

# Introduction and Project Background

## Little Cottonwood River Watershed

### Project Background & History

Since 1989, upper reaches of the Little Cottonwood River had been monitored as part of groundwater studies in Brown and Nicollet Counties. Results of previous groundwater and surface water studies can be found in Appendix A at the back of this report. The Brown-Nicollet-Cottonwood Groundwater Quality Analysis Projects began in 1990 and finished in 1998. Since the Little Cottonwood drains part of the West Study Area / West Priority Management Area of the groundwater project, and because the groundwater and surface water are inter-connected in this area, three surface water sampling sites were established on the river and monitored between 1989 and 1994.

In the spring of 1996, monitoring in this area intensified as part of a resource investigation project titled Middle/Lower Minnesota [River Basin] Assessment Project (MLAP). The main purpose was to identify which surface waters were negatively affecting the MN River. Four monitoring sites were sampled under 1) Climatic Conditions and 2) Scaled Watershed Profile sampling schedules. And the channel/bed status was evaluated at several sites using the newly developed Tailored Integrated Stream/Watershed Assessment (TISWA). The MLAP project also began other watershed assessment activities, and established communications with landowners in the watershed. In the upper reaches a channel morphology study was conducted by the MPCA.

A project application for Clean Water Partnership<sup>1</sup> funding and technical assistance was completed in November 1996. The application was successful and the Little Cottonwood River Restoration Project was funded under Clean Water Partnership programming beginning in the spring of 1997. This report represents the findings of that four year Clean Water Partnership Diagnostic Study. In addition, a proposed implementation plan to improve the water quality of the river is included in Chapter 7.

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<sup>1</sup> Clean Water Partnership is a Minnesota Pollution Control Agency administrated program designed to assist interested units of government and citizens in controlling non-point source pollution.

### 1997 Activities

During the first year, monitoring was conducted at four sites, and a project newsletter was produced and distributed (see Appendix section O).

Also during 1997, citizen concern about drainage was heightened by two situations. First was an unusually wet spring, with resulting mid-river flooding of pastures, cropland, and some roads. And then work began on an enlargement of County Ditch JD 9 near Jeffers, in the upper reaches of the watershed. The timing of this new ditch construction was unfortunate, and downstream watershed residents were extremely concerned about the possible effects of even more water. Two meetings were convened where these issues were hotly debated. One took place in New Ulm in spring of 1997. In July, Congressman David Minge arranged for a forum on Little Cottonwood River drainage; it took place at the University of Minnesota Agricultural Research Station in Lamberton and was very well attended. While concerns were aired openly at this forum, it did not result in any long-term changes for the watershed.

In August, a citizen survey was conducted. Although 650 surveys were sent out, only 27 were returned. The project took this as an indication of the scope of education and public awareness activities that would be needed in the watershed. A copy of the survey and summary of survey results is included in Appendix P.

### 1998 Activities

The project work plan was to be fully implemented beginning in 1998. The first activity of 1998 was a well-attended citizens meeting for watershed residents in Comfrey, Minnesota on March 16. With over 75 people in attendance, and a rich give-and-take between upstream and downstream residents, and between citizens and agency staff, this meeting was considered to be a major success in the life of the project. Staff documented twenty-five issues citizens expressed opinions or concerns about. Another result of the meeting was a list of citizens willing to assist the project, such as being members of a Citizen Council or performing citizen monitoring.

But the success was to be very short-lived. Within twelve days, a massive and rare F4 tornado roared down the complete length of the watershed, causing widespread destruction to farms, homes, croplands, woodlands, communities, and riparian areas. This storm, which traveled over 100 miles, and is detailed later in this report, also took out the offices and lab of Brown-Nicollet-Cottonwood Water Quality Board, the sponsor of the Little Cottonwood River Restoration Project. Another casualty was the entire community of Comfrey, including the hall where the meeting had just taken place.

As the counties, communities, citizens, and Water Quality Board reeled from their losses, the MPCA granted the LCR project a time extension and provided assistance with monitoring during the trying months of 1998. Adding to the Board's problems, the project coordinator, Kevin Bigalke, resigned to take a position with MN DNR. A summer intern, Kim Johnson, was hired to help maintain projects; she worked with Lee Ganske (MPCA) to perform interim monitoring during our post-storm hiatus. Late in 1998, the Board interviewed Kevin Kuehner for the Water Quality Specialist Position. He was hired and began work on the LCR diagnostic study and other board projects in January of 1999.

**1999 Activities**

During spring, summer and fall of both 1999 and 2000, monitoring resumed in earnest on the Little Cottonwood. Sampling stations were upgraded technically, and sampling schedules were developed and adhered to. Unfortunately from 1998 through May of 2000, conditions in most of the watershed were unusually dry. This limited the ability to study hydrology and water chemistry under high flow conditions. Intense technical assistance in interpretation of hydrologic findings came through the efforts of Pat Baskfield, hydrologist for the MPCA who provided Kevin with software and tutoring on the calculation of loading rates, so interim data assessment could take place. Kevin was part of a presentation on preliminary loading rates calculated using the FLUX program at the Minnesota River summer conference in Redwood Falls in July.

In early September, two field events were held to explain monitoring and to solicit opinions and concerns from watershed residents, but they were very poorly attended.

**2000 Activities**

During the winter of 1999-2000, the MPCA granted the project another extension so that work could be completed, data compiled and analyzed, and this report and an implementation plan could be developed.

After a dry winter and spring, May and June of 2000 provided enough rainfall, so that work from previous years could be interpreted and loading rates calculated with a greater measure of certainty.

As part of a related project called Township Testing, Brown-Nicollet-Cottonwood staff held 35 groundwater-screening clinics between mid-April and mid-June. At the events in the ten Little Cottonwood River watershed townships, a display on the project was set up and staff were able to hold personal conversations with a number of watershed residents.

Several meetings in the summer were devoted to review of project results, including contaminant loading rates and comparisons between the four watershed segments. These included data reviews with the technical committee and the Joint Powers Board, and work sessions with county staff to develop an implementation plan. Final assessment work and interpretative mapping was completed with the assistance of Scott Janni, a summer intern and former watershed resident.

Late in August, the DNR Fisheries Specialists completed a biological/fish survey in the Little Cottonwood. Project staff were able to assist at several sites.

During the five years of work on this phase of the Little Cottonwood River Restoration Project, the project encountered many problems including staffing changes, storm damage, dry weather, and changes in citizen participation from uproar to apathy. At the conclusion of this long and bumpy project path, the Board and staff are grateful to the MPCA and its staff for sticking with us, and allowing us to persevere in the analysis of this resource.

## LCR Project Cooperators

### Technical Committee:

Kevin Kuehner - Coordinator	Brown-Nicollet-Cottonwood Water Quality Joint Powers Board
Lee Ganske - Project Manager	MN Pollution Control Agency
Pat Baskfield – Project Hydrologist	MN Pollution Control Agency
Greg Payne	US Geologic Survey Hydrology
Paul Davis	Brown County Water Planner
Mike Hanson	Cottonwood County Water Planner & ES Director
Bonnie Holz	Brown-Nicollet Environmental Health Director

Other project assistance was provided by Jane Starz-Brown County Planning & Zoning Administrator, Tom Maher – Brown County SWCD, Greg Tenant – Brown County NRCS, Craig Berberich, Todd Kolander-DNR Fisheries, Joe Stangl – Renville SWCD, Cis Berg – MN State University Mankato Water Resources Center, Brown-Nicollet Environmental Health Staff, Cottonwood County Environmental Services, NRCS and SWCD staff.

Special appreciation is extended to Marcy Pengilly, Project Account Clerk

## Brown-Nicollet-Cottonwood Water Quality Joint Powers Board

LaVonne Craig - Nicollet County (Chair)	Judy Hanson – Nicollet County
Don Wellner – Brown County (Clerk)	Charlie Guggisberg – Brown County
John Oeltjenbruns – Cottonwood County (Vice-Chair)	Ken Elg – Cottonwood County

## Project Costs

Although work continues on the project through October, the following explanation shows the project costs through June of 2000. For complete itemization of cash and in-kind costs, the most recent Quarterly Expenditure Report is included in Appendix S.

### Program Element 1 – Preliminary Activities

Work plan development actually took place twice. The first work plan was completed during spring and summer of 1997. The work plan was revised after the tornado to reflect a longer timeline; the revision was completed in June of 1998. Total cost: \$ 4,939.

Pollutant Characterization attempted to correlate citizen concerns with contaminant levels for nitrate, phosphorous, total suspended solids, and bacteria. Total cost: \$ 1,470.

Citizen Concern Assessment covered communications with watershed residents. It included meetings, surveys, and one-to-one work with citizens. Total cost: \$ 4,720.

Travel for this program element totaled \$ 341.

### Program Element 2 – Hydrologic and Water Quality Activities

Climatic Conditions Sampling included storm sampling and seasonal comparisons of the various sites. Total cost: \$ 10,489.

Scaled Water Quality Watershed Profile Sampling looked at contaminants (including bacteria) from the headwaters--through sites 2 and 3--to the mouth, to help determine relative contributions of various reaches. Total cost: \$ 12, 188.

Precipitation Monitoring is conducted to help determine the effects of rainfall and snowmelt on the water quality and flows of the river. Total cost: \$ 1,246.

Stage Discharge Characterization includes monitoring for stage of the river at the sites, the calculation of a rating curve, and preliminary work on contaminant loading. Total cost: \$ 18,639.

Travel costs for program element 2 came to \$ 2,105. Summer activities will change the cost totals for this program element.

### **Program Element 3 – Watershed Assessments**

Tailored Integrated Stream/Watershed Assessment, commonly known as TISWA, was co-developed by BNC staff and MPCA Hydrologist Joe Magner. It helps characterize geographic areas (subwatersheds) within a basin as to land use, vegetation, soils, and other criteria, and is used to prioritize areas according to their relative environmental health. Total cost: \$ 3,051.

Map and Aerial Photo Analysis is used to help define watershed areas and provides a link with other watershed assessments and GIS (below). Total cost: \$ 609.

Geographic Information System Development uses Arc View to provide graphic representation of project data via maps, and is also used to visualize possible prioritized areas for implementation. Total cost: \$ 8,574.

Fisheries Survey by the DNR was just conducted. Preliminary results show a decline in numbers of game fish since the last survey; the final report will be used in implementation planning. Total cost: unknown as of the June financial report.

Travel costs for Program Element 3 were \$ 527; this figure will increase with the addition of summer, 2000 activities.

### **Program Element 4 – Evaluation and Planning**

Data Interpretation included activities to review project results and the work involved in using the Flux program to characterize contaminant loading. Total cost: \$ 4,277.

Implementation Plan Development correlates all the phase one work and determines probable activities to remediate the water quality problems. Total cost: \$ 1,103, with considerably more expenses to be added after summer and fall activities are accounted for.

Travel costs so far for Program Element 4 come to \$ 65.

### **Program Element 5 – Information and Outreach**

Project Newsletter production resulted in three editions of the newsletter, with one to follow this fall if the budget allows. Development of the mailing list was a big component of this activity. Total cost so far: \$ 2,982.

Citizen Meetings were described in detail in the project history section, above. Total cost: \$ 3,792.

Other Education activities included work with schools, presentations, county fairs, and displays at Township Testing. Total cost: \$ 9,912.

Professional Education is included to ensure that project staff are current in scientific methodology, information technology, and other necessary skills. Total cost: \$ 3,796.

Travel costs for this program element come to \$ 2,039.

### **Program Element 6 – Administration**

Project Communications includes updates, media releases, board minutes, etc. Total cost: \$ 5,859.

Fiscal Activities is the part of the work plan that includes staff time tracking, expenditure accounting, reports, evaluations, audits, and board financial oversight. Total cost: \$ 44,433 ( a high percentage of this total is in-kind contributions).

Project Direction includes board meetings, committee meetings, supervision and staff meetings, and administrative activities. Total cost: \$ 16,187.

Travel costs for the administration program element total \$ 1,163.

As of June 30, 2000, the total costs of the Little Cottonwood River Restoration Project come to \$ 168,614.

## Project Milestones

Program Element	1/97	7/97	1/98	7/98	1/99	7/99	1/00	7/00
1)-Preliminary Activities		x		x				
2)-Hydrologic & Water								
Quality Activities		x-----	[MPCA]	-----				→
3)-Watershed								
Assessments					x-----			→
4)-Evaluation &								
Planning						x-----		→
5)-Information &								
Outreach			M M NL	M NL		NL	M	TT
6)-Administration								
		x-----	throughout project	-----				x

Key: [MPCA] = in 1998, the MPCA covered monitoring

M = meeting

NL = newsletter sent

TT = township testing display on watershed



## March 1998 Tornado

On Sunday, March 29, 1988, tornadoes spawned by a supercell laid waste to 100 miles of urban and rural areas in five counties. Two tornadoes, classified as multiple-vortex F3s and F4s (winds between 160 and 260 miles per hour), devastated the towns of Comfrey and St. Peter. These tornadoes with paths 1.5 miles wide, also destroyed scores of farms and homes between the two communities. The tornadoes came earlier in the year than any on record and were the most damaging in Minnesota history.

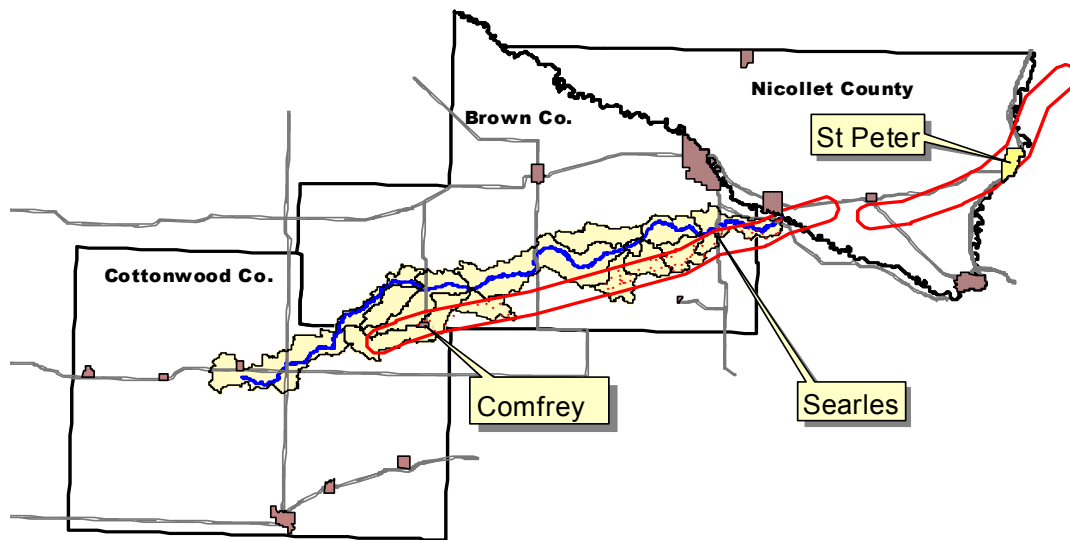
The western tornado (an F3/F4) began near the watershed in Cottonwood County and stayed on the ground for over fifty miles. It destroyed or severely damaged 191 rural sites in Brown and Cottonwood Counties. One person was killed and dozens injured. The total area affected by the tornado in the watershed was roughly 26,000 acres or about 25% of the watershed area. The following table indicates the scope of the devastation within the Little Cottonwood River Watershed. Map 1 shows the path of the tornado thorough the watershed according to damage reports from Brown and Nicollet County Emergency Management staff and a DNR flyover soon after the storm.

### Brown & Cottonwood County Damages

#### # of Home Sites in LCR Watershed Destroyed or Badly Damaged

##### **Brown County:**

City of Comfrey	112	Bashaw Township	6
Mulligan Township	6	Lake Hanska Township	26
Linden Township	5	Sigel Township	1
Cottonwood Township	15		
Cottonwood County	23		



**Map 1:** Tornado Path. Red line indicates general path of March 1998 tornado in relation to the watershed. Affected cities are labeled.

In addition to the above homes, hundreds of vehicles were totaled, dozens of farm buildings destroyed, livestock lost, and in Brown County alone, 32,000 acres were covered with debris. In a swath several miles wide on either side of the tornado, hail damage and downed electric and telephone lines basically destroyed the area's infrastructure for weeks. One chilling fact: 82% of the damage in Brown County took place in the Little Cottonwood River Watershed.

Comfrey, the largest community in the watershed, lost all its restaurants, grocery stores, library, schools, community center, fire hall, and all but one of its churches.

The path of the first storm eerily followed the Little Cottonwood River from its headwaters to its mouth. Devastation in the formerly lovely ravine area near the mouth (in Blue Earth County) was unimaginable, with thousands of trees downed, and the area draped with debris from the west. Here, the river itself was choked with fallen trees, debris, and sediments from the accompanying heavy rainfall and hail.

But the storm did not only victimize the Little Cottonwood River Watershed. It moved eastward to batter Nicollet County, including the City of St. Peter, where the offices and lab of the Brown-Nicollet-Cottonwood Water Quality Board (the LCR project sponsor) were located.

### **Nicollet County Damage**

Central Community Center in St. Peter was fatally damaged by the second major tornado produced by the supercell, which produced winds around 200 miles per hour. Hundreds of homes, vehicles, churches, retail establishments, and offices (including ours) were destroyed here. Another fatality and thirty serious injuries were sustained. As in Brown and Cottonwood Counties, power and communications were disrupted for weeks.

The BNCWQB offices were relocated twice in the next two weeks. Most computers and files were able to be saved, but much of the lab equipment was destroyed. Staff were affected in three ways: damage to personal property, loss of office/lab relocation efforts, and increased workload to assist devastated families, community systems, businesses, and institutions.

### **Long-term Effects**

The total damage wreaked by the storm system was over \$ 500 million. Economic effects were horrific, but even so, they take a back seat to social and psychological damages to the storm's human victims. This report is being written 2.5 years after the storm, and every person affected in March 1998, is still suffering some after-effects.

What is the total toll of the storm on the Little Cottonwood River? Its too soon to understand all the ramifications of this tragedy, but a few facts emerge:

- Families in the watershed have had little time to spare for consideration of nonessential activities such as the LCR project.
- The river itself probably sustained some harmful effects—increased sedimentation due to erosion, foreign matter and chemicals deposited in the river and its tributaries, and necessary agricultural shortcuts taken during the rest of 1998 (without regard to time-consuming best management practices).
- The LCR Diagnostic Study was granted a one-year extension, mainly so staff could regroup and concentrate on more critical activities, but also to allow watershed residents time to rebuild their lives.
- One positive effect: damage to home sites resulted in some environmental improvements; almost all rebuilt sites included upgrades of onsite sewage treatment systems and livestock waste systems.
- Reconvening watershed citizens for input on the project was impossible during the first two years—there were no suitable facilities. Recent attempts to reorganize public events have been unsuccessful; it appears that families still have not regained an interest in environmental issues. Project staff affected by the storm find this attitude perfectly understandable. Both energy and memory are profoundly affected by traumatic events, and priorities are radically changed.

Because of these psycho-social considerations, future work in this watershed will likely differ from activities in other remediation projects in Minnesota. Emphasis will be placed on one-to-one outreach, rather than on group activities. Sensitivity to watershed residents' past difficulties and current situations will be taken into account. These considerations will also be covered in depth in the final section of this report—the implementation plan.