Prior Lake-Spring Lake Watershed District
Wetland Demonstration Project Final Report
December 1997

I. INTRODUCTION

A. Description of Project Area: The Prior Lake-Spring Lake Watershed District (District) is a watershed of the Minnesota River. The watershed is located entirely within Scott County, Minnesota, some 20 to 30 miles southwest of Minneapolis. This section of the state is within the North Central Hardwood Forest Ecoregion (NCHFE). The District is relatively small in area, 42 square miles, and shares most of the nonpoint pollution source (NPS) problems found in the Minnesota River basin: developed (urban runoff), developing (construction site runoff), and agricultural (farm fertilizer runoff). These (examples of) NPS pollutants as well as other past land impacts such as wetland draining and filling adversely effect the quality of the District's water resources

The most significant waterbodies within the District include Upper and Lower Prior, and Spring Lakes. The area which the program focuses on is a 9.7 square mile subwatershed, except for public education efforts which target the entire watershed. This subwatershed (Southwest Spring Lake) drains northeasterly to Spring Lake via County Ditch 13. Spring Lake drains to Upper Prior Lake which in turn drains to Lower Prior Lake.

The biggest single land use within the District is agricultural (44% in 1993), but much of the northern part of the watershed has been developed. Recent trends of land use patterns within the District indicate intense residential development for the municipality of Prior Lake especially adjacent to Prior Lake. The southern part of watershed has experienced a modest decline in cropland acres and in the number of farms as land is subdivided into 10 acre residential lots and cluster developments. Future land use plans from the City of Prior Lake and Scott County Comprehensive Plans indicate that these recent trends in land use should continue within the District. For a more complete description of the District refer to the Phase I Diagnostic/Feasibility Study (Montgomery Watson, August 1993).

B. Description of Water Quality Problems: This diagnostic/feasibility study funded by the U.S. Environmental Protection Agency (EPA) Clean Lakes Program and the District was completed in July of 1993. Both Spring and Upper Prior Lakes were found to be eutrophic, while Lower Prior Lake was mesotrophic. Chronic occurrences of blue-green algae blooms were documented for Spring and Upper Prior, while these conditions arose only periodically on Lower Prior Lake. Severe oxygen depletion was also documented on Spring Lake, and was especially bad on Upper Prior Lake. This condition was concluded to be a contributor to the poor water quality of both lakes. A reduction in phosphorus levels was determined to be necessary to improve the quality of all three lakes.

The mean total phosphorus (TP) concentrations were found to be 149 ug/l on Spring, 81 ug/l on Upper Prior, and 46 ug/l on Lower Prior Lake (1989 growing season average surface concentrations). In comparison, the typical mean TP concentration range for the NCHFE is 23-50 ug/l. The annual TP load to Spring, Upper Prior, and Lower Prior Lake in 1982 was estimated to be 8,680 lbs, 5,147 lbs, and 5,450 lbs, respectively. For a more detailed description of phosphorus budgets for these lakes refer to the Phase I Diagnostic/Feasibility Study (Montgomery Watson, August 1993).

C. Purpose/History of the Project: The primary qualitative water quality goals for area lakes are improvement of aesthetic quality, reduction of nuisance/toxic blue-green algal blooms, and improvement of fishing. In order to meet these goals, phosphorus loading must be reduced. Phosphorus concentration goals were established based on the qualitative goals and desired uses of the lakes. Phosphorus concentration goals are 70 ug/l, 55 ug/l, and 40 ug/l for Spring, Upper Prior, and Lower Prior Lakes, respectively. The necessary phosphorus load reductions to meet the in-lake concentrations are 3,480 lbs/year, 1,290 lbs/year, and 1,021 lbs/year for Spring, Upper Prior, and Lower Prior Lakes, respectively.

The diagnostic/feasibility study identified the restoration of altered wetlands as one potential method of mitigating the phosphorus loading to the lakes. Two programs for pursuing restorations were then implemented. The first program focused on 5 specific restoration opportunities identified in the diagnostic/feasibility study. This element received funding through the Lake Improvement Project Phase II via an EPA 319 grant in spring 1994.

The second implementation program is the Wetland Demonstration Project which is the subject of this Final Report. The District developed the Wetland Demonstration Project to address NPS problems resulting from past agricultural drainage and wetland destruction on a watershed basis. Also, as part of the Minnesota river drainage basin, the District developed this project to document and demonstrate the process and feasibility of subwatershed-wide wetland restoration and its effects on NPS. By identifying a process of integrating all the available resources of planning and implementing a watershed-based program, the District hoped to provide NPS implementing agencies with a guideline in reducing NPS pollution using watersheds as a base. This program identified 24 potentially restorable wetlands as high priority wetlands. This project was initiated in 1994 and received EPA 319 grant funding through the Minnesota Pollution Control Agency (MPCA) as well as a Metropolitan Council Water Quality Initiatives grant.

D. Description of Project: The project consisted of the following eight elements:

- Inventory and Characterization
- Education
- Agency Coordination
- Easement Acquisition
- Engineering and Permits
- Construction
- Monitoring
- Documentation

A general description of each of these elements is given below. A more detailed description of the individual work efforts completed under each element is given in Section II :DISCUSSION OF WORK COMPLETED. Wetland restoration is also an element of the Lake Improvement Project. To foster efficiency, the wetland restoration efforts for the Wetland Demonstration and Lake Improvement Projects were combined. Other elements common to both projects include: *public education, monitoring,* and *documentation*. Although not discussed within this report, elements specific to the Lake Improvement Project - *watershed management planning, conservation tillage*, and the *ferric chloride chemical addition system* - are key elements in the overall goal to improve the water quality of Spring and Prior Lakes.

The first task completed for the Wetland Demonstration Project was a detailed inventory and characterization of restorable wetlands in the subwatershed. This inventory was completely funded by the District and was completed in the spring of 1994 prior to the grant programs. A description of the inventory and an example data sheet is given in Appendix A.

The next task included a public education/information program. This task was ongoing throughout the project and was merged with the education program for the Lake Improvement Project. This was done to maximize both programs and avoid duplication of effort.

Agency coordination was completed using an Interagency Task Force. The task force's efforts were completed early in the project and primarily focused on development of the process and prioritization of the restorable wetlands.

Easement acquisition included a land appraisal and contact and negotiation with private property owners. Originally, the major element of this project was to enhance the benefits of any wetland site identified as high priority. As the project progressed, the Highway 13 Wetland became the focus of the project due to landowner interest, high visibility because of its proximity to a state highway, and identification as a high priority restorable wetland for several reasons including its location in a high priority subwatershed directly on a major drainage tributary Restoration and enhancement of this wetland will provide substantial water quality benefits in terms of helping meet the phosphorus reduction goal for Spring and Prior Lakes. It is estimated that approximately 40% of the total phosphorus load to Spring Lake is derived from the County Ditch 13 Subwatershed (a subwaterhshed of the Southwest Spring Lake Subwatershed). The estimated loading reduction for this enhancement is 50%. Therefore, a 20% total reduction would occur with successful completion of the Highway 13 Wetland Enhancement Project. The total reduction goal in the diagnostic feasibility report is an overall 40%. The remaining 20% is to be derived from other wetland restorations, other elements of the Wetland Demonstration Project, and those of the Lake Improvement Project.

Engineering and permits included the necessary surveying for easement descriptions, surveying for engineering design, engineering design and specifications, construction supervision, and acquisition of appropriate permits. Permits included US Army Corps of Engineers Section 404 and Minnesota Department of Natural Resources Protected Waters permits

Construction included the necessary physical activities to complete the restorations.

Monitoring included additional pre-construction water quality characterization of the sediment and phosphorus loads from County Ditch 13. Post project monitoring is scheduled for completion in 1998.

Documentation was ongoing throughout the project. This Final Report represents the completion of this element.

II. DISCUSSION OF WORK COMPLETED

A. Inventory and Characterization: This first step of the project consisted of an inventory and characterization of restorable wetlands throughout the targeted subwatershed. The effort was completely funded by the District and was completed by the Scott Soil & Water Conservation District (Scott SWCD) in the spring of 1994. A description of the inventory and an example data sheet is given in Appendix A. Characterization of each potentially restorable wetland included:

- Basin Characteristics
  - * Original wetland size
  - * Current wetland size
  - * Percent drained/altered
  - * Direct drainage area
  - * Total drainage area
  - * Wetland classification (Circular 39)
  - * NWI classification

- Vegetation
  - * Dominant plant species

- Drainage Method
  - * Ditch
  - * Tile
  - * Cultivation
  - * Excavation
  - * Pump
  - * Other

- Site Location
- Current Land Use
- Soil Classification
- Restoration Potential
- Notes

B. Education Public Education efforts focused on improving water quality overall, and were not specific to the Wetland Demonstration Project or the Lake Improvement Project. Public Education is an ongoing effort of the District and not limited to grant related activities. In order to inform the public and encourage participation, the following tasks were completed:

- Preparation of press releases for the local newspaper and other various agency newsletters.
- Distribution of three newsletters to District residents in the spring of 1994, fall of 1995, and spring of 1997. The first newsletter outlined the project's primary and specific goals, elements, schedule, and sponsors, and welcomed volunteer assistance. The second newsletter included articles regarding fertilizer and yard waste management, free soil sampling, a fertilizer incentive program for farmers, use of the no-till-drill, wetland restorations, and upcoming events. The third newsletter emphasized wetland restorations, included before and after color photographs of an example restoration, and solicited for participants.
- Formation and training of a Citizens Advisory Committee for contact of potential wetland restoration site owners.
- Demonstration of a watershed model at two local elementary schools.
- Exhibition of projects at local community events.
- A lawn and garden workshop was hosted in April of 1995, and attended by thirty people.
- A septic system seminar was hosted cooperatively with Scott County Extension Service in October of 1996. The District held a drawing for one free septic system pumping as an incentive to attend. The seminar was attended by over thirty people.

- Repeated solicitation of School Superintendents outlining various programs such as Project Wet & Project Wild and explaining how the schools could become involved. District attempted to sponsor a science teacher for attendance of project training.
- Distribution of soil test kits with over 125 samples analyzed and explained to participants. Of this, approximately 50 samples were taken by students of two elementary classes for a hands on science course activity.
- Coordination of an Eagle Scout Project for distribution of door hangers and soil sampling around Spring Lake. Over a dozen boy scouts were actively involved in this project. Collectively, they spent over 80 hours collecting samples and distributing the door hangers. The door hanger outlined ten ways that residents could help to prevent the degradation of lake water quality.
- Stenciling of approximately 100 stormsewers grates (which drain directly to Prior Lake without treatment) with the phrase "DO NOT DUMP / DRAINS TO LAKE".
- Promotion of an agricultural fertilizer incentive program with the purpose of limiting the amount of fertilizer used.

C. Agency Coordination The work plan specified the development of an Interagency Task Force because of the nature of the project and number of agencies involved. This Task Force held its first meeting in July of 1994 and was attended by representatives from Montgomery Watson (District consulting engineers), U. S. Fish & Wildlife Service (USFWS), Board of Water & Soil Resources (BWSR), Scott SWCD, MPCA, MDNR, and the District. A project overview was discussed and each agencies' role in implementation of the project was reviewed. Subsequent meetings focused on how to prioritize and establish criteria for potential restoration of altered wetland sites after completion of a wetland inventory by the Scott SWCD.

The Task Force met again after completion of the wetland inventory and sites were determined to be high or medium priority by a subcommittee based on their potential water quality benefit. Recognizing the fact that restoration of wetlands for improving water quality is still somewhat uncharted territory, prioritization of restoration projects required some informed personal judgment. Characteristics used to evaluate potential sites when ranking included:

- size of wetland
- contributing watershed size
- ratio of wetland watershed area to wetland surface area
- subwatershed pollutant export rate
- proximity to protected waterbody (Spring/Prior Lakes)
- hydrologic regime (temporarily/seasonally/permanently flooded)

Sites identified as high priority wetlands were to utilize grant and medium priority wetlands would use other programs such as RIM, PWP, etc., for potential restoration/enhancement funding. All agencies continued to be involved in contacting potential site owners and making referrals to appropriate agencies as necessary.

D. Easement Acquisition: Efforts for easement acquisition included landowner contact, negotiation and appraisal. An appraisal of the Highway 13 Wetland was contracted with Peter J. Patchin & Associates, Inc., in order to determine fair offer prices. This appraisal was completed in August of 1994. Landowner contacts included contact of approximately 30 landowners of potential restoration sites by the District's Citizen Advisory Committee, Scott SWCD, USFWS, and District staff over the past three years. As a result of this, restoration/enhancement of two altered wetlands located in the County Ditch 13 Subwatershed was completed. A vicinity map is provided in Appendix B.

Perpetual conservation easements were successfully negotiated with two landowners for the restoration of County Ditch 13 Subwatershed Wetland #1 (located in the SW ¼ of Section 20 & the NW ¼ of Section 29, Township 114, Range 22) in December of 1996. A preliminary elevation survey was conducted, in cooperation with Scott SWCD, on 20± acres that had been previously drained, and cropped. After restoration, there is now approximately 11 acres of wetland and 1.4 acres of upland buffer.

Drainage and ponding easements were successfully negotiated with three landowners for the Highway 13 Wetland which is along the main tributary draining to Spring Lake. The wetland is located on an unnamed section of ditch between County Ditch 13 and Spring Lake just south of Highway 13 (W1/2, NW 1/4, Section 17, T114N, R22W, Spring Lake Township). Prior to enhancement of this wetland, these easements covered a total of 37.7 acres, of which 8.5 acres were upland and 29.2 acres were wet meadow. After restoration/enhancement, there is now 4 acres of open water, 7.2 acres of deep marsh, 4.4 acres of shallow marsh, 15.2 acres of wet meadow, and 6.9 acres of upland.

In response to the newsletter distributed in 1996, District staff received and followed up on nearly 20 inquiries regarding possible wetland restorations. These leads did not prove to be feasible for this project for one of the following reasons: 1) the site was in the District but not within the subject subwatershed, 2) the site was in the subject subwatershed but not identified as a high or medium priority wetland, or 3) landowner misconception, i.e. he/she wanted the District to excavate a "duck pond" for them. Sites unqualified for this project for reasons one or two were referred to USFWS for potential restoration. As a result, two wetland basins have been restored. Both are in Section 30, Township 114 North, Range 22 West, Scott County. These basins were previously pasture and idle prior to restoration. After restoration, there is now approximately 1.5 acres of seasonally flooded wetland with surrounding idle uplands. Each basin is approximately 0.75 acres.

E. Engineering and Permitting: Engineering for the Highway 13 Wetland restoration included completion of an Engineers Report in October 1995. The project was then ordered and plans and specifications were completed in December 1995. Bids were accepted in January 1996. The project was awarded in the spring of 1996. Construction began in December 1996. Permits obtained for the project included a MDNR Protected Waters permit and a USCOE Section 404 permit.

Surveying for the County Ditch 13 Subwatershed Wetland #1 was completed by the Scott SWCD and District staff. Engineering plans and specifications were completed by the USFWS.

F. Construction: Construction of the Highway 13 Wetland was completed by Ryan Contracting, Inc. The main elements of this restoration/enhancement included excavation of two basins to provide for open water and sedimentation and construction of a sheetpile weir structure to provide ponding of water. Final inspection of the project was completed on February 24, 1997.

Construction of the County Ditch 13 Subwatershed Wetland #1 was completed by Rud Construction, Inc., with assistance from USFWS and District staff. This design included placement of a 1-3 foot high berm along the northern boundary, approximately 600 feet in total length. In addition, it was necessary to break an existing drain tile and install a riser pipe to pond water. Construction commenced in late December of 1996 and completed in early January of 1997, except for berm seeding in the spring.

G. Monitoring As outlined in the work plan for this project, the primary goals for monitoring include:

1) Development of current pre-project sediment and phosphorus loading estimates from County Ditch 13 to Spring Lake.
2) Increased understanding of the flows and sediment and phosphorus loads in County Ditch 13 to help refine and design the implementation elements.
3) Determine sediment and phosphorus loads from County Ditch 13 after the implementation of the project to determine the benefits and provide a cost/benefit ratio.

Of these goals, all but number three have been obtained by pre-project monitoring in the spring of 1994 which consisted of both routine and storm event sampling. The results of this monitoring are presented in Appendix C. Post-project monitoring has not yet been completed because of setbacks related to landowner negotiations, easement acquisition, and construction delays due to unfavorable weather conditions.

In addition, it was decided to hold off on this monitoring until after the construction of the Spring Lake Ferric Chloride Addition System (an element of the Lake Improvement Project) has been completed. This system is an integral part in the overall goal which is to reduce the amount of phosphorus entering Spring Lake. The Ferric Chloride System is currently under construction and will be completed by spring of 1998. Post-project monitoring will be conducted from April through November of 1998. This monitoring will fulfill the third primary monitoring goal for this project.

The findings of the monitoring and data analysis will be reported as part of the Final Report for the Lake Improvement Project. This report will include an analysis of the phosphorus removal efficiency of the Highway 13 Wetland, the Ferric Chloride Chemical Addition System, and both together. In addition, the results of the water quality monitoring for the routine and event composite samples will be provided to MPCA in STORET format.

H. Documentation A flow chart of the process used is shown in Figure 1. This process has the 8 basic elements implemented plus additional sub-elements that are suggested based on insights gained during the project. These insights are explained in Section III below.

III. CHALLENGES FACED, INSIGHTS GAINED, & RECOMMENDATIONS

Challenges and insights can be broken down into the following five topics areas:

- Landowner acceptance / concerns
- Negotiation approaches
- Easement value changes / perceptions
- Watershed changes
- Process

The challenges, insights and recommendations for each of these areas are briefly described below.

A. Landowner Acceptance / Concerns: It did not take long after starting to call land owners to realize that owners were mistrustful of having easements acquired on their property. One reason speculated for this was the accelerated urban development in the area and a concern over whether easements would affect or decrease their property value. Other concerns expressed by owners included the affect on

taxes, and whether easements would affect the number of urban density credits. This created a need to project staff to investigate issues regulated by entities that were not part of the project. Ultimately an easement informational fact sheet was developed to hand out to interested owners, and one of the public information/education newsletters was completely dedicated to issues regarding wetland restoration along with information showing that restoration actually adds to property value. A recommendation for future projects is to complete these actions (i.e. fact sheet, and wetland property value information) earlier in the project. Despite the initial landowner concerns, feedback from participating landowners has been positive with complete acceptance of the restoration/enhancement projects. Another recommendation for future projects is to compile a list of landowners that have participated in wetland restorations to use a reference for landowners who are considering participation.

B. Negotiation Approaches: The original intent of the project was to use volunteers for the initial contact with property owners. However, even with training volunteers had difficulties. Volunteers were easily frustrated and did not have good follow-up. Specific recommendations for easement negotiation include the use of professional negotiation services, keeping better meeting notes, use of the fact sheet discussed above, and the use of pictures of previous restoration projects to better demonstrate how the wetlands will look after restoration.

C. Easement Value Changes / Perceptions: One challenge of this project was establishing fair easement prices. An appraisal was contracted early in the project for the Highway 13 Wetland and it was thought that this appraisal would set the rate. However, several things happened during the course of the project that changed both the actual and perceived value of wetland easements. They were related to the Minnesota Wetland Conservation Act which has strict wetland replacement requirements and started to create a market for restorable wetland during the course of the project. This created an increase in easement costs to the market rate as well as creating a perceived higher value because of differences in the degree of restoration. Land owners would hear of someone who received $4,000 an acre for restoration and could not differentiate the cost of $4,000/acre for total restoration on cropland versus a partial restoration on drained Type 1 Wetland.

D. Watershed Changes: Watershed changes affected the project in two ways. The first was changing ownership of properties and the ability to identify and contact new owners. The second was the perception of increased urban development and increasing property values. It appeared that landowners wanted to keep their property free of easements until such time as they knew what future use would be.

E. Process: The primary insight gained as a result of this project was the importance of a process. This process is shown on the attached flow chart (Figure 1). Each step is important. However, two of the most valuable steps included the detailed inventory and the prioritization. The detailed inventory was important for making informed decisions while the prioritization was critical for making the most out of limited funds. Staying with the prioritization helped the project stay focused and ultimately helped with easement acquisition and restoration of what were scored as the two highest priority restorations.

IV. FUTURE IMPLEMENTATION ACTIVITIES

In the spring of 1998 the District will continue to identify and contact other property owners for potential wetland restorations utilizing funding from the Lake Improvement Project, Year 2 Grant. In addition, the District is considering funding its own wetland restoration program after all grant moneys have been expended. And as always, public education will be a continuing effort as long as the District exists.

FIGURE 1 : WETLAND RESTORATION FOR WATER QUALITY PROCESS