LONG PRAIRIE RIVER

TOTAL MAXIMUM DAILY LOAD
(TMDL)
NON-POINT SOURCE IMPLEMENTATION PLAN

wq-iw8-01c

Introduction

This document is the implementation plan for nonpoint source activities needed to meet the load allocation of the Long Prairie Dissolved Oxygen TMDL study, which was approved by the U.S. Environmental Protection Agency on August 5, 2005. This implementation plan was approved by the Minnesota Pollution Control Agency (MPCA) in 2006. Point source-related activities identified by the TMDL are currently being implemented through the permitting process and are not addressed in this plan.

1. Long Prairie River TMDL Statement of Problems and Existing Conditions

A. General Description of the Project Area:

The Long Prairie River's 883 square mile watershed is located in the upper Mississippi River Basin in Central Minnesota, within the boundaries of Todd, Douglas, Morrison, and Ottertail counties. Agriculture dominates the landscape; 41% of the land within the watershed is used for row crops, potatoes, dairy and beef operations, and other agricultural uses. In addition, 24% of the watershed is grassland, some of which is used for pasture. The balance of the watershed area is comprised of forest, water and wetlands, urban areas and other land uses. The land use immediately adjacent to the river is dominated by agriculture and wetlands because the floodplain is wide and flat. Some reaches of the river have a well developed riparian zone. The Long Prairie River extends from Lake Carlos near Alexandria, east to the City of Long Prairie, then north through Browerville and to Motley, where it joins the Crow Wing River. This 100 mile long river is shallow, meandering, and flat until the last ten miles, which are wider, steeper in grade and less sinuous. The average slope for the whole length of the river is 2.03 feet per mile, and its average sinuosity is 0.689. In 2004, The Minnesota Legislature designated the Long Prairie River as a canoe route. The DNR will be establishing landing sites and rest stops, and plans to take a more active part in the management the river.

The river flows through two of Minnesota[1]s seven distinct eco-regions, each characterized by different land forms, soils, native plant communities and impacts from human use. Approximately three quarters of the watershed is located in the North Central Hardwoods Forest eco-region. From its source in Lake Carlos, where it looks like a small stream, the river begins its path eastward flowing into Todd County through terrain originally characterized by a mosaic of aspen and oak forest, wetlands and tall grass prairie. This section of the river includes a large wetland area in southern Leslie Township. Tributaries include Spruce and Dismal creeks. From the Douglas County Line to Long Prairie, where the river turns sharply north, the area has significantly more agriculture and continues to grow in width, until approximately 10 miles north of Browerville where the river crosses the boundary to the Northern Lakes and Forests eco-region. From here to its end in the Crow Wing River, the Long Prairie River flows mostly through an eco-region that features many lakes and streams amid a patchwork of formerly grassy and forested areas. Although almost all of the original forest was cut down, second-growth forest remains, and along some stretches leafy trees on its banks keep the river in shade all summer. In other parts, the banks are lined with farm fields. Creeks in this section include Turtle Creek, Moran Brook and Fish Trap Creek.

B. TMDL Results and Plan Purpose:

The MPCA has observed dissolved oxygen (DO) concentrations below the 5-mg/L standard in the lowermost portion of the river at Motley. The Todd Soil & Water Conservation District (Todd SWCD) working in cooperation with MPCA under a Clean Water Partnership (CWP) and other programs has more recently found DO concentrations below 5-mg/L periodically in the middle reach, in and around Browerville, and during the summer months in the uppermost portion near the city of Carlos. As a result, six segments of the Long Prairie River are listed as" impaired waters" for low dissolved oxygen.

The Long Prairie River is a Class 2B water body. Its designated uses are aquatic life, recreation, canoeing, industrial consumption, agriculture, wildlife, aesthetic enjoyment and navigation. However, fish kills have occurred in the Long Prairie River, and monitoring in recent years has shown that dissolved oxygen (DO) concentrations in portions of the river intermittently fall below the state water quality standard of 5 milligrams per liter (mg/L).

In the course of the TMDL study, it was determined that a large percentage of the dissolved oxygen depletion stems from point sources, and that there is a potential for municipal and industrial discharges to cause ammonia toxicity during low flow conditions. The permitted facilities will be working directly with MPCA, through the permit process to reduce ammonia discharges.

While the non-point pollutant sources contribution to the dissolved oxygen TMDL are limited, they have a cumulative impact on the watershed's water quality. The nonpoint sources are mainly agriculture, and will be addressed by traditional installation of best management practices installed by the land owner using Cost Share, Clean Water Partnership, Section 319 implementation grants, private capital, or similar funding in cooperation with continuing strong programs that are in place through Todd and Douglas Counties, and Todd & Douglas SWCD's. Adjacent counties located within the watershed will also be invited to participate.

C. The TMDL Project Study Findings (Suspected or Potential Problems):

The Long Prairie River flows nearly 100 miles through Douglas, Todd, and Morrison counties in central Minnesota, from the outlet of Lake Carlos to the Crow Wing River, an Upper Mississippi River Tributary. For the TMDL study, the Long Prairie River's watershed was considered to be the 647 mile drainage area downstream from Lake Carlos. The watershed is predominantly agriculture and contains five municipalities with wastewater treatment facilities explicitly considered in the TMDL study. The headwater outflow from Lake Carlos, which drains the remaining 236 square miles of the watershed, is of generally high quality.

However, fish kills have occurred in the Long Prairie River, and monitoring in recent years has shown that dissolved oxygen concentrations in portions of the river intermittently fall below the state standard DO level of 5 milligrams per liter (mg/L). Based on long term DO monitoring near the river's mouth at Motley that began in 1975, the MPCA has observed low DO concentrations in most winters. The Todd Soil & Water Conservation District, working in cooperation with the MPCA under Clean Water Partnership grants, has more recently found low DO in the Middle Reach, in and around Browerville, and in the river's uppermost reach near the city of Carlos.

Four of the river's main stem segments were originally listed on the 2004 list for low DO impairment. Three main stem segments plus Eagle Creek were on the 2004 list for impaired biota. In the course of the TMDL study, two other main stem segments were also found to be impaired due to low DO, and the potential for municipal and industrial discharges to cause ammonia toxicity in the Long Prairie River was determined.

The Segments involved in the 2005 approved Long Prairie River TMDL include:

Reach 07010108-506	Long Prairie Headwaters to Spruce Creek	Low DO
Reach 07010108-505	Spruce Creek to Eagle Creek	Low DO
Reach 07010108-504	Eagle Creek to Turtle Creek	Low DO
Reach 07010108-503	Turtle Creek to Moran Creek	Low DO
Reach 07010108-502	Moran Creek to Fish Trap Creek	Low DO
Reach 07010108-501	Fish Trap Creek to Crow Wing River	Low DO

The pollutants of concern for low DO are carbonaceous and nitrogenous biochemical oxygen demand (CBOD and NBOD). CBOD is a general measure of organic materials such of sewage solids, animal wastes, animal and other food processing wastes, and plant litter. CBOD represents the oxygen equivalent of the organic matter in a sample. Nitrogen is a constituent of organic matter and especially of animal and animal processing wastes. A wide variety of microorganisms rapidly transform organic nitrogen to ammonia nitrogen. Nitrification of the ammonia nitrogen by certain specialized bacteria then transforms it to nitrate nitrogen, while consuming oxygen in the process. The state standard in Class 2B waters for ammonia is a maximum non-ionic ammonia concentration of 0.04 mg/L as nitrogen. The non-ionic form of ammonia nitrogen is toxic to fish.

Non-point sources that we plan to address with this implementation plan include runoff from cropland and from urban and other developed areas, and livestock operations including storage and land application of agricultural waste

Agricultural land use is undergoing a significant change from sand plain fields adjacent to the river, in continuing vegetative cover or enrolled in the Conservation Reserve Program (CRP) and in traditional rotations that included hay and small grain crops, to continuous row crop rotations that may include potatoes, corn and varieties of edible beans and soybeans, usually under irrigation. Small "family" farms are going out of business, leaving unused wells, non-conforming septic systems, and abandoned Ag waste pits.

According to the Todd County Feedlot Officer, there are 150 active feedlots in the Todd County portion of the watershed, 1 in 5 of them needs to be brought into compliance. In addition there are at least 40 Ag waste pits that have been abandoned and will require technical and financial assistance to close them properly, following MPCA guidelines. In Douglas County, there are 210 registered feedlots in the watershed, one in seven of which need to be brought into compliance.

There are no known MS4 storm water permits in the Long Prairie River watershed, but storm water runoff and spring snow melt from roads and urban areas have been recognized as sources of pollution.

Ground water impacts to the Long Prairie River have the potential to be significant. Groundwater yields are typically high within the watershed, and average annual recharge to the surficial aquifer has been estimated to be 8.0 inches. The USGS conducted base flow measurements along the Long Prairie River between Long Prairie and Motley during 1978 and 1979, which indicated net gains of 0.85 and 1.3 cfs per river mile respectively. The shallow aquifer is susceptible to contamination by unused wells, abandoned Ag waste pits and other direct access points to the ground water. Subsequent pollution of the river channel is a real possibility.

The Minnesota Department of Health (MDH) has developed a nitrate-nitrogen (nitrate) probability map for Todd County, (Grow, July 2002) that identifies areas of the county with relatively high, moderate and low probability of having elevated nitrate concentrations in groundwater.

The probability rating on the map represents nitrogen input, aquifer sensitivity, and geochemical sensitivity. Concentrations of 1 – 3 ppm are transitional concentrations that may or may not represent anthropogenic influences and are mapped as low probability. Concentrations of 3 – 10 ppm may indicate elevated concentrations representing human activities and are mapped as medium probability. Concentrations greater than 10 ppm are above state and federal groundwater standards and are mapped as high probability. The largest high probability areas are located just south of the City of Long Prairie, and from north of Long Prairie to about 10 miles north of Browerville, near site 15.

Nitrate can be a valuable indicator of environments that are susceptible to contamination. Elevated nitrate concentrations may result from contamination of the aquifer, or more localized problems, such as surface water drainage into an abandoned well, poor well construction, or location of the well near a pollution source, such as an old septic system.

Nitrogen Reduction through Best Managements Practices (BMP's):

Nitrogen (N) is an essential plant nutrient that is applied to Minnesota crops in greater quantity that any other fertilizer. In addition, vast quantities of nitrogen are contained in the ecosystem, including in soil organic matter. Biological processes that convert nitrogen to its mobile form, nitrite, occur continuously in the soil system. Nitrogen is found in several forms in the environment. Animal wastes and fertilizer are common nonpoint sources of ammonium nitrogen, a form of nitrogen that is very toxic to fish. The ammonium can be converted to the nitrate and nitrite forms in a process called nitrification, which consumes large amounts of oxygen and can kill fish by lowering dissolved oxygen levels in water.

Nitrate nitrogen is naturally found in water at low levels. When nitrogen is applied to cropland in excess of crop needs or at a time then it will not be used by crops, nitrates can leach below the root zone, eventually reaching surface or ground water. Most soils in central Minnesota are moderately to excessively drained. While many soils in this region are susceptible to leaching, relative differences must be assessed based on soil texture, rainfall and subsoil.

Nitrogen BMP's for Central Minnesota include:

1. Manage nitrogen applications on soils characterized by high leaching potential.
2. Do not apply fertilizer nitrogen in the fall to coarse-textured (sandy) soils.
3. Comprehensive Nutrient Management Plans.
4. Use of the Nitrogen Loss Assessment Worksheet for commercial fertilizers.

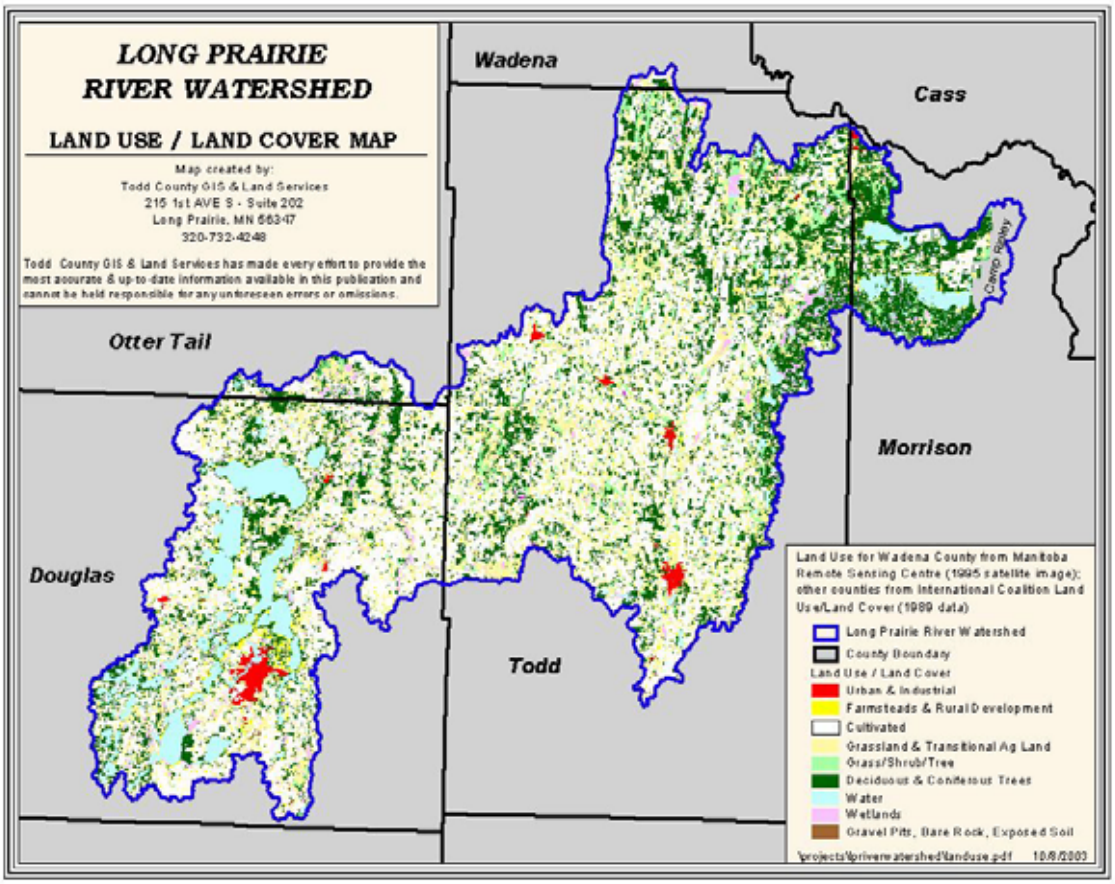
5. Soil testing to take credit for nutrients already in the soil.
6. Proper nutrient crediting of nitrogen for crops in rotation.
7. The use of nitrogen inhibitors
8. Manure sampling and testing
9. Sensitive areas identification for proper setbacks.
10. Split nitrogen fertilizer applications on sandy and coarse textured soils.
11. Calibration of manure application equipment.
12. Filter strips and riparian buffers along water courses.
13. Conservation tillage and no-till for erosion control

By encouraging farmers to use the above practices, through nutrient management plans, and financial and technical assistance, it is estimated that the annual nitrogen application can be lowered by 30 to 50 pounds per acre.

D. The Economic Significance of the TMDL Project:

The watershed supports Todd County's 13 towns and 28 townships, a population of over 24,000, and economic activity totaling more than $442 million annually. It also supports ample fishing and hunting, six Wildlife Management Areas and many municipal parks, and numerous species of birds, amphibians, reptiles and mammals as well as wildflowers, shrubs and trees. In Douglas County, the watershed contains 89 lakes which attract both seasonal visitors and new residents. The attraction of this lake area causes the population of the headwaters area of Alexandria to triple to nearly 24,000 in the summer months. Douglas County is also home to Lake Carlos State Park and five county parks. The Long Prairie River is a defining asset for both wildlife and people in the four-county area. With care and attention, it will continue to play a major role in the region's ecological and economic life for years to come.

E. Land Use Information:



The dominant land use for the watershed is agriculture (41%). Much of the agriculture is in a continuous row crop rotation that includes potatoes, corn and several varieties of beans. There are numerous small livestock operations, “hobby” farms and a growing number of rural residents. Other land uses include urban and rural development (3%), grassland (24%), forest (21%) and water and wetlands (10%). There is extensive irrigation in the Long Prairie River Watershed, with most of it occurring in the sand plain region located adjacent to the river, primarily in the middle reach. According to DNR records, irrigation now comprises 20,970 acres. Of this total, 19,712 acres are in a row crop rotation. The primary irrigated crops are a rotation of potatoes, beans, and corn.

The upper reach is located mostly in Douglas County, in the North Central Hardwood Forest ecoregion and is dominated by agricultural use (43%). Of the three reaches, it is the largest and contains the most water and wetland designation (17%), and the most urban and rural development (4%). The middle reach, completely located in Todd County and predominantly in the North Central Hardwood Forest Eco-region, is only slightly smaller that the upper reach, and dominated by agriculture (48%), including cash crop and dairy operations, and grassland (28%). This reach also has the distinction of having the majority of both point and non-point sources of pollution. The Northern Lakes and Forests Eco-region encompasses the lower reach, which is dominated by forest (35%) and agriculture (28%). A large number of beef cattle operations are located in this reach.

3. The Long Prairie River TMDL Nonpoint Source Goals and Work Plan

A. Goal Statements:

The primary goal for the non-point implementation is to implement BMPs in priority sub-watersheds targeted by the SWAT model used in the TMDL study to maintain nutrient levels at or below the Eco-region median values. The BMPs which appear in Minnesota's list of approved BMPs for agriculture include, but are not limited to, riparian buffers, manure and nutrient management systems, contour cropping, grassed waterways, stream bank stabilization, conservation tillage, sealing unused wells, closing abandoned manure pits, and the use of alternative water sources, seed varieties, rotations, cover crops and fertilizers.

An overall reduction in BOD from all sources is desirable. However, the BOD loads during low flow conditions are of primary importance because it is usually during low flow conditions that the dissolved oxygen standard is violated. To solve this problem, wastewater treatment facilities will play a major role in the overall BOD reduction because their discharges become more significant under conditions of low dilution in the river. Other non point sources such as agricultural contributions are less significant during low flow conditions, due to decreased runoff, but will also play a role in solving this problem. Results from the TMDL study indicate that with BOD (principally NBOD) reductions, it is possible to meet the dissolved oxygen standard of 5.0 mg/L in the Long Prairie River during low flow conditions.

MPCA EcoRegion Guidelines* Median Concentrations 1986-1992

	North Central Hardwood Forest River Reach		Northern Lakes and Forest River Reach	
Parameter	**Annual**	**Summer**	**Annual**	**Summer**
Conductivity umhos	295	290	180	160
pH S.U.	8.1	8.3	7.8	7.8
Total Suspended Solids mg/L	7.7	9.3	2	2
Total Ammonia-Nitrogen mg/L	0.08	0.08	0.05	0.04
Nitrate/Nitrite Nitrogen mg/L	0.08	0.06	0.02	0.01
Total Phosphorus mg/L	0.07	0.07	0.03	0.02
5-Day Biochemical Oxygen Demand	1.7	1.8	0.9	0.9
(BOD5) mg/L				

*(McCollor and Heiskary, 1993)

B. Implementation Work Plan:

The non-point source implementation plan will be addressed on a voluntary basis, using financial and technical assistance as an incentive to aggressively encourage landowners to install BMP's. The first

year (2006) of the implementation plan will be aimed at providing landowners with the appropriate information concerning the need and potential benefit of certain BMPs, and getting them committed to installing the practices. The goals for 2007 and 2008 will be the installation of the practices and reduction of nutrient loading.

Part of the education component is the development of a Nitrogen Reduction demonstration project, in partnership with Todd and Douglas Counties, SWCD's, Department of Ag, U of M, Central Lakes Irrigation Center, and Area 2 commercial potato growers, who farm extensively in the cropland immediately adjacent to the river. Plans are in place to work with these landowners and the Central Lakes Irrigation Center to set up demonstration plots using a variety of new practices, including a new potato variety that requires less nitrogen, a controlled release nitrogen fertilizer that can be incorporated at the time of planting, reducing the potential for runoff, and the use of deep tillage and alternative cover crops to tie up the nitrogen and reduce the need for fumigation.

The installation of BMPs for non-point sources is on a voluntary basis and while difficult to predict, it is hoped that the milestones for the non-point source plan will be reached, including approximately one mile of riparian buffers, 1500 acres of nutrient and manure management plans, 2 to 4 complete Ag waste systems, and 3 erosion control practices, 10 unused wells sealed and 10 abandoned manure pits closed properly by the end of 2006. It is reasonable to expect these numbers to double by the end of 2008. Nitrogen reduction demonstration plots will be installed in 2006, and the results distributed to appropriate stakeholders and media in 2007-2008. BMPs will be installed with financial assistance to the landowners through 319 grant funds, State and Federal cost share programs and State Revolving Fund low interest loans through the Department of Ag. Todd SWCD has an excellent record of combining cost share from several sources and SRF loans to complete projects. In 2006-2007, eight Ag waste system projects and two feedlot filter strips projects for beef operations were approved for SRF loans that will be using these combined funding sources.

A copy of the anticipated CWP-319 Project Application is included with this plan as Attachment A.

Objective 1: Installation of Best Management Practices

Riparian Buffers:
Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds Anticipated _$5,000_ Match__$5,000__ Total__$10,000._____

Goal: Project staff will work with watershed landowners to install up to 2 miles of riparian buffers. The BMPs for Riparian Buffer areas along the Long Prairie River and its tributaries (including streams, ditches and drainage ways), will include plantings of native grasses, trees and shrubs, cool and warm season grasses and legumes. The buffer areas will range from a minimum of 33 feet up to 120 feet wide where possible. Where trees are planted a maximum of 180 feet is possible. A combination of trees, shrubs and grasses will be used in some plantings.

Task 1: Distribute information via personal contact, printed materials and venues such as county fair, etc.
Task 2: Enroll landowners in appropriate incentive programs wherever possible, the

landowners will be encouraged to enroll the riparian area into CCRP/CRP. Where CCRP or CRP are not an option, the use of TMDL funds will be proposed for the installation and maintenance of the buffers, using rates similar to the Federal and State programs, but with a one-time payment instead of payments over a specific numbers of years.

Task 3: Provide technical assistance and project design to landowner
Task 4 Finalize landowner contracts and install practice
Task 5 Inspections; administrative oversight and payment for practice
Task 6 Reporting through e-link and semi-annual reports

Cost share for buffers will include: up to $125.00 per acre, not to exceed 75% of the cost for site preparation, seed, and planting for the grass and legume buffers, 75% cost-share for planting trees and shrubs, and up to a maximum rate of payment per acre according to the current CCRP/CRP Cost Share Docket, to preserve the practice for a minimum of ten years. Rates may change for new sign- ups only, if the CCRP/CRP Docket is updated within the duration of this grant. Long Prairie River Project cost share contracts will be prepared by District staff and signed by the landowner, using the State Cost-Share Program guidelines, before any work on the practice is started. Spot checks will be completed, on a regular basis, by SWCD and NRCS staff.

Nutrient & Manure Management:

Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds Anticipated $115,000. Match $316,500 Total $431,500.

Goal: Provide technical and administrative assistance to landowners within the watershed to install 2-4 complete Ag waste systems, 1500 acres of nutrient and manure management plans, close 10 abandoned ag waste systems, and other appropriate low-cost nutrient management options.

For this component, TMDL financial assistance will be required to cost-share these systems up to 75% of the cost, in partnership with other cost share programs and the State Revolving Fund loans to assist the landowners to complete the required BMP installation.

In areas where complete manure management systems are not needed to lower nutrient levels, low cost options will be promoted and installed wherever possible. Low cost options will include: clean water diversions, livestock exclusion, alternative water facilities, grass buffers, runoff ponds, roof runoff control, Ag waste utilization plans, and nutrient management plans.

Task 1: Provide technical assistance and project design to landowner
Task 2 Finalize landowner contracts and install practice
Task 3 Inspections; administrative oversight and payment for practice
Task 4 Reporting through e-link and semi-annual reports

Nutrient management and Ag waste utilization plans will be developed with landowners and a one time incentive payment of $4.50 per acre for 3 years for implementation of those plans will be provided through the project. The Nutrient Management Specialist for NRCS is located in the Todd County Field Office and will be the primary partner in the development of these plans.

Engineer and Technical support will be provided by staff from NRCS, the SWCD's and the Central MN SWCD Cluster 5 Joint Powers Board (JPB). NRCS standards and specification, spot checks, and operation and maintenance plan guidelines, will be used in most practices.

Erosion Control:

Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds Anticipated _$15,000._ Match__$15,000.___ Total__$30,000._____

Goal: Provide technical and administrative assistance to landowners within the watershed to install 2-4 erosion and sediment control practices, 2,500 feet of grassed waterways, and 500 to 750 acres of cover crop installation.

Task 1 Provide technical assistance and project design to landowner
Task 2 Finalize landowner contracts and install practice
Task 3 Inspections; administrative oversight and payment for practice
Task 4 Reporting through e-link and semi-annual reports

To help control the amount of erosion on the river banks and on the adjacent fields, several erosion control practices are proposed. The levels of total suspended solids in the middle reach and to a lesser extent, in the lower reach, are a good indication of sediment loading in these areas. The sand bar formations at sites 2, 5, and 6 have changed and grown significantly.

Grassed waterways could be installed at a cost-share rate of $3.00 per foot, or at the same rate of payment detailed in the CCRP/CRP Cost Share Docket. Bank erosion control projects will be solved on an individual basis, depending on the site. Up to 75% of the cost can be provided by the TMDL project. Other erosion control practices that are being considered include contour strips on sloping fields at a one time cost share rate of $15.00 per acre and a variety of tree planting practices, using federal and state cost share rates.

NRCS standards and specification for all erosion control practices will be used whenever possible, with technical support provided by SWCD staff, NRCS, and JPB Engineers, in cooperation with appropriate state agencies. It is possible that some projects will have to be based on "generally accepted engineering principles", where NRCS may not have specs. Standard NRCS operation and maintenance plans will also be used for erosion control practices.

In the same category as the other erosion control practices, the Best Management Practice of planting a cover crop, on fields where the crops are harvested before September 25th and where little or no crop residue is remaining will be encouraged. Landowners would be paid $6.00 per acre up to a maximum of 150 acres, for planting a cover crop (barley, oats, etc.). Contracts with landowners for this practice will be for a minimum of 3 years and will incorporate a process of self certification for eligible fields each year. The majority of the fields where this practice would be eligible are located in the middle reach, with a few in the lower reach.

Storm Water Control:

Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD, Todd County Planning & Zoning
Estimated Cost: Grant Funds Anticipated $2,500. Match $2,500. Total $5,000.

Goal: Promote storm water control in urban and rural shore land areas.

Information will be provided to encourage development and implementation of BMPs, rain gardens and alternatives for impervious surfaces for storm water control. Landowners and developers will be encouraged to provide NPDES permit information before any new plats are approved.

Task 1: Provide technical assistance and project design to landowner
Task 2 Finalize landowner contracts and install practice
Task 3 Inspections; administrative oversight and payment for practice
Task 4 Reporting through e-link and semi-annual reports

General Technical Support for the Installation of Nonpoint Source BMPs for the Long Prairie River TMDL:

Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD, Todd County Planning & Zoning
Estimated Cost: Grant Funds Anticipated $25,000. Match $10,000. Total $35,000.

Goal: Provide technical support for the development, installation and implementation of BMP's

Onsite Individual Sewage Treatment System BMP Installation – Technical Assistance Supporting Practice):

Time Frame: Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds Anticipated $2,500. Match $6,000. Total $8,500.

Goal: Repair ISTS systems requiring upgrades for non-compliance within the Long Prairie River Watershed

In many cases, the landowners requesting the erosion and pollution control BMPs, are located in the shore land protection zone and are required to obtain a shore land alteration permit to install the practice from the local Planning & Zoning office. To obtain this permit a compliance check for Individual septic treatment systems (ISTS) is required, along with sealing of any unused wells, in some areas. If a landowner has to upgrade their ISTS and/or seal a well, the financial burden makes the installation of these BMP's more than many landowners can afford. Since implementation of ISTS system may need to accompany other BMPs, a system will be developed to assist land owners who meet certain income guidelines with the correction of open-ended sewage systems or nonconforming sewage systems in the county.

Depending on availability and ISTS system location grant assistance and State Revolving Fund Loan dollars will be sought to make available to landowners to install these practices. Cost share will be provided to eligible homeowners for compliance inspections. This practice will provide an incentive to homeowners to verify the status of their septic system and subsequently reduce the numbers of failing systems in the watershed. Noncompliant systems will be addressed through the processes set by MN Rule Chapter 7080 and local ordinances. Low-interest loans will be available for only the system upgrades.

Time Frame: Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD and Planning and Zoning
Estimated Cost: Grant Funds Anticipated $200,000. Total $200,000.

Nitrogen Reduction Demonstration

Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds Anticipated $10,000. Match $15,000. Total $25,000.

Goal: Encourage 3 or 4 landowners to participate in the Nitrogen Reduction Demonstration Project.

Landowners participating in the demonstration plots, outlined in the education component, will be offered appropriate cost share to use alternate seed, fertilizer, cover crops and rotations, to complete the potential nitrogen/phosphorus reduction practices.

Part of the education component is developing a demonstration project, in partnership with Todd and Douglas Counties, SWCD's, Department of Ag, U of M, Central Lakes Irrigation Center, partially funded through an LCNR grant, to reduce nitrate and phosphorus losses to groundwater and surface waters of sandy eco-regions through the development, promotion, and adoption of new farming and land management practices and techniques. While the agricultural economy depends on phosphorus and nitrogen applications for crop productivity, the recreational economy depends on keeping those nutrients out of surface waters.

The results of this project aim to identify regionally appropriate land management alternatives for reducing nutrient losses to water, and to justify these alternatives by beginning to document their costs and benefits.

- The effectiveness of new farming techniques will be examined. Techniques include new generation of polymer coated controlled release nitrogen fertilizer, nitrogen rate recommendations, evaluation of newly released nitrogen efficient (eco-friendly) crop varieties, phytofiltration to remove ground water nitrate while providing income, and deep tillage on responsive soils.
- Phosphorus losses to surface waters, which reduce recreational appeal, will also be addressed by creating a tool that quantifies the risk and identifies actions that reduce losses. The Minnesota Phosphorus Index (currently used by farmers) will be modified to address land use activities in proximity of lakes.

- Accelerated adoption of new farming techniques that reduce the risk of nitrogen loss is necessary to reduce nitrate losses to drinking water supplies. This will be accomplished by on-farm demonstration and outreach efforts based on results from the field studies. Demonstrations will be strategically located on sensitive soils and aquifers. Profitability and water quality impacts will be considered on a field scale.
- The costs of input expenses and yields associated with the various techniques will be measured. One benefit of these new farming techniques is the protection of drinking water quality. This benefit will be estimated by documenting the potential costs of nitrate contamination incurred by municipal and private well-owners.

Evaluation of novel techniques:

Techniques such as new forms of nitrogen fertilizer, more efficient crop varieties, and deep-rooted rotation crops to improve water quality in vulnerable aquifers will be evaluated. Cost/benefit analysis will be achieved by characterizing crop response, profitability, and leaching losses of nitrate beyond the root zone. Individual landowner incentives through cost share will be used to establish and implement these new practices. Outreach meetings will be conducted in these eco-regions to disseminate results. A report/summary of the techniques, outreach, etc will be included with the final report of the TMDL project.

Evaluation/Demonstration of new tillage techniques:

These techniques will provide a favorable crop environment but minimize the potential of nitrogen and phosphorus loss. Cost/benefit analysis will be achieved by characterizing crop response, profitability, risk of phosphorus runoff losses and leaching losses of nitrate beyond the root zone. Cost share and technical assistance provided to landowners will encourage adoption of these new methods. Outreach meetings will be conducted these eco-regions to disseminate results.

Modification of Minnesota Phosphorus Index:

This is a tool to quantify risk of phosphorus losses to nearby lakes. It will be modified to include land use practices such as nutrient management, vegetated buffer zones, and changes in surface water storage in proximity to lakeshore environments. Workshops on the use and interpretation of the P Index will be delivered to end-users.

In addition to progress reports and an annual report, field days will be conducted during the summer to explain the project to interested growers and citizens. A presentation will be made at the Area 2 potato meetings. Local media will be informed of the project objectives and results. One to two news articles will be submitted to agricultural news outlets. This project will be a cooperative effort among: 1) Sand Plain Counties and SWCDs, 2) University of Minnesota, 3) Minnesota Department of Agriculture, 4) United States Department of Agriculture and 5) commercial growers.

Objective 2: General Administration of the Long Prairie Nonpoint Source TMDL Plan.

Plan Administration:

Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds Needed $40,000. Match $20,000. Total $60,000.

Goal: All activities for the management of this project that are not specifically identified by other objectives and tasks, including personal, office expense, fiscal management and miscellaneous office duties and activities that will be performed to properly complete this project.

Work Plan Development:

Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds Needed $1,200. Match _____ Total $1,200.

Goal: Todd SWCD will work closely with MPCA and other partners to develop a relevant work plan. This document will provide a general overview of the project goals and agenda as well as a general budget summary.

Data Entry:

Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds Needed $3,000. Match _____ Total $3,000.

Goal: Todd SWCD staff will enter monitoring data and nutrient results into specific spreadsheets as the data is collected. BMP's and project activities will be reported in E-Link, and all data will be submitted to Storet at the end of each reporting year.

Semi-Annual Reporting:

Time Frame: Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds $2,800. Match _____ Total $2,800.

Goal: The semi-annual reports will be prepared by the staff of the Todd SWCD in a timely manner, with contributions from various partners as requested.

Final Reporting:

Time Frame: Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds $3,000. Match _____ Total $3,000.

Goal: The final report will be prepared by staff of the Todd SWCD, in cooperation with participating partners in the project, in the spring of 2009. The report will summarize the progress and results of the project and the success of our efforts. Enough copies will be printed to distribute to anyone interested.

Public Relations & Education

Time Frame: Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds $5,000. Match _____ Total $5,000.

Goal: Provide project and monitoring results to interested landowners. Distribute information packets for Ag and shore land BMP's. Publish news articles 1 to 2 times each year to update the progress of the TMDL projects. Sponsor a public meeting to announce the implementation of the Long Prairie River TMDL. Sponsor environmental education programs for students. Co-sponsor farm tour.

Equipment:

Time Frame: Time Frame: 2005 – 2009
Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds $20,000. Match $5,000. Total $25,000.

Goal: Todd SWCD will purchase equipment necessary to complete the administration and implementation of the TMDL – 319 Project, including monitoring supplies, office equipment and partially fund the purchase of a field vehicle to complete the project.

4. Implementation Plan Monitoring, Milestones, and Evaluation Plan:

To evaluate the effective of the Long Prairie River TMDL a monitoring program will be implemented. The measures to evaluate the success of this plan will include:

- The maintenance of nutrient levels at or below the Eco-region median values.
- The maintenance of dissolved oxygen levels at or above the state standard of 5 mg/L in the Long Prairie River during low flow conditions.
- The number of BMP's installed and implemented by landowners resulting nutrient reduction.

Implementation Monitoring and Milestones:

Time Frame: Time Frame: 2005 – 2009

Person(s) Responsible: Staff, Todd SWCD
Estimated Cost: Grant Funds $50,000. Match $5,000. Total $55,000.

Regular monitoring will take place at ice out and continue through late October or early November. High flow monitoring will take place approximately once per week, low flows will be monitored twice a month. Winter and under ice monitoring will be completed as needed. Additional monitoring cycles will be used to determine wastewater discharge impacts, benefits of established BMP's, and storm events.

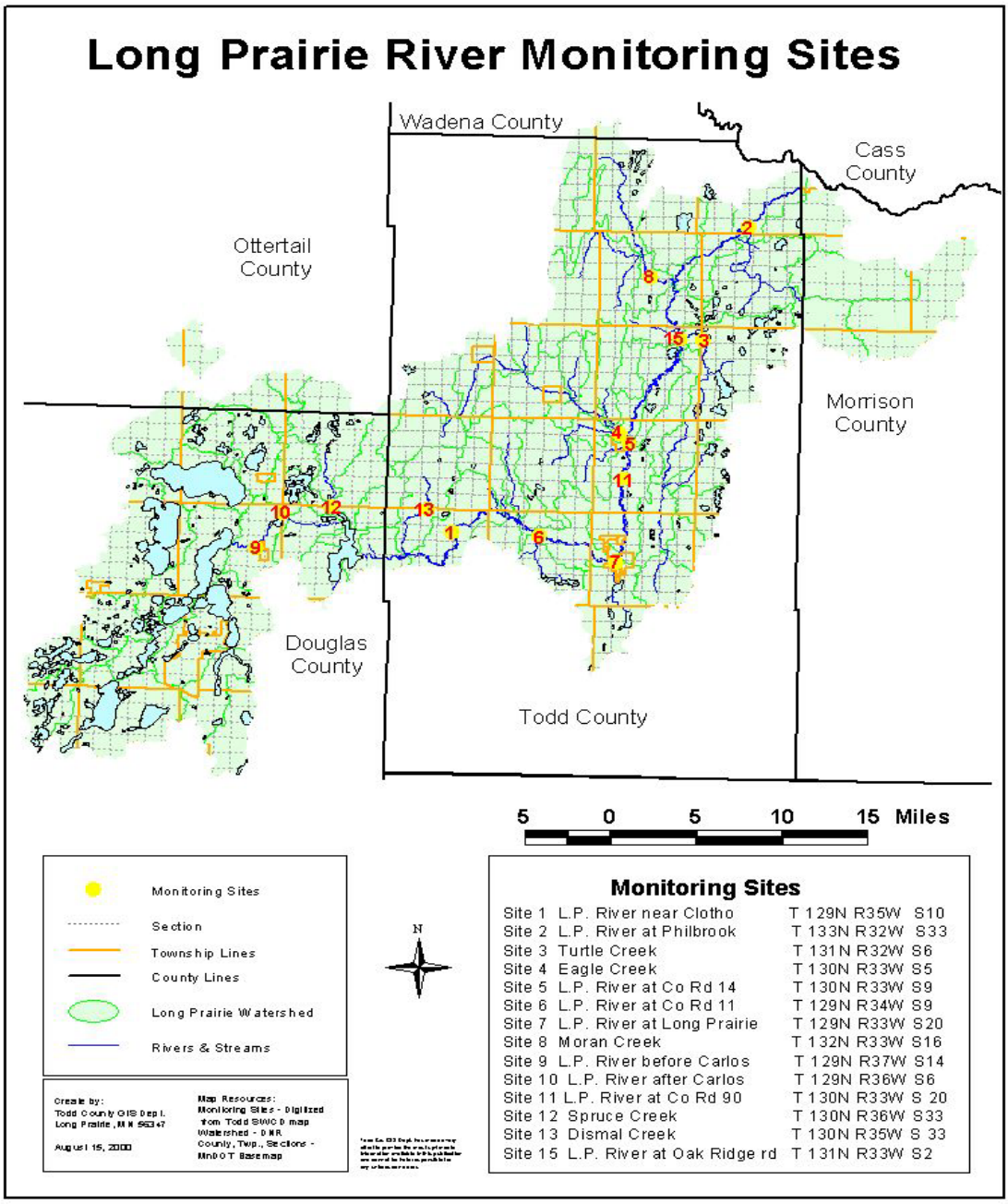
Sampling stations are located throughout the river and tributaries representing discharges along the entire 100 miles of the Long Prairie River system. Some stations are automated by the use of Campbell Scientific CR10 data loggers. The remaining stations are equipped with staff gauges or bridge down measures of water elevation, and stage-discharge relationships, and are operated manually by the Todd County SWCD staff, and MPCA interns.

Starting at the headwaters from west to east, after discharging from the Lake Carlos dam, sites 9 and 10 are before and after the City of Carlos. Subsequent downstream main stem sites go to site 6 at County Road 11, site 7 at Long Prairie, site 5 at County Road 14, site 15 at Tyrrell's bridge, and site 2 at Philbrook. The Eagle Creek station, site 4, is located in Browerville just downstream of the County Road 14 site with the Turtle Creek, site 3, discharging just north of Tyrrell's, and Moran Creek site 8, located upstream of the Philbrook main stem site. Additional sites will be added as necessary to monitor point and non-point source locations, and to determine the benefit of established BMP's

The data reduction techniques include estimates of 1.) estimated water flows for each of the main stem and tributary stations; 2.) estimated nutrient concentrations and mass loadings using FLUX software (Walker, 1986), and 3.) hydrologic and phosphorus routing through the main stem and tributary sites. Land use – runoff responses will be employed to simulate the effect of future land cover changes and to estimate the effectiveness of the control options employed. All monitoring data collected will be submitted to MPCA for entry into the Water Quality Data Base.

A grab sampling program was initiated in 1996 and will be continued at the various stations. Samples are collected mid-depth and mid-channel at each station using a plastic horizontal Van Dorn sampler. Samples are immediately acidified for nutrient analysis, and all sample containers are iced in the field and then stored in the refrigerator or freezer as required. Sample shipment to the certified laboratory occurs the day of sampling with the lab receiving the samples within 24 hours of collection. Analytes that are routinely obtained include total phosphorus, orthophosphorus, nitrate+nitrite nitrogen, ammonia nitrogen, total kjeldahl nitrogen, chlorides, and total suspended solids. Performance standards for total phosphorus are routinely accomplished during the study.

Flow measurements will be obtained by the use of a modified bridge board equipped with a 15 pound torpedo coupled with a Marsch-McBirney model 2000 portable flow meter. Flow measurement quality assurance was verified by use of Price flow meters used by the MPCA. Continuous recording data loggers are installed at some stream sites, and will be downloaded about every 6 weeks by use of storage modules and uploaded into IBM compatible desk top computers.



Milestone Schedule

	W 06	Sp 06	Su 06	F 06	W 07	Sp 07	Su 07	F 07	W 08	Sp 08	Su 08	F 08	W 09	Sp 09	Su 09
Installation of BMP's			X	X		X	X	X		X	X	X		X	
Nitrogen Reduction Demo	X	X	X	X		X	X	X	X						

Project Administration	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Work Plan Development	X	X													
Data Entry		X	X	X		X	X	X		X	X	X		X	X
Semi Annual Reporting			X		X		X		X		X		X		
Final Report														X	X
Public Relations & Education			X	X		X	X	X		X	X	X		X	X
Equipment		X	X			X	X			X	X				
Monitoring & Evaluation		X	X	X		X	X	X		X	X	X		X	X

Attachment A – Anticipated Project CWP – 319 Clean Water Partnership Application

Project Name: Long Prairie River TMDL – 319 Non-Point Implementation Plan

Project Support Summary: Please complete the following section for all the sources of match money and in-kind contributions for your project. The match requirement is at least 50 % of the total project costs.

Project Sponsors (Attach additional sheets if necessary)	**Cash Contribution To Project (2)**	**In-kind Contribution To Project (3)**	**Total Project Support (2+3)**
Grant amount requested (grant and loan total cannot exceed $250,000/year, or $750,00o for 3 years)	300,000		
Clean Water Partnership Loan (for 319 projects only)			
A. Project Sponsor - subtotals	300,000		300,000
Local Contributing Sponsors:			
1. Todd SWCD	5,000	37,000	42,000
2. Douglas SWCD	0	5,000	5,000
3. Central Lakes Ag Center	0	2,500	2,500
4. SRF Loan Program	100,000	0	100,000
5. Landowner Contribution	58,000		58,000
B. Local Contributing Sponsors subtotals	163,000	44,500	207,500
State and/or Federal Contributing Sponsors:			
6. NRCS/FSA	100,000	10,000	110,000
7. MN Board of Water & Soil Resources	60,000	0	60,000
8. MN Dept. of Agriculture	0	2,500	2,500
9. University of Minnesota		5,000	5,000
10. SRF Engineers		15,000	15,000
C. State and/or Federal Contributing Sponsors Subtotals: (cannot be more that 20% of the total project costs)	160,000	32,500	192,500
SUBTOTAL: All project sponsors (A+B+C)	323,000	77,000	400,000
GRAND TOTALS	Total Cash $623,000	Total In-kind $77,000	Total Project Cost $700,000

Long Prairie River TMDL - 319 Non-Point Implementation Project

Itemized Budget and Expenditure Report **Period Ending:_____**

Cost Category	Unit Cost	Quantity	Grant Cash	Match Cash	Match In-Kind	Total Budget	Cumulative Expenditures	Budget Balance
Objective 1 - Installation of Best Management Practices								
Riparian Buffers			$5,000.00	$2,500.00	$2,500.00	$10,000.00		$10,000.00
Nutrient & Manure Management			$115,000.00	$296,500.00	$20,000.00	$431,500.00		$431,500.00
Erosion Control			$15,000.00	$7,500.00	$7,500.00	$30,000.00		$30,000.00
Storm Water Control			$2,500.00	$1,500.00	$1,000.00	$5,000.00		$5,000.00
Technical Support	$30./hr	1167 hrs	$25,000.00		$10,000.00	$35,000.00		$35,000.00
Supporting Practices			$2,500.00	$5,000.00	$1,000.00	$8,500.00		$8,500.00
Nitrogen Reduction Demo			$10,000.00	$5,000.00	$10,000.00	$25,000.00		$25,000.00
Objective 1 - Total			**$175,000.00**	**$318,000.00**	**$52,000.00**	**$545,000.00**	**$0.00**	**$545,000.00**
Objective 2 - Administration of 319 Grant								
Project Administration			$40,000.00		$20,000.00	$60,000.00		$60,000.00
Work Plan Development	$30./hr	40 hrs	$1,200.00			$1,200.00		$1,200.00
Data Entry	$30./hr	100 hrs	$3,000.00			$3,000.00		$3,000.00
Semi-Annual Reporting	$30./hr	93.3 hrs	$2,800.00			$2,800.00		$2,800.00
Final Report			$3,000.00			$3,000.00		$3,000.00
Public Relations &Education			$5,000.00			$5,000.00		$5,000.00
Equipment Purchase			$20,000.00	$5,000.00		$25,000.00		$25,000.00
Objective 2 - Totals			**$75,000.00**	**$5,000.00**	**$20,000.00**	**$100,000.00**	**$0.00**	**$100,000.00**
Objective 3 - Monitoring								
Lab Analysis			$35,000.00			$35,000.00		$35,000.00
YSI & Routine Sampling	$30./hr	200 hrs	$6,000.00		$3,000.00	$9,000.00		$9,000.00
Equipment Maintenance			$1,500.00		$1,000.00	$2,500.00		$2,500.00
Training & Workshops			$1,500.00			$1,500.00		$1,500.00
Mileage & Vehicle Maintenance	44.5/mile		$3,000.00		$1,000.00	$4,000.00		$4,000.00
Data Evaluation	$30./hr	100 hours	$3,000.00			$3,000.00		$3,000.00
			$50,000.00	**$0.00**	**$5,000.00**	**$55,000.00**	**$0.00**	**$55,000.00**
TOTALS			**$300,000.00**	**$323,000.00**	**$77,000.00**	**$700,000.00**	**$0.00**	**$700,000.00**