completed by graduate and undergraduate students at the University of Minnesota. All passed an aural bird identification test, verified their hearing ability, and participated in field standardization exercises.

Over the two breeding seasons (2011 and 2012) of this project, the target of 40% of Minnesota townships (>920) was successfully completed. Currently, over 80% (>1,800) of the townships have been sampled, with over 230 species observed and over 160,000 individuals counted in over 2,800 individual point counts. Thousands of additional breeding observations were submitted by surveyors from this project to the volunteer database in the complementary study organized by Audubon Minnesota, including over 4,000 probable or confirmed breeding records for Minnesota birds. Over 70% of the data gathered during 2009-2012 have been entered, checked for errors, and briefly summarized.

Project Results Use and Dissemination
The data gathered through 2010 have been downloaded to the Minnesota breeding bird atlas database and during the fall of 2011 through the Cornell University interface. All of these data will be incorporated into a comprehensive atlas of Minnesota's breeding birds that will be used as 1) a first-ever baseline on the current population status of this important Minnesota resource, 2) critical information for future conservation planning, and 3) as a guide for such activities as identifying important bird areas or for nature-based tourism activities. The ultimate dissemination of these data will be through an interactive data system and we anticipate the publication of a hard copy book assuming suitable funding can be obtained.

Project completed: 6/30/2012

Integrated, Operational Bird Conservation Plan for Minnesota
Subd. 03d $151,000

Lee Pfannmuller
Audubon Minnesota
2357 Ventura Dr, Ste 106

St. Paul, MN 55125

Phone: (612) 810-1173
Email: leepfann@msn.com
Fax: (651) 731-1330
Web: http://mn.audubon.org/

Appropriation Language
$151,000 is from the trust fund to the commissioner of natural resources for an agreement with Audubon Minnesota to develop an integrated bird conservation plan targeting priority species and providing a framework for implementing coordinated, focused, and effective bird conservation throughout Minnesota.

Overall Project Outcome and Results
Many national, regional, and state conservation plans broadly address Minnesota birds, but a consolidated and focused state conservation agenda does not exist. The goal of this initiative was to develop a clear operational plan for Minnesota conservation organizations and resource agencies that builds on existing plans, establishes priorities to guide conservation actions, and identifies conservation targets. Plans were prepared for Minnesota's four ecological provinces: the Tallgrass Aspen Parklands, the Laurentian Mixed-Forest, the Eastern Broadleaf Forest and the Prairie Parkland. The bird composition of each province is sufficiently distinct to warrant a different approach and different priorities. Three tasks were implemented in each province:

- First Task: Delineated a pool of priority species and selected a subset of conservation target species.
- Second Task: Decided where, among the suite of Minnesota's 48 Important Bird Areas (IBAs), it is most important to work to protect and manage these species.
- Third Task: Developed a toolbox of conservation actions to insure these species maintain viable populations on the priority IBAs, as well as throughout Minnesota.

Titled An Implementation Blueprint for Minnesota Bird Conservation, the operational plan's components include:

1. Implementation Blueprints for Bird Conservation in each ecological province, which identify clear priorities to guide conservation actions;
2. conservation accounts for 78 priority species;
3. detailed Conservation Blueprints for nine target species;
4. a database compiling critical information on 434 Minnesota birds;
5. a publication that highlights twelve of Minnesota's stewardship species (species that have >5% of their global population in the state and >5% of their North American breeding range in the state); and
6. management plans for three of Minnesota's priority Important Bird Areas (Goose Lake Swamp IBA, the Twin Cities Mississippi River IBA, and the Vermillion Bottoms-Cannon River IBA).

Project Results Use and Dissemination

- The Conservation Blueprints were used in the development of Audubon's recently completed Guide to Urban Bird Conservation (Spring 2012): http://mn.audubon.org/twin-cities-bird-conservation.
- A booklet, Stewardship Birds of Minnesota: Our Global Responsibility was published in June 2012.
- Findings were presented at nine workshops and eleven additional statewide and regional meetings.

- The Common Tern Minnesota Conservation Blueprint was used at a Structured Decision Making meeting to inform future Common Tern management at the Rice Lake National Wildlife refuge.
- Audubon is exploring ways to make all project data available to resource managers in a GIS format; in the interim Conservation Blueprints for the nine conservation targets and Implementation Blueprints for each ecological province will be available on the Audubon Minnesota website.
- Information is helping update Minnesota's Comprehensive Wildlife Conservation Strategy.

Project Publication:
Stewardship Birds of Minnesota: Our Global Responsibility (PDF - 6.6 MB)

Project completed: 06/30/2012

Strategic Planning for Minnesota's Natural and Artificial Watersheds
Subd. 03h $327,000

David Mulla
U of MN
439 Borlaug Hall, 1991 Upper Buford Cir
St. Paul, MN 55108

Phone: (612) 625-6721
Email: mulla003@umn.edu
Fax: (612) 625-2208
Web: http://www.swac.umn.edu/People/DavidMulla/

Appropriation Language
$327,000 is from the trust fund to the Board of Regents of the University of Minnesota to identify the interrelationship between artificial systems of drain tiles and ditches and natural watersheds to guide placement of buffers and stream bed restoration and modification.

Overall Project Outcome and Results
Artificial watersheds have significant areas that are drained using ditches and/or buried perforated pipes, leading to hydrologic characteristics that differ from natural watersheds. Water and pollutants from artificial watersheds often disturb the hydrologic regime and impair water quality in natural watersheds. This project aims to protect Minnesota's natural watersheds by disconnecting them from the artificial watersheds.

High resolution digital elevation models (DEMs) from LiDAR and corresponding digital orthoquad photos were obtained in Beauford Creek, Seven Mile Creek and Elm Creek Watersheds. These data were used along with GIS databases for land use, soils, and hydrologic networks to predict the locations of renewable wetlands. In the Beauford watershed (5,500 ac), logistic regression was able to accurately identify 69% of the potentially restorable wetland locations. Most of the error was due to very small wetlands that are difficult to identify using GIS techniques alone. In the Seven Mile Creek watershed (23,500 ac), logistic regression was able to accurately identify 70% of the potentially restorable wetland locations. In Elm Creek (186,600 ac), 94% of the potentially restorable wetlands were identified. These results show that it is possible to quickly and accurately identify a large proportion of larger restorable wetlands over large areas in Minnesota using straightforward terrain analysis techniques, soil databases

and logistic regression.

The optimum locations for restoring wetlands were determined based on factors that included the location and extent of subsurface tile drains, the contributing area to the wetland, the distance between the potential wetland and nearby streams, ditches or county tile mains, the amount of discharge from subsurface tile drains to wetlands, and the ratio of drainage flow to wetland storage capacity. Using these criteria, 44 optimal sites for wetland restoration were identified in Beauford Creek watershed, while 75 sites were identified in Seven Mile Creek watershed. Placing wetlands at these locations is optimal in terms of intercepting, treating and reducing the effects of subsurface tile discharge to nearby drainage ditches.

More efficient approaches for processing LiDAR DEMs were developed using a supercomputer. The new methods run much faster than conventional methods for processing LiDAR DEMs on a personal computer. Terrain attributes for DEMs (e.g. slope, flow accumulation, stream power index, compound topographic wetness, etc) were calculated for all 42 Minnesota counties that have LiDAR data. We are exploring the possibility of using the Minnesota Geospatial Information Office web site to disseminate these LiDAR based terrain attributes.

Project completed: 06/30/2012

Farmland Conservation in Minnesota
Subd. 03j $100,000

Jennifer Jambor-Delgado
Farmers Legal Action Group, Inc. (FLAG)
360 N Robert St, #500
St. Paul, MN 55101

Phone: (651) 223-5400
Email: jjambor-delgado@flaginc.org
Fax: (651) 223-5335
Web: http://www.flaginc.org/

Appropriation Language
$100,000 is from the trust fund to the commissioner of natural resources for an agreement with the Farmers Legal Action Group, Inc. to assess the implementation of applicable laws for preserving agricultural land and develop a comprehensive and systematic approach and policy tools to preserve agricultural lands.

Overall Project Outcome and Results
The report that resulted from this project - "Preserving Minnesota's Agricultural Land: Proposed Policy Solutions" - recommends a new statewide approach to preserving our state's diminishing agricultural lands to ensure that our state's best farmland is preserved. The state's prime farmland - that most well suited for farming - has been developed at a steady rate, with significant negative consequences for the security and stability of our natural resources and food supply.

The report notes that existing state farmland preservation programs can be invaluable tools for the

immediate and short-term preservation of farmland, but they have not successfully preserved farmland for the long-term because they suffer from poor incentives and limited promotion. State land use planning requirements could facilitate farmland preservation, but Minnesota's fail to because they do not require local governments to address farmland preservation in their comprehensive plans or zoning ordinances.

Among the report's recommendations are:

- Adopt state farmland preservation goals and a statutory requirement for comprehensive plans and zoning ordinances to include farmland preservation plans.
- Develop a statewide Purchase of Agricultural Conservation Easement (PACE) program to be offered in counties with farmland preservation plans. Include soil and water conservation and stewardship plans in the easements. Consider building upon Dakota County's PACE program, which explicitly joins farmland protection with water quality protection.
- Streamline the Metro and Greater Minnesota Programs into one comprehensive state program administered by the Minnesota Department of Agriculture. Make the program available in all counties with farmland preservation plans.
    - Tiered incentives should be used to promote conservation and long-term protection.
    - Add a permanent and a 30-year agricultural preserve option.
    - Require preservation of similar quantity and quality of farmland to acquired farmland when enrolled land is acquired though eminent domain or annexation.
- Make all working farms, including small-acreage farms, eligible for Green Acres program benefits. Farms most affected by existing size restrictions are Community Supported Agriculture farming operations, beginning and immigrant farmers, small-scale diversified farms, direct marketers, and farms that raise grass fed livestock or that allow animals to forage. Current restrictions result in excluding farms using production methods that are better for the environment and thwarts economic development by denying benefits to burgeoning small-scale farming operations.
- Develop policies and allocate resources to help to facilitate the transfer of land from one generation of farmers to the next and allow for affordable access to good quality farmland. Consider adopting a tax credit for those who lease land to beginning farmers; conservation measures could be made a required component of such leases.

Project Results Use and Dissemination
The report has been distributed to a regional media list; federal, state, and local public officials and staff; farm organizations; and influential farmers and other citizens. The report's contents (and a link to the report online) has also been distributed to almost 3,000 contacts. Plans are underway for any follow up strategies farm organizations may pursue in the legislative sessions ahead.

Project Publication:
Preserving Minnesota's Agricultural Land: Proposed Policy Solutions (PDF - 8.3 MB)

Project completed: 06/30/2012

SUBD. 04 LAND, HABITAT, AND RECREATION

Minnesota's Habitat Conservation Partnership Supplemental
Subd. 04f $1,344,000

Joe Pavelko
Pheasants Forever (on behalf of all partners)
7975 Acorn Circle
Victoria, MN 55386

Phone: (612) 532-3800
Email: jpavelko@pheasantsforever.org
Fax: (320) 354-4377
Web: http://www.mnhabitatcorridors.org

Appropriation Language
$1,344,000 is added to Laws 2009, chapter 143, section 2, subdivision 4, paragraph (e), from the trust fund for the acceleration of agency programs and cooperative agreements. Of this appropriation, $308,000 is to the commissioner of natural resources for agency programs and $1,036,000 is for agreements as follows: $425,000 with Ducks Unlimited, Inc.; $50,000 with National Wild Turkey Federation; $164,000 with the Nature Conservancy; $102,000 with Minnesota Land Trust; $200,000 with the Trust for Public Land; $45,000 with Friends of Detroit Lakes Wetland Management District; and $50,000 to the Leech Lake Band of Ojibwe to plan, restore, and acquire fragmented landscape corridors that connect areas of quality habitat to sustain fish, wildlife, and plants. The United States Department of Agriculture Natural Resources Conservation Service is an authorized cooperating partner in the appropriation. Expenditures are limited to the project corridor areas as defined in the work program. Land acquired with this appropriation must be sufficiently improved to meet at least minimum habitat and facility management standards as determined by the commissioner of natural resources. This appropriation may not be used for the purchase of residential structures, unless expressly approved in the work program. All conservation easements must be perpetual and have a natural resource management plan. Any land acquired in fee title by the commissioner of natural resources with money from this appropriation must be designated as an outdoor recreation unit under Minnesota Statutes, section 86A.07. The commissioner may similarly designate any lands acquired in less than fee title. A list of proposed restorations and fee title and easement acquisitions must be provided as part of the required work program. All funding for conservation easements must include a long-term stewardship plan and funding for monitoring and enforcing the agreement.

Project Overview
With continued land use changes in Minnesota, areas that once served as important areas for fish, wildlife, and plant habitat have become fragmented and disconnected resulting in adverse impacts on these ecological communities. Strategic and coordinated efforts in protection, restoration, and enhancement of lands throughout Minnesota can create land and water corridors that reconnect remaining habitat areas and reverse some of the adverse impacts. This appropriation represents a supplement to the sixth phase of an ongoing effort by a partnership of state, federal, and non-profit organizations to do such strategic and coordinated land protection, restoration, and enhancement. Earlier phases of this project have resulted in the protection, restoration, or enhancement of more than 100,000 acres throughout the state. Many of these projects matched Trust Fund money with non-state funds, stretching these dollars to provide a greater benefit to the state. This supplemental funding to Phase VI of this effort involves nine partners and is expected to result in the permanent protection of

nearly 200 additional acres and restoration or enhancement of approximately 1,900 additional acres. Projects from the individual partners are listed below.

Project completed: 6/30/2012

ABSTRACTS AND FINAL REPORTS OF INDIVIDUAL PARTNER PROJECTS (Click project # to go to listing for that project)

2d FINAL REPORT - HCP VI Supplemental - Shallow Lake Assessment - MN DNR ($45,000)

Overall Project Outcome and Results

The Minnesota Department of Natural Resources (DNR) is working with Ducks Unlimited (DU) and other partners in a focused, strategic approach to assess, improve and protect the aquatic ecology and water quality of shallow lakes for waterfowl and other wildlife. Shallow lakes are a critical component of the wetland habitat complexes once common to Minnesota landscapes. These lakes provide the migration, brood rearing, and hibernacula critical for shorebirds, waterfowl, water birds, turtles and amphibians. Through this grant, and the existing shallow lake program, DNR will provide the predesign habitat assessment and monitoring of shallow lake structural enhancements accomplished by DU through bioengineering. There were 15 shallow lake assessments planned to be completed with this grant. There were actually 11 shallow lake habitat assessments completed with a combination of DNR and ENRTF funding. All of the assessments were completed within the Habitat Conservation Partnership Project Area 3. The information collected will be used to inform lake management strategies including DU lake structure enhancements and DNR accelerated management activities. Assessments included data collection on water depths, aquatic vegetation, water clarity, and water chemistry. Lakes were selected from a priority list developed by the MN DNR shallow lakes program. The reason for the shortfall was related to the conversion of the state accounting system to SWIFT and the consequent difficulty in locating and coding to the proper account.

Project Results Use and Dissemination

Accomplishment Reports and press releases will be made available at http://www.mnhabitatcorridors.org.

Project completed: 6/30/2012

2f FINAL REPORT - HCP VI Supplemental - Shallow Lake Habitat Enhancement and Wild Rice Enhancement and Monitoring - Leech Lake Band of Ojibwe ($50,000)

Overall Project Outcome and Results

The goal of this project was to improve habitat for waterfowl and other species that utilize wetlands on the Leech Lake Reservation in addition to analyzing a long term wild rice data set to determine if waterfowl numbers are influenced by rice abundance. A number of techniques were utilized to accomplish this work.

Waterfowl habitat enhancements, over the period of this grant, were conducted on seven impoundments that are located throughout the reservation and covered approximately 300 acres. On these impoundments water levels were managed and dike and control structures were repaired and maintained. Beaver plugging is also an issue on many of these impoundment so dam material was removed as needed, Clemson Levelers were installed, and in some cases beaver removal was utilized to control the problem. Water draw downs were also accomplished on two impoundments to restore aquatic vegetation.

A second aspect of this project was to enhance waterfowl food supply by planting wild rice. Wild rice has been degraded in some locations due to inappropriate water levels, damage from wind storms, and human activities. Two hundred acres of water was reseeded with rice during the course of this grant period.

The third aspect of this project was to scan, and rectify the first seventeen years of aerial wild rice bed images that have been taken of major rice beds on the Reservation. A subset of this data was then analyzed and compared to waterfowl abundance data provided by the MN DNR to see if a positive correlation between rice abundance and waterfowl numbers could be identified. The work thus far completed has not been able to detect a significant relationship between rice abundance and waterfowl numbers, but we will continue this work on a larger data set looking at more parameters to see if one exists. The largest benefit from this work has been the development of the methodology to analyze rice distribution and abundance from aerial photographs that will be helpful for us and other resource personnel to manage wild rice into the future.

Project Results Use and Dissemination

The methodology and techniques used to quantify wild rice beds from aerial photographs will be available to other resource managers if they would like to use them to evaluate their rice beds.

Project completed: 6/30/2012

2h FINAL REPORT - HCP VI Supplemental - Fisheries Habitat Restoration - MN DNR ($100,000)

Overall Project Outcome and Results

Citizens of the state of Minnesota benefit from this project by having a better fish community structure in Hartley and Long Lake that is sustainable by natural reproduction. This then creates better fishing and recreation available in high priority waterbodies. The project was completed on June 30, 2011. The project consisted of seven step-pools that started at the dam and went down stream approximately 230 ft. In addition four stop-log bays on the dam were modified to allow fish passage. The public have reported seeing fish using the pools to move into Hartley Lake and Long Lake. In July 2011, heavy rains created high waters and resulted in some of the organic fill being washed out. The lake association is going to work with staff to repair the damage. Long term maintenance of this project is going to be

shared with the local lake association.

Project Results Use and Dissemination
Information on HCP project results have been shared and disseminated through all partner organizations. The Environment and Natural Resources Trust Fund provides information to the general public on how the lottery funds are spent for natural resource activities.

Project completed: 6/30/2012

2k FINAL REPORT - HCP VI Supplemental - Prairie Management - MN DNR ($63,000)
Overall Project Outcome and Results
A total of 127 acres of invasive species were controlled during the project (69 acres of woody removal, 58 acres of herbaceous invasive species treatments). Invasive tree species controlled includes Buckthorn, Siberian elm, Red cedar and Boxelder. Herbaceous invasive species treated include Spotted Knapweed, Leafy Spurge, and Crown-vetch. Projects were implemented by both private contractors and DNR crews. A total of 197 acres were burned on 2 SNA's and 2 Native Prairie Banks during the reporting period. All burns were completed by DNR crews as it remains difficult to hire qualified prescribed fire contractors. A total of 15 acres were reconstructed on the Langhei SNA and Mickelson Native Prairie Bank. All seeds were collected on the projects sites, and every attempt was made to collect a diversity of seeds. Both reconstructions are adjacent to native prairie; one reconstruction was a former row-crop field, and the other a site previously disturbed by installation of underground utilities. Data collection occurred on 4 different management projects. The data was loaded into the SNA Program's Adaptive Management Spatial Database (AMSD) for analysis and permanent documentation. Projects monitored included invasive species treatments and prescribed burning. As additional SNA management actions are implemented, and the data sets grow larger, AMSD will prove to be a valuable tool for continuous improvement of management methods.

Project Results Use and Dissemination
Accomplishment Reports and press releases will be made available at http://www.mnhabitatcorridors.org.

Project completed: 6/30/2012

2n FINAL REPORT - HCP VI Supplemental - Campaign for Conservation - Restoration/Acquisition - The Nature Conservancy ($164,000)

Overall Project Outcome and Results
The Nature Conservancy's (TNC) 2010 ENRTF appropriation focused on habitat restoration/enhancement in critical corridors and landscapes identified by TNC and the Habitat Conservation Partnership. This program allowed us to significantly accelerate our work to maintain and enhance Minnesota's prairies, savannas, and wetlands using prescribed fire and surveying/treating invasive species. Other efforts focused on restoring sand prairies and long-lived conifers in landscapes where these are threatened. Our goal in this phase was to restore 2,415 acres. We were able to complete work on 3,178 acres, including:

1. 2,529 acres of prescribed fire was planned/implemented at 15 sites in the Northern Tallgrass Prairie and prairie-forest transition areas of Minnesota.
2. 533 acres of invasive species were treated at 15 sites in the same areas.

3. 75 acres of white pine and other long-lived conifers were replanted in forests along the North Shore.
4. 41 acres of sand prairie were restored in Southeast Minnesota.

Not included in these totals, but still valuable, were preparations for future prescribed burns on 240 acres and surveys for invasive species on over 7,000 further acres. Both will contribute to future conservation results. In addition, this support from the Environment and Natural Resource Trust Fund allowed TNC to bring an additional $54,284 in private and non-state public dollars for conservation work in these critical places.

Project completed: 6/30/2012

2o FINAL REPORT - HCP VI Supplemental - Working Lands Partnership - Friends of the Detroit Lakes Wetland Management District ($45,000)

Overall Project Outcome and Results

This project funded the restoration of thirty-three wetlands totaling approximately seventeen acres on two Waterfowl Production Areas (WPAs) in Becker County. These areas are managed by the USFWS's Detroit Lakes Wetland Management District office. The primary objective was to restore small seasonal wetlands on WPAs. These small wetlands are important because they are the first to melt in the spring, providing critical habitat to early arriving migrating birds. Research has also shown that these types of wetlands have some of the highest invertebrate densities, a critical food source for egg-laying hens and fast-growing ducklings. These wetlands also play a role in flood protection in the Red River Valley. Because they are temporary or seasonal wetlands, they are often dry during the late fall. During snow melt the following spring, they are able to capture their full volume of water. Wetland restoration in western Minnesota is becoming increasingly important under several climate change models. First, these models predict increased flooding in the future. Second, the models predict that the climate of central Dakotas, the duck factory, will shift to western Minnesota. Wetland restoration in Minnesota buffers us against current and future flooding as well as the possible future waterfowl and songbird production in the Central Flyway.

Project Results Use and Dissemination

We are currently drafting a press release for local television and newspapers to discuss all of the grant funded projects in this area, including both ENRTF and LSOHC-CPL funded projects. However, due to the business of the pre-Xmas season, we will probably wait until mid-January before contacting these media. We have had informal conversations with newspapers in the area and they are interested in doing a story on the habitat restoration work in this area.

Project completed: 6/30/2012

2p FINAL REPORT - HCP VI Supplemental - Bluffland Restoration - National Wild Turkey Federation ($50,000)

Overall Project Outcome and Results

This project was part of a long-term bluffland restoration effort by DNR, National Wild Turkey Federation, and private landowners in SE MN. Funds from the Environment and Natural Resources Trust Fund were used to hire contractors to remove Eastern red cedar, buckthorn, honeysuckle, and prickly ash that was growing over former "goat prairies". The project focused primarily on improving habitat for the timber rattlesnake, three other at-risk snake species (racer, bullsnake, and hognose snake) and numerous at-risk plant species in the Bluffland subsection.

Goat prairies are native prairies found on steep south-facing hills in southeastern Minnesota. They are important to wildlife because the wind prevents deep snowpack, and intense sunlight melts much of what does stick. Animals can then rest and forage on the exposed sites. Nearby rock bluffs hold snakes, which forage in the prairies in summer. These prairies were historically maintained by periodic wildfire, but fire prevention has allowed native red cedar and non-native brushy species to encroach on them. These need to be removed to restore the native habitat. Restoring vegetation through these methods also reduces soil loss and improves water quality within the watershed.

During this grant period we treated 29.2 acres of habitat on private lands by hand cutting the invasive overstory. Stumps were treated with herbicides to prevent re-sprouting. Cut material was piled and burned on-site. A ten-year agreement was required from the landowners before any work began. The level of brush infestation, location and access impacted the contract price, which in turn led to lower than anticipated accomplishment acreage. The treatment area was 28 acres rather than the anticipated "up to 45 acres" as indicated in the initial plan. A second site was added later and an additional 1.2 acres treated. Periodic prescribed burning will be conducted by DNR (non-Trust-Fund monies) and will maintain the site in the desired habitat state.

Project Results Use and Dissemination
Accomplishment Reports and press releases will be made available at http://www.mnhabitatcorridors.org.

Project completed: 6/30/2012

3a FINAL REPORT - HCP VI Supplemental - Shoreland Protection Program - Minnesota Land Trust ($102,000)

Overall Project Outcome and Results
This 2010 grant was supplemental to the sixth phase (2009) of our Shorelands Protection project. This grant provided acquisition capital needed to complete two urgent projects that otherwise we would not have been able to complete. One project protects important shoreline along Lake Superior, while the other project protects shoreline along the Little Pine River. Collectively, these two easements protect 99 acres of critical habitat and protect more than 7,000 feet of fragile shoreline.

Both easements were purchased at significant bargain prices. One of the projects (Lake Superior) also used some 2009 funding, so project details, including the funding breakdown, also were reported in our 2009 (Phase 6) final report.

Additionally, the Land Trust prepared baseline property reports for each easement, detailing the condition of the property for future monitoring and enforcement. To fund this required perpetual obligation, the Land Trust dedicated funds to its segregated Stewardship and Enforcement Fund for several completed projects. For these projects, we estimated the anticipated annual expenses of each project and the investment needed to generate annual income sufficient to cover these expenses in perpetuity - all in accordance with our internal policies and procedures as approved by LCCMR. We will report to LCCMR annually on the status of the Stewardship and Enforcement Fund and the easements acquired with funds from this grant.

An appraised value is known for only one of the easements. The donated value of this easement is $515,000. Based on the estimate of value for the second easement, we believe the donated value of that easement is approximately $53,000. Therefore, we were able to leverage significant private

donation with the State's small investment in these projects.

Cumulatively, across all phases of the HCP program, the Land Trust has protected 7,549 acres of critical habitat and nearly 224,000 feet of shoreline, at a cost to the State of $293 per acre.

The Land Trust's work on this project continues to demonstrate the cost effectiveness of working with conservation easements to protect natural and scenic resources along Minnesota's lakes, rivers, and streams, as the cost to the State was well below the cost to purchase land along our increasingly threatened shorelines. This grant continued to generate interest among landowners, and therefore, ongoing funding will be important to sustained success. Additionally, we believe that funds to purchase easements - even a small incentive - will be necessary in the future as work becomes more targeted, selective, and focused on building complexes of protected land.

Project Results Use and Dissemination
The Land Trust disseminated information about the specific land protection projects completed under this grant though our newsletter, email updates, web site, and press releases. The Land Trust also shared information about conservation easements generally and our experience with our partner organizations, other easement holders, local communities, as well as policy makers including members of the LCCMR and LSOHC.

Project completed: 6/30/2012

3c FINAL REPORT - HCP VI Supplemental - Shallow Lake Easements - Ducks Unlimited, Inc. ($75,000)
Overall Project Outcome and Results
Ducks Unlimited used this grant in combination with our 2009 appropriation to help fund approximately 40% of the cost to purchase a permanent conservation easement on the 150-acre Donovan-Posch property on Garden and Johnson Lakes in Crow Wing County in June 2011. In addition, Ducks Unlimited also provided technical assistance and conducted outreach and promotion of conservation easements as a land protection option to new landowners on several shallow lakes, and secured appraisals for potential conservation easements on both the Papenheim and Douglas County Land Company properties on Lake Christina, and ordered an appraisal on the Radunz property on Cedar Lake in Meeker/McLeod County under this grant before funds ran out. Negotiations with these and other landowners are ongoing and will continue in the future through our 2011 appropriation. DU spent $29,639 in Other Funds to complete this project.

Project Results Use and Dissemination
This grant helped DU continue the protection of shallow lakes by working with private landowners to secure conservation easements and promote conservation easement concepts. Conservation easements with private landowners are sensitive land deals that don't lend themselves to widespread publicity. However, DU has recognized individual landowners and has publicized our work to protect shallow lake shorelines and shoreland locally through local conservation groups, soil and water districts, and tribal organizations supportive of our work to protect wild rice lakes. DU also informed the foundations supporting our Living Lakes Initiative of our conservation accomplishments. The accomplishment of securing two new permanent conservation easements through this grant has helped encourage other private landowners to consider working with DU to protect their shorelines, and news of our progress may be further disseminated through DU news releases and articles DU publications in the future. Accomplishment Reports and press releases will be made available at http://www.mnhabitatcorridors.org.

Project completed: 6/30/2012

3d FINAL REPORT - HCP VI Supplemental - Wetland Reserve Program - Ducks Unlimited, Inc. and USDA Natural Resource Conservation Services ($350,000)

Overall Project Outcome and Results

In partnership with the USDA's Natural Resources Conservation Service (NRCS), Ducks Unlimited (DU) contracted with seven Wetlands Reserve Program (WRP) wetland technicians from November 2010 through November 2011 as part 3d of the Habitat Conservation Partnership (HCP) Phase 6.5 "Supplemental" grant. Grant funds were used in combination with private DU funds and federal USDA funds provided by the Natural Resources Conservation Service (NRCS) to contract for the professional services of these seven technicians, whose function was to provide technical assistance to private landowners and USDA - NRCS complete applications and enroll new lands into the WRP, and to help USDA-NRCS and private landowners plan, design, and implement restoration measures on lands previously enrolled in the WRP. The delivery goal for these technicians was to provide Technical Assistance (TA) to help NRCS protect 1,000 acres through new WRP easements and help restore wetlands and associated upland habitat on WRP easements in HCP project areas at an estimated Other Funds cost of $1,520,000 to NRCS. During the life of this grant, the contract specialists made 900 landowner contacts, prepared and submitted 122 applications, submitted 156 easement restoration plans or plan modifications, completed 7 wetland restoration designs, and provided field level management and oversight of 64 restoration projects. Meanwhile, during this grant period, NRCS spent $6,222,501 of federal other funds to close 50 WRP easements protecting 5,252 acres. DU and NRCS also spent an additional $463,127 to pay specialists and administer this grant, for a total non-state Other Funds investment of $6,685,628 during this grant period, significantly more than our estimated proposal goal of $1,520,000.

Project Results Use and Dissemination

Information on the WRP signups has been publicized through news releases from the USDA's NRCS and local Soil and Water Conservation Districts, and through hundreds of individual landowner contacts made by DU wetland restoration specialists. Additional announcements and landowner contacts continue to be made and publicized by DU and USDA's NRCS.

Project completed: 6/30/2012

4b FINAL REPORT - HCP VI Supplemental - Fisheries Land Acquisition - MN DNR ($100,000)

Overall Project Outcome and Results

This project focused on the acquisition of Preece Point AMA, one of the most prominent geographic features on Lake Marquette - a Mississippi River headwaters lake. Here the lakeshore forms a long, narrow point, which is visible from virtually everywhere around the lake. The entire property along with it's associated aquatic habitat is unimpacted by human activities. This AMA will now provide walk-in access to a lake that has no developed public access. The property was sold to DNR as a bargain sale, and the family is happy to know that it will be preserved in it's natural state.

Project goals were to protect 20 acres (0.3 miles of lake and stream shoreline) with the help of partner and other state funding. Partner funding includes donations of land value and cash.

This project resulted in a grand total of approximately 11.8 acres and 0.2 miles of lake and stream shoreline. Environmental and Natural Resources Trust dollars directly acquired approximately 5.9 acres

of the total, including 0.1 mile of lake shoreline. Donations of land value and cash ("other funds" $50,000) and other state monies ($50,000) leveraged with trust dollars totaled $100,000. These contributions helped acquire the remaining acres of the grand total, including 2.94 acres and 0.05 shoreline miles using other state dollars and 2.94 acres and 0.05 shoreline miles from donations of land value and cash. Preece Point was acquired jointly using both 2009 and 2010-Supplemental grants to Minnesota's Habitat Conservation Partnership - Fish and Wildlife Acquisition (4b). Results for Preece Point were proportionately distributed for each grant.

As a result of the combined 2009 and 2009-supplemental grants, 17 acres, including 0.3 miles of critical fish and wildlife habitat are now permanently protected and open to public angling and other light use recreational activities on Preece Point AMA. Acquired parcels are now designated and managed as Aquatic Management Areas (AMAs).

Project Results Use and Dissemination
Accomplishment Reports and press releases are available at www.mnhabitatcorridors.org., and all AMAs will be added to DNR's Public Recreational Information Maps (PRIM).

Project completed: 6/30/2012

4c FINAL REPORT - HCP VI Supplemental - Critical Lands Protection Program - Trust for Public Land ($200,000)
Overall Project Outcome and Results
On September 30, 2011, the Trust for Public Land (TPL) acquired 510 acres in Le Sueur County containing high-quality wetlands and 1.64 miles of naturally flowing Cannon River just upstream from a concentration of rare freshwater mussels. TPL immediately conveyed the property to the Department of Natural Resources (DNR) who will manage the land as a new Wildlife Management Area ("Dora Lake WMA"). In addition to conserving a large area of Minnesota County Biological Survey (MCBS)- identified native habitat, acquisition of these tracts provides an opportunity to restore approximately 200 acres of tilled land in a sensitive water quality area. The DNR will restore them to wetlands, grassland and eventual guided succession to Big Woods. Protection of the property ensures habitat for fish, game and wildlife in the Cannon River watershed.

Project Results Use and Dissemination
Accomplishment Reports and press releases about the overall Habitat Conservation Partnership are available at www.mnhabitatcorridors.org.. Information about this acquisition and the Cannon River Headwaters Habitat Complex effort will be posted on TPL's website: www.tpl.org. Information about the Cannon River Headwaters Habitat Complex effort has also been disseminated through its network of supporters which include: the Cannon River Watershed Partnership, the Tri-Lake Sports Club, the Dark House Anglers Southern Chapter, Minnesota Deer Hunters Association South Central Prairieland Bucks Chapter (Le Sueur, Rice, Waseca, and Steele Counties), Waterville Sportsman's Club, Montgomery Sportsmen's Club, Minnesota Waterfowl Association Scott- LeSueur Chapter, the Izaak Walton League Owatonna Chapter, and the Minnesota Department of Natural Resources.

Project completed: 9/30/2011

Metropolitan Conservation Corridors Supplemental
Subd. 04g $1,750,000

Sarah Strommen
Minnesota Land Trust
2356 University Avenue West, Suite 240
St. Paul, MN 55114

Phone: (651) 647-9590
Email: sstrommen@mnland.org
Fax: (651) 647-9769
Web: http://www.dnr.state.mn.us/metroconservationcorridors

Appropriation Language
$1,750,000 is added to Laws 2009, chapter 143, section 2, subdivision 4, paragraph (f), from the trust fund to the commissioner of natural resources for acceleration of agency programs and cooperative agreements. Of this appropriation, $1,750,000 is for agreements as follows: $890,000 with the Trust for Public Land; $485,000 with Minnesota Land Trust; $325,000 with Minnesota Valley National Wildlife Refuge Trust, Inc.; and $50,000 with Friends of the Minnesota Valley for planning, restoring, and protecting important natural areas in the metropolitan area, as defined under Minnesota Statutes, section 473.121, subdivision 2, and portions of the surrounding counties, through grants, contracted services, technical assistance, conservation easements, and fee title acquisition. Land acquired with this appropriation must be sufficiently improved to meet at least minimum management standards as determined by the commissioner of natural resources. Expenditures are limited to the identified project corridor areas as defined in the work program. This appropriation may not be used for the purchase of residential structures, unless expressly approved in the work program. All conservation easements must be perpetual and have a natural resource management plan. Any land acquired in fee title by the commissioner of natural resources with money from this appropriation must be designated as an outdoor recreation unit under Minnesota Statutes, section 86A.07. The commissioner may similarly designate any lands acquired in less than fee title. A list of proposed restorations and fee title and easement acquisitions must be provided as part of the required work program. All funding for conservation easements must include a long-term stewardship plan and funding for monitoring and enforcing the agreement.

OVERALL PROJECT OUTCOMES AND RESULTS
During this supplemental grant to the fifth phase of the Metro Corridors project, the Metro Conservation Corridors Partners continued their work to accelerate protection and restoration of remaining high-quality natural lands in the greater Twin Cities Metropolitan Area by strategically coordinating and focusing conservation efforts within a connected and scientifically-identified network of critical lands. This corridor network stretches from the area's urban core to its rural perimeter, including portions of 16 counties.

This supplemental phase was focused on unique opportunities that were not funded through prior phases of the MeCC program. This supplemental phase included only four of the MeCC partners and accomplished work in two specific result areas.

1. Restore and Enhance Significant Habitat: Partners restored and enhanced a total of 133 acres of significant habitat in the Lower Minnesota River Watershed using Phase V Supplemental funding plus an additional 33 acres with other funds.

2. Acquire Significant Habitat: Partners protected 494 acres of land through acquisition of fee title and conservation easements and leveraged an additional 454 acres of land using other funds.

Since 2003, MeCC partners have protected more than 10,000 acres and restored nearly 8,000 acres. These strategic and coordinated efforts address a number of recommendations of the Statewide Conservation and Preservation Plan, including, protecting priority land habitats, protecting critical shorelands of streams and lakes, restoring land, wetlands, and wetland-associated watersheds, and improving connectivity and access to outdoor recreation.

OVERALL PROJECT RESULTS USE AND DISSEMINATION
As projects were completed, the individual partners were encouraged to publicize accomplishments through press releases, organization newsletters and websites. These efforts resulted in information being distributed to the public through websites, email lists, daily and weekly newspapers, newsletters, and other print materials. Additionally, the MeCC Partnership maintains an interactive public web map that shows the locations of MeCC projects over time. This web map can be accessed at: http://www.dnr.state.mn.us/maps/MeCC/mapper.html.

Project completed: 6/30/2012

ABSTRACTS AND FINAL REPORTS OF INDIVIDUAL PARTNER PROJECTS (Click project # to go to listing for that project)
2.4 - MeCC V Supplemental - Lower Minnesota River Watershed Restoration and Enhancement Friends of the Minnesota Valley ($50,000)
3.1 - MeCC V Supplemental - Critical Land Protection Program - Trust for Public Land ($890,000)
3.2 - MeCC V Supplemental - Protect Significant Habitat by Acquiring Conservation Easements - Minnesota Land Trust ($485,000)
3.3 - MeCC V Supplemental - Minnesota Valley National Wildlife Refuge Fee Title Acquisition - Minnesota Valley National Wildlife Refuge Trust, Inc. ($325,000)

2.4 FINAL REPORT - MeCC V Supplemental - Lower Minnesota River Watershed Restoration and Enhancement - Friends of the Minnesota Valley ($50,000)
Project Outcome and Results
Friends of the Minnesota Valley (FMV) undertook restoration of habitat for the Lower Minnesota River Watershed portion of the Metropolitan Conservation Corridors Project (MeCC) as a continuation of our wildlife habitat restoration within the Minnesota Valley National Wildlife Refuge and Wetland Management District (Refuge) and within the Lower Minnesota River Watershed.

The Friends' objectives were to complement and connect habitat restoration and management of Refuge lands with that being done by other entities. Project sites addressed the need to restore hydrology within floodplain communities and to restore upland communities such as native oak savanna and wet and dry prairies, resulting in the rehabilitation of nesting, breeding, and brood-rearing habitat for migratory waterfowl in wetland areas and habitat for four documented species in upland areas. Due to late and persistent flooding, our access to the wetland site was prohibited and, as a result, we shifted our focus to upland restoration, as described in our amended work program.

FMV and our partners were able to successfully restore and enhance 30 acres of native wet prairie, 74 acres of native dry sand-gravel oak savanna, and 29 acres of native dray sand-gravel prairie with LCCMR funds during MeCC Phase V Supplement for a total acreage of 133 acres. We also restored additional match acreage of 14 acres of native dry sand-gravel oak savanna and 9 acres of native dry sand-gravel

prairie with non-LCCMR, non-state funds. All work was completed on four Refuge Units and included cutting and herbicide treatment of non-native woody brush species such as buckthorn, honeysuckle, prickly ash, eastern red cedar, and Siberian elm. Our project data is publicly accessible by contacting the Friends, through information disseminated through our newsletter which is distributed to our 1,200 active members, our annual report, on our website, and through information provided by the MeCC Partnership.

Project Results Use and Dissemination
As projects were completed, Friends of the Minnesota Valley publicized project accomplishments through the Friends' quarterly newsletter, our annual report, and the posting of project information on our website. Other dissemination of information occurred through the Metro Conservation Corridors partnership and on the Metro Corridors website.

Project completed: 6/30/2012

3.1 FINAL REPORT - MeCC V Supplemental - Critical Land Protection Program - Trust for Public Land ($890,000)
Project Outcome and Results
In its Critical Lands Protection Program, The Trust for Public Land (TPL) used $890,000 from the Environment and Natural Resources Trust Fund (ENRTF) to secure fee title on portions totaling 50.2 acres of 407 total acquired acres. TPL conveyed these lands to public agencies for permanent protection. Individual project successes include the following:

- TPL spent $552,000 2010 ENRTF funds to protect 10.8 ENRTF acres of land as part of a larger 69-acre purchase of a high biodiversity corridor including forest, bluffland, wetland and rare calcareous fen. TPL conveyed the land to the Department of Natural Resources as the Savage Fen SNA on the Credit River addition in Scott County.
- TPL spent $338,000 2010 ENRTF to protect 39.4 ENRTF acres of land as part of a 338-acre acquisition of one of the largest undeveloped and contiguous tracts of open space in the Twin Cities Metro Area. TPL then conveyed the land to Anoka County. Located at the confluence of Cedar Creek and the Rum River, this land will be managed by the County as the Cedar Creek Conservation Area.

TPL leveraged $890,000 in TPL Metro Conservation Corridors (MeCC) 2010 funding on these projects with $1,090,000 in non-state funds to protect 357 additional pro-rated acres of land. $300,000 of this was non-state public funds and $790,000 of this was from private land value donations. Additionally, $300,000 in state RIM funds were used to protect 5.9 pro-rated acres and $3,400,000 in Outdoor Heritage Funds were used to protect 250.8 pro-rated acres. TPL's 2009 ENRTF funds in the amount of $62,000 and DNR's 2009 and 2010 ENRTF funds in the amount of $358,493 were used to protect 7.2 pro-rated acres and 7.1 pre-rated acres respectively. SNA 2006 bonding dollars in the amount of 289,507 were also used to protect 5.7 pro-rated acres. All acres acquired total 407.

*Please note, since a portion of TPL's 2009 ENRTF funding was used for the Cedar Creek Conservation Area project, a portion of these results was also reflected in TPL's 2009 MeCC Work Program update and Final Report.

Project Results Use and Dissemination
As conservation transactions were completed, The Trust for Public Land disseminated information on the TPL website, www.tpl.org, broadcast emails to Embrace Open Space (EOS) and TPL list serve members, distributed press releases, and included information in TPL's newsletters as appropriate. TPL

also worked with the long-term stewards to ensure information was distributed to their listserves and posted on their websites as well.

Project completed: 6/30/2012

3.2 FINAL REPORT - MeCC V Supplemental - Protect Significant Habitat by Acquiring Conservation Easements - Minnesota Land Trust ($485,000)

Project Outcome and Results

This 2010 grant was supplemental to the fifth phase (2009) of the Metro Conservation Corridors project. This grant provided acquisition capital needed to complete urgent projects that otherwise we would not have been able to complete. Two perpetual conservation easements were completed that collectively protect 374 acres of land and more than 700 feet of shoreline. One easement was purchased at a bargain price, and one easement was donated. The Land Trust also purchased two additional easements that used both 2009 and 2010 ENRTF funding. Because we reported those projects accomplishments as part of our 2009 report, we described them but did not count acreage in the 2010 reports to avoid double-counting. All projects represent unique opportunities to protect high quality natural habitat, riparian areas, and to build upon prior land protection work by the Land Trust at several priority sites.

Additionally, the Land Trust prepared baseline property reports for each easement, detailing the condition of the property for future monitoring and enforcement. To fund this required perpetual obligation, the Land Trust dedicated ENRTF and other funds to its segregated Stewardship and Enforcement Fund for all completed projects. We estimated the anticipated annual expenses of each project and the investment needed to generate annual income sufficient to cover these expenses in perpetuity - all in accordance with our internal policies and procedures as approved by LCCMR. We will report to LCCMR annually on the status of the Stewardship and Enforcement Fund and the easements acquired with funds from this grant.

The total value for the two easements acquired is $1,242,000. The donated value is $1,162,000. Therefore, we were able to leverage significant private donation with the State's investment in these projects.

Cumulatively, across all phases of the Metro Corridors program, the Land Trust has protected 3,672 acres of critical habitat and more than 76,000 feet of shoreline, at a cost to the State of $580 per acre.

The Land Trust's work on this project continues to demonstrate the cost effectiveness of working with conservation easements to protect natural and scenic resources within developed and developing areas, as the cost to the State was well below the cost to purchase land in the Twin Cities region. This grant continued to generate interest among landowners, and therefore, ongoing funding will be important to sustained success. Additionally, we believe that funds to purchase easements - even a small amount - will be necessary in the future as work becomes more targeted, selective, and focused on building complexes of protected land.

Project Results Use and Dissemination

The Land Trust disseminated information about the specific land protection projects completed under this grant though our newsletter, email updates, web site, and press releases. The Land Trust also shared information about conservation easements generally and our experience with our partner organizations, other easement holders, local communities, as well as policy makers including members of the LCCMR and LSOHC.

Project completed: 6/30/2012

3.3 FINAL REPORT - MeCC V Supplemental - Minnesota Valley National Wildlife Refuge Fee Title Acquisition - Minnesota Valley National Wildlife Refuge Trust, Inc. ($325,000)

Project Outcome and Results

The Minnesota Valley Trust acquired 103 acres of priority lands in Scott County to expand the St. Lawrence Unit of the Minnesota Valley National Wildlife Refuge. Of the 103 acres acquired, 70 acres were acquired with Environment and Natural Resources Trust Fund and 33 acres were acquired with other private, non-state funds.

An additional 63.71 acres were acquired from two other landowners using other private, non-state funds as match of the ENRTF grant. Those acquisitions expand the Jessenland Unit of the Minnesota Valley Refuge in Sibley County. The total leverage to this project was 96.71 acres acquired using other, non-state funds.

These targeted acquisitions expand upon prior acquisitions funded in part by the Environment and Natural Resources Trust Fund, as recommended by the LCCMR. The parcels acquired are adjacent to or very near other lands protected by the Minnesota Valley Trust for the Minnesota Valley National Wildlife Refuge. All are within the expansion boundaries for the Refuge as identified through a public planning process by the US Fish and Wildlife Service and documented in the Refuge's "Comprehensive Conservation Plan."

After any needed restoration and enhancement, the lands will be donated to the USFWS for perpetual management as part of the Minnesota Valley National Wildlife Refuge. They will be managed for wildlife and open to the public for wildlife-dependent recreation, including hunting, fishing, wildlife observation, photography, wildlife interpretation and environmental education.

Project Results Use and Dissemination

The Minnesota Valley Trust will publicize the completion of this project through its website and news releases. All funding partners will be acknowledged on Refuge Unit kiosks, including the Environment and Natural Resources Trust Fund, as recommended by the Legislative Citizen Commission on Minnesota Resources.

Project completed: 6/30/2012

SUBD. 05 WATER RESOURCES

Evaluation of Dioxins in Minnesota Lakes
Subd. 05f $264,000

William Arnold
U of MN
Dept of Civil Engineering, 500 Pillsbury Dr SE
Minneapolis, MN 55455

Phone: (612) 625-8582
Email: arnol032@umn.edu
Fax: (612) 626-7750
Web: http://www.ce.umn.edu/directory/faculty/arnold.html

RESEARCH

Appropriation Language
$264,000 is from the trust fund to the Board of Regents of the University of Minnesota to examine the concentration of dioxins in lake sediment and options to improve water quality in lakes.

Overall Project Outcome and Results
Triclosan is an antimicrobial agent commonly detected in wastewater effluent. During water and wastewater disinfection with chlorine, triclosan can be transformed to a series of chlorinated triclosan derivatives. When discharged into surface waters, triclosan and its derivatives react in sunlight to form a series of four polychlorinated dibenzo-p-dioxins.

To evaluate the historical and current exposure of surface waters to triclosan, chlorinated triclosan derivatives, and their derived dioxins, sediment cores were collected from wastewater-impacted Minnesota lakes. Following radiometric dating, triclosan and chlorinated triclosan derivatives were extracted from core sections and quantified. Dioxins were extracted from the same core sections and also quantified.

The concentrations and temporal trends of triclosan, chlorinated triclosan derivatives, and their dioxins in aquatic sediments were found to be a function of historical wastewater treatment operations and lake system scale. Cores collected from large-scale riverine systems with many wastewater sources recorded increasing concentrations of triclosan, chlorinated triclosan derivatives, and their derived dioxins since the patent of triclosan in 1964. The trends were directly attributed to increased triclosan use, local improvements in treatment, and changes in wastewater disinfection practices. Concentrations of triclosan, chlorinated triclosan derivatives, and their dioxins were higher in small-scale systems, reflecting a greater degree of wastewater impact. In a lake receiving no wastewater influent, no triclosan was detected. Low levels of the four triclosan-derived dioxins were found in northern wastewater-impacted Minnesota lakes prior to the introduction of triclosan as well as in the lake with no wastewater input. The background levels of these dioxins were attributed to a secondary, region-specific source. Nonetheless, it is clear that triclosan is the major source of these dioxins after 1960. The contribution of the triclosan-derived dioxins to the total dioxin pool in terms of mass was determined for each sediment core. In heavily impacted systems, the dioxin contribution from triclosan and chlorinated triclosan derivatives accounted for up to 60% of total dioxin mass in recent sediment. Thus, the discharge of triclosan and chlorinated triclosan derivatives may pose a threat to wastewater-impacted lakes.

The findings of this work suggest that additional treatment of wastewater to remove triclosan, additional regulation of triclosan use, or dissemination regarding the prevalence of triclosan in consumer products may be necessary. Full results are presented in the M.S. Thesis of Cale T. Anger submitted with this report.

Project Results Use and Dissemination
This project led to the production of the M.S. Thesis of Cale T. Anger, Quantification of Triclosan,

Chlorinated Triclosan Derivatives, and their Dioxin Photoproducts in Lacustrine Sediment Cores. The thesis received the Distinguished Master's Thesis Award from the University of Minnesota, recognizing it as the best thesis at the U of MN for 2011-2012. A manuscript with the same title has been submitted to the peer reviewed journal Environmental Science & Technology. The results of the work have been presented at the American Chemical Society National Meeting, the St. Croix River Research Rendevous, the Itasca Water Legacy Project lecture series, and the Mississippi River Forum. Two more presentations at the American Society of Limnology and Oceangraphy and the IWA Micropol and Ecohazard conferences are planned. We anticipate press coverage of the findings upon publication of the peer-reviewed article.

Project completed: 6/30/2012

Assessment of Shallow Lake Management
Subd. 05g $262,000

Mark Hanson
DNR
Wetland Wildlife Group, 102 23rd Street NE
Bemidji, MN 56601

Phone: (218) 308-2283
Email: mark.hanson@dnr.state.mn.us
Fax: (218) 755-2604
Web: http://www.dnr.state.mn.us/wildlife/shallowlakes/index.html

RESEARCH

Appropriation Language
$262,000 is from the trust fund to the commissioner of natural resources to evaluate the major causes of deterioration of shallow lakes in Minnesota and evaluate results of current management efforts. This appropriation is available until June 30,2013, by which time the project must be completed and final products delivered.

Overall Project Outcome and Results
Minnesota's shallow lakes provide numerous direct human benefits such as clean water, hydrologic storage to limit flooding, recreational opportunities, and access to unique wild areas. They also contribute many valuable ecosystem services including carbon sequestration, habitat for native species, and unique recreational opportunities. Unfortunately, water and habitat quality of Minnesota's shallow lakes have deteriorated dramatically during the past century. Conversion from native upland covers, widespread wetland drainage and surface-water consolidation to facilitate agricultural and urban/residential development have been implicated as major causes for these changes. To facilitate better conservation of these areas, we studied approximately 140 shallow lakes in 5 ecological regions of Minnesota to:

- Identify major factors leading to deterioration.
- Evaluate results of specific lake restoration approaches, including cost-effectiveness of various combinations of lake management strategies.
- Assess the impacts of increased surface water connectivity on fish invasions and resulting habitat quality.

Our efforts included: comprehensive sampling of shallow lakes to identify direct and indirect causes of deterioration, evaluation of approximately eight lakes currently undergoing rehabilitation, and economic analyses to help managers identify which restoration strategies are likely to produce the greatest improvements in water quality and other lake characteristics per unit cost. Our key findings were as follows:

- High nutrient levels and dense populations of undesirable fishes favor water quality deterioration. These influences increase along a NE-SW gradient. Turbid lakes more often occur in prairie than in forested regions.
- Fish removal via rotenone, water control structures, and drawdowns improve water quality and wildlife habitat. Deteriorated conditions often recur; this underscores need for long-term approaches that reduce nutrient loading.
- Fish removal via rotenone and drawdown are effective methods for improving lakes in the short-term (5-10 years). Because improvements may not persist, watershed restoration to reduce nutrient loading is also necessary. More monitoring of rehabilitated lakes is necessary. Region-specific guidelines are not yet possible, but in-lake measures will be most beneficial in short-term, regardless of where lakes are located.
- Limiting surface connectivity is critical to controlling distribution of undesirable fishes including invasive species.

These findings were used to develop improved modeling and produced a series of recommendations to guide future efforts to maintain and rehabilitate shallow lakes throughout Minnesota. This information is being disseminated through future presentations and publications and through the Minnesota DNR Data Deli website (http://deli.dnr.state.mn.us).

Project Results Use and Dissemination

We anticipate preparation of 5-8 peer reviewed manuscripts to be developed from data gathering and analyses completed during the present study. We are also planning to develop a shallow lake workshop for lake managers and other conservation partners to be held in central Minnesota during July or August 2013. We expect to offer a day-long technical program that will center on results of the present LCCMR-funded research, allow discussion of lake rehabilitation strategies, and will offer opportunities for project managers and collaborators to present study findings directly to lake and landscape managers and other conservation partners in Minnesota. Presently, the Minnesota Chapter of the Wildlife Society has agreed to sponsor this workshop and to coordinate meeting and facilities requirements.

Results and synthesis from this work have been presented at annual meetings of the American Society of Limnology (Lake Biwa, Shiga, Japan, July 2012), the Ecological Society of America (Portland, Oregon, Aug 2012), and at various regional meetings of DNR staff and others. In addition, results have been distributed to DNR staff, other professionals, and the general public via annual project summaries from the Wildlife Research Unit, Minnesota DNR. We expect to develop 5-8 manuscripts for publication during the next 2-3 years.

Project completed: 06/30/2012

SUBD. 07 RENEWABLE ENERGY

Demonstrating Sustainable Energy Practices at Residential Environmental Learning Centers (RELCs)

Subd. 07d $1,500,000

MN COALITION OF RELCs
Web: http://www.earthsensealliance.org/

07d-1 ($350,000)
Joe Deden
Eagle Bluff Environmental Learning Center
28097 Goodview Dr
Lanesboro, MN 55949
Phone: (507) 467-2437
Email: director@eagle-bluff.org
Fax: (507) 467-3583
Web: http://www.eagle-bluff.org/

07d-2 ($206,000)
Bryan Wood
Audubon Center of the North Woods
P.O. Box 530
Sandstone, MN 55072
Phone: (320) 245-2648
Email: bwood@audubon-center.org
Fax: (320) 245-5272
Web: http://www.audubon-center.org/

07d-3 ($212,000)
Dale Yerger
Deep Portage Learning Center
2197 Nature Center Drive NW
Hackensack, MN 564529
Phone: (218) 682-2325
Email: portage@uslink.net
Fax: (218) 682-3121
Web: http://www.deep-portage.org/

07d-4 ($258,000)
Karl Brown
Laurentian Environmental Learning Center
8950 Peppard Road
Britt, MN 55710
Phone: (651) 621-6041
Email: karl.brown@moundsviewschools.org
Fax: (651) 621-7405
Web: http://www2.moundsviewschools.org/laurentian/

07d-5 ($240,000)
Todd Roggenkamp
Long Lake Conservation Center
28952 438th Lane

Palisade, MN 56469
Phone: (218) 768-4653
Email: todd@llcc.org
Fax: (218) 768-2309
Web: http://www.llcc.org/

07d-6 ($234,000)
Kimberly Skyelander
Wolf Ridge Environmental Learning Center
6282 Cranberry Road
Finland, MN 55603
Phone: (218) 353-7414
Email: director@eagle-bluff.org
Fax: (218) 353-7762
Web: http://www.wolf-ridge.org/

Appropriation Language
$1,500,000 is from the trust fund to the commissioner of natural resources for agreements as follows: $206,000 with Audubon Center of the North Woods; $212,000 with Deep Portage Learning Center; $350,000 with Eagle Bluff Environmental Learning Center; $258,000 with Laurentian Environmental Learning Center; $240,000 with Long Lake Conservation Center; and $234,000 with Wolf Ridge Environmental Learning Center to implement renewable energy, energy efficiency, and energy conservation practices at the facilities. Efforts will include dissemination of related energy education.

07d1: EAGLE BLUFF ENVIRONMENTAL LEARNING CENTER AND OVERALL PROJECT COORDINATION

Overall Project Outcome and Results
Minnesota's six accredited Residential Environmental Learning Center's undertook a collaborative project, "Today's Leaders for a Sustainable Tomorrow," with the intent of acting as a public resource for information regarding energy use and energy technologies. This was accomplished by demonstrating geographically appropriate technologies for reducing energy use and providing public access to energy information through formal education programs and a web presence. In-depth information on each center's energy reduction demonstrations are found in their individual reports. A bulleted summary of each demonstration is as follows:

- Eagle Bluff Environmental Learning Center - Lanesboro, MN: Installed deep energy reduction retrofit, solar thermal, and a solar hot water heater.
- Audubon Center of the North Woods - Sandstone, MN: Installed geothermal heat pump, solar arrays, solar panels, and a wind generator.
- Deep Portage Learning Center - Walker, MN: Installed wood gasification system and lighting upgrades (CFLs to LEDs and T12s to T8s).
- Laurentian Environmental Learning Center - Britt, MN: Installed building envelope improvements, energy conservation technologies, and a solar hot water heater.
- Long Lake Conservation Center - Palisades, MN: Installed building envelope improvements, a solar hot water heater, and lighting upgrades (trail lighting and T12s to T8s).
- Wolf Ridge Environmental Learning Center - Finland, MN: Installed biofuel heating system, solar arrays, wind generation, and lighting upgrades (trail lighting and T 12s to T8s).

Eagle Bluff implemented a deep energy reduction retrofit on its most inefficient building, the staff residence. The building was super insulated using the Cold Climate Housings Research Center's REMOTE

(Residence Exterior Membrane Outside-insulate Technique). Solar thermal heat was added for domestic hot water and building heating. A 5.6 Kw solar photovoltaic system provides green power for the heating system. As a result of the retrofit, the building became the 9th house in North America to receive ACI's 1000 Home Challenge for reducing energy consumption by over 78% A pdf describing the project is available from Eagle Bluff.

All centers collaborated in developing over 20 new units of educational curriculum based on the following seven areas: biomass, conservation, efficiency, energy basics, food and energy, solar power and wind power. An activity toolbox was designed for use at the RELC's and in the formal classroom. They range from formal lessons to informal tours to an energy choice challenge and are currently in practice at the RELC's collectively reaching nearly 60,000 visitors/students annually. In order to determine the efficacy of the educational materials and program, an external assessment was done which evaluated the knowledge and behaviors of visitors to the RELC who participated in the activities. The results showed that 88.5% of children and 50.6% of adults had an increase in knowledge and 70.2% of children and 52.6% of adults increased their energy conserving behaviors while visiting an RELC.

Project Results Use and Dissemination
Homeowners, commercial businesses, educators and the general public can access the educational materials, assessment results, demonstration information, and current energy use/production on the Today's Leaders for a Sustainable Tomorrow website at: www.tlfast.org.

In addition, this project has allowed the centers the opportunity to collaborate with Winona State University to offer an Energy Resource Advisor course which is part of Continuing Education program and a core course in WSU's Sustainability major.

Using the TLFAST demonstrations and curriculum as the framework, the centers are also now positioned to collaborate on an innovative program funded by the National Science Foundation which focuses on providing informal STEM (Science-Technology-Engineering-Math) experiences for K-12 students.

In the upcoming year and upon the total completion of the project, the centers' will be participating in tours, conferences, or workshops to share the success of the project and publicize the resources available to the public as a result of the project.

Project completed: 6/30/2012

07d2: AUDUBON CENTER OF THE NORTH WOODS

Overall Project Outcome and Results
As part of the coalition of Minnesota's residential environmental learning centers Today's Leaders for a Sustainable Tomorrow (TLFAST), the Audubon Center of the North Woods has made reducing our carbon footprint, through energy conservation, efficiency and renewable technologies, a top priority. We aim to serve as a sustainable energy demonstration site by modeling responsible energy usage and through energy offering energy curriculum for the nearly 10,000 participants that visit us every year. Through funding from the Environment and Natural Resources Trust Fund (ENRTF), we have been able to make strides in both of these directions. With our ENRTF grant, we hired an architecture and engineering firm to design the envelope improvements and solar hot water systems that would benefit several of our campus buildings. We contracted with local builders and installers to:

1. Improve the envelopes of our two largest buildings, the Dining Hall and Crosby Dormitory, through blown cellulose insulation, foam sealing air penetrations and weather stripping exterior doors.
2. Insulate the walls and roof as well as re-side and re-shingle our 100+ year old Wildlife Barn.
3. Insulate Nationally Historic Registered Schwyzer Lodge through blown cellulose insulation in the crawl spaces and attic, as well as vapor-line and foam-seal the open air basement.
4. Install a solar hot water system at our Dining Hall for hot water use in our kitchen and dining hall restrooms.
5. Install a solar hot water system at Crosby Dormitory for hot water use of showers and sinks in the dormitory rooms.

Through these energy improvements we anticipate savings 259,570 lbs. of carbon annually from reduction in propane and electricity usage. As part of TLFAST, we have helped to create 22 energy lessons to engage and inform students about energy issues and topics to be taught at the Audubon Center and outreach programs.

Project Results Use and Dissemination
Information about this project is disseminated through the TLFAST collective website at http://earthsensealliance.org/e_energy.php. We have written about this project in our past two Audubon Center of the North Woods newsletters, and have been leading energy tours for local groups for the past several months, highlighting the outcomes of the ENRTF grant. In the spring of 2011, we contacted our 80+ participating K-12 schools about the opportunity to pilot test the energy curriculum developed and had several schools participate. Information about the completed energy lessons has been sent to all participating schools as options for their on-site or outreach programs.

Project completed: 6/30/2012

07d3: DEEP PORTAGE LEARNING CENTER

Overall Project Outcome and Results Cass County, MN has installed a small wind turbine and solar hot water system and has made electrical and envelope improvements to the environmental education facility known as Deep Portage Learning Center. A $212,000 grant from the Environment and Natural Resources Trust Fund has made this possible. All of these systems have been installed, and we now have a year's worth of energy savings data. The 10 Kw small wind turbine has produced 4,200 Kw hours of electricity and has eliminated the emission of 10,080m lbs. of carbon dioxide. The solar hot water system has produced thousands of gallons of domestic hot water and displaced 1,400 gallons of fossil fuel propane. New LED (light-emitting diodes) lights, E Solutions refrigeration equipment and new Energy Star windows round out the project. These technologies are for demonstration and education. A new sustainable energy curriculum has been developed and piloted with several Minnesota schools. Five-hundred-plus people have now gone on a renewable energy tour at the center. This project shows our residents how to reduce our carbon footprint, save money. and support local jobs and industry. The electrical use at the Deep Portage Learning Center is now an astonishing 2.2 Kw hours per square foot annually. The Carbon footprint has been cut in half, and the total energy savings is $15,000-20,000 per year. This is a model that can be repeated at public schools and government buildings around the State.

Project Results Use and Dissemination
Information about this project will be disseminated in our center's newsletters, website and blogs, emails, and annual reports. It will also be discussed in all future New ERA training seminars held on-site at each center.

The Energy Resource Advisor (ERA) certificate, developed by Winona State University, is a new curriculum designed to accelerate public understanding of energy efficiency, clean energy, carbon emissions, resource conservation, green technologies, and green jobs. This curriculum is the first of its kind in Minnesota. It is a non-credit, continuing education course for adults 18 years of age and older, using online instructional technology combined with applied, field experience at one of the six RELCs. Participants in this class will learn about: a) the basic components of an energy audit, b) small-scale renewable energy including site suitability, system sizing, and financial incentives that are available, c) alternative building and transportation options, d) ways to "green up" the home or business, and e) the field of emerging "green" jobs. After completing this course, the successful participant may serve as an energy resource advisor and "green" consultant in the community and workplace.

Deep Portage has had over 200 participants attend renewable energy tours and has taught classes to elementary students in renewable energy. We have posted data on our Facebook page, and our website has a renewable energy toolbar with data on the accomplishments of the initiative. The TLFAST and LCCMR websites also feature information.

The collective website is up and running, www.tlfast.org/dplc.html. The six centers have collaboratively developed 22 units of curriculum for use by each center. These curricula integrate the use of the demonstrated sustainable energy practices at each of the centers. These lessons were pilot tested in all six centers this past spring, adjustments made over the summer, and are now all available for groups.

Project completed: 6/30/2012

07d4: LAURENTIAN ENVIRONMENTAL LEARNING CENTER

Overall Project Outcome and Results
In 2007, a McKinstry study was conducted at the six residential environmental learning centers in Minnesota to identify ways to reduce carbon, and energy consumption. The results of the study were used as the baseline carbon and energy use for Laurentian Environmental Center. This data was submitted as part of the LCCMR ENRTF grant request that focused on carbon reduction as a result of envelope improvements for the lodge and office buildings, and a solar hot water. In 2010, Laurentian Environmental Center (LEC) was awarded $258,000 from the ENRTF. In late early fall of 2010,an RFP was sent out for the design work of the project. Wagner Zaun Architecture of Duluth was selected to design and manage the project. A predesign site assessment determined the scope of work. A design package and RFP for the energy retrofit of the lodge and office was created, and sent out. Nelson Exteriors was selected to complete the project. The retrofit work included air sealing, insulation, high efficiency windows and doors, and mechanical improvements. Construction began in fall 2010, and was completed in spring 2011.

In spring 2011, design work for the solar hot water system was conducted by Wagner Zahn Architecture, and Conservation Technologies. Bid specifications were developed. Qualified contractors were identified, and invited to submit proposals. Innovative Power Systems was awarded the contract for the design and installation of the lodge solar hot water system, and Gruska Construction was awarded the contract for site preparation and slab installation. The slab was installed fall 2011. Solar installation occurred fall/winter 2011/2012.. The solar hot water system was fully operational in April 2012.. Innovative Power Systems designed and installed a solar hot water monitoring package that was below budget, and met the center needs.

The envelope improvements in the lodge and office have made a remarkable difference in the overall comfort of the buildings. Prior to the construction, it was difficult to maintain uniform temperatures. Air sealing, insulation, and operational windows have made the building extremely comfortable for groups and staff to use. Propane use in the lodge has dropped approximately 40%, due to a combination of burning more wood for heating, and the energy retrofit projects. Future energy monitoring and utility bills will likely yield continued reductions in carbon, and energy use.

Project completed: 6/30/2012

07d5: LONG LAKE CONSERVATION CENTER

Overall Project Outcome and Results
Minnesota's six Residential Environmental Learning Centers (RELC) including Long Lake Conservation Center (LLCC) teamed up to obtain grant funding to reduce their carbon footprints and provide energy education that focuses on renewable energy. In order to get the most value from the energy efficiency measures a study was conducted for each RELC. As a result, a series of recommendations were given to reduce carbon and energy consumption. Each RELC is unique, so recommendations varied between them. Specifically for LLCC, the recommendations were to improve the energy efficiency in campus buildings, convert campus lighting to solar and LED's, design and install solar energy sources for the Northstar Lodge and Dining Hall.

LLCC goals for this project were:

1. Increase conservation measures and energy efficiency in the targeted buildings.
2. Invest in renewable energy technology applications that LLCC currently does not have.
3. Use these conservation measures and renewable energy applications to educate users on making choices about conservation and renewable energy options that are applicable to their everyday lives.

All three goals have been met and the project was under budget.

In 10 years this collective education program will reach nearly 100,000 people who will attend LLCC and participate in its programs. This includes 55-60 K-12 schools annually and a number of other colleges and organizations who use LLCC.

The project is completed with the monitoring equipment installed and tested during the last week in June. Final installation and testing of the Solar Panel for the Dining Hall was completed in May, 2012. An issue with the Mille Lacs Energy Cooperative regarding the 3 Phase inverter was solved resulting in the final installation. The issue was technical in nature and the inverter's Manufacturer's specifications were submitted to Mille Lacs Energy Cooperative, which they approved. The experience could assist in future solar projects with the cooperative. Overall the project went very well. However, over the 4th of July Holiday, LLCC experienced a lightning strike that disabled the entire phone system and the Directors computer, where the monitoring software was loaded. Aitkin County IT Department has rebuilt the computer and has re-installed the system at LLC. The phone system was also just recently repaired.

Project completed: 6/30/2012

07d6: WOLF RIDGE ENVIRONMENTAL LEARNING CENTER

Overall Project Outcome and Results

In 2007, the six residential environmental learning centers (RELCs) of Minnesota organized a collaborative group naming themselves Today's Leaders For A Sustainable Tomorrow (TLFAST). The TLFAST group that collectively serves over 550 schools in the region and over 40,000 students annually, began an effort to raise the energy education capacity of each center, along with a stronger commitment to model sustainable energy practices. Needing a baseline to begin, the TLFAST group hired McKinstry Engineering in 2007 to conduct an energy audit of each facility and recommend the best efforts to reduce energy and/or carbon footprints at each center. The McKinstry recommendations were used as a basis for action items chosen to implement at each center. At Wolf Ridge Environmental Learning Center (WRELC), the ENRTF funding enabled four projects.

1. Installation of an energy monitoring system that provides data on the generation and total consumption of energy, both electrical and heating, in each building of the facility. Use of the system provides accurate information to instructors of conservation lessons while also providing maintenance personnel with data to focus on documented energy wasting conditions.
2. Upgrading the building envelopes in 5 buildings by replacing the worst insulating and sealing doors with a Curries Trio-E Door. This door product is one of the most energy efficient, highest performing commercial doors available. Following professional site evaluation and calculation, replacing the five doors will achieve savings of 125,034 kBtu or 42,673 kWh of energy. Four of the five doors are in buildings heated by wood, thus carbon neutral; at the fifth location, the door is calculated to conserve 2,888 kg of CO2.
3. Upgrade to energy efficient interior lighting by conversion of the last of the campus' T12 fluorescent fixtures, 106 total, to T8 technology; a reduction of 33% energy use, thus 33% reduction in carbon footprint. Also upgraded was the entire outdoor campus lighting system by replacing all 46 fixtures with LED lighting technology. This achieved a 74% reduction in energy consumption and carbon footprint for lighting at the center.
4. The addition of a solar domestic hot water heating system to the East Dormitory that houses 180 students. The installed system will supply 50% of the annual hot water need for the building occupancy while reducing the domestic hot water carbon footprint by 49%.

A fifth project was originally proposed and approved with the ENRTF funding, a recapture of waste heat from refrigeration systems in the center's kitchen, but following initial work on the project, expert opinion and consultation quickly revealed problems and the project was aborted following an approved amendment for redistribution of funds. The budgeted funds were moved into three of the other four projects.

As the project only recently concluded, data collection is not yet adequate to document the change in carbon footprint for the entire center, but examples listed above by project, provide via calculation the reductions in energy and/or carbon footprint. To further enhance the education effectiveness of these demonstrations, 24 energy education lessons were created with the ENRTF funding and have been implemented at the six respective centers.

Project Results Use and Dissemination

It is important within every energy sustainability learning experience that students' understand that to achieve energy sustainability the best investment value for the effort is to first begin with conservation, then move to increased efficiencies and finally to new renewable energy generation. Wolf Ridge chose and implemented projects that will demonstrate and be regularly used to teach all three concepts. On a daily basis our students will engage with energy efficient doors, view the trail in front of them lit by an energy efficient LED light fixture, see the panels that renewably generate the hot water for their shower, and learn from a monitoring system how much energy was used or conserved in their dormitory. These

are the learning experiences that occur simply by living at WRELC as a student for a week.

Immediately after the ENRTF funding was made available to the TLFAST group, the energy education specialists of the six centers met and outlined plans for over 20 new units of energy curriculum to be developed. Twenty-four new curricular units on energy were developed, pilot tested with students, refined, and written lesson plans were prepared with accompanying Minnesota graduation standards. Lessons were created for eight subject areas: biomass, climate change, conservation, efficiency, energy basics, food and energy, solar power and wind power. Developed lessons have been incorporated into curriculum in the following WRELC courses: Climate Change, Renewable Energy, and Conservation Challenge. All of the lessons as well as 19 point of action posters are available at the web site for free download, www.tlfast.org. The free and publicly available curriculum on the web site is also made available to the over 550 schools that attend the collective group of RELCs. See the comprehensive report from Eagle Bluff ELC that provides more detail on the educational dissemination of the collective effort of the six RELCs known collectively as TLFAST.

The fulfillment of the project as per its title became evident even before the project was complete. Not only are the participants in WRELC programs learning from the demonstrated installations, but also political leaders, agency staff of Minnesota and corporate business leaders. To date 123 people have come to tour and learn from the sustainable energy installations including: the Ambassador of Sweden, leaders of several different offices of the Minnesota Department of Natural Resources, staff of US Senator offices, native tribal leadership and corporate leaders interested in renewable energy. In program participation, WRELC recorded 13,084 participants last year on the WRELC campus, with another 10,843 in off site programs. The on-campus attendance is an extremely consistent number of students that are annually learning from these models of energy sustainable practices at WRELC. With support from the ENRTF, WRELC is changing how our future generations will see their own future. What is considered "cutting edge" to adults, is being learned and viewed by our children as behaviors and technologies that are simply "the appropriate way we live" in the 21st century. Through this project we have furthered established this transformation for thousands of Minnesota children each year.

Project completed: 6/30/2012

SUBD. 08 ENVIRONMENTAL EDUCATION

Connecting Youth with Nature
Subd. 08c $160,000

Carrol Henderson
DNR
500 Lafayette Rd, Box 25
St. Paul, MN 55155

Phone: (651) 259-5104
Email: carrol.henderson@dnr.state.mn.us
Fax: (651) 296-1811
Web: http://www.dnr.state.mn.us/eco/nongame/projects/digitalbridge.html

Appropriation Language
$160,000 is from the trust fund to the commissioner of natural resources to hold teacher training workshops on the use of digital photography as a tool for learning about nature. The equipment must be provided from other funds.

Overall Project Outcome and Results
Connecting Youth with Nature has successfully achieved it goals as initially proposed. The working title of the project was changed to the "Digital Photography Bridge to Nature" because there were federal agencies using the name "Connecting Youth with Nature" for other environmental education initiatives. Two statewide coordinators were hired under contract-one for the metropolitan region and one for greater Minnesota. Nine workshop facilitators were hired to deliver 80 Digital Bridge workshops over the course of the project. The kickoff teacher workshop was held on July 10 at Luverne, Minnesota, and was attended by 60 teachers. The keynote speaker was world-reknown National Geographic photographer Jim Brandenburg who grew up in Luverne, Minnesota.

A total of 40 camera kits of 12 cameras each and several field guides were purchased and assembled with additional funds provided by the Nongame Wildlife Program and the DNR Division of Parks and Trails. Additional cameras were purchased for use on "Photo safari" programs in State Parks.

For the 24 month period from July 10, 2010, through June 30, 2012, a total of 84 teacher workshops were carried out for a total of 1147 teachers. The goal of the project was to present 80 workshops reaching 1000 teachers in two years. In addition to facilitating teacher workshops, project facilitators have also gone into classrooms with teachers and taken the students on "photo safaris". A total of ten photos safaris were carried out with teachers with a total of over 500 students.

Workshop facilitators have been providing the camera kits to teachers so they can carry out their photo safaris after attending Digital Bridge workshops. The Nikon digital cameras selected for this project have been holding up very well to such intensive use. Only ten cameras out of 500 have been damaged beyond repair.

Project Results Use and Dissemination
Information on the Digital Photography Bridge to Nature project is available on the DNR website (http://www.dnr.state.mn.us/eco/nongame/projects/digitalbridge.html). Additional publicity on this project has been shared on local and state newspapers, radio, television, and the national Birdwatching magazine.

Project completed: 06/30/2012

Project Get Outdoors
Subd. 08h $15,000

Sara Grover
Project Get Outdoors, Inc.
Whitewater State Park, 19041 Hwy 74
Altura, MN 55910

Phone: (507) 951-5885

Email: sara.grover@yahoo.com
Fax: (507) 932-5938
Web: http://mnprojectgetoutdoors.org/

Appropriation Language
$15,000 is from the trust fund to the commissioner of natural resources for an agreement with Project Get Outdoors, Inc. to develop out of school programs connecting children to local nature experiences.

Overall Project Outcomes and Results
Project GO has developed a toolkit to help local communities design, implement, evaluate, and sustain free after-school and summer programs that introduce children to nearby public lands and outdoor activities and skills they can enjoy at these sites.

Through funds from the Minnesota Environment and Natural Resources Trust Fund, Project GO was able to assemble 50 Activity Backpacks and 32 Equipment Trunks for Project GO program leaders to use in their communities. Each program leader is issued a backpack to keep during their involvement with the Project GO program. The Activity Backpacks provide basic supplies to help leaders implement 100 or more different outdoor games, projects, and activities.

The Equipment Trunks focus on 16 different activities and are available for Project GO leaders to check out for free. These trunks are housed at Whitewater State Park for use in SE Minnesota and we anticipate the other set of 16 trunks will be housed out of Minneopa State Park for use by Project GO clubs in SW Minnesota.

At the time of this report, 14 backpacks have been issued. Equipment trunks are beginning to be checked out. Program leaders are excited to have these resources and so far, feedback has been very positive. The children are happy to have more diverse equipment and supplies to use while learning about the outdoors. We plan to evaluate the usefulness of these resources over the coming year via a program leader survey. One obstacle we are looking at is getting the equipment trunks to and from program sites that are farther from the storage site. We are hoping to develop a network of volunteer "runners" who would be reimbursed mileage for delivering and returning the equipment trunks when a GO site in a community such as Red Wing or Spring Grove desires to check out a trunk.

Project Results Use and Dissemination
The completed Activity Backpacks have already been issued to 14 sites. We will continue to help communities design Project GO programs that are unique as well as work with local staff at community organizations such as youth centers, school age child care programs, and other after school sites to introduce children in those programs to nature through our toolkit resources.

Since completing the assembly of the 50 Activity Backpacks and 32 Equipment Trunks, Project GO has formed a partnership with local public health and child care resource professionals to look at implementing our program into the larger child care centers that serve school age children during the after school hours. We are currently piloting this at a child care center in Caledonia and looking to work with two child care centers in Rochester. We will train the school age room staff at these centers to use our backpacks at least once a week. As an incentive for them to use the backpacks and journal their experiences, Project GO will provide a person to come out to their site no more than once a month to lead a hands-on nature activity using one of the Equipment Trunks. This new approach with child care centers will allow us to serve many more children. Project GO will be presenting at an upcoming Focus

on the Child conference in Rochester, sharing this information with child care providers from across the southern region.

A number of colleges and college professors in SE Minnesota have expressed enthusiasm to connect their students to service learning, internship, and practicum experiences with Project GO. We have found that college students bring great enthusiasm to the program which the children really enjoy and in exchange Project GO is able to provide real world learning experiences for these students.

We are already looking to secure additional funds to purchase more backpacks, as we anticipate the first 50 will be issued within a year. The US Fish & Wildlife Service Winona District is eager to help us acquire another batch of backpacks.

Project completed: 11/16/2010

Online Field Trip of Minnesota River
Subd. 08k $124,000

Kimberly Musser
MN State University - Mankato
184 Trafton Science Center S
Mankato, MN 56001

Phone: (507) 389-5492
Email: kimberly.musser@mnsu.edu
Fax: (507) 389-5493
Web: http://mrbdc.mnsu.edu

Appropriation Language
$124,000 is from the trust fund to the commissioner of natural resources for an agreement with Minnesota State University - Mankato to develop online educational materials on the Minnesota River for schools and outreach centers.

Overall Project Outcome and Results
Considerable public funding and effort has gone into better understanding and restoring the Minnesota River. Research about the river is housed in an array of scientific publications not easily accessible for the public. This project helps to bridge the information gap between researchers and the public and to generally improve environmental education about the river. The project's goal is to increase public awareness about the river's health by using new media techniques to engage students and the public.

Major results included 1) developing and delivering the "Ask an Expert about the Minnesota River" website and 2) performing educational outreach. This project developed a multi-media virtual field trip with accompanying educational materials to showcase what scientists are learning about the Minnesota River. Citizens have a unique opportunity to learn directly from natural resource experts about the current state of the Minnesota River. Video clips of interviews and related information are available online on the Minnesota River Basin Data Center website: http://mrbdc.mnsu.edu/learn.

Online Educational Website - Ask an Expert about the Minnesota River
Video clips of scientist and citizen experts answering questions about the river's health are the central

feature of the website enriched by accompanying handouts, and graphics. Specifically, the major features of the website include:

- 171 video clips of experts answering questions;
- 27 handouts with background information developed to enrich each theme;
- 9 panoramic virtual tours and 20 slideshows;
- 5 educator's guides and 7 accompanying PowerPoint presentations on prairies, wetlands, agriculture, fish, and mussels.

Educational outreach and learning stations

Four computer kiosks (learning stations) were installed at key educational centers across the basin - specifically Treaty Site History Center in St. Peter, MN; Regional River History Center in New Ulm, MN; Ney Nature Center in Henderson, MN; and Clean Up the River Environment (CURE) office in Montevideo, MN - likely reaching 4,000-8,000 people in the upcoming year. Open houses at the four educational centers and other events directly reached approximately 349 people during the project period. Four school classroom presentations reached approximately 371 students.

Project Results Use and Dissemination

The broad dissemination goals for the project are to share data with the public, students and teachers through both traditional and nontraditional outreach methods. The dissemination of this project proceeded at several levels. All the project data is available on the web in a user-friendly format. Computer kiosks (learning stations) highlighting the project were developed and installed in four key river and history centers across the basin. We also conducted outreach to three schools and four educational centers that included presentations and open houses. We have also used social media resources such as Facebook and YouTube to disseminate information about the project.

We worked collaboratively with a wide range of state and local agencies (MPCA, MDNR, Department of Agriculture, etc.) and citizen organizations (CURE, Ney Nature Center, Nicollet County Historical Society) to develop and publicize the project. Project staff have spoken about the project to local and state officials and staff, nonprofit organizations, teachers and students, and citizens. The project has received attention at scientific meetings (both poster session in 2011 and presentation in 2012 at the Minnesota Water Resources Conference) and educational training (DNR Naturalists). The project team plans to continue outreach to schools and putting on public events to promote the project and further raise public awareness about the Minnesota River.

Project completed: 06/30/2012

M.L. 2009 Projects Completed 2011-2012

MN Laws 2009, Chapter 143, Section 2

M.L. 2009 Projects Completed 2011-2012

M.L. 2009 Projects
MN Laws 2009, Chapter 143, Section 2 (beginning July 1, 2009)

NOTE: Below are short abstracts for projects funded during the 2009 Legislative Session and ending during 2011-2012. The final date of completion for these projects is listed at the end of the abstract. Final Reports for all completed projects are available at http://www.lccmr.leg.mn/projects/2009-index.html or by contacting the LCCMR office.

Subd. 03 Natural Resource Data and Information

03a Minnesota County Biological Survey
03b County Geologic Atlas and South-Central Minnesota Groundwater
03c Soil Survey
03d Springshed Mapping for Trout Stream Management
03e Restorable Wetlands Inventory

Subd. 04 Land, Habitat, and Recreation

04a State Parks Acquisition
04b State Trail Acquisition
04d Statewide Scientific and Natural Area Acquisition and Restoration
04e Minnesota's Habitat Conservation Partnership (HCP) - Phase VI
04f Metro Conservation Corridors (MeCC) - Phase V
04g Statewide Ecological Ranking of Conservation Reserve Program (CRP) and Other Critical Lands
04h Protection of Granite Rock Outcrop Ecosystem
04i MN Farm Bill Assistance Project

Subd. 05 Water Resources

05d Intensified Tile Drainage Evaluation - RESEARCH
05e Citizen-Based Stormwater Management
05f Minnesota Drainage Law Analysis and Evaluation

Subd. 06 Aquatic and Terrestrial Invasive Species

06a Ballast Water Sampling Method Development and Treatment Technology - RESEARCH
06b Emergency Delivery System Development for Disinfecting Ballast Water - RESEARCH
06c Improving Emerging Fish Disease Surveillance in Minnesota - RESEARCH

Subd. 07 Energy

07b Projecting Environmental Trajectories for Energy-Water-Habitat Planning
07c Energy Efficient Cities

Subd. 08 Administration and Other

08a Contract Management
08b Legislative-Citizen Commission on Minnesota Resources (LCCMR)

SUBD. 03 NATURAL RESOURCE DATA AND INFORMATION

Minnesota County Biological Survey
Subd. 03a $2,100,000

Carmen Converse
DNR
500 Lafayette Rd
St. Paul, MN 55155

Phone: (651) 259-5083
Email: carmen.converse@dnr.state.mn.us
Fax: (651) 296-1811
Web: http://www.dnr.state.mn.us/eco/mcbs/index.html

Appropriation Language
$2,100,000 is from the trust fund to the commissioner of natural resources for continuation of the Minnesota county biological survey to provide a foundation for conserving biological diversity by systematically collecting, interpreting, and delivering data on plant and animal distribution and ecology, native plant communities, and functional landscapes.

Overall Project Outcome and Results
Since 1987 the Minnesota County Biological Survey (MCBS) has systematically collected, interpreted and delivered baseline data on the distribution and ecology of plants, animals, native plant communities, and functional landscapes in 81 of 87 counties. MCBS has added 19,089 new records to the Rare Features Database and contributed 4,544 of the 9,634 total database records to the Releve (vegetation sampling) Database. Rare aquatic plant and vegetation surveys were completed for 1,764 lakes. Statewide 9,713 MCBS Sites of Biodiversity Significance and 58,957 polygons of native plant communities are now publically available on DNR's Data Deli.

During this project period, northeastern surveys documented features within large functional landscapes of fire-dependent forests, cliff and talus complexes, and undeveloped lakes. Surveys began in a portion of the northern patterned peatlands, one of the state's largest (about 2.5 million acres) and most inaccessible ecological systems. Surveys included successful collaboration with Red Lake Reservation DNR managers and University of Minnesota researchers.

New range distributional data were recorded for Braun's holly fern (Polystichum braunii), Laurentian tiger beetle (Cicindela denikei), Black-throated Blue Warblers (Setophaga caerulescens) and three species of mosses.

MCBS data on the locations of native prairie were a centerpiece of a plan: Minnesota prairie conservation plan 2010: a habitat plan for native prairie, grassland, and wetlands in the Prairie Region of western Minnesota. See also: Minnesota's Remaining Native Prairie 100 Years After the Public Land Survey.

MCBS provided data and interpretation to inform management and monitoring activities in the Manitou and Sand Lake Seven Beavers Collaboratives- two large multi-jurisdictional landscapes.

DNR's Forest Certification implementation used a MCBS data access tool to assist in evaluation of data related to High Conservation Value Forests.

Maps of the Minnesota locations of 242 breeding birds based on observations by MCBS are on the web: Bird Distribution Maps.

Project Results Use and Dissemination
Data delivery includes delivery of information to local units of government, presentations and field trips, publications and web products. Several examples of recipients of data during this period include: St Louis County, Becker County, State Parks, northeast Landscape Collaboratives, Potlatch, Hamden Slough National Wildlife Refuge, Voyageurs National Park, Heron Lake Watershed District, and private landowners near the Chandler, MN Chanarambie Creek Prairies. See Final Report for additional information.

Project completed: 06/30/2011

County Geologic Atlas and South-Central Minnesota Groundwater
Subd. 03b $2,695,000

Part 1: County Geologic Atlas and South-Central Minnesota Groundwater ($820,000)
Dale Setterholm
Minnesota Geological Survey
2642 University Ave. W.
St. Paul, MN 55114-1057

Phone: (612) 627-4780 x223
Email: sette001@umn.edu
Fax: (612) 627-4778
Web: http://www.mngs.umn.edu/county_atlas/countyatlas.htm

Part 2: County Geologic Atlas and South-Central Minnesota Groundwater ($1,875,000)
Jim Berg
DNR
500 Lafayette Road
Saint Paul, MN 55155

Phone: (651) 259-5680
Email: jim.berg@dnr.state.mn.us
Fax: (651) 296-0445
Web: http://www.dnr.state.mn.us/waters/groundwater_section/mapping/index.html

Appropriation Language
$2,695,000 is from the trust fund for collection and interpretation of subsurface geological information and acceleration of the county geologic atlas program. $820,000 of this appropriation is to the Board of Regents of the University of Minnesota for the geological survey to continue and to initiate the production of county geologic atlases. $1,875,000 of this appropriation is to the commissioner of natural resources to investigate the physical and recharge characteristics of the Mt. Simon aquifer.

This appropriation represents a continuing effort to complete the county geologic atlases throughout

the state. This appropriation is available until June 30, 2012, at which time the project must be completed and final products delivered, unless an earlier date is specified in the work program.

PART 1: Minnesota Geological Survey

Overall Project Outcome and Results
County geologic atlases support water and mineral resource management and education. An atlas provides maps and databases at scales appropriate for land use planning and water management decisions. An atlas greatly improves our ability to monitor the resource, to predict the effects of pumping, and to respond effectively to contamination. This project created atlases for Anoka and Wright counties in paper, digital, and web-accessible formats. Copies will be provided to LCCMR and the counties, and workshops will be held to train users.

Geologic maps describe the distribution of earth materials that determine where water can enter the ground (become ground water), where it can be taken from the ground (aquifers), and how aquifers connect to rivers, lakes, and wetlands. Each geologic atlas contains these parts:

1. Database map: shows the location of all well records, borings, scientific drilling, natural exposures, and geophysical measurements used to support the atlas. The databases are also provided.
2. Surficial Geology map: shows the earth materials immediately beneath the soil zone, and describes their composition and ability to convey water. The surface described by this map is the interface between human activities and ground water. Its character determines to a great degree the sensitivity of ground water to contamination.
3. Glacial Stratigraphy and Sand Distribution Model: A series of maps show the location, depth, and thickness of sand or gravel bodies (aquifers) in glacial materials. This map is useful in finding a water source, determining pumping effects, and in understanding the results of water monitoring.
4. Bedrock Geology map, bedrock topography map: These maps describe the location and type of bedrock present, and its ability to host and transmit groundwater. The contacts between layers of sedimentary rock are mapped as digital surfaces and this enables numerical simulations of the ground water system that can predict the effects of pumping before wells are drilled.

Project Results Use and Dissemination
Geologic atlases support informed decision-making. They are applied to wellhead protection, water appropriation decisions, well field design, onsite water treatment design, facility siting, monitoring, and remediation of contamination. The atlases are printed, and also provided in several digital formats for electronic use including geographic information systems. When the atlases are complete we hold workshops in the county to explain the products and their uses.

Project completed: 06/30/2012

PART 2: MN Department of Natural Resources

Overall Project Outcome and Results
Most data collected for the Mt. Simon - Hinckley aquifer Phase 2 study were derived from 16 wells installed at 10 locations to depths of 100 to 695 feet in McLeod, Wright, Hennepin, Sherburne, Anoka, and Isanti counties. In the Phase 2 area chemical residence time indicators from the Mt. Simon aquifer indicate groundwater ages less than approximately 1,000 years in eastern Wright and Sherburne

counties and northern Isanti County. These relatively young groundwater ages are consistent with water level and stratigraphic information that indicate both direct and indirect connection of surface water to the Mt. Simon- Hinckley aquifer through localized focused recharge.

This project has shown that the most critical recharge area for the Mt. Simon-Hinckley aquifer and Minneapolis-St. Paul metropolitan area water supply includes portions of Wright, Sherburne, and Isanti counties. Protection of this region from water pollution should be a high priority for all levels of government. Continued monitoring of wells installed for this investigation will create a long term record that can be used to interpret changes in local and regional water supply due to water use or climate changes.

The County Geologic Atlas, Part B, portion of this project supported the completion of three and the initiation of six Part B atlases in the County Geologic Atlas series that the DNR prepares in collaboration with the Minnesota Geological Survey. Each Part B atlas provides groundwater maps, data describing aquifer properties and use, analytical results of groundwater chemistry sampling including age-dating samples, and interpretation of pollution sensitivity. All of these maps and data are used to meet many environmental information and protection needs, including resource protection planning, water resource management, water appropriation permitting, contamination mitigation, education, among others. The Todd, Carlton, and Benton Part B atlases were completed and the Carver, McLeod, Chisago, Blue Earth, Nicollet, and Sibley Part B atlases were initiated.

Project Results Use and Dissemination
The reports from this project have been available on the DNR website since the summer of 2012. The Mt. Simon project was presented as a poster at the Midwest Groundwater Association meeting in Minneapolis in October 2012. We are currently producing a short (15 minute) video highlighting some of the results of the project for presentation at future meetings and for general viewing on the internet. In addition, a summary of the project will be submitted to the Minnesota Groundwater Association for inclusion in the quarterly newsletter.

The well log and well construction information is currently available in the project report and the Minnesota Department of Health County Well Index (http://mdh-agua.health.state.mn.us/cwi/cwiViewer.htm). The wells have become part of the DNR observation well network. Water level data is currently available at: http://climate.umn.edu/ground_water_level/.

Publication of Part B atlas reports include preparation and printing of the County Geologic Atlases, Part B, and delivery of printed reports to the county; preparation and delivery of Part B materials to MGS for inclusion in a DVD version of each completed project that incorporates geographic information system (GIS) files, database files, pdfs, and additional digital products. When each atlas Part B is completed a training workshop for the county and local users is held to explain the results and how the maps, data, and other information can be used to assist local water resource programs. To reach other users and audiences program staff contributed newsletter articles and presented talks and posters at conferences. Completed digital products are posted on DNR webspace at http://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html. Printed reports are available for sale through MGS Map Sales at http://www.mngs.umn.edu/mapsales.html.

Project Publication:
South-Central Minnesota Groundwater Monitoring of the Mt. Simon Aquifer - Phase 2

Project completed: 06/30/2012

Soil Survey
Subd. 03c $400,000

Megan Lennon
BWSR
520 Lafayette Road N
Saint Paul, MN 55155

Phone: (651) 296-1285
Email: megan.lennon@state.mn.us
Fax: (651) 297-5615
Web: http://www.bwsr.state.mn.us and http://soils.usda.gov/survey/online_surveys/minnesota/

Appropriation Language
$400,000 is from the trust fund to the Board of Water and Soil Resources to accelerate the county soil survey mapping and Web-based data delivery. This appropriation represents a continuing effort to complete the mapping. The soil surveys must be done on a cost-share basis with local and federal funds.

Overall Project Outcome and Results
Accurate soils information is essential for evaluating the potential for land to support development, crop and forest production, and for identifying the most suitable locations for conservation practices and other land uses. Readily accessible local soil information is critical to informing conservation decisions and provides a foundation for sustainable land use planning. The soil survey is the mechanism for how this basic natural resource information is made available to land use authorities and landowners to make the best land use decisions.

In the ongoing, multi-year project to map, classify, interpret, and Web-publish an inventory of the soils of Minnesota, this two-year phase of the project focused on accelerating the completion of a Statewide soil survey, increase soil mapping in targeted areas, and enhancing soils data through increased sample collection, availability and interpretation. Specifically:

- 330,000 acres mapped in Crow Wing County;
- 32,000 acres mapped in Pine County;
- 85,000 acres mapped in Koochiching County;
- 80,000 acres mapped in the Crane Lake subset of St. Louis County;
- 219,000 acres mapped in Lake County;
- 114,000 acres mapped in Cook County;
- Data from 1,000 soil samples (some dating back to the 1970's) were interpreted for the first time and incorporated into Soil Surveys for many Minnesota counties;
- Land use effects on soil carbon were determined on 122 sites in 14 counties throughout the State; this data can be used to develop soil carbon management guidance.

The soil survey project was extremely successful and many of the mapping goals were exceeded. Mapping surpassed initial acreage goals in both Crow Wing, Lake, Cook and Pine Counties, and the soil surveys for Koochiching and St. Louis Counties were completed 1 year ahead of schedule. A report

detailing the results of re-analysis of lab samples from the 1970's highlighting land use impacts on soil carbon is available below and on BWSR's State Soil Office website.

Project Results Use and Dissemination
The Soil Survey project funded by the Minnesota Environment and Natural Resources Trust Fund is highlighted as a BWSR feature project on the Agency's home page. All the data, mapping information, and interpretations are available on the Web Soil Survey as a user-friendly, GIS-based application. Web Soil Survey provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world.

Project Publication:
Historical C Project Report on land use impacts on soil carbon

Project completed: 06/30/2011

Springshed Mapping for Trout Stream Management
Subd. 03d $500,000

Part 1: Springshed Mapping for Trout Stream Management ($250,000)
E. Calvin Alexander, Jr.
U of M
310 Pillsbury Dr. Se
Minneapolis, MN 55455

Phone: (612) 624-3517
Email: alexa001@umn.edu
Fax: (612) 625-3819

Part 2: Springshed Mapping for Trout Stream Management ($250,000)
Jeff Green
DNR
2300 Silver Creek Rd NE
Rochester, MN 55906

Phone: (507) 206-2853
Email: jeff.green@dnr.state.mn.us
Fax: (507) 285-7144

Appropriation Language
$500,000 is from the trust fund to continue to identify and delineate supply areas and springsheds for springs serving as coldwater sources for trout streams and to assess the impacts from development and water appropriations. Of this appropriation, $250,000 is to the Board of Regents of the University of Minnesota and $250,000 is to the commissioner of natural resources.

PART 1: University of Minnesota

Overall Project Outcome and Results
Native trout require clean, cold water that usually originates from springs, but the springs feeding the 173 designated trout streams in southeastern Minnesota are under increasing pressure from current and expected changes in land use. This joint effort by the University of Minnesota and the Minnesota Department of Natural Resources continued an ongoing effort begun in 2007 that is working to identify and map the springs and the areas that feed water to these springs and to learn how these waters might be affected by development and water use.

Springshed delineation provides critical information for the protection and management of the springs that form the coldwater streams of southeast Minnesota. Our primary tool is fluorescent dye tracing. During the two-year period of Phase II, the U of M in collaboration with the DNR conducted 26 traces in Fillmore, Houston, Winona and Wabasha counties that mapped over 12,000 acres. Each individual trace typically has involved two or more different tracers with up to five different tracers employed in one trace. These traces are expanding the tools available for the springshed mapping, while defining new springsheds and refining the boundaries of known springsheds. These traces have been conducted in the Galena, Prairie du Chien and St. Lawrence springshed areas. Additionally, data monitoring equipment was also added as an additional component in this phase. The availability of new, high resolution LiDAR data also provided an important new tool that is being utilized to locate sinkholes, sinking streams, and spring as part of the springshed mapping effort.

We coordinated our efforts with other LCCMR funded programs in SE Minnesota and with ongoing resource management efforts by the DNR, MPCA and Agriculture Department State agencies. Six of the dye traces were done in coordination with local governmental staff in order to support the Root River pilot project of the Mississippi River Basin Initiative (MRBI) in Minnesota. We are working with the MPCA's TMDL efforts in SE Minnesota.

Project Results Use and Dissemination
The dissemination of the results of this project proceeded at several levels. We provided interim results to local landowners and to local, county, regional, and state agency staff and resource managers. MPCA staff, for example, routinely contact us with questions about karst features in SE Minn. We worked synergistically with other LCCMR funded research projects and with a range of resource management efforts. The generation and dissemination of the maps and written reports was part student educational projects - including local high school students, university students, interns, graduate student theses, post Doctoral researchers, and various colleagues. We lead and participated in fieldtrips sponsored by LCCMR, the MGWA, and other groups focused on protecting SE MN trout streams and water resources. We worked collaboratively with MPCA, DNR, Department of Agriculture and other agencies to expand and complement the LCCMR funded work. A dozen reports on the interim results of this project were presented at state and national scientific meetings.

Project completed: 06/30/2011

PART 2: MN Department of Natural Resources

Overall Project Outcome and Results
Springshed delineation provides critical information for the protection and management of the springs that form the coldwater streams of southeast Minnesota. Our primary tool is fluorescent dye tracing. During the two-year period of Phase II, DNR (in cooperation with the U of M) conducted 26 traces in Fillmore, Houston, Winona and Wabasha counties that mapped over 12,000 acres.

The Fillmore County traces were in the Galena Formation. We discovered three previously unmapped springsheds and expanded the boundaries of five known springsheds. The expanded boundary springsheds were in the Watson Creek and South Fork Root watersheds, target areas for the local, state and federal Root River Initiative. The new springsheds are in the Crystal Creek watershed. These traces enhanced MDA watershed research and education efforts.

The traces in Houston, Winona and Wabasha were in the St. Lawrence Formation. This work expanded the geographic range of St. Lawrence traces and demonstrated that conduit flow in the St. Lawrence (a confining unit in the state well code) is a regional phenomenon. Four new springsheds were located in the St. Lawrence. Two of the traces in Houston County were run from streams that do not disappear into the St. Lawrence but flow continually across it. Both of those traces were detected at springs and one was detected in a private well. This indicates that St. Lawrence groundwater across southeast Minnesota could be impacted by the surface water quality of streams crossing the formation in shallow conditions.

Solinst level-temperature-conductivity loggers were purchased in the second year of the project. The data from them has shown that Prairie du Chien formation springs can be monitored for minor temperature fluctuations. Detecting these fluctuations has allowed us to conclude that the monitored springs are affected by snowmelt runoff. This information will be used for spring assessment protocol development.

Project Results Use and Dissemination
The project manager has spoken about the project and its results to local, state and federal officials, citizen groups, anglers, local, state and federal agency staff, and met one-on-one with numerous landowners. Project results are part of the base data for Root River Initiative watershed management efforts in the Watson Creek and Rush Pine watersheds. MPCA staff are using the maps as part of their nitrate-TMDL development. MDA staff are using the springshed maps to modify their watershed research in the Crystal Creek watershed. The project was featured on MPR when a reporter accompanied the project manager on a spring snowmelt runoff dye trace near Canton, MN. Two traces were conducted in cooperation with the earth science class at Fillmore Central High School in Harmony. The students assisted with dye input and sampling.

Project completed: 06/30/2011

Restorable Wetlands Inventory
Subd. 03e $300,000

Darin Blunck
Ducks Unlimited, Inc.
2525 River Road
Bismarck, ND 58503

Phone: (701) 355-3500
Email: dblunck@ducks.org
Web: http://prairie.ducks.org/index.cfm?&page=minnesota/restorablewetlands/home.htm

Appropriation Language
$300,000 is from the trust fund to the commissioner of natural resources for an agreement with Ducks Unlimited, Inc., to complete the inventory, mapping, and digitizing of drained restorable wetlands in Minnesota. This appropriation is available until June 30, 2012, at which time the project must be completed and final products delivered, unless an earlier date is specified in the work program.

Overall Project Outcome and Results
The Restorable Wetlands Inventory (RWI) is a complement to the National Wetlands Inventory (NWI) completed in late-1980s by the U.S. Fish & Wildlife Service. An administrative decision was made developing the original NWI not to map wetland basins in Minnesota identified as completely drained. The number and acreage of completely drained wetlands that were not mapped by the NWI process is significant. In Pope County alone, 25,000 acres of completely drained wetland acres were missed in the NWI mapping process - nearly 19% of the total wetland resources in that county. The RWI project identifies and digitizes the completely-drained depressional wetlands that were not mapped by the NWI process. Restorable wetlands mapping is based upon protocols established for NWI allowing seamless integration of the two datasets.

The 2009 Environment and Natural Resources Trust Fund appropriation provided the last project funding needed to complete, remaining RWI mapping for the glaciated, tallgrass prairie region of Minnesota - an additional 6,120 square miles. The mapping occurred in approximately 178 townships in Clay, Mahnomen, McLeod, Meeker, Nicollet, Norman, Renville, Sibley, Wilkin, and Wright Counties.

In the Red River Valley Complex, over 132,000 individual restorable wetland basins were identified and mapped. In the Prairie-Hardwood Complex, almost 131,000 individual restorable wetland basins were identified and mapped.

As in previous phase of the mapping project, partners included the LCCMR, Ducks Unlimited, Inc., and the U.S. Fish and Wildlife Service. The photo-interpretation and digitization work was contracted to the GIS Lab at South Dakota State University.

The attached "Restorable Wetlands Inventory: Final Status Map" displays the counties and townships that were completed under the M.L. 2008, M.L. 2009, and prior appropriations.

Data will be distributed on the web via the Minnesota GIS Data Deli (http://deli.dnr.state.mn.us) and the Ducks Unlimited, Inc. (http://www.ducks.org) websites.

Project completed: 06/30/2012

SUBD. 04 LAND, HABITAT, AND RECREATION

State Parks Acquisition
Subd. 04a $590,000

Jennifer Christie
DNR
500 Lafayette Rd

St. Paul, MN 55155

Phone: (651) 259-5633
Email: jennifer.christie@state.mn.us
Web: http://www.dnr.state.mn.us/state_parks/index.html

Appropriation Language
$590,000 is from the trust fund to the commissioner of natural resources to acquire in-holdings for state parks. Land acquired with this appropriation must be sufficiently improved to meet at least minimum management standards as determined by the commissioner of natural resources. A list of proposed acquisitions must be provided as part of the required work program.

Overall Project Outcome and Results
The Environment and Natural Resources Trust Fund funding allowed for the following:

- Ownership of approximately 87 acres in the Cuyuna Country State Recreation Area. Acquisition of this parcel provides for unified ownership of park-managed land and includes a key access point into the recreation area. This parcel also has over one mile of water frontage on three lakes within the recreation area.
- Ownership of a 17-acre parcel in Whitewater State Park. Acquisition of this parcel provides protection on the Whitewater River and adjacent to the park visitor center. The current trail system lies close to the boundary and could now be extended for additional river resource interpretation. The parcel also provides a natural buffer between the visitor center and private development.
- Ownership of approximately 20 acres of land in Nerstrand Big Woods State Park due to partially funding from the Trust Fund. This property is identified by Minnesota County Biological Survey as having outstanding biodiversity significance and has not been logged in over 100 years. The spring ephemerals prevalent in this area of the park are now protected. The site is also key to maintaining the closed canopy and diverse understory characteristic of 'big woods' in Nerstrand Big Woods State Park.

All acquisitions were from willing sellers, and located within the statutory boundary of state parks.

Project completed: 06/30/2012

State Trail Acquisition
Subd. 04b $1,000,000

Jennifer Christie
DNR
500 Lafayette Rd
St. Paul, MN 55155

Phone: (651) 259-5633
Email: jennifer.christie@state.mn.us
Web: http://www.dnr.state.mn.us/state_trails/index.html

Appropriation Language
$1,000,000 is from the trust fund to the commissioner of natural resources to assist in the acquisition of

the Brown's Creek Segment of the Willard Munger Trail in Washington County and Paul Bunyan State Trail in the city of Bemidji.

Overall Project Outcome and Results
The Environment and Natural Resources Trust Fund funding allowed for the following:

- Ownership of approximately 1.25 miles of the Paul Bunyan State Trail. Acquisition of this property provided for the necessary connection to the Paul Bunyan State Trailhead on the southeastern corner of Lake Bemidji. The property is comprised entirely of former industrial property, located adjacent to the shoreline of Lake Bemidji. The 2009 Trust Fund appropriation amount partially funded this acquisition.
- Ownership of approximately 6 miles of the Browns Creek Segment of Munger State Trail. The property is comprised entirely of the right-of-way of the former Minnesota Zephyr Dinner Trail and traverses the margins of the St. Croix River floodplain adjacent to T.H. 95, the gently to steeply sloping bluffs of the river valley and gently rolling uplands that are interspersed with residential and commercial development. The 2009 Trust Fund appropriation amount partially funded this acquisition.

Project completed: 06/30/2012

Statewide Scientific and Natural Area Acquisition and Restoration
Subd. 04d $590,000

Peggy Booth
DNR
500 Lafayette Rd, Box 25
St Paul, MN 55155

Phone: (651) 259-5088
Email: peggy.booth@dnr.state.mn.us
Fax: (651) 296-1811
Web: http://www.dnr.state.mn.us/eco/sna/index.html

Appropriation Language
$590,000 is from the trust fund to the commissioner of natural resources to acquire high quality native plant communities and rare features and restore parts of scientific and natural areas as provided in Minnesota Statutes, section 86A.05, subdivision 5. A list of proposed acquisitions must be provided as part of the required work program.

Overall Project Outcome and Results
Acquisition and SNA designation of five properties at three SNAs was completed permanently protecting and providing for public use of 207.32 acres (pro-rated as 106.4 acres with this appropriation). Acquisitions include the following:

- A new SNA was established with acquisition of the 14.72-acre Morton Outcrops SNA - the heart of a 65-acre exceptional and geologically significant Minnesota River valley rock outcrop site with seven rare species - located in Redwood County.
- Two additions totaling 105.7 acres (pro-rated as 50.3 acres for this appropriation) to the Hastings Sand Coulee SNA were acquired; along with a 78-acre adjoining tract transferred from

DNR Wildlife, these acquisitions mean that 267 acres is now protected as SNA out of the ~500-acre sand coulee area which is the largest remaining sand prairie complex in Dakota County and is home to 14 rare species including three snakes and two butterflies.

- Two native prairie sites were added to Blanket Flower Prairie SNA in Clay County which now protects about 430 acres of habitat for 106 bird species including the greater prairie chicken: a 14-acre addition was acquired with this appropriation; and the 135.9-acre Ole Huseby Homestead addition to Blanket Flower Prairie SNA was acquired in part with this funding (pro-rated as 27.4 acres for this appropriation).

A total of 563 acres at 27 SNAs across the state received restoration and enhancement work, plus development projects were completed at 17 SNAs, thus increasing the native habitat quality and public use of these SNAs. In summary:

- One 11-acre prairie reconstruction project was completed.
- Woody invasive/non-native species were removed on 202 acres at 11 SNAs and herbaceous or seedling invasive species were removed at another 44 acres at four SNAs.
- Prescribed burning was completed on 317 acres at nine SNAs.
- New Adaptive Management Plans were completed for two sites.

Conservation Corps Minnesota (CCM) was involved in these projects at ten SNAs.

Project Results Use and Dissemination
Information about Scientific and Natural Area (SNA) sites, including those SNAs with new acquisition, restoration, enhancement and development activities through this appropriation, is available on the DNR website (www.mndnr.gov/snas). DNR-sponsored volunteer events are regularly posted at: www.dnr.state.mn.us/volunteering/sna/index. The Hastings Sand Coulee SNA acquisition was referenced in articles in the Hastings Gazette and the Friends of the Mississippi River website.

Project completed: 06/30/2012

Minnesota's Habitat Conservation Partnership (HCP) - Phase VI
Subd. 04e $3,375,000

Joe Pavelko
Pheasants Forever, Inc.
7975 Acorn Circle
Victoria, MN 55386

Phone: (612) 532-3800
Email: jpavelko@pheasantsforever.org
Web: http://www.mnhabitatcorridors.org

Appropriation Language
$3,375,000 is from the trust fund to the commissioner of natural resources for the sixth appropriation for acceleration of agency programs and cooperative agreements. Of this appropriation, $770,000 is for the Department of Natural Resources agency programs and $2,605,000 is for agreements as follows: $450,000 with Pheasants Forever; $50,000 with Minnesota Deer Hunters Association; $895,000 with Ducks Unlimited, Inc.; $85,000 with National Wild Turkey Federation; $365,000 with the Nature Conservancy; $210,000 with Minnesota Land Trust; $350,000 with the Trust for Public Land; $100,000 with Minnesota Valley National Wildlife Refuge Trust, Inc.; $50,000 with the United States Fish and

Wildlife Service; and $50,000 with Friends of Detroit Lakes Watershed Management District to plan, restore, and acquire fragmented landscape corridors that connect areas of quality habitat to sustain fish, wildlife, and plants. The United States Department of Agriculture-Natural Resources Conservation Service is a cooperating partner in the appropriation. Expenditures are limited to the project corridor areas as defined in the work program. Land acquired with this appropriation must be sufficiently improved to meet at least minimum habitat and facility management standards as determined by the commissioner of natural resources. This appropriation may not be used for the purchase of residential structures, unless expressly approved in the work program. All conservation easements must be perpetual and have a natural resource management plan. Any land acquired in fee title by the commissioner of natural resources with money from this appropriation must be designated as an outdoor recreation unit under Minnesota Statutes, section 86A.07. The commissioner may similarly designate any lands acquired in less than fee title. A list of proposed restorations and fee title and easement acquisitions must be provided as part of the required work program. All funding for conservation easements must include a long-term stewardship plan and funding for monitoring and enforcing the agreement. To the maximum extent practical, consistent with contractual easement or fee acquisition obligations, the recipients shall utilize staff resources to identify future projects and shall maximize the implementation of biodiverse, quality restoration projects in the project proposal into the first half of the 2010 fiscal year.

OVERALL PROJECT OUTCOMES AND RESULTS

During the period between July 1st, 2009 and June 30th, 2011, Minnesota's Habitat Conservation Partnership (HCP) collectively expended $10,849,598 of funds to restore, enhance or protect a total of 10,350 acres of habitat and 32,957 feet of shoreline and riparian areas within the defined HCP project areas. More specifically, 5,732 acres of habitat and 16,461 feet of shoreline and riparian areas were restored, enhanced or protected with $2,973,871 of Environment and Natural Resources Trust Funds (ENRTF) that leveraged an additional $5,217,069 of other non-state funds to restore, enhance, or protect 3,896 acres of habitat and 1,415 feet of shoreline and riparian areas.

In total, partners expended $1,913,371 ($1,158,226 ENRTF) to restore/enhance a total 6,100 acres (4,874acres ENRTF). Work included 4,805 acres of grassland restoration/enhancement, 578 acres of wetland restoration/enhancement, 125 acres of woodland restoration, and 4,740 feet of shoreline restoration. Other accomplishments included 71 shallow lake surveys and designs, dam modifications, and site access/development.

Partners acquired a total of 3,463 acres (649 acres ENRTF) of perpetual conservation easements. Grassland/wetlands continued to be a priority for HCP partners working on easements, with 3,071.7 acres protected. Shoreline/riparian areas were also a priority with 13,216 feet protected. In addition, 335.6 acres of woodland was also permanently protected.

Partners permanently protected 787.6 acres in fee-title acquisition with total funding of $2,499,610 ($897,368 ENRTF and $568,517 of other non-state funds). In total, HCP partners permanently protected 600.5 acres of new WMAs, 56.3 acres of AMAs, 52.3 acres of TNC preserve, and 78.5 acres of WPAs.

For complete information, go to http://www.mnhabitatcorridors.org.

HCP Partners include: Ducks Unlimited, Friends of the Detroit Lakes Wetland Management District, MN Deer Hunters Association, MN Department of Natural Resources, MN Land Trust, MN Valley National Wildlife Refuge Trust, Inc, National Wild Turkey Federation, Pheasants Forever, The Nature Conservancy,

Trust for Public Land, U.S. Fish and Wildlife Service, U.S. Natural Resources Conservation Service.

OVERALL PROJECT RESULTS USE AND DISSEMINATION
The partnership acknowledges funding from the Minnesota Environment and Natural Resources Trust Fund. Accomplishment report information, mapping products, and project information can be found at www.mnhabitatcorridors.org.

Project completed: 6/30/2011

ABSTRACTS AND FINAL REPORTS OF INDIVIDUAL PARTNER PROJECTS (Click project # to go to listing for that project)

1a FINAL REPORT - HCP VI - Project Coordination and Mapping - Pheasants Forever ($100,000)
Overall Project Outcome and Results
Duties assigned to the project coordinator under this work program and as outlined and approved by the Habitat Conservation Partnership were to:

1. Coordinate partners, projects and cultivate partnerships,
2. Manage project data and contract/coordinate mapping service,
3. Solicit & compile partner information & provide reports to LCCMR and partners,
4. Schedule, coordinate, and chair meetings & provide meeting minutes,
5. Coordinate public relations outreach to media,
6. Serve as primary contact for LCCMR,
7. Facilitate executive & full committee meetings & coordinate subcommittee meetings, and
8. Manage contract for administration and mapping components of the Partnership.

We expended a total of $38,267 of Environment and Natural Resources Trust Fund (ENRTF) funds. Pheasants Forever, Inc. completed the above-referenced tasks successfully so that the outstanding habitat work detailed in this report could be completed, reported, and promoted. Work included full partnership meetings, executive committee meetings, and the required full partnership update reports which included coordination between all funded partners, LCCMR, and Community GIS Services. Promotion of individual partnership accomplishments and overall accomplishments was encouraged and several positive articles and events occurred and were shared as a result. ENRTF expenditures for personnel (Project Coordinator and accounting staff) and project coordinator travel totaled $2,242. A total of $25,758 within the personnel budget item was not needed to achieve our results and remains unspent. In addition, $36,025 of ENRTF funds were expended to manage data, operate the online reporting system from which all partner reports are generated, and map all partner projects. Pheasants Forever, Inc. contracted the mapping and data management services for the Phase VI Habitat Conservation Partnership with Community GIS Services of Duluth, Minnesota.

Community GIS has made several improvements to the operability of the reporting and mapping system. These updates include identifying free-text fields from the reporting website, and creating pre-populated drop down lists for them. As part of this exercise, all mapping fields were inspected to ensure minimal data duplication within the geodatabase. Metadata was created for the geodatabase at this time as well, which helps to define the fields being used. All HCP project accomplishments and expenditures are accounted for and fully described within the online reporting system and report generation. Anyone can access the Phase VI data electronically from the HCP website.

Project Results Use and Dissemination
The partnership acknowledges funding from the Minnesota Environment and Natural Resources Trust Fund. Accomplishment report information, mapping products, and project information can be found at www.mnhabitatcorridors.org. Other forms of information can be obtained by contacting Joe Pavelko, the HCP Coordinator, at (612) 532-3800.

Project completed: 6/30/2011

2a FINAL REPORT - HCP VI - Hides for Habitat Restoration - Minnesota Deer Hunters Association ($50,000)
Overall Project Outcome and Results
MDHA funding restored a total of two oak savannahs (grassland enhancement) consisting of 35 acres on the Winger Waterfowl Production Area (WPA). Federal WPA's are managed for waterfowl production and are open to public hunting and other recreation consistent with the National Wildlife Refuge System. This restoration to the oak savannahs will create suitable habitat for deer, turkey, ruffed grouse, and other cavity nesting birds.

Specifically, on the Winger WPA (Polk County Winger Township 147, Range 42, Section 2) we restored two oak savannahs for 35 acres by shearing and piling undesirable trees such as boxelder, cottonwood, willow, and aspen which opened the landscape to promote savannah habitat. Large and small oak trees were not cut and the seedlings were flagged to prevent accidental damage.

All work was done in partnership with the USFWS Detroit Lakes Wetland Management District and other funds were secured and provided by the Minnesota Deer Hunters Association Hides for Habitat funds.

Project Results Use and Dissemination
MDHA has restored a total of two oak savannahs (35 acres total) on public land that is permanently protected and open to public hunting. These restored oak savannahs provide upland habitat for a variety of wildlife with a large scale benefit to hundreds of acres on the Winger WPA as well as the surrounding private land habitats. Future management of grasslands will be conducted by the USFWS Detroit Lakes Wetland Management District.

Since this initial project was submitted, MDHA changed project managers from Phase IV. In phase V our funds from matching came mostly from the Hides for Habitat funds through MDHA which is why there are less "other funds" contributed to this Phase V work plan. MDHA strives to identify projects that capitalize on our chapter system and will improve on this into the future.

Project completed: 6/30/2011

2b FINAL REPORT - HCP VI - Partners for Wildlife U.S. Fish and Wildlife Service ($50,000)
Overall Project Outcome and Results
Since 1987, the USFWS's Partners for Fish and Wildlife Program (Partners) has restored more than 16,280 drained wetlands (74,300 acres) and more than 1,240 upland sites (54,100 acres) to native grasses and forbs, on private lands in Minnesota. Through its Partners Program, the USFWS works with other federal and state agencies, local units of government, tribal entities, conservation organizations, and individual landowners to restore or enhance fish and wildlife habitats on private land. This program emphasizes restoring habitats and native vegetation for fish and wildlife in concert with the goals of individual private landowners. These projects also benefit the general public by providing habitat for fish, wildlife and plants, improving water quality and watershed health, reducing non-point source pollution, and creating opportunities for outdoor recreation and education.

The $50,000.00 of Minnesota Environment and Natural Resources Trust Fund (ENRTF) funding obtained through this work program, accelerated the USFWS' existing Partners Program with an additional voluntary restoration or enhancement of 38 wetland basins covering 54 acres of wetland habitat and five grassland sites covering 491 acres of upland habitat. With this funding, a total of 6 projects were completed on private land within HCP Project Area 12. The ENRTF funds were expended from July 2009 through June 2011. The USFWS Partners Program provided $33,138.00 of Other Funds cost-sharing to complete these projects.

The USFWS Partners Program also provided $13,400.00 of Other Funds to complete two additional upland enhancement projects totaling 43 acres.

Under the Partners Program, wetlands are restored or enhanced by plugging or filling drainage ditches, removing excess sediment, breaking up sub-surface tile systems, embankment construction, and/or installing water control structures. Upland grassland areas are restored or enhanced by removing invasive woody vegetation and re-seeding former cropland to a native prairie seed mixture. All seeded areas complied with requirements to utilize local native ecotype seed as available.

Project selection for ENRTF cost-share via the Partners Program is based on the project's contribution to building wetland and upland habitat complexes or corridors and/or restoring or enhancing native habitats in the focus project areas.

Project Results Use and Dissemination

These projects were completed within the nine HCP Project Areas across the state of Minnesota. Without the willingness of the landowners involved, and the variety of other partners, this important wetland, upland and river/riparian wildlife habitat would not be restored.

Numerous presentations including information about ENRTF habitat restorations have been made over the past ten years at various meetings - i.e., Minnesota State Private Lands Meeting, the Wetland Summit, the Shallow Lakes Forum, MNDNR Roundtable, and at Kiwanis, Rotary, and Lion's Club presentations. One project completed with ENRTF dollars was also featured on the Minnesota Bound television program hosted by Ron Schara.

Project completed: 6/30/2011

2c FINAL REPORT - HCP VI - Shallow Lake Enhancement - Ducks Unlimited, Inc. ($225,000)

Overall Project Outcome and Results

The objective of this project was to accelerate Ducks Unlimited (DU) bio-engineering assistance to help agencies design and construct enhancement projects on shallow lakes for waterfowl using water control structures. DU biologists and engineers provided technical assistance to Minnesota DNR, U.S. Fish & Wildlife Service, and private landowners around shallow lakes with a goal of:

- Enhancing at least one shallow lake totaling 100 wetland acres with a new water control structure and/or fish barrier,
- Engineering at least four new shallow lake enhancement structure projects for DNR on designated shallow lakes or basins within state Wildlife Management Areas (WMAs) and for the Service on federal Waterfowl Production Areas (WPA), and
- Providing technical assistance to agency field staff on other shallow lake projects throughout HCP project areas.

Through this grant project, DU biologists and engineers surveyed and designed six new water control structures for the Minnesota DNR and US Fish & Wildlife Service, including Sandborn Lake in LeSueur County, Lindsey Lake in Becker County, Everglade Wildlife Management Area in Stevens County, Harder Lake and Wolf Lake Waterfowl Production Areas (WPA) in Cottonwood County, and Henjum WPA in Kandiyohi County. These six bio-engineering projects will be implemented in the future as permits and easements are secured. In addition, DU enhanced 453 wetland acres by constructing previously designed water control structures on the outlets of three shallow lakes, including Block WPA in Grant County, Perch Lake in Blue Earth County on Perch Lake WPA, and Gislason Lake in Lincoln County on the Northern Tallgrass Prairie National Wildlife Refuge. This far surpasses our target goal of enhancing at least one shallow lake totaling 100 wetland acres or more. Finally, DU shallow lakes field biologist provided ongoing technical assistance to Minnesota DNR and the Service on 30 shallow lake projects in HCP Project Areas to help assess and develop new projects for future possible bio-engineering, implementation, and management by those conservation agencies.

DU's total cost to provide these bio-engineering services to enhance shallow lakes was $526,225, and included reimbursement of $225,000 from the Environment & Natural Resources Trust Fund through this grant, and the expenditure of $1,249 in Other State Funds and $299,977 in Other Funds (DU and federal funds) that far exceeds the $100,000 in Other Funds that we originally proposed to spend.

Project Results Use and Dissemination

This grant helped DU, DNR, and the Service accelerate the assessment and enhancement of shallow lakes throughout southern, central and western Minnesota. DU provided six detailed engineering design

plans to state and federal agency staff, and informed the public of shallow lake improvement projects through public meetings, news releases sent to the media, and in articles in DU publications. Shallow lake assessment data collected by DU biologists was provided to DNR's shallow lake program and area wildlife managers, and shared with MPCA to aid in their impaired waters assessment.

Project completed: 6/30/2011

2d FINAL REPORT - HCP VI - Shallow Lake Assessment - MN DNR ($145,000)

Overall Project Outcome and Results

DNR spent $140,689 to continue on-site field investigations to accelerate management of shallow lakes and adjacent wetland complexes and support the accomplishments of Ducks Unlimited through HCP 2c and 3c. Temporary field personnel (1 full time and up to 6 temporary) documented shallow lake habitat occurrence and quality. Habitat surveys were conducted on 171 lakes within seven HCP project areas. The lakes surveyed totaled over 82,831acres. The surveys were distributed more broadly than in the past with:

- 9 surveys conducted within Area 1,
- 9 surveys conducted within Area 2,
- 71 surveys conducted within Area 3,
- 15 surveys conducted within Area 4,
- 11 surveys conducted within Area 6,
- 30 surveys conducted within Area 9, and
- 26 surveys conducted within Area 10.

Data was entered into the DNR Shallow Lake Database, checked and verified.

Project Results Use and Dissemination

The habitat survey information was used to support DNR's shallow lake management efforts identified in the 2006 Duck Recovery Plan and Ducks Unlimited's efforts under Restoring Minnesota's Fish and Wildlife Habitat Corridors IV - Wildlife Shallow Lakes Enhancement 2(c). Dissemination of project accomplishments will be through the LCCMR reporting process and normal DNR budgeting and accomplishment reporting. Data collected on the habitat quality of shallow lakes will be available as part of the DNR shallow lakes database managed by Division of Fish and Wildlife staff in Brainerd.

Project completed: 6/30/2011

2g FINAL REPORT - HCP VI - Wildlife Areas Management - MN DNR ($50,000)

Overall Project Outcome and Results

Through this project DNR-Wildlife provides oversight for infrastructure management and habitat restoration on lands acquired by Habitat Conservation Partners (HCP). Partners acquire priority land and transfer it to the DNR for long term management as Wildlife Management Areas. This funding source ensures DNR will not incur a significant short-term liability for initial site development from these acquired lands. Temporary project staff or intermittent labor is hired as needed to implement development on lands acquired. Infrastructure management may include but is not limited to boundary surveys, boundary signing, professional services, public access, parking lots and user facilities, and clean up of old buildings or wells. Habitat restoration may include but is not limited to grassland development or improvement, wetland restoration or impoundment development, forest or woody cover development or improvement, brush land management, professional services, and food plot development. Digital boundary, habitat inventory and facilities files will be developed as part of the management plans. DNR cannot start work until the Partners have completed acquisition on each

parcel. Once the new acquisitions are transferred to the DNR site development and habitat restoration work can occur.

Specifically in this phase, $6,128 was expended on habitat and development work at Benderberg WMA, including thirty acres of former cropland that were site prepped, seeded, and mowed. $43,872 went unspent due to when acquisitions were transferred to DNR, season for habitat work, and field staff availability.

Citizens of the state of Minnesota benefit from this project by having more public hunting and recreation land available in high priority landscapes throughout the state. These new public lands are managed as State Wildlife Management Areas (WMAs) by the Minnesota Department of Natural Resources (DNR) - Section of Wildlife for wildlife habitat.

Project Results Use and Dissemination
Information on HCP project results have been shared and disseminated through all partner organizations. Signs are posted on completed project sites identifying the ENRTF funding source. These signs provide information to the general public on how the lottery funds are spent for natural resource activities.

Project completed: 6/30/2011

2h FINAL REPORT - HCP VI - Fisheries Habitat Restoration - MN DNR ($100,000)
Overall Project Outcome and Results
Citizens of the state of Minnesota benefit from this project by having a better fish community structure in Mills Lake, Blue Earth Co, and Horseshoe Lake, Rice County. They also benefit from improved stream habitat for trout on Winnebago Creek, Houston Co. This then creates better fishing and recreation available in high priority waterbodies. The portions of the work that the DNR was responsible for was completed on June 30, 2011. Design and planning for two barriers to prevent carp migration was the basis for these two projects. The projects were installed with the assistance of partners. The Horseshoe Lake barrier is completed while high water resulted in the Mills Lake installation being delayed until this fall. Once both are completed, we will have enhanced approximately 654 acres total. Another project done was plans, designs, and purchase of materials to restore 3,200 feet of trout waters on Winnebago Creek. Due to high waters, the partners will finish the installation this fall. Long term maintenance of these projects is going to be shared with the partners. These funds were also used to get the designs done for the Hartley Lake fish passage project.

Project Results Use and Dissemination
Information on HCP project results have been shared and disseminated through all partner organizations. The Environmental Trust Fund provides information to the general public on how the lottery funds are spent for natural resource activities.

Project completed: 6/30/2011

2i FINAL REPORT - HCP VI - Set Out Seedlings/Bluffland Restoration - National Wild Turkey Federation ($85,000)
Overall Project Outcome and Results
This project contained two types of habitat enhancement that resulted in the enhancement of a total of 72 acres of habitat.

In Habitat Corridor Area 11 in southeastern Minnesota, we contracted to have invasive eastern red cedar and buckthorn removed and controlled on south-facing blufftops on 60.75 acres of private land (5 parcels). These "goat prairies" were historically maintained by wind, freeze/thaw cycles, thin soils, and frequent wildfires. Fire suppression has allowed trees, shrubs, and exotic species to encroach upon the prairies. The contractor hand cut, piled, and burned trees and shrubs, and treated invasive species to ensure they would not resprout. This project enhanced prairie and outcrop habitat for state-threatened timber rattlesnakes, as well as three other at-risk snake species and numerous at-risk plant species found in this unique habitat. The resulting open grasslands will also be used as nesting and brood-rearing habitat for wild turkeys and other birds. Participating landowners have signed a 10-year maintenance agreement. Project cost was $67,259.50.

In Habitat Corridor 9, we purchased seedlings to plant 150 bur oak, 150 black walnut, and 175 hackberry trees on 11 acres on the Talcot Lake WMA. These trees were protected from herbivory by tree shelters and weed mats. In addition, we purchased 475 seedlings of each of the following fruiting shrubs - chokecherry, red osier dogwood, elderberry, and American plum. All seedlings were planted by DNR staff. This project restored oak savanna and lowland hardwood forest to provide roosting sites for wild turkeys along southwestern Minnesota river corridors, and provided natural winter food resources by planting fruit-bearing shrubs. Project cost was $7,070.23. We had hoped to accomplish more tree planting, but a staff change near the end of the project prevented us from finding a suitable location and order materials before the project deadline.

Project Results Use and Dissemination
Our intention is to make NWTF Chapters and volunteers aware of the accomplishments of this Environmental Trust Fund project by posting an article on our website and Facebook page. In addition, we plan to release a press statement announcing the completion of the project to the general public.

Project completed: 6/30/2011

2j FINAL REPORT - HCP VI - Lakescaping for Wildlife and Water Quality - MN DNR ($75,000)
Overall Project Outcome and Results
For Phase 6 of the Habitat Corridors Partnership project a total of eight lakescaping buffer zones were proposed for selection, planning, and installation in habitat corridors 3, 4, 7, and 9. This project exceeded that goal for a total of nine buffer zones, which were completed on schedule and under budget, totaling 1298 frontage feet of shoreline. This equates to an average cost of $55.82 per foot for planning, installing, and maintaining these shoreline buffer zones which are designed to improve water quality and fish and wildlife habitat.

In addition to the buffer zones, two field days were provided for the public in 2010 to view buffer zones that had previously been installed. One field day was held near Grand Rapids and one was held in the Alexandria vicinity.

The final component of this activity was to collect native origin plant seeds and propagules in 2009 and 2010 for propagation and subsequent planting on buffer zone sites. The goal was to collect seeds for a total of 80 plant species. However, a total of 92 species of native plant seeds and propagules were collected and subsequently used in the plantings.

This has been a very successful effort and an excellent partnership between the DNR's Division of

Ecological and Water Resources and the Division of Fish and Wildlife to carry out this effort to promote stewardship of lakeshore habitat on private shorelands.

Project Results Use and Dissemination
Completion of Phase 6 brings to 73 the total number of lakescaping buffer zone demonstration areas that have been installed in 7 habitat corridors in 22 Minnesota counties since May of 2000 with LCMR and LCCMR support provided from the Minnesota Environment and Natural Resources Trust Fund. This initiative has been instrumental in promoting this concept of lakeshore stewardship not only throughout Minnesota but also in adjacent states and as far off as Washington state and South Carolina. The book Lakescaping for Wildlife and Water Quality and the new on-line version of Restore Your Shore provide a continuing source of information for people to learn how to plan and install their own buffer zones. Also, the DNR Shoreland Habitat Program continues to offer on-the-ground assistance to local lakeshore associations, landowners, and local and county units of government to initiate lakeshore buffer zones throughout the state. The LCCMR deserves considerable credit for providing funding to help promote this essential concept for stewardship of privately owned lakeshore in Minnesota.

Project completed: 6/30/2011

2k FINAL REPORT - HCP VI - Prairie Management - MN DNR ($75,000)
Overall Project Outcome and Results
A total of 536 acres of native and reconstructed prairie (largely native) were prescribed burned. This includes 318 acres on Scientific and Natural Areas (SNA) and 218 acres on perpetual Native Prairie Bank (NPB) easements. Due to a lack of qualified prescribed burn vendors, most burns were implemented by agency crews. Invasive species control treatments were completed on a total of 113 acres, including 48 acres on SNAs and 65 acres on NPB lands. Invasive species treated include buckthorn, siberian elm, red cedar, knapweed, leafy spurge, and cow-vetch. Due to the availability of qualified contractors, many woody invasive species projects were contracted. One reconstruction project totaling 30 acres was completed on the Zilmer WMA, which is part of the larger Felton Prairie Complex. Seed for the reconstruction was collected from surrounding lands. In total, 679 acres of prairie habitat was improved during this project.

Project Results Use and Dissemination
Ecological and Water Resources invests considerable time in publishing and distributing results in a variety of formats for various audiences. SNA Program staff make presentations that describe prairie management methodologies and results to a wide range of audiences including county boards, local planning groups, land managers, citizen and technical advisory groups, and at professional meetings.

Project completed: 6/30/2011

2n FINAL REPORT - HCP VI - Campaign for Conservation - Restoration - The Nature Conservancy ($315,000)
Overall Project Outcome and Results
The Nature Conservancy's (TNC) 2009 work program focused on 6 habitat restoration projects totaling 3,664 acres (3,118-ENRTF funds; 546-other funds). Additional details, beyond the short summary below, are found in the more detailed reporting provided for each project.

Northern Tallgrass Prairie: Prairie was restored on 183 acres (88 acres-ENRTF; 95 acres-other funds) of TNC land on this key parcel for building connections within the Bluestem Prairie complex. Project

activities included seed collection, site preparation, sowing, and follow work to control invasives in the restoration area.

Western MN Invasives Control & Prescribed Fire: TNC accelerated management activities on 1,067 acres (798 acres-ENRTF; 269 acres-other funds) of TNC lands. Activities included planning/implementing prescribed fire on 1,060 acres, buckthorn removal, and a focused effort on controlling leafy spurge.

Prairie Coteau Restoration: Prairie was restored on 84 acres (all acres-ENRTF) of TNC land in a key parcel for connecting remaining areas of native prairie in the Lac qui Parle complex. Completed work included preparing and seeding 71 acres, clearing trees, buckthorn removal, and fence removal.

Prairie Forest Border Restoration: This project accelerated prescribed fire and invasives management on 2,091 acres (1,932 acres-ENRTF; 159 acres-other funds) of TNC and public grassland, wetland and forest at 7 sites in Central and Southeastern Minnesota. Individual activities included planning/implementing prescribed fire on 1,392 acres, invasive surveys/treatment on 560 acres, brush removal on 135 acres, and buckthorn removal on 19 acres.

NE MN Conifer Restoration: 114 acres (all acres-ENRTF) of TNC and public land was managed to encourage the regeneration of conifers in Northeast Minnesota. Project tasks included installing exclosures and budcaps to prevent browsing and using brush saws, grass mats, and grubbing to control competing vegetation.

Sand Prairie Restoration: Prairie was restored on 90 acres and existing habitat was enhanced on an additional 35 acres of TNC land buffering the outstanding native prairie on the adjoining Weaver Dunes SNA (102 acres-ENRTF; 23 acres-other funds). Project activities included seed collection, site preparation, three rounds of sowing with a high-diversity 115-species mix, brush clearing, and surveying/treating invasive species.

One thing to note when reviewing detailed information on the individual projects: the completed acres shown for each project may be lower than the number of acres listed for the separate restoration activities. The lower total reflects the fact that multiple activities may have been done on the same acres.

Project Results Use and Dissemination
All restored lands are open to the public. TNC continues to coordinate with public and private partners to apply lessons learned from this project to work at these and other sites.

Project completed: 6/30/2011

2o FINAL REPORT - HCP VI - Prairie Landscape Restoration: Oak, Savanna, Grasslands, and Wetlands - Friends of the Detroit Lakes Wetland Management District ($50,000)
Overall Project Outcome and Results
This project restored approximately 40 acres of oak savanna on Kruger Waterfowl Production Area. Oak savanna is even rarer in Minnesota than tallgrass prairie and there are numerous plant and wildlife species that depend on this habitat. We removed invasive trees from these areas, restored an open, park-like structure to the vegetation, and created enough light gaps in the tree canopy to support a herbaceous understory. The biomass we removed was stacked and is drying. This fall the biomass will be chipped, hauled to the biomass burning plant in Benson, and converted to electrical power. This was a

significant savings. Money that would have been spent burning or removing the biomass from the site was used for additional habitat work. After all the equipment is done at the site, FWS staff will overseed the areas where the trees were removed and any place equipment damaged the soil with a diverse mix of local ecotype grass and forb seed. The long-term maintenance of the site will be done through the FWS's fire management program.1

Originally we planned to do both wetland and oak savanna restoration at the site. However, with the persistent rains over the period of this grant, we were not able to get heavy equipment into the wetlands to restore them. Therefore, we requested and were granted an amendment to spend the wetland funds on additional oak savanna work at the site.1

Project completed: 6/30/2011

3a FINAL REPORT - HCP VI - Shoreland Protection Program - Minnesota Land Trust ($210,000)
Overall Project Outcome and Results
In the sixth phase of our Shorelands Protection project, the Minnesota Land Trust continued to work with landowners to secure permanent conservation easements on quality habitat along or containing critical riparian lands. We initiated or continued contact with more than 50 landowners and completed five conservation easements. Collectively, these easements preserve 566 acres of land (508 acres-ENRTF; 58 acres-other funds)- exceeding our original goal of 300 to 500 acres - and protect nearly 17,000 feet of fragile shoreline. Two of the five easements completed involved significant bargain purchases, while the other three projects were donated easements:

- Rabbit Lake in Aitkin County: 171 acres (all acres-ENRTF) containing forest, wetland, grassland, and hay field being restored to prairie.
- Blackhoof River in Carlton County: 248 acres (all acres-ENRTF) containing a mix of forest, wetlands, grasslands, and woodlands.
- Encampment River in Lake County: 88 acres (40 acres-ENRTF; 48 acres-other funds) containing a mature conifer forest with black ash lowlands and wetlands along the Encampment River.
- Blacklock Nature Sanctuary along Lake Superior in Lake County: 11 acres (1 acre-ENRTF; 10 acres-other funds) containing forest and cobblestone beach along Lake Superior.
- Lake Elysian in Waseca County: 48 acres (all acres-ENRTF) containing oak savanna and big woods.

All five projects met the following selection criteria:

1. Habitat: quality and quantity of existing habitat on site; protects riparian areas and buffers water resources
2. Context: proximity and relationship to other protected lands
3. Opportunity cost-benefit ratio: which landowners will participate now
4. Other Benefits: meeting multiple objectives, including visual and physical access, forestry goals, water quality, etc.

Additionally, the Land Trust prepared baseline property reports for each easement, detailing the condition of the property for future monitoring and enforcement. To fund this required perpetual obligation, the Land Trust dedicated funds to its segregated Stewardship and Enforcement Fund for several completed projects. For these projects, we estimated the anticipated annual expenses of each project and the investment needed to generate annual income sufficient to cover these expenses in perpetuity - all in accordance with our internal policies and procedures as approved by LCCMR. We will report to LCCMR annually on the status of the Stewardship and Enforcement Fund and the easements

acquired with funds from this grant.

The value is known for only one of the easements. The donated value of this easement is $515,000. The cost to the State of Minnesota to complete the five projects completed under this phase of the grant was just over $370 per acre.

Cumulatively, across all phases of the HCP program, the Land Trust has protected 7,461 acres of critical habitat and more than 218,000 feet of shoreline, at a cost to the State of $283 per acre.

The Land Trust's work on this project continues to demonstrate the cost effectiveness of working with conservation easements to protect natural and scenic resources along Minnesota's lakes, rivers, and streams, as the cost to the State was well below the cost to purchase land along our increasingly threatened shorelines. This grant continued to generate interest among landowners, and therefore, ongoing funding will be important to sustained success. Additionally, our experiences during this phase of the grant indicate that funds to purchase easements will be necessary in the future as work becomes more targeted, selective, and focused on building complexes of protected land.

Project Results Use and Dissemination
The Land Trust disseminated information about the specific land protection projects completed under this grant though our newsletter, email updates, web site, and press releases. The Land Trust also shared information about conservation easements generally and our experience with our partner organizations, other easement holders, local communities, as well as policy makers including members of the LCCMR and L-SOHC.

Project completed: 6/30/2011

3c FINAL REPORT - HCP VI - Shallow Lake Easements - Ducks Unlimited, Inc. ($250,000)
Overall Project Outcome and Results
The objective of this project was to accelerate Ducks Unlimited (DU) efforts to help improve and protect shallow lakes managed for waterfowl. To protect shallow lakes, DU worked with private shallow lake shoreline landowners to secure permanent conservation easements on managed shallow lakes prioritized by DU for their importance to waterfowl and threat of development. The goal was to permanently protect at least 200 shallow lake shoreland acres.

DU land protection staff worked with several private landowners on multiple shallow lakes over the course of this two year grant, and eventually began negotiations with five landowners on four different shallow lakes who expressed a desire to proceed with appraisals and discuss easement terms. Through that process, two of the five easement negotiations were successful and became viable land protection deals. DU subsequently proceeded to close on a fully purchased conservation easement on 76 acres on Fish Lake in Stearns County in February 2011. DU then proceeded to seek approval to split the cost of a second larger easement of 150 acres on Garden and Johnson Lakes in Crow Wing County using the remaining funds from this 2009 Trust Fund appropriation (60%) and a related 2010 Trust Fund appropriation (40%). Overall, DU successfully closed two conservation easements through this grant and permanently protected 226 acres in total, which was slightly more than our 200-acre goal.

The total project cost to protect shallow lakes through conservation easements was $353,532, which includes reimbursement of $250,000 from the Trust Fund through this grant plus the expenditure of $61,532 in Other Funds by DU and $42,000 donated to DU for easement stewardship.

Project Results Use and Dissemination
This grant helped DU accelerate the protection of shallow lakes by working with private landowners to secure conservation easements and promote conservation easement concepts. Conservation easements with private landowners are sensitive land deals that don't lend themselves to widespread publicity, however, DU has recognized individual landowners and has publicized our work to protect shallow lake shorelines and shoreland locally through local conservation groups, soil and water districts, and tribal organizations supportive of our work to protect wild rice lakes. DU also informed the foundations supporting our Living Lakes Initiative of our conservation accomplishments. The accomplishment of securing two new permanent conservation easements through this grant has helped encourage other private landowners to consider working with DU to protect their shorelines, and news of our progress may be further disseminated through DU news releases and articles DU publications in the future.

Project completed: 6/30/2011

3d FINAL REPORT - HCP VI - Wetland Reserve Program - Ducks Unlimited, Inc. and USDA Natural Resource Conservation Services ($420,000)
Overall Project Outcome and Results
In partnership with the USDA's Natural Resources Conservation Service (NRCS), Ducks Unlimited (DU) contracted with six Wetlands Reserve Program (WRP) technicians that began HCP Phase 6 work on September 10, 2009 with combined funding support from Environment and Natural Resources Trust Fund funds and NRCS grants. The purpose of these contracted technicians was to provide technical assistance to private landowners and USDA - NRCS complete applications and enroll new lands into the WRP, and to help USDA-NRCS and private landowners plan, design, and implement restoration measures on lands previously enrolled in the WRP. The delivery goal for these technicians was to provide Technical Assistance (TA) to help NRCS protect 1,000 acres through new WRP easements and help restore wetlands and associated upland habitat on WRP easements in prairie Habitat Conservation Partnership (HCP) project areas at an estimated Other Funds cost of $1,500,000 to NRCS.

During the life of this grant, the contract specialists made 275 landowner contacts, helped process 80 applications, developed 96 easement conservation plans, completed 21 wetland restoration designs, and managed construction of 55 wetland restoration projects. Overall, NRCS closed (purchased) 25 new WRP easements protecting 2,721 acres with the assistance of these six contracted wetland specialists funded through this grant, which exceeds the easement acre goal of this project. This includes WRP easements protecting 1,031 acres of wetlands and 1,690 acres of adjacent uplands. Other Fund expense incurred by NRCS to purchase these easements and by DU to hire and manage the contractors totals $3,923,321 in non-state funding, more than double our Other Funds expense pledge of $1.5 million.

Project Results Use and Dissemination
Information on the WRP signups has been publicized through news releases from the USDA's NRCS and local Soil and Water Conservation Districts, and through hundreds of individual landowner contacts made by DU wetland restoration specialists. Additional announcements and landowner contacts continue to be made and publicized by DU and USDA's NRCS.

Project completed: 6/30/2011

4a FINAL REPORT - HCP VI - Critical Lands Conservation Initiative - Pheasants Forever ($350,000)
Overall Project Outcome and Results

To help slow the loss of habitat and declining wildlife populations, Pheasants Forever purchased in fee-title two parcels totaling 93 acres to permanently protect quality wildlife habitat lands within Chippewa and Lac Qui Parle Counties, MN. Of the 93 acres, 38 acres were acquired with $72,987 from the Environment and Natural Resources Trust Fund (ENRTF) and the other 55 acres with $56,000 in non-state funds. These lands have been or are in the process of being enrolled into the state Wildlife Management Area System and will be protected and managed in perpetuity by the Minnesota Department of Natural Resources. In addition, these newly acquired WMAs will provide access and recreational opportunities for all Minnesotans.

Of the total 93 acres, 49 acres are grassland (including native prairie) and 43 acres hold wetlands. Striving to build landscape level habitat complexes that will protect and sustain wildlife populations, both projects are additions to existing WMAs and build upon past investments in wildlife habitat conservation.

Due to the volatile real estate market and county board approval requirements, a balance of $277,013 was left unspent and returned to the ENRTF. A project by project accounting and supporting context can be found in the final work program report and all accomplishment reports are available at www.mnhabitatcorridors.org.

Accomplishments were achieved by working with many local, state, and federal partners. Effective partnerships are the backbone of conservation in Minnesota. Through this project we have continued the effort to build and enhance effective conservation partnerships that provide wildlife and recreation benefits to all Minnesotans.

Project Results Use and Dissemination
All projects acquired through the Habitat Conservation Partnership acknowledge the funding from the Minnesota Environment & Natural Resources Trust Fund. These new public land additions will be incorporated into the DNR Wildlife Management Area System and will be added to appropriate maps, websites, and other WMA information dissemination outlets. Detailed accomplishment report information is available at www.mnhabitatcorridors.org..

Project completed: 6/30/2011

4b FINAL REPORT - HCP VI - Fisheries Land Acquisition - MN DNR ($300,000)
Overall Project Outcome and Results
This project focused on the acquisition of habitat linkages that provided environmental protection of the shoreline and riparian zone, exhibited a high risk of development, supplied angler access, and afforded management access necessary for implementing habitat improvement projects.

Project goals were to protect 120 acres (1.4 miles of lake and stream shoreline) with the help of partner and other state funding. Partner funding includes donations of land value and cash.

This project resulted in the acquisition of four parcels with a grand total of approximately 54.2 acres and 1.3 miles of lake and stream shoreline. Because of the extreme variation in shoreline values it is hard to accurately predict a reliable acre benchmark. Most years, including the 2008 Environment and Natural Resources Trust Fund (ENRTF) appropriation, we far exceeded our acres goal. For the 2009 ENRTF appropriation, we fell short of the acres goal, but nearly reached our "miles of shoreline" goal. ENRTF dollars directly acquired approximately 35.12 acres of the total, including 0.4 miles of lake and stream

shoreline. Donations of land value ("other funds" $396,600) and resulting Reinvest In Minnesota Critical Habitat match ("other state monies" $165,000), leveraged with trust dollars, totaled $561,600. These contributions helped acquire the remaining acres of the grand total, including 4.0 acres and 0.2 shoreline miles using other state dollars and 8.5 acres and 0.4 shoreline miles from donations of land value. Preece Point was acquired jointly using both 2009 and 2010 Supplemental grants to Minnesota's Habitat Conservation Partnership - Fish and Wildlife Acquisition (4b). Results for Preece Point were proportionately distributed for each grant.

As a result of this project, 54.2 acres, including 1.3 miles of critical shoreline fish and wildlife habitat are now permanently protected and open to public angling and/or hunting - as well as other light use recreational activities. Acquired parcels are now designated and managed as Aquatic Management Areas (AMAs).

Project Results Use and Dissemination
Accomplishment Reports and press releases are available at www.mnhabitatcorridors.org., and all AMAs will be added to DNR's Public Recreational Information Maps (PRIM).

Project completed: 6/30/2011

4c FINAL REPORT - HCP VI - Critical Lands Protection Program - Trust for Public Land ($350,000)
Overall Project Outcome and Results
On September 30, 2011, the Trust for Public Land (TPL) acquired 510 acres in Le Sueur County containing high-quality wetlands and 1.64 miles of naturally flowing Cannon River just upstream from a concentration of rare freshwater mussels. Of the 510 acres, 104 acres were acquired with $350,000 from the Environment and Natural Resources Trust Fund (ENRTF) and the other 406 acres with $1,369,493 in other state funds. TPL immediately conveyed the property to the Department of Natural Resources (DNR) who will manage the land as a new Wildlife Management Area ("Dora Lake WMA"). In addition to conserving a large area of Minnesota County Biological Survey (MCBS) identified native habitat, acquisition of these tracts provides an opportunity to restore approximately 200 acres of tilled land in a sensitive water quality area. The DNR will restore them to wetlands, grassland and eventual guided succession to Big Woods. Protection of the property ensures habitat for fish, game and wildlife in the Cannon River watershed.

Project Results Use and Dissemination
Accomplishment Reports and press releases about the overall Habitat Conservation Partnership are available at www.mnhabitatcorridors.org.. Information about this acquisition and the Cannon River Headwaters Habitat Complex effort will be posted on TPL's website: www.tpl.org. Information about the Cannon River Headwaters Habitat Complex effort has also been disseminated through its network of supporters which include: the Cannon River Watershed Partnership, the Tri-Lake Sports Club, the Dark House Anglers Southern Chapter, Minnesota Deer Hunters Association South Central Prairieland Bucks Chapter (Le Sueur, Rice, Waseca, and Steele Counties), Waterville Sportsman's Club, Montgomery Sportsmen's Club, Minnesota Waterfowl Association Scott- LeSueur Chapter, the Izaak Walton League Owatonna Chapter, and the Minnesota Department of Natural Resources.

Project completed: 9/30/2011

4f FINAL REPORT - HCP VI - Campaign for Conservation - Acquisition - The Nature Conservancy ($50,000)

Overall Project Outcome and Results

In this phase, The Nature Conservancy's (TNC) proposed acquiring fee title to 115 acres of habitat with Environment and Natural Resources Trust Fund (ENRTF) and other funds. These projects would emphasize protecting and linking existing public and private conservation lands, helping to build larger, more sustainable areas of habitat.

Using ENRTF and private funds, TNC purchased two parcels adjoining Weaver Dunes SNA. The Conservancy purchased the Cox tract (30.6 acres) on November 16, 2010 and the Carroll-Fitzgerald tract (21.7 acres) on December 10, 2010. Together, these parcels total 52.3 acres.

Both parcels are located in an area identified as critical in both TNC's and the Habitat Conservation Partnership's planning processes. As part of the Conservation by Design process, The Conservancy develops a Conservation Area Plan (CAP) and Rapid Protection Plan (RPP) for each landscape where we are active. These plans define conservation objectives, management strategies, and areas targeted for action. Both parcels were identified as targets in TNC 's 2007 Conservation Area and Rapid Protection Plans for the Weaver Dunes-Zumbro Delta landscape.

Purchasing these parcels protects the native prairie found on portions of both properties. These prairies were ranked as having outstanding biodiversity significance by the Minnesota County Biological Survey. The protection and restoration of the remaining areas of converted or degraded prairie on these tracts will provide a valuable buffer to the large areas of outstanding native prairie on the 6,000 acres of adjoining TNC-, state-, and federally-protected lands.

The Conservancy will retain ownership and manage both properties as additions to the Weaver Dunes SNA. Funds for the continuing management of these acquisitions were ensured by placing 20% of the fair market value of the properties in a dedicated stewardship endowment. The income from this endowment provides the resources for approximately 50% of the ongoing costs of land management. The remaining 50% of future funding needs will be raised through private fundraising and private and public grants.

TNC was unable to reach our original goal for acres protected. The relatively -high cost of land in Southeastern Minnesota where these tracts are located and the continuing state-wide escalation in rural land prices made this difficult to achieve.

The Conservancy spent an additional $235,754.57 of its private funds in transaction-related expenses for these fee title acquisition projects. For more details on the purchases, the associated costs, and their conservation significance, see the Transaction Cost Reporting Guidelines memo submitted to LCCMR on January 14, 2011.

Project Results Use and Dissemination

All acquired lands are open to the public. The Conservancy publicizes its work on these projects via press releases, membership publications, presentations and/or the Conservancy's website. TNC has also participated in publicizing the overall accomplishments of the Habitat Corridors Partnership project as it has reached significant milestones.

Project completed: 6/30/2011

4h FINAL REPORT - HCP VI - Habitat Acquisition for Minnesota Valley Wetland Management -

Minnesota Land Trust ($100,000)

Overall Project Outcome and Results

The Minnesota Valley Trust acquired 78.5 acres of priority lands in Lincoln Township of Blue Earth County to expand the Lincoln Waterfowl Production Area for the Minnesota Valley Refuge and Wetland Management District, US Fish and Wildlife Service. Of the 78.5 acres, 21 acres were acquired with Environment and Natural Resources Trust Fund; the other 56.5 acres were acquired with nonprofit / other, non-state funds.

This acquisition expands upon prior acquisitions for the Lincoln WPA that were funded in part by the Environment and Natural Resources Trust Fund in HCP Phases III and V, as recommended by the LCCMR. This and another acquisition completed concurrently by the Trust bring the total acreage of the Lincoln WPA to approximately 720 acres.

All parcels acquired to create the Lincoln Waterfowl Production Area, including this one, were identified by the US Fish and Wildlife Service as a high priority within an established USFWS Focus Area. Acquisition and restoration will complete USFWS objectives in the area for a host of waterfowl species.

After wetland and upland restoration on the lands is completed, the lands will be donated to the US Fish and Wildlife Service for perpetual management as part of the Minnesota Valley Wetland Management District. They will be managed for wildlife and wildlife-dependent recreation, including hunting, fishing, wildlife observation, photography, wildlife interpretation and environmental education.

Project Results Use and Dissemination

The Minnesota Valley Trust will publicize the completion of this project through its website and news releases. All funding partners will be acknowledged on Refuge kiosks, including the Environment and Natural Resources Trust Fund, as recommended by the Legislative Citizen Commission on Minnesota Resources.

Project completed: 6/30/2011

4i FINAL REPORT - HCP VI - Professional Services - MN DNR ($25,000)

Overall Project Outcome and Results

This project focused on paying professional services related to the conveyance of habitat corridor lands to the DNR by HCP partners. Parcels acquired from HCP partners will be placed in public ownership and administered as State Wildlife Management Areas.

Project goals were to pay professional services as parcels are conveyed to DNR by nonprofit HCP partners. During this appropriation only Pheasants Forever (PF) projects were conveyed to DNR.

This project resulted in professional services being paid on 15 different parcels as they were processed for conveyance to DNR by HCP Partners. Project funding by PF changed as time went by, with some projects not being acquired with Environment and Natural Resources Trust Fund (ENRTF) dollars at closing, and other unanticipated parcels changing to ENRTF dollars at closing. Some of these PF projects were closed last year, but continued to have residual professional services for closing the project out. Some projects have just started the acquisition process and will continue into the next phase of 4i: Habitat Acquisition - Professional Services. Consequently the range of dollars spent on projects varied greatly, but ranged from $20 to $3,700.

As a result of this project, DNR was able to pay for professional services and processing costs related to land acquisition transfers to the DNR from HCP partners. Costs include the following: staff time for Division of Lands and Minerals ($83/hour) and the Attorney General's Office ($110/hour), survey costs, recording and abstracting fees, and deed tax.

Project Results Use and Dissemination
Accomplishment Reports and press releases are available at www.mnhabitatcorridors.org. and all WMAs acquired with professional services funds will be added to DNR's Public Recreational Information Maps (PRIM).

Project completed: 6/30/2011

Metro Conservation Corridors (MeCC) - Phase V
Subd. 04f $3,375,000

Sarah Strommen
Minnesota Land Trust
2356 University Avenue West, Suite 240
St. Paul, MN 55114

Phone: (651) 647-9590
Email: sstrommen@mnland.org
Web: http://www.dnr.state.mn.us/metroconservationcorridors/index.html

Appropriation Language
$3,375,000 is from the trust fund to the commissioner of natural resources for the fifth appropriation for acceleration of agency programs and cooperative agreements. Of this appropriation, $2,185,000 is for Department of Natural Resources agency programs and $1,190,000 is for agreements as follows: $380,000 with the Trust for Public Land; $90,000 with Friends of the Mississippi River; $155,000 with Great River Greening; $250,000 with Minnesota Land Trust; $225,000 with Minnesota Valley National Wildlife Refuge Trust, Inc.; and $90,000 with Friends of the Minnesota Valley for the purposes of planning, restoring, and protecting important natural areas in the metropolitan area, as defined under Minnesota Statutes, section 473.121, subdivision 2, and portions of the surrounding counties, through grants, contracted services, technical assistance, conservation easements, and fee title acquisition. Land acquired with this appropriation must be sufficiently improved to meet at least minimum management standards as determined by the commissioner of natural resources. Expenditures are limited to the identified project corridor areas as defined in the work program. This appropriation may not be used for the purchase of residential structures, unless expressly approved in the work program. All conservation easements must be perpetual and have a natural resource management plan. Any land acquired in fee title by the commissioner of natural resources with money from this appropriation must be designated as an outdoor recreation unit under Minnesota Statutes, section 86A.07. The commissioner may similarly designate any lands acquired in less than fee title. A list of proposed restorations and fee title and easement acquisitions must be provided as part of the required work program. All funding for conservation easements must include a long-term stewardship plan and funding for monitoring and enforcing the agreement. To the maximum extent practical, consistent with contractual easement or fee acquisition obligations, the recipients shall utilize staff resources to identify future projects and shall maximize the implementation of biodiverse, quality restoration projects in the project proposal into the

first half of the 2010 fiscal year.

OVERALL PROJECT OUTCOMES AND RESULTS

During the fifth phase of the Metro Conservation Corridors project, the Metro Conservation Corridors Partners continued their work to accelerate protection and restoration of remaining high-quality natural lands in the greater Twin Cities Metropolitan Area by strategically coordinating and focusing conservation efforts within a connected and scientifically-identified network of critical lands. This corridor network stretches from the area's urban core to its rural perimeter, including portions of 16 counties. The Partners employed a multi-faceted approach, which included accomplishments in four specific result areas:

- Partnership and Program Coordination: Partners met several times a year to review project accomplishments and coordinate activity. With DNR support, Version 2 of the online database was refined and implemented to facilitate tracking and reporting of MeCC projects over time. Additionally, DNR and Minnesota Land Trust have worked together to complete cumulative accomplishment mapping, gathering as much information as possible from previous grant phases, which allows the partnership to conduct historical analysis of our collective work.
- Restore and Enhance Significant Habitat: Partners have restored and enhanced a total of 775 acres of significant habitat using Phase V funding plus an additional 450 acres with other funds.
- Acquire Significant Habitat: Partners protected 977 acres of land, including nearly 7 miles of shoreline through acquisition of fee title and conservation easements and leveraged an additional 585 acres of land and 0.4 miles of shoreline using other funds.
- Other Conservation Tools and Incentives: The Metro Greenways Program assisted eight cities, two counties, and one park district with the development and gathering of natural resources information to identify sites for protection or restoration and/or to implement conservation measures. Additionally, Metro Greenways organized and facilitated two annual events that brought all 25 DNR Community Assistance grantees together for a day of information-sharing and peer-to-peer learning, and also funded the development and offering of six new natural resource-based workshops for local government staff and appointed officials.

Since 2003, MeCC partners have protected more than 9,600 acres and restored more than 7,800 acres. These strategic and coordinated efforts address a number of recommendations of the Statewide Conservation and Preservation Plan, including, protecting priority land habitats, protecting critical shorelands of streams and lakes, restoring land, wetlands, and wetland-associated watersheds, and improving connectivity and access to outdoor recreation.

OVERALL PROJECT RESULTS USE AND DISSEMINATION

As projects were completed, the individual partners were encouraged to publicize accomplishments through press releases, organization newsletters, and websites. These efforts resulted in information being distributed to the public through websites, email lists, daily and weekly newspapers, newsletters, and other print materials. Additionally, an interactive public web map is now fully functional and shows the locations of MeCC projects over time. This web map can be accessed at: http://www.dnr.state.mn.us/maps/MeCC/mapper.html.

Project completed: 6/30/2011

ABSTRACTS AND FINAL REPORTS OF INDIVIDUAL PARTNER PROJECTS

1.1/1.2 - MeCC V - Mapping and Coordination - Minnesota Land Trust ($100,000)

2.3 - MeCC V - Restore and Enhance Significant Watershed Habitat - Friends of the Mississippi River

($90,000)
2.4 - MeCC V - Lower Minnesota River Watershed Restoration and Enhancement Friends of the Minnesota Valley ($90,000)
2.5 - MeCC V - Restore and Enhance Significant Habitat - Great River Greening ($155,000)
2.6/3.4/4.1 - MeCC VI - Metro Greenways Grants for Restoration, Acquisition, Easements, and Other Conservation Tools - MN DNR ($1,175,000)
2.7/3.6 - MeCC V - Scientific and Natural Area Restoration and Acquisition - MN DNR ($646,955)
2.9/3.5 - MeCC V - Fish and Wildlife Habitat Restoration and Acquisition - MN DNR ($500,000)
3.1 - MeCC V - TPL's Critical Land Protection Program - Trust for Public Land ($380,000)
3.2 - MeCC V - Protecting Significant Habitat by Acquiring Conservation Easements - Minnesota Land Trust ($250,000)
3.3 - MeCC V - Expansion of Minnesota Valley National Wildlife Refuge - Minnesota Valley National Wildlife Refuge Trust, Inc. ($225,000)

1.1/1.2 FINAL REPORT - MeCC V - Mapping and Coordination - Minnesota Land Trust ($100,000)
Project Outcome and Results
The Metro Conservation Corridors (MeCC) Partnership completed its fifth phase of work to accelerate protection and restoration of remaining high-quality natural lands in the greater Twin Cities metropolitan area. Work was accomplished by strategically coordinating and focusing conservation efforts within a connected network of critical lands that stretches from the area's urban core to its rural perimeter, including portions of 16 counties.

Projects and activities took place within science-based corridors and were guided by the Minnesota Statewide Conservation and Preservation Plan, Minnesota's Comprehensive Wildlife Conservation Strategy, as well as numerous local and resource-specific plans. This project addressed several recommendations of the Statewide Conservation and Preservation Plan:

- Protect priority land habitats
- Protect critical shorelands of streams and lakes
- Restore land, wetlands, and wetland-associated watersheds
- Improve connectivity and access to outdoor recreation

The Mapping and Coordination element of the MeCC Partnership provided coordination and leadership for the partnership by Minnesota Land Trust staff and improved prioritization through enhanced database development and mapping of the corridors by DNR staff.

During this phase of work, the coordination activity included regular meetings of the partners to share information and accomplishments, assisting partners with preparation of reports, compiling overall partnership results, and assisting DNR staff with the mapping, database development, and results tracking. The mapping activity included successful development and refinement of a GIS-based database to track historic and current MeCC projects. The database allows partners to generate tables and reports for status and accomplishment reporting for a variety of MeCC components - from project types, to funding sources, to activities, to partnerships, to location analysis. It also links to an interactive web map where the public can see the locations of completed projects.

Although we had originally hoped to complete a mini-evaluation of the MeCC Partnership, due to the time involved in mapping and compiling historic project data, there was not time to complete the evaluation.

Project Results Use and Dissemination
The Metro Conservation Corridors Partnership primarily distributed information through individual partners as projects were completed. Partners publicized accomplishments through press releases and organization newsletters and websites. Additionally, the Partnership now has a public web map where the public can view MeCC projects. This web map can be accessed at: http://www.dnr.state.mn.us/maps/MeCC/mapper.html.

Project completed: 6/30/2011

2.3 FINAL REPORT - MeCC V - Restore and Enhance Significant Watershed Habitat - Friends of the Mississippi River ($90,000)

Project Outcome and Results
The Twin Cities contains significant habitat areas. There is a concerted effort to protect, improve and link these areas. FMR's goal with this project was to partner with landowners to restore and enhance habitat at a number of these areas. During this phase of the MeCC project, FMR conducted activities at 9 distinct sites resulting in the restoration of a total of 287 acres, including 179 acres using Environment and Natural Resources Trust Fund funds and 108 acres using leveraged funds. A management plan exists for each site, which served as guide for the restoration and enhancement activities. These sites included:

1. Pine Bend Bluffs Natural Area: Spot treated weeds on a 17-acre restored prairie and conducted exotic brush control on 28 acres of woodland. Conducted follow up buckthorn control on 3-acres of woodland.
2. Sand Coulee Prairie. Conducted prescribed burns, mowing, and spot-spraying on 83- acres. Volunteers assisted in collecting seeds and removing weeds.
3. Rosemount Wildlife Preserve. Conducted a prescribed burn on 16 acres of woodland.
4. Wilmar. Mowed a 25-acre prairie restoration & treated exotic invasive plans in a 15-acre woodland.
5. Mississippi River Gorge. Volunteers installed native tree and shrubs on 2-acre and installed prairie plants to enhance a 4-acre prairie restoration within Crosby Park. Volunteers also hand weeded the site. At the Riverside Park in Minneapolis, volunteers installed native plants within 4-acre of woodland.
6. Hastings Riverflats Park. Applied basal bark treatment to buckthorn on 27 acres of floodplain forest.
7. Gores Pool Wildlife Management Area and Aquatic Management Area. Exotic brush was removed and sprouts treated on 67 acres of woodland. Native grass seed was broadcasted over this woodland. Prairie restoration activities took place on a 4-acre old field. A 4-acre reed canary grassland was treated as part of a re-forestation effort.
8. Ravenna Block Greenway-Dakota County. Buckthorn was removed from 12 acres of woodland, while a prescribed burn was conducted and native prairie seed was broadcasted on a 24-acre grassland.
9. Emrick. 22 acres of a former farm field were seeded to prairie, followed by a mowing. Nine acres of exotic dominated woodland were removed and chipped for biofuels.

Project Results Use and Dissemination
FMR organizes many tours and stewardship events at the sites where we conduct restoration activities. We share information about this project with the participants of these events. FMR also occasionally publishes articles in its paper and electronic newsletters regarding restoration projects that it is involved in.

Project completed: 6/30/2011

2.4 FINAL REPORT - MeCC V - Lower Minnesota River Watershed Restoration and Enhancement Friends of the Minnesota Valley ($90,000)

Project Outcome and Results

Friends of the Minnesota Valley (FMV) undertook restoration of habitat for the Lower Minnesota River Watershed portion of the Metropolitan Conservation Corridors Project (MeCC) as a continuation of our wildlife habitat restoration within the Minnesota Valley National Wildlife Refuge and Wetland Management District (Refuge) and within the Lower Minnesota River Watershed. FMV sought to restore native habitats within the Refuge and to work in concert with the U.S. Fish & Wildlife Service and other partners on critical, publicly-owned habitat on Refuge lands. During this phase of the MeCC project, FMV and our partners were able to successfully restore and enhance 17 acres of native wet prairie, 48 acres of native dry sand-gravel oak savanna, and 28 acres of native dray sand-gravel prairie with Environment and Natural Resources Trust Fund funds for a total acreage of 93 acres. We were also able to restore additional match acreage of 59 acres of native dry sand-gravel oak savanna with non-LCCMR, non-state funds, bringing total acres impacted by this project to 152 acres.

The FMV objectives were to complement and connect habitat restoration and management of Refuge lands with that being done by other entities. Restoration sites were selected to address primary management issues and challenges, including the need to restore hydrology within floodplain communities and to restore upland communities such as native oak savanna and wet and dry prairies. Public access to restored lands for recreation and education and the assurance of permanent protection were also primary factors. Due to persistent flooding, our access to wetland sites was severely limited and, as a result, we shifted our focus to upland restoration, as reflected in our amended work program.

All work was completed on four Refuge Units. Work included cutting and herbicide treatment of non-native woody brush species such as buckthorn, honeysuckle, prickly ash, eastern red cedar, and Siberian elm. Minnesotans will be able to access and appreciate the restored sites through the access and education provided to Minnesota Valley National Wildlife Refuge visitors. Our project data is publicly accessible by contacting FMV, through information disseminated through our newsletter and on our website, and through information provided by the MeCC Partnership.

Project Results Use and Dissemination

As projects were completed, Friends of the Minnesota Valley publicized project accomplishments through the Friends' quarterly newsletter, our annual report, publication of a habitat restoration prospectus, and the posting of projects on our website. Other dissemination of information occurred through the Metro Conservation Corridors partnership and on the Metro Corridors website.

Project completed: 6/30/2011

2.5 FINAL REPORT - MeCC V - Restore and Enhance Significant Habitat - Great River Greening ($155,000)

Project Outcome and Results

Great River Greening, along with our volunteers and partners, restored and enhanced a total of 204 acres of habitat with Environment and Natural Resources Trust Fund dollars, exceeding our goal of 155 acres, and an additional 140 acres with over $153,000 in leveraged non-state funds. Habitats included prairie, savanna, and forest, including nine native plant communities with biodiversity of statewide significance (as rated by Minnesota County Biological Survey), and habitat for 18 documented rare plant

species (1 invertebrate, 2 bird, and 15 plant species). Restorations/enhancements also occurred at sites in priority watersheds rich with rare terrestrial and aquatic rare species, including the St. Croix, Mississippi, and Minnesota; as well as Valley Creek and Eagle Creek trout stream watersheds. A total of 15 different sites were restored/enhanced.

Enhancement of native plant communities with existing significant biodiversity occurred at:

- Arcola Mills Historic Foundation (Stillwater);
- St Croix Valley Early Detection/Rapid Response Garlic Mustard (Taylors Falls and Marine locations);
- Spring Lake Regional Park (Scott Co);
- Spring Lake Park Reserve (Dakota Co);
- Hidden Valley Park (Savage);
- Snail Lake Regional Park (Shoreview);
- St. Croix Savanna SNA (Bayport);
- Lost Valley Prairie SNA (Denmark Township); and
- Pond Dakota Mission (Bloomington).

Restoration/enhancement of habitats in important and strategic locations were:

- prairie/savanna establishment at Pilot Knob Hill (Mendota Heights), located in an area identified by DNR as a top-tier township for habitat for Species of Greatest Conservation Need;
- a large prairie/savanna restoration/enhancement at Belwin Conservancy's Lake Edith site (Afton), in the Valley Creek watershed;
- early detection and control of garlic mustard at a Valley Creek watershed location;
- prairie restoration/enhancement at Central Corridor (Woodbury and Cottage Grove), historically connected to Lost Valley Prairie SNA;
- savanna maintenance at Eagle Creek AMA (Savage), a metro trout stream;/li>;
- floodplain forest enhancement at Heritage Village Park (Inver Grove Heights) to expand on existing significant floodplain forest on the banks of the Mississippi River;
- and a prairie reconstruction burn at OH Anderson Elementary (Mahtomedi), habitat that is also used extensively in classroom studies.

Volunteers contributed over 2500 hours to these habitat projects.

Project Results Use and Dissemination

In January, 2010, Great River Greening included a feature article on the ENRTF, LCCMR, and the Metro Conservation Corridors program and projects in our e-postcard, circulation 3200. A write up on the Metro Conservation Corridors program with features of select projects was included in our Spring 2011 Newsletter, and an article featuring the Pond Dakota Mission restoration was featured in our Fall 2010 newsletter. These are available for continued viewing at http://www.greatrivergreening.org/news.asp. In addition, project descriptions are included in our volunteer recruitment efforts to all the volunteers in our database. In addition, Greening is in active partnership with landowners and other land managers, resulting in a dynamic and timely exchange of information and results.

Project completed: 6/30/2011

2.6/3.4/4.1 FINAL REPORT - MeCC VI - Metro Greenways Grants for Restoration, Acquisition, Easements, and Other Conservation Tools - MN DNR ($1,175,000)

Project Outcome and Results

The DNR Metro Greenways Program has worked since its inception in 1998 toward the goals of protecting, restoring, and reconnecting remaining natural areas in the Twin Cities greater (12-county) metropolitan region. The principal strategies employed by the Program to achieve these goals included: 1) competitive grants to local and regional governments to restore degraded habitats; 2) competitive grants that support the acquisition of or conservation easements on strategically important parcels of terrestrial, wetland, or riparian habitat; 3) incentive grants to local governments to address other conservation needs such as land cover inventories, natural resource based land use decision tools, and ordinance revisions to support conservation efforts; and 4) natural resource based workshops on topics of interest to local government staff and officials.

The 2009 appropriation concludes DNR Central region's Metro Greenways Program, which is sun setting after 13 years. This final allotment of $1,175,000 was used to fund a total of 21 projects and to develop and offer six new natural resource-based workshops. Combined, the restoration and protection projects conserved an additional 375 total acres in the 12-county greater metropolitan region, almost meeting Metro Greenways' combined target of 385 acres of lands restored and protected:

- Five restoration grants totaling $90,000 were awarded to three counties and one city. In combination with other funds, a total of approximately 255 acres of city, county, and regional park lands were restored to native vegetation, primarily prairie and savanna. The newly restored acreage was over two times more than targeted for this result (120 acres).
- Six protection projects were awarded a total of $650,000. Only three projects totaling $370,000 were initiated and completed (Lindstrom, Grannis, and Niebur), resulting in the protection of just 120 acres of the 325 acre projected target for Metro Greenways. The city of Lindstrom acquired a new 64 acre Allemansratt "wilderness" park that will give residents the chance to explore its several clear lakes and deciduous hardwood forest. Two grants to Dakota County added a total of 56 acres under conservation easements to its green infrastructure network being created by the Farmland and Natural Areas Program. Unfortunately, a $200,000 grant to Anoka Conservation District did not materialize and a $10,000 grant awarded to Chanhassen was turned down. These funds were put toward other projects. A Washington County project fell through very late in the biennium, leaving an $80,000 balance for this result category.
- Metro Greenways' Community Conservation Assistance Program awarded 13 grants to cities, counties and special districts that supported a variety of locally-specific conservation needs: a) to obtain land cover and urban tree canopy (UTC) inventories; b) to develop natural resource-based land use decision models; c) to create interjurisdictional partnerships to protect high quality natural areas; and d) to write new or revise existing ordinances to protect natural resources. In addition to these grants, the Program organized and facilitated two annual events (Rendez-Vous) that brought all DNR Community Assistance grantees (2008 and 2009 appropriations) together for full days of information-sharing and peer-to-peer learning. The DNR also convened the three cities undertaking urban tree canopy (UTC) inventories, along with the University of Minnesota forestry and extension service, U.S. Forestry Service, and Minneapolis Park and Recreation Board, to hear about each city's findings and proposed applications of UTC data.

This third result area also funded the development and offering of six new natural resource-based workshops in 2010/2011 for local government staff and appointed officials. These workshops were offered in the metro area and were promoted by Government Training Services to its clientele (local government commissioners). Almost 325 local government staff and officials (62% from cities; 14% counties; 10% townships; and14% special districts and others) attended these workshops on shoreland conservation, stormwater management, and the incorporation of natural resources into land use

planning and engineering design. The workshops all received excellent evaluations from attendees.

Project Results Use and Dissemination
Press releases were sent to local newspapers where projects were funded. The DNR convened all of the Community Conservation Assistance (CCA) project managers in November of 2009 and in February 2011 to share the findings of their conservation work. CCA Project Profiles were drafted and posted on the DNR website. Protection and restoration project information is available through the Metro Conservation Corridor partnership map created for public use. The CCA deliverables will be tried and tested as part of the Results Outcomes effort by the State of Minnesota.

Project completed: 6/30/2011

2.7/3.6 FINAL REPORT - MeCC V - Scientific and Natural Area Restoration and Acquisition - MN DNR ($646,955)

Project Outcome and Results
Nearly 150 acres of high quality native habitat threatened by urban development was acquired and added to two metro Scientific and Natural Areas (SNAs). First, 80 acres were acquired (36.7 acres pro-rated to this appropriation) and added to the Hastings Sand Coulee SNA. The addition contains native oak savanna and prairie and increases this SNA to 267 acres. Thus, more than half of this largest remaining prairie complex in Dakota County is protected for its 13 resident rare species (including 3 snake and 2 butterfly species) and for public use, including hiking and nature observation. Second, about 70 acres - including public fishing frontage on the Credit River - was acquired (6.2 acres pro-rated to this appropriation) and added to the Savage Fen SNA in Scott County. These sites offer urban residents close-to-home nature-based recreation, including a new archery hunting opportunity on 300 acres at Savage Fen SNA.

SNA restoration and enhancement activities were completed on 187 acres at 13 SNAs in 7 counties in the greater metropolitan area. For example, a 55-acre prairie was reconstructed (restored) at Lost Valley Prairie SNA with the help of volunteers and a Sentence-to-Serve crew using seed collected on site by hand and mechanically harvested by the SNA crew. Almost 100 acres was prescribed burned at 5 SNAs. About 34 acres received invasive species control actions, including work by Conservation Corps Minnesota. These activities result in better habitat for the SNAs' rare features and improved quality for users of SNAs.

Project Results Use and Dissemination
Information about Scientific and Natural Area (SNA) sites, including those SNAs with new acquisition, restoration, enhancement and development activities through this appropriation, is available on the DNR website (www.mndnr.gov/snas). DNR-sponsored volunteer events, such as those involved in the Lost Valley Prairie, are regularly posted at: www.dnr.state.mn.us/volunteering/sna/index. Both of the acquisition projects received publicity in local newspapers and in partner organization newsletters. Specifically, Savage Fen SNA acquisition was publicized in the Shakopee Valley News and in the Trust for Public Land's electronic newsletter and electronic invite. The Hastings Sand Coulee SNA acquisition was referenced in articles in the Hastings Gazette and the Friends of the Mississippi River website.

Project completed: 6/30/2011

2.9/3.5 FINAL REPORT - MeCC V - Fish and Wildlife Habitat Restoration and Acquisition - MN DNR ($500,000)

Project Outcome and Results
This project had a two pronged focus. Result 1 (4f2.9) focused on a trout stream habitat restoration project located within Vermillion River Aquatic Management Areas (AMA), in Dakota County. This stretch of the Vermillion River channel had been altered by ditching. Result 2 (4f3.5) focused on securing fee title parcels on the Vermillion River in Dakota County and Eagle Creek in Scott County. Parcels include habitat linkages that provided environmental protection of the shoreline and riparian zone, exhibit a high risk of development, supply angler access, and afford management access necessary for implementing habitat improvement projects. Project goals were to restore 0.6 miles of stream habitat and acquire 60 acres with 1.0 mile of shoreline. Partner funding includes donations of land value and cash.

Result 1 (4f2.9): Restoration of 0.9 miles of Vermillion River channel. Environmental and Natural Resources Trust Fund (ENRTF) dollars directly restored approximately 0.44 miles of the total restored channel. Other State dollars (TU OHC = $140,000) restored 0.41 miles, and other funding (Vermillion River Watershed = $20,000) restored 0.05 miles of the total.

Result 2 (4f3.5): Acquisition of four parcels with a grand total of approximately 50.5 acres and 1.1 miles of stream shoreline. Because of the extreme variation in shoreline values it is hard to accurately predict a reliable acre benchmark. Most years, including the 2008 ENRTF appropriation, we far exceeded our acres goal. For the 2009 ENRTF appropriation, we fell short of the acres goal, but reached our "miles of shoreline" goal. ENRTF directly acquired approximately 38.8 acres of the total, including 0.7 miles stream shoreline. Donations of land value ("other funds" $106,800) accounted for 11.7 acres and 0.4 shoreline miles. One of the Vermillion River parcels (parcel 7) was acquired jointly using both 2008 and 2009 grants to Metro Corridors Conservation Partnership. Results for Vermillion River, P7 were proportionately distributed for each grant.

Overall, as a result of this project, 0.9 miles of Vermillion River channel was restored to its original course, after being ditched for 50 or more years. Also, as a result of this project, 50.5 acres, including 1.1 miles of critical shoreline fish and wildlife habitat are now permanently protected and open to public angling and/or hunting - as well as other light use recreational activities. Due to failed negotiations, two acquisitions went into abeyance towards the end of the grant, resulting in $57,975 being turned back to the ENRTF. Acquired parcels are now designated and managed as AMAs.

Project Results Use and Dissemination
All new AMA lands will be added to DNR's Public Recreational Information Maps (PRIM).

Project completed: 6/30/2011

3.1 FINAL REPORT - MeCC V - TPL's Critical Land Protection Program - Trust for Public Land ($380,000)
Project Outcome and Results
In its Critical Lands Protection Program, The Trust for Public Land (TPL) used $380,000 ENRTF funds to secure fee title on 21.63 ENRTF acres of 402 total acquired acres. TPL conveyed these lands to public agencies for permanent protection. Individual project successes include the following:

- TPL spent $318,000 2009 ENRTF funds to protect 14.43 ENRTF acres of land as part of a larger 64-acre purchase of shoreline designated by the Minnesota Department of Natural Resources as a "regionally significant ecological area." TPL conveyed the land to the City of Lindstrom to create the Allemansratt Wilderness Park.

- TPL spent $62,000 2009 ENRTF to protect 7.2 ENRTF acres of land as part of a 338-acre acquisition of one of the largest undeveloped and contiguous tracts of open space in the Twin Cities Metro Area. TPL then conveyed the land to Anoka County. Located at the confluence of Cedar Creek and the Rum River, this land will be managed by the County as the Cedar Creek Conservation Area.

TPL leveraged $380,000 in TPL Metro Conservation Corridors (MeCC) 2009 funding on these projects with $992,000 in non-state funds to protect 87.79 additional pro-rated acres of land. $652,000 of this was non-state public funds and $339,500 of this was from private land value donations. Additionally, $500,000 in state remediation grant funds were used to protect 22.7 pro-rated acres and $1,900,000 in Outdoor Heritage Funds were used to protect 221.4 pro-rated acres. TPL's 2010 ENRTF funds in the amount of $338,000 and DNR's 2008 ENRTF funds in the amount of $200,000 were used to protect 39.4 pro-rated acres and 9.08 pre-rated acres respectively. All acres acquired total 402.

*Please note, since a portion of TPL's 2010 ENRTF funding was used for the Cedar Creek Conservation Area project, a portion of these results will also be reflected in TPL's 2010 MeCC Work Program update and Final Report.

Project Results Use and Dissemination
As conservation transactions were completed, The Trust for Public Land disseminated information on the TPL website www.tpl.org, broadcast emails to Embrace Open Space (EOS) and TPL list serve members, distributed press releases, and included information in TPL's newsletters as appropriate. TPL also worked with the long-term stewards to ensure information was distributed to their listserves and posted on their websites as well.

Project completed: 6/30/2011

3.2 FINAL REPORT - MeCC V - Protecting Significant Habitat by Acquiring Conservation Easements - Minnesota Land Trust ($250,000)
Project Outcome and Results
During the fifth phase of the Metro Corridors project, the Minnesota Land Trust continued to work with landowners throughout the greater metropolitan area to permanently protect lands that are key components of Minnesota's remaining natural areas in the region. Eight perpetual conservation easements were completed that collectively protect 765 acres of land and more than 13,000 feet of shoreline. Three easements were purchased, and the remaining five easements were donated. While two of the purchased easements used both 2009 and 2010 ENRTF funding, we are reporting the accomplishments as part of our 2009 report. We will not report these acres in future 2010 reports to avoid double-counting. All eight projects represent unique opportunities to protect high quality natural habitat, riparian areas, and to build upon prior land protection work by the Land Trust at several priority sites. The specific project sites of the conservation easements include:

- 45 acres, including 1,095 feet of shoreline, along Deer Lake in Anoka County (purchased using both ML 2009 and ML 2010 ENRTF appropriations);
- 148 acres, including 2,527 feet of shoreline, along Elk River in Sherburne County (donated);
- 44 acres, including 3,065 feet of shoreline, on Kingswood Pond in Hennepin County (purchased using both ML 2009 and ML 2010 ENRTF appropriations);
- 157 acres near Hardwood Creek in Washington County (donated);
- 5 acres in Scandia in Washington County (donated);
- 126 acres near the headwaters of Valley Creek in Washington County (donated);

- 39 acres adjacent to Wild River State Park in Chisago County (purchased using ML 2009 ENRTF appropriation only);
- 201 acres near Baypoint Park in Goodhue County (donated).

Additionally, the Land Trust prepared baseline property reports for each easement, detailing the condition of the property for future monitoring and enforcement. To fund this required perpetual obligation, the Land Trust dedicated ENRTF and other funds to its segregated Stewardship and Enforcement Fund for all completed projects. We estimated the anticipated annual expenses of each project and the investment needed to generate annual income sufficient to cover these expenses in perpetuity - all in accordance with our internal policies and procedures as approved by LCCMR. We will report to LCCMR annually on the status of the Stewardship and Enforcement Fund and the easements acquired with funds from this grant.

Values are known for only five of the eight easements acquired, and this value totals $854,500, with a known donated value of $413,500. The cost to the State of Minnesota to complete these projects was just over $326 per acre.

Cumulatively, across phases I-V of the Metro Corridors program, the Land Trust has protected 3,298 acres of critical habitat and more than 75,000 feet of shoreline, at a cost to the State of $520 per acre.

The Minnesota Land Trust's work on this project continues to demonstrate the cost effectiveness of working with conservation easements to protect natural and scenic resources within developed and developing areas, as the cost to the State was well below the cost to purchase land in the Twin Cities region. This grant continued to generate interest among landowners, and therefore, ongoing funding will be important to sustained success. Additionally, our experiences during this phase of the grant continue to indicate that funds to purchase easements, as opposed to obtaining donated easements, will be necessary in the future as work becomes more targeted, selective, and focused on building complexes of protected land.

Project Results Use and Dissemination
The Minnesota Land Trust disseminated information about the specific land protection projects completed under this grant though our newsletter, email updates, web site, and press releases. The Land Trust also shared information about conservation easements generally and our experience with our partner organizations, other easement holders, local communities, as well as policy makers including members of the LCCMR and L-SOHC.

Project completed: 6/30/2011

3.3 FINAL REPORT - MeCC V - Expansion of Minnesota Valley National Wildlife Refuge - Minnesota Valley National Wildlife Refuge Trust, Inc. ($225,000)
Project Outcome and Results
The Minnesota Valley National Wildlife Refuge Trust, Inc. acquired 96 acres of priority lands in the Minnesota River Valley floodplain in Sibley County to expand the Jessenland Unit of the Minnesota Valley National Wildlife Refuge. Of the 96 acres acquired, the Environment and Natural Resources Trust Fund paid for 90 acres and the Minnesota Valley Trust paid for 6 acres with nonprofit and other non-state funds.

Using other non-state funds, the Minnesota Valley Trust also acquired 44.67 acres of priority lands in the

Minnesota River Valley in Scott County to expand the Blakely Unit of the Minnesota Valley National Wildlife Refuge. The Blakely and Jessenland Units are on opposite (facing) sides of the Minnesota River and, together, form a large contiguous block of priority wildlife habitat.

Both of these acquisitions expand upon prior acquisitions funded in part by the Environment and Natural Resources Trust Fund, as recommended by the LCCMR. The parcels acquired are adjacent to other lands protected by the Minnesota Valley Trust for the Minnesota Valley National Wildlife Refuge.

The Blakely and Jessenland Units of the Refuge were identified through a planning process by the US Fish and Wildlife Service as priority expansion units of the Minnesota Valley National Wildlife Refuge. The parcels acquired are within the expansion boundaries of those Refuge units.

After any needed restoration, the lands will be donated to the USFWS for perpetual management as part of the Minnesota Valley National Wildlife Refuge. They will be managed for wildlife and wildlife-dependent recreation, including hunting, fishing, wildlife observation, photography, wildlife interpretation and environmental education.

Project Results Use and Dissemination
The Minnesota Valley Trust will publicize the completion of this project through its website and news releases. All funding partners will be acknowledged on Refuge kiosks, including the Environment and Natural Resources Trust Fund, as recommended by the Legislative Citizen Commission on Minnesota Resources.

Project completed: 6/30/2011

Statewide Ecological Ranking of Conservation Reserve Program (CRP) and Other Critical Lands
Subd. 04g $107,000

Greg Larson
BWSR
520 Lafayette Road N
Saint Paul, MN 55155

Phone: (651) 297-7029
Email: greg.a.larson@state.mn.us
Fax: (651) 297-5615
Web: http://www.bwsr.state.mn.us/ecological_ranking/

Appropriation Language
$107,000 is from the trust fund to the Board of Water and Soil Resources to continue the efforts funded by the emerging issues account allocation to identify and rank the ecological value of conservation reserve program (CRP) and other critical lands throughout Minnesota using a multiple parameter approach including soil productivity, landscape, water, and wildlife factors.

Overall Project Outcomes and Results
To allocate scarce fiscal resources to natural resource programs, identifying the location and ranking the ecological value of critical lands is important. Using parameters of soil productivity, soil erosion risk,

water quality risk, and habitat quality, an ecological ranking tool was developed. An economic model was also incorporated to analyze CRP (Conservation Reserve Program) parcels and determine the likelihood of contract renewal given anticipated crop prices and land quality. A parameter for soil erosion risk was developed using several factors from the Universal Soil Loss Equation. To identify lands posing a risk to water quality, or lands that are most likely to contribute overland runoff to surface waters, terrain analysis was used. Runoff rankings from terrain analysis were then integrated with a proximity analysis of surface water features based on DNR 24k surface water data. A parameter for habitat quality was derived from an update to the work done as part of the Minnesota Conservation and Preservation Plan (LCCMR, 2008). Combining the data sets therein, and assessing them with a "weight of evidence" approach, produced a ranking of wildlife quality. These several parameters were combined into an environmental benefits index (EBI). High EBI translates into high risk. Therefore, a high EBI score implies a site has a high value for conservation. CRP or other parcels deemed critical for conservation can be assessed simultaneously on the basis of multiple ecological benefits. The EBI tool has demonstrated utility as users can establish thresholds for EBI values based on program goals and amount of funding available.

Project Results Use and Dissemination
The EBI was first presented to a general audience through a WEBINAR. A follow-up technical training session, geared to GIS professionals, was developed. The technical sessions were attended by 42 conservation professionals representing local units of government, state and federal agencies, non-governmental organizations, and private companies.

A majority (70%) of participants at the three technical training sessions said they planned to use the ecological ranking tool in their professional work. Given the diverse professional affiliations of the participants, their active involvement in conservation planning and delivery, and their connection to the network of natural resource professionals, it is likely that the Ecological Ranking Tool will be integrated into many conservation activities throughout Minnesota.

Presentations of the project and project results were provided to the LCCMR, Lessard-Sams Outdoor Heritage Council and the Board of Water and Soil Resources.

A final report was prepared. The report describes all results in more detail and includes maps and graphics and suggestions for use. A website was established by the Board of Water and Soil Resources that provides an overview of the ranking methodology. The BWSR website also includes links to an interactive ranking tool (located at the University of Minnesota, Natural Resources Research Institute (NRRI) and the final report, which is available in downloadable format.

Project Publication:
Statewide Ranking of Ecological Value of CRP and other Critical Lands

Project completed: 06/30/2011

Protection of Granite Rock Outcrop Ecosystem
Subd. 04h $1,500,000

Thomas Kalahar
Renville Soil and Water Conservation District

1008 West Lincoln
Olivia, MN 56277

Phone: (320) 523-1559
Email: kalahar@yahoo.com
Fax: (320) 523-2389
Web: http://www.renvilleswcd.com

Appropriation Language
$1,500,000 is from the trust fund to the Board of Water and Soil Resources, in cooperation with the Renville Soil and Water Conservation District, to acquire perpetual easements of unique granite rock outcrops located in the Upper Minnesota River Valley and to restore their ecological integrity.

Overall Project Outcome and Results
A total of 560.4 acres of rare and unique Minnesota River Valley landscape were permanently protected and sixteen landowners were paid $1,379,814 for voluntarily placing perpetual conservation easements on those acres. Five counties participated in the project including Lac qui Parle, Chippewa, Yellow Medicine, Redwood and Renville. Easement applications were scored by resource professional teams and funding was based on those scores.

Soil & Water Conservation District (SWCD) employees saw a need to protect the natural environment and to provide economically viable choices for the landowners. The Minnesota River Valley contains exposed ancient granite rock outcrops that provide unique landscape features and habitat for specialized plant and animal communities rarely found elsewhere in Minnesota. No programs existed that would give landowners a payment if they chose to protect the area from development by mining, overgrazing and other development interests. Rock outcrops are a component of the Minnesota River's riparian zone, and destruction of this unique habitat degrades water quality and wildlife habitat in the Minnesota River and its tributaries. Removal of the rock results in severe degradation and permanent loss of these unique landscape features. The Minnesota River Corridor is easily susceptible to fragmentation because it comprises such a small percentage of the Minnesota River Watershed. Past development activities and mining operations have already fragmented large areas of the fragile Minnesota River Corridor.

Demand for aggregate is growing as our population and infrastructure grow. Interest in mining exposed granite rock outcrops in the Minnesota River Valley is high because the rock is readily available and there is no overburden to remove. This encourages the practice of horizontal mining, removing the easiest and most profitable rock, and moving on. Unlike gravel mining operations, there is no reclamation plan possible for replacing this unique landscape feature once it is removed.

Project completed: 06/30/2012

MN Farm Bill Assistance Project
Subd. 04i $1,000,000

Tabor Hoek
Board of Water and Soil Resources (BWSR)
520 Lafayette Rd N

St. Paul, MN 55155

Phone: (507) 537-7260
Email: tabor.hoek@state.mn.us
Fax: (507) 537-6368
Web: http://www.bwsr.state.mn.us

Appropriation Language
$1,000,000 is from the trust fund to the Board of Water and Soil Resources to provide funding for technical staff to assist in the implementation provisions of conservation programs including the federal farm bill conservation programs. Documentation must be provided on the number of landowner contacts, program participation, federal dollars leveraged, quantifiable criteria, and measurement of the improvements to water quality and habitat.

Overall Project Outcome and Results
A joint effort of MN Board of Water and Soil Resources, MN Dept. of Natural Resources, MN Pheasants Forever, and local Soil and Water Conservation Districts, the focus was acceleration of technical assistance to private landowners for enrollment in federal USDA conservation programs as they relate to grassland and wetland resources. This effort provided 16 full time equivalents at the field level with a goal to establish or restore 50,000 ac. of grassland and wetlands during the 2 year period ending June 1, 2011. This goal was exceeded with a total enrollment of 69,081 acres resulting in $79,000,000 of USDA program payments coming to MN landowners for implementing conservation practices on their land. Efforts of this project will continue for at least another 2 years under new funding from the Environment and Natural Resources Trust Fund and partner agency contributions.

Project Results Use and Dissemination
Overall project results and its impact can be found in the Minnesota Conservation Lands Summary table found at http://www.bwsr.state.mn.us/easements/COENROL_083111.pdf.

Project completed: 06/30/2011

SUBD. 05 WATER RESOURCES

Intensified Tile Drainage Evaluation
Subd. 05d $300,000

Shawn Schottler
Science Museum of Minnesota
16910 152nd Street N
Marine on St. Croix, MN 55047

Phone: (651) 433-5953 x18
Email: schottler@smm.org
Fax: (651) 433-5924

RESEARCH

Appropriation Language
$300,000 is from the trust fund to the Science Museum of Minnesota for the St. Croix watershed research station to conduct a comparative assessment of hydrologic changes in watersheds with and without intensive tile drainage to determine the effects of climate and tile drainage on river erosion. This appropriation is available until June 30, 2012, at which time the project must be completed and final products delivered, unless an earlier date is specified in the work program.

Overall Project Outcome and Results
Agricultural rivers throughout Minnesota are impaired by excess sediment, a significant portion of which comes from non-field, near-channel sources, suggesting that rivers have become more erosive over time. In the upper Mississippi basin, crop conversions have lead to an intensification of artificial drainage, which is now a critical component of modern agriculture. Coincident with the expansion of drainage networks were increases in annual rainfall. To disentangle the effects of climate and land-use we compared changes in flow, runoff ratio, precipitation, crop conversions, and extent of drained depressional areas in 21 watersheds over the past 70 years. Major finding from this study are:

- Flow and runoff ratio have increased by than more 50% in about half of the watersheds.
- Increases in rainfall generally account for less than half of the increases in flow.
- The largest increases in flow are correlated to the largest conversions to soybeans and extent of artificial drainage.
- Using a water budget, calibrated to the first 35 years of record, we calculate that artificial drainage accounts for the majority of the statistically significant increases in flow.
- Artificial drainage of depressional areas reduces water residence time on the landscape, consequently; a significant portion of annual rainfall that was once returned to the atmosphere via evapo-transpiration, is now routed to the rivers.
- Loss of depressional areas and wetlands are strongly correlated to increases in excess flow in the 21 watersheds, thus supporting the proposed linkage between facilitated drainage of depressional areas and increases in river flow.
- Rivers with increased river flow have experienced channel widening of 10-40%.
- Climate, crop conversion and artificial drainage have combined to create more erosive rivers, with drainage as the largest driver of this change.

Project Results Use and Dissemination
Results of this study have been submitted for publication to the journal Hydrological Processes and have been accepted pending final review. Summaries and findings and implications of this study have been presented at more than 30 technical meetings in Minnesota and nationally. Many of these presentations have been in conjunction with local watershed groups, and have an audience of County Commissioners, farmers, SWCD staff, and agricultural consultants. These meetings have been highly successful at delivering the findings of this study to people who are directly involved in watershed management but are less likely to attend scientific meetings or read scientific journals.

Project completed: 06/30/2012

Citizen-Based Stormwater Management
Subd. 05e $279,000

Becky Rice
Metro Blooms

PO Box 17099
Minneapolis, MN 55417

Phone: (651) 699-2426
Email: becky@metroblooms.org
Web: http://www.metroblooms.org

Appropriation Language
$279,000 is from the trust fund to the commissioner of natural resources for an agreement with Metro Blooms, in cooperation with Minnehaha Creek Watershed District and the city of Minneapolis, to install and evaluate the effectiveness of rain gardens on improving the impaired water of Powderhorn Lake in Minneapolis. This appropriation is available until June 30, 2012, at which time the project must be completed and final products delivered, unless an earlier date is specified in the work program.

Overall Project Outcome and Results
The long term success in reducing impairments to local water bodies will require better citizen-based approaches to increase public awareness and affect behavior change. This project demonstrates a fast-paced approach to citizen engagement for the installation of raingardens within a 28-acre area that drains to Powderhorn Lake (Minneapolis). A paired watershed study was undertaken to evaluate the effectiveness of raingardens in reducing runoff and pollutant loads generated solely on private property.

230 community members participated in project installation events and activities demonstrating the connection between runoff and water quality of Powderhorn Lake. Approximately 50% of homeowners in the test neighborhood received a free raingarden for a total of 125 project-installed raingardens. Two congregations also installed raingardens and permeable pavement strips in their parking lots. Youth and young adult job programs excavated and planted the majority of gardens. More than 70,000 sq. ft. of impervious area was redirected to a stormwater best management practice (BMP). Additionally, 50% of participants also exhibited behavior change by taking voluntary steps to reduce run off from their property (redirecting downspouts, installing rainbarrels, or additional raingardens).

Performance was measured by monitoring the quality and quantity of stormwater discharged to Powderhorn Lake from the test and control sites and comparing results. Minneapolis Park and Recreation Board installed and maintained equipment for three years, providing stormwater runoff characteristics before and after raingarden installation.

Fewer water quality samples were collected than planned due to challenges posed by the urban storm sewer system and climatic conditions. While the paired watershed analysis results do not show a statistically significant outcome, the few water quality samples collected in 2011 provide promise that the test neighborhood efforts could have reduced pollutant loads when compared with the control area. Continued stormwater monitoring is planned in both areas (funded by the City of Minneapolis).

Project Results Use and Dissemination
The project has continued to engage others in similar efforts across the Twin Cities metropolitan area, including 14 additional Neighborhood-of-Raingardens style projects led by Metro Blooms and another 170+ raingardens installed.

Neighborhood of Raingardens is also a film produced by University of Minnesota's Mark Pedelty, and funded by the Institute on the Environment. The film gives an introduction to raingardens and

stormwater runoff and highlights the Powderhorn Park project. It aired on the MN Channel (TPT MN) on April 22, 2011 at 7:30pm, with repeats on April 23, 2011 at 1:30am and 7:30am, and during the month of June. The film has been shown at neighborhood events and co-ops and is available to be viewed online or for download at http://www.raingardenmovie.org.

Metro Blooms has a created a Powerpoint presentation on the project, which has been presented to the Watershed Partners and Blue Thumb partners, as well as staff of the Ramsey Washington Metro Watershed District. We will be presenting our project at the2012 Water Resources Conference, a state-wide event that showcases innovative, practical, and applied water resource engineering solutions, management techniques, and current research about Minnesota's water resources.

All project partners received a copy of the final report and executive summary. All project participants received a copy of the executive summary with accompanied raingarden maintenance brochure. The full report and executive summary are available on our website at http://www.metroblooms.org/neighborhood-of-raingardens.org. Additional copies of the executive summary will be made available at outreach events and upon request, while supplies last.

Project Publication:
A Citizen-Based Approach to Stormwater Management: Raingardens to Improve Impaired Waters (PDF - 12.6 MB)

Project completed: 06/30/2012

Minnesota Drainage Law Analysis and Evaluation
Subd. 05f $87,000

Louis Smith
Smith Partners PLLP
400 Second Ave S, Suite 1200
Minneapolis, MN 55401

Phone: (612) 344-1400
Email: smith@smithpartners.com
Fax: (612) 344-1550
Web: http://www.smithpartners.com; http://www.waterlaws.com

Appropriation Language
$87,000 is from the trust fund to the commissioner of natural resources for an agreement with Smith Partners PLLP to identify and analyze legal and policy issues where the drainage code conflicts with other laws impacting protection of public waters and wetlands.

Overall Project Outcome and Results
The Environment and Natural Resources Trust Fund enabled this study to analyze Minnesota drainage laws and related economic and environmental considerations, and to explore alternative strategies that would best protect both the state's surface waters and the rights of property owners to make beneficial use of their land through drainage. This study presents an overview of the drainage code and related water resource laws; identifies critical issues where potential conflicts between the drainage code and

other laws create barriers to successful resource protection; and identifies three prototypical demonstration scenarios (Red River Valley, Minnesota River Valley, and Developing Watershed) to inform the study's analysis of these critical issues.

A study advisory committee composed of individuals from diverse backgrounds and expertise met nine times, from December 2009 through May 2011. We also presented this study to the Minnesota Association of Watershed Districts annual meeting in 2009 and 2010; three times to the Board of Soil and Water Resources Drainage Work Group; and to the Red River Watershed Management Board in June 2011.

Key recommendations include:

- Give drainage authorities more tools and resources for watershed-based planning.
- Give drainage authorities more tools and resources to implement projects with integrated drainage, flood control, conservation and water quality benefits.
- Better integrate effects on wetlands and water quality into drainage authority decisions about drainage system work.
- Provide drainage authorities with more clarity in legal authority to address drainage system alignment, grade, cross section, and hydraulic capacity of bridges and culverts for multipurpose design of drainage system establishment, improvement, or repair.
- Extend the authority to establish a locally based wetland regulatory framework under a comprehensive wetland protection and management plan (CWPMP) to public water wetlands.
- Foster reliability of CWPMP outcomes through coordination of local land use authority and wetland regulatory authority.

The policy recommendations include both pertinent findings, specific recommended actions, and draft legislation.

Project Results Use and Dissemination
This project will be presented at the University of Minnesota Water Resources Conference on October 18-19, 2011, the Annual conference of the Minnesota Association of Watershed Districts on December 2, 2011, and at the Annual Convention for the Minnesota Association of Soil and Water Conservation Districts on December 6, 2011.

Project Publication:
MN Drainage Law Analysis and Evaluation (PDF - 3.3 MB)

Project completed: 06/30/2011

SUBD. 06 AQUATIC AND TERRESTRIAL INVASIVE SPECIES

Ballast Water Sampling Method Development and Treatment Technology
Subd. 06a $366,000 ($300,000 TF / $66,000 GLPA)

Rebecca Walter, MPCA; Principal Investigator, Allegra Cangelosi (Northeast Midwest Institute)
MPCA
520 Lafayette Rd N
St. Paul, MN 55155

Phone: (651) 757-2807
Email: rebecca.walter@state.mn.us

RESEARCH

Appropriation Language
$300,000 is from the trust fund and $66,000 is from the Great Lakes protection account to the commissioner of the Pollution Control Agency in cooperation with the Department of Natural Resources to conduct monitoring for aquatic invasive species in ballast water discharges to Minnesota waters of Lake Superior and to test the effectiveness of ballast water treatment systems.

Overall Project Outcome and Results
Safe and effective ballast water treatment (BWT) is the best way to prevent ship-mediated introductions of invasive species in the Great Lakes. However, knowing whether a proposed BWT works in freshwater, and whether it is used properly by a ship is a difficult challenge for the Minnesota Pollution Control Agency (MPCA) and other regulators. BWTs with International Maritime Organization (IMO) approval have never been tested in natural fresh water, and there are no agreed methods for monitoring ballast discharge from ships. This project assisted the MPCA through accomplishing a) IMO-consistent freshwater validations of two promising BWTs at the Great Ships Initiative (GSI) freshwater testing facility, and 2) design, installation and demonstration of a credible and feasible ballast discharge sampling method for Great Lakes ships. The IMO-approved PureBallast system (AlfaLaval), performed well in tests overseas, but did not function effectively in the GSI test, likely due to clogging by freshwater filamentous algae (see http://www.nemw.org/GSI/GSI-LB-F-A-2.pdf). This outcome informs MPCA that IMO-approval does not by itself assure freshwater effectiveness. The other BWT tested, a lye-based system aimed at US lakers, performed better (see http://www.nemw.org/GSI/GSI-LB-F-A-3.pdf), warranting refinement and shipboard testing. The project's ship sampling system proved a) applicable to the Great Lakes fleet, as demonstrated by project installation plans for 10 ships; b) cost-effective, as demonstrated by installations on 5 ships; and c) feasible, as demonstrated by sampling exercises on 2 ships. A detailed guidebook (see http://www.nemw.org/GSI/ballastDischargeMonitoringGuidebook.pdf) equips MPCA with the project method. All sample ports are permanent installations. The remaining four installations and seven tests will take place in 2012 using Department of Transportation, Maritime Administration funds. GSI will collect and analyze data on live organisms in ballast water discharge sampled in 2011 and 2012, and will post outcomes on the GSI website (http://www.greatshipsinitiative.org) and forward them to the MPCA.

Project Results Use and Dissemination
Final reports on ballast treatment tests performed pursuant to this grant, and the guidebook developed for ship discharge sampling, have been posted on the GSI public website (www.greatshipsinitiative.org). The project forwarded final reports on ballast treatment performance tests to the United States Environmental Protection Agency (USEPA) Science Advisory Board which reported to the USEPA and the USCG on availability of ballast treatment technology in 2011. NEMWI presented the sampling method developed through this project to an international gathering of ballast discharge researchers and regulators (Global R&D Forum and Exhibition on Ballast Water Management in a session on ballast treatment testing and compliance monitoring in Istanbul Turkey in the fall of 2011), and will submit the guidebook as a manuscript for the conference proceedings.

Project Publications:
Final Report of the Land-Based, Freshwater Testing of the AlfaWall AB PureBallast Ballast Water

Treatment System (PDF - 1.8 MB)
Final Report of the Land-Based, Freshwater Testing of the Lye (NaOH) Ballast Water Treatment System (PDF - 2 MB)
A Ballast Discharge Monitoring System for Great Lakes Relevant Ships: A Guidebook for Researchers, Ship Owners, and Agency Officials (PDF - 1.5 MB)

Project completed: 06/30/2011

Emergency Delivery System Development for Disinfecting Ballast Water
Subd. 06b $125,000

Scott Smith
USGS
6505 - 65th Street NE
Seattle, WA 98115

Phone: (206) 427-8374
Email: sssmith@usgs.gov
Fax: (206) 526-6654

RESEARCH

Appropriation Language
$125,000 is from the trust fund to the commissioner of the Pollution Control Agency for an agreement with the United States Geologic Survey to test the viability of treating ballast water through tank access ports or air vents as a means to prevent the spread of invasive species.

Overall Project Outcome and Results
This project was part of Phase III of an overall effort to produce an Emergency Response Guide to Handling Ballast Water to Control Non-Indigenous Species. Phase I ($25,000) was funded by National Oceanic and Atmospheric Administration and resulted in a study plan entitled "Mixing Biocides into Ships' Ballast Water: Efficiency of Novel Methods." Phase II ($185,000) was funded by the Great Lakes Fisheries Trust and studied in-line injection, bulk dye dosing, perforated hose dosing, and passive mixing methods, such as ship's motion.

Similar to Phase II, this effort (Phase III) prepared ballast tank mixing and sampling equipment, field work on a working ship to trial promising ballast mixing methods, and analysis/report. The active methods being studied in Phase III are venturi eductors and air lifts. The outcome will be the incorporation of these methods (if determined to be effective and practical) into a best practices guide for treating the ballast water of ships either:

- Arriving in port with high risk ballast water,
- Leaving a port that contains ballast known to be high risk for the destination port, or
- Grounded and laden with high risk, untreated ballast water.

Project Results Use and Dissemination
Preliminary information from Result 1 and Result 2 activities were shared at the May 18, 2010 Great Lakes Ballast Water Collaborative meeting in Montreal, QC and at the June 1, 2010 Lake Superior

Binational Program - Invasive Species Workshop in Duluth, MN.

The final project results consisting of two reports entitled "Emergency Response Guidance for Handling Ballast Water to Control Aquatic Invasive Species" and "Mixing Biocides into Ship's Ballast Water-Great Lakes Bulk Carrier Field Trials" are posted on the National Park Service web site at http://www.nps.gov/isro/naturescience/handling-ballast-water-to-control-non-indigenous-species.htm.

Project Publication:
Emergency Response Guidance for Handling Ballast Water to Control Aquatic Invasive Species (PDF - 2.2 MB)
Mixing Biocides into Ship's Ballast Water: Great Lakes Bulk Carrier Field Trials (PDF - 3.5 MB)

Project completed: 06/30/2012

Improving Emerging Fish Disease Surveillance in Minnesota
Subd. 06c $80,000

Katharine Pelican
U of M
1333 Gortner Avenue
St. Paul, MN 55108

Phone: (612) 625-8561
Email: pelicank@umn.edu
Fax: (612) 624-4906
Web: http://www.vdl.umn.edu

RESEARCH

Appropriation Language
$80,000 is from the trust fund to the Board of Regents of the University of Minnesota to assess mechanisms and control of the transmission of Heterosporosis, an emerging fish disease in Minnesota, to assist in future management decisions and research.

Overall Project Outcome and Results
Heterosporosis is an emerging disease of importance to Minnesota fish populations. The disease is caused by the previously undescribed microsporidian parasite, Heterosporis sp., which effectively destroys the skeletal muscle of susceptible fish hosts. The resulting damage from advanced infection renders the fillet unfit for human consumption and likely results in indirect mortality due to increased predation and reduced fitness. With no treatment of the disease in wild fish populations, management is limited to preventing the spread to naive fish populations. The goal of this study was to improve diagnostic testing capabilities and perform a survey to prevent the further spread of this important fish disease. To that end, a highly sensitive and specific quantitative PCR (qPCR) assay was developed to detect sub-clinical Heterosporosis disease in fish. This assay vastly improved our capacity to detect the pathogen and was used to survey 50 waterbodies in Minnesota. From this survey and three additional MDNR submitted samples, six new waterbodies were identified as Heterosporis-positive, including: North Long Lake, (Crow Wing County), Mary Lake (Douglas County), a private pond in both Douglas and

Pope Counties, Wabana Lake (Itasca County), and Black Hoof Lake (Crow Wing County). Positive fish species from this study included: walleye, yellow perch, cisco, northern pike, and for the first time spottail shiners. Further evaluation to characterize the parasite identified very low genetic variability in the species H. sutherlandae, collected from inland waters of Minnesota. However, there was a unique Heterosporis species (H. superiorae) in Lake Superior. This suggests a distant evolutionary divergence between the parasite species, but a rapid distribution once introduced into inland waters. These findings highlight the importance of continued surveillance and research to improve our understanding and control this important pathogen in Minnesota.

Project Results Use and Dissemination
The results from this project have been important for the management of the emerging fish disease, Heterosporosis, in Minnesota. This was achieved, in part, by increasing laboratory capacity and diagnostic confidence. The Minnesota Veterinary Diagnostic Laboratory now offers this highly sensitive and specific qPCR assay for surveillance testing and research. In addition, the ability to make science based management decisions at the MDNR has been greatly improved following the survey performed in this study. Understanding the distribution of Heterosporis is essential to controlling the spread.

The results from this project will be widely disseminated online, in press, and presented to a variety of stakeholders. A summary report will be made available on the University of Minnesota Extension's aquaculture website for review by aquaculture producers, veterinarians, MDNR, LCCMR, and other groups. A more detailed published paper will be prepared for submission to the Journal of Parasitology and presented at the American Fisheries Society - Fish Health Section Annual Meeting to update the scientific community on these important findings.

Project completed: 06/30/2012

SUBD. 7 ENERGY

Projecting Environmental Trajectories for Energy-Water-Habitat Planning
Subd. 07b $180,000

Peter Reich
U of M
220f Green Hall, Upper Buford Circle
St. Paul, MN 55108

Phone: (612) 624-4270
Email: preich@umn.edu
Fax: (612) 625-5212
Web: http://www.cbs.umn.edu/climatetracker

Appropriation Language
$180,000 is from the trust fund to the Board of Regents of the University of Minnesota to combine detailed climatic records of Minnesota with present and past ecosystem boundaries to forecast future fine-scale flow of climate across the state impacting human activities and natural resources.

Overall Project Outcome and Results
Just as weather flows across the surface of the earth, so does climate-only much more slowly. Understanding the flow of climate is of particular importance in Minnesota because Minnesota encloses the junction of the three great ecosystems of North America western prairie, northern needle-leaf forests, and eastern broad-leaf forests. Conditions here are particularly sensitive to local changes, and therefore can also be indicators for the nation as a whole.

We applied new methods for understanding this flow of climate, in terms of direction and speed, to actual historical Minnesota weather data. Utilizing established data on both average temperature and total precipitation, we found the lines along which precipitation and temperature do not change and where those lines intersect across Minnesota's landscape. Tracking the advancement of an intersection over time, artifacts of historic importance on climate are identifiable, such as the beginning and end of the dust bowl era. For the present and future, the data show climate in recent years moving northward at a few miles per year.

Results have two major implications, first, as a new confirmation of rate of climate shifts from projections based on global circulation models, and second, as a fine-scale mapping of climate migration in Minnesota. In addition to the average migration, we found differences between longitudinal and lateral migration and differences within Minnesota's ecoregions.

This report outlines the significance of climate migration on habitat for trees, tree pests and diseases, and insects in Minnesota. The project has spawned future research to apply the implications of climate flow, such as how it relates to degree days and other agricultural parameters for the bioenergy industry.

A public product of this project is the Climate Tracker, found on the project website: http://www.cbs.umn.edu/climatetracker. Climate Tracker allows citizens to follow the flow of climate at any point in Minnesota over the past century, including where it has been and where it is going.

Project Results Use and Dissemination
This was a two-year project. Its first year involved data assembly, algorithm validation, analysis, and preparation of preliminary maps and tables. In its second year, results were correlated with ecological, hydrological, physical, and social aspects. Included in the second year are a final report, public presentations, and web dissemination, which can be found at http://www.cbs.umn.edu/climatetracker. This website is designed to be user-friendly, useful, and interesting to both scientists and the general public. The interactive Climate Tracker application was developed as a novel way to dynamically view a century of data at a glance, while the brief video introduction presents information in a broader context and allows visitors to the website to meet some of the project researchers.

Future publications in scientific journals are expected to result from this project. Impacts of shifting climate on crops important to Minnesota's economy are being explored through collaborations with the Department of Agronomy and Plant Genetics at the University of Minnesota. A collaboration with the University of Minnesota's Department of Forest Resources is considering the interaction of climate and tree growth, tree ranges, and tree pests. A methods paper is underway documenting the methodology used in this project and comparing the resulting climate velocities with those found using Global Circulation Models.

Project completed: 06/30/2011

Energy Efficient Cities
Subd. 07c $2,000,000

Carl Nelson
Center for Energy and Environment
212 3rd Avenue N, Suite 560
Minneapolis, MN 55436

Phone: (612) 335-5871
Email: cnelson@mncee.org
Fax: (612) 335-5888
Web: http://www.mncee.org

Appropriation Language
$2,000,000 is from the trust fund to the commissioner of commerce for an agreement with the Center for Energy and Environment for demonstration of innovative residential energy efficiency delivery and financing strategies, training, installation, evaluation, and recommendations for a utility residential energy conservation program.

Overall Project Outcome and Results
The Energy Efficient Cities project was developed to demonstrate innovative residential energy efficiency program delivery to reduce energy use and environmental impact in at least 6,000 homes through a community-wide partnership approach. With strong and crucial support from local gas and electric utilities, city-specific programs were developed in a total of 8 cities: Apple Valley, Austin, Duluth, Minneapolis, Owatonna, Park Rapids, Rochester, and St. Paul. While each city developed a customized approach, each program was designed to provide a "one-stop shop" comprehensive whole-house approach that makes taking energy efficiency actions as easy as possible for the homeowner, while maximizing participation and energy savings opportunities. This comprehensive approach involved the following components shared by each program:

- Community-based marketing strategies to recruit participants to workshops and for training participants to take low-cost energy actions;
- Home energy visits that include installation of low-cost materials and identify other energy-saving opportunities;
- Energy usage feedback reports to encourage individual energy-saving actions;
- Follow-up assistance, including providing cost-share, for completion of major efficiency upgrades including insulation, air sealing and major mechanicals replacement; and
- Training and quality control for insulation and air sealing contractors.

The project exceeded its original goals for participation, with 8,243 people attending workshops, 6,922 of those households completing a home energy visit, and 1,474 homes completing major energy efficiency upgrades. Over 36 contractors were trained in high performance installation techniques for insulation and air sealing jobs. The upgrades completed under this program generated $4.8 million in work for Minnesota's insulation and heating contractors. The total energy savings from measures installed in these homes will result in an estimated $13.8 million dollars in energy savings for the homeowners over the life of the measures. The programs will be continued in at least 5 of the participating cities.

Project Results Use and Dissemination
Dissemination of information to homeowners was an integral part of the program. Our outreach activities for the program reached tens of thousands of Minnesotans, resulting in over 7,500 households attending a workshop that was produced by the project. The workshops educated people on basic energy conservation concepts and strategies, such as how a home loses energy, low-cost or no-cost methods for reducing energy, and what the process is for doing major energy efficiency upgrades in your home. The "Home Energy Resource Minnesota" website was also designed for education and outreach on energy efficiency issues. In addition, each city program had an on-line presence for dissemination of information about the program.

In addition to outreach targeted to homeowners as part of program activities, efforts were made to communicate to utilities, cities and other potential program sponsors of energy efficiency programs the Energy Efficient Cities program results, and increase uptake of similar residential programs. A presentation was given in August 2010 at the American Council for an Energy-Efficient Economy's (ACEEE) Summer Study on Buildings in Pacific Grove, California. Based on interest at that conference, another webinar presentation on the program was given as part of a series sponsored by the U.S. Department of Energy and attended by over 500 participants. A second webinar presentation was conducted for a national network of local government officials organized by the Institute for Sustainable Communities. A presentation was also conducted for the Clean Energy Teams (CERTs) conference in February 2011. Both Minneapolis's and St. Paul's programs were featured in a national study of retrofit programs by Lawrence Berkeley National Lab entitled "Driving Demand for Home Energy Improvements." As a result of the initial program success, programs in Minneapolis, Duluth, Owatonna, Rochester and Austin will continue beyond the grant period, funded by utilities and other sources.

Finally, a report was completed to document the project and communicate lessons learned to utilities and other potential program sponsors. The report will be disseminated to Minnesota utilities, and presentations will be scheduled with interested parties. A presentation has been scheduled for October in Owatonna for the Midwest chapter of the Association of Energy Service Professionals.

Project Publication:
Energy Efficient Cities: Using a Community-Based Approach to Achieve Greater Results in Comprehensive, Whole-House Energy-Efficiency Programs

Project completed: 06/30/2011

SUBD. 08 ADMINISTRATION AND OTHER

Contract Management
Subd. 08a $158,000

Kristel Lynch
DNR
500 Lafayette Rd
St. Paul, MN 55155

Phone: (651) 259-5533
Email: kristel.lynch@state.mn.us
Web: http://www.dnr.state.mn.us

Appropriation Language
$158,000 is from the trust fund to the commissioner of natural resources for contract management for duties assigned in Laws 2007, chapter 30, section 2, and Laws 2008, chapter 367, section 2, and for additional duties as assigned in this section.

Overall Project Outcome and Results
This appropriation was used to provide continued contract management services to pass-through recipients of Environment and Natural Resources Trust Fund dollars. The DNR provided this fiduciary service to ensure funds were expended in compliance with session law, state statute, grants policies, and approved work plans. Contract management ensured oversight of reimbursement for project deliverables and met the requirements of the Department of Administration's Grants Management procedures.

Ensuring timely access to the funds through streamlined grant agreements and prompt processing of reimbursement requests was an overarching goal of DNR's contract management. Services provided under this appropriation included the following:

- Contract Management Services
  - Prepare grant agreements and amendments.
  - Encumber/unencumber funds.
  - Execute Use of Funds agreements.
  - Communicate with LCCMR staff and pass-through grant recipients, informally and formally.
  - Continue to work on process improvements that improve efficiency and ease for grantee while ensuring fiscal integrity.
  - Contract management documentation, including file management.
- Training and Communications
  - Train recipients on state grant requirements, including reporting procedures, proper documentation of expenses, and the Department of Administration's grants management policies, to ensure grantees follow state law and grants management policies set forth by the state's grant agreement.
  - Work with recipients to ensure grantees understand the state's reimbursement procedures and requirements.
  - Provide ongoing technical assistance/guidance to recipients.
- Reimbursement Services
  - Review reimbursement requests to ensure claimed reimbursements include sufficient documentation and comply with state and session laws, LCCMR approved Work Plan and grants policies.
  - Arrange for prompt payment once grantee has submitted a completed reimbursement request and expenses have been deemed eligible for reimbursement.
  - Detailed accounting by pass-through appropriation for each recipient.
- Fiscal and Close-out Services
  - Financial reconciliation/reporting.
  - Contract management reporting (fund balance/expenditures).

- Examine records of recipients.
- Work with recipients to successfully close-out grants.

Project Results Use and Dissemination
This project's grants specialists are in frequent contact with pass-through grant recipients. The grants manager and DNR's liaison communicate with LCCMR staff. In addition, grant agreement requirements are communicated through manuals, emails, and letters.

Project completed: 06/30/2012

Legislative-Citizen Commission on Minnesota Resources (LCCMR)
Subd. 08b $1,254,000

Susan Thornton
Legislative-Citizen Commission on Minnesota Resources
100 Rev Dr Martin Luther King Jr Blvd, Rm 65
St. Paul, MN 55155

Phone: (651) 296-2406
Email: lccmr@lccmr.leg.mn
Fax: (651) 296-1321
Web: http://www.lccmr.leg.mn

Appropriation Language
$1,254,000 is from the trust fund for fiscal years 2010 and 2011 and is for administration as provided in Minnesota Statutes, section 116P.09, subdivision 5.

Overview
Per M.S. 116P.09, up to 4% of the amount available for appropriation from the Environment and Natural Resources Trust Fund (ENRTF) for a biennium is available for expenses related to LCCMR administration - this includes expenses pertaining to project selection, approval, and ongoing oversight of projects funded by the ENRTF, including new projects funded during the biennium and existing projects funded in previous bienniums. Historically, LCCMR has always used less than 3% of available funds for administration. This appropriation, which represents 2.33% of the amount available for the biennium, funds LCCMR administration expenses for FY 2010-11.

Project completed: 6/30/2012

M.L. 2008 Projects Completed 2011-2012

MN Laws 2008, Chapter 367, Section 2

M.L. 2008 Projects Completed 2011-2012

M.L. 2008 Projects
MN Laws 2008, Chapter 367, Section 2 (beginning July 1, 2008)

NOTE: Below are short abstracts for projects funded during the 2008 Legislative Session and ending during 2011-2012. The final date of completion for these projects is listed at the end of the abstract. Final Reports for all completed projects are available at http://www.lccmr.leg.mn/projects/2008-index.html or by contacting the LCCMR office.

Subd. 03 Land and Habitat
03b Vermillion River Corridor Acquisition and Restoration in Dakota County
03d Preserving the Avon Hills Landscape
03g State Land Acquisition Consolidation
03i Metropolitan Regional Park System Land Acquisition
03p Impacts of Climate Change and CO2 on Prairie and Forest Production - RESEARCH
03q Biofuel Production and Wildlife Conservation in Working Prairies - RESEARCH

Subd. 04 Water Resources
04b Accelerating Plans for Integrated Control of the Common Carp - RESEARCH
04e Intra-Lake Zoning to Protect Sensitive Lakeshore Areas
04f Native Shoreland Buffer Incentives Program
04h South-Central MN Groundwater Monitoring and County Geologic Atlases

Subd. 05 Natural Resource Information
05a Updating the National Wetlands Inventory for Minnesota
05c Updating Precipitation Intensities for Runoff Estimation and Infrastructure Designs
05g Conservation Easement Stewardship, Oversight and Maintenance
05h Conservation Easement Stewardship and Enforcement Program Plan

Subd. 06 Environmental Education
06b Global Warming - Reducing Carbon Footprint of Minnesota Schools

Subd. 7 Establishment of an Emerging Issues Account

SUBD. 03 LAND AND HABITAT

Vermillion River Corridor Acquisition and Restoration in Dakota County
Subd. 03b $400,000

Alan Singer
Dakota County
14955 Galaxie Ave
Apple Valley, MN 55124

Phone: (952) 891-7001
Email: al.singer@co.dakota.mn.us

Fax: (952) 891-7031
Web: http://www.co.dakota.mn.us

Overall Project Outcome and Results
The Vermillion River, a designated trout stream, flows through four cities and five rural townships starting in Scott County and running through Dakota County. The existing watershed plan, like most other comparable plans, identified and addressed water quality issues, but recommended and required that management efforts do not include corridor-related wildlife habitat protection and restoration, or recreational use and conflicts.

The new Vermillion River Corridor Plan developed with these funds establishes a vision and philosophy for the corridor along the main stem and primary tributaries of the Vermillion River from New Market Township in Scott County to Vermillion Falls in Hastings. It is based on integrating multiple benefits: environmental (water quality and upland habitat), social (recreation), and economic (sustainable high-quality places to live and work). The plan creates a foundation for coordinating and prioritizing funding, implementation and management. The plan also includes the "Vermillion River Corridor Handbook", a searchable, online Best Management Practices tool intended for use by a broad audience. The tool includes practices indexed by primary benefits (water quality, habitat, and recreation) and by the predominant landscape type of interest to the user (urban, rural, and developing). Information on and links to potential funding sources and technical information is included. The plan, process, and products were designed to be replicable.

The corridor plan also creates the framework for initiating a comprehensive riparian buffers initiative throughout Dakota County. An 800-point criteria system that includes water quality, wildlife habitat, recreation, financial, and other considerations was developed to evaluate and select future land protection projects. An innovative system for determining financial value for corridor buffer easements based on land cover/use types was developed.

The plan and resulting selection system resulted in the acquisition of a 193-acre permanent conservation easement that protects the headwaters of South Branch of the Vermillion River, a very high quality restored prairie, and a network of trails open to the public.

Project Results Use and Dissemination As the project transitioned from planning to implementation, information has been shared with the general public through various venues and media forms. See the Final Report, Section VII "Dissemination" for more information.

Project Publications:
Vermillion River Corridor Plan: Improving Water Quality, Habitat, and Recreation (PDF - 13.2 MB)
Vermillion River Corridor Handbook (Web-based)

Project completed: 6/30/2011

Preserving the Avon Hills Landscape
Subd. 03d $337,000

Thomas Kroll
Saint Johns Arboretum and University

Box 3000
Collegeville, MN 56321

Phone: (320) 363-3163
Email: tkroll@csbsju.edu
Fax: (320) 363-3202
Web: http://www.csbsju.edu/arboretum/avonhills

Overall Project Outcome and Results
The Avon Hills Initiative is a group of local citizens interested in preserving the rural nature of the 50,000 acre Avon Hills 15 miles west of St. Cloud. The group helped steer this project made possible with Environment and Natural Resources Trust Fund support. Saint John's provided the staff and fiscal support. This project had three goals:

1. Increase the level of interest and understanding of all citizens and landowners interested in the Avon Hills, mostly through conferences. Outcome: Three day-long conferences were held with nearly 900 total attendees indicating very strong local support.

2. Negotiate and complete acquisition of permanent conservation easements. Outcome: Six conservation easements totaling 400 high quality forest, wetland, and grassland acres in Stearns County were successfully enacted. Two of the easements, totaling 99 acres, were purchased, and four of the easements, totaling 301 acres, were donated by the landowners. These acres contain a total of more than two miles of shoreline on streams, ponds, and lakes, and provide habitat to a variety of species, including several of greatest conservation need. Additionally, through this process we tested a new method for prioritizing and acquiring easements for the best value. Called MMAPLE, the Minnesota Multi-faceted Approach for Prioritizing Land Easements, the system weighs the measurable environmental benefits against the cost that the current landowner wants to provide a permanent easement on that land. Using sealed bids, each landowner chooses their own price which results in lower costs and fewer complaints from landowners and taxpayers about the "fairness" or "price" of the easement process.

3. Provide support for township and county officials to review and change zoning and ordinances that impeded protection of the open space. Outcome: Two "conservation design" conferences for officials and the public as well as reviews of the existing ordinances by professionals resulted in positive feedback from the participants. This gradual education helped create sufficient support for Stearns County to pass a land-use ordinance that requires new housing developments in the Avon Hills to permanently preserve at least 80% of the land. This is believed to be the highest standard in the United States.

Project Results Use and Dissemination
The success of the land use concepts used in the Avon Hills of Stearns County to preserve open space and working forests and farms has been disseminated in a variety of ways. Staff, officials, and citizens have been asked to discuss the concepts with neighboring county officials and at professional meetings.

Todd County, a neighboring county, sent several officials to the land use conferences and has gradually begun to implement similar practices in their county.

The MMAPLE method developed under this grant is being used to apply for a Outdoor Heritage Fund

grant for more easements.

Project completed: 6/30/2011

State Land Acquisition Consolidation
Subd. 03g $500,000

Craig Engwall
MN Department of Natural Resources (DNR)
1201 E Hwy 3
Grand Rapids, MN 55744

Phone: (218) 999-7913
Email: craig.engwall@dnr.state.mn.us
Fax: (218) 327-4263
Web: http://www.dnr.state.mn.us

Overall Project Outcome and Results
The goal of a land consolidation revolving fund was, and is, to enable Department of Natural Resources (DNR) to purchase lands of significant natural resource value adjacent to, or imbedded within, lands that are already managed by public agencies. Many of these purchases are likely to be private, industrial forest lands that would otherwise be subdivided and sold for development. At the same time, the DNR would sell parcels of state-owned land that are isolated and difficult to manage from a resource or public benefit standpoint. The proceeds from the sale of these parcels would go back into the land consolidation revolving fund. By strategically purchasing and selling parcels through this fund, the state could achieve a net gain from both a natural resource and economic perspective.

The appropriation for this project enabled DNR to purchase five parcels in Koochiching County and two parcels in Itasca County, totaling 800 acres. These were key acquisitions as each one was selected because it either was a sole private parcel imbedded in tens of thousands of acres of public ownership, or it was adjacent to DNR managed lands and would enhance that management and provide natural resource benefits. Development or subdivision of these parcels would create fragmentation and potentially hinder forest management activities on adjacent lands.

On the sale side, results were not as successful. DNR identified six parcels in the project area for potential sale, but did not succeed in selling any of them. We learned from this project that the geographic scope of this project was too small. The vast majority of the land in the project area (well over 90%) is state trust fund land and the proceeds of sales from these lands must go to the corpus of the school trust fund and not the revolving account. Had the project been broadened to include some northwestern Minnesota counties, where there are significantly more acquired lands, the project would have had more success. On a positive note, DNR has statutory authority to continue the purpose of this project statewide and will do so. We will continue to provide LCCMR updates on our work in this area.

Project Results Use and Dissemination
The State Land Acquisition Consolidation project information has been disseminated to DNR staff who manage lands in the project area, as well as county land departments and county commissioners in Koochiching and Itasca counties.

As stated above, we were in regular contact with the counties. We also have communicated with third party non-profits such as The Nature Conservancy, The Trust for Public Lands, and The Conservation Fund.

Project completed: 6/30/2012

Metropolitan Regional Park System Land Acquisition
Subd. 03i $1,500,000

Arne Stefferud
Metropolitan Council
390 N Robert St
St. Paul, MN 55101

Phone: (651) 602-1360
Email: arne.stefferud@metc.state.mn.us
Fax: (651) 602-1467
Web: http://www.metrocouncil.org

Overall Project Outcome and Results
This $1.5 million appropriation leveraged a total of $1,833,241 of other funds to acquire 66.7 acres for the Metropolitan Regional Park System as follows:

- 0.5 acres including shoreline of the Mississippi River for Above the Falls Regional Park in Minneapolis (Grant SG-2008-143: $81,392 Environment Trust Funds and $54,261 Metro Council bonds, and matched with $45,216 of Minneapolis Park & Rec. Board funds for a total of $180,870).
- 9.42 acres along Rush Creek for Rush Creek Regional Trail managed by Three Rivers Park District in suburban Hennepin County (Grant SG-2009-021: $244,440 Environment Trust Funds and $152,528 Metro Council bonds, and matched with $132,233 of Three Rivers Park District funds for a total of $529,200).
- 8.89 acres including shoreline of Schulz Lake for Carver Park Reserve, managed by Three Rivers Park District in Carver County (Grant SG-2009-059: $431,640 Environment Trust Funds and $287,760 Metro Council bonds, and matched with $239,800 Three Rivers Park District funds for a total of $959,200).
- 8.12 acres including shoreline of Cedar Lake for Cedar Lake Farm in Scott County (Grant SG-2009-062: $221,810 Environment Trust Funds and $147,873 Metro Council bonds, and matched with $123,228 of Scott County funds for a total of $492,911).
- 38 acres including shoreline of the Mississippi River for Grey Cloud Island Regional Park in Washington County (Grant SG-2010-045: $445,455 Environment Trust Funds, and $296,970 Metro Council bonds, and matched with $247,475 of Washington County funds for a total of $989,900).
- 1.8 acres including shoreline of the St. Croix River for the St. Croix Valley Regional Trail in Washington County (Grant SG-2010-052: $75,263 Environment Trust Funds and $60,608 Metro Council bonds, and matched with $45,290 of Washington County funds for a total of $181,161).

Project Results Use and Dissemination
Each regional park agency that received a grant or grants from this appropriation informs the public about the land acquisition with its own website and news releases. The Metropolitan Council also publishes a "Regional Parks Directory and Map" that informs the public about the recreation activities available at each regional park and trail and includes website addresses and phone numbers for each park agency for more information. Finally, the Metropolitan Council's website includes an interactive parks map that contains the same information as the paper version of the "Regional Parks Directory and Map" at http://www.metrocouncil.org/parks/r-pk-map.htm.

Project completed: 6/30/2011

Impacts of Climate Change and CO2 on Prairie and Forest Production
Subd. 03p $330,000

Peter Reich
University of Minnesota
1530 Cleveland Ave N
St. Paul, MN 55108

Phone: (612) 624-4270
Email: preich@umn.edu
Fax: (612) 625-5212
Web: http://www.forestry.umn.edu/people/facstaff/reich/

RESEARCH

Overall Project Outcome and Results
Funds from the Environment and Natural Resources Trust Fund (ENRTF) were used to help establish, maintain, and expand studies regarding impacts of elevated carbon dioxide and changing climate on productivity (i.e. carbon acquisition) and carbon sequestration of woody and herbaceous vegetation. Two new state-of-the-art open air experiments were begun. A new biofuel-oriented experiment was installed in 72 elevated CO2 plots within the ongoing BioCON (Biodiversity, CO2, and Nitrogen) experiment - an effort started in 1997 that is examining how plant communities respond to environmental changes in biodiversity, CO2, and Nitrogen; these plots were planted with potentially "high-yielding" woody and herbaceous perennials. A Boreal Forest Warming experiment in Cloquet and Ely was installed, planted and warming treatments implemented in 2009 and 2010. ENTRF funds were also used to support specific carbon cycling measures in the original, ongoing BioCON experiment. The following findings were documented:

1. In all studies, results showed that acquisition of new carbon is likely in a world with higher CO2 levels and/or with modest warming, but is significantly dampened during periods of low water availability or when soil nutrients are limiting.
2. Long-term sequestration in soil of acquired carbon is likely modest due to the rapid return (through respiration of roots and decomposers) of new carbon to the atmosphere.
3. Soil carbon storage is likely dependent upon soil characteristics however, with sandy soils in our experiments less able to build up carbon stores than finer-textured soils might be.

4. Results suggest considerable potential to grow biomass carbon that could potentially contribute to biofuel offsetting of fossil fuel use and to carbon sequestration in live biomass, dead biomass, and potentially in soils.

Project Results Use and Dissemination Several publications are in preparation. These include experiment-specific papers (about individual experiments), cross-experiment papers for several related experiments at the Cedar Creek station, and meta-analyses and synthesis papers for which data from this ENRTF project have been combined with similar data from other experiments in North America, Europe, and Asia.

Project completed: 6/30/2011

Biofuel Production and Wildlife Conservation in Working Prairies
Subd. 03q $750,000

Clarence Lehman
University of Minnesota
100 Ecology Building,1987 Upper Buford Circle
St. Paul, MN 55108

Phone: (612) 625-5734
Email: lehman@umn.edu
Fax: (612) 624-6777
Web: http://www.cbs.umn.edu/eeb/faculty/LehmanClarence/

RESEARCH

Overall Project Outcome and Results
Minnesota prairies reliably produce bioenergy resources which largely go untapped. This project sought management practices to promote wildlife and habitat diversity on future working prairies used for bioenergy in Minnesota. It combined harvested areas with refuges and monitored wildlife populations and bioenergy potential in Minnesota grasslands, while developing protocols for future long-term work.

We collaborated with land managers of established prairies to survey birds, insects, small mammals, reptiles, amphibians, plants and soils in regions across western Minnesota. Statistical trends show that harvesting grasslands with refuge remaining does not reduce wildlife abundance. In fact, harvested areas supported greater biomass of insects for bird food. Harvesting can also increase overall small mammal abundance when equal area is left as refuge. These results are being clarified in the ongoing second phase of this project.

We measured bioenergy potential measured by harvesting prairies with production-scale equipment. We tested various harvesting machinery, techniques, and bale types, and found current round baling technology more amenable to these plots, a discbine cutter mounted on a four-wheel drive tractor as the most effective cutting equipment, and tractors with custom-made front and rear mounted bale spikes worked best for transport. We obtained noticeably higher quantities of biomass per acre in the south, but biomass quality was approximately the same. Harvesting three years in a row did not reduce yield, and we found mixed-species biomass can produce at least as much liquid fuel per unit mass as

switchgrass. Our bioenergy partners reported that bales of prairie grass have better storage life than other renewable feedstocks they used.

The large amount of data produced is being made available on the project website for general use. Results from this first phase of the project will inform future land management by analyzing the intersection of renewable energy and wildlife conservation.

Project Results Use and Dissemination
We have a project website available (www.cbs.umn.edu/wildlife) to make the ideas and results available world-wide. This website will continue to develop as the protocols for this project are refined and as data become available. The project will also be featured in Cedar Creek educational programs for school-age and other groups. Presentations (oral and poster) to special interest groups, research groups, and other interested parties continued by project collaborators throughout the project. The first publication from this project in a peer-reviewed scientific outlet is now available. (Jungers et al., Characterizing Grassland Biomass for Energy Production and Habitat in Minnesota, Proceedings of the 22nd North American Prairie Conference, 2010). Further publications will be submitted as the project moves into its second phase.

Project completed: 6/30/2011

SUBD. 04 WATER RESOURCES

Accelerating Plans for Integrated Control of the Common Carp
Subd. 04b $550,000

Peter Sorensen
University of Minnesota
1980 Folwell Ave
St. Paul, MN 55108

Phone: (612) 624-4997
Email: soren003@umn.edu
Fax: (612) 625-5299
Web: http://fwcb.cfans.umn.edu/sorensen/

RESEARCH

Overall Project Outcome and Results
The common carp (Cyprinus carpio) was introduced to Minnesota in the late 1800s and quickly came to dominate the fish communities in the south-central portion of the state where it is now responsible for poor water quality and greatly reduced duck habitat. Our previous Environment and Natural Resources Trust Fund (ENRTF) funded projects from appropriations in 2003 and 2005 had suggested that recruitment (survival of fertilized eggs to adulthood) might be a key weakness in the life history of the carp and that predatory fish, odors, or sounds might be used to control recruitment. This project investigated these possibilities in six studies ('results'):

1. For the first, we monitored the fate of carp eggs and larvae in both the field and lab to determine if predators might be eating them. We discovered that bluegill sunfish, a native game-fish, consume large numbers of carp eggs and larvae.
2. For result 2 we examined correlations between the abundance of young-of-the-year (YOY) carp and predatory game-fish across two dozen lakes using trap-net surveys. We discovered the YOY carp are rarely found in lakes that have bluegills, suggesting that bluegills control carp in lakes.
3. A third study examined the age structure of several populations of adult carp. It found that YOY carp only recruit in years and places where winter oxygen levels are low enough to kill bluegills.
4. A fourth study examined whether food odors might be used to enhance capture rates of YOY carp. While, we found evidence that certain baits are attractive in the lab, field results were variable and application appeared impractical.
5. A fifth study examined pheromones for use in YOY removal and came to a similar conclusion.
6. Lastly, we examined whether air-bubble curtains have potential to reduce the movement of YOY carps from nursery areas by producing sound. These results were promising.

In summary, this project provided compelling evidence that populations of invasive carp can be controlled by promoting the abundance of native predators and controlling movement using bubble barriers.

Project Results and Dissemination The results of this project are presently being implemented by the Riley Purgatory Bluff Creek Watershed District and the Ramsey Washington Metro Watershed District. Both watersheds report that carp densities are reduced and under control while water quality has improved. The barrier bubble developed here is now being developed further by another ENRTF project. This work has been described in 6 peer-reviewed publications (with more in review), over a dozen scientific meetings, a dozen agency meetings and in at least 6 press and TV reports.

Project completed: 6/30/2011

Intra-Lake Zoning To Protect Sensitive Lakeshore Areas
Subd. 04e $125,000

Paul Radomski
MN Department of Natural Resources (DNR)
1601 Minnesota Dr
Brainerd, MN 56401

Phone: (218) 833-8643
Email: paul.radomski@dnr.state.mn.us
Fax: (218) 828-6043
Web: http://www.dnr.state.mn.us

Overall Project Outcome and Results
Protection of critical fish and wildlife habitat, particularly for "species in greatest conservation need", is necessary given the substantial near-shore habitat losses estimated to date and the losses projected with future shoreland development. This cooperative Cass County/State project identified sensitive shoreland for the county's largest and most valuable waters. The project used objective, science-based criteria to identify sensitive shoreland parcels. Cass County selected seventeen lakes that were the highest priority for assessment (e.g., Ten Mile, Woman, and Leech). The objectives of this project were

to: (1) identify and map sensitive shorelands, (2) develop and adopt shoreland ordinances to provide greater protection to sensitive areas, and (3) propose and implement zoning districts for identified sensitive shorelands.

Biological surveys were completed on the 17 priority lakes, as well as three connecting waterbodies. Species presence was recorded in extensive spatial detail. Botanists documented a total of 69 native aquatic plant taxa, including 42 submerged and free-floating, 7 floating-leaf, and 20 emergent taxa. Surveyors mapped over 2,000 acres of bulrush, and over 6,000 acres of other emergent and floating-leaf plant stands. Seventeen unique or rare plant species were documented. Biologists recorded four fish species in greatest conservation need. Pugnose shiners were the most widespread of these species, and were recorded on 10 study lakes. Longear sunfish, least darters, and greater redhorse were collected on four lakes each. Biologists documented 161 bird species, including 45 species in greatest conservation need. Four of these species are listed as Threatened in Minnesota and seven species are of Special Concern status. Mink and green frog breeding locations were identified on all surveyed lakes.

A total of 190.2 miles of shoreline, representing 40% of the total shoreline miles, were identified as sensitive. Nearly 28,000 acres of shoreland were identified as sensitive. Cass County proposed and adopted innovative zoning provisions within their shoreland ordinance to protect water quality and near-shore habitat.

Project Results Use and Dissemination

We completed sensitive lakeshore assessments on the 17 priority lakes, as well as three connecting waterbodies. Lake reports summarizing sensitive lakeshore assessments were completed for the 20 lakes. These reports describe the results of the biological surveys and provide maps of identified sensitive lakeshore. Reports were distributed to Cass County as well as to interested lake associations, organizations, and individuals. They are also available online at: http://www.dnr.state.mn.us/eco/sli.

Public presentations explaining the sensitive area identification process and results were given to the Cass County Board of Commissioners, Cass County Planning Commission, Association of Cass County Lake Associations, U.S. Forest Service, multiple lake associations, and many other groups.

Several organizations have used the sensitive lakeshore identification information to help protect critical and vulnerable lakeshore areas. In 2010, Cass County received Environment & Natural Resource Trust Fund monies to provide assistance for donation of conservation easements to protect sensitive shoreland parcels in Cass County. The Leech Lake Area Watershed Foundation has identified large, undeveloped parcels that when overlaid with areas of sensitive shoreland have become priorities for conservation easements and acquisition. Recently implemented conservation easements on Wabedo Lake properties protect from development over 3500 feet of shoreline and nearly 70 acres of shoreland. Additional conservation easements that will protect another three to five miles of shoreline are currently in process. In addition, the information has been utilized within the DNR to help identify priority conservation areas (e.g., aquatic management areas). Finally, a project funded by an Outdoor Heritage Fund appropriation to the Leech Lake Area Watershed Foundation, Minnesota Land Trust, and DNR will pay for acquisition-related expenses and monitoring costs of donated permanent conservation easements on sensitive shorelands in north central Minnesota.

Cass County developed and adopted sensitive lakeshore and conservation subdivision ordinances. Other local governments are considering these ordinances for their own use. Crow Wing County modified Cass County's ordinance provisions for sensitive lakeshore protection, as the county is pursuing sensitive

lakeshore zoning districts to better protect areas in their jurisdiction. In addition, the DNR used Cass County's conservation subdivision ordinance within its draft state shoreland standards.

Project completed: 6/30/2011

Native Shoreland Buffer Incentives Program
Subd. 04f $225,000

Mark Hauck
MN Department of Natural Resources (DNR)
940 Industrial Drive South
Sauk Rapids, MN 56379

Phone: (320) 255-4279 ext. 236
Email: mark.hauck@state.mn.us
Web: http://mndnr.gov/nsbi

Overall Project Outcome and Results
Through a competitive grant process, the MN DNR offered two $75,000 grants. East Ottertail SWCD and the Itasca Water Legacy Partnership (Itasca SWCD) collaborated with DNR and the Water Resources Center (WRC) at the U of M to craft shoreland restoration incentive programs for lakeshore residential properties. Unique to this project was the focus on assessing the effectiveness of applying social science methods (KAP Studies) in promoting the planting of native shoreland buffers. Using a process that is well known but rarely used in natural resources, Dr. Karlyn Eckman (WRC) used KAP Studies to determine Knowledge, Attitudes and Practices of target audiences. The process has three steps:

1. Survey landowners
2. Design & implement incentives
3. Survey again

The second survey determines the effectiveness of project activities in changing the knowledge, attitudes and practices of the target audience. Target audiences for East Ottertail County were lakeshore owners 50 to 70 years old owning 120 feet or more of shoreline and for Itasca County, all landowners on 5 selected lakes. Funds were utilized for designing incentives and analyzing results.

Project conclusions:

- Using a "KAP Study" contributed to more successful outcomes (more shoreland restored) by predicting better incentives and better communication methods.
- People were more knowledgeable than expected about water quality.
- People in these particular studies were not motivated to action by a financial incentive - they took it because it was offered. Therefore, funds intended for financial incentives may have greater impact if they are re-allocated to hire high-quality, knowledgeable professionals.
- Social networks were more important than previously realized. Groups like lake associations, churches, garden clubs, informal groups of neighbors helped spur interest and motivation.
- More projects should incorporate KAP methods so they are "evaluation-ready" before implementation to better utilize the use of conservation funding and document project success to funders.

- Social science practices could be used in areas such as invasive species, habitat restoration, and recreation. Practices include KAP studies, message re-framing and utilizing existing social networks in the community.

Project Results Use and Dissemination

The DNR project manager and partners have shared the results of the project and project components on several different occasions at conferences to a total of approximately 365 attendees.

This project was submitted for consideration for the 2011 Environmental Initiative Awards. Now that the project is complete consideration is now being given for submission again in the spring of 2013.

In order to widen the influence of the results of the demonstrations, several actions are being considered at the present time. They include:

1. This final LCCMR report and the individual detailed survey evaluations will be entered into the DNR Documents Library for reference to others.
2. Development of a Native Shoreland Buffer Initiative web page hosted by the DNR that will provide a gateway to information on the buffer projects including survey examples, final reports from the University of Minnesota, resource products developed by the project partners.
3. Communication back to the original 'class' of buffer proposers participating in the initial workshop.
4. The DNR's Division of Ecological and Water Resources widely distributes results in order to adopt social science principles into natural resources work.

Discussions are ongoing as to the applicability of the project results to other programs within the Department of Natural Resources and elsewhere.

Project completed: 6/30/2012

South-Central MN Groundwater Monitoring and County Geologic Atlases
Subd. 04h $1,600,000

Part 1 ($894,000)
Jim Berg
MN Department of Natural Resources (DNR)
500 Lafayette Rd
St. Paul, MN 55155

Phone: (651) 259-5680
Email: jim.berg@dnr.state.mn.us
Fax: (651) 296-0445
Web: http://www.dnr.state.mn.us

Part 2 ($706,000)
Dale Setterholm
Minnesota Geological Survey
University of Minnesota
2642 University Ave. W.
St. Paul, MN 55114

Phone: 612) 627-4780
Email: sette001@umn.edu
Fax: (612) 627-4778
Web: http://www.geo.umn.edu/mgs/

PART 1: MN Department of Natural Resources

Overall Project Outcome and Results
To better understand the recharge dynamics of the Mt. Simon aquifer the western edge of this aquifer was investigated through observation well installations, water level monitoring, groundwater chemical analysis, and aquifer capacity testing. Most data collected for this study are derived from the 27 observation wells, drilled to depths of 70 to 718 feet, that were installed at 14 locations by contracted drilling companies.

The combination of chemical residence time indictors, continuous water level data from nested well locations, and a general knowledge of the regional hydrostratigraphy, shows the Mt. Simon aquifer in this region has a very slow recharge rate from a large source area located south of the Minnesota River, and a smaller source area located in the northern portion of the study area. The younger Carbon-14 residence time values of Mt. Simon groundwater (7,000-8,000 years) from this project roughly correspond to a time after the last ice sheet had receded from southern Minnesota suggesting groundwater in the Mt. Simon aquifer in this region began as precipitation that infiltrated during the post-glacial period. The stable isotope data of oxygen and hydrogen support this conclusion. A recharge estimate of the Mt. Simon aquifer south of the Minnesota River based on these minimum residence time data suggest an infiltration rate of approximately 2 cm/year. The resulting 5 billion gallons/year of recharge from the southern source area is approximately equal to permitted volumes (volume of water that the users are allowed to pump) for appropriators in this area. At current groundwater extraction rates the region appears to be in a steady state. A major accomplishment of this project was the creation of a network of observation well nests, base line water level data, and geochemical data in this region that will enable future hydrologists to evaluate the local and regional affects of any future expansion of Mt. Simon groundwater pumping beyond current volumes. This effort is documented in a report "South-Central Minnesota Groundwater Monitoring of the Mt. Simon Aquifer". A document titled "Minnesota Groundwater Level Monitoring Network-Guidance Document for Network Development" was also completed as part of this project. The Guidance Document outlines how Minnesota's current groundwater level monitoring network of approximately 750 wells should be expanded to meet monitoring needs. This expansion is necessary because large areas in Minnesota are not adequately monitored. Many areas of Minnesota are underlain by multiple aquifers, all of which must be considered in developing the long-term network that will provide adequate resource data.

Project Results Use and Dissemination
The reports from this project will be available on the DNR website during the summer of 2011. An abstract of the project results will be submitted to the Geological Society of America for the national conference in Minneapolis during October 2011. In addition, a summary of the project will be submitted to the Minnesota Groundwater Association for inclusion in the quarterly newsletter. The well log and well construction information is currently available in the project report and the Minnesota Department of Health County Well Index. The wells have become part of the DNR observation well network. Water level data is currently available at: http://climate.umn.edu/ground_water_level/.

Project Publication:

South-Central Minnesota Groundwater Monitoring of the Mt. Simon Aquifer (PDF - 3.0 MB)
Minnesota Groundwater Level Monitoring Network-Guidance Document for Network Development (PDF - 3.3 MB)

Project completed: 06/30/2011

PART 2: Minnesota Geological Survey

Overall Project Outcome and Results
County geologic atlases are created to support water and mineral resource management. An atlas provides maps and associated databases at scales appropriate for land use planning and water management decisions. An atlas greatly improves our ability to monitor the resource, to predict the effects of pumping, and to respond effectively to contamination. This project created atlases for Blue Earth, Nicollet, and Sibley counties in paper, digital, and web-accessible formats. They will be published as MGS C-24, C-25, and C-26, and workshops will be held to train users.

Geologic maps describe the distribution of earth materials. The materials determine where water can enter the ground (become ground water), where it can be taken from the ground (aquifers), and how aquifers connect to rivers, lakes, and wetlands. Each geologic atlas contains the below parts.

Database map: shows the location of all well records, borings, scientific drilling, natural exposures, and geophysical measurements used to support all the maps in the atlas. The data itself is also provided.

Surficial Geology map: this map shows the earth materials immediately beneath the soil zone, and describes their composition and ability to convey water. The surface described by this map is the interface between human activities and ground water. Its character determines to a great degree the sensitivity of ground water to contamination.

Glacial Stratigraphy and Sand Distribution Model: A series of maps show the location, depth, and thickness of sand or gravel bodies (aquifers) in glacial materials. This map is useful in finding a water source, determining pumping effects, and in understanding the results of water monitoring.

Bedrock Geology map, bedrock topography map: These maps describe the location and type of bedrock present, and its ability to host and transmit groundwater. Where a sequence of sedimentary rocks are present the contacts between layers are mapped as digital surfaces and this enables numerical simulations of the ground water system that can predict the effects of pumping before wells are drilled.

Through this project, MGS also provided support to the DNR Mt. Simon monitoring well project by examining and describing samples, conducting downhole geophysical surveys, and providing interpretations of the geologic units penetrated by these wells.

Project Results Use and Dissemination
Geologic atlases are created to support informed decision-making. They are applied to wellhead protection, water appropriation decisions, well field design, onsite water treatment designs, facility siting, monitoring, and remediation of contamination. The atlases are printed for those who don't use computers and for use in the field. They are also provided in several digital formats for electronic use including geographic information systems. When the atlases are complete we hold workshops in the county to explain the products and their uses.

Project completed: 06/30/2011

SUBD. 05 NATURAL RESOURCE INFORMATION

Updating the National Wetlands Inventory for Minnesota

Subd. 05a $550,000

Doug Norris
MN Department of Natural Resources (DNR)
500 Lafayette Rd, Box 25
St. Paul, MN 55155

Phone: (651) 259-5125
Email: doug.norris@dnr.state.mn.us
Fax: (651) 296-1811
Web: http://www.dnr.state.mn.us/eco/wetlands/index.html

Overall Project Outcome and Results

Over the past 100 years, about half of Minnesota's original 22 million acres of wetlands have been drained or filled. Some regions of the State have lost more than 90 percent of their original wetlands. Urban development, agricultural drainage, mining, road construction, and utility projects result in additional losses each year. The National Wetland Inventory (NWI) is the only comprehensive inventory of wetlands for Minnesota, but it is inaccurate in many places because it is 25-30 years out-of-date. Updating the NWI is a key component of the State's strategy to monitor and assess wetlands in support of efforts to assure healthy wetlands and clean water for Minnesota.

This project is the first phase of a multi-phase effort to update the NWI for all of Minnesota. Under this project, the project team:

1. developed wetland mapping standards and quality control objectives to assure that the final product can meet the broad array of data needs for various stakeholders,
2. developed a request for proposal that incorporates these standards and objectives,
3. acquired high-resolution, spring, leaf-off, digital aerial photography for northeastern and east-central Minnesota (22,500 square miles),
4. developed updated wetland mapping procedures for northeastern and east-central Minnesota that incorporate modern high-resolution digital imagery, radar imagery, and LiDAR elevation data,
5. provided training to DNR and Ducks Unlimited staff (total of six people) on the application of the updated wetland mapping procedures, and
6. performed initial data processing for updating NWI maps for east-central Minnesota and northern Koochiching County.

Subsequent phases of this project are focused on producing updated NWI maps for five different regions of Minnesota; east-central, southern, northeastern, central-lakes, and northwestern. These subsequent phases will also include the continuation of the imagery acquisition for the southern, northeastern, and central-lakes regions.

Project Results Use and Dissemination
The wetland mapping standards and quality assurance objectives developed through this project are presented in reports found on the project website. Imagery acquired as part of this project are freely available to the public through the Minnesota Geospatial Information Office website. The imagery for northeastern Minnesota receives an average of about 62,000 requests per month and the imagery for east-central Minnesota receives an average of more than 300,000 requests per month. Wetland mapping procedures based on pilot studies in northeast and east-central Minnesota are contained in two separate reports. Three hard copies and one electronic copy on CD have been submitted with the final project report to LCCMR. Presentations and workshops have been provided by the University of Minnesota regarding the updated wetland mapping methods as described above.

Project Publications:
Comprehensive Project Plan for the National Wetland Inventory Update of Minnesota
Requirements for the National Wetland Inventory of Minnesota
Quality Assurance Project Plan for the National Wetland Inventory of Minnesota
Wetland Mapping Methods for the Twin Cities Metropolitan Area
Wetland Mapping Methods for the Arrowhead Region of Minnesota

Project completed: 06/30/2011

Updating Precipitation Intensities for Runoff Estimation and Infrastructure Designs
Subd. 05c $100,000

Bruce Wilson
MN Pollution Control Agency (PCA)
520 N Lafayette Rd
Saint Paul, MN 55155

Phone: (651) 282-2619
Email: bruce.wilson@state.mn.us
Fax: (651) 297-8337
Web: http://www.pca.state.mn.us

Overall Project Outcome and Results
Checking the daily weather forecast for where and how bad the next storms will be has become a more important part of our daily routines. Recent variable climate (dry periods, intense storms and floods) have brought heightened awareness by farmers, engineers, cities, and water managers of rainfall intensity (how fast) and duration (how long). Up to now, available summaries (done in the early 1960's) were based on relatively crude analyses of rainfall data collected through the 1950's. This project has updated precipitation intensities based on the compilation of hundreds of rainfall monitoring locations in and around Minnesota (including our neighboring Canadian and adjacent state partners) with continuous data collected through 2009 via a partnership with the National Oceanic and Atmospheric Administration, National Weather Service (NOAA/NWS). State-of-the-art computer-based statistical procedures have generated summary information and maps with a resolution of 4 km by 4 km (or about 2.5 miles by 2.5 miles). NOAA required one contract with all 11 Midwest states (Minnesota, North Dakota, South Dakota, Wisconsin, Michigan, Iowa, Missouri, Colorado, Nebraska, and Kansas) with pass-

through funding via the Pooled Highway Fund. All Environment and Natural Resources Trust Fund dollars were expended by June 30, 2011 with additional funding provided by the Minnesota DOT being used to complete the final work components. This study has generated rainfall frequency estimates for durations from 15 minutes to 60 days and for average recurrence intervals from 1 to 1,000 years along with trend analyses. Final web-based products will be available in early 2012 due to delays associated with reducing huge amounts of data from about 1/2 of the contiguous United States. The results of this work are required for standard engineering practices associated with runoff routing, flood prevention and safe road & culvert designs - and will become part of our daily forecasts ("today's storm is called a hundred year event").

Project Results Use and Dissemination
Precipitation frequency information is required for standard engineering practices for building new roads, highways, bridges, and developments so as to minimize flooding and for water quality treatment, agricultural and other watershed management purposes.

This study has resulted in rainfall frequency estimates from 15 minutes to 60 day durations and for average recurrence intervals from 1 to 1,000 years. Data has been summarized in NOAA's nationally recognized standard engineering tables. New products have been developed for inclusion in GIS formats for a wide variety of computer-based applications and website distribution for watershed management purposes. Regional patterns and comparisons to old TP-40 rainfall frequency data will also be available.

Project products will be freely available from the NOAA website www.nws.noaa.gov/ohd/hdsc, including reports, maps and spatial data with precipitation frequency estimates and downloads of digital files.

Project completed: 6/30/2011

Conservation Easement Stewardship, Oversight and Maintenance
Subd. 05g $180,000

Kevin Lines
MN Board of Water and Soil Resources (BWSR)
520 Lafayette Rd
St. Paul, MN 55155

Phone: (651) 297-8025
Email: kevin.lines@bwsr.state.mn.us
Fax: (651) 297-5615
Web: http://www.bwsr.state.mn.us

Overall Project Outcome and Results
Since collection of digital easement data within the Minnesota Board of Water & Soil Resources (BWSR) first began in the late 1990's, every effort had been made to keep the database accurate and complete. However, over a decade later, and with over 5,000 easements and growing, it became prudent (particularly with the advent of more advanced technology) to reexamine, update, and enhance that database.

Attributes and boundaries for easements and conservation practices (planned land cover types based on

the NRCS Field Office Technical Guide) that previously only existed in paper format were scanned and digitized, then added to a Geographic Information Systems (GIS) database for the RIM Reserve easement program. The GIS database is flexible enough to implement future easement monitoring technology that can capture stewardship data such as easement condition and compliance, habitat quality, easement maintenance, and enhancement.

Prior to this undertaking, it would have been impossible to implement a modern long-term conservation easement stewardship plan. Easement boundaries only existed on paper and an outdated database placed limitation on reporting and analysis. As a result of this project, the framework is in place for implementing such a plan. A modern database is being implemented. 220,329 acres of conservation practices within 5,882 easements have been digitized into a GIS database, and a GIS-based monitoring field application has gone through pilot testing.

BWSR now has increased capabilities to target new easement projects using GIS reporting and analysis, as well as ensure the quality of past projects through easement stewardship and monitoring. This maximizes the return of each dollar spent, benefitting Minnesotans through better water quality, reduced soil erosion, and enhanced wildlife habitat.

Project Results Use and Dissemination
As a result of this project, a conservation easement database that is more streamlined has been implemented, giving BWSR staff the ability to edit and update easement boundaries and attributes, conduct geospatial reporting and analysis using GIS technology, create online delivery applications available via BWSR's website, and develop and test future easement stewardship and monitoring applications.

Conservation easement data has been made publically available as both an interactive online web map and a GIS shapefile download, both available at BWSR's web site:
http://www.bwsr.state.mn.us/easements

Project completed: 6/30/2011

Conservation Easement Stewardship and Enforcement Program Plan
Subd. 05h $520,000

Kathy Lewis
MN Department of Natural Resources (DNR)
500 Lafayette Rd
St. Paul, MN 55155

Phone: (651) 259-5404
Email: kathy.lewis@dnr.state.mn.us
Fax: (651) 296-6047
Web: http://www.dnr.state.mn.us

Co-Project Manager
Susan Damon
MN Department of Natural Resources (DNR)

500 Lafayette Rd
St. Paul, MN 55155

Phone: (651) 259-5961
Email: susan.damon@dnr.state.mn.us
Web: http://www.dnr.state.mn.us

Overall Project Outcome and Results
The DNR needed comprehensive information about its conservation easements in a centralized database and an agency-wide plan to monitor and enforce the easements.

Project objectives were to:

1. Conduct a comprehensive inventory of DNR's easements, classify conservation easements by type, and capture relevant data about each easement in DNR's land records system;
2. Develop a conservation easement stewardship plan that integrates an easement monitoring computer application developed through DNR's Land Records Management Project;
3. Recommend solutions to long-term conservation easement stewardship funding.

The inventory consisted of a review of all deed and easement records maintained by DNR's Lands and Minerals Division, capture of relevant easement data, and reconciliation of the data with records maintained by DNR's conservation easement administrators. The stewardship plan was developed after test monitoring a sample of existing conservation easements and obtaining extensive input from a working group comprised of representatives of DNR divisions that administer conservation easements.

The inventory identified 13 DNR conservation easement types and a total of 974 conservation easements covering 355,623 acres. The stewardship plan outlines monitoring methods and monitoring frequency for each conservation easement type, estimates stewardship costs and identifies options for funding. Project results are detailed in the "Conservation Easement Stewardship and Enforcement Program Plan" dated Feb. 28, 2011.

Under a work program amendment, project staff converted scans of 600 conservation easements into a format for use in the new conservation easement monitoring application, developed GIS tools that identified subdivisions and ownership of 557 trout stream easements and created shapefiles for 170 conservation easements from legal descriptions. The Aug. 15, 2011 Final Report Supplement contains examples of these work products.

The database, forms, tools, and plans developed in this project provide the foundation for the DNR to implement an agency-wide conservation easement stewardship program.

Project Results Use and Dissemination
Project results are currently being used by the DNR in several ways:

- Conservation easement data entered into the DNR's existing land records system in the project are being used to respond to inquiries from DNR staff and the public about DNR's conservation easements.
- A conservation easement Geographic Information Systems (GIS) layer developed by project staff and Division of Lands and Minerals GIS staff is available to all DNR ArcGIS users.
- The DNR is beginning the process of implementing the conservation easement stewardship plan developed in the project.

- Staff in divisions that administer conservation easements are currently using the baseline property report and monitoring forms developed in the project.
- The DNR's land records system contractor, International Land Systems, Inc. (ILS), is using the baseline property report and monitoring forms developed in the project and input about application design provided through the project to build the conservation easement administration application in the DNR's new land records system.
- Staff in divisions that administer conservation easements and project staff for the Conservation Easement Stewardship and Enforcement Program, Phase II will use shapefiles prepared under the Jan. 31, 2011 Work Program Amendment to create maps for baseline property reports and conservation easement monitoring.
- The Division of Fish and Wildlife is in the process of merging its existing GIS layer, which contains trout stream easement shapefiles, with the geoprocessing tools developed in the project to identify subdivisions and current landowners. This will enable Fisheries staff statewide to access the subdivision and landowner data using ArcGIS.
- All data entered into DNR's existing land records system in the project, as well as trout stream subdivision and landowner data and the Access database of easement terms created under the Work Program Amendment, will be migrated to and used in the new land records system currently being built by ILS.

Project results have been disseminated both within the DNR and to members of the public.

Project Publication:
Conservation Easement Stewardship and Enforcement Program Plan (PDF - 10.6 MB)

Project completed: 6/30/2011

SUBD. 06 ENVIRONMENTAL EDUCATION

Global Warming - Reducing Carbon Footprint of Minnesota Schools
Subd. 06b $750,000

William Sierks
MN Pollution Control Agency (PCA)
520 N Lafayette Road, Ste. 200
Saint Paul, MN 55155

Phone: (651) 757-2722
Email: bill.sierks@state.mn.us
Fax: (651) 215-0246
Web: http://www.pca.state.mn.us

Project Outcome and Results
Minnesota Schools Cutting Carbon (MnSCC) is a three-year project that engaged over 7,000 students in 100 public high schools, colleges and universities across Minnesota to save energy, and reduce

greenhouse gas emissions at their schools.

Results: The 100 MnSCC schools collectively saved their schools about 5 million kWh of electricity (totaling 18 billion BTUs) and $325,000 in energy costs annually, which means the three-year program paid for itself in two and a half years. The project also avoided 9.5 million pounds of carbon dioxide emissions (CO_2 is a greenhouse gas).

In addition, 23 of the MnSCC schools received a total of $202,828 in competitive grants for renewable energy, energy efficiency, recycling, and transportation reduction projects. Fourteen schools were able to measure and report savings of over 3 million kWh of electricity; 10,500 therms of natural gas; and 26,000 gallons of gasoline - totaling 14.4 billion BTUs. These projects saved approximately $300,000 in annual energy costs and avoided 6.2 million pounds of CO_2 emissions.

The cumulative impact of all 100 MnSCC school projects saved schools 32.4 billion BTUs of energy, $625,000 in energy costs, and reduced carbon dioxide emissions by 15.7 million pounds, the equivalent of taking 1,700 cars off of Minnesota roads.

Our project team helped schools create clean energy teams, personally visited every school, provided individual school reports with recommendations on saving energy and resources, and gave students the opportunity to develop and lead energy-saving projects, network with other schools, and share success stories.

Student leadership was a key focus of our project, and there are many great examples of students having a direct impact on their schools and communities:

- Students presented at the biennial Clean Energy Resource Teams (CERTs) conference in St. Cloud in February 2011 to over 100 conference attendees over two days.
- Students rallied in the State Capitol Rotunda on Earth Day 2010, meeting fellow students and several legislators.
- Students presented before the LCCMR and the House Environment Policy and Oversight Committee to talk about how their work has impacted their school.

Overall, MnSCC demonstrated that our students are highly motivated and very effective. They achieved significant energy savings, and they directly influenced their schools and communities through their leadership and interactions with school officials, teachers, fellow students, and community representatives.

Project Results Use and Dissemination

One of the primary objectives of this project was to raise awareness of energy issues and to implement low cost and no cost energy-saving actions in schools through the leadership of students. We also were focused throughout the project on creating opportunities for students to talk about their projects, share results, and for MnSCC to recognize their successes. A variety of resources, detailed in the final report, were created and made available to enable schools to take clean energy actions and make presentations to their communities and local officials. These resources were made available on a robust MnSCC website. Many schools also used the website to share their project success stories and post rleated text, pictures, and videos. Additionally, ongoing communication, outreach, and interaction with Minnesota's schools, colleges, and universities through a variety of means was at the heart of this project from beginning to end.

Project completed: 6/30/2011

Subd. 07 Establishment of an Emerging Issues Account

Emerging Issues Account
Subd. 07 $155,000

Susan Thornton, Director
LCCMR
100 Rev. Dr. Martin Luther King Blvd.
Rm 65 State Office Bldg
St. Paul, MN 55155

Phone: (651) 296-2406
Email: susan.thornton@lccmr.leg.mn
Fax: (651) 296-1321
Web: http://www.lccmr.leg.mn

Funds will be used by the LCCMR to provide assistance for an unexpected, urgent, or emergency need where time is of the essence, as authorized in Minnesota Statutes, section 116P.08, subdivision 4, paragraph (d).

WENT TO:

Statewide Ecological Ranking Conservation Reserve Program (CRP) and Other Critical Lands - $155,000 (completion date for this portion is 6/30/2010)

Other funds include:
M.L. 2007, Chp. 30, Sec. 2, Subd. 7 "Emerging Issues Account" - $13,000 (completion date for this portion is 6/30/2009)

M.L. 2009, Chp. 143, Sec. 2, Subd. 4g "Statewide Ecological Ranking of Conservation Reserve Program (CRP) and Other Critical Lands" - $107,000 (Project due to be completed: 6/30/2011)

Project completed: 6/30/2011

M.L. 2006 Projects Completed 2011-2012

MN Laws 2006, Chapter 243, Section 20

M.L. 2006 Projects
MN Laws 2006, Chapter 243, Section 19 & Section 20 (beginning July 1, 2006)

NOTE: Below is a short abstract for a project funded during the 2006 Legislative Session ending during 2011-2012. The final date of completion for these projects is listed at the end of the abstract. Final Reports for all completed projects are available at http://www.lccmr.leg.mn/projects/2006-index.html or by contacting the LCCMR office.

Subd. 08 Land Exchange Revolving Fund for Aitkin, Cass, and Crow Wing Counties

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FISH AND WILDLIFE HABITAT

Land Exchange Revolving Fund for Aitkin, Cass, and Crow Wing Counties
Section 20, Subd. 08 $290,000

Mark Jacobs
Aitkin County
209 - 2nd Street NW
Aitkin, MN 56431

Phone: 218-927-7364
Fax: 218-927-7249
Email: mjacobs@co.aitkin.mn.us
Web: http://www.co.aitkin.mn.us

Overall Project Outcome and Results:
In 2006, an inter-county revolving loan fund was established for the benefit of Aitkin, Cass and Crow Wing Counties. The objective of this fund was to improve public and private land-ownership patterns, which will increase public management efficiency, protect critical habitat, and reduce public service expenditures to isolated parcels; without reducing the local tax base.

Under this program, the Counties purchased privately owned parcels that met certain project criteria. Tax forfeited land, of substantially equal value and better suited to private ownership, was sold to replenish the fund; resulting in the public/private land ownership base remaining stable.

A total of 174.6 acres of land plus a lot were purchased solving many easement issues and consolidating public ownership so that public service expenditures to these parcels would not exist.

During this process, land values dropped because of the recession which made it harder to recoup the funds from land sales. Parcels were put up for sale, but did not sell because of the economy. Purchases of recreational property was no longer a priority, when homes were being lost and people weren't sure about the future of their jobs.

Another item that caused some problems, was that as funds from the account were used, sometimes larger parcels were unable to be purchased as there was not enough in the account for purchase. Exchanges were not as favorably looked at as when a county parcel was exchanged, people thought that

everyone should have the opportunity to purchase the parcel, not just the person doing the exchange.

Overall, the process was a good process. It gave counties the opportunity to cure problem parcels with a ready cash fund. No access properties, wetland properties that should not be developed, and recreational opportunities were all developed with a 'no cash out of the general fund' opportunity.

Project completed: 6/30/2011

M.L. 2005 Projects Completed 2011-2012

MN Laws 2005, First Special Session, Chapter 1, Article 2, Section 11

M.L. 2005 Projects
MN Laws 2005, First Special Session, Chapter 1, Article 2, Section 11 (beginning July 1, 2005)

NOTE: Below is a short abstract for a project funded during the 2005 Legislative Session ending during 2011-2012. The final date of completion for these projects is listed at the end of the abstract. Final Reports for all completed projects are available at http://www.lccmr.leg.mn/projects/2005-index.html or by contacting the LCCMR office.

Subd. 06 Recreation
06l Local and Regional Trail Grant Initiative Program

Subd. 06 Recreation

Local and Regional Trail Grant Initiative Program
Subd. 06l $700,000 Funding available through duration of matching Federal funding.

Andrew Korsberg
DNR
500 Lafayette Rd.
St. Paul, MN 55155

Phone: (651) 259-5642
Email: andrew.korsberg@dnr.state.mn.us
Fax: (651) 297-5475

Overall Project Outcomes and Results:
Every year the department solicits grant proposals from local governments for local trail connections, and regional trails outside the metro area. Project applications are usually due in the spring, with project selection completed by the end of May.

Two distinct grant programs provide matching grants to local governments for acquisition and development of trails:

- Local Trail Connections Grant Program - helps link communities to trails and parks through development of connecting trail segments. The maximum grant amount of $100,000 has been established administratively and is not defined in statute. Historically, the maximum grant amount for this program was $50,000. In October 2001, the amount was changed to reflect increased construction costs realized by prospective grantees.
- Regional Trail Grant Program - provides grants of up to $250,000 to cities, counties, and townships for development of regionally significant trails funded with local or federal funding. Primary determinants of significance include length, expected use and resource quality and/or attractiveness. The 1999 LCMR appropriation language specifies that the funds be used for project outside the seven-county metropolitan area.

Project proposals for all of these programs are evaluated and ranked on a competitive basis, with grants being awarded to the highest-ranking projects.

The Local Trail Connections Program was able to provide 23.45 miles of new trail, 6 new bridges/culverts, 1 easement, 1.62 miles of bituminous surfacing of a gravel trail and provided

rehabilitation on 1.65 miles of trail. The regional Trail Grant Program was able to provide 25.50 of new trail, 1 bridge, 2.70 miles of railroad bed acquisition, and 19.85 miles of bituminous surfacing of a gravel trail. Together, both programs provided 48.95 miles of new trail, 7 bridges/culverts, 1 easement, 2.70 miles of railroad bed acquisition, 21.47 miles of bituminous surfacing of a gravel trail, and 1.65 miles of trail rehabilitation. There were a total 29 projects to 25 different communities supported with this LCCMR funding.

Project completed: 06/30/2011