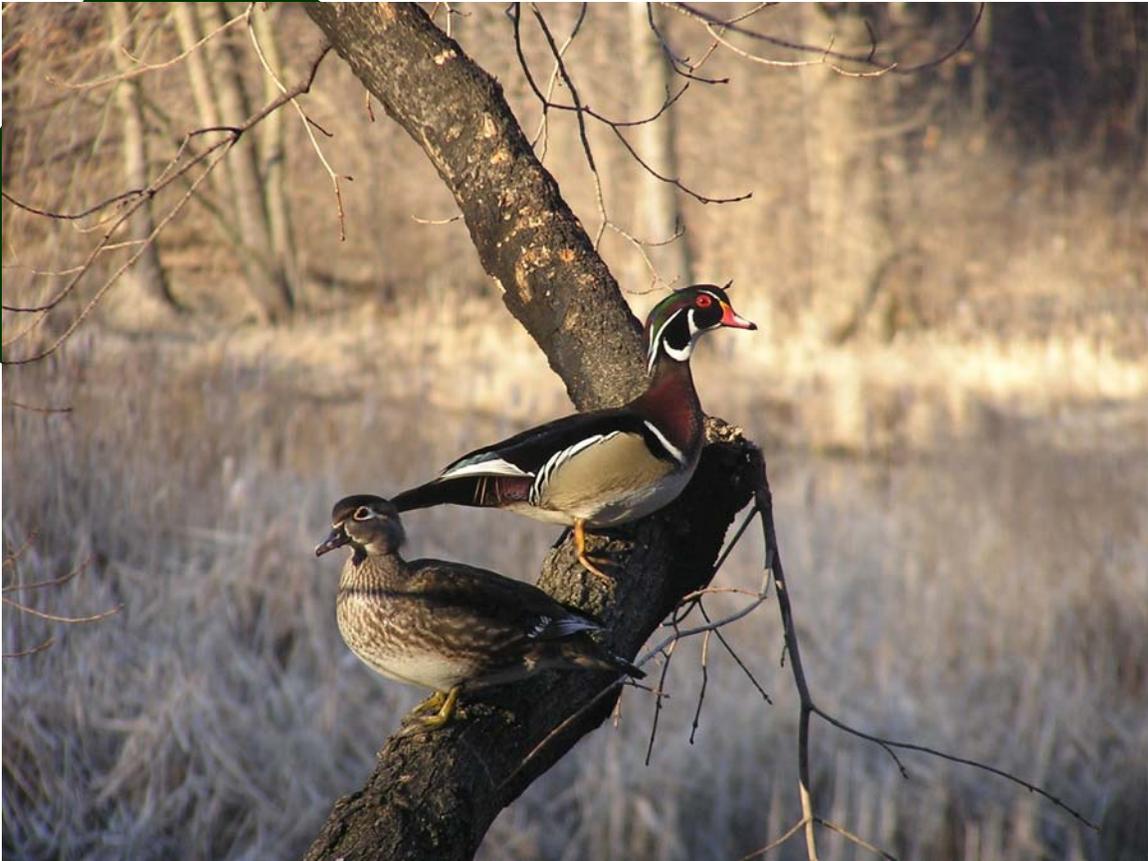


Elm Creek Watershed Management Commission

2008 Annual Report



Champlin • Corcoran • Dayton • Hassan • Maple Grove • Medina • Plymouth • Rogers

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

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*Cover photograph: Wood ducks in Plymouth, Minnesota
by Ed and Barbara Thode*

2008 Annual Report

Elm Creek Watershed Management Commission 2008 Annual Report

Table of Contents

	page
The Elm Creek Watershed Management Commission	1
History	1
The Watershed	1
The Commission	1
Table 1: Area of Members within the Elm Creek Watershed	2
Second Generation Plan	3
Local Watershed Management Plans	4
Table 2: Status of Local Water Management Plans	4
Project Reviews	4
Wetland Conservation Act.....	5
Water Monitoring.....	5
Lake Monitoring.....	5
Table 3: Lake Monitoring History	6
Table 4: Lake and Watershed Characteristics	6
Table 5: Carlson’s Trophic State Index	7
Stream Monitoring	7
Flow Monitoring	8
Table 6. Elm Creek Annual Instantaneous Peak Discharge Rates	8
Elm Creek Channel Study	8
Macroinvertebrate Monitoring (River Watch)	9
Stream Health Evaluation Program (SHEP)	10
Table 7: 2008 Stream Health Evaluation Program Results	11
Elm, Rush and Diamond Creek Stream Monitoring Project	11
Total Maximum Daily Loads (TMDLs)	13
Elm Creek Watershed-wide TMDL.....	14
Wetland Health Evaluation Program (WHEP)	15
Education and Public Outreach	15
Written Communication.....	16
Interest Proposals	16
Financial Reporting.....	16
2009 Work Plan	17
 Appendices	
Commissioners, Staff and Consultants.....	1
Project Reviews	2
Lake Monitoring - Diamond, Fish, and Weaver Lakes	3
Lake Monitoring - Henry, Rice and Sylvan Lakes	4
Stream Monitoring	5
River Watch	6
Watershed-wide TMDL.....	7
Wetland Health Evaluation Program (WHEP)	8
Financial Reporting.....	9
Acronyms Used in this Report	10



Elm Creek Watershed Management Commission

The Elm Creek Watershed Management Commission was established to protect and manage the natural resources of the Elm Creek watershed. Its current members are the cities of Champlin, Corcoran, Dayton, Maple Grove, Medina, Plymouth, and Rogers and the Township of Hassan.

History.

The Commission was formed in 1973 as a joint powers organization by the cities of Champlin, Corcoran, Dayton, Maple Grove, Medina, and Plymouth, and the Hennepin Conservation District, under the authority conferred to the member parties through MN Statutes Sections 471.59 and 103B.211. In 1981 the Town of Hassan entered the agreement. The cities of Greenfield and Rogers became non-voting, non-paying members of the Commission in 1982. In 2000 Rogers became a full member of the Commission and the City of Corcoran withdrew from the Pioneer-Sarah Creek Commission in order to include all of its area under the Elm Creek Commission. The following year the City of Greenfield voted to withdraw from the Elm Creek Commission and to include all its area in the Pioneer-Sarah Creek Watershed Management Commission.

In 2003, the Hennepin County Board of Commissioners authorized the establishment of conservation services under County auspices. Effective in June 2003, the Hennepin County Department of Environmental Services (HCDES) began providing technical services to the Elm Creek Watershed Management Commission. These services include conservation engineering services related to hydrology and hydraulic analyses, the review of site development plans, administration of the Wetland Conservation Act (WCA), and technical assistance regarding best management practices (BMPs) for stormwater management, erosion control and the protection of water quality. This necessitated an amendment to the Joint Powers Agreement (JPA) since, prior to that time, technical services were provided by the Hennepin County Conservation District (HCD), a party of the original JPA.

The Watershed.

The Elm Creek Watershed covers approximately 130.68 square miles and lies wholly within the north central part of Hennepin County, Minnesota. The Crow and Mississippi Rivers demarcate the northern boundary. Although some areas in the north drain to the Crow and Mississippi Rivers, they are within the legal boundaries of the Elm Creek watershed. Table 1 (on the next page) shows the area share of the member communities in the watershed. A map of the watershed can be viewed on the Commission's website, www.elmcreekwatershed.org.

The Commission.

A Board of Commissioners comprised of representatives appointed by the member communities was established as the governing body of the Elm Creek Watershed Management Commission. The table in *Appendix 1* shows the names of the Commissioners appointed to serve in 2008. Also listed are the members of the Commission's Technical Advisory Committee (TAC) along with the individuals/firms serving as the Commission's administrative, legal and technical support staff. The Commission has no employees.



Elm Creek Watershed Management Commission

**Table 1 - Area of Members
within the Elm Creek Watershed**

<u>Local Government Unit</u>	<u>Area (Square Miles)</u>	<u>%age of Watershed</u>
Champlin	3.08	2%
Corcoran	36.09	28%
Dayton	25.06	19%
Hassan	19.96	15%
Maple Grove	26.37	20%
Medina	9.35	7%
Plymouth	4.45	3%
Rogers	6.31	5%

The Commissioners meet monthly on the second Wednesday at 11:30 a.m. at Maple Grove City Hall, 12800 Arbor Lakes Parkway. These meetings are open to the public and visitors are welcome. Meeting notices, agendas and approved minutes are posted on the Commission's website.

The responsibilities of the Commissioners include:

1. Preparing and adopting a watershed management plan meeting the requirements of MN Rules Chapter 8410. The purpose of the Elm Creek Watershed Management Plan is to:
 - a. Protect, preserve, and manage surface water and groundwater resources;
 - b. Minimize property damages and economic losses through water resource management;
 - c. Manage public expenditures needed to study, control, and/or correct flooding and water quality problems;
 - d. Educate and inform the public on pertinent water resource management issues and increase public participation in water management activities;
 - e. Identify and plan for means to effectively protect and improve surface and groundwater quality;
 - f. Establish more uniform local policies and official controls for surface and groundwater management;
 - g. Reduce erosion of soil into surface water systems;
 - h. Promote groundwater recharge;
 - i. Protect and enhance fish and wildlife habitat and water recreational facilities;
 - j. Reduce and control stream degradation through land protection measures, runoff restrictions, and pollutant restrictions.

2. Reviewing and approving local water management plans as defined in MN Rules Chapter 8410.
3. Exercising the authority of a Watershed Management Organization under MN Statutes Chapter 103B to regulate the use and development of land when:
 - a. a local water management plan has not been approved and adopted, or
 - b. a local permit requires an amendment to or variance from the local water management plan, or
 - c. the Commission has been authorized by the local government to require permits for land use.
4. Exercising authority when the local government fails to enforce the policies of the Commission.

According to the Metropolitan Surface Water Management Act, the Watershed Management Plan must:

1. Provide a land and water resource inventory;
2. Present information on the hydrologic system and its components, including any drainage system previously constructed under MN Statutes Chapter 106 (the Public Ditch Laws), and existing and potential problems;
3. State goals and policies, including management principles, alternatives and modifications, water quality, and protection of natural characteristics;
4. Develop a management plan, including the hydrologic and water quality conditions that will be sought and the significant opportunities for improvement;
5. Describe conflicts between the watershed plan and existing plans of local government units;
6. Write an implementation program that is consistent with the management plan and which includes a capital improvement program, as well as standards and schedules for amending the comprehensive plans and official controls of local government units in the watershed to bring about conformance with this watershed plan.

Second Generation Plan.

In 2000 the Elm Creek Watershed Management Commission, working cooperatively with the Pioneer-Sarah Creek Watershed Management Commission, began developing its *second generation* watershed management plan. Input from meetings with citizens from both watersheds, the Commissions' Technical Advisory Committees (TACs), and representatives from various state agencies was used to create a draft plan that was presented to watershed residents, member communities, and local and state agencies for review and comment. The Board of Water and Soil Resources (BWSR) approved the *Elm Creek Watershed Management Commission*.



Elm Creek Watershed Management Commission

Comprehensive Watershed Management Plan on October 27, 2004. The Commission adopted the plan on December 8, 2004. The plan is available at <http://www.elmcreekwatershed.org/mgmtplan.shtml>.

An outcome of the Elm Creek Channel Study approved by the Commission in 2007 (see section entitled *Elm Creek Channel Study* later in this report) is the development of revised management practices for incorporation as revised standards into the Commission's Watershed Management Plan. In December 2007 the Commission began the review process for a Minor Plan Amendment to revise the Commission's existing Water Quality standards. A public meeting was held on February 13, 2008 to receive public comment. Receiving no comments for which response was required, the Commission adopted the revised standards on March 12, 2008. They became effective on that date and member communities were required to amend their local water plans and official controls to incorporate the new standards.

Local Watershed Management Plans.

Every member community must prepare and adopt its own water management plan. Local plans must comply with MN Statutes, Sec. 103B.235 and MN Rules 8410.0160 and 8410.0170 regarding local plan content and the requirements of the Commission's Watershed Management Plan. Under the statutes, member cities are required to revise their plans to conform to the Commission's plan within two years of Commission plan adoption. The status of member communities' local plans is shown in Table 2.

Table 2: Status of Local Water Management Plans

Community	Initial Submission	Status at 2008 Year-End
Champlin	October 28, 2008	Review in progress
Corcoran		Not submitted
Dayton	February 7, 2007	Approved December 11, 2007
Hassan	October 8, 2007	Denied November 14, 2007
Maple Grove	September 30, 2008	Denied November 12, 2008
Medina	October 15, 2008	Denied November 12, 2008
Plymouth	July 28, 2008	Approved November 12, 2008
Rogers	April 17, 2006	Approved October 23, 2008 pending compliance with 2-foot freeboard requirement

Project Reviews.

Land use within the Elm Creek watershed has been influenced by agricultural activities, rural residential, and higher density development pressure. Existing and projected land uses for areas within the Commission's boundaries are described in the member communities' Comprehensive Plans. These land use plans include residential, commercial, and industrial development; designated park and open space areas; and public recreational areas.

Under various authorities the Commission reviews local development plans for conformance with the standards outlined in their second generation Watershed Management Plan. Projects are reviewed for erosion and sediment control, wetland, floodplain and stormwater management, as well as Department of Natural Resources (DNR) permits. The Commission's technical staff

performed 42 project reviews in 2008. Included in that number were Comprehensive and Surface Water Management Plans from four member communities. A list of each project, its location, and the critical areas reviewed is attached as *Appendix 2*. The Commission anticipates fewer projects will be reviewed in 2009 due to a downturn in the economy that has resulted in fewer residential development starts.

Wetland Conservation Act.

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

The Commission's goal is to assure that WCA rules are properly implemented, wetland violations are resolved and replacement plans are reviewed. In 2008 the Commission reviewed 12 plans involving wetlands and received no new wetland banking applications. They also participated in four TEPs. Two new potential Wetland Conservation Act violations within the watershed in 2008 were investigated. A somewhat lower level of activity is anticipated in 2009.

Four outside firms were approved to perform wetland consulting services for the Commission in 2007-2008. They are named in *Appendix 1*.

In order to administer the Wetland Conservation Act more effectively the Commission has developed the *Wetland Review Process*. This guide includes an overview of wetland requirements, a flow chart showing the review process, a WCA sequencing worksheet, the Commission's performance standards for wetland mitigation, and the Commission's monitoring report requirements. The guide is available on the Commission's website www.elmcreekwatershed.org/wreswetland.html.

Water Monitoring.

The Commission conducts lake and stream monitoring programs to track water quality and quantity conditions. The Commission began monitoring Elm Creek and its tributaries in 1975 and the lakes within the watershed in 1980. The Commission conducts chemical, physical and biological monitoring of the streams and physical and chemical monitoring of lakes. Periodically, the Commission may also participate in special studies such as lake diagnostic-feasibility studies or in larger projects if a need is identified.

Lake Monitoring.

In 2008 the Commission monitored Diamond, Fish and Weaver Lakes in cooperation with Three Rivers Park District. The Park District's 2008 lake sampling results are included in *Appendix 3*. Also shown are historical trend data for Fish and Weaver Lakes.

In addition, the Commission funded the monitoring of Henry, Rice and Sylvan Lakes through Metropolitan Council's Citizen Assisted Monitoring Program (CAMP). The 2008 CAMP report is summarized in *Appendix 4*. More detailed data on these and other lakes within the watershed are available on the Commission's website.



Elm Creek Watershed Management Commission

Table 3: Lake Monitoring History

	Cook	Cowley	Diamond	Dubay	Fish	Frencce	Henry	Jubert	Mill Pond	Mud	Rice	Sylvan	Weaver
2008			T		T		C				C	C	T
2007		C	T		T		C				C		T
2006		C			T	T	C						T
2005					T	T	C						T
2004			T		T	T							T
2003													
2002					T	C			T				T
2001	T				T	C							T
2000					T			C					T
1999					T				T				T
1998			T		T								T
1997					T							T	T
1996					T								T
1995					T		C						T
1994			C		T								T
1993					T								T
1992	T		T		T								T
1991					T			T	T				T
1990	T				T	T							T
1989			T	T	T			T					T
1988	T				T				T				T
1987					T			T					T
1986	T		T	T	T					T			T

T = monitored by Three Rivers Park District

C = monitored through CAMP program

Table 4: Lake and Watershed Characteristics

Lake	Size (acs)	Max Depth (ft)	Mean Depth (ft)	Watershed Size (acs)	Land Use Characteristics
Diamond	408	8	6.5	2,666	Agricultural, rural residential
Fish	244	48	19	1,990	Residential, commercial, park
Henry	77	5	3*	979*	Agricultural, rural residential
Rice	252	11	6	17,171	Residential, park
Sylvan	114	13	4.9		Agricultural, rural residential
Weaver	159	57	21	510	Residential, park

*Approximation

Table 5: Carlson’s Trophic State Index (R.E. Carlson)

<u>Lake</u>	<u>TSI</u>	<u>Trophic Status</u>	<u>Expected Conditions</u>
Diamond	72.9	Eutrophic	Severe algal blooms with decreased transparency, potential fish kills during summer and winter.
Fish	55.4	Eutrophic	Decreased transparency, anoxic hypolimnion during summer, macrophyte problems evident.
Henry	65*	Eutrophic	Dominated by aquatic vegetation.
Rice	60	Eutrophic	Dominated by aquatic vegetation.
Sylvan	64	Eutrophic	Macrophyte abundance problems, algal scums probable.
Weaver	57.7	Eutrophic	Decreased transparency, anoxic hypolimnion during summer, macrophyte problems evident. Water quality improved significantly in 2005 and 2006 and decreased slightly in 2007.

*Approximation

Table 3 shows the Commission’s lake monitoring schedule. As the Commission continues to implement its second generation Management Plan, goals for these lakes will be constantly evaluated.

Lake and watershed characteristics of the lakes monitored in 2008 are shown in Table 4. 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 5 shows the summary of 2008 data.

Stream Monitoring.

The Elm Creek watershed contains several large depressions and drainageways. Water is generally directed from the south and west to the northeast via four main drainageways – Rush Creek, North Fork Rush Creek, Diamond Creek, and Elm Creek. These drainageways converge in the Elm Creek Park Reserve and enter Hayden Lake. Water is eventually discharged to the Mississippi River near the Mill Pond in Champlin.

The monitoring station in Champlin, located at the Elm Creek Road crossing in the Elm Creek Park Reserve, is operated in cooperation with 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. The watershed area above the gauging station is 86 square miles, or 81% of the hydrologic watershed.

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 the monitoring station in Champlin may be viewed on the Internet at http://waterdata.usgs.gov/mn/nwis/uv/?site_no=05287890&PARAMeter_cd=00065,00060.



Elm Creek Watershed Management Commission

Flow Monitoring.

Storm event samples are collected using an automatic sampler. Routine manual sampling occurs approximately monthly. The average daily discharge for the 2008 water year (WY), October 1, 2007 through September 30, 2008, was 35.7 cubic feet per second (cfs) or 5.65 inches. During the same period, the minimum and maximum observed average daily discharge values were 0.71 cfs and 195 cfs, respectively. The long-term average daily discharge at the station is 38.7 cfs or 6.11 inches (years 1979-2008). A spreadsheet of the data received in 2008 WY, including daily discharge and summary information, long-term flow volumes (calendar and water years), and the flow hydrograph are included in *Appendix 5*. Table 6 shows the annual instantaneous peak discharge values at the gauging station for the period of record.

Table 6. Elm Creek Annual Instantaneous Peak Discharge Rates

Date	Peak Flow (cfs)	Date	Peak Flow (cfs)	Date	Peak Flow (cfs)
4/4/79	307	8/1/90	225	4/25/01	875**
3/25/80	199	6/1/91	371	5/11/02	554
6/15/81	44	3/8/92	380	6/28/03	695
4/3/82	471*	6/22/93	315	6/03/04	350
3/9/83	408	4/30/94	669*	10/30/04	118
2/25/84	341	3/17/95	237	10/09/05	295
3/18/85	579*	3/19/96	407	3/17/07	223
3/27/86	812*	4/1/97	511*	5/4/08	205
8/1/87	185	4/5/98	306		
3/27/88	39	5/15/99	538*		
3/31/89	159	7/13/00	112		

*These values have been revised based on the 2001 rating curve.

**All-time instantaneous peak discharge. 100-year flood discharge at this site is 2290 cfs.

Elm Creek Channel Study.

In their second generation Watershed Management Plan, the Commission determined that bank stabilization and erosion control are very high priority issues. In 2005 the Commission undertook the Elm Creek Channel Study to identify unstable areas of Elm Creek, Rush Creek, North Fork Rush Creek and Diamond Creek. Due to its rapidly changing land use, low flow regimes in Elm Creek are changing and threatening the stability of the stream. The Commission wanted to determine these low flows at critical points along the creek and the stable stream configurations that would



sustain these flows in order to develop policies at the subwatershed level to prevent further degradation of the stream. Bonestroo, Rosene, Anderlik & Associates conducted the study and Three Rivers Park District entered into a cooperative agreement with the Commission to provide cost-share assistance to complete the study.

The Channel Study stated the following conclusions:

1. Many stream channels have been impacted by development.
2. The current watershed management requirements have not been adequate to reduce flow from development to provide for a stable channel.
3. Additional watershed management requirements are needed to address channel stability.
4. Extended detention and reduction of surface water runoff should be implemented by the Commission to maximize channel protection. Low impact design techniques and infiltration practices are encouraged wherever possible to reduce the need for extended detention.

Following public review and comment, the Elm Creek Channel Study was accepted by the Commission on September 12, 2007. It can be viewed at <http://www.elmcreekwatershed.org/wreschannel.shtml>.

Macroinvertebrate Monitoring (River Watch).

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 three major 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 and the main stem begins in Medina and flows through Plymouth, Dayton and Champlin, where it discharges to the Mississippi River.

Since 1995 the Commission has worked with the Hennepin Conservation District (HCD) to create and maintain a benthic macroinvertebrate monitoring program. In 2003 the program came under the guidance of the Hennepin County Department of Environmental Services (HCDES). Led by Mary Karius, Program Coordinator, River Watch, as this program is now 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 2008 students from four schools performed monitoring at five locations in the Elm Creek watershed. Todd Martin and students from Maple Grove High School monitored Elm Creek site 5. The site is located in a wooded natural area. MGHS students began monitoring this site in 1996. Elm Creek runs directly behind the school, downstream from Rice Lake, giving the students an excellent opportunity to learn about their local creek.

Students from Champlin High School, led by teachers Peter Ockuly and Jackie Paul, monitored Rush Creek site 6. This sample site is located in the Elm Creek Park Reserve and has a naturally vegetated riparian zone. It is a slow-moving, meandering stream at this site. Just upstream, the south fork of Rush Creek joins the north fork of Rush Creek. Site 6 has been sampled since 1995.



Elm Creek Watershed Management Commission

Wayzata High School students and teacher Susie Newman monitored Elm Creek site 17. This site is located on the Wayzata High School grounds just downstream from the school's stormwater holding ponds near the crossing of Elm Creek and Peony Lane.

Peter Ockuly and Jackie Paul and their Champlin High School students also monitored Elm Creek site 26. The most downstream site on Elm Creek, site 26 is located in Josephine Nunn Park in Champlin between Hayden Lake and the Mill Pond. It used to be in a forested stretch of river with high banks and several riffle areas. In 2003 development started along the banks and the entire character of the river has changed.

Rush Creek site 4 was monitored by Kaleidoscope Charter School and their teacher, Paula Higgins. This is farthest upstream sample site on Rush Creek. Rush Creek is a tributary of Elm Creek, north of its main stem. This is the only site on the south fork of Rush Creek and the only grazed agricultural sample site in the River Watch program. Water draining from most of Corcoran and northern Maple Grove flows into this stretch of creek. Through its Water Quality Education grant program the Elm Creek Commission funded the purchase of two compound microscopes to enable the students to expand their spring 2008 monitoring program. (See more details in the *Education* section of this report.)

River Watch 2008, available from HCDES, includes results from all the Hennepin County monitoring sites. Excerpts from the report on the sites in the Elm Creek watershed are found in *Appendix 6*. The complete report is available at <http://www.co.hennepin.mn.us>, keyword River Watch.

Stream Health Evaluation Program (SHEP).

In 2008, Hennepin County Department of Environmental Services (HCDES) partnered with the Elm Creek Watershed Management Commission to initiate a new stream monitoring program. HCDES has been coordinating successful monitoring programs for several years. (River Watch focuses on stream monitoring using high school students in their classroom setting to gather data. The Wetland Health Evaluation Program [WHEP] recruits adult volunteers to monitor biological health of wetlands throughout the County.)



Using the same parameters as WHEP, the Stream Health Evaluation Program (SHEP) began monitoring streams in the fall of 2008. The pilot program consisted of one team of adult volunteers monitoring seven sites in the Elm Creek Watershed. Staff from HCDES partnered with Three Rivers Parks District staff to select the monitoring sites. The sites chosen were at one time part of the River Watch program and also within the Park District boundaries.

The protocol used in SHEP is the “multi-habitat” method which has been adapted for volunteer use by the United States Environmental Protection Agency (EPA). To download the manual visit, www.epa.gov/volunteer/stream. All samples are collected by the SHEP team and processed using EPA methods. Identification is to the Family level and 100% of the samples are checked by Hennepin County Environmental Services staff for accuracy. Data is entered into an Excel

spreadsheet and appropriate indices are calculated. Evaluation is performed using the multi-metric approach.

The Hennepin County SHEP team also participated in using a new protocol for volunteers monitoring the cast skins of Chironomidae. Along with the traditional macroinvertebrate sample, the team used a technique developed by University of Minnesota Entomologist Dr. Len Ferrington. Dr. Ferrington spent an afternoon with the team training them on sampling protocols. The samples were preserved and analysis will be performed in conjunction with Dr. Ferrington’s lab. HCDES and Dr. Ferrington plan to develop an identification key for volunteer use to identify these samples to the Genus/Species level for a finer assessment of water quality.

Table 7: 2008 Stream Health Evaluation Program Results

Site	Total No. of Organisms	No. of Families	EPT*	FBI**	Grade
EC#1 Elm Creek at Territorial	431	9	1	7.9	D+
EC#2 Elm Creek at Hayden Lake Rd.	202	13	1	7.7	C
EC#3 Diamond Creek at Zanzibar	No Water; No Sample Taken				
EC#4 Rush Creek at 116	205	13	0	7.4	C+
EC#5 Rush Creek at Territorial	227	10	2	8.0	C-
EC#6 Elm Creek at 77th Avenue	234	17	3	6.6	C+

*EPT = Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (caddisflies)

**FBI = Family Biotic Index

The 2008 *Stream Health Evaluation Program Report*, available from HCDES, includes results from all the monitoring sites. Data from the sites in the Elm Creek watershed are found in Table 7. The complete report can be requested from mary.karius@co.hennepin.mn.us.

Elm, Rush and Diamond Creek Stream Monitoring Project.

The most recent water quality assessment work in the Elm Creek watershed was conducted as part of a Clean Water Legacy Act - Surface Water Assessment Grant (SWAG) awarded by the Minnesota Pollution Control Agency in 2007. The goal of the SWAG is to assess the current condition of Elm Creek and identify possible pollution sources that may be contributing to the range of water quality impairments throughout the watershed.

To assess the condition of the Elm Creek watershed, biological, chemical and physical data were collected from a series of stream and lake sites from 2007 to 2008. Chemical and physical water quality sample collection and analysis was coordinated by Three Rivers Park District (TRPD) and all samples were collected by Park District staff and citizen volunteers. Biological samples were



Elm Creek Watershed Management Commission

collected and analyzed by volunteers from TRPD and Hennepin County Environmental Services through River Watch and the Stream Health Evaluation Program (SHEP).

Ten stream sites were monitored for dissolved oxygen, *E. coli*, total phosphorus, soluble reactive phosphorus, total nitrogen, chloride, total suspended solids and invertebrate assemblage composition. Five sites were monitored weekly by citizen volunteers and sampled using standard grab sample techniques. Five sites were sampled by TRPD staff following all precipitation events using flow-automated ISCO samplers. Stream discharge was also measured at all ISCO sampler sites. Invertebrates were sampled at ten sites.

Six lake sites were monitored by TRPD staff and volunteers from the Citizen Assisted Monitoring Program (CAMP). Park District staff monitored Diamond, Weaver and Fish Lakes and CAMP volunteers monitored Henry, Sylvan, Rice and Cowley Lakes bi-weekly from April to October in both 2007 and 2008. Lakes monitored by Park District staff were sampled for water temperature, dissolved oxygen, specific conductivity, pH, secchi depth, total phosphorus, total nitrogen, chloride and chlorophyll-a. Lakes monitored by CAMP volunteers were sampled for water temperature, total phosphorus, total nitrogen, chlorophyll-a and secchi depth.

Results from the study confirm the existing impaired waters listings and suggest that Elm, Rush and Diamond Creeks and Cowley and Rice Lakes may also be impaired for bacteria, chloride, dissolved oxygen and/or nutrients. Of the three main subwatersheds, Rush and Elm Creeks had the highest nutrient and sediment loads and Diamond Creek had the lowest. Chloride concentrations were highest in Elm and Rush Creeks and lowest in Diamond Creek. Bacteria concentrations were generally above Minnesota state surface water criteria in all three tributaries, but highest in Diamond and Rush Creeks. Dissolved oxygen levels were below state standards in all three tributaries, but lowest in Rush and Diamond Creeks. Of the lakes sampled by TRPD staff, Fish and Diamond Lakes had the highest growing season surface water total phosphorus concentration (above Minnesota water quality standards) and Weaver Lake had the lowest (below state water quality standards).

Results from the SWAG, River Watch and SHEP invertebrate monitoring efforts confirm the biological impairment listing for Rush Creek and suggest that upper Elm Creek may also be impaired for biological condition. Invertebrate assemblage data from Rush and Elm Creek indicated a low occurrence of pollution-sensitive Ephemeroptera, Plecoptera and Trichoptera (EPT taxa) and a high occurrence of pollution-tolerant taxa. Additionally, a 1999 DNR fish biomonitoring study identified a fish Index of Biotic Integrity (IBI) score for Diamond Creek of 10, which is lower than the current fish IBI score (35) on Rush Creek, suggesting Diamond Creek may also be impaired.

Data analysis will be completed in 2009 and a final report will be available on the Commission's website in the fall of 2009. Results from the project will provide a more detailed understanding of the extent and source of water quality impairment throughout the Elm Creek watershed. To address these existing water quality impairments the Commission will develop a multi-parameter, watershed-wide Total Maximum Daily Load (TMDL) and Implementation Plan for the Elm Creek watershed.

Total Maximum Daily Loads (TMDLs)

The Federal Clean Water Act (CWA) of 1972 provides states with the overarching framework for protecting and restoring water quality. Section 303 of the CWA established the Water Quality Standards Program and the Impaired Waters Program.

The Impaired Waters Program (Section 303(d)) requires the Minnesota Pollution Control Agency (MPCA) to prepare a list of impaired waters every two years, which is transmitted to the Environmental Protection Agency (EPA) for review and approval. In addition, MPCA must prioritize these waters and develop an in-depth study of each, called a Total Maximum Daily Load (TMDL) study. TMDL studies are intended to be a first step toward improving water quality and restoring beneficial uses for each impaired water. The EPA requires that TMDLs be developed and completed within 15 years of a waterbody being placed on the 303(d) list.

Examples of impairments commonly seen in waterbodies across Minnesota include low dissolved oxygen, E. coli, turbidity, bioaccumulative toxics, mercury, ammonia, excess nutrients, and biotic integrity. Some waterbodies have multiple impairments, which must be reported individually. Minnesota's 2008 TMDL list contains 1,475 impairments on 336 rivers and 510 lakes. For a complete list visit <http://www.pca.state.mn.us/water/tmdl/tmdl-303dlist.html>.

According to the EPA, a TMDL is both a *process* and a *formula*. As a process a TMDL provides an organized framework for pinpointing the water quality problems associated with an impairment. The TMDL also serves as a springboard for action, by not only diagnosing the problem, but also outlining pollutant reduction goals as well as action steps leading to the restoration of beneficial uses of the waterbody.

Completing a pollutant load allocation formula is key to the TMDL process. Using quantitative assessment tools (e.g., models); TMDL studies describe the existing condition of a waterbody and determine the maximum amount of a specific pollutant that can be discharged to a waterbody while still meeting water quality standards. This formula must be completed for each impairment.

$$LA(s) + WLA(s) + MOS + RC = TMDL \text{ for pollutant}$$

Where:	LA	=	Load allocation for nonpoint sources of pollution
	WLA	=	Waste load allocation for point sources of pollution
	MOS	=	Margin of Safety to account for scientific uncertainty
	RC	=	Reserved loading capacity for future development
	TMDL	=	Total Maximum Daily Load

Some of the major components of a TMDL document include:

- A description of the *public participation plan*.
- An *assessment* of waterbody health.
- A *technical analysis* of water quality data to determine the causes and sources of impairments.
- An *allocation of acceptable pollutant loads* to the waterbody from both point and nonpoint sources.
- A *general implementation strategy* that includes potential restoration strategies.
- An *effective monitoring plan* to assess progress in improving water quality over time.



Elm Creek Watershed Management Commission

MPCA is responsible for reviewing TMDLs for quality and completeness and submitting them to the EPA; EPA is responsible for approval; and both are responsible for legally defending the technical accuracy of the TMDL study. Local units of government are not legally liable for the accuracy or completeness of the document. A host of funds, including federal, state, local, nonprofit and private monies will likely be needed for implementation of water quality restoration activities.

In the past the Elm Creek Watershed Management Commission, in collaboration with Three Rivers Park District, Hennepin County Environmental Services, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency (MPCA), United States Department of Geological Services (USGS) and the Metropolitan Council, has conducted a series of monitoring and assessment studies to address water quality throughout the watershed. Based on the results of this work, Diamond, Fish, Weaver and French Lakes and Elm, Rush and Diamond Creeks are currently listed as impaired for dissolved oxygen, biota, nutrients or mercury by MPCA.

Elm Creek Watershed-wide TMDL.

At 2008 year-end discussions were ongoing with the Minnesota Pollution Control Agency, Three Rivers Park District and the Commission to develop a watershed-wide, multi-parameter Total Maximum Daily Load (TMDL) and Implementation Plan that will collectively address all water quality impairments throughout the Elm Creek watershed. Given the size and complexity of the Elm Creek watershed, both ecologically and socio-politically, the TMDL work plan proposes that TMDL development be divided into five phases beginning in the spring of 2009 and ending in the fall of 2014. In general, the phases will be implemented sequentially (working downstream to upstream), and prioritized based on level of impairment. *Appendix 7* shows the Waterbodies Addressed in the Watershed-wide TMDL and includes a map showing the Elm Creek sampling sites.

Phase I will characterize the dissolved oxygen (DO) impairment in lower Elm Creek and identify the relative oxygen demand (OD) loading (biological and chemical) from landscape inputs, upstream reaches and internal processes. Phase II will be conducted in the Rush Creek subwatershed and will identify the source(s) of the Biological Impairment in Rush Creek, Nutrient Impairment in Henry Lake and the downstream contribution of DO loading to lower Elm Creek. Phase III will be conducted in the upper Elm Creek subwatershed and will identify the source(s) of dissolved oxygen (DO) impairment in upper and lower Elm Creek and Nutrient Impairment in Rice and Fish Lakes. Phase IV will be conducted in the Diamond Creek subwatershed and will identify the source(s) of Nutrient Impairment in Diamond and French Lakes and OD loading to lower Elm Creek.

Assessment work in each subwatershed will be completed in approximately two years. Throughout the assessments, samples will be collected and analyzed to determine the scope and magnitude of Bacteria, Chloride and Biotic Impairment based on results from the Surface Water Assessment Grant.

Following completion of the TMDL assessment work in each subwatershed, stressor-specific TMDL targets, Wasteload Allocations (WLAs), Load Allocations (LAs) and Implementation Plans will be developed in conjunction with a concurrent stakeholder process. Results from all modeling and assessment work will be initially summarized to describe multi-stressor WLAs, LAs and load

reduction goals for various stakeholder groups on a subwatershed basis and ultimately summarized into a multi-stressor, watershed-wide TMDL and Implementation Plan (Phase V). The watershed-wide Implementation Plan will be holistic in that it will address management activities for all the surface waters (both impaired and those currently meeting water quality standards) in the watershed. The goal is for this plan to complement the Commission's Watershed Management Plan.

Wetland Health Evaluation Program (WHEP).

In 1997 the Minnesota Pollution Control Agency (MPCA) developed monitoring and assessment protocols for volunteer use in wetlands. Today, the Minnesota Wetland Health Evaluation Program (WHEP) continues to use these same methods to train citizens to conduct assessments of wetland health by sampling both the invertebrate and plant communities. Volunteers identify their samples, score the wetland appropriately, and ultimately assess the condition of the wetland. In order to produce quality data, two quality assurance (QA) steps are built into the program. The first is a "cross-check," whereby teams sample one wetland from another team. The second is a check performed by the Hennepin County Department of Environmental Services (HCDES) staff. All data sheets and resulting scores are checked for accuracy by the HCDES coordinator.

The Hennepin County WHEP began in 2002. In 2008 eight teams comprised of more than 75 citizen volunteers monitored 32 sites covering every watershed in Hennepin County. Twelve wetlands were monitored in the Elm Creek watershed. Eight of the wetlands are in Maple Grove; the remaining four are in Champlin, Corcoran, Dayton and Plymouth.

WHEP uses the Index of Biological Integrity (IBI) to provide a thorough analysis of wetland condition. An IBI score shows a strong response to human disturbance and/or pollution. Six measures are used to make up the IBI for invertebrates, seven for vegetation. Each wetland receives both a macroinvertebrate and vegetation score.



2008 macroinvertebrate scores ranged from a low of 10 (poor) to a high of 30 (excellent), with most of the sites in the 15-22 (moderate) range. The vegetation IBI scores ranged from 7 (very poor) to 27 (excellent). Results from the twelve wetlands as well as a map of all of the Hennepin County WHEP monitoring sites are found in *Appendix 8*.

The *2008 Wetland Health Evaluation Report*, available from HCDES, includes results from all the Hennepin County monitoring sites. The complete report can be requested from mary.karius@co.hennepin.mn.us.

Education and Public Outreach.

In 2007 the Commission became a member of the joint watershed Education and Public Outreach Committee (EPOC). Comprised of members from the Bassett Creek, Elm Creek, Shingle Creek, and



Elm Creek Watershed Management Commission

West Mississippi watershed management organizations and representatives from Hennepin County Department of Environmental Services and Three Rivers Park District, EPOC's goal is to coordinate and collaborate in education and outreach activities in the northwestern Hennepin County watersheds.



Last year the EPOC conducted a joint opinion survey to help identify the water resources knowledge base of residents living in the nineteen cities covered by the four organizations. An intended outcome of the survey is a joint educational program for citizens, municipal employees and educators. The program will be launched in 2009.

In 2008 the Elm Creek Commission awarded a Water Quality Education Grant to Kaleidoscope Charter School in Rogers. The \$1,000 funding was used to purchase

two Leica E24 compound microscopes that will be used for water quality testing and continued science education in the classroom. Paula Higgins and her middle school students use the microscopes to assist in identifying the organisms collected while participating in River Watch. They focus on the ecological aspects of the river including water quality and stewardship. For their final report, the students created a PowerPoint™ presentation of their River Watch results. It can be viewed at www.elmcreekwatershed.org.

Written Communications.

The Elm Creek Commission maintains a website www.elmcreekwatershed.org to provide news to residents of the watershed and beyond. The Watershed Management Plan, monthly meeting materials, project reviews, Annual Reports, water monitoring results, and other watershed-related information are posted there. In addition, from time to time, news releases are provided to the member cities and their official newspapers for publication.

www.pressnews.com serves as the Commission's official newspaper.

Interest Proposals.

The required biennial solicitation for interest proposals for professional, technical and wetland consulting services was published in the January 8, 2007 edition of the *State Register*. After reviewing the responses, the Commissioners approved the individuals and companies named in *Appendix 1*. This process will be repeated in 2009.

Financial Reporting.

Appendix 9 includes the Commission's approved budget for 2008, a report of revenues and expenditures for 2008, and the 2008 Audit Report prepared by Johnson & Company, Ltd., Certified Public Accountants.

2009 Work Plan.

In addition to continuing the programs and activities described above, in 2009 the Elm Creek Watershed Management Commission will:

- Sponsor a Metro Blooms Rain Garden Workshop in conjunction with its Education and Public Outreach Program.
- Begin development of the Watershed-wide Total Maximum Daily Load (TMDL).
- Redesign the Commission's website to incorporate the latest technologies and interactive capabilities.

Questions regarding this 2008 Annual Report should be directed to judie@jass.biz.