

Maple River Watershed Improvement Project

Plan of Work

MPCA Clean Water Partnership Project #951-1-194-07

Phase II B Implementation Continuation
June 2006-June 2009

Submitted by: Blue Earth County Soil and Water Conservation District
March 2007 Final Draft

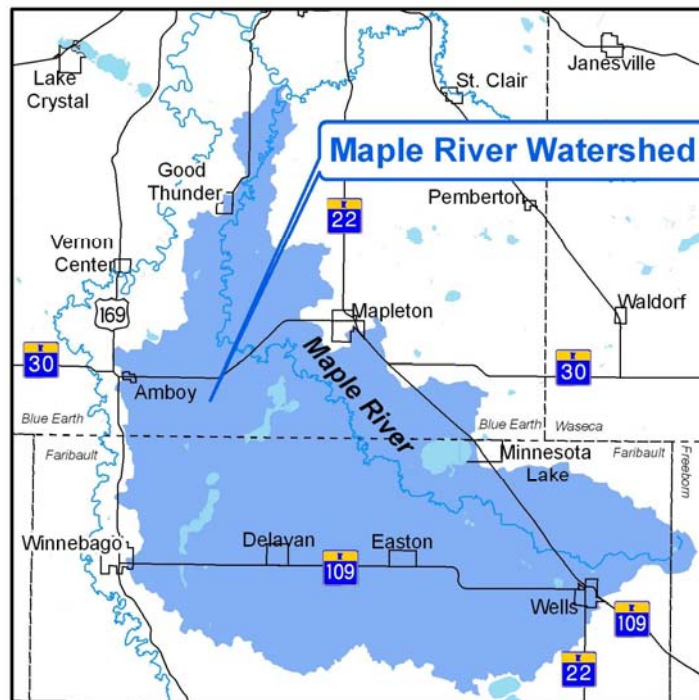


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I. Purpose and Project Summary

The Maple River Watershed Improvement Project, part of the Le Sueur River Watershed has a purpose to improve water quality in the sub watershed. By promoting the Best Management Practices (BMP) associated with the project and to increase the public's awareness about high pollutant loads that the Maple River and its watershed are contributing to the Le Sueur River that leads to the Minnesota River. As the Maple River Watershed's population grows and diversifies, we hope the citizens of the watershed will support these BMP's to ensure; the environmental quality of the Maple River Watershed will improve and provide environmental benefits for generations to come.

The selection of the Maple River Watershed as a priority management area (PMA) was based on water quality data collected in 1996 indicating that the Lower Maple River exceeds the 75th percentile for Total Suspended Solids (TSS), Total Phosphorus (TP), Nitrate-Nitrogen (N-NO₃), and turbidity in comparison to the water quality standards of minimally impacted streams in the Western Corn Belt Plains Ecoregion.

The areas selected in the Lower Maple River watershed as a PMA consist of a 1200 foot corridor that's adjacent to the Maple River and all of its tributaries and land that is adjacent to drainage ditches within the watershed. The Maple River Group will focus on this area to promote the BMP's listed below and to promote programs such as CRP, WRP and EQIP.

The Le Sueur River Watershed encompasses a total of 711,838 acres or 1,112 square miles. The Lower Maple River Sub Watershed covers approximately 69,172 acres of the total. This sub watershed contains approximately 9,649 acres of potentially restorable wetlands, approximately 2,433 acres of highly and potentially erodible land and 44% of the land in the 99 foot riparian zone contains a slope greater than six percent.

In addition to the Phase 1 data (1996) showing the importance of the LeSueur River watershed, the State of the Minnesota River report, reports for monitoring years 2000, 2001, 2002, and 2003 higher pollutant loads coming from this Watershed. Ongoing work in both the Le Sueur and Blue Earth River Watersheds will be critical to the overall Greater Blue Earth River Basin, the Lower Minnesota River Total Maximum Daily Loads (TMDL), as well as efforts further downstream such as the Lake Pepin project.

The Lower Maple River Watershed consists of approximately 69,172 acres. In comparison the Upper Maple River Watershed, mainly located in Faribault County consists of 149, 865 acres. The upper watershed plays a pivotal role in the dynamics of the lower watershed as activities conducted directly impact the lower section of the watershed. Including the Upper Maple River Watershed into the continuation period of this grant will bring cohesiveness to the project and allow funding to be allocated to priority projects that will reduce pollutant loads to the Maple and Le Sueur River systems. With coordination between Blue Earth and Faribault Counties, we will be able too complete more projects throughout the entire watershed. With the addition of the Upper Maple River Watershed, the project will now be called the Maple River Watershed Improvement Project. The projects goals will still be consistent with what was outlined in the Le Sueur River Watershed Implementation Plan.

This work plan is a model of what the Lower and Upper Maple River Watershed Group would like to accomplish during the Phase II Implementation Continuation Period (Phase II B). We will outline; people's roles and responsibilities within the project, and how grant, loan, and in-kind resources will be distributed and how they will be accounted for. The dynamics of this project are expected to vary through out its duration. As a result, we will continue to monitor the work plan and adjust the contents as needed This work plan will meet the requirements of the Minnesota Pollution Control Agency's (MPCA) Clean Water Partnership Program, and account for Phase II B funds, that have been provided by the State of Minnesota for the Lower and Upper Maple River Watershed.

While implementing this work plan we will focus on many different conservation programs and activities. By supporting educational programs at local schools, water quality monitoring, soil conservation programs and getting local citizens to participate in our programs. We realize there are currently programs available that have the same goals, but we would like to "fill in the gaps" with a current framework of education, technical assistance, and financial incentives and/or cost share to the landowner. While allowing local citizens to continue utilizing current programs, we will also be able to merge our work plan within their current plans. We will be able to focus specifically on the Maple River Watershed, which is a very important piece of the puzzle; our data has shown that the Maple River Watershed needs specialized attention to help improve it environmentally from a land and water conservation viewpoint.

There are other complimentary work groups currently working in the Le Sueur River Basin as well as in the Greater Blue Earth River Basin. Examples of these work groups are the Greater Blue Earth River Basin Alliance (GBERBA), and Three Rivers Conservation and Development Council. These projects working individually will be able to help reach everyone's goals.

A. Overview

The main sections of the work plan are listed in the table of contents. This plan will reference previously completed documents, reports and plans. By doing this, interested parties can look over our current activities as well as pursue additional information. Listed below is a brief synopsis of what is included in the various sections of this work plan.

Watershed Project Development- As the Maple River Group proceeds through the implementation phase. The group will need to know where we were, where we are, the direction we're heading and who has helped us along the way. This section will cover project history and acknowledgements for past work and participation.

Project Participants- A project of this scale will require the involvement of professionals from a variety of disciplines to be successful. This section will describe who is involved and what their roles and responsibilities will be.

Program Elements- Work plan program elements are groups of related activities that together add up to a more unified watershed improvement effort. Each element will be defined as to what activities will take place.

Milestone Schedule- A general schedule of activities is contained in this section of the work plan. Responsibilities and timeframes are listed.

Project Budgets- A series of budgets are provided that show how the project is supported by cash and in-kind contributions and how expenditures (by program element category) will be targeted.

Appendices- In order for this work plan to be more useful to project participants, we have included a variety of lists, fact sheets and reference materials within the appendix.

II. Watershed Project Development

A. History of Project

The 1930's brought an increased awareness for soil and water conservation. Political leaders realized that only active, voluntary support from landowners would guarantee the success of conservation work on private lands. Soil and Water Conservation Districts were formed because of this to help local landowners effectively manage their lands. More recently clean water partnerships have focused on controlling nonpoint source pollution through watershed management to protect and improve surface and ground water.

The Phase I diagnostic study (conducted in 1996) of the Greater Blue Earth (GBE) River Watershed has historical value. Phase I depicted a detailed "snapshot" in time showing the Le Sueur River Watershed's water quality issues. It found that the Le Sueur River Watershed is a major contributor of sediment, phosphorous and nitrates to the Minnesota River Basin, compared to its other tributaries.

Local citizens with support from technical staff recognized specific features of the Lower Maple River watershed, which were important in its selection as a PMA. In June of 2002, the Lower Maple River Watershed was selected as a recipient of a program implementation grant from the MPCA's Clean Water Partnership. Local support continues to be committed for implementation, monitoring and educational activities in the entire Maple River Watershed.

As the Maple River group works together to develop a work plan that will soon be implemented, we would like to see other sub watersheds receive the funding needed to focus on their individual goals. As this funding has not been allocated to the Upper Maple River Watershed, during the Phase II Continuation Period, we would like the Upper Maple River Watershed area to be eligible for funds allocated in Phase II B.

Ongoing stream monitoring in the Le Sueur River watershed has been accomplished, and is available in the State of the Minnesota River reports which, can be found on the Minnesota River Basin Data Center's website.

III. Project Participants

A. Roles and Responsibilities of Project Participants

A project of this scale will require the involvement of professionals from a variety of disciplines each having clearly defined roles and responsibilities in order to achieve its goals. This portion of the project is essential towards increasing efficiency and accomplishing goals. The Milestone schedule indicates a time-line for the project implementation for both those involved and those interested.

The Maple River Watershed group and the Le Sueur River Watershed Team will provide an overview and cohesiveness to the project. Jonathan Hanson, Project Coordinator will chair the Maple River Watershed Group, which includes committee members from the Lower Maple and Upper Maple River Watersheds. Other committee members will include; Blue Earth Soil and Water Conservation District (SWCD), District Manager and SWCD Staff, Faribault County SWCD District Manager, Blue Earth County (BEC), MPCA Project Manager, the Minnesota Department of Natural Resources (MN DNR – including Fisheries, Waters, and Private Lands programs), the Natural Resource Conservation Service (NRCS), the U.S. Fish and Wildlife Service (USFWS), the University of Minnesota Extension Service (MES), the Minnesota Board of Water and Soil Resources (MN BWSR), and other interested groups. A special effort will be made to broaden the team to include teachers, city officials, landowners, sports groups, farm groups and township officials. The General responsibilities of the project groups are as follows:

1. Project Representative, Soil and Water Conservation District Manager and Staff

- Assist in the development of work and monitoring plans, revise plans as needed.
- Fiscal management and administration.
- Participate with the Lower Maple River Watershed group, the Le Sueur and Greater Blue Earth Watershed Teams.
- Supervise project technician, Jonathan Hanson.
- Promote BMP's with landowners through regular contact and special initiatives of this project.

2. Project Coordinator, Jonathan Hanson

- Develop work and monitoring plans, revise plans as needed.
- Chair the Maple River Watershed Group, and participate on the Le Sueur Watershed Team and Greater Blue Earth Watershed Team.
- Work with MPCA project manager and communicate among project sponsors.
- Analyze and assess data.
- Coordinate all activities in the watershed and assist BEC NRCS in promotion and technical assistance of existing programs.
- Coordinate monitoring and citizen stream monitoring efforts and work closely with the monitoring intern.
- Coordinate public meetings.
- Place signs at sampling sites and demonstration projects.
- Work with educators in the Maple River Watershed, coordinate and participate in educational activities in the watershed.
- Promote BMP's with landowners through regular contact and special initiatives of this project.
- Assist in fiscal management.

3. Blue Earth County

- Involvement of Feedlot Officer, George Leary.
- Participate with Nutrient Management component.
- Create maps using GIS.
- Participate with Septic System Upgrades (ISTS) in the watershed.
- Participate with information and education in the watershed.
- Participate with the Maple River Watershed group.
- Participation of the County Water Planner, Julie Conrad.
- Involvement of Drainage Authority, Craig Austinson and Blue Earth County Board.
- Participate with woody debris, dumpsite and stream stability sites.

4. Maple River Sub Watershed Group

- Participate in implementation and work plan development.
- This group will consist of staff from the SWCD, Blue Earth County, NRCS, DNR and other interested organizations or citizens.
- Oversee the implementation of strategies to attain the goals.
- Provide local and technical support to watershed efforts.

- Communicate with the Le Sueur River Watershed Team and Blue Earth Watershed Team and report progress.
- Form Sub-groups that will implement specific portions of the work plan.

5. Faribault County Soil and Water Conservation District

- Involvement of district staff for the implementation of best management practices in the Upper Maple River Watershed.
- Participate in the Maple River Watershed Group.
- Provide local and technical support to watershed efforts in the Upper Maple River Watershed
- Participate in education/information activities in the Upper Maple River Watershed.

6. Minnesota Department of Natural Resources (MN DNR: Fisheries, Waters, and Private Lands)

- Participate on Maple River Watershed group and Le Sueur River Watershed Teams.
- Assist with water quantity on drainage systems and streams issues.
- Participate in fisheries management and education.
- Participate in water retention projects.
- Conduct fish population and assessment surveys.

7. Natural Resource Conservation Service (NRCS)

- Participate in crop residue transect survey.
- Participate in implementation plan development.
- Review data analysis and assessment.
- Participate on the Maple River Watershed group and the Le Sueur River Watershed Team.
- Work to coordinate activities via federal programs (CRP, EQIP, WRP, etc.) with initiatives of this project.
- Promote Agricultural BMPs.
- Provide technical support design.
- Include project information in local newsletters.
- Participate with nutrient management plans.

8. US Fish & Wildlife Service (USFWS)

- WRP-Wetland Restoration.
- Assistance with learning site owned by USFWS near Amboy.

9. Municipalities and Townships

- Include the cities of Amboy, Mapleton, Good Thunder, Minnesota Lake, Delavan, Easton and Wells.
- Include the townships of Beauford, Danville, Decoria, Lyra, Mapleton, Shelby and Sterling.
- Participate on the Maple River Watershed group.
- Storm water management projects.

10. Maple River, United South Central and Blue Earth Area School Districts

- Participate on the Maple River Watershed group.
- Be involved in the educational and informational program element of the watershed plan.
- Participate in the Benthic/Macro-invertebrate sampling monitoring.

11. Sportsmen's Conservation Organizations

- Participate on the Maple River Watershed group.
- Participate in projects throughout the watershed related to stream bank and habitat.

12. Minnesota Pollution Control Agency (MPCA)

- Participate on the Maple River Watershed group and the Le Sueur River Watershed Team.
- Staff assistance from Bill Thompson, Scott MacLean and Pat Baskfield.
- Participate with the drainage elements.
- Review data analysis and assessment.
- Assist with project coordination and management.
- TMDL Program management.
- Monitoring assistance for the automated site and Citizen Stream Monitoring Program.

13. Board of Water and Soil Resources

- Participate on the Maple River Watershed group and the Le Sueur River Watershed Team.
- Involvement of the Board Conservationist, Chris Hughes.
- Enforce the WCA on infractions in the Watershed.

14. Three Rivers Resource Conservation and Development Council

- Encumber additional funds for resource protection projects as needed.
- Assist with promotional and educational activities.
- Project coordination for the Le Sueur River Watershed Team.

15. Minnesota Department of Agriculture

- Provide technical assistance with nutrient management.
- Provide technical assistance with monitoring.

16. Private Consultants and Cooperatives

- Involvement of Blue Earth Consulting to run demonstration plots for nutrient and manure management.
- Participate in sub group to educate landowners concerning lowering nutrient levels in cropping systems.

17. University of Minnesota - Extension Service

- Assist in education projects.

IV. Project Goals

Goal 1. Pollution Reduction

Water quality goals targeted in the Maple River Watershed include a reduction of Total Suspended Solids (TSS), Total Phosphorous (TP) Nitrate-Nitrogen (N-NO₃), and Fecal Coliform Bacteria by 25%. The percent reduction goals for the Maple River Watershed are located in Table 1 and are further described below. The basic objective is to obtain significant reductions in these pollutant categories. While there will be year-to-year variations, we desire that the long-term trend will show these pollutant numbers to be declining.

Table 1. Percent Reduction Goals for Selected Water Quality Parameters

Water Quality Parameters	Percent Reduction
Total Suspended Solids (TSS)	25%
Total Phosphorous (TP)	25%
Nitrate-Nitrogen (N-NO ₃)	25%
Fecal Coliform Bacteria	Meet State Standards

The following numbers are from the Phase I diagnostic study and will be adjusted as continued monitoring has been done in 2003, 2004, 2005 and 2006.

TSS:

Reduce sediment yields in the Lower Maple River Watershed from **252 lbs/acre to 189 lbs/acre**. A measure of the material suspended in water, total suspended solids interfere with light penetration and can potentially reduce aquatic habitat. TSS also carries nutrients that can cause algal blooms and other toxic pollutants that are harmful to aquatic ecosystems.

TP:

Reduce phosphorous yields in the Maple River Watershed from average of **0.23 lbs/acre to 0.17 lbs/acre**. Integration of BMP's that will reduce point source and nonpoint source pollution will be necessary to reach this goal. Results from monitoring have indicated that during periods of low flow that point source is the major contributor (70%) of phosphorus to the watershed. While, during periods of high flow only 10% of the phosphorus levels come from point source pollution. Long term averages indicate that nonpoint source pollution contributes approximately 75% of the phosphorus levels in the watershed.

While Minnesota does not have a state standard for TP, there is research indicating that reducing the levels of TP will cause a noticeable difference in algal growth.

N-NO₃:

Reduce nitrate-nitrogen levels in the Maple River Watershed from an average of **7.9 mg/l to 5.9 mg/l**. Minnesota doesn't have a standard for nitrate-nitrogen for surface water but it does have one for drinking water (10 mg/l). Nitrate-nitrogen levels concern the project for two reasons; first because Mankato draws its drinking water from shallow aquifers adjacent to the Blue Earth River. Secondly, because of the hypoxia problem that continues in the Gulf of Mexico which the Le Sueur River Basin is a contributor to.

Bacteria:

Reduce fecal coliform bacterial levels in the Maple River Watershed to meet Minnesota's water quality standard of **200 CFU/100 ml**. Fecal coliform itself does not pose a danger to people or animals but it does indicate the presence of other disease causing bacteria that do not survive long enough in the water, outside the body of animals, to be detected. The Maple River Project will cooperate with the Regional Fecal TMDL project for the entire GBE Basin.

Biological:

Improve conditions for plants and animals with the Maple River Watershed. Improving their conditions will increase the recreational and aesthetic value of the river system. Included with the biological goals for the Maple River is to manage specific reaches on the river to improve the game fish population. This project will be planned in coordination with MN DNR Fishers.

Goal 2. Reduce Pollutant Loading from Nonpoint Sources:

Basic routine approaches will be used to promote BMP programs. The coordinator and other members of the work group will continue to promote conservation programs to local landowners. One way to utilize current technology is through the use of LIDAR (high resolution orthophotos) and Digital Elevation Models (DEM) will help us determine the proper way to implement best management plans. DEM uses light pulses sent from an airplane to determine distances from the airplane to the ground by analyzing the time it takes the pulse to hit the ground and return to the plane. Combining this technology with GPS Blue Earth County will be able to generate very detailed (2-foot intervals) contour and slope maps. Current best management practices the Maple River Project is promoting include:

- Federal Programs
 - Practices will include those listed in:
 - NRCS EQIP Docket
 - State Cost-Share Approved Practice List
- City and Municipalities Programs
 - Urban Management Practices
- County Programs
 - Individual Sewage Treatment Systems
 - Drainage System Management

Goal 3. Increase the public’s awareness of water quality and water quantity issues in the Maple River Sub Watershed.

Goal 4. Coordinate efforts to integrate point source pollution management with nonpoint source control efforts promoted by this project and the counties and communities within the watershed.

Goal 5. Assess and evaluate the project’s effectiveness through stream water quality monitoring, land use management changes and tracking the implementation of management strategies.

Goal 6. Partner with MN DNR Fisheries to improve wildlife habitat and recreational activities for the residents of the watershed.

Goal 7. Promote the sensible management of the riparian corridor along the Maple River and adjacent tributaries.

Goal 8. Increase the amount of technical assistance received for the implementation of activities and monitoring programs.

V. Program Elements

Program elements described below may be completed through various funding sources. The overall policy will be to utilize existing funding sources when available, and to appropriately use clean water partnership grant dollars to enhance BMP adoption if and when funding is needed. Landowners will be required to have a financial and/or labor/equipment “stake” in all practices related to this project.

A. Program Element 1. Best Management Strategies/Implementation Projects

This program element includes the implementation of select best management practices. Technical staff will be involved with the selection, design, implementation, tracking and evaluation of those BMP's that were approved for funding. Unless otherwise noted the Blue Earth County and Faribault County SWCD's, NRCS and Blue Earth County will be responsible for implementing these BMP's. We will utilize not only grant dollars, but also promote programs such as EQIP, WHIP, CRP, WRP, RIM, etc. This program element emphasizes the following BMP's:

1). Tile Intake Alternatives

Surface tile inlets contribute sediment, phosphorus and nitrogen directly into ditches which enter streams throughout the watershed. This element recognizes and supports alternative practices for surface tile intakes to help improve water quality in the watershed. The two options we are giving landowner's are to install rock inlets or put a buffer around the existing intake. Activities related to a demonstration site are also included in this element. The option of seeking a site for both demonstration and contractor workshops will also be investigated. The replacement of surface tile inlets as a direct conduit with a rock and soil filtering component should be instrumental in reducing the sediment and decrease flows entering the tile system, depending on the soil texture.

Rock Inlets:

- Cost share will be provided for the replacement of the intake (75% up to a maximum of \$300 per replacement).

Grass Buffering:

- Buffer the area that holds water after a 1-2 inch storm event.
- A Minimum of a 30-foot radius would be required.
- We would pay the landowner \$100 an acre and have them enroll into a 10 year contract and pay all the payments up front.
- The grant would grant cost-share of 100% for seed and the landowner would be responsible to plant and maintain the site.
- The landowner will need to plant a seed mix that's able to withstand standing water 2-3 days.

2). Conservation Cost-share

Cost-share will be provided to landowners in the watershed to install erosion control practices on their agricultural and non-agricultural lands. Structures such as terraces, waterways and water and sediment basins are effective ways of controlling erosion by effectively trapping sediment therefore improving water quality. Practices will include those listed in the NRCS EQIP Docket, the Board of Water and Soil Resources State Cost-share manual and other locally accepted practices.

Prioritization would occur in areas that have been identified as having an excessive erosion problem. When the landowner applies the technician will complete a ranking form. There will be no more than a 75% cost share. 75% of the total project cost coming from grant dollars and the remaining 25% coming from the landowner. All structures will be designed to NRCS technical standards. The project will also partner with other cost-share programs such as EQIP to provide a total of 75% cost-share. Because of the recent change in EQIP that only allows 50% cost-share. The project will provide the additional 25%, which will be a good use of funds for project completion and landowner cooperation.

In order to accelerate the installation of these Best Management Practices, Joint Powers Zone 10 Staff will be partially compensated for their assistance in engineering and installation of these practices. Local district staff will also be utilized for their expertise and design assistance.

3). Residue Management

The goal of this practice is to make landowners aware of the need for conservation tillage systems that leaves crop residue on the field in order to reduce soil erosion, and have large amounts of sediment reach the river. Blue Earth County has one of the lowest averages in the region for residue cover; according to the tillage transect survey results. Through this BMP, we would like to use the grant dollars to:

- Increase knowledge and education in the watershed through direct mailings and informational sessions in conjunction with informational sessions about the nutrient and waste management BMP. We want to increase the average amount of residue in the watershed.

- Complete a detailed tillage transect survey in the watershed and sort points and routes by sub watershed within the Lower Maple Sub Watershed. Use the information to target specific areas that are the lowest for crop residue. Educate the landowners on how they can reduce erosion and increase residue on their land.
- If landowners don't have reduced tillage equipment, we will promote the Ag BMP loan program in hopes that they will take that step towards less erosion and sedimentation.

4). Nutrient and Waste Management/Feedlots

The proper application of commercial and animal fertilizers is an issue that has always been in question with farmers, agricultural professionals, scientists, etc. The pollution of water systems with nitrogen and phosphorus that generally comes from over application, leaching and runoff is a major source of concern in water quality issues not only locally, but globally. The over application of nitrogen not only contributes to poor water quality in the Minnesota River Watershed, but the Mississippi River Watershed, which is a major contributor to the hypoxia problem in the Gulf of Mexico.

The project will work with a Nutrient Management Specialist when available. This position will be funded by a Clean Water Legacy grant through the Greater Blue Earth River Basin Alliance.

- This group would like to see a reduction in the nitrogen and phosphorus levels in the Maple River and see that the landowners more educated about the proper rates of nitrogen, phosphorus. We would also like to see more consistent recommendations between private crop consultants' and the University of Minnesota's recommendations for fertilizer applications.
- BEC Feedlot officer and project technician will find landowners that would like to do test plots that vary commercial and manure fertilizer rates. Blue Earth Consulting, an independent crop consultant will be responsible in organizing the plots for a fee that is billed to the project. We would like to work with other area projects to organize a field day or winter meeting in 2007 to review results and promote more proper nutrient management. See Appendix for the details of the plots.

- The promotion of EQIP will be a main portion of this element. As with residue management, we will be offering a \$5/acre up to 250 acres signing bonus for landowners who enter a 5-year nutrient management contract through EQIP.

5). Grass Drill

The Blue Earth SWCD will continue to rent a grass drill to seed priority areas with native species in the Blue Earth County portion of the Maple River Watershed. The drill can also be used for seeding waterways and terraces. The Blue Earth SWCD also owns a tree planter that can be rented by landowners.

6). Drainage

Implementation of the drainage component should significantly impact water quality in this watershed. An inventory and evaluation of the watershed identifies numerous overland and concentrated flow paths that directly impact sediment delivery to the Maple River. The inventory identified sites with particularly poor drainage systems and surface intakes critical to improving the quality and reducing the quantity of water leaving individual farms. The key to this goal will be the utilization of traditional and non-traditional conservation management systems. In a sense most of the land treatments revolve around the issue of drainage. The drainage components consist of the implementation of terraces, water and sediment control basins, wetland restorations, and tile intake replacement and cost share for the acquisition of perpetual easements.

Another major component is the wetland restoration program. This item is important due to the sheer number of acres that can potentially be restored. An inventory was completed in the watershed that identified basins 10 acres or smaller. This inventory will be used to promote the restoration of wetlands for perpetuity and short term durations. In many cases either county or private tiles may not be feasible to repair or improve. This being the case, efforts will be made to enroll land into long or short-term agreements, through CRP, WRP or RIM. We would like to utilize existing programs to the fullest extent possible.

Drainage will be an important issue as the project enters into the continuation Phase of the project. A drainage project analyzing Judicial Ditch 20 in a hydrologic/hydraulic analyses in combination with an economic analysis conducted by the University of Minnesota Department of Applied Economics was completed during the Phase II A and this has sparked landowner involvement into the improvement process and

revealed alternatives that could be possible in combination with BMP's to provide adequate drainage to landowners. In Phase II B this project may partner with Blue Earth County Environmental Services and Land Record departments to develop a county ditch drainage model in a targeted sub watershed in the Maple River Watershed. These models will be GIS based and will give the county a better understanding of the effects drainage has on water quality. After the adoption of the new and accurate GIS layer it will give the Maple River Coordinator a better management tool when looking at potential surface water storage sites. For the purpose of water retention that will alleviate pressure on the drainage system. This project is part of the counties Green Print program.

Increasing filter strips adjacent to ditches and local best management practices such as terracing and water storage and retention areas will be an important part of future improvement projects in many areas. The promotion of such practices will provide increased drainage, but will not increase the peak flows in the river systems.

The following table illustrates the importance of water management on the public drainage system scale, for the Maple River system.

Public Drainage System (PDS) and Land Area Table – Maple River System (Blue Earth and Faribault Counties)

Major Subshed	Total Area	# of PDS	Land Area in PDS
			Acres
			%
Lower Maple 55	67,000	18	37,953
Upper Maple 58	149,865	28	82,266
Totals 55	216,865	46	120,219

These PDS can be composed of open ditch, all tile, or a combination of the two (tile + ditch systems). In the Lower Maple for example, there are twice as many buried tile-only systems, as opposed to other types.

Since over half of the Maple River Watershed's land area is within PDS's, and a significant number of those systems contain large diameter tile, the potential conversion (i.e. tile system changed to open ditch system) to an "All ditch" type system is a concern.

This project will utilize methods and "lessons-learned" from both Blue Earth County JD-20 effort, and Faribault County's CD-3 Project. Faribault's CD-3 is a specially-funded project (MN BWSR Challenge Grant) that is just completing a Drainage Watershed Implementation and Management Plan, for the 8,200 acre CD-3 area. CD -3 is also very important in that it receives water from another 43,000 acres in Faribault County, making it the largest (51,200 acres) single hydrologic unit in the Upper Maple River Watershed. Eleven other PDS outlet into CD-3, so management on CD-3 itself is critical for other tributary systems.

We are very fortunate that these two efforts (JD-20 and CD-3) can now be assessed and evaluated; it will provide the framework for more comprehensive PDS management in the entire watershed. To be specific, the Maple River Project would make timely recommendations to the local drainage authorities, so information on water storage, pollutant reduction, and water quality can be considered as repairs or improvement projects present themselves. The economic spreadsheet developed for JD-20 could also be adapted for other PDS projects, to provide much needed economic data. The transferal of techniques, methods and tools, from the smaller projects to our larger watersheds will be a critical challenge facing both watershed projects and drainage authorities in the coming years.

We will be utilizing grant dollars to host public meetings regarding drainage system management with special emphasis on the installation of grass buffer strips adjacent to open ditches and upland water storage techniques. Promoting these programs to a wider audience, like those utilizing systems in need of updating one of the goals of the Maple River Watershed Project.

7.) Existing Program Promotion and Implementation

Promoting and implementing existing federal programs such as CRP, WHIP, WRP, EQIP, etc. helps demonstrate the need for better water quality in the watershed. While promoting these programs we hope people will realize the importance of them not only on their own farm but to the entire watershed. The local NRCS and Farm Service Agency (FSA) have put priority concerns in this watershed and their efforts will be emphasized. Landowner contributions and efforts will be tracked by the coordinator as will acres and practices applied during the course of the grant.

Technical assistance in promotion of riparian buffers and wetland restorations will be received from the DNR private lands technical assistance program.

8.) Harvestable Buffer Strip Implementation

Buffer strips provide a buffer between fields and water bodies and allow for settling out suspended soil particles, adsorption of pollution on soil and plant surfaces and uptake of soluble pollutants by plants thus improving water quality and protecting the environment. The effectiveness of the buffer strip shall be maintained by harvesting and removing vegetative growth to remove excess nutrients that are deposited with in the grasses. These buffer strips must be properly maintained which will include weed control and removal of vegetation by haying. Grazing will not be permitted within the buffer strip. Six to eight inches of stubble must be left after each cutting to insure proper performance of the buffer strip. This will also include buffer strips that are planted to a native grass mixture, in which case the seed would be harvested instead of cutting for haying purposes. The goal is to enroll 100 acres for a minimum of 10 years at a rate of \$50/acre up front payment to the landowner.

B. Program Element 2. Education and Information

The projects goals, objectives, activities, and evaluations will be communicated to the public via newsletters, newspapers, publications, public meetings, press releases, tours, demonstration sites, displays, involvement with civic organizations, sportsman clubs, and local schools. Special efforts will be made to highlight groups and individuals engaged in the sustainable conservation efforts for land and water resources. Highlighting the special efforts made by groups and individuals should bring public interest to watershed issues. This information will be posted on the Blue Earth SWCD/Maple River websites, also through press releases in the Maple River Messenger and Wells Mirror and in Blue Earth SWCD's annual report.

A major component of this program element will be to communicate the importance of water quality to school age children in the Maple River Watershed. The work group has been talking with the Environmental Science, Curriculum Director, the Agricultural and Science Teachers at Maple River High School discussing possible water quality activities. We've also been discussing possible activities with the elementary and middle school teachers. Activities that we funded during Phase II A were well received by the local educators that participated in them. Education

grants were given and educators could apply for funding not to exceed \$1,000 per project. This will continue through Phase II B.

Education programs will be planned and conducted with the Maple River, Blue Earth Area and United South Central School Districts:

- Numerous instructors in the school district will assist in relaying information to the students and make this project part of their curriculum.
- Work with local teachers who can bridge the gap between the watershed project and area schools, and help classroom teachers directly, by customizing curriculum with up to date data and information.
- Educators will need to apply for grant funding that will help promote environmental education.
- Items that can be purchased include the following; conducting environmental education events, environmental books, field equipment (waders, etc), microscopes, water testing kits, teacher training aids, guest speakers, school assemblies and other approved teaching aids.
- Maple River Watershed Group staff will be available to assist in all aspects of these projects.
- Take an annual canoe trip down the river for interested citizens.
- We will also communicate with and inform local citizens through a series of articles in local newspapers.

C. Program Element 3. Integrate Point Source Pollution Management with Nonpoint Source Control Efforts.

1.) Individual Sewage Treatment Systems (ISTS)

This program element recognizes individual sewage treatment systems located in the watershed and supports efforts to upgrade them. Noncompliant systems increase the potential risk to human health and environmental issues. Programs to upgrade septic systems into compliance with state and local laws will be followed. In the Blue Earth County portion of the watershed a low-interest loan is available for replacing failing septic systems. Upon acceptance of the loan, the loan will be repaid as a special assessment (special assessment is placed as a lien on the property with acceptance of the loan) on the landowners property taxes. The length of the loan can vary between 5 & 10 years with the

amount not to exceed \$10,000. The annual percentage rate for this loan is 3.5% accrued from the date the county pays the contractor. The applicant must own the property on which the practice is installed. Applications are available at Blue Earth County Environmental Services Department. Faribault County already has an ISTS program and has chosen to use that instead.

2.) Urban Strategies

This program element supports the realization that proper communication/education of local citizens about urban management strategies will be an important component of the implementation plan. Most of this work plan focuses on farmers and large landowners but, there are small towns scattered around the watershed that contribute to point and nonpoint source pollution. Subsequently, storm drain stenciling supplies that were purchased during the Phase II A will be available to any city in the watershed that would like to conduct a storm drain stenciling event. This program element recognizes the need to educate local citizens that may not know that storm water is a source of point source pollution and is a concern affecting water quality.

The promotion of rain gardens and other urban management strategies will support improving water quality standards in the watershed. Demonstration sites have been built in the City of Eagle Lake and in Basswood Park in Faribault County. We would like to support other demonstration projects to let interested parties know of opportunities available to them.

The project will also work with an Urban Management Specialist located in Faribault County. This position is funded by a Clean Water Legacy grant through the Greater Blue Earth River Basin Alliance. This position primarily deals with urban management issues such as storm water issues.

D. Program Element 4. Water Quality Monitoring/Implementation and Evaluation Assessment

This program element includes the establishment and maintenance of a continuous watershed monitoring network. The project will collect and analyze water quality and flow data at two sites in Blue Earth County. The first site was previously monitored in Phase I and we have reestablished it in 2003 the other one was just established during the 2006 monitoring season. The original site is in the lower reach of the Maple River located on Blue Earth County 35 (0.3 mi. west of Blue Earth County 16). The

upper site established in 2006 is located on Blue Earth County 18 (0.4 miles east of Blue Earth County 1). Water quality monitoring has been and will continue to be coordinated with MPCA's Mankato field office. They will also evaluate the water quality data that is collected.

The Citizen Stream Monitoring Program will be incorporated into the monitoring element with a network of citizen stream monitors and students to provide additional monitoring throughout the Lower and Upper Maple watersheds. A banquet will be held in the spring to show appreciation for the Citizen Monitors and review data collected by the monitors. This Citizen Stream Monitoring network will work together with the other networks that are being established and reestablished in the Greater Blue Earth River and Le Sueur River Watersheds. Continually monitoring the watershed will lead to water quality improvements

1.) Benthic Macro-invertebrate Sampling

In 1972 the Clean Water Act declared as its objective the restoration and maintenance of the chemical, physical and biological integrity of the nation's water. This section of the work plan will specifically deal with biological integrity. The Clean Water Act defines Biological integrity as "the ability of an aquatic ecosystem to support and maintain balance, integrated, adaptive community of organisms having a species composition, diversity and functional organization comparable to that of the natural habitats of a region." Since few (if any) unimpacted water bodies exist today, biological integrity in surface water is based on "least impacted" conditions which are used to guide restoration and protection programs.

Freshwater biological monitoring has generally been focused on species diversity (the number of different species present), individual abundance (number of representatives of a single species), and their feeding level (carnivore, herbivore or filter feeder).

Benthic macro invertebrates (spineless organisms) have been used as indicator organisms for decades. Some macro invertebrates are more sensitive to pollutants than others. Mayflies (*Ephemeroptera*), stoneflies (*Plecoptera*) and caddisflies (*Trichoptera*) are generally much more sensitive to pollution than leeches (*Erpobdellidae*), snails (*Pupillidae*) and bloodworms (*Chironomidae*). The Percent pollutant sensitive organisms, % EPT (mayflies+ stoneflies + caddis flies), is an important indicator of water.

There are advantages to using benthic macro invertebrates. They are good indicators of localized conditions, they have limited migration patterns, have sensitive stages that respond quickly, are relatively easy to identify at the family level, have a broad range of pollution tolerances, have numerous feeding types (predator, prey, scrapper and filter feeder) and are currently being used for rapid biological assessment by the Environmental Protection Agency (EPA).

The benthic macro invertebrate composition will be monitored at 4-6 sites in the Maple River Watershed for three years. Samples will be collected using D-nets and artificial substrates.

2.) Citizens Stream Monitoring Program “Plus”

A CSMP “Plus” program will also be piloted. This program will have select volunteers collect water samples at specific locations for predetermined lab analysis. This effort will develop a better relationship between transparency and lab tests. This should provide a more comprehensive stream monitoring program. Sediment boxes will also be used, particularly in relation to riparian areas that have and have not been buffered.

We will use eLink to report and evaluate management strategies and estimate pollution reduction benefits from our implemented conservation practices.

D. Program Element 5. Promote Existing Programs that will help Manage the Riparian Corridor

Riparian Corridor Management refers to how we take care of the land immediately surrounding the river in a way that is beneficial to the river and the wildlife that depends on it. Managing this area of land is vital towards the restoration of the river system in the Maple River Watershed. The area of interest will be 1,200 feet on either side of the Maple River and its tributaries. Improvements will be recognized with an increase in water quality, wildlife habitat and wildlife abundance. A series of maps developed for Phase II B will be used to target areas of special interest. The Conservation Reserve Program (CRP) will be recommended to as many landowners as possible. The installation of filter strips and riparian buffers will be a crucial part of this program element. The coordinator will make landowner contacts to encourage landowners to plant riparian buffers and enroll into the CRP program.

F. Program Element 6. Technical Staff Assistance

Blue Earth County SWCD will continue to be responsible for the supervision of the full time coordinator who will work on this project. This individual will work directly with the area's landowners to implement the management practices mentioned in the work plan. The coordinator will also be responsible for the tracking the management practices and evaluating their effects on the watershed.

VI. Quality Assurance Plan for Construction Activities

NRCS technical standards will be used. These standards have and will continue to follow state cost-share guidelines.

VII. Best Management Practice Operation and Maintenance Plan

The most current state cost-share contracts will be used. These contracts include an operation and maintenance plan and regular checks of the BMP before, during and after implementation.

VIII. Monitoring and Modeling Plan

The Maple River Clean Water Partnership monitoring program is designed to set reference levels for water quality parameters in the Maple River Watershed and to determine if the programs actions have changed the water quality. Listed below are brief descriptions of the projects monitoring objectives.

1.) Monitoring Objectives:

- Establish a sufficient baseline and continue to collect water quality data in the priority management area as defined in Phase 1, and to assess the project's effectiveness.
- In efforts to increase public awareness, utilize and expand upon as needed the citizen rain gauge network and MPCA Citizen Stream Monitoring program.
- Determine the most effective areas for water quality improvements in the Maple River watersheds.

- Program Coordinator will continue to assist with monitoring efforts.
- Water quality data will be collected and processed and displayed on the project's website
- Our monitoring plan will follow the guidelines that the Minnesota River Basin set for water quality monitoring.
- Define any information needed for water quality monitoring and methods used to evaluate information.
- Set data requirements for meaningful modeling and analysis.

Monitoring Protocol:

- A revised Quality Assurance Project Plan (QAPP) will be developed for Phase II B of the project.
- I.D. tabs, specific analytical methods, labs quality assurance, cert. Number:
- Outline a plan to analyze monitoring and land use data to assess project effectiveness.

IX. Public Participation Plan

Efforts will be made to involve citizens in the project through review of the work plan, community meetings, and the following media resources:

- Newspapers:
 - Faribault County Register
 - Mankato Free Press
 - Mapleton Messenger
 - Wells Mirror
- Newsletters
- Brochures
- Fact sheets
- Radio Spots: KTOE
- Website Postings: Blue Earth County
- Community Service Announcements
- Revision of established website as needed.

X. References

- A Framework for the Economic Analysis of Ditch System Management Alternatives, 2005
- County Ditch 3, Comprehensive Drainage Systems Management Plan, 2005
- Minnesota River Basin Plan, 2001
- Judicial Ditch 10 Wetland Restoration Project, 2006
- Le Sueur River Implementation Framework Work Plan, 1996
- State of the Minnesota River Report, Summary of Surface Water Quality Monitoring, 2003

XI.) Milestone Schedule:

Key for Timeframe:

- SP (Spring) = March, April, May
- SU (Summer) = June, July, August
- F (Fall) = September, October, November
- W (Winter) = December, January, February
- 06 = Year 2006
- 07= Year 2007
- 08= Year 2008
- 09=Year 2009