



Legislative-Citizen Commission on Minnesota Resources

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LCMR 2005 PROJECT ABSTRACTS

MN Laws 2005, First Special Session, Chapter 1, Article 2, Section 11 (July 1, 2005 through June 30, 2007)

The following documents are short abstracts for projects funded during the 2006-2007 biennium. The final date of completion for these projects is listed at the end of the abstract. When available, we have provided links to a projects web site. The sites linked to on this page are not created, maintained, or endorsed by the LCCMR office or the Minnesota Legislature. If you would like further information about specific projects, please contact the appropriate program manager at the address or phone number listed.

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Environment and Natural Resources Trust Fund (TF)

Oil Overcharge (OOC)

Great Lakes Protection Account (GLP)

SUBD. 03 - ADMINISTRATION

Legislative Commission on Minnesota Resources - PARTIAL GOVERNOR VETO

03(a) \$ 899,000 \$449,000 (second year appropriation of \$450,000 was vetoed)

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LCMR

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For administration as provided in Minnesota Statutes, section 116P.09, subdivision 5.

Project completed: 6/30/2007

Contract Administration

03(b) \$150,000

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Contract administration activities assigned to the commissioner for agreements with non-state agencies to receive project funding on a reimbursement basis.

Project completed: 6/30/2008

SUBD. 04 - ADVISORY COMMITTEE

Citizen Advisory Committee for the Trust Fund

04 \$20,000

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For expenses of the citizen advisory committee as provided in Minnesota Statutes, section 116P.06. Notwithstanding Minnesota Statutes, section 16A.281, the availability of \$15,000 of the appropriation from Laws 2003, Chapter 128, article 1, section 9, subdivision 4, advisory committee, is extended to June 30, 2007.

Project due to be completed: Funding changed to the newly created LCCMR M.L. 2006, Chp. 243, Section 19

SUBD. 05 - FISH AND WILDLIFE HABITAT

Restoring Minnesota's Fish and Wildlife Habitat Corridors - Phase III

05(a) \$4,062,000

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DNR, Board of Water and Soil Resources, and for agreements with Pheasants Forever, Minnesota Deer Hunters Association, Ducks Unlimited, Inc., National Wild Turkey Federation, the Nature Conservancy, Minnesota Land Trust, the Trust for Public Land, Minnesota Valley National Wildlife Refuge Trust, Inc., U.S. Fish and Wildlife Service, Red Lake Band of Chippewa, Leech Lake Band of Chippewa, Fond du Lac Band of Chippewa, USDA-Natural Resources Conservation Service.

Overall Project Outcome and Results

The Habitat Conservation Partnership (HCP) restored, enhanced or protected 21,380.9 acres in defined project areas expending a total of \$16,354,411, with \$4,032,739 coming from the Environment and Natural Resources Trust Fund (ETF). Please see <http://www.mnhabitatcorridors.org> for complete information.

Partners restored or enhanced 14,721-acres, exceeding the goal of 11,685 acres. Work included 8,161-acres of grassland restoration/enhancement, 2,295-acres of wetland restoration, 526-acres of woodland restoration, and 2,886-acres of wetland enhancement. Other accomplishments included shallow lake surveys & lakescaping demonstration projects/workshops. A total of \$4,193,879 (\$972,203 ETF, \$3,221,676 Other Funds) was expended.

Partners acquired 5,484 acres of perpetual conservation easements. HCP fell below the goal of 7,270 acres due to increased non-state funds spent on restoration. Easement protection priority was placed upon shoreline habitats of which over 5.2 miles were protected. Habitats protected were grasslands, wetlands, and woodlands. A total of \$7,150,074 (\$1,360,830 ETF, \$5,789,244 Other Funds) was expended.

Partners acquired 1,176.5 acres in fee-title. HCP exceeded the goal of 984 acres. HCP achieved 437.3 acres of new WMA's, 15.2 acres of AMA's, 458.4-acres of WPA's, and 266.5-acres of private/local government lands. A total of \$4,725,457 (\$1,474,706 ETF, \$3,250,751 Other Funds) was expended.

HCP Partners included: Ducks Unlimited, Fond du Lac Reservation, Leech Lake Band of Ojibwe, MN Board of Water and Soil Resources, 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, Red Lake Band of Chippewa, The Nature Conservancy, Trust for Public Land, U.S. Fish and Wildlife Service, and U.S. Natural Resources Conservation Service.

Project completed: 6/30/2008

**I
Metropolitan Area Wildlife Corridors - Phase II**

05(b) \$3,530,000

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DNR, and for agreements with Trust for Public Land, Ducks Unlimited, Inc., Friends of the Mississippi River, Great River Greening, Minnesota Land Trust, Minnesota Valley National Wildlife Refuge Trust, Inc., Pheasants Forever, Inc. and Friends of the Minnesota Valley

Overall Project Outcome and Results

The key objectives and results of this program are to accelerate agency programs and cooperative agreements with partner organizations for the purposes of planning, improving, and protecting important natural areas in the metropolitan region and portions of surrounding counties through grants, contracted services, conservation easements, and fee acquisition.

The primary results of the program were:

- Restoration of 2,026 acres of habitat
- Protection of approximately 2.4 miles of shoreline
- Fee and easement acquisition of 2,973 acres

Project Results Use and Dissemination

The Metro Corridors partnership distributed information about the program and projects through the widely broadcast e-mails to people on the Regional Greenways Collaborative (RGC) database, through the RGC quarterly meetings, and jointly held county meetings. As projects were completed, the partners publicized accomplishments through press releases and organization newsletters and websites.

Project completed: 6/30/2008

Development of Scientific and Natural Areas

05(c) \$134,000

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Overall Project Outcome and Results

Ecological restoration and development projects were carried out on about 330 acres in 26 counties across the state at 37 of the state's 147 state Scientific and Natural Areas (SNA). This included:

- Prairie grassland improvement (exotics and woody encroachment removal) on 155 acres at 17 SNAs,
- Prairie restoration, including seed collection on 40 acres at 2 SNAs and 179 acres of prescribed burns and 31.35 miles of burn break development at 18 SNAs,
- Boundary signing along 19 miles of perimeter at 4 SNAs,
- Other development work, including deer enclosure construction, kiosk, gates, parking lots, and site cleanup at 8 SNAs.

This work is necessary to preserve and perpetuate the state's ecological diversity, including rare species and native plant communities in sites of biological diversity significance, in areas that are part of the state's SNA system and to enhance the value and usage of SNAs as part of the state's outdoor recreation system.

Project completed: 6/30/2008

Prairie Stewardship of Private Lands

05(d) \$100,000

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Overall Project Outcome and Results

Native prairie is Minnesota's most threatened natural habitat. Less than 1%, or less than 170,000 acres, of the State's native prairie survives - and much of it is privately owned. Many of these remaining prairies have not received sustainable management activities since European settlement and subsequent removal of nature processes. In the absence of active management prairies frequently deteriorate from encroachment by woody species or competition from non-native plants. Landowners are almost always interested in improving the stewardship of their native prairie remnant, but often lack the expertise or resources to identify and address this backlog of needed management.

One project objective was to provide native prairie landowners with comprehensive Prairie Stewardship Plans that offer long-term guidance for the care of their native prairie. Natural resource professionals prepared plans that inventoried and evaluated the landowner's native prairie and other land resources, identified their goals and objectives, and recommended ecologically sound management strategies. Both DNR Prairie Specialists and qualified private-sector prairie professionals, who competitively bid their services, assisted landowners with completion of their Prairie Stewardship Plans. A total of 37 stewardship plans were written covering 4,459 total acres, 1,313 acres of which were prairie.

The second project objective was to implement existing Prairie Stewardship Plans. Landowners were able to request cost-share assistance for habitat improvement practices which they implemented themselves, or had DNR prairie staff carryout practices they did not feel qualified to do. Example habitat projects included prescribed burns, woody encroachment removal, invasive species control, and prairie reconstruction. In many cases, DNR packaged groups of projects, such as prescribed burns, into larger contracts for professional vendors to competitively bid on, thereby maximizing efficiencies and minimizing costs for landowners. A total of 23 stewardship projects were completed covering 1,043 total acres, which included 469 acres of which were prairie.

Since inception of the Scientific and Natural Area's Prairie Stewardship Program in 1999 there have been 144 Prairie Stewardship Plans written for prairie landowners. Future plans for the Prairie Stewardship Program include surveying past stewardship plan recipients to determine if plans have been fully implemented, and if not, what have been the obstacles to setting those plans in motion.

Project Results Use and Dissemination

Copies of Stewardship Plans have been provided to local DNR managers and used by the landowners as they work with other conservation agencies and programs.

One landowner participating in the cost-share assistance for habitat improvement took it upon himself to highlight the project in his local newspaper. The article was published in the January 24, 2008 issue of the Advocate Tribune (Granite Falls, MN). A scan of this article has been included with the final report.

Project completed: 6/30/2008

Local Initiative Grants (Conservation Partners and Environmental Partnerships)

05(e) \$500,000

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Overall Project Outcome and Results

The objective of this program is to foster public/private and intergovernmental partnerships through state matching grants to private organizations and local governments for 'on the ground' fish, wildlife and native plant habitat improvement projects and related research and environmental service and conservation projects.

Grants totaling \$404,911 were provided to private and non-profit organizations, educational institutions, local governments and soil and water conservation districts. Of that total, 19 Conservation Partners grants were made for 'on the ground' fish, wildlife and native plant habitat improvement projects and research or surveys of fish and wildlife directly related to specific habitat improvement. The remaining 18 Environmental Partnerships grants were made for community environmental service, education, information, and conservation projects.

A number of habitat restorations were completed, including lake, pond, river and stream shoreland restorations and prairie, oak forest, and oak savanna restorations. Other projects included invasive species control, research related to proposed fen restoration, and Dwarf Trout Lilly habitat protection. Among the Environmental Partnerships projects funded were educational exhibits, prairie restoration and homeowners natural habitat project guides, GIS modeling, resource assessments, stream and river clean-up projects, a Prairie Chicken video, water quality monitoring, and a stormwater treatment project.

These projects are located throughout the state, therefore many Minnesotans will benefit directly by having access to the project areas. Minnesotans will also benefit from information or research that may be applicable in many locations, such as the Prairie Restoration Guide, or habitat improvements that benefit fish and wildlife populations and help protect water quality. Environmental education, interpretation, and information projects also foster an appreciation for the need to conserve our natural resources, particularly for younger generations.

For more detailed information on any of the projects contact the DNR Local Grants Unit. A list of funded projects is included in the final report.

Project Results Use and Dissemination

Information from these projects has been used and/or disseminated in a number of ways. Some of the projects involve habitat improvement that can be accessed by the public. Other projects involved development of informational materials such as interpretive signing, written reports or guides, data bases, traveling educational trunks, field visits, videos, workshops, and training of community volunteers. Project managers sent copies of written materials, guides, etc., to the DNR with their final reports. See the individual project descriptions in the final report for more details.

Project completed: 6/30/2008

Minnesota ReLeaf Community Forest Development and Protection

05(f) \$500,000

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Overall Project Outcome and Results

Since 1991, Minnesota ReLeaf Community Forestry Grants have helped over 350 communities to build sustainable tree care programs. The 2005-2007 program provided assistance to 57 projects statewide through matching grants and technical assistance to support community efforts.

The overall emphasis was to address current and potential community forest health problems by enabling communities to build their capacity to develop and sustain forest management programs that increase tree diversity and improve tree vigor.

Local matching grants were provided in three areas. Forest health protection projects focused on enhancing forest resilience against insects and disease. Tree planting projects focused on increasing the diversity of tree species and increasing forest canopy. Community forestry assessment projects conducted inventorying and assessment of existing forest resources to support better planning.

Grantees received technical assistance in the form of maps, workshops, in field training sessions, and printed resources.

Nearly one third of the projects included an assessment of public trees, resulting in management plans to guide planting a greater diversity of species, use of native trees and improved vigor of existing trees through proper maintenance. These activities provide valuable examples for residents and neighboring towns to emulate, thus multiplying and maximizing the many benefits healthy trees provide. Continued coordination and co-promotion with DNR, PCA and other grant programs would help provide one-stop assistance for local environmental management needs.

Project Results and Dissemination

Experience gained will improve:

- A web portal to offer tree care information to communities and homeowners: www.MNtrees.org
- Oak wilt control practice, community programs, and policies. Decreased Federal Oak Wilt Suppression dollars results in a move to demonstration projects in place of generally available matching grants.
- The Inventory Decision Model to guide cities considering this vital step toward management, and Inventory/Management plan guidelines being developed with private contractors.
- Use of I-Tree, a USDA Forest Service software suite of urban and community forestry analysis and benefits assessment tools.

All of these new tools are available via the DNR web page, www.dnr.state.mn.us or www.MNtrees.org

Project completed: 6/30/2008

Integrated and Pheromonal Control of Common Carp

05(g) \$550,000

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RESEARCH

To research new options for controlling common carp.

Project due to be completed: 6/30/2009

Biological Control of European Buckthorn and Garlic Mustard

05(h) \$200,000

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RESEARCH

Overall Project Outcome and Results

This project builds upon and continues work begun from a 2003 Trust Fund appropriation and has since received an additional 2007 Trust Fund appropriation to further continue and accelerate the work.

Buckthorn and garlic mustard are invasive species of highest priority for development of long-term management solutions, such as biological control (bio-control). This research aimed to help determine 1) if there are suitable insects that can be used to reduce impacts caused by buckthorn and 2) to implement introduction of insects to control garlic mustard and assess their establishment and success.

Buckthorn: Insects were collected and reared for carrying out host specificity testing. A total of 1,733 specimens (356 species) were collected from buckthorn infestations in this insect fauna survey. In total, 39 specialized arthropods were recorded from *R. cathartica* (common buckthorn) and *F. alnus* (glossy buckthorn) in Europe.

The reassessment of the potential for biological control of *R. cathartica* and *F. alnus* was conducted based on work done in Europe from 2002-2007 on potential biological control agents. A summary of 10 priority species for future research on biological control of *R. cathartica* is provided in Appendix A of the Work Program Final Report. This final suite of priority species are being tested for use as effective bio-control agents in future work.

Garlic mustard: Pre-release data is providing a greater understanding of normal year-to-year variation. To help differentiate normal fluctuation from changes due to the bio-control insect, data was collected over the course of this project. On average, less than 2% of the leaf area was damaged by herbivores. Garlic mustard plant populations do vary considerably from year to year. Two to three years of pre-release monitoring data have given us a good understanding of the year-to-year fluctuations in populations. At some sites, the population fluctuations are due to the changes in dominance between the seedling and adult stages.

After biological control insects are released we expect to see decreases in garlic mustard populations. With long-term data collection we can see long-term trends in garlic mustard populations (see Appendix B of Work Program Final Report).

Project Results Use and Dissemination

Information garnered from this study will be used to further our objective of developing an effective and efficient bio-control agent for buckthorn and garlic mustard. Effective bio-control agents will help reduce the damage and cost related to control of these invasive species. The information provided by this work helps to establish basic biological information pertaining to the types of species available for potential bio-control agents for buckthorn and narrow our efforts to a few priority species. The information gained on garlic mustard growth and impacts on native species will help us to assess the effectiveness of the current bio-control agents once they have been applied to the test sites. Without this type of baseline data a true understanding of the impacts the bio-control agent is having are impossible to attain. Information from these projects are being shared with multiple federal and state agencies to help the region better understand the potential control mechanisms for buckthorn and garlic mustard.

Information on this work has also been developed into peer reviewed scientific papers. The information has been presented at a variety of national and international conferences. Locally this information has been presented to a variety of interested practitioners and citizens at local conferences and meetings.

Project completed: 6/30/2008

Land Exchange Revolving Fund for Aitkin, Cass, and Crow Wing Counties - GOVERNOR VETO

05(i) — \$500,000

Roger Howard

Aitkin County

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For a six-year revolving loan fund to improve public and private land-ownership patterns, increase management efficiency, and protect critical habitat in Aitkin, Cass, and Crow Wing counties. By June 30, 2011, Aitkin County shall repay the \$500,000 to the Commissioner of Finance for deposit in the Environment and Natural Resources Trust Fund.

Project due to be completed: 6/30/2011

Received 2006 appropriation of \$290,000: ML 2006, Chap., Sec. 20, Subd. 8 ("Land Exchange Revolving Fund for Aitkin, Cass, and Crow Wing Counties"). See [2006 Abstracts](#) for more information.

SUBD. 06 - RECREATION**State Park and Recreation Area Land Acquisition**

06(a) \$2,000,000

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Overall Project Outcome and Results

The purpose of this project was to acquire inholdings from willing sellers within state park and recreation area boundaries. Approximately 931 acres in the following locations were completed using the 2005 LCMR appropriation:

- Crow Wing State Park: 213 acres (also used 2003 Trust Fund funding)
- G. Crosby Manitou State Park: 420 acres (also used Coastal Zone Management Grant)
- Whitewater State Park: 218 acres
- Judge C.R. Magney State Park: 80 acres

This appropriation was significant in that it continued the progress toward acquiring critical private in-holdings within statutory state park boundaries. The Crow Wing State park acquisition protected additional lands along the Mississippi River wildlife corridor in an area that is experiencing rapid residential development. These parcels will also preserve the natural views from the park facilities and helped facilitate the connection of the Paul Bunyan State Trail. The George Crosby Manitou and Judge C.R. Magney State Park parcels were acquired to protect lands within the Lake Superior watershed and offer recreational opportunities such as hiking (one mile of hiking trail included), backpacking and birdwatching. The Whitewater State Park parcel protects the integrity of the valley and park by preserving the bluff above the park.

Project Results Use and Dissemination

Parcels acquired have been shown on updated state park boundary maps, and have been described in the Minnesota State Park Traveler newspaper and other publications.

Project completed: 1/18/2008

LAWCON Federal Reimbursements

06(b) \$1,600,000

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Overall Project Outcome and Results

This project involves administration of the federal Land and Water Conservation Fund (LAWCON) allocation to the state. One-half of these funds are used to provide grants to local governments for local parks and are appropriated by statute. LAWCON funds are also used to reimburse state expenditures on state outdoor recreation facilities. These reimbursements, in turn, are used to fund additional state outdoor recreation projects recommended by the LCCMR. The cost of administering the program, including planning and related activity required to maintain eligibility, can also be funded from these reimbursements.

Two state projects were funded. An allocation of \$800,000 was used to help purchase 470 acres of fish and wildlife habitat on the Vermillion River in Dakota County as part of the Vermillion Empire WMA/AMA. The second allocation of \$384,000 was used to help purchase a 90 acre addition to the Pine Bend Bluffs Scientific and Natural Area located on the bluffs of the Mississippi River in Dakota County.

A total of \$416,000 was used for administration costs related to implementing the LAWCON program. In addition to covering the administrative costs of grants administration, financial management, contract management and project monitoring, these funds were used to complete the State Comprehensive Outdoor Recreation Plan (SCORP). This plan is required to maintain eligibility for LAWCON funding. The plan was completed and has been forwarded to the National Park Service for final approval.

As part of the SCORP public involvement and information requirement a \$30,000 contract was provided to Twin Cities Public Television (TPT) to produce a one-hour television program dealing with issues of changing outdoor recreation participation. The program, entitled "Outdoor Recreation in Decline", included interviews with outdoor professionals and a focus group of parents and teachers. The program has aired several times since its completion in 2007.

The 2005 local grants portion of the LAWCON funds was used to fund projects solicited during two annual grant rounds in 2004 and 2005. These funds are not part of the \$1,600,000 LAWCON appropriation covered by this work program, but are included for informational purposes. Information on these projects is included in the 2005 Local Initiative Grants work program.

Project Results Use and Dissemination

The two state land acquisition project areas are open for public use.

The SCORP is posted on the DNR web site and may be downloaded (click on "Grants" on the DNR home page to find the link to the SCORP). Five hundred copies of the report were printed and approximately 200 copies have been distributed to date to a wide variety of individuals, agencies and organizations.

The TPL television program debuted in 2007 with two separate advertised airings on TPT Channel 17. It continues to be aired periodically on TPT channels. DVDs of the program were provided to the DNR and several copies have been distributed to DNR staff, local National Park Service staff and other individuals.

Project completed: 6/30/2008

State Park and Recreation Area Revenue-Enhancing Development - GOVERNOR VETO

06(c) \$200,000

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To enhance revenue generation in the state's park and recreation system.

Project due to be completed: 6/30/2007

Best Management Practices for Parks and Outdoor Recreation

06(d) \$200,000

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Web: For MRPA - www.mnrpa.org For Project - www.bestpracticesmn.org

Overall Project Outcome, Results, Use and Dissemination

This project was the result of the 2004 Legislative Commission on Minnesota Resources (LCMR) Parks Study and the 2003-2008 State Comprehensive Outdoor Recreation Plan (SCORP). Together, both of these studies pointed toward the value and importance of better coordination and collaboration across Minnesota's outdoor recreation providers. The Best Management Practices for Parks and Outdoor Recreation grant project addressed these recommendations by engaging public and private outdoor recreation leaders to translate better coordination into concrete advice and on-the-ground action.

The project was successful in reaching a broad cross-section of professional outdoor recreation providers from city, county, state and federal agencies; private consultants; universities and non-profits. More than 1,250 professionals participated in nine events held throughout the state. These events, including a Best Practices Summit and regional workshops, provided participants with new ideas and ways of managing parks and outdoor recreation. The networking has been instrumental in better coordination and collaboration among outdoor recreation providers.

A website (www.bestpracticesmn.org) was developed during the project to enable professionals to share best practices in a wide variety of areas – from facility maintenance to natural resource management to research. During the project, there were approximately 3,800 unique visitors to the website.

Prior to this project, there were no other forums for learning and collaboration at a cross-agency level. This project provided park and outdoor recreation professionals with the opportunity to learn from one another, share best practices and lessons learned. Project participants now have an enhanced set of tools in which to do their jobs more effectively and efficiently.

Project participants gained information to work more effectively and efficiently in many areas, including, but not limited to:

- Outdoor recreation trends
- Sustaining outdoor recreation facilities for the future
- Park, open space & trail system planning
- Surface & storm water management
- Innovative financing for operations & maintenance
- Innovative financing for land acquisition & development
- Contemporary approaches to natural resource stewardship
- Strategies for getting kids and young adults outdoors
- Case studies for successful cross-agency collaboration
- Energy efficiency in parks and recreation

A detailed report of project results can be obtained by contacting Kathy Schoenbauer at keschoenbauer@comcast.net or Michelle Snider at snider@mnrecpark.org.

Project completed: 6/30/2007

Metropolitan Regional Parks Acquisition, Rehabilitation and Development

06(e) \$2,000,000

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Website: www.metrocouncil.org

Overall Project Outcome and Results

This appropriation leveraged \$1,333,000 of Metropolitan Council bonds and \$701,000 of 2005 State bonds in grants from the Metropolitan Council to regional park agencies to accomplish the following:

- Acquire 567 acres in 4 parks (0.8 acre for Long Lake Regional Park in Ramsey County, 543 acres for Rice Creek Chain of Lakes Park

Reserve in Anoka County , 18.6 acres for Lake Waconia Regional Park in Carver County , and 5 acres for Big Marine Park Reserve in Washington County).

- Acquire a permanent trail easement from Burlington Northern Railroad for a 0.8 mile of right-of-way for the Bruce Vento Regional Trail in Ramsey County .
- Partially finance trail and shoreline rehabilitation at Lake of the Isles in Minneapolis
- Replace 4 pit toilets with sewer-served restrooms for picnic areas at Keller Regional Park in Ramsey County
- Rehabilitate 0.7 miles of separated bike/pedestrian trails, lighting and landscaping along East Lakeshore Drive at Como Regional Park in St. Paul
- Build 2 classrooms, storage and reception areas for a visitor center at Gale Woods Special Recreation Feature in Three Rivers Park District
- Design/engineering for 1.5 miles of North Urban Regional Trail in Dakota County
- Build a picnic shelter at the Sucker Lake portion of Grass-Vadnais Regional Park in Ramsey County

A partial extension to the appropriation timeline is allowing Anoka County to use \$524,000 remaining from a land acquisition grant to match \$1,050,000 of Federal Transportation Enhancement grant funds to construct two linked sections of the Rice Creek North Regional Trail within Rice Creek Chain of Lakes Park Reserve that totals 4 miles.

Project Results Use and Dissemination

The parks and trails where these projects are located had 9,233,000 visits in 2007, which was 28% of all visits to the Metropolitan Regional Park System in 2007.

Each regional park agency that received a grant or grants from this appropriation informs the public about the land acquisition, or new or rehabilitated park facilities 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 www.metrocouncil.org/parks/r-pk-map.htm

Project due to be completed: 6/30/2010

Gitchi-Gami State Trail

06(f) \$500,000

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To design and construct approximately two miles of Gitchi-Gami state trail segments.

Project due to be completed: 6/30/2009

The Casey Jones State Trail

06(g) \$1,200,000

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Windom, MN 56101

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For land acquisition and development of the Casey Jones State Trail in southwest Minnesota.

Project due to be completed: 6/30/2009

Paul Bunyan State Trail Connection

06(h) \$400,000

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Bemidji, MN 56601

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To acquire land to connect the Paul Bunyan State Trail within the City of Bemidji.

Project due to be completed: 6/30/2009

Minnesota River Trail Planning

06(i) \$200,000

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Overall Project Outcome and Results

The community-engaged planning/design work on the Minnesota River State Trail was done in collaboration with the cities of Redwood Falls, New Ulm, and Saint Peter; the Dakota Community; local trail groups; local citizens; and the Trails and Waterways Division of the DNR. The work focused on identifying potential state trail alignments, making city trail systems that connected to the state trail, locating and designing state trailheads, creating signature trail elements that expressed the unique Minnesota River landscape and created a trail identity, and increasing environmental awareness in the Valley. Analysis of the natural and cultural landscape of the Minnesota River Valley, aspirations of the local communities and citizens, and the needs of the DNR's master planning efforts informed the work. Local community meetings were held to gather information, present preliminary design work for review and feedback, and present the final designs.

The work produced included:

- An analysis of the cultural and natural amenities and features of the Valley's landscape,
- Proposed state trail alignments that interpretive the landscape,
- Local trail systems that connect local features and provide local access to the state trail,
- Two trail head designs for each of the three cities that create a trail presence in the city, provide access to the city by visiting trail users, and tie the communities more closely and powerfully to the trail, the river, and the valley landscape,
- Designs for a state trail sign and kiosk/resting place that celebrate the Valley's changing geology and landscape,
- Site designs for resting places along the trail that honors the presence of the Dakota peoples in the Minnesota River, and
- A design for spaces along the route of the Commemorative March.

Project Results Use and Dissemination

The work has been presented in public meetings to Redwood Falls, Saint Peter, and New Ulm, and at a gathering of the Dakota Community. The Trails and Waterways Division of the Minnesota Department of Natural Resources, the Redwood Falls, Saint Peter, and New Ulm, local trail and citizen groups, and citizens have used and are using the work. The DNR has used and will continue use the work in the future in its Minnesota River State Trail master planning efforts. The local communities are using the work to inform local trail planning and local recreational and development scenarios. Local trail groups and citizens are using the work in their communities to promote trails and trailheads.

The work has been published in a 166-page report in printed and digital forms. The reports have been sent to the communities and the DNR and is available on the Center for Changing Landscapes website.

Project completed: 6/30/2007

Local Initiative Grants (Parks and Natural Areas)

06(j) \$1,200,000

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Overall Project Outcomes and Results

The key objectives and results of the Local Initiative Grants program are to assist local governments in: 1) acquisition of regional parks outside the Metro Area; 2) acquisition of natural and scenic areas statewide; and 3) acquisition of local parks.

The primary results of the program were:

- Four grants totaling \$900,000 for three county and one city administered regional parks resulted in the acquisition of 736.6 acres of park land. These grants protected high quality woods and prairie, wetlands, and a heron rookery to be added to Stanley Eddy Regional Park in Wright County; acquired agricultural land to be added to Robert Ney Regional Park in Wright County for restoration to prairie, forest and wetlands; acquired agricultural land to be added to the Hormel Nature Center for restoration to prairie; and protected one-half mile of undeveloped lake frontage and over 200 acres of high quality maple/basswood/oak forest recognized as a significant area by the state County Biological Survey in the new Kraemer Lake Regional Park in Stearns County
- One grant of \$100,000 for a new city administered natural and scenic area at Pilot Knob in Mendota Heights totaling 8.25 acres . The area has significant scenic, historical, geological, natural and cultural values and offers one of the most striking vistas in the Twin Cities metro area. It is currently being restored to prairie and oak savanna.
- One grant of \$100,000 for a new city administered park (McKinney Lake Park) protecting 1.88 acres of lake shore in Grand Rapids . The site will provide shore fishing and canoeing opportunities as well as a scenic stop along the Edge of the Wilderness Scenic Byway.
- Total acres acquired: 746.73.

Project Results Use and Dissemination

Information about most of these parks and natural and scenic areas has been added to the DNR website. Click on 'Profiles' under both the Regional Park Grants and Natural and Scenic Area Grants headings. The county web sites and the City of Austin web site also include information about these parks.

Project completed: 6/30/2008

Regional Park Planning for Nonmetropolitan Urban Areas

06(k) \$86,000

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Overall Project Outcome and Results

The report, "Regional Parks for Minnesota's New Outstate Urban Complexes" discusses the need for regional park investments in the following outstate urban complexes: nine collar counties around the Twin Cities metro, the greater St. Cloud region, greater Rochester, the Central Lakes region, the Western Lakes region, greater Bemidji and greater Willmar.

The report identifies the most scenic places in the fastest-growing areas of Minnesota, and proposes sixteen Regional Recreation Districts distributed throughout the outstate urban complexes. These proposed districts contain about 2 million acres, approximately 4 percent of the state. The proposed districts represent the highest amenity locations (hills, trees, and water) in the fastest-growing outstate urban complexes.

Project completed: 6/30/2007

Report: [Regional parks for Minnesota's outstate urban complexes](#)

Local and Regional Trail Grant Initiative Program

06(l) \$700,000

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To provide matching grants to local units of government for the cost of acquisition, development, engineering services, and enhancement of existing and new trail facilities.

Project due to be completed: 6/30/2009

Mesabi Trail

06m \$1,000,000

Bob Manzoline
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Chisholm, MN 55719

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To acquire and develop segments of the Mesabi Trail.

Project due to be completed: 6/30/2009

Cannon Valley Trail Belle Creek Bridge Replacement

06(n) \$300,000

Scott Roepke
Cannon Valley Trail Joint Powers Board
825 Cannon River Avenue
Cannon Falls, MN 55009

Phone: (507) 263-0508**Fax:** (507) 263-5843**E-mail:** trailmanager@cannonvalleytrail.com**Web:** www.cannonvalleytrail.com**Overall Project Outcome and Results**

In order to maintain the natural and cultural resource based Cannon Valley Trail - a 20-mile paved recreational trail in Goodhue County, Minnesota - the old, rotting Belle Creek Bridge was replaced. The old wooden bridge structure was replaced with a steel bridge that spans 155 feet. The bridge project was completed in April 2006 just in time for the beginning of the 2006 biking season. Nearly 100,000 Minnesotans visit the Cannon Valley Trail annually.

Project completed: 6/30/2007

Arrowhead Regional Bike Trail Connections Plan

06(o) \$83,000

Andy Hubley
Arrowhead Regional Development Commission
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Phone: (218) 529-7512**Fax:** (218) 529-7592**E-mail:** ahubley@ardc.org**Web:** www.arrowheadplanning.org**Overall Project Outcome and Results**

The Arrowhead Regional Bike Trail Connections Plan objective is to guide to long-term transportation investments in the Arrowhead Region by recommending bicycle and pedestrian connections from communities and tourist facilities to the Region's three major trails-the Willard Munger State Trail, the Gitchi-Gami State Trail, and the Mesabi Trail, and to the Region's several shorter trail segments.

The project assessed the region's ten trails and inventoried 19 facilities and communities which were within five miles from the current regional trails. Five of these communities were identified as lacking adequate trail connections. ARDC guided these communities through a more detailed planning process to design connection that improved the public's trail access.

The project succeeded in producing a resource document that includes a trail assessment with maps, photos and descriptions, and the conditions of the trail connections for communities in proximity. This information resulted in five communities receiving detailed trail plans, who are now ready to work with ARDC's transportation planning program to implement the connections.

Project Results Use and Dissemination

The final Arrowhead Region Bike Connections Plan is being used by communities to improve their trail access. Local and regional planners are also using the Plan for related projects. The public and interested officials can view the document on ARDC Regional Planning Division website:

www.arrowheadplanning.org/bikeconnections**Project completed:** 6/30/2007

Land Acquisition, Minnesota Landscape Arboretum

06(p) \$650,000*

**An equal match of non-state dollars was required for this project.*

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Overall Project Outcome and Results

A 90-acre parcel within the boundaries of the Minnesota Landscape Arboretum was acquired by combining these Trust Fund funds with some remaining funds from a ML 2003 Trust Fund appropriation. This particular land acquisition concludes a 25 year long process to acquire these lands. The acquisition provides an internal connection to the Horticultural Research Center and adds to the Arboretum additional big woods, high quality wetlands and valuable tillable land for future research and education programs.

Project completed: 10/07/2008

Development and Rehabilitation of Minnesota Shooting Ranges

06(q) \$300,000

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To provide technical assistance and matching grants to local communities and recreational shooting and archery clubs for the purpose of developing or rehabilitating shooting and archery facilities for public use. Recipient facilities must be open to the general public at reasonable times and for a reasonable fee on a walk-in basis.

Project due to be completed: 6/30/2008 - **FINAL REPORT NOT YET RECEIVED**

Birding Maps

06(r) \$100,000

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Overall Project Outcome and Results

In order to attract more birdwatchers, and their economic impacts, to Minnesota four birding trail guides were produced and nationally distributed. Nine thousand eight hundred (9,800) copies were created and printed of a new birding guide for the North Shore region, following US Hwy 61 from Duluth to Grand Portage. Two thousand five hundred (2,500) guides for the Minnesota River Valley watershed, from Big Stone Lake to the Twin Cities, and 5,500 guides for the Mississippi River (Great River Birding Trail) from Lake Itasca to the Iowa border were updated and printed. The guide to the Pine to Prairie trail extending from Warroad to Fergus Falls was updated and 67,500 copies were printed.

To facilitate distribution and retail sales, we contracted with Adventure Publications, located in Cambridge, MN to distribute the North Shore, Minnesota River, and Great River books nationally. The North Shore guide retails for \$9.95, and the Minnesota River and Great River guides retail for \$12.95 each. Proceeds from these sales will be placed in a special account at Audubon and be used for work consistent with the objectives of this project. The Pine to Prairie guide will continue to be free of charge and distributed through the Detroit Lakes Regional Chamber of Commerce.

Project Results Use and Dissemination

All of the Bird Trail Guides have national distribution through Audubon, the Detroit Lakes Chamber of Commerce and Adventure Publications. The North Shore, Minnesota River Valley, and Great River Guides are available at retail outlets.

Project completed: 6/30/2007

SUBD. 07 - WATER RESOURCES

Local Water Management Matching Challenge Grants

07(a) \$1,000,000

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Overall Project Outcome and Results

The Board of Water and Soil Resources (BWSR) oversees the Local Water Management Program. The purpose of this program is to protect water resources through the adoption and implementation of water management plans by counties and soil and water conservation districts. BWSR has supported implementation of these plans with other state funds since 1990, and funds provided by the Environment and Natural Resources Trust Fund ("Trust Fund") since 2000.

In February 2005 BWSR solicited local units of government to apply for project funding via Trust Fund funds. A total of 78 project proposals were received; the ranking of these project proposals was conducted by a team consisting of staff from BWSR, Department of Agriculture, Minnesota Department of Health, Department of Natural Resources, and the Minnesota Pollution Control Agency. The review team recommended 35 projects be approved for funding. The BWSR Board approved these recommendations on May 25, 2005.

The funded projects undertook the following activities:

- 10 projects focused on drainage system planning and inventories
- 7 projects focused on the assessment and implementation of water quality plans and practices
- 4 projects focused on lake management planning
- 4 projects focused on designing and implementing stormwater management plans and practices
- The remaining 10 projects focused on water quality education, land conservation, development of a geologic atlas, on-site wastewater treatment, developing a drained wetland inventory, groundwater monitoring, and flood damage reduction.

The level of interest and financial need to implement these types of local management plans remains high, as evidenced by the number of applications received for this period of funding. Local governments continue to value their water resources, and State funding helps maintain a state-local partnership in protecting these important resources. Funding these projects makes local resource management a priority by encouraging and enabling the implementation of these plans.

Project Results Use and Dissemination

Detailed project work plans, budgets, and reports will be maintained by BWSR for successful grant applicants. These materials are available for inspection upon request. Final project results are available in an electronic format through the required use of BWSR's local government reporting system (eLINK).

Individual project proposers will be using the results of their projects to continue their water resource management programs, which include education of local citizens and public officials, and in addressing priorities as identified in their BWSR approved plans.

Project completed: 6/30/2008

Accelerating and Enhancing Surface Water Monitoring for Lakes and Streams

07(b)1 \$350,000

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Overall Project Outcome and Results

Building upon and continuing work begun from a 2003 appropriation, this second appropriation for the Accelerating and Enhancing Surface Water Monitoring Project was designed to pilot new monitoring approaches for streams (biological and remotely sensed), and to educate and increase citizen participation in water monitoring efforts in Minnesota.

The Minnesota Pollution Control Agency's (MPCA) goal was to develop and pilot a systematic, intensive, watershed assessment monitoring system to identify waters exhibiting impairments. MPCA staff using Trust Fund funds sampled 57 sites in the Snake River Watershed using the intensive watershed assessment monitoring system. In addition, staff sampled 105 sites in the Rainy and Red River Basins to complete sampling needed to develop a state-wide index of biological integrity. The University of Minnesota Remote Sensing Laboratory's (RSL) objective was to develop and evaluate the potential of remote sensing for monitoring water quality of rivers. The RSL continued work started with 2003 Trust Fund funds to collect

hyperspectral remote sensing data and water quality data in 2004, 2005, and 2007 for 7 major river systems in Minnesota. Strong relationships were found between the remote sensed data and water quality data; this indicates an excellent potential for use of this technology in large river systems. The University of Minnesota Water Resources Center's (WRC) goal was to expand and support a network of volunteers monitoring macroinvertebrates and E. coli bacteria on lakes and streams in Minnesota. The WRC trained 66 volunteers in 9 workshops, resulting in 48 sites being monitored on 28 different lakes and streams in 18 Minnesota counties. In total, 369 bacteria samples were collected, with 22 samples exceeding state standards. Minnesota Waters' objective was to continue enhancement of the ability of volunteer citizen groups to collect water quality data that will be useful for local water management and/or state water quality assessment.

Project Results Use and Dissemination

The MPCA is currently using this intensive watershed monitoring framework to plan future MPCA stream sampling efforts funded under the Clean Water Legacy Act. Approximately 3,600 sites have been picked to sample state-wide over the next 10 years (2008 to 2017). The Snake River Watershed Assessment Report will be available online at: <http://www.pca.state.mn.us/water/biomonitoring/bio-streams-fish.html#reports>.

The RSL has received coverage from the Star Tribune and Kare 11 on the river remote sensing project. The information is also available online at: <http://water.umn.edu/rivers/index.html>. Leif Olmanson presented and had a poster on, "Use of Airborne Remote Sensing Imagery for Water Quality Assessment of Minnesota's Rivers," with the initial results at the North American Lake Management Society annual conference at Madison, Wisconsin on November 9-11, 2005 and included a summary of current results in a presentation entitled, "Using Remote Sensing Applications for Local Water Planning & Management," at the Minnesota Waters: Lakes and Rivers Conference at Duluth on September 7, 2006.

The WRC presented the project at the 2006 Minnesota Lakes and Rivers Conference in Duluth, MN and at the MPCA Lakes and Stream Team Meeting in January, 2007. Information and the training manual are available online at: <http://wrc.umn.edu/outreach/ecolimonitoring/index.html>. Two peer reviewed journal articles are in preparation on the project and articles were included in the WRC Minnogram and the Minnesota Sea Grant Seiche newsletters. In addition, data from Minnesota has been included in presentations at 8 different regional/national meetings in 2006 and 2007. Finally, based on the results of a year end survey of volunteers in 2006, over 60% said they shared results of monitoring efforts with neighbors/friends, 30% with lake association leaders, 30% with elected or appointed officials, and 25% with local resource managers.

Project completed: 6/30/2008

Accelerating and Enhancing Surface Water Monitoring for Lakes and Streams (Result 3)

07(b)2 \$250,000

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*Minnesota Lakes Association and Rivers Council of Minnesota merged to Minnesota Water in 2006.

Result 3: Continued enhancement of the ability of volunteer citizen groups to collect water quality data that will be useful for local water management and/or state water quality assessment.

Overall Project Outcome and Results

When this project was started in 2005 the MPCA only had surface water assessment for 14% of Minnesota's lakes and 8% of its streams. At conclusion in 2008 the numbers have slowly climbed to 18% of lakes and 14% of streams. Citizen volunteers have been contributors to understanding the quality of Minnesota's surface waters; they have been able to gather data from lakes and rivers that state organizations, because of limited funding and staff, have not monitored. Minnesota Waters worked on Result 3 which is part of the continuation proposal: Accelerating and Enhancing Surface Water Monitoring. Minnesota Waters expanded the ability of individuals and organizations to collect useable data by developing and implementing training programs for citizen monitors and their leaders. Minnesota Waters believes that the best way to promote responsible stewardship of water resources is by engaging citizens, local and state policymakers, and other partners in the protection and restoration of Minnesota's lakes and rivers. Through various training programs we have helped citizen volunteers follow a data pathway from collecting the data, transforming the data to information, and finally to water quality protection / restoration action.

The programs that were offered included: Freshwater Mussel Monitoring, Putting Green, Design Your Monitoring Plan, Stream Health Evaluation Program (Benthic macroinvertebrate monitoring), Monitoring Data Assessment / Interpretation, Monitoring Rivers and Lakes for Road Salt, Lake Sampling Skills Training, Stream Sampling Skills Training, Aquatic Plant Identification.

The workshops produced: 405 monitoring volunteers (from 56 citizen groups) that drafted 16 monitoring plans and are active on 240 lakes and 52 streams.

Project Results Use and Dissemination

In addition to the training workshops, water quality monitoring in Minnesota was advanced by providing informational outreach to volunteers statewide. This outreach has been accomplished by producing:

- 5 newsletters with a distribution of approximately 4000 each mailing : These newsletters contain information on both water quality monitoring and effective volunteer group organization. These newsletters also share what other volunteer groups have accomplished across the state.
- 2006 Lakes and Rivers Conference with over 500 participants: Topics that were covered during the three day conference included shoreland restoration, citizen monitoring, lake management planning, increasing organizational effectiveness, stormwater runoff, impaired waters assessment, and low impact shoreland development.

- Production of "A Citizen's Guide to Using Monitoring Data": This booklet is designed to showcase volunteers across Minnesota involved in water quality monitoring and how their data has been used to affect change. The topics covered include the value of citizen monitoring, developing monitoring plans, lake monitoring, stream monitoring, wetland monitoring, and biological monitoring. Appendices include resource information for citizen monitors.
- Minnesota Waters website and monthly electronic newsletter *The Confluence* : The website keeps citizen monitors informed about workshops that are available during the year. Minnesota Waters has also provided downloadable informational materials as well as hosting websites for lake and river group association. *The Confluence* provides the latest information about water quality issues and events to over 3000 constituents monthly.

Project completed: 6/30/2008

Effects of Land Retirements on the Minnesota River

07(c) \$300,000

Board of Water and Soil Resources (BWSR) for a cooperative agreement with the U.S. Geological Survey.

Board of Water and Soil Resources (BWSR) for a cooperative agreement with the U.S. Geological Survey.

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RESEARCH

Overall Project Outcome and Results

Three watersheds in the Minnesota River basin were selected to study effects of agricultural land retirement on stream quality. Site selections were based on similarities in hydrology, land use, soil type, and other characteristics and differences in land retirement percentages. Water samples were collected from 2005-2007 and analyzed for field measurements, nutrients, and sediment. Streamflow and continuous water-quality data were collected and disseminated (<http://waterdata.usgs.gov/nwis/mn/rt>). Biological sampling was conducted in August 2006 and 2007. The South Branch Rush River (representing little to no land retirement) had substantially higher nitrogen concentrations (mean=14.3 mg/L) than Chetomba Creek (mean= 11.3 mg/L) and West Fork Beaver Creek (mean=8.5 mg/L), watersheds with more riparian land retirement. Total phosphorus was highest (mean=0.26 mg/L) in West Fork Beaver Creek and lower in Chetomba Creek (mean=0.15 mg/L) and South Branch Rush River (mean=0.16 mg/L). A second monitoring site was established in Chetomba basin, downstream from substantial riparian land retirement. Nitrite plus nitrate, total nitrogen, and total phosphorus were lower for the downstream monitoring site, which may indicate that water-quality improved due to land retirement. Fish data indicate better resource quality for West Fork Beaver Creek than other streams likely due to several factors including habitat quality, food resources, and dissolved oxygen characteristics. Index of biotic integrity scores increased as local land-retirement percentages (50- and 100-ft buffers) increased. Information from this study can be used to evaluate land retirement programs for improving water quality.

Additional work will continue at these sites under another USGS/BWSR project funded through the Trust Fund and USGS (ML2007, [Chap. HF 293], Sec. [2], Subd. 5(c)). Biological data collected from these watersheds will be compared to existing data collected across the Minnesota River basin and GIS coverages of land retirement, allowing the results from this study to extend to other sites in the Minnesota River basin and address the relation of retired land characteristics and biological integrity.

Project Results Use and Dissemination

The streamflow and continuous, in-stream water-quality data for Chetomba Creek, West Fork Beaver Creek, and South Branch Rush River was disseminated to the public in real-time through the USGS National Water Information Website at <http://waterdata.usgs.gov/nwis/mn/rt>. In addition, the following products or presentations were given:

1. A poster presentation, *Effects of Land Retirement on Three Streams in the Minnesota River Basin*, was given to attendees of the Minnesota Water 2006 and Annual Water Resources Joint Conference at the Earl Brown Center, Brooklyn Center, Minn. On October 24-25, 2006 by Chad R. Anderson, Victoria G. Christensen, and Kathy E. Lee.
2. An informal presentation was held on July 11, 2007 at the Muetzel Farm in the Minnesota River basin to discuss the project with LCCMR, BWSR, local agencies and land owners. Jim Stark, USGS, provided to attendees a hand-out on how we are collecting the data, preliminary results, and analysis.
3. The presentation, *Effects of Agricultural Land Retirement on Quality of Streams of the Minnesota River Basin*, was given and an abstract published for the Soil and Water Conservation Society, Rocky Mountain Rendezvous II on July 25, 2007 by V.G. Christensen and K.E. Lee.
4. A presentation was given at the 2008 AWRA Summer Specialty Conference in Virginia Beach, Virginia on July 1, 2008. A proceedings paper also was published and provided to LCCMR (Christensen, V.G., and Lee, K.E., 2008, Effects of Agricultural Land Retirement in the Minnesota River Basin, in proceedings of the American Water Resources Summer Specialty Conference, June 30-July 2, 2008, Virginia Beach, VA, 6 p.).

Future presentations scheduled include a field tour in Olivia, MN hosted by the Board of Water and Soil Resources and the Renville Soil and Water Conservation District on August 27, 2008. A hand-out will be prepared and an informal presentation will be prepared. Additionally, an abstract has been accepted for a presentation at the Minnesota Water 2008 and Annual Water Resources Joint Conference in October 2008. The focus of this

presentation will be the benefits of continuous water-quality monitoring.

Project completed*: 6/30/2008

*Work continues via 2007 appropriation of \$275,000: ML2007, Chap. 30, Sec. 2, Subd. 5(c) - "Land Retirement Effects on Minnesota River Basin Streams". See [2007 Abstracts](#) for more information.

Recycling Treated Municipal Wastewater for Industrial Water Use

07(d) \$300,000

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Overall Project Outcome and Results

Recycled treated municipal wastewater is an emerging non-potable water supply for Minnesota industries. Economic development, water supply limitations, and environmental regulations will increasingly drive the need to find alternative water supplies. Recycling treated municipal wastewater for industrial water use is feasible and, in some situations, cost competitive with other water supplies. Implementation issues are addressable. Recycling treated municipal wastewater can conserve water resources and support industries and economic development

Non-power industries in Minnesota use 442 million gallons per day (mgd) of water from their own permitted supplies. The quantity of treated municipal wastewater available statewide, estimated at 425 mgd, could fill a portion of this use. However, industries and wastewater plants are not always close to each other. Over half of the treated municipal wastewater, 255 mgd, is generated in the Twin Cities while industrial water demand in this area is estimated at 75 mgd.

Wastewater treatment technologies are available to meet the highest levels of water quality required by industries and protect public health. Treatment needs range from minimal additional disinfection to significant additional treatment. Typically, hardness and salt reduction would be required.

Recycled wastewater costs can be competitive with other water supplies for some industries, especially at capacities of 1 mgd or greater. Systems of this size would likely serve one large or several smaller industries or multiple recycled wastewater users, industrial and non-industrial.

Regulatory, industry, and broader-based stakeholders advised more public education to move recycling from unknown to accepted and positive. The current case-by-case regulatory approach matches the existing permit requests but unknowns associated with this approach may deter some projects. Addressing industry concerns regarding liability and providing economic incentives beyond the market value of water versus treated wastewater would support new recycling projects. Next steps could include demonstration projects with unilateral, partnered, or other approaches.

The study's results are presented in the report, '[Recycling Municipal Wastewater for Industrial Water Use](#)'. This report posted on the Metropolitan Council website September 1, 2007 .

Project Results Use and Dissemination

The information the study developed has been used by state agencies and industries to evaluate and promote, as appropriate, the use of recycled wastewater as a water source for industries. Examples include:

- Metropolitan Council staff presented preliminary findings to an ethanol industry stakeholder meeting sponsored by the Minnesota Pollution Control Agency
- Department of Natural Resources staff used information to make recommendations to the Public Facilities Administration to provide grant funds for a project to demonstrate the use of recycled wastewater in an ethanol production plant.
- Stakeholder industries to evaluate if using recycled wastewater is feasible in their particular case.

The project results was disseminated in technical presentations, such as the Conference on the Environment in early November 2007 co-sponsored by the Central States chapter of the Water Environment Foundation and Air and Waste Management. Project results are disseminated to the general public through the Metropolitan Council newsletters and website.

Project completed: 6/30/2007

Unwanted Hormone Therapy: Protecting Water and Public Health

07(e) \$300,000

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RESEARCH**Overall Project Outcome and Results**

Endocrine disruptors have been linked to numerous problems in ecosystems and humans, particularly with respect to reproductive function and development. The effluent from the Western Lake Superior Sanitary District (WLSSD) Wastewater Treatment Plant in Duluth, Minnesota and the Metropolitan (Metro) Treatment Plant in St. Paul, Minnesota have been observed to be estrogenic. The goal of this project was to conduct mass balances across the two treatment plants to determine where estrogenic compounds come from and how they are distributed. For the Metro plant, the estrogenicity entering the plant was relatively consistent and was removed effectively, as measured by a receptor binding assay (the YES assay) (96% + or - 2%). The estrogenicity leaving the plant consisted mainly of estrone, nonylphenol, and bisphenol A. Hormones (estriol and ethynylestradiol) were detected on two occasions (410 and 18 ng/L, respectively). At the WLSSD plant, the estrogenicity throughout the plant varied extensively over time. This was expected as the plant receives about 2/3 of its flow from industrial sources. The estrogenicity in the effluent also varied, as measured by the YES assay (3-34 ng/L or 0.4-4.3 g/day estradiol equivalent), but did appear to be treated within the plant. The estrogenic compounds most often detected in the effluent were estrone, nonylphenol, and bisphenol A. Unlike the Metro plant, bisphenol A did not appear to degrade appreciably in two out of three samples. This could be a result of competition, as the levels of other organic compounds would be high. Therefore, more research is required to determine how the presence of competing organic compounds, such as phytoestrogens, affects the microbial transformation of problematic compounds such as bisphenol A. Other removal methods (e.g., sorption for nonylphenol) will also be complicated by the presence of competing compounds; additional research will also be required to better facilitate such processes.

Project Results Use and Dissemination

Results have been disseminated at several conferences. In addition, two manuscripts are being written and will be submitted for publication in September, 2008. This project also resulted in the generation of three Master's theses.

Project completed: 6/30/2008

Climate Change Impacts on Minnesota's Aquatic Resources - GOVERNOR VETO

07(f) — \$250,000

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RESEARCH

To quantify climate, hydrologic, and ecological variability and trends; and identify indicators of future climate change effects on aquatic systems.

Project due to be completed: 6/30/2008

Received 2006 appropriation of \$250,000: ML 2006, Chap., Sec. 20, Subd. 7 ("Impacts on Minnesota's Aquatic Resources from Climate Change"). See [2006 Abstracts](#) for more information.

Green Roof Cost Share and Monitoring - GOVERNOR VETO

07(g) — \$350,000

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To install green, vegetated roofs on four commercial or industrial buildings in Roseville and Falcon Heights and to monitor their effectiveness for stormwater management, flood reduction, water quality, and energy efficiency. The cost of the installations must be matched by at least 50 percent nonstate money.

Project due to be completed: 6/30/2007

Woodchip Biofilter Treatment of Feedlot Runoff

07(h) \$270,000

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RESEARCH

Overall Project Outcome and Results

Animal agriculture has the potential to adversely affect surface water quality through the uncontrolled overland conveyance of manure particulates from feedlots to adjacent water bodies during the melting of the winter snow pack or from storm-water generated runoff. In undulating terrain of central Minnesota, more than half of the feedlots are located in close proximity to surface water and many of these locations have insufficient space for the installation of a vegetated filter strip. The two primary objectives of the two-year study financed by the Environment and Natural Resources Trust Fund were to: (I) characterize and evaluate the removal efficiency of nitrogen, phosphorus and *E.coli* from 10 different types of media in a controlled laboratory setting; and (II) construct a prototype woodchip biofilter and assess its performance at a feedlot site located at the West Central Research and Outreach Center in Morris. The initial studies both in the laboratory and field showed great potential for biofilters to serve as an alternative or addition to space-consuming vegetative filter strips (VFS) to treat feedlot runoff. The demonstration biofilter in Morris was able to reduce water discharge volume by 95% through absorption by the woodchip media. A subsequent potassium bromide injection test demonstrated the ability of the woodchip media to attenuate and absorb the conservative bromide tracer as it flowed through the biofilter. Based on the information learned in the laboratory and at Morris test site, refinements have been made to the biofilter design that should lead to increased nutrient removal and water absorption efficiencies at a dairy farm site in Melrose, Minnesota where additional design considerations will be evaluated. Based upon the positive results to date, it appears that a well-designed woodchip biofilter will provide a viable alternative option for some farmers with feedlots located near sensitive waters.

Project completed: 6/30/2008

Improving Water Quality on the Central Sands

07(i) \$587,000

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RESEARCH

University of Minnesota and the Central Lakes College Agricultural Center

To reduce nitrate and phosphorus losses to groundwater and surface waters of sandy ecoregions through the development, promotion, and adoption of new farming and land management practices and techniques.

Project due to be completed: 6/30/2010

Improving Impaired Watersheds: Conservation Drainage Research

07(j) \$300,000

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RESEARCH

To analyze conservation drainage systems at University of Minnesota research and outreach centers and for opportunities to retrofit drainage infrastructure with water quality improvement technologies.

Project due to be completed: 6/30/2009

Hydrology, Habitat and Energy Potential of Mine Lakes (There are 5 parts to this project)

07(k) \$500,000

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Overall Project Outcome and Results

This four-part project studied aspects of existing post-mining landforms to provide baseline data for developing a long-range land-use plan. The goal of such a plan is to design landforms for the most desirable results in 30-50 years, transforming landforms through current mining activities with a predetermined post-mining outcome suitable for residential, commercial, recreation and transportation uses. Understanding the ultimate pit water level is the key in planning for future land uses and future lake bottom configurations to maximize the ultimate future benefit.

The *Geology and Ultimate Pit Morphology* study, a \$101,000 research project conducted by the Minnesota Geological Survey (MGS), reviewed existing data and conducted fieldwork to produce maps and databases describing the interconnection of subsurface features in the hydrologic system of existing pit lakes directly east of Chisholm, MN. This data helped agencies like the Minnesota DNR and MGS, landscape architects, mine engineers and municipal governments understand the impact decades of open-pit mining has had on water tables and groundwater movement within and among mine pits.

The *Ultimate Mine Pit Water Levels* study was conducted by the Minnesota DNR, Division of Lands and Minerals and Division of Waters. The \$218,174 project examined an predicted groundwater levels in five mine-pits: Twin City North, Twin City South, Fraser, Sherman, and Hartley-Burt/Forester. Phase I evaluated whether or not water levels in these pits were rising, using monitoring wells, slug tests and watershed delineation. Phase II examined 12 scenarios for water discharge from hypothetical "megapit" complexes resulting from continued ore mining to assess potential pit outflow impacts on the Lake Superior, Red River, and Mississippi watersheds. Results from this study provide natural resource managers, land use planners and mining companies with conceptual data that can be used as a starting point to engineer solutions to mitigate potential environmental impacts.

In the *Sport Fish Habitat* project, which was conducted as part of this project but was not funded from this appropriation, the Minnesota DNR and the Center for Water and the Environment at the Natural Resources Research Institute examined five existing mine pit lakes: Canisteo, Embarrass, Judson, Larue, and Tioga. These pits were selected because fish population assessment data was available. A compilation of the assessment data showed that the pit lakes contain 18 species of fish. Cold-water species, particularly rainbow trout, are common due to regular stocking programs. Analysis of the lakes' chemical make-up found water clarity high, but that pit lake waters do not always contain optimum amounts of chemicals that foster and support fish life cycles. In addition, pit lake structure could be a limiting factor to fish diversity. The study found a positive relationship between littoral areas and fish species diversity, yet most existing mine pit lakes have steep slopes both above and below the water line. Land use planners, mine engineers, and natural resource managers can use these results to plan current mining activity that results in mine pit lake basins with shallow, gently sloping lake beds conducive to fish habitat.

Wind Power Development and Pumped Energy Storage on Minnesota's Iron Range was a \$15,000 study done by Barr Engineering that researched the feasibility of and possible sites for wind turbines and hydro-storage energy potential in mine-pit lakes. Two sites - one for each type of alternative energy source - were identified on the Central Iron Range.

Project Results Use and Dissemination

With information from the four studies outlined above, CIRI has the baseline information about key features of existing mine pit lakes needed to move toward development of a regional comprehensive landform and lakeform plan. Such a plan would be detailed enough that mining companies could use it in their permitting processes. It also would provide public and private Iron Range interests - mining companies, regulatory agencies, municipal government, and the private sector - with a roadmap for creating landforms that will maximize residential, commercial, and recreational activity. The next step in this process will be to secure funding to examine planning and zoning requirements and other locally specific land management issues not covered by this project.

Presentations on project results were made to the Central Iron Range Initiative, which has approximately 140 members. Information was also shared with area mining engineers, local legislators, and area chambers of commerce. Reports on each study are available at the Iron Range Research Center at Ironworld Discovery Center in Chisholm, MN.

Project completed: 6/30/2007

Hennepin County Beach Water Quality Monitoring Project

07(l) \$100,000

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Overall Project Outcome and Results

This project was designed to develop a predictive model for on-site determination of beach water quality to prevent outbreaks of waterborne illness and to provide related water safety outreach to the public.

From July 2005 through August 30, 2007, Hennepin County temporary staff collected, recorded, and analyzed beach water quality data using a handheld five-sensor sonde for shallow depth and beach survey observations at 11 Hennepin County beaches (1129 samples in 2005, 1431 samples in 2006, 2007 pending). Temperature, pH, dissolved oxygen, conductivity, and turbidity were measured, along with the directly observed variables bather counts, animal counts, beach management techniques, location of storm water outlets and rainfall. After a trial run in 2006, rainfall, solar radiation, wind speed, and wind direction were also measured hourly at automated meteorological stations at Bryant, French, and Weaver Beaches in 2007.

In the fall of 2006, a contracted lake water quality consultant, Dr. Greg Olyphant, developed multivariate time-series regression models predictive of *E. coli* levels based on data for Bryant and French beaches. These models are specific to each beach and will facilitate decisions about when the beach should be closed or reopened based on current information. This precludes waiting the 24 hours for *E. coli* laboratory results, the present accepted practice, based on EPA beach closure guidelines. Using meteorological station data, additional samples were collected in 2007 and attempts will be made to validate the Bryant and French models in the future.

Results from this study were presented at the 2007 International Conference on Diseases Communicable to Man in Nature in Madison, WI. Additional results will be compiled and made available in electronic form to other local health and park departments at no charge. The public education component of this project involves posting summary water quality data and beach user information on a publicly accessible website.

Project completed: 6/30/2007

SW Minnesota Floodwater Retention Projects

07(m) \$500,000

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Overall Project Outcome and Results

This portion of the Minnesota River watershed lies along the Coteau des Prairies, more commonly known as the Buffalo Ridge, where elevation differences range from 80 feet/mile (Lac qui Parle River) to 50 feet/mile (Redwood River). Due to these very steep slopes, flooding has become an annual occurrence. These areas typically do not qualify for land retirement programs as they do not have the necessary cropping histories to enable their enrollment. Common land conservation practices often suffer severe erosion and/or failure with water forces of this magnitude, making it imperative to hold the water where it falls on the landscape. The main objective of the funding was to design and construct at least four floodwater retention projects to temporarily store floodwaters and meter out the flows at a rate tolerable by the receiving streams.

Through this appropriation five projects were completed: two road retentions and three small dams in Yellow Medicine, Cottonwood, Murray and Lyon County in southwestern Minnesota. Local match in the amount of \$220,916.62 was provided by the project partners.

Construction of these floodwater retention projects resulted in improved water quality and waterfowl habitat, 1,157.1 acre-feet of temporary

floodwater storage, reduced flows of 1,673 cfs which reduces streambank erosion, sediment transport, and nutrients into receiving streams. Perpetual flowage easements upon 151.3 acres were acquired to protect the viability and longevity of the constructed projects.

Project Results Use and Dissemination

Area II hosts an annual meeting where educational presentations are made to nine counties of county commissioners, Soil and Water Conservation District supervisors and staff, watershed district managers and staff, state agency representatives, and state and federal legislators. Presentations are occasionally made to various groups and organizations with tours of completed project sites. A

Project completed: 6/30/2007

Upgrades to Blue Heron Research Vessel- GOVERNOR VETO

07(n) — \$295,000 / TF & GLPA (\$28,000)

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To upgrade and overhaul the Blue Heron Research Vessel.

Project due to be completed: 6/30/2007

Received 2006 appropriation of \$295,000: ML 2006, Chap., Sec. 20, Subd. 6 ("Lake Superior Research"). See [2006 Abstracts](#) for more information.

Bassett Creek Valley Channel Restoration

07(o) \$175,000

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Overall Project Outcome and Results

The Bassett Creek Valley Restoration Study (Plan) presents a compilation of existing data used in conjunction with new research to set the context and physical design constraints for implementing public open space development in the proposed Commons and Greenway areas. The Plan provides further review of the open space concept put forward by the Bassett Creek Valley Master Plan (<http://www.ci.minneapolis.mn.us/planning/bassett-creek.asp>). The Plan presents several Design Alternatives that were considered before arriving at the Preferred Design for the Commons and Greenway. The Plan provides phasing concepts, estimated implementation costs, and associated long-term maintenance costs. The Plan is being prepared for distribution in printed and electronic versions. The design scenarios were tested through a public participation process and a technical advisory committee of City of Minneapolis and Hennepin County staff.

The Preferred Design for the Commons includes a rehabilitated Bassett Creek with a functioning riparian habitat, an expanded floodway, and stream meanders. Upland areas are to be converted to naturalized prairie. A newly created savanna will extend northward from the existing tree canopy along the south. The project design also addresses soil contamination issues. The public open space includes a system of iconic bridges and internal trails with links to adjacent neighborhoods. The Luce Line Trail enters the Commons via a railroad underpass and links to Van White Memorial Boulevard. A 'Great Lawn' is envisioned which will serve as an informal gathering place and a gateway to a learning terrace with interpretive opportunities along the revitalized creek.

The Preferred Design for the Greenway includes a stream channel alignment running south to north from existing Bassett Creek to the old stormwater tunnel near Glenwood Avenue. This waterway will be flanked by an exciting and dense urban setting that include restaurants, offices and connections to neighborhoods and existing public open-space systems.

Project Results Use and Dissemination

The Bassett Creek Stream and Habitat Restoration Implementation Plan was completed in October 2007 in print and electronic versions. The electronic version is posted on the City of Minneapolis website: http://www.ci.minneapolis.mn.us/cped/bassett_restoration_plan_home.asp.

Project completed: 6/30/2007

Restoration of Indian Lake

07(p) \$200,000

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Overall Project Outcome and Results

The Indian Lake Improvement District and Bemidji State University cooperated on a project to remove excess nutrients from Indian Lake in Wright County to improve water quality.

Project completed: 6/30/2008

SUBD. 08 - LAND USE AND NATURAL RESOURCE INFO

MN County Biological Survey

08(a) \$1,000,000

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Overall Project Outcome and Results

This appropriation continued and accelerated the ongoing effort to identify significant natural areas and to collect and interpret data on the distribution and ecology of rare plants, rare animals, and native plant communities in each county of the state. At the end of this phase, surveys have been completed in 65 of Minnesota's 87 counties. Data from these surveys reside in the Department of Natural Resource's (DNR) Natural Heritage Information System (NHIS). Since 1987, MCBS has added 15,543 new records of rare features to the NHIS. The DNR's 'Data Deli' is a web site location where users with Geographic Information System (GIS) capabilities have access to various digital natural resource map layers. Currently over 35,511 polygons of native plant community types and complexes and 7,063 sites mapped by MCBS now reside in this location. Native plant communities are also documented by 8,756 vegetation plot samples recorded in DNR's Releve Database. Sixteen species of native plants, and two species and one hybrid of amphibians not previously documented in Minnesota have been recorded by MCBS.

Project Results Use and Dissemination

A three volume series of native plant community field guides was completed in 2005 with the publication of two final volumes: *Field guide to the native plant communities of Minnesota : The Eastern Broadleaf Forest* and *Field guide to the native plant communities of Minnesota : The Prairie Parkland and Tallgrass Aspen Parklands Provinces*. All three volumes are available through Minnesota's Bookstore. The field sampling handbook, *A handbook for collecting releve data in Minnesota*, and portions of the native plant community field guides are posted on the DNR website. Training sessions were conducted statewide in the use of the field guides.

Featured use of data: 1) A report, *Headwaters Site*, prepared from field data and associated resources, describing the ecological resources of a nearly 40,000 acre area at the headwaters of the St Louis River is being used by the Sand Lake Seven Beavers to inform collaborative management planning for the area; 2) Surveys resulted in private land protection on high quality prairies in western Murray County; 3) Issues related to Forest Certification, biofuel development and off-road vehicle issues reference MCBS data; and 4) A preliminary list of 'Quality Lakes of Minnesota' was prepared based largely on the results of rare aquatic plant and nongame fish data.

Project completed*: 6/30/2007

*Work continues via 2007 appropriation of \$1,500,000: ML2007, Chap. 30, Sec. 2, Subd. 6(a) - "Minnesota County Biological Survey". See [2007 Abstracts](#) for more information.

Soil Survey

08(b) \$500,000

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Overall Project Outcome and Results

This appropriation continued the ongoing study of the state's soils by accelerating the completion of soil mapping and digitization of soils data.

To accelerate the completion of soil mapping, and the eventual digitization of soils data, mapping projects were initiated in Pine and Crow Wing Counties. During the project period, the NRCS established survey offices and hired the lead soil scientists and most of the assistant soil scientists for these counties. To characterize the landscape, geology and soil patterns, soil surveys begin with extensive field investigations and exploratory borings. To those ends, about 15 percent of the overall project has been addressed in Crow Wing County and about 10 percent has been addressed in Pine County.

Existing soil surveys for two counties, Beltrami and Aitkin, were fully digitized to USDA SSURGO (Soil Survey Geographic Database) Standards by staff employed with Trust Fund funding. These staff also contributed to USDA Natural Resource Conservation Service efforts to digitize additional published soil surveys in Minnesota. Additional soils data from a total of 28 counties were digitized during the funding period. These 28 counties brought the total number of counties digitized to 75 at the end of calendar year 2007. (An additional 6 project areas were done by the NRCS with 2007 funding, for a total of 81 survey areas having digital coverage).

It was during the 2005 funding period that NRCS fully implemented a WEB-delivered soil survey. Digital SSURGO soil surveys are the basis for the WEB Soil Survey. Consequently, the acceleration of digitization efforts means that the WEB Soil Survey is available in 81 soil survey areas. Built to complement the WEB Soil Survey, NRDSS (Natural Resource Decision Support System) was developed. This product allows users to perform multiple queries of soils data and download it in formats not currently available with the USDA WEB Soil Survey.

Project Results Use and Dissemination

Digital data through the WEB Soil Survey <http://soils.usda.gov/survey> is available for 81 project areas. Soils data from counties not yet mapped and digitized is available to the public on a request basis.

Project completed*: 6/30/2008

*Work continues via 2007 appropriation of \$400,000 and 2008 appropriation of \$400,000: ML2007, Chap. 30, Sec. 2, Subd. 6(b) - "Soil Surveys" and ML2008, Chap. 367, Sec. 2, Subd. 5(b) - "Soil Survey". See [2007 Abstracts](#) and [2008 Abstracts](#) for more information.

Land Cover Mapping for Natural Resource Protection - GOVERNOR VETO

08(c) \$250,000

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To develop GIS tools for prioritizing natural areas for protection and restoration and to update and complete land cover classification mapping.

Project due to be completed: 6/30/2007

Received 2006 appropriation of \$250,000: ML 2006, Chap., Sec. 20, Subd. 5 ("Land Cover Mapping for Natural Resource Protection"). See [2006 Abstracts](#) for more information.

Open Space Planning and Protection

08(d) \$250,000

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Website: http://www.anokanaturalresources.com/acd/tech_assist/res_plan.htm

Overall Project Outcome and Result

The premise of the Open Space Planning and Protection Project was to bring concepts related to open space planning into the local comprehensive planning process in hopes that they would be incorporated into comprehensive plan updates. Since it is not possible to mandate local government adoption of open space protection strategies, giving those concepts a place at the table and prominence in local planning discussions is the next best alternative. Ultimately, the success of the effort lay with the local decisions makers and in the end mixed results were achieved.

Results 1 and 2, the creation of local open space protection plans and local adoption of tools to provide the means of implementation, have been achieved to the extent participating communities consented to do so. Due to an unanticipated lack of new development in the project area the goals for land protection in number of acres have not been met. Moreover, participating communities have been given a blueprint for natural resource protection going forward, including both 1) the identification and prioritization of natural resources for protection and 2) the planning and land use regulation approaches that can be used to protect land as part of the development process. In addition, the necessary long term shift in how

communities view development and planning for the future has begun to occur-while difficult to quantify, this is a very important point. These techniques were demonstrated through an actual protection project in one community (East Bethel) and through a mock platting process in another (Burns Township/City of Nowthen).

Project Results Use and Dissemination

Each of the participating communities received extensive individualized planning documents that included maps and analysis, infrastructure planning, demographics, model open space protection ordinances, easement documents, etc. Full copies of the reports are available on the Anoka Conservation District's website (www.anokanaturalresources.com/acd/tech_assist/res_plan.htm). The information and expertise amassed as a result of this project have and will continue to inform efforts throughout the county. A low impact development workshop in Andover and the donation of 200 acres of conservation easement in the City of Anoka both benefited from this project. Many articles have appeared on this and related topics in community newsletters throughout the planning process and periodic articles will be sent to local and regional newspapers.

Project complete: 6/30/2008

SUBD. 09 - AGRICULTURE AND NATURAL RESOURCE INDUSTRIES

Completing Third-Party Certification of DNR Forest Lands

09(a) \$250,000

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For third party assessment and certification of 4.47 million acres of DNR administered lands under forest sustainability standards established by two internationally recognized forest certification systems, the Forest Stewardship Council system and the Sustainable Forestry Initiative system.

Project due to be completed: 6/30/2009

Third Party Certification of Private Woodlands

09(b) \$376,000

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Overall Project Outcome and Results

Third party certification of forest lands verifies the land is being managed sustainably. Minnesota is a leader in the US with its certification of public and industrial forests, driven by demand from major purchasers for products made using certified fiber. However, efforts to certify private woodlands have been far less successful, even though those lands comprise nearly 40% of Minnesota's forest land base and supply about 50% of the wood harvested in the state. To sustain the quality of the state's forests and its forest-based economy, this project was funded to develop mechanisms to certify wood coming from family forests.

This project found the vast majority of family forest owners have little interest in certifying their land and providing additional information about the benefits of certification does little to change their minds. Their primary interest in owning the land is for its wildlife or other recreational value. They have no interest in paying for certification, are distrustful of certification because they perceive it as a government program, and are concerned about losing decision-making control over their land.

To address the situation, this project helped develop the Minnesota Master Logger Certification program. Wood harvested by Minnesota Certified Master Loggers is considered to be third party certified by numerous major paper purchasers and it does not impinge on landowner income or management objectives. In one year this program increased the amount of certified wood harvested from family forests from 0% to 9.8%.

Other mechanisms for family forest certification are also available. The Aitkin County Soil and Water Conservation District (SWCD) was awarded certification for its forest services program covering 13 landowners and 1,574 acres, with owners of another 20,000 acres eligible to participate. The state Tree Farm System is working with the Minnesota Forest Stewardship program to certify additional landowners. In the future, there may be opportunities to link certification with markets for carbon credits and carbon sequestration, opening new avenues for family forest certification.

Project Results Use and Dissemination

The Minnesota Master Logger Certification program is being marketed vigorously to loggers in the state. To date, 43 loggers have been certified and another six are seeking certification. Efforts to certify more loggers will continue in the future and there has been substantial press coverage of this program. The Aitkin County SWCD is being considered by others as a model. More than 10,000 brochures summarizing the options for family

forest certification were printed and are being distributed to private woodland owners. A September 2007 workshop will explain the project results, and they will be shared at an upcoming 'Million Acre' conference for private woodland owners. A journal article describing the entire project is being prepared for publication in the future. Although excellent progress was made, there is still a significant gap in certified wood from family forests. Work will continue by many involved in this project to close that gap.

Project completed: 6/30/2007

Sustainable Management of Private Forest Lands

09(c) \$874,000

ML 2006, Chap 243, Sec. 20, Subd. 11: "Forest Legacy" - \$500,000 incorporated into this project.

TOTAL of ML2005 and ML2006 appropriations = \$1,374,000

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Overall Project Outcome and Results

This project targeted private forestland in Minnesota. Private (non-industrial) landowners own 40% of the forestland in Minnesota. These acres have been identified as critical to the overall sustainability of our forest resources.

The purpose of this project was to: 1) provide stewardship advice to private forest landowners to improve the sustainability of forest habitat on their property; 2) cost-share stewardship practices on private forestland; and 3) protect private forestland with permanent conservation easements.

Complimentary results #1 ("Landowner Motivation Through Stewardship Plans") and #2 ("Cost Sharing to Convert Forest Stewardship Plans to Action") protect water quality, create wildlife habitat, offer recreational opportunities, provide forest-based economies wood fiber, and improve many other forest amenities. Stewardship plans outline forest management recommendations that help landowners meet their goals. Some of those recommendations may require financial assistance. The cost share dollars are incentives provided to landowners to entice them to implement those forest management activities outlined in their stewardship plan.

Result #1 used \$274,000 to provide stewardship plans to 272 forestland owners, covering 44,348 acres, and professional forest management assistance via the Woodland Stewardship Program. Result #2 used \$100,000 in cost-sharing for stewardship practices on private forestlands, resulting in the implementation of nearly 1,150 acres of on-the-ground forest management projects. Results #3 ("Protection of Private Forestland with Permanent Conservation Easements through matching Federal Funds" used \$500,000 of ML2005 Trust Fund funding and \$500,000 of ML2006 Trust Fund funding to acquire permanent working forest conservation easements from 2 landowners in Itasca County and Lake County, Minnesota. Total federal match leveraged on these two projects was \$818,983. Accomplishments: The total acres protected from development is 7,665 acres: 1,659 acres on the Sugar Hills Project in Itasca County; and 6,006 acres on the Wolfwood project in Lake County. All 7,665 acres provide permanent public access for hunting and fishing according to the terms of the conservation easements.

Project completed: 6/30/2008

Evaluating Riparian Timber Harvesting Guidelines: Phase 2

09(d) \$333,000

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RESEARCH

Overall Project Outcome and Results

This project continues research begun with a 2001 appropriation from the Trust Fund and is being further continued by a 2007 appropriation.

Minnesotans care about how timber harvesting practices may impact the terrestrial, aquatic, and wildlife components of forested riparian areas. Research addressing the long-term effectiveness of riparian guidelines to mitigate harvesting impacts is critical to effectively resolve riparian management conflicts and sustain Minnesota's forest resources. This project evaluated post-harvest impacts of Minnesota's riparian guidelines on eight northern Minnesota sites harvested in 2004 and 2005.

Terrestrial findings include: 1) partially-harvested riparian management zones (RMZs) have substantial aspen suckering, although at or just below the low range of full stocking; 2) partially-harvested RMZs, particularly at medium residual basal areas, have significant hardwood regeneration; 3) medium basal area retention maintains leaf litter input to streams at control levels; 4) RMZs with medium basal area retention promote development of aspen-mixed wood stands, while retaining adequate stream litter inputs; and 5) residual tree blowdown was low.

Site-level stream effects include: 1) harvesting resulted in reduced canopy cover but increased woody cover; 2) fine sediments increased downstream of the intermediate harvest treatment; 3) harvest effects were observed for macroinvertebrate abundance and species richness, and the proportion of tolerant fish and fish Index of Biotic Integrity (IBI) scores in some treatments; and 4) water quality parameters exhibited seasonal and year-to-year variation with few harvest effects. Although significant harvest effects were found, the changes were relatively small and suggest that application of the RMZ guidelines minimizes negative impacts.

Bird community effects include: 1) no change in species richness or diversity, 2) decrease in total abundance in harvested treatments, and 3) dramatic community compositional change from domination by mature forest species to domination by early successional bird species. These results suggest that if the management goal is to maintain pre-harvest bird species composition in RMZs with a concurrent upland harvest, it is best to leave RMZs at their unharvested basal areas.

Because these results only assessed dynamics three years post-harvest, there is a need to continue monitoring the sites to more fully assess effects over time.

Project Results Use and Dissemination

Project results were disseminated to scientists, natural resource managers, private landowners, legislators, and others through fifteen presentations, two posters, and two field tours. Three additional manuscripts are in preparation. Three graduate student produced theses or dissertations from their project work. Other graduate students continue to collect, analyze, and summarize data which will result in additional theses, dissertations, and manuscripts. As this research study was designed to be a long-term assessment with little dissemination during the initial project phases, researchers will continue to monitor, analyze, and report post-harvest effects in the future as funding permits. With that additional information, we will be able to assess how birds and terrestrial and aquatic ecosystems respond to timber harvesting within RMZs over the long-term. Results will then be used to inform on-the-ground decision making as well as suggest changes to the guidelines to more effectively manage forested riparian areas.

Project completed*: 6/30/2008

*Work continues via 2007 appropriation of \$400,000: ML2007, Chap. 30, Sec. 2, Subd. 5(f) - "Evaluating Riparian Timber Harvesting Guidelines: Phase 3". See [2007 Abstracts](#) for more information.

3rd Crops for Water Quality - Phase 2

09(e) \$500,000

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RESEARCH

Overall Project Outcome and Results (Rural Advantage)

The purpose of the project was to accelerate the adoption of 3rd crops to enhance water quality, accomplish TMDL goals, diversify cropping systems, supply bioenergy, provide wildlife habitat and improve economic vitality through demonstrations, research, and education. The term 3rd crop is used to represent a variety of crops beyond corn and soybeans such as hays, small grains, cover crops, native species, hazelnuts, grapes, etc. These crops provide multiple benefits to society in the form of improved water quality, reduced soil erosion, enhanced wildlife and pollinator habitat, water storage/ aquifer recharge, and carbon sequestered plus they provide economic return to the landowner. These are meant to be working lands.

Numerous outreach, education, and marketing activities were conducted to accelerate the adoption of 3rd crops. These ranged from one-on-one consultations to public events to conferences to feasibility development activities.

Through this project there were 51.5 acres of 3rd crops established on seven sites in the greater Blue Earth and Lower Minnesota River watersheds and 3rd crop demonstration sites of two acres each at Belle Plaine, Fairmont, Starbuck, and Roseau. Each site contains a diverse planting of various 3rd crops. Each site has a ten year easement to maintain the 3rd crop. We expect that there will be viable markets at the end of the easement term to maintain these sites in a 3rd crop use for the long term. 3rd crops demonstrated include native grass mixes for bioenergy [4 sites], pasture mix, native grasses for seed production and grapes. All were targeted to environmentally sensitive lands within their local geography.

There has been significant progress toward the acceleration of 3rd crop adoption in Minnesota as a result of this project and the collaborations with

multiple partners. The University of Minnesota completed the research aspects of the 3rd Crop Project and is submitting a separate report for their portion of the funding.

Project Results Use and Dissemination (Rural Advantage)

Throughout the timeframe of this project there were over 200 outreach, education, and marketing activities conducted to accelerate the adoption of 3rd crops. These ranged from one-on-one consultations to public events to conferences to feasibility development activities. It is estimated that at least 12,000 individuals have been reached through these efforts.

Overall Project Outcome and Results (U of MN CINRAM)

The intent of this project was to accelerate the adoption of 3rd crops at a demonstration scale documenting their long term impact on water quality and storage, renewable energy supply and rural economic vitality. Demonstrations were established in the Greater Blue Earth, Chippewa, Lower Minnesota, and Rouseau River Watersheds. The work has resulted in significant findings that are being disseminated through publications and the activities of our partner, Rural Advantage.

- Landscape position has a significant impact on the success and productivity of different biomass species.
- Research on the impact of conversion from row cropping to perennial crops coupled with wetland restoration suggests that we can expect diminished flow volumes, total suspended solids, and nitrate levels. Although grass competes with woody crops, this study demonstrates the importance of soil cover as a best management practice to reduce runoff, soil erosion, and phosphorous loads during establishment of woody crops.
- Soil frost is deeper under annual crops than under perennials making soils under perennials are better able to absorb water earlier in the spring and reduce runoff from rain on snow events and from rapid snowmelt.
- Through research on the production and nutrient cycling impacts of 3rd crops, we are able to suggest species that will be productive, have important characteristics for cellulosic ethanol production, and protect environmentally sensitive areas.

The overall impact has been to generate and disseminate information that will allow us to target 3rd crop plantings for bioenergy to optimize their economic, environmental and water quality and storage benefits. The project has leveraged funding through 2013 from the private sector that will continue monitoring benefits, expand the research to answer additional questions, and provide greater detail for the development of renewable energy options in Minnesota.

Project Results Use and Dissemination (U of MN CINRAM)

The outreach activities of this project are reported in a separate report prepared by Rural Advantage, the partner in this project. In addition to the work by Rural Advantage for audiences including farmers, natural resource professionals and citizens, the University portion of the project has provided information in the following venues and formats:

- Presentations by University researchers and students at Rural Advantage sponsored events. (approximately 12 presentations)
- Presentations at professional meetings in the US (7) and internationally (1).
- Papers and Theses prepared by University Graduate students (7).
- Projects prepared and presented by Undergraduate students (8).
- Publications by graduate students and researchers.

It is important to note that the project has used a variety of venues to disseminate information and results from project activities. Results have been disseminated to interested members of the public through a series of meetings sponsored by Rural Advantage and UMN extension as well as meetings sponsored by state agencies and initiatives (MPCA, NextGen, BWSR). In addition, research results have been disseminated through publications, presentations at scientific meetings and integrated into coursework at the University of Minnesota.

Project completed: 6/30/2008

Bio-conversion of Potato Waste into Marketable Biopolymers

09(f) \$350,000

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RESEARCH

Overall Project Outcome and Results

Potato processing plants generate large quantities of potato waste that pollutes air, water, and soil; no solution to the problem has yet been found. Biopolymers are renewable and biodegradable materials that could replace petroleum based plastics, which are polluting and environmentally unfriendly. We studied production of two biopolymers (i.e. xanthan and polylactic acid) on potato waste. Xanthan has many applications in the chemical, food, oil, pharmaceutical, and other industries. Its global market was estimated at \$300-400 million and is expected to grow at an annual

rate of 4 to 10%. Polylactic acid is also an attractive raw material. Its market is smaller than that for xanthan; however, polylactic acid has a large growth potential.

The objectives of the project were to study: 1) Lactic acid fermentation of potato waste and subsequent polymerization of the lactic acid into polylactic acid (PLA), 2) Xanthan (XA) fermentation of potato waste, and 3) To compare economic feasibility of PLA and XA production from the potato waste. The major results were: 1) Lactic acid average yield was 60% (i.e. kg lactic acid / kg potato waste starch), 2) Xanthan average yield was 24.90 % (i.e. kg xanthan/ kg dry potato waste), 3) Both lactic acid and xanthan fermentations can be more profitable on potato waste than on current production media, and 4) PLA polymerization from the lactic acid fermented on potato waste would be less profitable than conventional processes.

Fermentation of potato waste into xanthan or lactic acid could generate net social benefits regardless of whether these processes are commercially viable. The potential for positive externalities emanates from: 1) reducing environmental costs of potato waste disposal, and 2) alleviating the pressure on materials that are both conventional media for fermentation of xanthan and lactic acid and inputs in subsidized markets for food and fuel.

Project Results Use and Dissemination

The project has resulted in a patent application ("Solid or Semi-Solid State Fermentation of Xanthan on Potato or Potato Waste" - Patent Publication No. US-2008-0113414-A1). Additionally, information about project results has been disseminated through multiple conference presentations and posters, news stories in Minnesota media, and multiple manuscripts submitted for publication.

Project completed: 6/30/2008

SUBD. 10 - ENERGY

Clean Energy Resource Teams and Community Wind Energy Rebate and Financial Assistance Programs

10(a) \$700,000

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The project has been divided into two parts. Part 1 – Clean Energy Resources Teams for \$300,000 was completed in 2007. Part 2 – Community Wind Energy Rebate and Financial Assistance Program for \$400,000 which will be completed in 2010.

Part 1: Clean Energy Resource Teams

Appropriation Amount: \$300,000

Overall Project Outcome and Results

The Clean Energy Resource Teams (CERTs) provide technical assistance to implement cost-effective conservation, energy efficiency, and renewable energy projects throughout Minnesota. This is accomplished through a network of six regional teams working with the statewide CERTs coordinators to implement community-based energy projects that addressed their respective regional priorities.

CERTs awarded grants for technical assistance for at least two projects in each region, funding fifteen in all. An estimated thirty energy efficiency and renewable energy projects received assistance from CERTs while countless individuals consulted with CERTs coordinators for project advice.

The CERTs model has proven to be an effective way for citizens to participate in energy efficiency and renewable energy development. In 2006, the Minnesota Environmental Initiative recognized the Clean Energy Resource Teams with the *Partnership of the Year* award. As further affirmation of the CERTs model, both the governor and the legislature budgeted for a second phase of CERTs through fiscal year 2009. (Minnesota State Laws 2007, 216C.385.) This legislation also appropriated funds to create a seventh CERT to serve the Twin Cities area. A survey titled, *Report on the Clean Energy Resource Teams (CERTs) Project* is part of the final report and measures volunteer satisfaction with the CERTs program statewide at 95%. (See *Attachment D*.)

Project Results Use and Dissemination

Each CERT hosts a quarterly meeting that draws between 20 and 100 people. Additionally, there are frequent workshops and trainings. This year, the CERTs statewide conference drew 400 people from the public, private, and not-for-profit sectors.

Designing a Clean Energy Future: A Resource Manual was published in 2003 to highlight opportunities for communities to work together on energy issues. It offers basic information on energy efficiency, biofuels, solar, and wind as well as other renewable technologies with tips on how to implement projects. The manual is available in hard copy and at www.cleanenergyresourceteams.org.

The CERTs website had nearly 16,000 new visitors this year. Additionally, there are 1,100 e-mail subscribers to CERTs monthly updates which cover upcoming events, funding opportunities and regional project highlights.

The CERT model is receiving recognition nationwide. This fall, CERTs is presenting to the Will Steger Foundation Summer Institute, the Rural Youth Summit in Ames, Iowa and the Western Mountains Alliance in Maine. The presentations will focus on how partnerships between land grant universities, not-for-profit organizations, and state energy offices can be an effective way for citizens to get involved in implementing successful community-based energy projects.

Project completed: 6/30/2007

Part 2: Community Wind Energy Rebate and Financial Assistance Program

Appropriation Amount: \$400,000

The Community Wind Energy Rebate Program will select community-oriented wind energy projects through a competitive process to receive financial assistance and rebates of \$200,000 each for the successful completion of grid-interconnected wind turbines.

Project due to be completed: 6/30/2010

Planning for Economic Development via Energy Independence - GOVERNOR VETO

10(b) — \$240,000

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To evaluate the socioeconomic benefits of statewide and community renewable energy production and distribution by analyzing system installation, technical capabilities, cost-competitiveness, economic impacts, and policy incentives.

Project due to be completed: 6/30/2007

Manure Methane Digester Compatible Wastes and Electrical Generation

10(c) \$100,000

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Overall Project Outcome and Results

The project examined the potential for a centrally located, multi-farm manure digester and the potential use of compatible waste streams with manure digesters.

The advantage of central anaerobic digesters in terms of their larger size relative to farm scale digesters comes from their ability to process other organic wastes in addition to dairy, swine, or poultry manure.

The project found that, overall, central anaerobic digesters appear to have the most potential for economic feasibility where:

- nuisance odors require action;
- offsite organic waste is available that can be co-digested to increase gas output and/or generate tipping fees;
- manure solids are separated and have a high value for dairy cow bedding or as a soil amendment;
- biogas can replace large onsite retail purchases of electricity or heat;
- electricity is sold to the grid in a region of the U.S. with higher-than-average electricity prices.

Central anaerobic digesters can be owned by farmer or consumer cooperatives, third party/non-farming investors, state or municipal government, or established as a cooperative or limited liability corporation.

Challenges unique to centralize digesters include:

- organizing groups of farms, reaching consensus and commitment to the project, and providing a mechanism for farms to leave the agreement;
- sanitary issues involved in transporting manure between farms;
- capital investment and operating costs for the manure transportation equipment and loading/unloading facilities.

Project Results Use and Dissemination

Results were disseminated at two workshops for producers and researchers and will continue to be made available to producers, producer groups, agri-businesses and researchers interested in central anaerobic digesters.

Project completed: 6/30/2007

Dairy Farm Digesters

10(d) \$336,000

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Overall Project Outcome and Results

Anaerobic digestion is a process using bacteria to stimulate production of gas during manure decomposition. The gas produced during digestion can be utilized to produce electricity. Anaerobic digestion technology had been proven economically feasible on dairy farms with at least 300 cows. The vast majority of Minnesota dairy farms, 96%, are between 50-300 cows.

The goal of this project was to test cutting edge digestion technology that could be profitable for an average Minnesota dairy farm. At the beginning of this project there were no commercially-available digestion technologies that could be utilized by our pilot farm site of 160 dairy cows. Two requests for proposals were solicited from project engineers across the county. Project partners reviewed and scored bids. Select engineers were invited to visit the pilot farm site and submit a site-specific bid for further evaluation. After a year and a half of soliciting, scoring, and evaluating dozens of project bids, one engineering firm was selected to enter into a binding contract for engineering services. The selected bid was from Genex Farm Systems, www.genex.crinet.com and Andigen, www.andigen.com.

Construction of an Induced Blanket Reactor (IBR) digester began in September, 2007 at Jer-Lindy Farms, Brooten. The digester began producing gas and electricity in the spring of 2008.

- 450 kwh of electricity is produced per day, on average
- Annual electricity production is 164,000 kwh
- Annual revenue from electricity sales \$13,000
- Electricity production at Jer-Lindy Farms represents nearly one million tons of avoided carbon emissions/year compared to conventional electricity production

Benefits to Minnesota's environment and economy from the Jennissen digester project include odor control, pathogen reduction (58% volatile solids destruction rate), reduction in Total Oxygen Demand, and avoided need for additional transmission lines due to renewable electricity production and distributed generation of electricity. A final summary of project results are contained in a field day folder submitted to LCCMR.

Project Results Use and Dissemination

A final project field day was held at the Jerry and Linda Jennissen farm, June 27th, 2008. Over 350 people attended the field day. Project documentation materials were developed and distributed at the field day. Materials from the field day are available at: www.mnproject.org/e-biogas.html. Materials include fact sheets about the project, biogas and electrical production, preliminary economic analysis of the project, and information about carbon credits and financing anaerobic digester projects. There was excellent media coverage from the field day, resulting in information about the project reaching a broader audience. Press releases about the field day and project were developed and distributed to agriculture and energy media across Minnesota.

Prior to the final field day, the Natural Resources Conservation Service hosted a field day at the farm with 65 state engineers and NRCS staff. Additionally, Jerry and Linda Jennissen have hosted smaller groups of interested parties to the farm to tour the digester and learn about the operation. It is estimated that since the digester began operating nearly 500 people have toured the project.

The Minnesota Milk Producers and the Stearns County Soil and Water Conservation District distributed information about the project, including project educational materials to dairy farmers and the Minnesota conservation community.

Project presentations were given early during this project to build interest in the final project results in advance of having definitive results to share. Each early presentation was followed up with in June 2008 to ensure final project results were shared with the groups who had heard about this digester project before construction began.

Project completed: 6/30/2008

Wind to Hydrogen Demonstration

10(e) \$800,000

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To develop a model, community-scale wind to hydrogen facility at the University of Minnesota - Morris Campus.

Project due to be completed: 6/30/2009

Natural Gas Production from Agricultural Biomass

10(f) \$100,000

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The overall objective of this project was to develop a roadmap for the production of pipeline quality natural gas from mixtures of hog manure and biomass. If this process is economic, then hog farmers will have an economic incentive to treat their wastes in a manner that eliminates odor and reduces the environmental footprint of hog operations.

This project was comprised of two primary elements: an experimental program to determine if crop residues could be combined with hog manure to increase biogas production and an engineering study to develop regional biogas production as a means to make treating hog manure economically attractive.

The study considered beet pulp, corn stalks or stover, wheat straw and switchgrass. The experimental study began with the assumption that these biomass sources could be digested in an anaerobic digester based on published literature values for gas generation. In the experiments, only the corn stover showed any gas generation but the gas generated would not be enough to be economic. The conclusion is that some form of pretreatment will be necessary before the biomass is fed to the digester. Acid hydrolysis as developed by the Department of Energy for biomass to ethanol or fungal composting are two candidate pretreatment technologies that could make biomass digestion economic. However, it is known from prior work that wood wastes such as sawdust will generate gas without pretreatment. This limits pretreatment to those technologies that are simple and inexpensive.

The second portion of the project was an engineering study of what regional biogas production would look like. This concept assumes multiple digesters located at individual hog (or dairy) operations producing biogas. With the addition of substrate, gas production is expected to increase sharply. Consolidating biogas from multiple locations into a single refinery is more capital efficient than dispersed refining units and allows for a single connection to the natural gas pipeline. The engineering feasibility study showed that very large hog operations are candidates for biogas production but smaller farms, under 5000 hogs, were not. There is a substantial economy of scale in gas refining and consolidation of multiple farm output is more likely to be successful.

The overall economics of biomass/hog manure digestion are potentially attractive if long term gas purchase agreements and long term financing can be assembled. The primary result of this effort has been to assemble a roadmap for regional biogas production. Minnesota will benefit from this project as the economic analysis and engineering details facilitate follow on project development in specific locations. The successful implementation of this strategy will dramatically reduce the environmental damage from stored manure odors and pollution. In addition to the broadly shared benefits of reducing hog odors, specific property owners down wind of hog operations could see property values go up and an enhanced quality of life.

The project ended with a net balance because the final step of engineering a final system based on biomass could not be completed. When the biomass/hog manure mixture did not produce gas, there was no data to size the digesters or the biomethane refinery.

A full report, compiling the engineering study and experimental results was submitted.

Project completed: 6/30/2007

Biomass-Derived Oils for Generating Electricity and Reducing Emissions

10(g) \$150,000

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Phone: (612) 624-3504**Fax:** (612) 624-1578**E-mail:** dzarling@me.umn.edu**Web:** www.me.umn.edu/centers/cdr/**Overall Project Outcome and Results**

This project is a portion of a larger program to identify and test Bio Derived Oils (BDOs) based fuels for use in a commercial power-generating turbine. This project assists an effort to demonstrate the applicability of biomass-derived oils in the operation of large scale electricity generating turbines by piloting the use of these fuels on a smaller scale in a small turbine. A micro turbine generator was purchased to allow for the evaluation of BDOs in a small turbine. The micro turbine was installed and calibrated and tests are being conducted as part of the larger program to understand the effects of using BDOs on turbine emissions and performance. Those tests are being funded by the Minnesota Soybean Research

and Promotion Council (MSR&PC) and are scheduled to be completed by December 2008. _

Project Results Use and Dissemination

During the project, data and information was shared with the AURI, MSR&PC and the University of Minnesota . Updates were published in AURI's Ag Innovation News. Information was included on the University of Minnesota 's Center for Diesel Research web site and other appropriate web sites.

Project completed: 12/30/2007

Phillips Biomass Community Energy System - GOVERNOR VETO

10(h) — \$900,000

Jeff Cook-Coyle

Phillips Community Energy Cooperative (PCEC)

2801—21st Ave. South, #110

Minneapolis, MN-55407

Phone 612-278-7117

Fax 612-278-7101

E-mail cnelson@greeninstitute.org

To assist in the distribution system equipment and construction costs for a biomass district energy system. This appropriation is contingent on all appropriate permits being obtained and a signed commitment of financing for the biomass electrical generating facility being in place.

Project due to be completed: 6/30/2007

Received 2006 appropriation of \$500,000: ML 2006, Chap., Sec. 20, Subd. 3 ("Phillips Biomass Community Energy System"). However, this appropriation was then declined in December 2007 and the project cancelled. See [2006 Abstracts](#) for more information.

Laurentian Energy Authority Biomass Project - GOVERNOR VETO

10(i) — \$466,000

Terry Leoni

Virginia Public Utility

PO Box 1048

Virginia, MN-55792

Phone 218-748-7540

Fax 218-748-7544

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To lease land and plant approximately 1000 acres of trees to support a proposed conversion to a biomass power plant.

Project due to be completed: 6/30/2007

Received 2006 appropriation of \$400,000: ML 2006, Chap., Sec. 20, Subd. 4 ("Laurentian Energy Authority Biomass Project"). See [2006 Abstracts](#) for more information.

SUBD. 11 - ENVIRONMENTAL EDUCATION

Enhancing Civic Understanding of Groundwater - GOVERNOR VETO

11(a) — \$150,000

Patrick Hamilton

Science Museum of Minnesota

120 W. Kellogg Blvd.

St. Paul, MN-55102

Phone 651-221-4761

Fax 651-221-4514

E-mail hamilton@smm.org

To create ground water exhibits and a statewide traveling groundwater classroom program.

Project due to be completed: 6/30/2008

Received 2006 appropriation of \$150,000: ML 2006, Chap., Sec. 20, Subd. 2 ("Laurentian Energy Authority Biomass Project"). See [2006 Abstracts](#) for more information.

Cedar Creek Natural History Area Interpretive Center and Restoration

11(b) \$400,000

David Tilman

U of M - Cedar Creek History Area

1987 Upper Buford Cir., 100 Ecology Bldg.

St. Paul, MN 55108

Phone: (612) 625-5743

Fax: (612) 624-6777

E-mail: tilman@umn.edu

Website: <http://www.cedarcreek.umn.edu>

Overall Project Outcome and Results

Cedar Creek completed three efforts: 1. restoration of 400 acres of prairie and oak savanna, 2. construction of an energy efficient science interpretive center, and 3. creation of interpretive trails and signage highlighting environmental research, habitats, and wildlife.

1. Restoration of 400 acres of prairie and oak savanna (\$141,638): The initial preparation of the restoration project was completed in 2005 and 2006 and burned in 2007 and 2008. Also with the Trust Fund money, Cedar Creek was able to leverage an addition \$60,000 from the National Fish and Wildlife Foundation for the project. The initial preparation work of the 400 acres included: removal of brush and branches on 150 acres, removal of invasive black locust from about 10 acres, and the creation of about 4 miles of new firebreaks. Also the acquisition of 2 fire ATVs outfitted for prescribed burning and the construction of a fire storage shed for prescribed burning vehicles and equipment was completed. Cedar Creek also established 7 vegetative monitoring plots, in which researchers will be using over the next decade to monitor the recovery of the oak savanna.

2. Construction of a Science and Interpretive Center (\$250,000): With the Trust Fund money, Cedar Creek was able to acquire an additional \$1.55 million in funds from; Department of Commerce, National Science Foundation, Great River Energy, U of MN Initiative in Renewable Energy and the Environment, and the University, making the total project \$1.8 million. In the spring of 2008, the Raymond L. Lindeman Research and Discovery Center opened, providing a 6000 square foot, highly energy efficient building for Cedar Creek's research and education/outreach programs. Some of the energy efficient features include: decreased volume of the building by lower ceiling height, high energy efficient windows, heat recovery unit, and HVAC units that are 93% efficient. The building includes a 1,500sf science interpretation and education area, two laboratory rooms, and a new computing area for environmental interpretation, research, and education/outreach programs.

3. Creation of interpretive trails and signage (\$8,362): With the Trust Fund money, Cedar Creek purchased 8 interpretive signs to be placed around the 3 mile walking trail that was established. The signage highlights the environmental research, habitats, and wildlife at Cedar Creek. Cedar Creek partnered with the City of East Bethel on this project and the city provided over \$150,000 dollars in material and labor for the construction of the 3 miles of walking trail and over 5 miles of winter ski trails.

Project Results Use and Dissemination

Savanna Restoration: The 400 acre oak savanna/prairie restoration project provided experience for both MCC (Minnesota Conservation Corp) and the DNR. The MCC and DNR helped burn the 400 restoration acres giving their individuals experience and training.

Cedar Creek also is monitoring the vegetation response of the oak savanna restoration unit. Through the collection and analyzing of data we could publish insights into restoration techniques. We will also share our insights through our website.

Center and Trails: Both, the new center and trail system have given Cedar Creek the ability to facilitate our newly expanded outreach and education program without interfering with our world class research. In fact, both Cedar Creek's research and outreach programs are complementing each other. In just a few months from opening our doors we have had close to 1000 Minnesotans using the facility for research and outreach through teacher workshops, K-12 school children programs, and general public tour groups.

The new facility is allowing K-12 teachers to hold workshops here, where as before there was no space. In these workshops teachers are learning about Cedar Creek's research directly from the researchers and by seeing the experiments first-hand. Each teacher will bring this information back to the classroom and hopefully through this indirect method, Cedar Creek will impact 1000s of students per year.

Cedar Creek is also bringing K-12 school children out to the site directly for informational and discovery field trips. We are using both the new center and trail to facilitate these trips.

Project completed: 6/30/2008

Environmental Problem-Solving Model for Twin Cities Schools - GOVERNOR VETO

11(c) — \$75,000

Kathy Kinzig

Eco Education

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St. Paul, MN 55101

Phone 651-222-7691

Fax 651-222-3425

E-mail kkinzig@ecoeducation.org

To train high school students and teachers on environmental problem-solving.

Project due to be completed: 6/30/2007

Tamarack Nature Center Exhibits

11(d) \$95,000

Marcie Oltman

Ramsey County Parks & Rec. - Tamarack Nature Ctr.

5287 Otter Lake Road

White Bear Township, MN 55110

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Fax: (651) 407-5354

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Website: <http://www.co.ramsey.mn.us/parks/tamarack>

Overall Project Outcome and Results

Tamarack Nature Center's (TNC) Destination for Discovery is a multi-year project that redirects TNC away from the role of a traditional nature center towards vital center of community engagement that uses the arts, humanities and sciences to reconnect people to nature. A comprehensive master plan was produced that describes and illustrates a set of indoor and outdoor experiences that aims to 'help people discover the value of nature through art, play, exploration and inquiry'. The-detailed concept design of site improvements, natural play areas, exhibits, building renovation and expansion will be implemented based on funding and further design and planning efforts. When complete, the project will serve between 150,000-200,00 users per year.

Tamarack Nature Center 's Destination for Discovery, an \$8-10 million dollar project is sponsored by public and private sources. The Trust Fund provided lead funding for Phase I of this multi-year project. Federal funds totaling \$149,000 were successfully secured to match the Trust Fund. A complete 84-page site and interpretive master plan detailing the projects concepts (Phase I) is available for public viewing and comment on the Ramsey County website www.co.ramsey.mn.us/parks/tamarack at Tamarack Nature Center, 5287 Otter Lake Road, White Bear Township, MN 55110 and Ramsey County Parks and Recreation Administration Building, 2015 North Van Dyke St., Maplewood, MN, 55109.

Next Steps: Due to the Trust Fund's early support of this project, TNC's project has been on a parallel trajectory of the 'Leave No Child Inside' movement. The project has received national attention for its innovative and integrated approach to reconnecting children and families to nature. Minnesota has been recognized as a key state in identifying strategies to link policy makers and practitioners from every discipline to encourage the creation of a national culture that values spending time in nature. Because of this, Tamarack Nature Center has received a second federal grant totaling \$118,000 from the Institute for Museum and Library Services to continue on to Phase II (develop and design) of Destination for Discovery. This, along with other private and public funding will put the entire project on track for completion within the next three to five years.

Project completed: 6/30/2007

SUBD. 12 - CHILDREN'S ENVIRONMENTAL HEALTH

Minnesota Children's Pesticide Exposure Reduction Initiative

12(a) \$200,000

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E-mail: collie.graddick@state.mn.us

Overall Project Outcome and Results

The "MN Children's Pesticide Exposure Reduction Initiative" objective was to reduce children's pesticide exposures through parent education of alternative pest control methods and safe pesticide use. Project efforts focused on rural and suburban residents and minorities (including migrant workers), as well as urban counterparts, through early childhood programs and community outreach. Project tasks included production of an educational DVD, a refrigerator magnet, and an educational training manual, all in four languages: English, Hmong, Somali and Spanish. A public service announcement and informational materials were also developed, along with a train-the-trainer component and training of others having direct familial contacts.

Program activities included identifying communities at risk, training local personnel to enhance safe pesticide use education, and establishing cooperative working relationships with other agencies, community organizations, environmental organizations, dealers, and educational institutions. The goal of the program was to establish a regulatory presence in urban and residential communities; provide educational materials and training on pest prevention and control; and ensure the safe and proper use of all pesticides. The program involved community outreach through a short presentation, a demonstration, and a free pest management kit to participants. The kits include several items that can be used to help control indoor pests such as cockroaches, ants, mice, spiders, etc.

The project partnered with numerous organizations including the U. S. Environmental Protection Agency, the MN Departments of Education, the MN Department of Health, U.S. Housing and Urban Development Healthy Homes program, the American Lung Association of MN, MN Migrant Health Services, the City of Minneapolis Environmental Action for Children's Health Demonstration Project, local school districts Early Childhood Family Education programs and MN Daycare Associations to name a few. The program worked with over 60 different organizations, gave over 120 presentations, and distributed over 9,000 pieces of information to approximately 7,000 people.

Project Results Use and Dissemination

Education Materials Developed: 4,000 DVDs with 4 languages on each (12 minutes long); 4,000 promotional fans; 5,000 promotional magnets with 4 languages on each; 5,000 user manuals (manual translated into 4 languages); 1,000 pest mgmt. kits (caulking, caulking gun, steel wool, screen kit, duct tape, cloth pin and trap); 3,000 promotional posters in 5 languages (Hmong, Spanish, English, Somali and Russian); MDA website developed with education and outreach materials.

Program Outreach: Meetings, Workshops, Project Materials, etc.: 850 promotional fans; 1,100 promotional magnets; 1,255 DVDs; 900 Pest Management Kits; 4,820 Outreach and Educational Materials (manuals, brochures, fact sheets, etc.); 182 Outreach and Educational Training Sessions, Meetings, Workshops; 6 Community Forums; 83 Different agencies and/or organizations as partners, workshops, forums, etc.; 18,860

Approximate number of children and families impacted by program

Project completed: 6/30/2007

LCMR [2005 Appropriations](#) (.pdf list), ML 2005, First Special Session, Ch. 1, Art. 2, Sec. 11 - Beginning July 1, 2005
(updated: 7/5/2005 with vetos)

LCMR Governor [Veto List](#) (.pdf list)

LCMR 2005 Proposal Process [Information Page](#)

Last Updated: 12/30/08 (mb)

send comments regarding this site to:

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