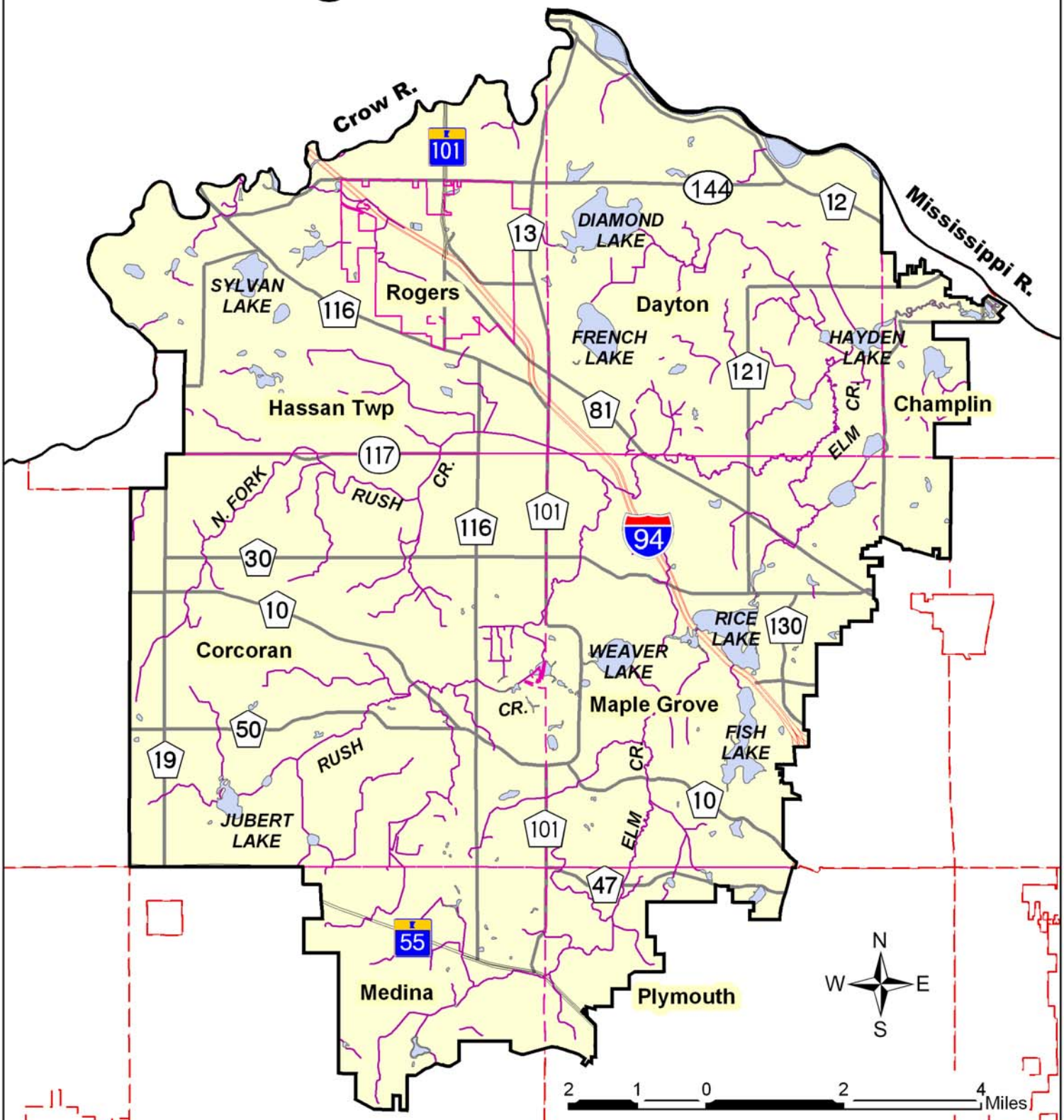
Elm Creek Watershed Management Commission



2003 Annual Report

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April 2004

This report was prepared
for the Elm Creek Watershed Management Commission
by Judie Anderson, JASS.

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Introduction.

The Elm Creek Watershed Management Commission (Commission) is a joint powers watershed organization formed as required under Minnesota Statutes 103B.201 through 103B.255 and Minnesota Rules Chapter 8410. The Commission was established in 1973 to protect and manage the natural resources of the Elm Creek Watershed. Its members are the cities of Champlin, Corcoran, Dayton, Maple Grove, Medina, Plymouth, and Rogers, and the Township of Hassan.

I. The Commission.

A. 2003 Board Members and Staff.

MEMBERS	ADDRESS	REPRESENTING/ RESPONSIBILITY	PHONE	E-MAIL
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* Water Quality Manager attends Commission meetings, providing valuable input on matters of water quality.

B. Business Planning Committee. Comprised of all board members.

C. Executive Committee. See Table above.

D. Technical Advisory Committee (TAC). See Table above.

II. 2003 Activities.

A. Plan Reviews.

The Commission reviewed 69 plans in 2003. A list of each project, location, and the critical areas reviewed is attached as *Appendix 1.* The Commission also adopted a revised fee schedule for reviewing projects to offset costs incurred by the Commission. It became effective on January 1, 2003.

The Commission anticipates reviewing 70-75 plans in 2004. These will include erosion and sediment control, wetland, floodplain, and stormwater management as well as DNR permits.

B. Lake Monitoring.

Water Quality.

The Commission has been monitoring lakes within the watershed since 1980. In 2003 the Commission monitored Fish and Weaver Lakes in cooperation with Three Rivers Park District. In addition, the Commission funded the monitoring of French Lake through the Metropolitan Council's Citizen Assisted Monitoring Program (CAMP). The volunteer who monitored the lake is Steve Fowler of Dayton. French Lake was monitored twice a month from April through October. A summary of the lake sampling history is shown in *Appendix 2.*

Fish and Weaver Lakes are listed in the Commission's Plan as Critical Lakes Category I. French Lake is a Category III lake. While Category I lakes are suitable for body contact recreation and fishing, Category III lakes are marginal fishing lakes and generally unsuitable for body contact recreation. Category I lakes are monitored more frequently than Category II and III Lakes. Under the Department of Natural Resources' (DNR) Shoreland Classification system Fish and Weaver Lakes are Recreational Development Lakes, and French Lake is a Natural Environmental Lake.

Lake and watershed characteristics of the lakes monitored in 2003 are shown in Table 1 below. Water quality data for 2003 is summarized below and listed in *Appendices 3 and 3a.* Water quality parameters for the lakes can be used to determine their Trophic State (state of nutrient enrichment) using Carlson's Trophic State Index (TSI). Table 2 on page 3 shows the summary of 2003 data.

Historical trend data are available for Fish and Weaver Lakes and listed in *Appendix 4.* The trend data includes samples from April through October for the entire monitoring period, and the summer means (May through September) since 1991. French Lake does not have long-term data from which to draw trend information.

Fish Lake.

The Three Rivers Park District and the Commission have established an in-lake phosphorus concentration goal for Fish Lake of 36 µg/L to support direct contact recreational use. Mean phosphorus concentrations for the summer season (May-September) have gradually increased from 39 µg/L in 2001 to 55 µg/L in 2003. The increase in phosphorus concentration in 2002 was due to an excessive amount of precipitation that produced increased phosphorus watershed loading.

Table 1. Lake and Watershed Characteristics

Lake	Size (acres)	Max Depth (feet)	Mean Depth (feet)	Watershed Size (acres)	Land Use Characteristics
Fish	244	48	19	1,990	Residential, commercial, park
Weaver	159	57	21	510	Residential, park
French	218*	6	3	870	Agricultural, rural residential, light

*Open water area

In 2003, above average precipitation conditions in May and June further contributed to high phosphorus concentrations ranging between 47 µg/L and 68 µg/L. The amount of precipitation for the remaining portion of the 2003 was considerably below average. However, phosphorus concentrations ranged between 40 µg/L and 94 µg/L from July through September. Although Fish Lake does not have an excessive curlyleaf pondweed problem in comparison to similar metropolitan lakes, the winter conditions in 2003 were conducive for curlyleaf pondweed growth. As a consequence of a high biomass of curlyleaf pondweed in 2003, there was a substantial amount of internal loading due to the plant senescence from the end of June to early July. The in-lake phosphorus concentration increased from 45 µg/L to 71 µg/L after the senescence of curlyleaf pondweed. The released nutrients from curlyleaf pondweed became available for algae up-take, and resulted in algae blooms that persisted throughout the summer. Chlorophyll-a concentrations increased from 32 µg/L to 53 µg/L shortly after the senescence of curlyleaf pondweed, and concentrations remained between 52 µg/L to 72 µg/L throughout the summer. Consequently, a decrease in water clarity occurred in response to the increased nutrient and chlorophyll-a concentrations.

Weaver Lake.

Weaver Lake has water quality conditions that potentially inhibit recreational use. The water quality for Weaver Lake has remained relatively constant since 1998. Phosphorus concentrations have been above 40 µg/L, which is the concentration recommended by the MPCA to support full recreational use. Since 1999, the five-year average phosphorus concentration was 45 µg/L.

Table 2. Carlson's Trophic State Index (R.E. Carlson)

Lake	TSI	Trophic Status	Expected Conditions
Fish	61.5	Eutrophic	Decreased transparency, anoxic hypolimnion during summer, macrophyte problems evident
Weaver	58.7	Eutrophic	Decreased transparency, anoxic hypolimnion during summer, macrophyte problems evident
French	75.4	Hypereutrophic	Heavy algal blooms possible throughout summer, dense macrophyte beds, but extent limited by light penetration

In 2003, the average phosphorus concentration was 49 µg/L, which is the highest phosphorus concentration observed since 1991. The high phosphorus concentrations can be partially attributed to the high density of curlyleaf pondweed within Weaver Lake. Weaver Lake has dense mats of curlyleaf pondweed that frequently grow to the surface. In 2003, the lack of snow cover created clear ice conditions that were excellent for curlyleaf pondweed growth. Consequently, there was a substantial amount of internal loading due to the plant senescence from the end of June to early July. The in-lake phosphorus concentration increased from 49 µg/L to 72 µg/L after the senescence of curlyleaf pondweed. The released nutrients from curlyleaf pondweed senescence contributed to a substantial algae bloom. Chlorophyll-a concentrations increased from 21 µg/L to 65 µg/L. After the senescence of curlyleaf pondweed, the phosphorus concentrations gradually decreased to concentrations as low as 35 µg/L. Despite the gradual decrease in phosphorus concentrations, the algae blooms persisted throughout the summer in which water clarity conditions did not exceed 1.0 m in depth as measured by a Secchi disk.

French Lake.

This was the third year that the French Lake, located within the boundaries of Dayton, has been monitored through CAMP. The lake has an open water area of 218 acres and covers 352 acres at the ordinary high water elevation. The lake has a maximum depth of 2.0 m (roughly 6 feet) with an average depth of 1.0 m. A search through the STORET nationwide water quality database for data on the lake provided limited data (just Secchi data in 1985). Therefore, the 2001-2003 CAMP data are the only known available nutrient water quality data for the lake.

The lake was monitored seven times from early-May to early-August, 2003. The dry mid- to late-summer conditions resulted in the lake becoming unnavigable. Results are presented in Appendix 3a. The summertime (May through September) means for the monitored parameters were: surface total phosphorus TP = 283.7 µg/L (with a range of 136 - 489 µg/L); surface chlorophyll-***a*** = 92.1 µg/L (with a range of 27.0 - 230.0 µg/L); Secchi transparency = 0.3 m (with a range of 0.20 - 0.55 m); and TKN = 2.74 mg/l (with a range of 1.70 - 4.80 mg/l). The lake's summer averages translate to water quality grades of F for TP, F for Chlorophyll-a, and F for Secchi transparency. These grades result in an overall water quality grade of F for French Lake in 2003 (similar to the overall grade recorded in 2002 and worse than that of 2002 [D]).

As mentioned earlier, there was little water quality data found for French Lake prior to the 2001 CAMP data. Therefore, it is not possible to determine any long-term or short-term trends. To better understand the lake's water quality and where it may be heading, more data are needed.

The last two graphs in *Appendix 3a*. show seasonal variation in the lake's perceived physical condition and recreational suitability. The average user perception rankings, on a 1-to-5 scale, were 3.7 for physical condition (between 3- "definite algae present" and 4-"high algal color"), and 4.3 for recreational suitability (between 4-"no swimming – boating ok" and 5-"no aesthetics possible").

If you notice any errors in the lake's data or physical information, or are aware of any additional or missing information, please contact Randy Anhorn of the Metropolitan Council at (651) 602-8743 or randy.anhorn@metc.state.mn.us.

As the Commission implements its second-generation management plan, the goals for these lakes will be constantly evaluated. The Commission will also consider a non-degradation policy to prevent further degradation of its water resources.

The Commission will monitor Fish, Weaver, Diamond and French Lakes in 2004. It is a goal of the Commission to contract with Three Rivers Park District to monitor the first three lakes and to again seek a volunteer to monitor French Lake through CAMP.

Lake Level Monitoring.

The Commission continued to operate and maintain an electronic lake level gauge at Mill Pond dam. The data are reported to the DNR. The gauge will be upgraded by a newer model this year. The City of Dayton staff monitors the gauge at Diamond Lake, near the boat launch. The 2003 data was incomplete because algae growth due to low lake levels obscured the gage. The French Lake staff gauge was inoperable in 2003 due to damage. Repairs will be done to bring the gauges back into service. The locations of the lake level monitoring sites are shown in *Appendix 5*.

C. Stream Monitoring.

The monitoring station in Champlin is operated with the cooperation of the United States Geological Survey (USGS). The Commission shares the costs of operating the station, which collects continuous flow data and periodic event and base water quality data, with the USGS. Both grab samples and storm runoff samples are collected and analyzed for various parameters. Analyses of the streamflow and water quality monitoring data for Elm Creek and its tributaries are summarized below. Real time data from this monitoring station may be viewed on the Internet at **http://webdmnspl.cr.usgs.gov/rt-cgi/gen_stn_pg?station=05287890**.

The gauging site is located at the Elm Creek Road crossing in the Elm Creek Park Reserve. Continuous flow monitoring, low flow, and storm event sampling are completed at the site. The watershed area above the gauging station is 86 square miles, or 81% of the watershed.

Flow Monitoring.

The average daily discharge for the 2003 Water Year (WY), October 1, 2002 through September 30, 2003, was 61.4 cubic feet per second (cfs). During the same period, the minimum and maximum observed average daily discharge values were 0.8 cfs and 651 cfs, respectively. The long-term average daily dis-charge at the station is 39.9 cfs (1979-2003).

In WY 2002 very high flow volumes were observed in Elm Creek and its tributaries. While the average flows were lower during WY 2003, a major storm event in June 2003 kept the 2003 WY flow volumes above the long-term average. The long-term flow volumes (calendar year and water year) are included in Appendix 6.

Table 3. Elm Creek Annual Instantaneous Peak Discharge Rates

Date	Peak Flow (cfs)	Date	Peak Flow (cfs)	Date	Peak Flow (cfs)	Date	Peak Flow (cfs)
4-Apr-1979	307	27-Mar-1986	**812***	22-Jun-1993	315	13-Jul-2000	112
25-Mar-1980	199	1-Aug-1987	185	30-Apr-1994	**669***	25-Apr-2001	**875***
15-Jun-1981	44	27-Mar-1988	39	17-Mar-1995	237	11-May-2002	554
3-Apr-1982	**471***	31-Mar-1989	159	19-Mar-1996	407	28-Jun-2003	**695**
9-Mar-1983	408	1-Aug-1990	225	1-Apr-1997	**511***		
25-Feb-1984	341	1-Jun-1991	371	5-Apr-1998	306		
18-Mar-1985	**579***	8-Mar-1992	380	15-May-1999	**538***		

* All-time instantaneous peak discharge.

The 100-year flood discharge at this site is 2290

In late June (24th-25th), Elm Creek and its surrounding region experienced a severe rainstorm event, which dropped 4-6 inches of rain in less than a 24-hour period. Following this rain event, on June 28, the flow at the gauging station peaked at 695 cfs, the second highest peak flow recorded at the station. The all-time

peak instantaneous discharge was observed on April 25, 2001. Table 3 above shows the annual instantaneous peak discharge values at the gauging station for the period of record. The flow hydrograph for the 2003 WY and the provisional daily discharge and the summary information at the Elm Creek USGS gauging station are included in Appendices 7 and 7a, respectively.

Water Quality Monitoring.

Storm event samples were collected using an automatic sampler. Routine manual sampling also occurred approximately monthly. A spreadsheet of the data received to date is included in *Appendix 8*. Due to the high number of precipitation events in WY 2002, the Commission amended its 2003 contract with the USGS to provide for two additional automated samples in lieu of the manual samples. Automated "event" samples provide more comprehensive results by taking a composite sample of the entire event hydrograph but may cost more to analyze.

The Commission will continue to work with USGS staff to operate the gauging and water quality monitoring station on Elm Creek and make real-time adjustments to the sampling needs based on field and climate conditions.

D. Macroinvertebrate Monitoring (River Watch) Program.

The Elm Creek watershed is the largest watershed completely within Hennepin County boundaries. Located in the north central section of the county, it covers an area of 109 square miles. Elm Creek and its tributaries are 23 miles long. There are two tributaries in the watershed -- the North Fork of Rush Creek starts in Greenfield and flows through Corcoran, Rogers and Hassan; the South Fork of Rush Creek originates in Corcoran. The main stem begins in Medina and flows through Plymouth, Dayton and Champlin, where it discharges to the Mississippi River.

In 1995 the Commission worked with the Hennepin Conservation District (HCD) to initiate a benthic macroinvertebrate monitoring program. River Watch, as this program has come to be called, is used both for education and data collection. It is a goal of the Commission to sustain existing monitoring sites, gain water quality data, and promote river stewardship through teaching and project participation by students.

In 2003 this program came under the guidance of the Hennepin County Department of Environmental Services. Currently, students from seven schools monitor at seven locations in the Elm Creek watershed.

2003 Hennepin County River Watch Results, available from Hennepin County Department of Environmental Services, includes results from all the Hennepin County monitoring sites. A map showing the watershed macroinvertebrate monitoring sites is shown in *Appendix 9*; excerpts from the report on the sites in the Elm Creek watershed are found in *Appendix 10.*

E. Precipitation Gauge Network.

The Commission continued to operate and maintain eight precipitation gauges in the watershed. The locations of the gauges are at city halls, public buildings, private properties, and near the gauging station. The Commission also assists volunteers to set up and operate the gauges. One of the gauges operates year-round, collecting rain and snowmelt. An additional year-round rain gauge will be installed in Crow Hassan Park Reserve.

Data from these gauges are reported to the State Climatology Office and are available through the Internet. Locations of the current precipitation gauges are shown in *Appendix 5*.

F. Watershed Management Plan.

In 2000 the Commission received a grant from the Board of Water and Soil Resources (BWSR) to help fund the costs of development and production of its second watershed management generation plan. The Commission worked jointly with the Pioneer-Sarah Creek Watershed Management Commission and WSB & Associates to develop and write the plan.

A public meeting was held in October 2001, at which time citizens from both watersheds came together to discuss water resource issues within their communities. Topics discussed included education, water quality, non-degradation policy, shoreline protection, erosion, flooding, groundwater, wetlands, fish and wildlife, livestock/feedlots, population density/development, administration/leadership and funding.

In 2002, the Technical Advisory Committee (TAC) and representatives from various state agencies continued to review and develop policies, standards and rules. A preliminary draft plan was presented to Elm Creek residents at a second public meeting in April 2002. In October 2002 a public hearing was held where comments were received from the cities of Maple Grove and Plymouth and the DNR. Capital project funding was also discussed. The second required 45-day agency comment period ended February 10, 2003.

The Commission will submit the Plan and its amended and restated Joint Powers Agreement (JPA) to BWSR for final approval in 2004. The Commission will also begin identifying studies to assess the feasibility of future capital projects identified in the second generation plan. (See Section IV. of this report.)

G. Wetland Conservation Act (WCA).

The Commission serves as the local government unit (LGU) for the cities of Champlin and Corcoran, and Hassan Township. The Commission reviews exemption applications, replacement plans, banking applications, attends Technical Evaluation Panel (TEP) meetings, and fulfill other requirements of WCA.

The Commission received one wetland banking application and 37 projects involving wetlands in 2003. Projects reviewed for wetland issues are so indicated in *Appendix 1*. A similar level of activity is anticipated in 2004.

H. Status of Local Water Plans.

The table below outlines the status of local plan development by the member communities. In addition, Natural Resource Inventories have been undertaken by a number of the members.

Table 4

Community	In Progress	Submitted for Review	Approved by Commission**
Champlin			yes
Corcoran	no	no	no
Dayton	no	no	no
Hassan	yes*	no	no
Maple Grove			yes
Medina	no	no	no
Plymouth			yes
Rogers	yes	no	no

* Subwatershed plan

**May need to be amended to comply with the Commission's second generation Plan

I. Written Communication.

The Elm Creek Watershed Management Commission publishes a newsletter which is transmitted electronically to member municipalities for dissemination to their citizens. The 2003 newsletter was published in April 2003. The next edition will be available in the summer of 2004.

It is anticipated that future publications will appear on the Commission's website. Development work on the website will begin mid-year 2004.

J. Proposals for Service.

The required biennial solicitation for interest proposals for professional services occurred in 2002 and will be repeated in 2004.

K. Boundary Changes.

In past years the city of Greenfield, a non-voting/non-funding member, withdrew all of its land from the Elm Creek Commission and the city of Corcoran incorporated all of its land into the Elm Creek Commission. A 2002 review of watershed maps revealed a small area in Medina which was not under the jurisdiction of any water management organization. The City of Medina supported the Commission's action to petition for the non-designated land. As part of the second generation planning process, the Commission updated its watershed boundaries to reflect these changes.

L. Commission's Technical Advisor.

On April 8, 2003, the Hennepin County Board of Commissioners authorized the establishment of conservation services under County auspices (Resolution 03-226). Effective June 2003, the Hennepin County Department of Environmental Services (HCDES) began providing technical services to the Elm Creek Watershed Management Commission. The technical services include conservation engineering services related to hydrology and hydraulic analyses, the review of site development plans, and technical assistance regarding best management practices for stormwater management, erosion control and the protection of water quality. Prior to June 2003, technical services were provided by the Hennepin Conservation District (HCD).

III. Financial Report for 2003.

Appendices 11, 12 and 13, respectively, include the Commission's approved budget for 2003, a report of revenues and expenditures for 2003, and the 2003 Audit Report prepared by Julius and Associates, Ltd., Certified Public Accountants.

IV. Work Plan for 2004.

In addition to continuing the programs and activities described above, the Elm Creek Watershed Management Commission has developed a water resource management program that reflects the needs and concerns of the Commission, its member communities and residents. The implementation program will be reviewed annually by the Commission.

Studies and capital improvements identified in the Commission's second generation Watershed Management Plan may be completed entirely or partially by member communities, the Commission, or a joint effort. A list of current and possible future capital improvement projects can be found in the Commission's second generation Plan.

In the Plan, the Commission has determined that bank stabilization and erosion control is a very high priority issue. In 2004 the Commission will undertake a study of low flows to identify unstable areas within the main branch of Elm Creek.

Stream stability is usually defined as the ability of a stream to maintain its physical features (such as channel width, depth, slope, meander) over a long period of time, so that the stream system neither aggrades nor degrades. Geomorphology studies generally agree that channel development within a riverene system is influenced, in a large part, by "low flows". In stable streams this flow roughly corresponds to bank-full conditions. Due to its rapidly changing land use, low flows in Elm Creek are increasing and threatening the stability of the stream. The Commission wants to determine these flows at critical points along Elm Creek and to correlate them to current physical stream conditions. This should help in predicting the streams' stability at those points and in developing policies to prevent further degradation of the stream.

The Commission will use its 1999-2001 Stream Geomorphology study results to determine low flows that would be conveyed at bank-full conditions. These results will then be used in a hydrologic analysis to determine the frequency of storm events that correspond to these low flows. These "design" storm events, in conjunction with the recommendations made in the geomorphology study, will be the basis for establishing policies to stabilize and restore Elm Creek and its tributaries.