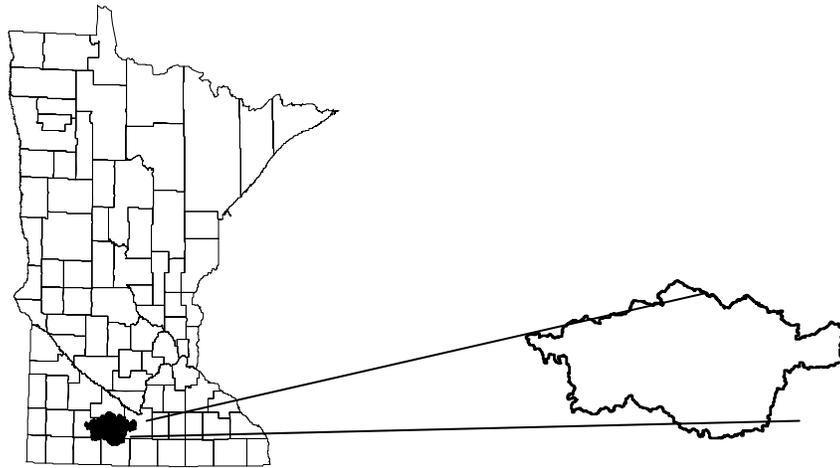


**WATONWAN RIVER WATERSHED
PHASE IIB PROJECT IMPLEMENTATION – FINAL REPORT**

2004-2008



Submitted by:

**Watonwan County Environmental Services
June 2008**

WATONWAN RIVER WATERSHED PROJECT – PHASE 2B FINAL REPORT

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WATONWAN RIVER WATERSHED CLEAN WATER PARTNERSHIP- PHASE 2B FINAL REPORT

I. PROJECT OVERVIEW – EXECUTIVE SUMMARY

The Watonwan River Watershed is 851 square miles in area (544,543 acres). The watershed lies in south-central and south-western Minnesota, and includes a major portion of three counties (Blue Earth, Watonwan, and Cottonwood counties), and smaller portions of other counties (Jackson, Brown and Martin). The Watonwan River system includes about 311 miles of perennial streams, and 57 miles of intermittent stream channels. The mainstem of the Watonwan River is about 113 miles in length, with its headwaters in Cottonwood County (about 9 miles NW of the town of Bingham Lake). The mouth of the Watonwan River is near the town of Garden City, in Blue Earth County. The Watonwan River drains into the Blue Earth River, which in turn is a major tributary to the Minnesota River at Mankato.

The Watonwan River Clean Water Partnership Phase 2B project was an implementation project. Phase 2A occurred during the 2000-2004 timeframe. The Phase 2B project, as reflected in this report, covers the timeframe of 2004-2008.

The project structure and management was comprised of a work group that included staff from the 5 Counties Soil and Water Conservation Districts and NRCS offices working in the counties. The project was sponsored by Watonwan County Environmental Services Director Bruce Johnson and Department Technical Assistant Julie Sulflow. Work group sessions that varied in attendance were held to prepare the work plan and budgets. A work group meeting held to discuss the final distribution of the budget was held on September 2, 2004. A nonpoint source work group met on an as-needed basis to review work plan status, develop projects, and share conservation implementation strategies. This work group consisted of SWCD technicians and county water planners. Other personnel who attended these meetings included BWSR staff. The project did not hire a part time or full time watershed project leader/coordinator or technician.

Political leadership for the project came through project sponsorship by the Watonwan County Board. Through much of the 2006 to 2007 timeframe, the Watonwan SWCD did not have a board of supervisors. A turnover in the lead conservation technician position had also occurred. These factors affected the overall number of BMPs installed, causing a downward trend compared to Phase 2A. These factors may also have

diverted focus away from a basic land and water conservation message, for a temporary period during the SWCD board replacement process.

From evaluation of the successes and the interest in implementation coming out of the 2000-2004 project, it was determined that the education projects and the efforts that had been begun to modernize drainage information would be continued. It was also deemed important that the work group continue to seek wetland sites that could be developed for purposes of holding water that would otherwise rapidly be carried to surface water.

There was also considerable interest, particularly in Cottonwood County, in the construction of roof structures over open cattle lots that had a history of runoff problems. It was agreed that the project would provide assistance to such projects as they were designed and approved. The insulation proposed for these projects for completion of new monoslope roofs, designed to cover the open areas of the lots for the purpose of diverting rainwater away from contacts with manure. The Phase 2B contribution to the project facilitated the water diversion devices in becoming utilizable.

The incentives for alternative tillage and cropping practices that had previously been supported were removed for Phase 2B. The incentives that had been paid out had created some conversion to continued use of alternative practices, but crop production and market economics were seen to be overriding the incentive payments.

The school grant program was considered to have been a success in Phase 2A, and the consensus was that it should be continued. This effort had proven to be effective in forging relationships between area educators and students with conservation and water quality improvement staff in the Soil and Water Conservation Districts and County departments. Upon being offered through the Phase 2B project, it created excellent levels of participation. There were 9 schools involved and a total of 20 educational projects completed during this timeframe.

Water quality monitoring remained as important elements of the project. Water sample collection near the mouth of the Watonwan River (near Garden City) has been done consistently from 2000-2008. Flow data at the outlet monitoring site was provided by the USGS. Additionally, the efforts of an active and enthusiastic Citizens Stream Monitoring group have provided other stream water quality data from various stream sites up and down the watershed.

Watonwan Watershed – Water Quality Summary

Stream water quality monitoring was conducted for this watershed project using two basic methods. The first method is the Citizens Stream Monitoring Program (CSMP). The second method was the standard use of fixed-stream monitoring stations with specific equipment to measure stream stage. Each is summarized below.

Citizens Stream Monitoring Program (CSMP)

The CSMP is a volunteer stream monitoring program, administered by the Minnesota Pollution Control Agency (MPCA). Citizen volunteers use a simple transparency tube and measure / record water transparency data for a given stream, at a specific location. The volunteers are also recording water appearance and recreational suitability, as well as a qualitative estimate of stream stage. The program is further described at: <http://www.pca.state.mn.us/water/csmp.html>.

The following table summarizes a superb effort by many individuals across the Watonwan Watershed for over 7 years.

Table. Watonwan Watershed Citizen Stream Monitoring Program – numbers of volunteers, stream sites monitored, and individual data (n) collected by year, 2000-2006.

Year	# Vols.	# Sites	n
00	3	3	57
01	11	14	382
02	14	17	400
03	9	10	315
04	8	8	291
05	12	13	430
06	9	10	382

While extensive data analysis has not been conducted, it has been shown that transparency varies according to stream size, and rainfall-runoff patterns. Stream sites with smaller drainage areas can show depressed transparency, but the ‘transparency recovery’ period is of shorter duration. Stream sites with larger drainage areas show consistently lower water transparencies (< 25-30 cm) that last longer.

The continuation of this critical method of stream monitoring will allow for more detailed trend assessments in the future, taking into account various landuse and stream factors.

Fixed-Stream Monitoring Stations

From 2000 through 2003 monitoring seasons, there were five fixed stream monitoring stations in the Watonwan Watershed. This included three sites on the mainstem Watonwan River, one at the South Fork Watonwan River, and the main outlet site at Garden City. For more information, please consult the State of the Minnesota River reports (Minn. River Basin Data Center web site – see reference section), and the Phase 2A Watonwan River Watershed Report.

These stream sites were equipped with water level recording devices, which continually log the stream stage. Measurement of stream discharge at a variety of stages then allows the development of a stage-discharge relationship, which converts stage (feet) to flow (cubic feet per second, cfs). Water samples collected during a variety of flow conditions then allows for a pollutant load (mass, i.e. pounds) estimate.

In general, from 2000-2005, the Watonwan River at Garden City exhibited the following flow-weighted mean concentrations (FWMC), as reported in the State of the Minnesota River reports.

Table. Watonwan River outlet @ Garden City, Flow-weighted mean concentrations for TSS, NO2+NO3-N, TP and OP, 2000-2005.

<u>Pollutant</u>	<u>FWMC (mg/L) Median</u>
Total Suspended Solids (TSS)	150
NO2+NO3 – Nitrogen	11
Total phosphorus (TP)	0.3
Ortho-phosphorus (OP)	0.15

Compared to the other major streams in the Greater Blue Earth Basin (GBEB), the Watonwan is similar to the LeSueur and Blue Earth rivers for the NO2+NO3 nitrogen and TP, exceeds the other streams for OP, and is less for TSS. Specific trend assessments for the Watonwan River watershed sites have not been conducted. However, it is likely that the general trend as observed across the Minnesota River Basin over 30 years, of increasing NO2+NO3-N, and decreasing TSS and TP, may also be occurring to some degree for the Watonwan. Pollutant loads for the Watonwan watershed tend to be less than the other GBEB streams, likely due in part to less precipitation and runoff, and a somewhat flatter topography.

For both stream monitoring methods employed by this project, the need for consistent, long-term data has been demonstrated, and is critical to determine stream and watershed health.

BMP Summary

Over the 2004-2007 period which would encompass the Phase 2B project, 481 water quality related projects were reported and entered on to the BWSR data base as having been implemented in the Watonwan River Watershed in 5 counties. These projects received financial assistance from numerous sources.

These 481 included wetland restoration and enhancements, water storage ponds, the adoption of alternative cropping practices, grassed waterways and filter strips, feedlot runoff controls, sealing of abandoned wells, streambank stabilization, the installation of alternative tile intakes and other practices.

The 481 projects were installed at a cost of \$1,719,578 and are credited with creating reductions of 4,107 tons/yr in soil loss, 8,899 tons/yr of sediment and a reduction in phosphorus and 15,703 lbs/yr of phosphorus.

Refer to the Elink BMP Summary Spreadsheet in the attached file and also located on a CD.

II. PROJECT WORKPLAN SUMMARY

The Phase IIB workplan for this project is dated March of 2006 and is on file at the Watonwan County ES office in St. James.

The overall work plan budget was \$256,820.07. Match for the CWP grant was provided by both ISTS loan repayments and inkind contributions by landowners and LUGs.

As the Phase 2A plan drew to completion, project personnel were informed that the Watonwan had been approved for Phase2B continuation funding. The Phase 2A workplan was reviewed. Project work group members met and expressed their needs regarding specific projects that they had in mind and had potential for.

The basic project elements of the Phase 2A were brought forward. As budgeting was done, it was desired that a considerable allocation be made to hydrology and water retention pond storage. Along with cost share funds being made available, it was seen as desirable that counties

be supported in efforts to inventory and modernize local drainage information systems.

Nutrient management was carried forward as a priority of the project. Much of what would be carried out under this element would be dependent on the level of increasing requirements of stakeholder as they were to be required by the Minnesota State Legislature and the MPCA. Increased requirements would be likely to move more nutrient management activity to the private sector. The USDA/NRCS nutrient management plan program was also seen as possibly filling more of this function. The Greater Blue Earth Basin Alliance will be addressing nutrient management through its projects.

Cottonwood County and Cottonwood SWCD had considerable interest in roof structures for cattle feed yards, and it was therefore determined to be necessary to continue feedlot cost share.

The self-determined school grant program that had come forward out of the Phase 2A project was continued on the consensus of the work group. Important relationships had been developed and school staff members were on record as supporting the continuation of the grant program.

Citizen stream monitoring efforts were scheduled to continue, and MPCA would continue to guide the monitoring of stream water at the mouth of the Watonwan, near Garden City.

Cluster septic systems were in planning for Long Lake in Watonwan County and Fish Lake in Jackson County and support for those efforts was written into the work plan.

Watonwan County would continue to fill the fiscal management and coordination of the project.

III. PROGRAM ELEMENT HIGHLIGHTS

The following provides a general summary of project activities, in narrative format, and organized by work plan program element, for the Phase 2B of the Watonwan River Water Implementation Project. The timeframe for these activities is 2004-2008. More specific information about each area is contained in the appendix to this report. If further detailed information about a certain practice or work activity is needed, please contact the Watonwan County Environmental Services Office in St. James.

Program Element 1 – Hydrology/Wetlands/Water Storage

Project funds supported the construction of a sediment basin site at the outlet of a tile system in Watonwan County in 2005. This series of 6 basins was installed to hold back sediment that was flowing over land to open drainage ditch at a significant rate at the outlet of drain tile. In 2006, a tile outlet that fed an existing restoration site in Cottonwood County that had been supported by the 2000-2004 project was repaired. In 2007, the City of Mountain Lake was supported in the restoration of a severely eroded recreational area along Mountain Lake. Two large restoration sites in Martin County were supported and a restoration site in Blue Earth County is being studied and is being planned for 2008.

Three public drainage systems were selected, by the project, and through the county drainage authorities, for an implementation planning and demonstration project.

Table. Implementation Planning and Demonstration Project – Selected Public Drainage Systems for Watonwan Watershed Project, Phase 2B

<u>Drainage System</u>	<u>Acres</u>	<u>Miles Ditch</u>	<u>Miles Tile</u>
Watonwan Co. JD-35 (Outlet: South Fork Watonwan River)	7,493	1.8	33.5
Cottonwood Co. CD-21 (Outlet: JD1 to stream to Irish Lake to SF Watonwan River)	1380	1.3	6.1
Cottonwood Co. JD-22 (Outlet: NF Watonwan River)	7600	0	3.8

The objectives of this element were to create an accurate and accessible inventory of existing drainage infrastructure in these systems. The information is intended to be made available for the purpose of investigating alternatives to traditional repairs and maintenance measures and as a tool to be utilized in the design and construction of controlled drainage projects, should there be interest in controlled drainage at some future date. In Watonwan County, this element is seen as a starting point for a comprehensive drainage inventory. The intent in Cottonwood County was to acquire an engineering analysis of 2 drainage systems on their potential for water storage projects. Limited progress was made on the two systems in Cottonwood County. Cottonwood County. Cottonwood County personnel chose not to utilize grant funds that were made available for this effort.

For the Watonwan County CD-35 demonstration project, staff embarked on a project for the purpose of modernizing existing drainage information for the purpose of enabling sound drainage management and decision making, including the study of alternative drainage and water retention methods such as controlled drainage, wetland restoration and sediment basins. This improvement in records and information capabilities will hopefully be useful on identifying potential sites for alternative practices.

Refer to Appendix A-7 Watonwan County-Public Drainage Systems/Demonstration Implementation Project Status Report.

Also refer to other related articles in Appendix A.

Total Project Costs: \$92,076.73 Inkind: \$18,225.00

Program Element 2 - Surface Tile Inlets

Seventeen tile intake modifications were supported financially from 2004-2007.

Total Project Costs: \$3,578.40 Inkind: \$850.00

Program Element 3 – Crop Residue Management/Upland Erosion

One shelterbelt in a critical upland location was supported in 2005.

Refer to related article in Appendix B.

Total Project Costs: \$1,000.00 Inkind: \$350.00

Program Element 4 – Nutrient Management

No further nutrient trials were conducted after 2004. University of Minnesota Extension continues to utilize the information obtained in the earlier project.

During the Clean Water Partnership Grant period, the University of Minnesota Extension, Departments and other state agencies in MN were very involved in trying to assess the Best Management Practices (BMP) of manure and nutrient applications to the land which would be economical yet environmentally safe. Many on-farm demonstrations and research plots were conducted in the Watonwan and Blue Earth watersheds. These demonstrations included proper application rates of livestock manure and Nitrogen fertilizer for corn.

The information which was documented from these sites were used to help educate area producers about these manure and nutrient BMP's through field tours, area meetings and news releases. The material was also used in compiling useful field documentation to formulate regional BMP nutrient recommendations from the University and other state agencies.

The field demonstrations and research during this time period has helped producers realize the importance of correct nutrient application rates both for an economic reason and to protect the environment.

Publications and web sites that were created including some of the watershed educational and field demonstration data were:

Best Management Practices for Nitrogen Use in South Central MN:
<http://www.extension.umn.edu/distribution/cropsystems/DC8554.pdf>

Manure Educational web sites at the UM:
<http://www.extension.umn.edu/Manure/>
<http://www.manure.umn.edu/>

Manure Application:
<http://www.manure.umn.edu/applied/application.html>

Total Project Costs: \$0

Inkind: \$0

Program Element 5 – Streambank/Streamside Management

Repairs to an existing streambank stabilization project in Watonwan County was supported in 2005. No additional streambank projects were supported.

Refer to related articles in Appendix C.

Total Project Costs: \$858.00

Inkind: \$140.00

Program Element 6 – Feedlot Upgrades

The feedlot waste control projects were supported in Cottonwood County over the course of the project. Roof structures were placed over open lots to direct rainwater from contact with the manure in the lots. These were new roofs that were being supported by other cost share sources. Project funds were used to supplement those funds in these efforts to remediate manure runoff conditions.

Refer to related articles in Appendix D.

Total Project Costs: \$15,000

Inkind: \$3,600.00

Program Element 7 – Education & Information

Twenty self-designed and determined school grants were supported during the project involving nine schools.

There were thirteen educational events supported by the project including booths at the Watonwan County Fair sponsored jointly with Watonwan Soil and Water Conservation District, local Green Saturday celebrations as well as support of the Prairie Ecology Bus being present at the Watonwan County Fair each year of the project. The Prairie Ecology Bus was also sponsored as a part of the school grant program.

Blue Earth County has commissioned the development of durable signage to be placed at important landmarks along the Watonwan. The signs located in the Watonwan River Watershed in Blue Earth County will be educational. They will include maps of the entire watershed area, relationship of the Watonwan River to the entire Greater Blue Earth River Basin and area historical items. The area of the signs are on a canoe route, a map of which will be included.

Refer to related articles in Appendix E.

Total Project Costs: \$42,089.71

Inkind: \$8,185.00

Program Element 8 – Water Quality Monitoring

Throughout the Phase2B project, extensive monitoring was continued near the mouth of the Watonwan River near Garden City in Blue Earth County. The Blue Earth SWCD and the Maple River Clean Water Partnership project staff assisted the Watonwan project in this effort. Pat Baskfield of the Minnesota Pollution Control Agency, has indicated that the agency will continue to monitor the site beyond 2008, as part of the State's overall watershed outlet load monitoring program.

Water quality monitoring data is included as spreadsheets on the Project Report CD.

Stream sampling and monitoring methods were consistent with those undertaken during Phase 2A, and those of other major Minnesota River tributary projects. Lab analysis was conducted at Minnesota Valley Testing Laboratory (MVTL) in New Ulm, an MDH-certified lab. More detailed descriptions of the water sampling methods are contained in the

State of the Minnesota River report series (see reference section for MRBDC web site), and in project-related files at Watonwan County ES and/or the MPCA's Mankato office.

Water sample collection for P2B was coordinated with the Maple River Watershed Project. One technician would collect samples from both Maple River stream sites, and the mainstem Watonwan River at Garden City, before driving the samples directly to MVTL at New Ulm for prompt analysis. Samples were collected from April 1st to late September or October of each year.

Selected data is provided in Appendix H-7 for stream water quality data for the Watonwan River at Garden City. Data collection was continued at this site from 2000 – 2008. The USGS maintains a river flow monitoring station at this site, and so combining the flow and pollutant concentration data provides a pollutant load estimate. A review of these data contained Tables 1 – 6 illustrate the following points:

- Water volumes varied from 3 – 21 cubic feet x 10⁹. Seasonal runoff values varied from 1-10 inches.
- Water samples were collected from the bridge deck with a rope and open bucket, with the number of samples ranging from 18-65 / monitoring season.
- Total suspended solids (TSS) is a parameter that estimates inorganic and organic solids from the stream water column. Loads ranged from 14 – 65 tons x 10³.
No increasing or decreasing trend is discernable.
- Nitrite+Nitrate nitrogen flow-weighted mean concentrations ranged from 9 – 12 Mg/L. An estimated yield for these nitrogen compounds ranges from 3 to 25 pounds per watershed acre of land.
- Total phosphorus (TP) concentrations ranged from 0.18 to 0.34 mg/L, while ortho phosphorus (OP) ranged from about 0.10 to 0.25 mg/L. The OP/TP ratio ranged from 40-80%. There is no discernable increasing or decreasing trend for these parameters, based on the seven years of data presented.
- Citizen stream monitoring program data was also collected across the Watonwan watershed by a corp of dedicated volunteer stream monitoring folks (see Appendix-H-4).

Refer to articles in Appendix H.

Total Project Costs: \$27,424.52 Inkind: \$0

Program Element 9 – ISTS Program/Cluster Septic Systems

Project funds were utilized to obtain bond opinions that enabled the counties in the Watonwan Watershed to access low interest loan funds for on-site septic system upgrades. Across the Watershed, \$1,626,814.73 in loan dollars was distributed, facilitating upgrades for 263 residences from 2000 through 2007 in 6 counties. From 2004 – 2008, 102 ISTS upgrades were done via the loan program.

A clustered system serving 19 residences and seasonal lake properties on Long Lake in Watonwan County was constructed in 2005. The project provided financial support for the development of the project design and a sizable number of the property owners utilized Clean Water Partnership loan funds.

Refer to related articles in Appendix F & Appendix I.

Total Project Costs: \$9,500.00 Inkind: \$1,626,814.73

Program Element 10 – Project Management/Fiscal

Meeting costs, the purchase of office supplies, postage, administrative and clerical services provided by Watonwan County Environmental Services, along with technical services provided by Watonwan SWCD were supported. In the Phase 2A project, technical services on general water quality work carried out within the watershed had been supported in the Soil and Water Conservation Districts. In Phase 2B, Watonwan County Soil and Water Conservation District submitted requests for technical services support for 2005 and 2006 for water quality related projects within the watershed.

Watonwan County Environmental Services was supported as provided for in the project budgets as arrived at and approved by the project work group.

Total Project Costs: \$48,942.71 Inkind: \$0

Program Element 11 – Urban Activity

Funds from the project have been allocated to the City of Mountain Lake for improvement of run off control on the trail system around the lake. The City of Mountain Lake will be installing 2 rain gardens at erosion

prone locations on the Mountain Lake recreational trail on the lake. Signage will be included explaining the function and benefits of rain gardens and crediting the Watonwan River Watershed project as a supporter.

Refer to related articles in Appendix G.

Total Project Costs: \$9350.00 Inkind: \$2,100.00

Program Element 12 – Recreational

The previously referred to signage that is being commissioned by Blue Earth County will serve as a key recreational location by the Watonwan Stop site in Blue Earth County.

Total Project Costs: \$7,000 Inkind: \$ 600.00

OVERALL PROJECT COSTS:	256,820.07
OVERALL INKIND COSTS:	1,660,864.73

OVERALL PROJECT & INKIND COSTS:	\$ 1,917,684.80
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- IV. PROJECT EXPENSE REPORTS – REFER TO ATTACHMENTS**
- IVA. SUMMARY EXPENSE BUDGET UPDATE (FINAL EXPENSES)
- IVB. DETAILED FINAL EXPENSES LISTING

V. PROJECT CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE EFFORTS

As the project concluded, it is difficult to define success without some perspective on its beginnings being offered.

A phase 2 CWP implementation grant application was prepared with assistance from the main counties of the watershed, and the MSU-M, Water Resources Center. The implementation grant proposal was reviewed, and then approved by the MPCA. Watonwan County was the project sponsor. There surfaced some disagreement among members of the original work group and the staff of the funding agency over coordination of the project. There was concern over whether it would be best to seek and hire a full time coordinator for the project or if it could be guided by the workgroup, led by Watonwan County staff. A lack of experience on the part of the designated project representative seems in retrospect to have been a legitimate concern and through the 8 years of the combined projects has remained a part of the discussions over it. On

one hand, a full time coordinator position would have taken up a considerably greater portion of the project budgets; leaving less for implementation support. On the other, an experienced and focused coordinator, had one been recruited to the project, whose sole responsibility and purpose as a watershed project employee, could well have established identity as a project flag bearer, educator and salesperson. Such a person could bring skills, ideas and perspectives to a project that may not exist locally. The project sponsor decided not to hire a dedicated watershed project coordinator or technician. The best recommendation that can come out of all of that may be that those responsible for the review and approval of grant applications and awards take steps to assure that they are well informed and aware of the level of experience and expertise that is desired, as seen in terms of what is present and what is available, as projects are established and awarded. There would be some desirability for more coordination activities to be carried out cooperatively for the purpose of a unifying vision and better ongoing awareness of in-project implementation possibilities. In the case of the Watonwan River Watershed, there has been the ongoing efforts to organize the Greater Blue Earth Watershed. There had been hope expressed at an early stage of the Phase 2A project that the Greater Blue Earth, once organized at that scale, could employ a full time coordinator who could take on responsibility for coordination of the Watonwan River Project also. Upon the Greater Blue Earth River Basin Alliance coming into being, the Watonwan Phase 2B project was in motion and the policy board of the GBERBA organization elected to hire a part-time coordination team.

The decisions on the part of the project funders to include a generous level of low interest loan funds for septic system upgrades within the watershed is considered to have been a good one by the county officials and staff who worked with the project and with the citizens of the counties who utilized the loan programs. These loan programs were a compliment to the implementation grants that put a face on the project and supplied some valuable credibility for the project and environmental efforts in general within the watershed and counties. While it was hoped with the inception of the loan program that the county officials within the watershed would have been encouraged by a successful loan program to establish a local revolving loan fund upon the completion of the project, that was not accomplished in Cottonwood and Watonwan Counties where the considerable majority of the loan funds were distributed. A useful recommendation for future projects may be the requirement of a resolution from participating counties, stating that any loan funds for septic systems that were provided in a project be considered as a spring board to a permanent county loan program.

In conclusion, the successes of the project lie in the connections that were made between landowners, citizens, educators, students and

conservation personnel through the various projects and practices that were completed and constructed.

It is regrettable that the work being done to deliver information to encourage and facilitate sound management of, and potential alternative solutions to agricultural drainage was not more successfully implemented earlier in the project. The project administrator should have been more insistent that the original project intern exhibit a higher degree of commitment and sought to seek a replacement sooner when it became evident that such commitment would not be forthcoming. It is also unfortunate that Cottonwood County, at the source of the Watonwan River system and containing a number of its most critical sub-watersheds, chose not to utilize grant funds that had been made available to them for pilot work for drainage system demonstration and water storage implementation.

Future projects in the Watonwan River Watershed will be most certain to address active Total Maximum Daily Loads (TMDL's). Local water plan and land use requirements for wastewater treatment that treat bacteria are enhanced when loan funds are available. Nutrient management will continue to be a very important part of addressing the fecal coliform TMDL in the Greater Blue Earth Rivers Basin and county and state efforts to educate and seek compliance with setbacks and adoption of application rate recommendations should be supported. As information and data continue to be gathered on drainage infrastructure in the watershed, it would be desirable if future projects, particularly those projects that address turbidity and sediment TMDL's were developed to provide financial incentives for easements and structure that hold water on the land.

The project work group and project coordinating staff greatly appreciate having had the opportunity to work in this project. Progress was made in growing awareness of surface water quality issues and hopefully the best management practices that were implemented will leave a lasting improvement on the Watonwan River and its receiving waters.

References and Pertinent Literature / Reports

Lorenz, D. L. and Gregory A. Payne. 1991. Selected data for stream subbasins in the Watonwan River basin, south-central Minnesota. U.S. Geological Survey, OFR 91-61. Minnesota Office, St. Paul, Minnesota.

USDA, 1973. Watershed Work Plan, Upper Watonwan River Watershed. Brown, Cottonwood, and Watonwan Counties, Minnesota. (prepared under the authority of P.L. 566 – State NRCS office, St. Paul)

Magdalene, Suzanne Carole Clark. 2004. From Field to Stream: Rapid Runoff through Agricultural Tile Drainage Systems within the Minnesota River Basin. PhD Thesis, University of Minnesota, Graduate School.

Minnesota River Basin Data Center web site – See Watonwan River Watershed, Phase I Report, as well as the State of the Minnesota River Reports.

<http://mrbdc.mnsu.edu/>

Watonwan County Public Works site for drainage/related maps.....

<http://www.co.watonwan.mn.us/departments.aspx?Id=97749b2d-c151-47a7-abce-56acfb31acaa>

VI. LIST OF APPENDICES

*** = Hard Copy Only – Refer To Manual**

A) PE1-Hydrology/Wetlands/Water Storage

- 1) Wes Beck – Water Sediment Basin/Tile Outlet (**no pictures**)*
- 2) Jon Penner – Pond Outlet Repair (Cottonwood County)
- 3) Trail Erosion/Water Control (Cottonwood County) **also refer to Appendix G-1**
- 4) Urban Forest Planting Project- Cottonwood County (**See request form – Fall of 2008**)*
- 5) Roger Bentz – Wetland Restoration (Martin County)
- 6) LeRoy Prochniak – Wetland Restoration (Martin County)
- 7) Watonwan County – Public Drainage Systems – Demonstration Implementation/Project Status Report

B) PE3 – Crop Residue/Upland Erosion

- 1) Bruce Hultgren – Windbreak/Shelterbelt Renovation *

C) PE5 – Streambank/Streamside Management

- 1) Charles Stradtman – Sediment Basin Repair Project *
- 2) Jon Wiederhoeft – Streambank Repair *

D) PE6- Feedlot Upgrades

- 1) Darold Evers – Ag Waste System

E) PE7 – Education & Information

- 1) Butterfield Public School/Ecology Bus *
- 2) Habitat Workshop *
- 3) Madelia Elementary/Environmental Hands-On Studies *
- 4) Meadow Lark Learning Center/Native Seed *
- 5) Truman Public School/Ecology Bus Program *
- 6) District 88 Schools/New Ulm/Big Cottonwood River Basin Study (**see request form – no report received**)*
- 7) Meadowlark Learning Center/Observation Dock Installation
- 8) Meadowlark Learning Center/Dock Parts
- 9) Truman Public School/Aboretum *
- 10) Educational Tool (Cottonwood County) *
- 11) Mountain Lake Trail Project/Tree Planting *
- 12) New Ulm Public School/9th Grade Field Trip (**see request form – no report received**) *
- 13) Winfair Elementary – Children’s Festival (**see request form- no report received**) *
- 14) Mountain Lake Public School/Winter Session
- 15) Butterfield/Odin School/Water Quality & Soils *

- 16)New Ulm High School/Sample Flowing Water Systems
(see request form – no report received) *
- 17)Madelia Elementary School/1st & 2nd Grade Project *
- 18)Mountain Lake School/Water Quality
- 19)Truman Elementary School/Prairie Ecology Bus *
- 20)Windom Public School/Des Moines River Water Quality
Project **(see request form – no report received) ***
- 21) Madelia High School/Blue Thumb Stream Team Project –
**(see request form/project completed Fall of 2008 -
received pictures of equipment used) ***
- 22)Windom School – Water Project - **(Fall 2008)Jeff Huska ***
- 23)Green Saturday
- 24)Ecology Bus Summary
- 25)Madelia Elementary–Ecology Bus Env. Studies *

F) PE9 – ISTS Program/Cluster Septic System

- 1) Long Lake Cluster Septic System Project
- 2) ISTS Loan Dollars by County (SRF0108)

G) PE11-Urban Activity

- 1) Trail Education & Erosion Control Project **(pictures on CD) ***

H) Newspaper/Information Articles

- 1) 1/18/05 Discussion/Presentation to Watonwan County
Board of Commissioners *
- 2) 2005 Cottonwood SWCD Annual Report *
- 3) 2007 Watonwan SWCD Annual Newsletter *
- 4) CWP Monitoring Poster Project
- 5) 4/29/08 CSMP Banquet Articles/Photos
- 6) Watonwan River Major Water Implementation Project
Article
- 7) Watershed Outlet Site at Garden City/Water Quality Data

I) Watonwan River CWP Maps

- 1) CWP ISTS Loan Map (Watonwan County)
- 2) BMP/Easement Maps from Eric Mohring (BWSR)
 - a) Active Conservation Easements
 - b) Conservation Easements
 - c) BMP's in Watonwan River Watershed

J) Project Items on CD/Folder

- 1) Phase 2B Final Report (**includes CWP Phase2B Final Report, Summary Expense Budget Update, and Detailed Final Expenses Listing**)
- 2) Phase 2B Appendices (**includes project pictures and/or articles included in appendices listing in Final Report**)
- 3) Phase 2B Pictures (**includes pictures of projects completed during Phase 2B**)
- 4) Water Quality Tables (**Watowan Watershed Monitoring Data Tables**)