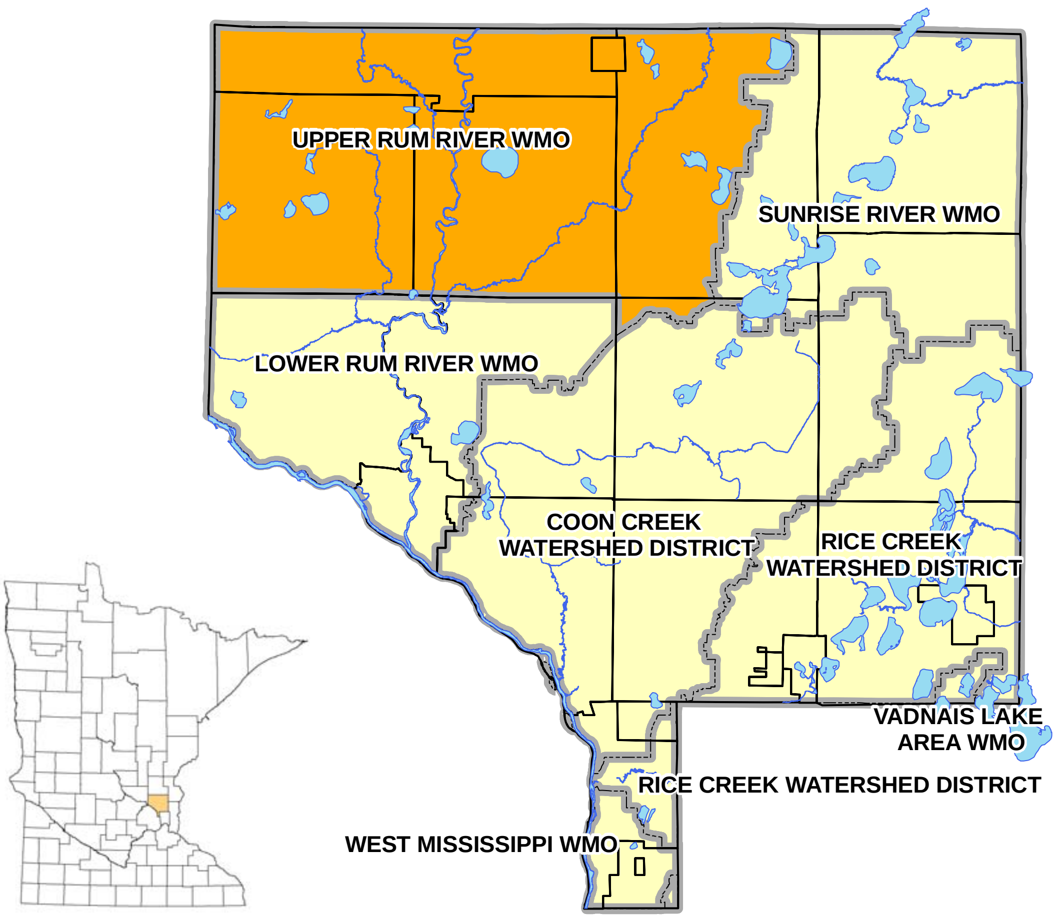
2011 Annual Report

Upper Rum River

Watershed Management Organization

Bethel - East Bethel – Ham Lake
Nowthen - Oak Grove – St. Francis



March 28, 2012

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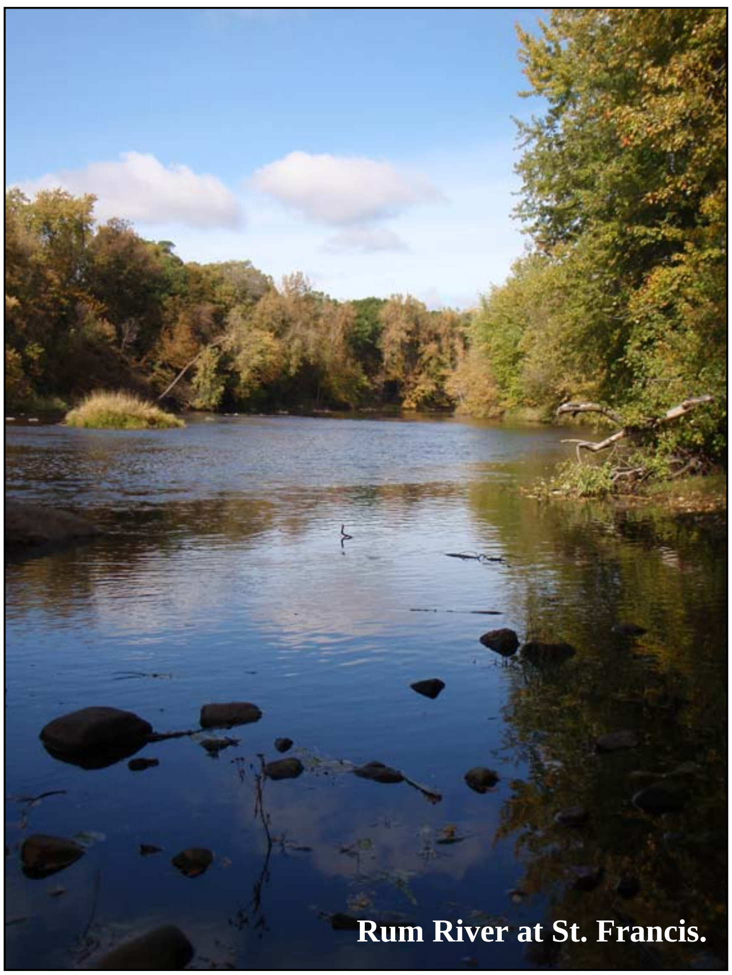
I. Introduction

This report has been prepared to meet the annual watershed management organization reporting requirements of Minnesota Rules 8410.0150. The report is intended to fulfill 2011 reporting requirements.

The Upper Rum River Watershed Management Organization (URRWMO) is a joint powers organization under Minnesota Statutes, Section 471.59. It is comprised of the cities of Bethel, Oak Grove, Nowthen, and St. Francis, and portions of the cities of East Bethel and Ham Lake. Board members are appointed by the member cities. The organization's direction is laid out in its watershed management plan and the member municipalities' local water plans. The URRWMO meets meet every other month on the first Tuesday at 7pm at the Oak Grove City Hall.



Rum River at St. Francis.

II. Activity Report

a. Current Board Members

<u>CITY OF BETHEL</u>	
Todd Miller (Chair) PO Box 15 Bethel, MN 55005 763.434.8331 tmiller@popp.net	Vacant
<u>CITY OF EAST BETHEL</u>	
Richard Lawrence 455 Sims Road NE East Bethel, MN 55011 763.434.0737 richard.lawrence@ci.east-bethel.mn.us	Jared Trost 23016 Sunset Rd NE East Bethel, MN 55005 763.477.8309 trost010@umn.edu
<u>CITY OF HAM LAKE</u>	
Kevin Armstrong 14333 Bataan ST NE Ham Lake, MN 55304 763.757.5121 kmarmst@mac.com	Vacant
<u>CITY OF NOWTHEN</u>	
Orval Leistico 21413 Nowthen Blvd Elk River, MN 55330 763.441.1959 ojnowthen@q.com	Richard Walstrom 20390 Basalt Street NW Nowthen, MN 55303 763.753.2367 tsmrlw02@msn.com
<u>CITY OF OAK GROVE</u>	
Ed Faherty 2847 Greenwald Island Cedar, MN 55011 763.753.3452 fahertyme@msn.com	John Wangensteen 19230 Orchid Street Anoka, MN 55304 763.213.0155 johnw.8462@usfamily.net
<u>CITY OF ST. FRANCIS</u>	
Lan Tornes 24244 Hummingbird Street NW St. Francis, MN 55070 763.213.0621 lantornes@gmail.com	Jerry Tveit 23340 Cree Street NW St. Francis, MN 55070 763.235.2310 jtveit@stfrancismn.org

b. Employees and Consultants

The URRWMO does not employ staff, but does utilize consulting services and enters into cooperative agreements with other government agencies. A description of contracted services is listed below:

Consultant/Partner	Contact	Work Description
Anoka Conservation District	Jamie Schurbon, Water Resource Specialist 1318 McKay Drive NW, #300 Ham Lake, MN 55304 763-434-2030 ext. 12 jamie.schurbon@anokaswcd.org	• Water quality and hydrological monitoring, and special studies. • Website maintenance. • Administer the WMO's cost share grants for water quality improvement projects. • Assistance preparing annual newsletter article. • Assistance preparing annual reports to BWSR. • Assistance reviewing local water plans.
Gail Gessner	Gail Gessner 4621 203rd Lane NW Oak Grove, MN 55303 763-753-2368 bethelgail@hotmail.com	• Recording secretary for meetings

c. Solicitations for Services

Minnesota Statutes 103B.227 require watershed management organizations to solicit bids for professional services at least once every two years. The URRWMO last solicited bids in 2010 for work to occur 2011. Documentation is provided in our 2010 annual report. The next time we plan to solicit bids is in 2012 for work to occur in 2013.

d. Implementation of Watershed Management Plan

The URRWMO Watershed Management Plan was last updated and approved by the Minnesota Board of Water and Soil Resources (BWSR) in 2007. Implementation of the updated plan also began in 2007. The plan contains a detailed schedule of tasks that the URRWMO should accomplish each year in order to realize its goals. The table on the following page compares our planned work to our accomplished work.

Comparison of work planned in the URRWMO Watershed Management Plan (including amendments) and work accomplished for the last 3 years. The work plan for 2012 is also shown.

Task	2009 Planned	2009 Accomplished	2010 Planned	2010 Accomplished	2011 Planned	2011 Accomplished	2012 In Watershed Plan	2012 Plan to Do
Monitoring								
Lake Levels	George, East Twin Lakes	George, East Twin Lakes	George, East Twin Lakes	George, East Twin Lakes	George, East Twin Lakes	George, East Twin, Minard, and Cooper Lakes	George, East Twin Lakes	George, East Twin, Minard, and Cooper Lakes
Lake Water Quality					George, East Twin Lakes	George, East Twin Lakes		
Stream Water Quality	Rum River, 2 sites Cedar, Ford, and Seelye Brooks to be monitored 1 year during 2008-2012	Rum River, 2 sites	Rum River, 2 sites Cedar, Ford, and Seelye Brooks to be monitored 1 year during 2008-2012	Rum River, 2 sites. Done in coordination with Lower Rum R WMO and Met Council monitoring	Rum River, 2 sites Cedar, Ford, and Seelye Brooks to be monitored 1 year during 2008-2012	Rum River, 2 sites Cedar, Ford, and Seelye Brooks	Rum River, 2 sites	None. MPCA monitoring in 2013-14. WMO temporarily suspending monitoring to avoid duplication.
River Biomonitoring with St Francis High School classes								Rum River biomonitoring with St. Francis High School classes
Reference Wetland Hydrology								Lake George and East Twin reference wetlands
Groundwater Levels			Develop groundwater level monitoring plan in 2010-11		Develop groundwater level monitoring plan in 2010-11			
Water Quality Improvement								
Water Quality Improvement Cost Share Fund	$1,000	$1,990 carry over	$1,000	$500 plus $1,990 carry over	$1,000	$567 + $1,385.50 carry over. Crooked Br streambank stabilization at Petro property	$1,000	$567 + $1,580.90 carry over. Fund Crooked Br streambank stabilization at Petro property and Lake George shoreline resto at Erickson property.
Public Education								
Website or Newsletter	Annual newsletter, Maintain and update website	Annual newsletter, Maintain and update website	Annual newsletter, Maintain and update website	Annual newsletter, Maintain and update website	Annual newsletter, Maintain and update website	Annual newsletter, Maintain and update website	Annual newsletter, Maintain and update website	Annual newsletter, website, create web video about the WMO and biomonitoring.
Other Education								
Inventories and Studies								
Erosion Mapping			Field study of Rum R. erosion and initiate corrective actions	Field study of Rum R. erosion and offer technical and corrective assistance to owners with problems	Field study of Rum R. erosion and initiate corrective actions	Study completed in 2010. Ongoing work with landowners to correct problems		
Study groundwater levels, trends, water quality and capacity.	Groundwater study, including aquifer capacity- 2010-2017.	Contributing $5,000 to initiate Co. Geologic Atlas.	Groundwater study, including aquifer capacity- 2010-2017.	Contributing $2,830 to County Geologic Atlas.				
Planning and Reporting								
Annual Report to BWSR	Write and submit	2008 Annual Report submitted April 9, 2009	Write and submit	Wrote and submitted	Write and submit	Wrote and submitted	Write and submit	Wrote and submitted
Review member cities' annual reports to the URRWMO	Review cities' reports	Done by URRWMO Bd	Review cities' reports	Done by URRWMO Bd	Review cities' reports	Done by URRWMO Bd	Review cities' reports	URRWMO Bd will do.
Review member city Local Water Plans, once revised	Complete review of draft Local Water Plans for compliance with URRWMO Plan	St. Francis, Oak Grove, & Ham Lake draft Plans reviewed, revised, and approved. East Bethel plan approved pending minor edits	Complete review of draft Local Water Plans for compliance with URRWMO Plan	Requested edits to E Bethel plan were received, plan approved. All are now done.				
Review WMO Plan, including past work and upcoming budget	Review WMO Plan, work and budget	Done by WMO Board during annual reporting	Review WMO Plan, work and budget	Done by WMO Board during annual reporting	Review WMO Plan, work and budget	Done by WMO Board during annual reporting		
Update Joint Powers Agreement		Minor updates in progress	WMO Board continues work on JPA updates	Minor updates remain outstanding, despite work	WMO Board continues work on JPA updates			
Set aside matching funds for future grants	$1,000	Unable with current finance administration	$1,000	Unable with current finance administration	$1,000	Unable with current finance admin. Admin changed so it can occur in 2012.		
Other	Review East Bethel's TH 65 wetland mgmt plan	Not needed - development has not proceeded					Develop 2013-17 water monitoring plan.	Develop 2013-17 water monitoring plan.

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e. Status of Local Plan Adoption and Implementation

All URRWMO member cities have local water plans which are consistent with the URRWMO Watershed Management Plan and have been approved by the URRWMO. All were updated in 2008 or 2009 for consistency with the URRWMO Plan, which was approved in 2007. These plans are now being implemented.

To track member cities' progress on local plan implementation, the URRWMO requires a brief annual report from each city and provides a template for this report. In addition to serving as a reporting tool, we hope that the template serves as a "to do" list for our cities. These reports are available upon request, and are summarized in the table below.

Status of city local water plans and some recent accomplishments toward plan implementation.

City of Bethel	
Local Water Plan Status	Bethel's new local water plan has been approved by the URRWMO and favorably reviewed by the Metropolitan Council. The URRWMO approved the plan in February 2009. In its 2011 annual report, it is apparent that the City lacks several programs that are required by the URRWMO plan. These include: an erosion and sediment control ordinance, stormwater ordinance, flood ordinance, a permit program for wetland excavations, stormwater infrastructure inspections, and guidelines for developers. The URRWMO is revisiting whether some of these requirements are not applicable to the City of Bethel because it is very small and completely built out. Some items are recognized by the City as deficiencies that need to be corrected. The URRWMO and City will work through these issues in 2012.
Submitted 2011 annual report to URRWMO?	Yes
Some Recent Implementation Accomplishments	• Educational efforts that reached 176 households on the topics of hazardous waste disposal and yard waste management. • Is working to reevaluate stormwater treatment and conveyance in the city. • Street sweeping. • Completed a wetland ordinance. • Development of a map in 2008 that includes ponds, lakes, streams, wetlands, and major storm sewer crossings. • Development in 2008 of an engineering manual with stormwater construction requirements.
City of East Bethel	
Local Water Plan Status	East Bethel's local water plan was approved by the URRWMO in 2010. Previously, a draft had been reviewed in May 2009, and was approved contingent upon several minor revisions. Those revisions were received in 2010, and favorably reviewed. The city still lacks several needed ordinances, including erosion and sediment control and stormwater. Their 2011 report indicated they lack a wetland ordinance, but also lists out required buffer widths which suggests they do have such an ordinance.
Submitted 2011 annual report to	Yes

URRWMO?

Some Recent Implementation Accomplishments

- Inventoried and did MN RAM classifications on four wetlands in 2011. Wetland protections differ for each wetland classification.
- Inspecting land disturbance activities weekly or after rain events. No enforcement actions were needed in 2011.
- Street sweeping.
- Ongoing work to complete BMP's in the City's Storm Water Pollution Prevention Plan.
- Developed stormwater treatment basin and sump inspection program in 2009. In 2010 they planned to begin the inspections in 2011. That did not occur and their 2011 report states inspections will begin in 2012.
- Educational efforts that reached 11,000 residents on the topics of wetland buffers, water conservation, hazardous waste disposal, yard waste management, and pet waste disposal.

City of Ham Lake

Local Water Plan Status

Ham Lake's new local water plan has been favorably reviewed by the Metropolitan Council and URRWMO. The URRWMO approved the plan in May 2009, with contingencies. At their December 7, 2009 meeting, the Ham Lake City Council approved the local water plan with revisions that met the URRWMO's contingencies.

Submitted 2011 annual report to URRWMO?

Yes

Some Recent Implementation Accomplishments

- Inspection of structural pollution control devices, and maintenance based upon inspection reports.
- Routine inspection of land disturbance activities.
- Street sweeping.
- Ongoing work to complete BMP's in the City's Storm Water Pollution Prevention Plan.
- Inspection of 20% of MS4 outfalls, sedimentation basins, and ponds each year on a rotating basis. Any cleaning or maintenance is based on the inspection reports.
- Educational efforts through the City's newsletter, which reaches the entire population of 14,000+. Educational article topics in 2011 included wetland buffers, water quality monitoring, groundwater protection, water conservation, hazardous waste disposal, yard waste management, pet waste disposal, and activities of the URRWMO. Additional education is accomplished through the city's website.

City of St. Francis

Local Water Plan Status

St. Francis' local water plan has been approved by the URRWMO. The City first submitted a revised local water plan that was favorably reviewed by the Metropolitan Council on May 5, 2009 and approved contingent upon several minor revisions by the URRWMO on the same day. Revisions were made by the city to address the contingencies and the URRWMO approved the St. Francis local water plan on September 1, 2009.

The City lacks a shoreland ordinance, as required by the URRWMO. However it does have a special Rum River district with scenic river rules. As determined by the DNR, because the city has no lakes, a shoreland ordinance is not applicable.

Submitted 2011 annual report to URRWMO?

Yes

Some Recent Implementation Accomplishments

- Inspecting construction projects weekly or after rain events >0.5 inches.
- Swept all streets with improved surfaces (urban and rural) in spring. Swept all urban streets again in the fall.
- Development of a GIS inventory and inspection plan for stormwater treatment basins and water control structures is underway. Inspections will begin in fall 2012.
- Educational efforts that reached 7,500 residents on the topics of groundwater protection, water conservation, yard waste management, and hazardous waste disposal.
- Routine removal of sediment from a Stormceptor treatment device on Rum River Boulevard.
- The City is working toward the goal of establishing local policies and official controls for surface and groundwater management.

City of Nowthen

Local Water Plan Status

Nowthen's local water plan ahs been approved by the URRWMO. The URRMO Board first reviewed the plan in February 2009, where some deficiencies were found. The City revised the plan based upon URRWMO comments. The revised plan was approved by the URRWMO Board in May 2009. The Metropolitan Council has also indicated that they found the draft plan satisfactory in their January 2009 letter.

The City has the full suite of water protection ordinances required by the URRWMO.

Submitted 2011 annual report to URRWMO?

Yes

Some Recent Implementation Accomplishments

- Updated ordinances in 2010, including erosion control, stormwater, and wetland ordinances for consistency with the URRWMO Plan.
- Adopted an illicit discharge ordinance in 2010.
- Swept streets in areas with curb and gutter and other priority areas, including Rogers Lake Area, Quiet Meadows, Autumn Acres, East Twin Lakes Parking Lots, and Garnet Street.
- Ongoing work to complete BMP's in the City's Storm Water Pollution Prevention Plan.
- Annual inspections of stormwater basins and sumps. Repaired a catch basin at 199th Avenue. Performed maintenance at the 223rd Avenue pond.
- Educational efforts to approximately 2,300 residents on topics of hazardous waste disposal and yard waste disposal.

City of Oak Grove

Local Water Plan Status

Oak Grove's local water plan ahs been approved by the URRWMO. The City first submitted its local water plan to the URRWMO in early 2009. The URRWMO noted several deficiencies in a comment letter dated February 3, 2009. Revisions were made and the URRWMO approved the plan in May 2009. The Metropolitan Council favorably reviewed the plan (letter dated Sept. 9, 2009). The City already has all of the ordinances required by the URRWMO Plan.

Submitted 2011 annual report to URRWMO?

Yes

Some Recent Implementation Accomplishments

- The Public Works Department inspected 88 storm ponds in 2010 and their attached facilities. Of those inspected, 15 had issues ranging from gopher mounds to poor vegetation. Issues are being addressed as they are identified.
- There are also 15 sumps located in the City and currently the City does not vacuum

sumps but now realizes this is desirable maintenance. They will work to begin this activity in 2012.

- Street sweeping in spring.
- Ongoing work to complete BMP's in the City's Storm Water Pollution Prevention Plan.
- Completed mapping of stormwater conveyance system.
- Educational efforts that reached 4,000 residents on the topics of groundwater protection, yard waste disposal, pet waste disposal, and activities of the URRWMO.
- The City continues to work diligently to decrease illicit discharges. Their recycle day and recycling center give residents options to dispose of material without turning to illegal dumping. Their quarterly newsletter is used to explain illicit discharge and proper septic system maintenance to residents.
- Monitored two permitted projects in 2011: Holly Street reconstruction and the Oak Grove Animal Hospital.

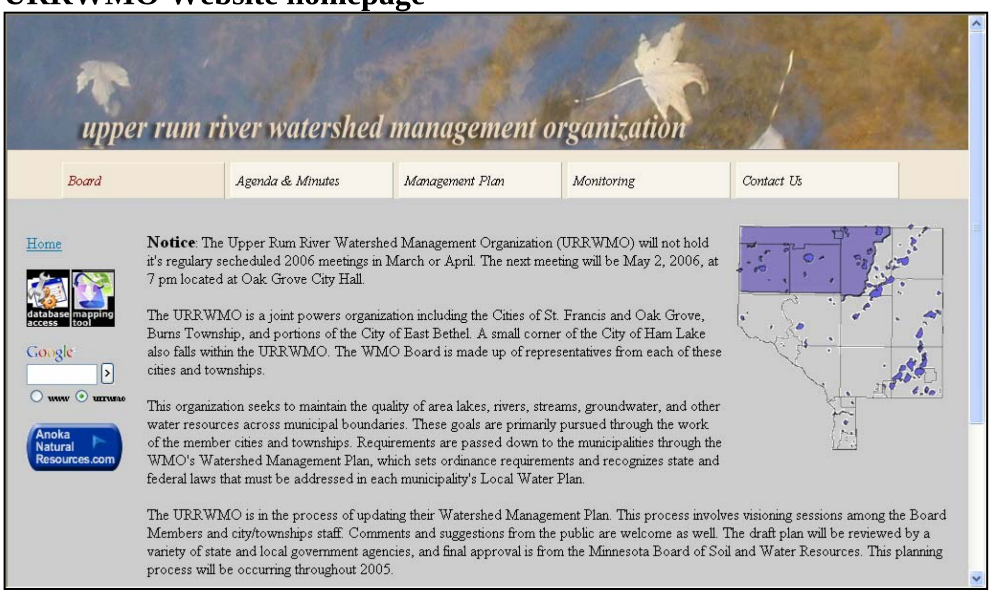
f. Public Outreach

The URRWMO and its member cities do occasional public outreach and education projects (see tables above), but the URRWMO's website serves as the primary, continuous public outreach tool. The website was designed in 2003 and has been in continuous operation since. Website contents include general information about the organization, the watershed management plan, meeting agendas and minutes, water monitoring results, profiles of WMO projects, access to mapping and data access tools, and others.

The website serves as an alternative to the state-mandated annual newsletter. The URRWMO ensures visibility of its website by asking member cities and townships to post the URRWMO website address in their newsletters. Links to the URRWMO website are also provided through other websites including the Anoka Natural Resources, Anoka Conservation District, and member municipality websites.

The website address is http://www.anokanaturalresources.com/urrwmo

URRWMO Website homepage



g. Permits, Variances, and Enforcement Actions

The URRWMO does not issue permits, variances, or take enforcement actions. These responsibilities are held by the member municipalities.

h. Status of Locally Adopted Wetland Banking Program

The URRWMO does not have a locally adopted wetland banking program.

i. 2012 Work Plan

Task	Purpose	Description	Locations or Action	Cost
Lake Level Monitoring	To understand lake hydrology, including the impact of climate or other water budget changes. These data are useful for regulatory, building/development, and lake management decisions. Cooper and Minard Lakes were being added in 2011. Water level issues and citizen complaints have become frequent at these lakes.	Weekly water level monitoring in lakes by volunteers. All are available on the Minnesota DNR website using the "LakeFinder" feature (www.dnr.mn.us.state \lakefind\index.html).	East Twin Lake Lake George Cooper Lake Minard Lake	$680
Lake Water Quality Monitoring	To detect water quality trends and diagnose the cause of changes.	May through September twice-monthly monitoring of the following parameters: total phosphorus, chlorophyll-a, secchi transparency, dissolved oxygen, turbidity, temperature, conductivity, pH, and salinity.	None in 2012	$0
Rum River Invertebrate Biomon-itoring	To assess overall river health. To provide a hands-on educational experience to high school students.	Facilitated by the ACD, science classes from St. Francis High School assess aquatic insect populations. Students will collect macroinvertebrate samples, identify them, and calculate indices of river health. Anoka Conservation District staff provide instruction, oversight, and write a final report. This monitoring has been conducted for more than 10 years.	Rum River at Hwy 24	$800

Task	Purpose	Description	Locations or Action	Cost
Reference Wetland Hydrology Monitoring	The ACD maintains a network of 18 reference wetlands throughout the county. These data aid in understanding of water conditions in wetlands, surficial water table changes, and trends. It is useful for regulatory determinations (for example, is a dry area actually a wetland, or are all wetlands dry right now?) and resolving water level disputes. Each reference wetland has been monitored for more than 10 years, providing a long term record.	Install and maintain a WL40 electronic water level monitoring device at the edge of reference wetlands. These devices measure water levels every four hours. Data are made available at any time through the ACD website.	East Twin and Lake George Reference Wetlands	$1,100
URRWMO Website	To increase awareness of the URRWMO and its programs. The website also provides tools and information that helps users better understand water resources issues in the area. The website serves as the URRWMO's alternative to a state-mandated newsletter.	Maintain and update the URRWMO website with current information about the organization, and meeting minutes and agendas. Web videos developed by the URRWMO are also featured on the website.	http://www.anokanaturalresources.com/urrwmo/	$290
URRWMO Annual Newsletter	To increase awareness of the URRWMO and its programs, as well as educate the public on water quality issues. A featured topic in the 2012 article will be stream biomonitoring.	In order to achieve the greatest distribution at the lowest cost the URRWMO will draft an newsletter article and ask that member cities include it in their newsletters. It is also printed in the school district newspaper, "The Courier."	Watershed-wide	$350
Web Video	To increase awareness of the URRWMO and its programs, as well as educate the public on water quality issues.	The 2012 web video will feature the student stream biomonitoring program.	Watershed-wide	$1,050
Prepare 2011 Annual Report to BWSR	To provide transparency and accountability of organization operations.	Produce an annual report of URRWMO activities and finances that satisfies Minnesota Rules 8410.0150.	Watershed-wide	$630
Cost Share Grants for Water Quality Improve-ment	To improve water quality in lakes, rivers, and streams.	These grants offer up to 70% cost sharing of the materials needed for a water quality improvement project. Typical projects include erosion correction, lakeshore restoration, and rain gardens. The Anoka Conservation District provides administration.	Offer grants	$1,000
Develop 2013-17 Monitoring Plan	To plan water monitoring efforts for the next five years.	This plan is a re-evaluation of monitoring plans set forth in the URRWMO Watershed Plan. That plan applies through 2012.	Watershed-wide	$455

III. Financial and Audit Report

a. 2011 Financial Summary

Expenditures and revenues for the year are detailed in the table below. Each municipality's contribution (WMO revenue) follows the WMO's joint powers agreement.

Expenditures	**Amount**
Administrative	
Insurance – League of MN Cities Insurance Trust	$2,277.00
Secretarial services - Gail Gessner	$675.00
Postage	$00.00
Copies	$00.00
City of Oak Grove administration fees	$300.00
SUBTOTAL	$3,252.00
Non-Administrative	
Water Monitoring - Anoka Conservation District (ACD)	$9,090.00
Website – ACD	$270.00
2010 annual report to BWSR – ACD	$630.00
URRWMO annual newsletter article – ACD	$350.00
Cost share grant fund for water quality projects	$567.00
SUBTOTAL	$10,907.00
GRAND TOTAL	$14,159.00
Revenues (% cost distribution specified in JPA)	**Amount**
Administrative	
City of Bethel (16.67% of expenses)	$ 542.00 (16.67%)
Burns Township (16.67% of expenses)	$ 542.00 (16.67%)
City of East Bethel (16.67% of expenses)	$ 542.00 (16.67%)
City of Ham Lake (16.67% of expenses)	$ 542.00 (16.67%)
City of Oak Grove (16.67% of expenses)	$ 542.00 (16.67%)
City of St. Francis (16.67% of expenses)	$ 542.00 (16.67%)
SUBTOTAL	$3,252.00
Non-Administrative	
City of Bethel (1.08% of expenses)	$ 117.80 (1.08%)
City of Nowthen (23.66% of expenses)	$2,580.60 (23.66%)
City of East Bethel (24.21% of expenses)	$2,640.58 (24.21%)
City of Ham Lake (0.99% of expenses)	$ 107.98 (0.99%)
City of Oak Grove (29.69% of expenses)	$3,238.29 (29.69%)
City of St. Francis (20.37% of expenses)	$2,221.76 (20.37%)
SUBTOTAL	$10,907.01
GRAND TOTAL	$14,159.01

In 2012 the URRWMO will begin using a new financial arrangement. Through December 31, 2011 URRWMO finances were handled within the City of Oak Grove's finances. As expenditures occurred, the member cities were invoiced that amount. The result was a zero account balance carryover from year to year. A disadvantage is that this prevented the URRWMO from having reserve funds and from accumulating funds to match grant opportunities. Starting in 2012 the URRWMO has its own checking account and member cities will be invoiced twice per year, each time for half of the annual budget (not the amount of actual expenditures).

b. Fund Balances

The URRWMO's general fund balance at the end of 2010 was $0. Revenues matched expenditures.

The URRWMO contributes to a fund for cost share grants for water quality improvement projects. This is part of a larger county-wide fund administered by the Anoka Conservation District. URRWMO dollars can only be awarded to projects in the URRWMO area. The fund balance history is:

2006-09 URRWMO Contributions	+	$1,990.00
2006-09 Expenditures		$ 0
2010 URRWMO Contribution	+	$ 500.00
2011 URRWMO Contribution	+	$ 567.00
2010-11 Expenditure Petro streambank stabilization	-	$1,027.52
2011 Expenditure Petro streambank stabilization (encumbered)	-	$ 76.98
2011 Expenditure Erickson lakeshore restoration (encumbered)	-	$ 371.60
Fund Balance		**$ 1,580.90**

a. 2011 Financial Audit Documentation

The URRWMO finances are scrutinized in two ways.

1. An financial report for 2011 is complete. That report is Appendix A.
2. Audit scrutiny of the URRWMO finances occurs through the audit of the City of Oak Grove finances. All URRWMO revenues and expenditures are administered through the City of Oak Grove, 19900 Nightingale St. NW Cedar, MN 55011. The City of Oak Grove has undergone a complete financial audit yearly by a certified accounting firm. The 2011 audit will be completed in June 2012. When completed the audit will be available for review at the City of Oak Grove. The audits are conducted by:

   Melissa A Schlingman, Senior Staff Accountant
   DeWenter, Viere, Ltd.
   320.650.0223 Direct
   Mschlingman@kdv.com
   http://www.kdv.com

b. 2012 Budget

At its May 3, 2011 meeting the SRWMO Board approved a 2011 budget of $12,415. Details of that budget are below.

		Bethel	East Bethel	Ham Lake	Nowthen	Oak Grove	St. Francis
WATERSHED PLAN IMPLEMENTATION		1.08%	24.21%	0.99%	23.66%	29.69%	20.37%
Lake Levels Monitoring - Lake George, East Twin Lake, Cooper Lake, Minard Lake	$680.00	$7.34	$164.63	$6.73	$160.89	$201.89	$138.52
River Water Quality Monitoring - upstream & downstream	$2,250.00	$24.30	$544.73	$22.28	$532.35	$668.03	$458.33
Develop 2013-2017 Monitoring Plan	$455.00	$4.91	$110.16	$4.50	$107.65	$135.09	$92.68
URRWMO Website	$290.00	$3.13	$70.21	$2.87	$68.61	$86.10	$59.07
URRWMO Annual Newsletter Article	$350.00	$3.78	$84.74	$3.47	$82.81	$103.92	$71.30
Web Video	$1,050.00	$11.34	$254.21	$10.40	$248.43	$311.75	$213.89
Prepare 2010 Annual Report to BWSR	$630.00	$6.80	$152.52	$6.24	$149.06	$187.05	$128.33
Water Quality Cost Share Grant Fund	$1,000.00	$10.80	$242.10	$9.90	$236.60	$296.90	$203.70
	$6,705.00	$72.41	$1,623.28	$66.38	$1,586.40	$1,990.71	$1,365.81

ADMINISTRATIVE BUDGET (Split equally six ways)		Bethel	East Bethel	Ham Lake	Nowthen	Oak Grove	St. Francis
Copies	$50.00	$8.33	$8.33	$8.33	$8.33	$8.33	$8.33
Postage	$60.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00
Recording secretary	$1,200.00	$200.00	$200.00	$200.00	$200.00	$200.00	$200.00
Insurance-League of MN Cities insurance trust	$2,500.00	$416.67	$416.67	$416.67	$416.67	$416.67	$416.67
Administrative fee-Oak Grove	$300.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00
Audit	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Budget for URRWMO matching participation on future grant opportunities (table V-1 of URRWMO plan)	$1,000.00	$166.67	$166.67	$166.67	$166.67	$166.67	$166.67
Public notice of watershed plan amendments	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Solicit bids for professional services	$100.00	$16.67	$16.67	$16.67	$16.67	$16.67	$16.67
Public outreach (each share based on LGU percentages)	$500.00	$5.40	$121.05	$4.95	$118.30	$148.45	$101.85
	$5,710.00	$873.73	$989.38	$873.28	$986.63	$1,016.78	$970.18
Budget Total	**$12,415.00**	**$946.15**	**$2,612.66**	**$939.66**	**$2,573.04**	**$3,007.50**	**$2,335.99**

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Appendix A:

2011 Financial Report

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UPPER RUM RIVER WATERSHED MANAGEMENT ORGANIZATION

FINANCIAL REPORT
FOR YEAR ENDED DECEMBER 31, 2011

To the Chairperson, Todd Miller, of Upper Rum River Water Management Organization

The enclosed statement has been prepared after review of the organization's financial records for 2011. I have not audited the organization's records and do not express an opinion. The enclosed information fairly reflects the Upper Rum River WMO's financial position for the stated year.

March 28, 2012

Prepared by:
Jamie Schurbon
1318 McKay Drive NE, suite 300
Ham Lake, MN 55304
763-434-2030

UPPER RUM RIVER WATERSHED MANAGEMENT ORGANIZATION
9900 Nightingale Street NW
Oak Grove, MN 55011-9204

STATEMENT OF REVENUES AND EXPENSES

For: year beginning January 1, 2011 and Ending December 31, 2011

Expenditures	**Amount**	
Administrative		
Insurance – League of MN Cities Insurance Trust	$2,277.00	
Secretarial services - Gail Gessner	$675.00	
Postage	$00.00	
Copies	$00.00	
City of Oak Grove administration fees	$300.00	
SUBTOTAL	$3,252.00	
Non-Administrative		
Water Monitoring - Anoka Conservation District (ACD)	$9,090.00	
Website – ACD	$270.00	
2010 annual report to BWSR – ACD	$630.00	
URRWMO annual newsletter article – ACD	$350.00	
Cost share grant fund for water quality projects	$567.00	
SUBTOTAL	$10,907.00	
GRAND TOTAL	$14,159	
Revenues (% cost distribution specified in JPA)	**Amount**	
Administrative		
City of Bethel (16.67% of expenses)	$ 542.00	(16.67%)
Burns Township (16.67% of expenses)	$ 542.00	(16.67%)
City of East Bethel (16.67% of expenses)	$ 542.00	(16.67%)
City of Ham Lake (16.67% of expenses)	$ 542.00	(16.67%)
City of Oak Grove (16.67% of expenses)	$ 542.00	(16.67%)
City of St. Francis (16.67% of expenses)	$ 542.00	(16.67%)
SUBTOTAL	$3,252.00	
Non-Administrative		
City of Bethel (1.08% of expenses)	$ 117.80	(1.08%)
City of Nowthen (23.66% of expenses)	$2,580.60	(23.66%)
City of East Bethel (24.21% of expenses)	$2,640.58	(24.21%)
City of Ham Lake (0.99% of expenses)	$ 107.98	(0.99%)
City of Oak Grove (29.69% of expenses)	$3,238.29	(29.69%)
City of St. Francis (20.37% of expenses)	$2,221.76	(20.37%)
SUBTOTAL	$10,907.01	
Other		
Insurance Dividend	$0	
GRAND TOTAL	$14,159	
Retained Cash Reserves	$0	
Total Cash Reserves	$0	

UPPER RUM RIVER WATERSHED MANAGEMENT ORGANIZATION

BALANCE SHEET

For: Year Beginning January 1, 2011 and Ending December 31, 2011

Assets	
Cash	-0-
Accounts Receivable	-0-
Water quality project grant fund held at the Anoka Conservation District	$1,580.90
Other	-0-
Total Assets	$1,580.90

Liabilities	
Accounts Payable	-0-
Other	-0-
Total Liabilities	-0-

Notes:
In 2012 the URRWMO will begin using a new financial arrangement. Through December 31, 2011 URRWMO finances were handled within the City of Oak Grove's finances. As expenditures occurred, the member cities were invoiced that amount. The result was a zero account balance carryover from year to year. A disadvantage is that this prevented the URRWMO from having reserve funds and from accumulating funds to match grant opportunities. Starting in 2012 the URRWMO has its own checking account and member cities will be invoiced twice per year, each time for half of the annual budget (not the amount of actual expenditures).

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Appendix B:

2011 Water Monitoring and Management Work Results

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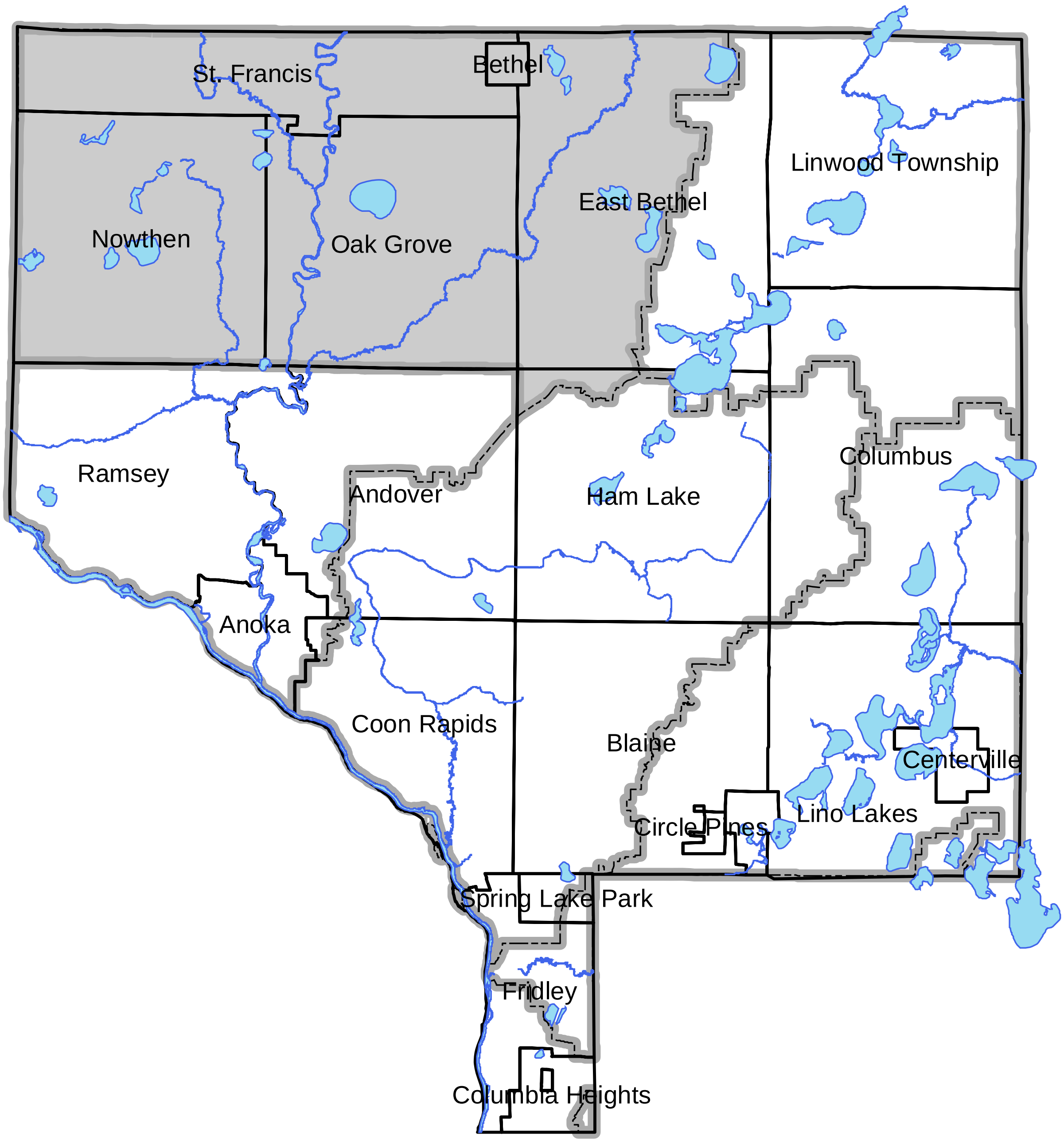
Excerpt from the
2011 Anoka Water Almanac

Chapter 3: Upper Rum River Watershed

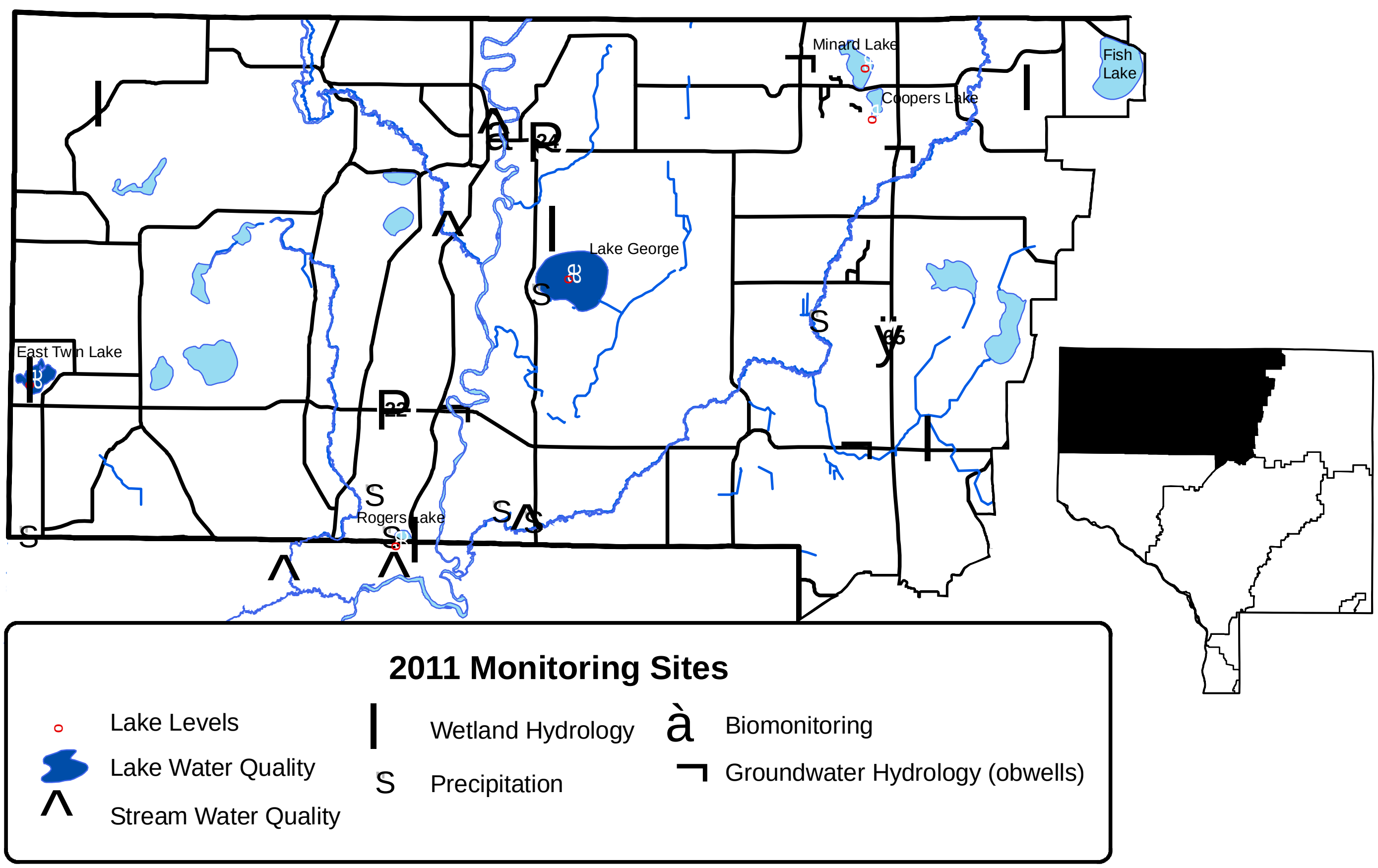


Prepared by the Anoka Conservation District

CHAPTER 3:
UPPER RUM RIVER WATERSHED

Task	Partners	Page
Lake Level Monitoring	URRWMO, ACD, MN DNR, volunteers	3-62
Lake Water Quality Monitoring	URRWMO, ACD	3-65
Stream Water Quality – Chemical Monitoring	URRWMO, LRRWMO, ACD, MC	3-70
Stream Water Quality – Biological Monitoring	ACD, ACAP, St. Francis High School	3-88
Wetland Hydrology	ACD, ACAP	3-91
Water Quality Grant Fund	URRWMO, ACD	3-97
URRWMO Website	URRWMO, ACD	3-100
URRWMO Annual Newsletter	URRWMO, ACD	3-102
URRWMO 2010 Annual Report to BWSR	URRWMO, ACD	3-103
Financial Summary		3-104
Recommendations		3-105
Groundwater Hydrology (obwells)	ACD, MNDNR	Chapter 1
Precipitation	ACD, volunteers	Chapter 1

ACAP = Anoka County Ag Preserves, ACD = Anoka Conservation District,
LRRWMO = Lower Rum River Watershed Mgmt Org, MC = Metropolitan Council
MNDNR = Minnesota Dept. of Natural Resources, URRWMO = Upper Rum River Watershed Mgmt Org



Lake Levels

Description: Weekly water level monitoring in lakes. The past five years are shown below, and all historic data are available on the Minnesota DNR website using the "LakeFinder" feature (www.dnr.mn.us.state\lakefind\index.html).

Purpose: To understand lake hydrology, including the impact of climate or other water budget changes. These data are useful for regulatory, building/development, and lake management decisions.

Locations: East Twin Lake, Lake George, Rogers Lake

Results: Water levels on George, Rogers, East Twin, Coopers, and Minard Lakes were measured by volunteers 36, 26, 18, 29, and 30 times, respectively, in 2011.

In 2011 all of these lakes had much higher water levels than in other recent years due to high rainfall totals in spring and early summer. In late summer very little rainfall fell and water levels dropped continuously on all lakes. However the magnitude of these changes were very different on each lake (see graphs on following pages). East Twin and Rogers Lakes rose approximately 3 feet in the spring and early summer, while Lake George rose only one foot. Coopers and Minards Lakes showed little gain in water level, and presumably any increases took place during early spring melting when monitoring was not yet in place.

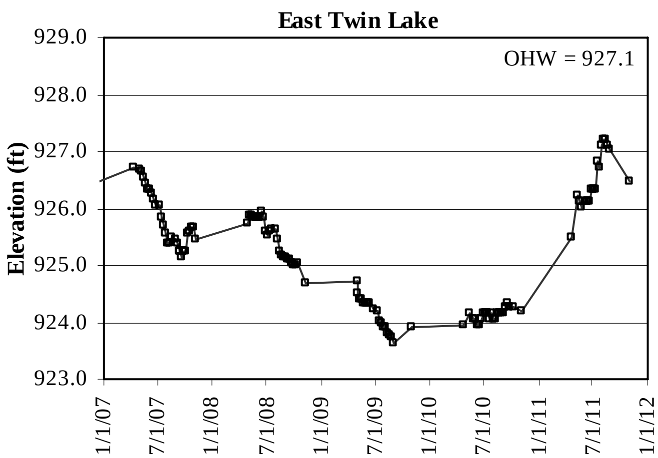
Rogers and Lake George both experienced the highest water levels on record. Rogers reached a record high of 885.31 feet on August 2, 2011. This exceeded the previous highest observed water level by 0.57 feet. George reached its highest ever observed on May 28, when it hit 903.19. This beat the previous record from September 2003 by only 0.01 feet.

This was the first year for monitoring Coopers and Minard Lakes. In recent years, there had been complaints about disproportionately low water in Coopers Lake and questions about why Minard Lake did not seem to have this problem. Minard Lake can flow into Coopers Lake when the water is high enough.

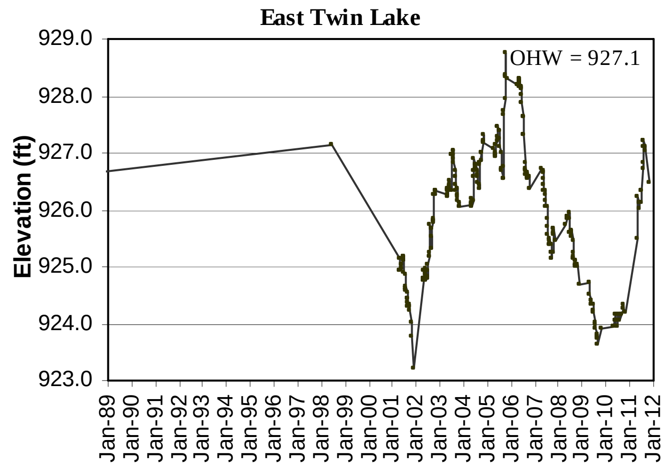
In 2011 there were 25 paired lake level measurements taken on Cooper and Minard Lakes (measurements within 3 days of eachother). On two occasions Minard was lower than Coopers (0.02 and 0.04 ft lower). On all other occasions Minard was higher. Throughout spring and summer, which was an excessively wet period, the elevation difference was 0.4 feet or less. August was the beginning of a very dry period. As both lakes dropped, the difference between them became more exaggerated, from 0.66 to 1.15 starting in September. The reason that Coopers Lake draws down faster in dry weather is unknown, but we speculate that Coopers Lake continues to have outflow from the south end of the lake during these periods, while Minard Lake has little outflow because its outlet flows through a culvert that is often higher than the lake level.

Ordinary High Water Level (OHW), the elevation below which a DNR permit is needed to perform work, is listed for each lake on the corresponding graphs below.

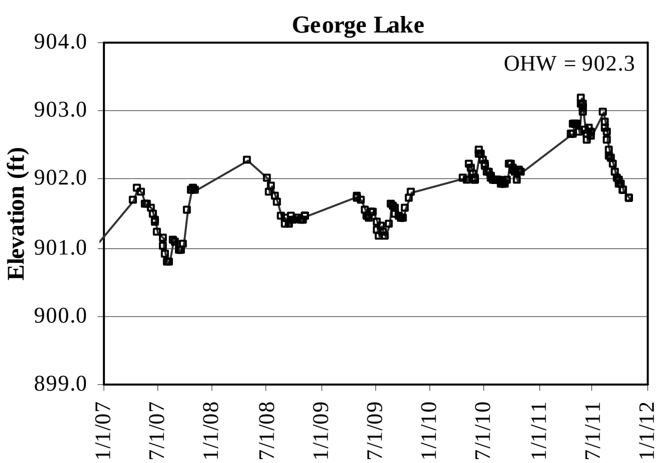
East Twin Lake Levels 2007-2011



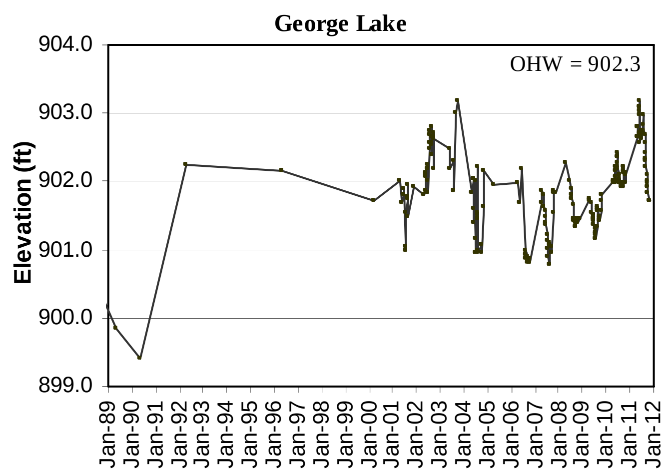
East Twin Lake Levels 1990-2011



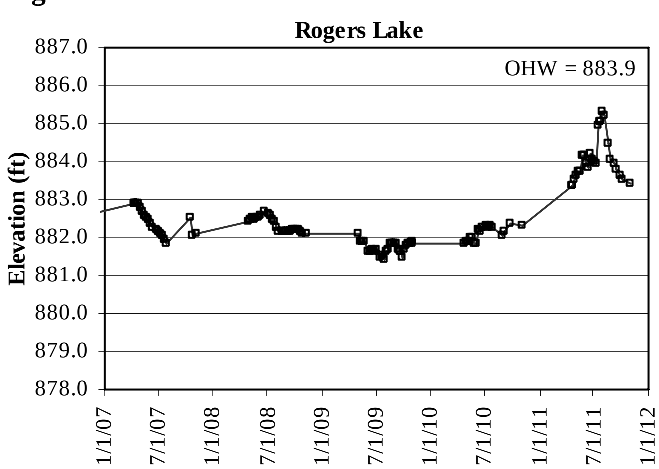
Lake George Levels 2007-2011



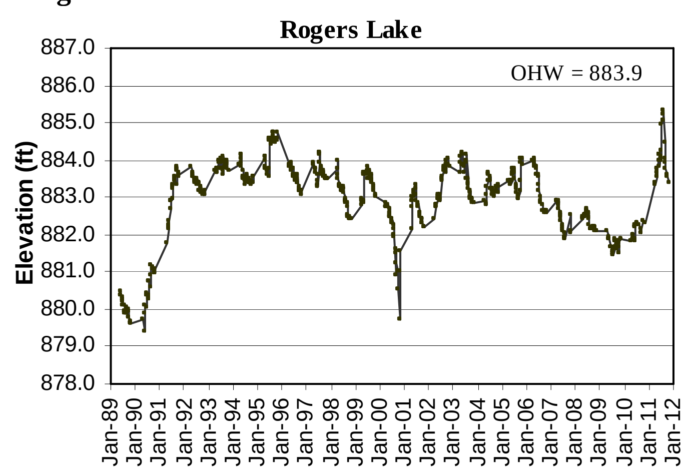
Lake George Levels 1990-2011



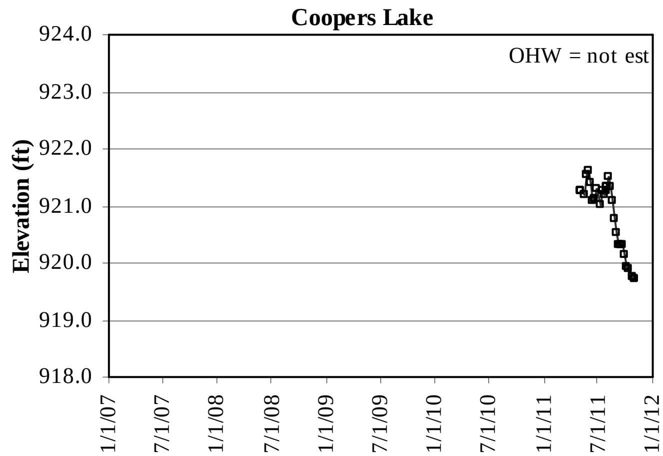
Rogers Lake Levels 2007-2011



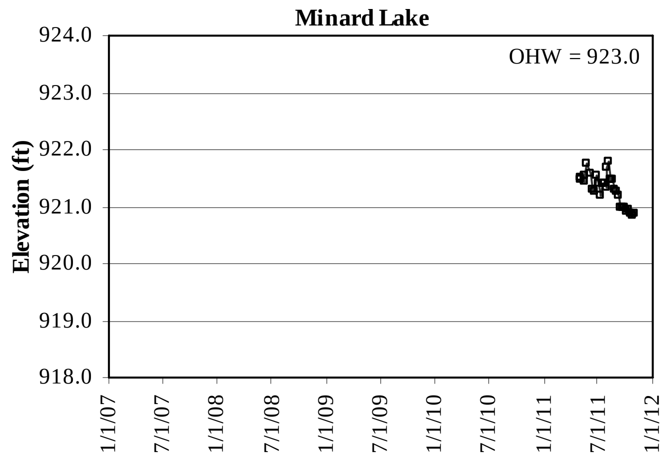
Rogers Lake Levels 1990-2011



Coopers Lake Levels 2007-2011



Minard Lake Levels 2007-2011



Lake Water Quality

Description: May through September twice-monthly monitoring of the following parameters: total phosphorus, chlorophyll-a, Secchi transparency, dissolved oxygen, turbidity, temperature, conductivity, pH, and salinity.

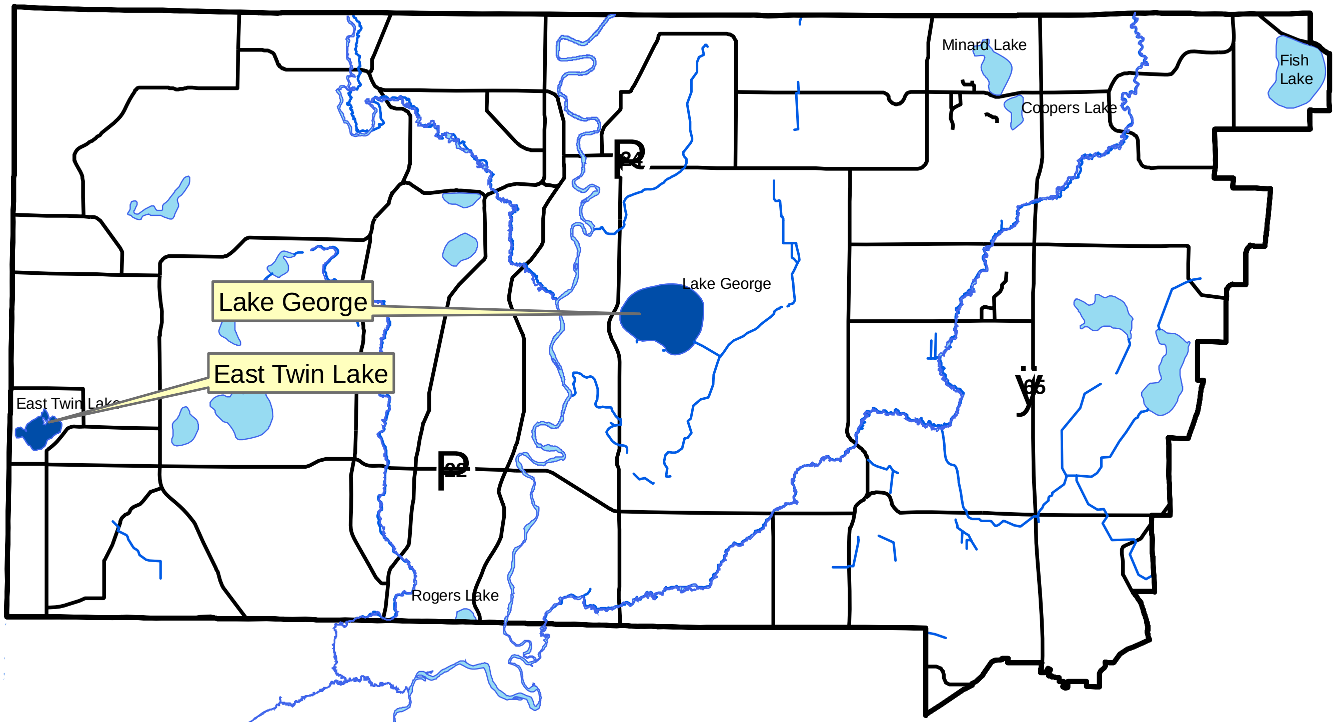
Purpose: To detect water quality trends and diagnose the cause of changes.

Locations: East Twin Lake

Lake George

Results: Detailed data for each lake are provided on the following pages, including summaries of historical conditions and trend analysis. Previous years' data are available at www.AnokaNaturalResources.com. Refer to Chapter 1 for additional information on interpreting the data and on lake dynamics.

Upper Rum River Watershed Lake Water Quality Monitoring Sites



East Twin Lake

City of Nowthen, Lake ID # 02-0133

Background

East Twin Lake is located on Anoka County's western boarder in the City of Nowthen. The lake has a surface area of 116 acres with a maximum depth of 77 feet (20.1 m), making it Anoka County's deepest lake. Public access is from East Twin Lake City Park, where there is both a swimming beach and boat launch. The lakeshore is only moderately developed, with residences being mostly of low density and encompassing about half of the lake. The watershed is >75% undeveloped, with low-density residential areas. This lake is one of the clearest in the county. One exotic invasive plant is known to this lake, curly-leaf pondweed.

2011 Results

In 2011 East Twin Lake had excellent water quality for this region of the state (NCHF Ecoregion), receiving an overall A grade; the same as in 11 of the previous 12 years monitored. The lake is mesotrophic. Of particular notability is the 18.7 ft Secchi transparency on May 16, 2011 and other exceptional clarity readings of 22 ft on May 28, 2008 and 20 ft in spring 2002; these are the deepest at any Anoka County lake since at least 1996. Even later in summer, transparency is sometimes >10 ft, although in 2011 it was less than 7 feet in August and September. Throughout summer total phosphorus held relatively steady at <31 ug/L and chlorophyll-a was consistently at <13 mg/L. These are low and considered excellent. Subjective observation by ACD staff ranked physical and recreational conditions optimal.

Trend Analysis

Thirteen years of water quality data have been collected by the Metropolitan Council (1980, '81,'83, '95, and '98), the Minnesota Pollution Control Agency (1989), and the Anoka Conservation District (1997, '99, 2000, 2002, 2005, 2008, and 2011). Trend analyses up to 2008 found water quality significantly improved since 1980 (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth, $F_{2,9}$= 7.31, p=0.01). The most obvious differences are from the 1980's data and the post-1980's data. One-way ANOVAs revealed that reduction in chlorophyll-a is the most important factor in this trend, but total phosphorus reductions also occurred. Secchi transparency changes have been minimal. The analysis with 2011 data finds that the trend is no longer statistically significant ($F_{2,10}$= 3.52, p=0.07). This suggests that water quality has held constant in recent years.

Discussion

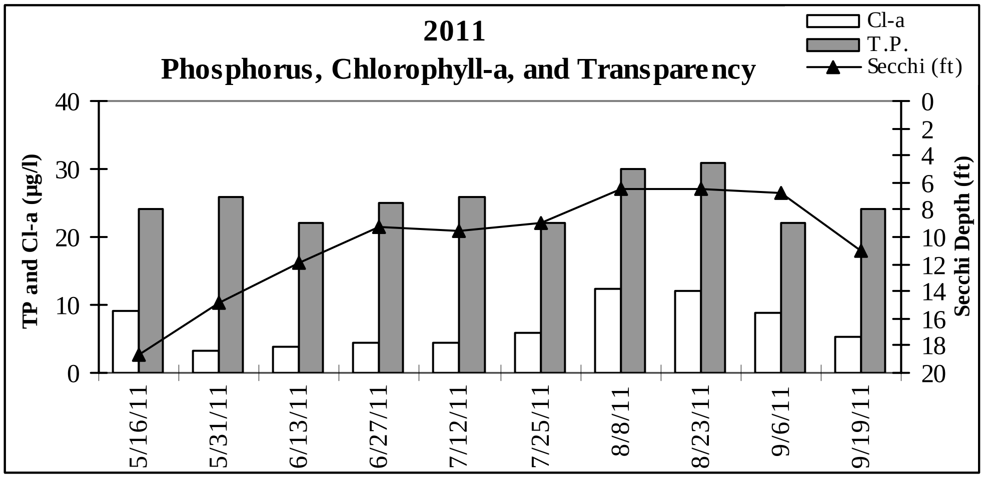
The ecology of this lake is different from that of many other Anoka County Lakes because it is deep. Sediment and dead algae can sink to the bottom and are essentially lost from the system because resuspension by wind, rough fish, and other forces is minimal. In shallower lakes, these nutrients circulate within the lake much more readily and the lake sediments can be a source of nutrients and turbidity that affect water quality. Additionally, East Twin Lake's direct watershed is small, so there is a small area from which polluted runoff might enter the lake. Aquatic vegetation is also healthy, but not so prolific as to be a nuisance, further contributing to high water quality. One exotic invasive plant is present in the lake, curly leaf pondweed, though its growth is moderate and restricted in extent due to lake depth.

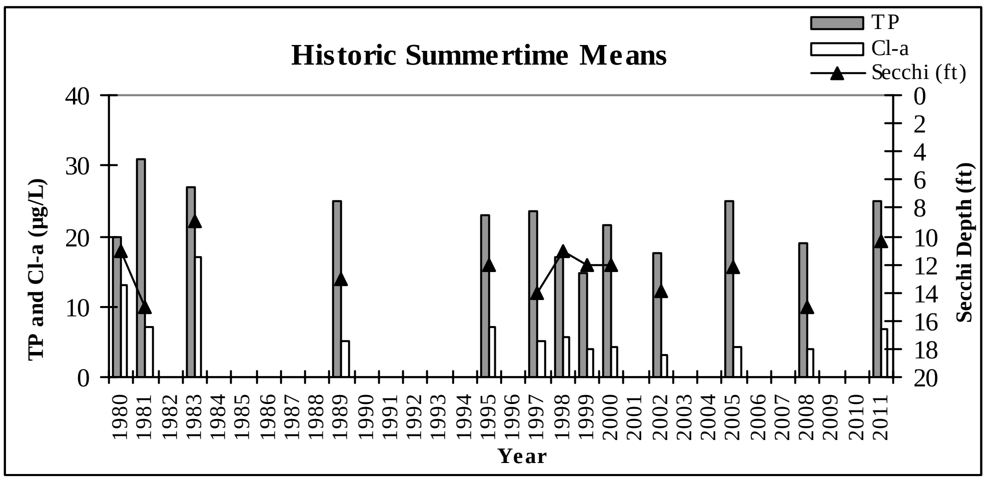
2011 East Twin Lake Water Quality Data

East Twin Lake 2011			5/16/2011	5/31/2011	6/13/2011	6/27/2011	7/12/2011	7/25/2011	8/8/2011	8/23/2011	9/6/2011	9/19/2011			
	Units	R.L.*	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Average	Min	Max
pH		0.1	8.02	8.14	8.50	8.36	8.07	8.00	7.94	7.97	8.16	8.05	8.12	7.94	8.50
Conductivity	mS/cm	0.01	0.192	0.196	0.196	0.196	0.203	0.175	0.177	0.166	0.158	0.150	0.181	0.150	0.203
Turbidity	FNRU	1	2.00	2.00	1.00	2.00	3	2	4.00	4.00	5.00	2.00	3	1	5
D.O.	mg/L	0.01		10.32	10.54	9.18	7.64	7.83	6.66	5.92	4.85	5.08	7.87	4.85	10.54
D.O.	%	1		110%	117%	103%	96%	99%	83%	71%	55%	53%	88%	53%	117%
Temp.	°C	0.1	13.1	19.3	20.8	21.4	27.2	27.5	26.6	24.6	21.1	17.3	21.9	13.1	27.5
Temp.	°F	0.1	55.6	66.7	69.4	70.5	81.0	81.5	79.9	76.3	70.0	63.1	71.4	55.6	81.5
Salinity	%	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cl-a	ug/L	0.5	9.1	3.1	3.9	4.3	4.3	6.0	12.5	12.2	8.7	5.2	6.9	3.1	12.5
T.P.	mg/L	0.010	0.024	0.026	0.022	0.025	0.026	0.022	0.030	0.031	0.022	0.024	0.025	0.022	0.031
T.P.	ug/L	10	24	26	22	25	26	22	30	31	22	24	25	22	31
Secchi	ft	0.1	18.7	14.9	11.9	9.2	9.5	8.9	6.4	6.5	6.8	11.1	10.4	6.4	18.7
Secchi	m	0.1	5.70	4.54	3.63	2.80	2.90	2.71	1.95	1.98	2.07	3.38	3.2	2.0	5.7
Physical			1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	1.0	1.4	1.0	2.0
Recreational			1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	1.5	1.0	2.0

*reporting limit

East Twin Lake Water Quality Results





East Twin Lake Summertime Annual Mean

Agency	MC	MC	MC	MPCA	MC	ACD	MC	ACD	ACD	ACD	ACD	ACD	ACD
Year	1980	1981	1983	1989	1995	1997	1998	1999	2000	2002	2005	2008	2011
TP	20.0	31.0	27.0	25.0	23.0	23.5	17.0	14.8	21.6	17.7	25.0	19.0	25.0
Cl-a	13.0	7.0	17.0	5.0	7.1	5.1	5.6	4.1	4.2	3.2	4.3	4.0	6.9
Secchi (m)	3.3	4.7	2.7	4.1	3.5	4.2	3.4	3.6	3.7	4.3	3.7	4.6	3.2
Secchi (ft)	11.0	15.0	9.0	13.0	12.0	14.0	11.0	12.0	12.0	13.9	12.2	15.1	10.4

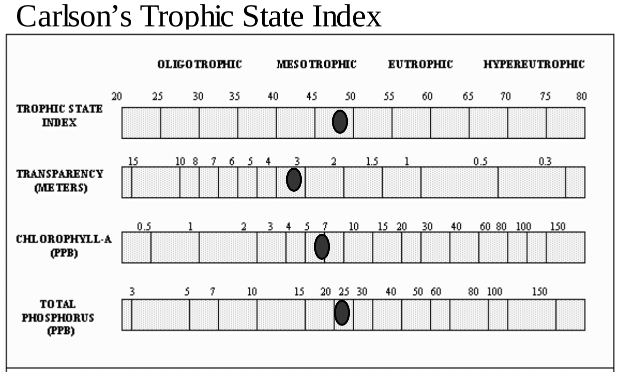
Carlson's Tropic State Indices

TSIP	47	54	52	51	49	50	45	43	48	45	51	47	51
TSIC	56	50	58	46	50	47	48	44	45	40	45	44	50
TSIS	43	38	46	40	42	39	42	42	41	40	41	38	43
TSI	49	47	52	46	47	45	45	43	45	42	46	43	48

East Twin Lake Water Quality Report Card

Year	80	81	83	89	95	97	98	99	2000	2002	2005	2008	2011
TP	A	B	B	B	B	B	B	A	A	A	B	A	B
Cl-a	B	A	B	A	A	A	A	A	A	A	A	A	A
Secchi	A	A	B	A	A	A	A	A	A	A	A	A	A
Overall	**A**	**A**	**B**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**

Carlson's Trophic State Index



Lake George

CITY OF OAK GROVE, LAKE ID # 02-0091

Background

Lake George is located in north-central Anoka County. The lake has a surface area of 535 acres with a maximum depth of 32 feet (9.75 m). Public access is from Lake George County Park on the lake's north side, where there is both a swimming beach and boat launch. About 70% of the lake is circumscribed by homes; the remainder is county parkland. The watershed is mostly undeveloped or vacant, with some residential areas, particularly on the lakeshore and in the southern half of the watershed. Two invasive exotic aquatic plants are established in this lake, Curly-leaf pondweed and Eurasian Water Milfoil.

2011 Results

In 2011 Lake George had good water quality for this region of the state (NCHF Ecoregion), receiving an overall B grade, however it was the poorest water quality of all years monitored. The lake is normally mesotrophic, but this year was mildly eutrophic. Total phosphorus averaged 29 ug/L, the highest observed in 14 monitored years. Secchi transparency was nearly 13 feet in mid-May, but only 3.4 feet throughout August. Average Secchi transparency was 6.7 feet, the poorest observed. Chlorophyll-a averaged 12.4 mg/L, the second highest observed in all years monitored. Chlorophyll-a and transparency were poorest in August, while phosphorus climbed nearly continuously from May through September. Another notable observation for this lake in 2011 is that Eurasian Water Milfoil continues to expand despite treatments to control it.

Trend Analysis

Fifteen years of water quality data have been collected by the Metropolitan Council (between 1980 and '94, 1998 and 2009) and the Anoka Conservation District (1997, 1999, 2000, 2002, 2005, 2008 and 2011). Water quality has not significantly changed from 1980 to 2011 (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth, $F_{2,12}$= 0.30, p>0.05).

Discussion

Lake George remains one of the clearest of Anoka County Lakes. Lake George and nearby East Twin Lake are especially valuable resources because of their condition, size, suitability for many types of recreation, and ample public access. Both will be under continued or increasing stresses from recreational usage and/or development. Continued efforts are needed to maintain the lakes' quality including monitoring, education, and lakeshore and nutrient best management practices. One example is residential lakeshore restorations which have occurred on several properties. Still, many properties on Lake George aggressively manicure their lakeshore in ways that are detrimental to lake health. Around any developed lake failing septic systems can also be a threat to water quality. This concern exists at Lake George, but is reduced because many homes are served by a community sewer system.

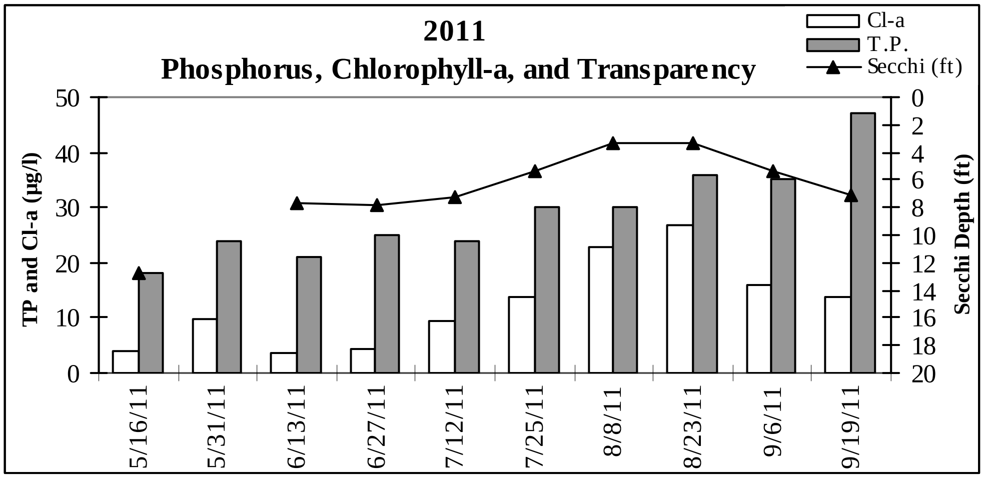
Two exotic invasive plants are present in Lake George. Curly leaf pondweed causes only a brief nuisance in the spring and dies back by mid-June. This die-back causes a brief pulse of phosphorus and algae growth on some lakes, but this is not apparent at Lake George. Eurasian Water Milfoil is also present, and in recent years has begun to affect recreation by matting to the surface in some localized areas. A Lake Improvement District as been formed to orchestrate control of this plant and multiple years of localized treatments have occurred. Despite this, Eurasian Water Milfoil has expanded. Its effects, if any, on water quality in Lake George are unknown.

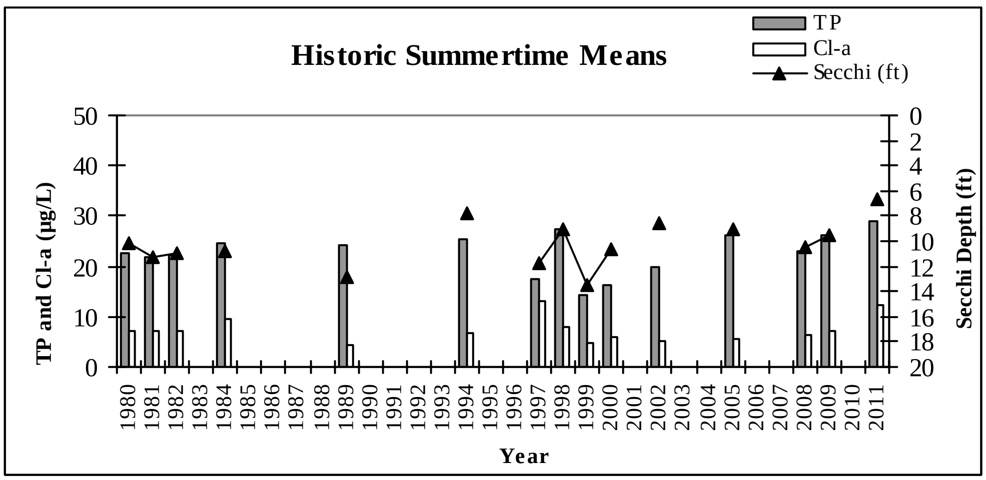
2011 Lake George Water Quality Data

Lake George 2011			5/16/2011	5/31/2011	6/13/2011	6/27/2011	7/12/2011	7/25/2011	8/8/2011	8/23/2011	9/6/2011	9/19/2011			
	Units	R.L.*	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Average	Min	Max
pH		0.1	7.98	8.29	8.28	8.40	8.60	8.61	8.92	8.80	8.27	8.24	8.44	7.98	8.92
Conductivity	mS/cm	0.01	0.206	0.198	0.200	0.199	0.196	0.169	0.169	0.161	0.155	0.146	0.180	0.146	0.206
Turbidity	FNRU	1	2.00	6.00	3.00	3.00	8.00	9.00	11.00	15.00	21.60	6.00	8	2	22
D.O.	mg/l	0.01		11.06	9.90	9.32	8.65	8.55	9.56	8.73	6.40	7.08	8.81	6.40	11.06
D.O.	%	1		121%	109%	104%	109%	108%	120%	106%	73%	75%	103%	73%	121%
Temp.	°C	0.1	13.2	19.7	20.3	21.0	27.0	27.4	27.0	25.2	21.6	17.5	22.0	13.2	27.4
Temp.	°F	0.1	55.8	67.5	68.5	69.8	80.6	81.3	80.6	77.4	70.9	63.5	71.6	55.8	81.3
Salinity	%	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cl-a	ug/L	0.5	3.9	9.9	3.5	4.3	9.5	13.6	22.8	26.7	15.9	13.8	12.4	3.5	26.7
T.P.	mg/l	0.010	0.018	0.024	0.021	0.025	0.024	0.030	0.030	0.036	0.035	0.047	0.029	0.018	0.047
T.P.	ug/l	10	18	24	21	25	24	30	30	36	35	47	29.0	18.0	47.0
Secchi	ft	0.1	12.8		7.7	7.9	7.3	5.3	3.4	3.4	5.3	7.1	6.7	3.4	12.8
Secchi	m	0.03	3.90		2.35	2.39	2.23	1.62	1.04	1.04	1.62	2.16	2.0	1.0	3.9
Physical			1.0	2.0	2.0	2.0	1.0	3.0	3.0	4.0	3.0	4.0	2.5	1.0	4.0
Recreational			1.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	2.2	1.0	3.0

*reporting limit

Lake George Water Quality Results





Lake George Summertime Annual Means

Agency	MC	MC	MC	MC	MC	MC	ACD	MC	ACD	ACD	ACD	ACD	ACD	MC	MC
Year	1980	1981	1982	1984	1989	1994	1997	1998	1999	2000	2002	2005	2008	2009	2011
TP	22.5	22.0	22.3	24.4	24.3	25.4	17.4	27.5	14.2	16.3	19.9	26.0	23.0	26.2	29.0
Cl-a	7.3	7.1	7.0	9.5	4.5	6.9	13.2	7.8	4.8	5.8	5.2	5.4	6.4	7.0	12.4
Secchi (m)	3.1	3.4	3.4	3.3	3.9	2.4	3.6	2.7	4.1	2.8	2.6	2.8	3.2	2.9	1.8
Secchi (ft)	10.2	11.2	11.0	10.8	12.9	7.8	11.7	9.0	13.5	10.7	8.6	9.1	10.4	9.5	6.7

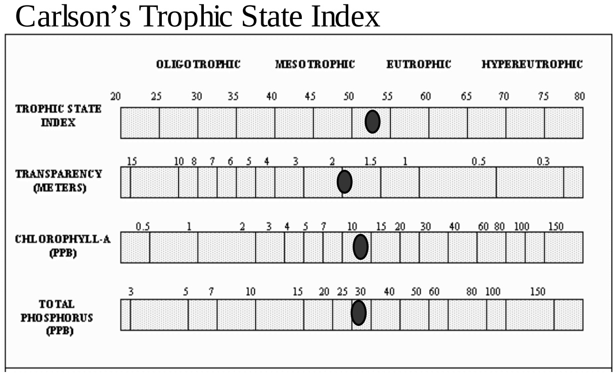
Carlson's Tropic State Indices

TSIP	49	49	49	50	50	51	45	52	42	44	47	51	49	51	53
TSIC	50	50	50	53	45	50	56	51	46	48	47	47	49	50	55
TSIS	44	42	43	43	40	48	42	45	40	45	46	45	43	45	52
TSI	48	47	47	49	45	49	48	49	43	46	47	48	47	49	53

Lake George Water Quality Report Card

Year	80	81	82	84	89	94	97	98	99	2000	2002	2005	2008	2009	2011
TP	A	A	A	B	B	B	A	B	A	A	A	B	B+	B	B
Cl-a	A	A	A	A	A	A	B	A	A	A	A	A	A	A	B
Secchi	A	A	A	A	A	B	A	B	A	B	B	B	A	B	C
Overall	**A**	**A**	**A**	**A**	**A**	**B**	**A**	**B**	**A**	**A**	**A**	**B**	**A**	**B**	**B**

Carlson's Trophic State Index



Stream Water Quality - Chemical Monitoring

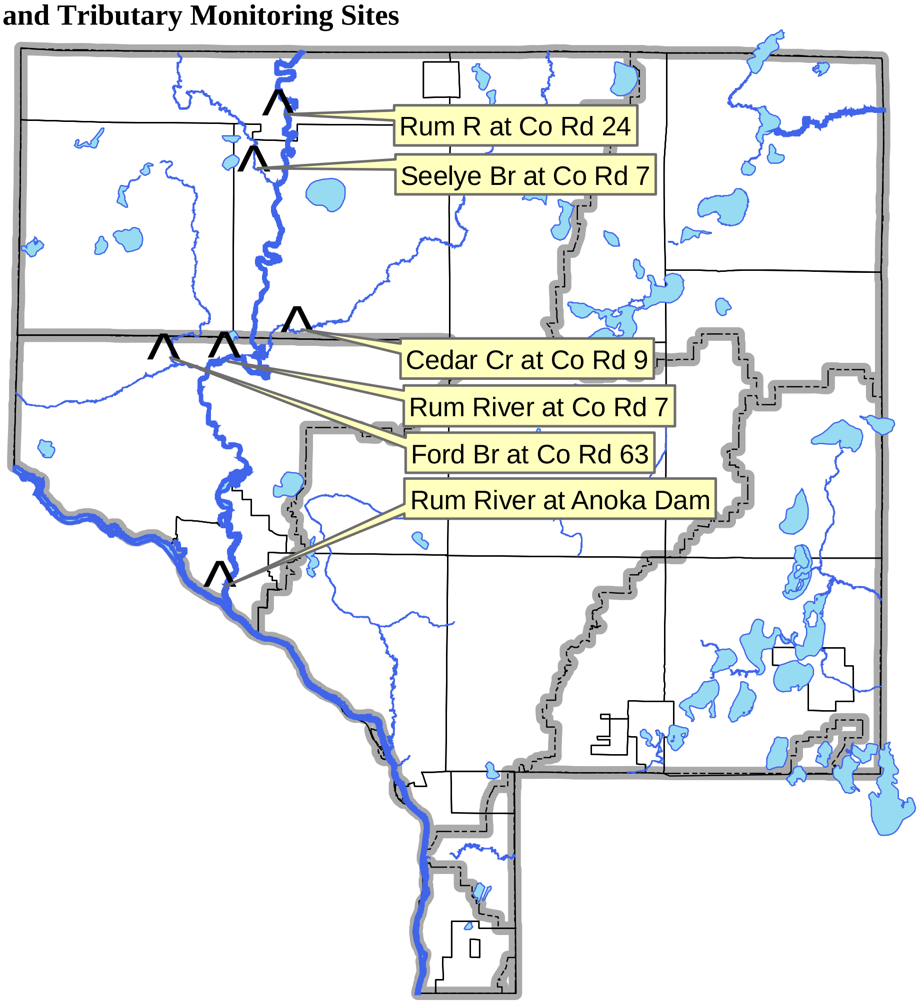
Description: The Rum River has simultaneously monitored the Rum River at three strategic locations in 2004 and 2009-11. The locations include the approximate top and bottom of the Upper and Lower Rum River Watershed Management Organizations. Additionally, the three largest tributaries in the URRWMO were monitored in 2011, simultaneous with the Rum River monitoring for greatest comparability. Collectively, these data allow for an upstream to downstream water quality comparison within Anoka County, as well as within each watershed organization. It also allows us to examine whether the tributaries degrade Rum River water quality.

Purpose: To detect water quality trends and problems, and diagnose the source of problems.

Locations: Rum River at Co Rd 24
Rum River at Co Rd 7
Rum River at the Anoka Dam
Seeyle Brook at Co Rd 7
Cedar Creek at Co Rd 9
Ford Brook at Co Rd 63

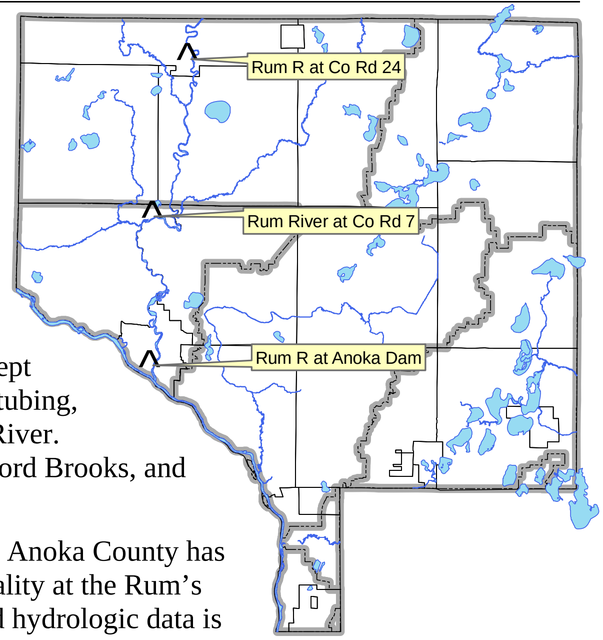
Results: Results are presented on the following pages. For the Rum River sites, the analysis is focused on comparing river conditions from upstream to downstream. For the tributaries, the analysis is focused on determining whether the tributaries improve or degrade Rum River water quality.

2011 Rum River and Tributary Monitoring Sites



RUM RIVER

Rum River at Co. Rd. 24 (Bridge St), St. Francis	STORET SiteID =	S000-066
Rum River at Co. Rd. 7 (Roanoke St), Ramsey	STORET SiteID =	S004-026
Rum River at Anoka Dam, Anoka	STORET SiteID =	S003-183



Years Monitored

At Co. Rd. 24 –	2004, 2009, 2010, 2011
At Co. Rd. 7 –	2004, 2009, 2010, 2011
At Anoka Dam –	1996-2011 by the Met Council WOMP program

Background

The Rum River is regarded as one of Anoka County's highest quality and most valuable water resources. It is designated as a state scenic and recreational river throughout Anoka County, except south of the county fairgrounds in Anoka. It is used for boating, tubing, and fishing. Much of western Anoka County drains to the Rum River. Subwatersheds that drain to the Rum include Seelye, Trott, and Ford Brooks, and Cedar Creek.

The extent to which water quality improves or is degraded within Anoka County has been unclear. The Metropolitan Council has monitored water quality at the Rum's outlet to the Mississippi River since 1996. This water quality and hydrologic data is well suited for evaluating the river's water quality just before it joins the Mississippi River. Monitoring elsewhere has been sporadic and sparse. Water quality changes might be expected from upstream to downstream because land use changes dramatically from rural residential in the upstream areas of Anoka County to suburban in the downstream areas.

Methods

In 2004, 2009, 2010 and 2011 monitoring was conducted at three locations simultaneously to determine if Rum River water quality changes in Anoka County, and if so, generally where changes occur. The Upper and Lower Rum River Watershed Management Organizations contributed to this work and monitoring sites were strategically located near the upper and lower boundary of each organization's jurisdictional boundary. The Metropolitan Council maintains a permanent monitoring station at the Anoka Dam, the farthest downstream monitoring site. The Metropolitan Council monitoring was coordinated to occur with the watershed organization monitoring so the data and costs could be shared. The Anoka Conservation District did the field work for both Metropolitan Council and the watershed organizations, ensured monitoring for both programs was conducted simultaneously so the data and costs could be shared, and reports the data together for a more comprehensive analysis of the river from upstream to downstream.

The river was monitored during both storm and baseflow conditions by grab samples. Eight water quality samples were taken each year; half during baseflow and half following storms. Storms were generally defined as one-inch or more of rainfall in 24 hours or a significant snowmelt event combined with rainfall. In some years, particularly the drought year of 2009, smaller storms were sampled because of a lack of larger storms. All storms sampled were significant runoff events. Parameters tested with portable meters included pH, conductivity, turbidity, temperature, salinity, and dissolved oxygen. Parameters tested by water samples sent to a state-certified lab included total phosphorus, total suspended solids, chlorides, sulfates, and hardness. Ten additional parameters were tested by the Metropolitan Council at their laboratory for the Anoka Dam site only and are not reported here. During every sampling the water level (stage) was recorded. The monitoring station at the Anoka Dam includes automated equipment that continuously tracks water levels and calculates flows. Water level and flow data for other sites was obtained from the US Geological Survey, who maintains a hydrological monitoring site at Viking Boulevard.

The purpose of this report is to make an upstream to downstream comparison of Rum River water quality. It includes only parameters and dates that were simultaneously tested at all three sites. It does not include additional parameters tested at the Anoka Dam or additional monitoring events at that site. For that information, see Metropolitan Council reports at http://www.metrocouncil.org/Environment/RiversLakes. All other raw data can be obtained from the Anoka Conservation District and is also available through the Minnesota Pollution Control Agency's EQuIS database, which is available through their website.

Results and Discussion

Overall, Rum River water quality is good throughout Anoka County, however it does decline slightly below the County Road 7 bridge (i.e. in the Cities of Andover, Anoka, and Ramsey) and during storms. The declines in water quality below that point are modest, as are declines in water quality during storms. Dissolved pollutants (as measured by conductivity and chlorides), total phosphorus, turbidity, and total suspended solids were all generally near or below the median of all 34 Anoka County streams that have been monitored, while pH and dissolved oxygen levels were appropriate.

Two areas of concern were noted. First, dissolved pollutants increased at each monitoring site downstream. Dissolved pollutants were highest during baseflow, indicating pollutants have infiltrated into the groundwater which feeds the river and tributaries during baseflow. Road deicing salts are likely the most significant dissolved pollutant. Secondly, total suspended solids increased notably below County Road 7. This was most pronounced during storms.

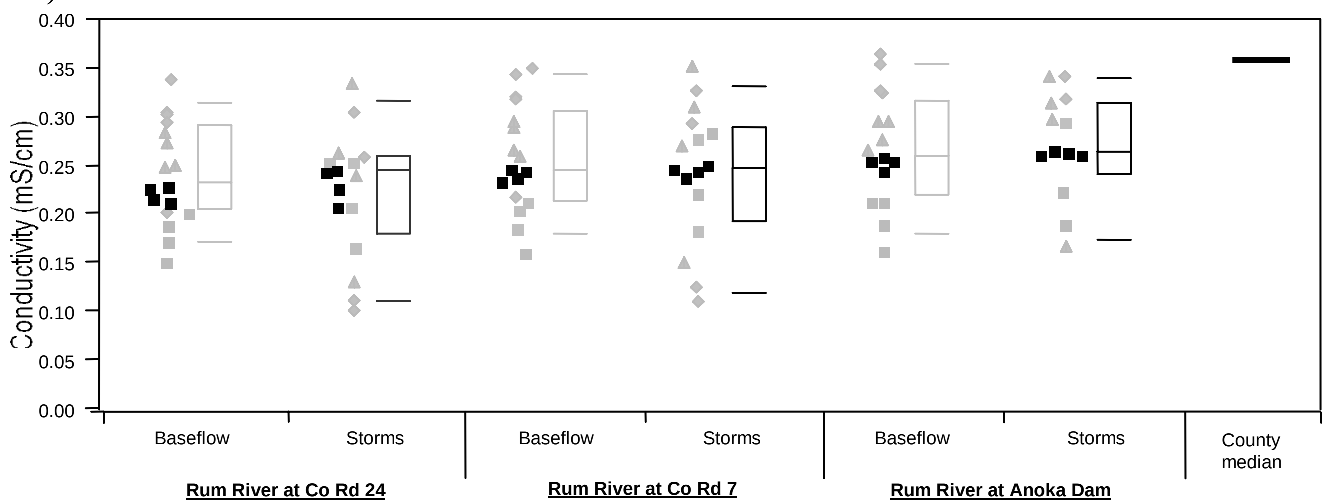
It is important to recognize the limitations of this report. The data is only from 2004, 2009, 2010, and 2011 when all three sites were monitored simultaneously to allow comparisons. It includes drought years (2009), years with slightly above normal precipitation (2010), and years with some excessively wet and some excessively dry months (2004 and 2011). We did not sample any extreme floods when river water quality is likely worst. If a more detailed analysis of river water quality is desired, data from many years and a variety of conditions is available for the Anoka Dam site through the Metropolitan Council. Their work includes composite samples throughout storms.

On the following pages data are presented and discussed for each parameter. The last section outlines management recommendations. The Rum River is an exceptional waterbody, and its protection and improvement should be a high priority.

Conductivity and chlorides

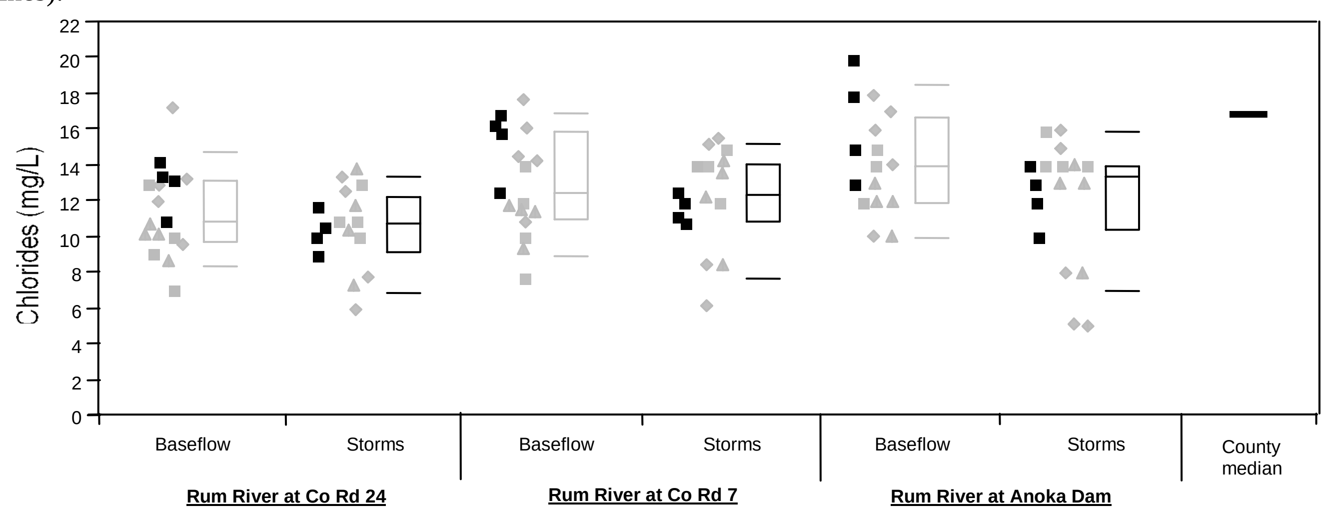
Conductivity and chlorides are measures of dissolved pollutants. Dissolved pollutant sources include urban road runoff, industrial chemicals, and others. Metals, hydrocarbons, road salts, and others are often of concern in a suburban environment. Conductivity is the broadest measure of dissolved pollutants we used. It measures electrical conductivity of the water; pure water with no dissolved constituents has zero conductivity. Chlorides tests for chloride salts, the most common of which are road de-icing chemicals. Chlorides can also be present in other pollutant types, such as wastewater. These pollutants are of greatest concern because of the effect they can have on the stream's biological community. They can also be of concern because the Rum River is upstream from the Twin Cities drinking water intakes on the Mississippi River.

Conductivity during baseflow and storm conditions Grey squares are individual readings from 2004, grey diamonds are 2009 readings, grey triangles are 2010 readings, and black squares are 2011 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Upstream → Downstream

Chloride during baseflow and storm conditions Grey squares are individual readings from 2004, grey diamonds are 2009 readings, grey triangles are 2010 readings, and black squares are 2011 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Upstream → Downstream

Conductivity is acceptably low in the Rum River, but increases downstream (see figures above) and during baseflow. Median conductivity from upstream to downstream was 0.245 mS/cm, 0.248 mS/cm, and 0.266

mS/cm, respectively. This is lower than the median for 34 Anoka County streams of 0.362 mS/cm. The maximum observed conductivity in the Rum River was 0.365 mS/cm.

Conductivity was lowest at all sites during storms, suggesting that stormwater runoff contains fewer dissolved pollutants than the surficial water table that feeds the river during baseflow. High baseflow conductivity has been observed in most other nearby streams too, studied extensively, and the largest cause has been found to be road salts that have infiltrated into the shallow aquifer. Geologic materials also contribute, but to a lesser degree.

Conductivity increased from upstream to downstream. During baseflow this increase from upstream to downstream reflects greater road densities and deicing salt application. During storms, the higher conductivity downstream is reflective of greater stormwater runoff and pollutants associated with the more densely developed lower watershed.

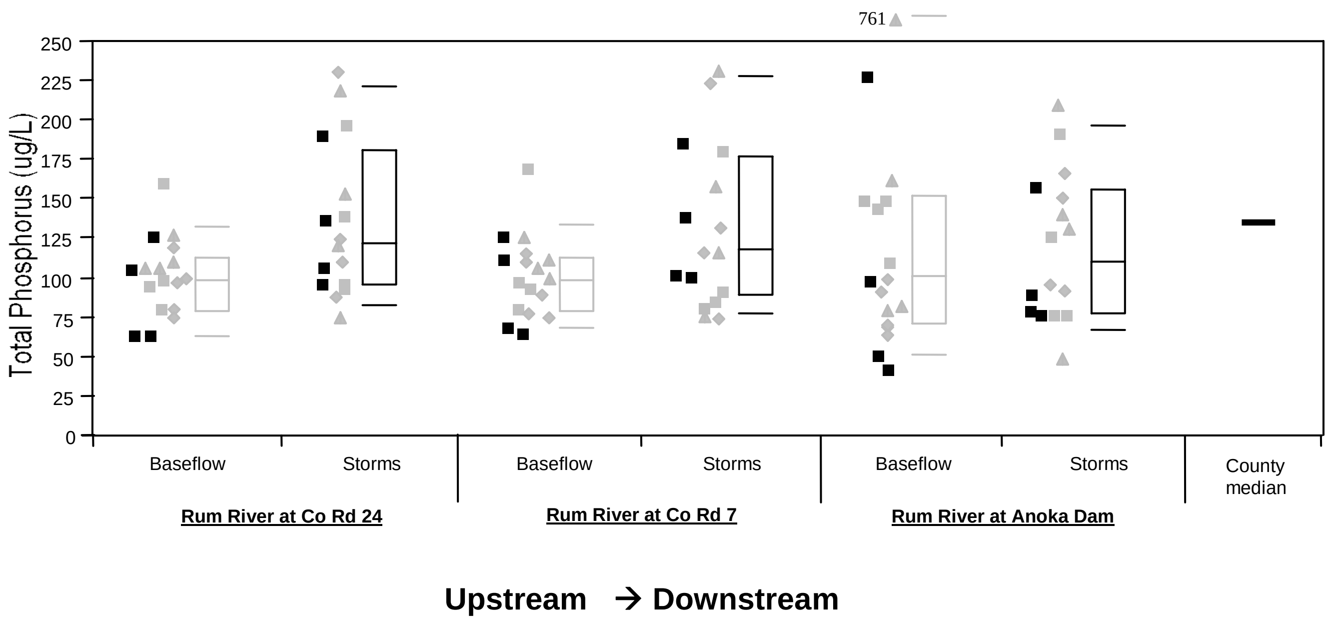
Chloride results parallel those found for conductivity (see figures above), supporting the hypothesis that chloride is an important dissolved pollutant. Chloride levels in the Rum River (median 11, 13, and 14 mg/L from upstream to downstream) are slightly lower than the median for Anoka County streams of 17 mg/L. The highest observed value was 20 mg/L, though higher levels may have occurred during snowmelts which were not monitored. The levels observed are much lower than the Minnesota Pollution Control Agency's (MPCA) chronic standard for aquatic life of 230 mg/L. Like conductivity, chlorides were slightly higher during baseflow than storms at each site and increased from upstream to downstream. Road deicing salt infiltration into the shallow groundwater is likely the primary contributor, as described above.

Total Phosphorus

Total phosphorus in the Rum River is acceptably low and is similar to the median for all other monitored 34 Anoka County streams (see figure below). This nutrient is one of the most common pollutants in our region, and can be associated with urban runoff, agricultural runoff, wastewater, and many other sources. The median phosphorus concentration at each of the three monitored sites was 106, 106, and 101 ug/L. These upstream-to-downstream differences are negligible and there is no trend of increasing phosphorus downstream. All sites occasionally experience phosphorus concentrations higher than the median for Anoka County streams of 135 ug/L. All of the highest observed total phosphorus readings were during storms, including the maximums at each site of 230, 234, and 761 ug/L (upstream to downstream). In all, phosphorus in the Rum River is at acceptable levels but should continue to be an area of pollution control effort as the area urbanizes.

One 2010 total phosphorus reading was excessively high, but we feel this outlier is likely an error. On September 22 a reading of 761 ug/L was recorded at the Anoka Dam. This was recorded as a baseflow sample because no recent rains had occurred, but was during a period of extended high water. River stage was approximately 0.5 feet higher than during the other baseflow samples. During this event dissolved phosphorus was analyzed in addition to total phosphorus. Dissolved phosphorus was only 13% of total phosphorus. Therefore most of the total phosphorus must be particulate phosphorus. Yet, inconsistently, there were few particulates in the water; total suspended solids was only 6 mg/L. Likewise, nothing in the field notes suggest unusually high turbidity. If this reading of 761 ug/L total phosphorus is excluded, as it probably should be, the next highest observed TP at this site is 209 ug/L.

Total phosphorus during baseflow and storm conditions Grey squares are individual readings from 2004, grey diamonds are 2009 readings, grey triangles are 2010 readings, and black squares are 2011 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Turbidity and Total Suspended Solids (TSS)

Turbidity and total suspended solids (TSS) are two different measurements of solid material suspended in the water. Turbidity is measured by refraction of a light beam passed through a water sample. It is most sensitive to large particles. Total suspended solids is measured by filtering solids from a water sample and weighing the filtered material. The amount of suspended material is important because it affects transparency and aquatic life, and because many other pollutants are attached to particles. Many stormwater treatment practices such as street sweeping, sumps, and stormwater settling ponds target sediment and attached pollutants. Suspended solids in the Rum River are moderate, and highest during storms and at the farthest downstream site. The results for turbidity and TSS differ, lending insight into the types of particles that are problematic.

It is important to note the suspended solids can come from sources within and outside of the river channel. Sources on land include soil erosion, road sanding, and others. Riverbank erosion and movement of the river bottom also contributes to suspended solids. A moderate amount of this "bed load" is natural and expected.

In the Rum River, turbidity was low with only slight increases during storms and a very slight decrease at downstream monitoring sites (see figure below). The median turbidity at each site was 9, 8, and 7 FNRU (upstream to downstream), which is similar to the median for Anoka County streams of 8 FNRU. Turbidity was elevated on a few occasions, especially during storms. The maximum observed was 66 FNRU during a snowmelt event in 2011. The Rum River's turbidity exceeded the Minnesota Pollution Control Agency's water quality standard of 25 NTU during only five of 99 events (5%).

Across all years, TSS was similar at the two upstream sites, but higher at the Anoka Dam (see figure below). The countywide TSS median for streams is 12 mg/L. The median at all the Rum River sites was the same - 8 mg/L. However the readings ranged highest at the farthest downstream site, the Anoka Dam.

At all the sites median TSS during storms was higher than during baseflow. At the upstream site the difference between median TSS during storms and baseflow was 3 mg/L, while at County Road 7 it was 4 mg/L and at the Anoka Dam 9 mg/L. TSS during storms was much more variable due to variability in storms sampled.

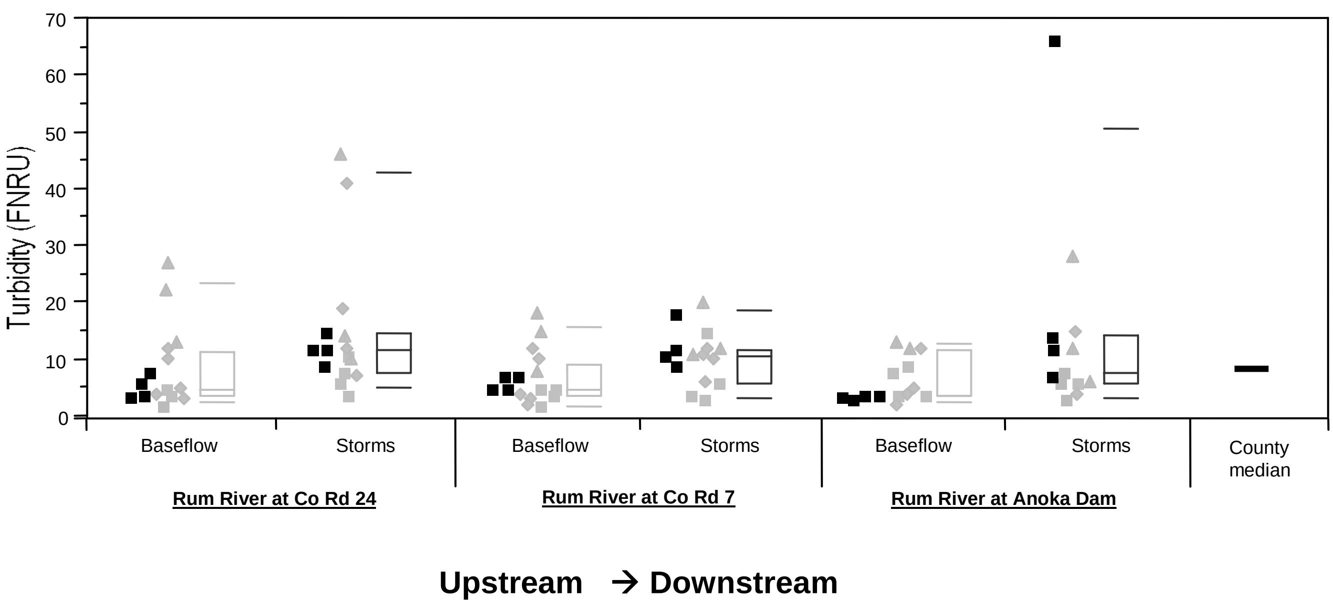
The maximum readings and moderate increases during storms are not unexpectedly high for a large river, and are within the range that should be considered healthy. At the same time, the increase in TSS between County Road 7 and the Anoka Dam during storms is noteworthy. It is not unexpected given the more dense land development between these two sites, but also speaks to the effectiveness of stormwater management practices like settling ponds. The river's water quality is in good condition, likely due in part to these practices, however they do not eliminate all impact. Rigorous stormwater treatment should occur as the Rum River watershed develops, or the collective pollution caused by many small developments will seriously impact the river. Bringing stormwater treatment up to date in older developments is also important.

Differences between TSS and turbidity lend insight into the nature of any problems. TSS showed increases at the downstream monitoring site, while turbidity did not. Turbidity is most sensitive to large particles. Therefore, the downstream increases are likely due to smaller particles. Other pollutants, such as phosphorus and metals, are most highly correlated with smaller particles. These other pollutants can "hitch a ride" on smaller particles because of their greater surface area and, in the case of certain soils, ionic charge. Furthermore, small particles stay suspended in the water column and therefore are more likely to be transported by stream flows and are more difficult to remove with stormwater practices like settling ponds.

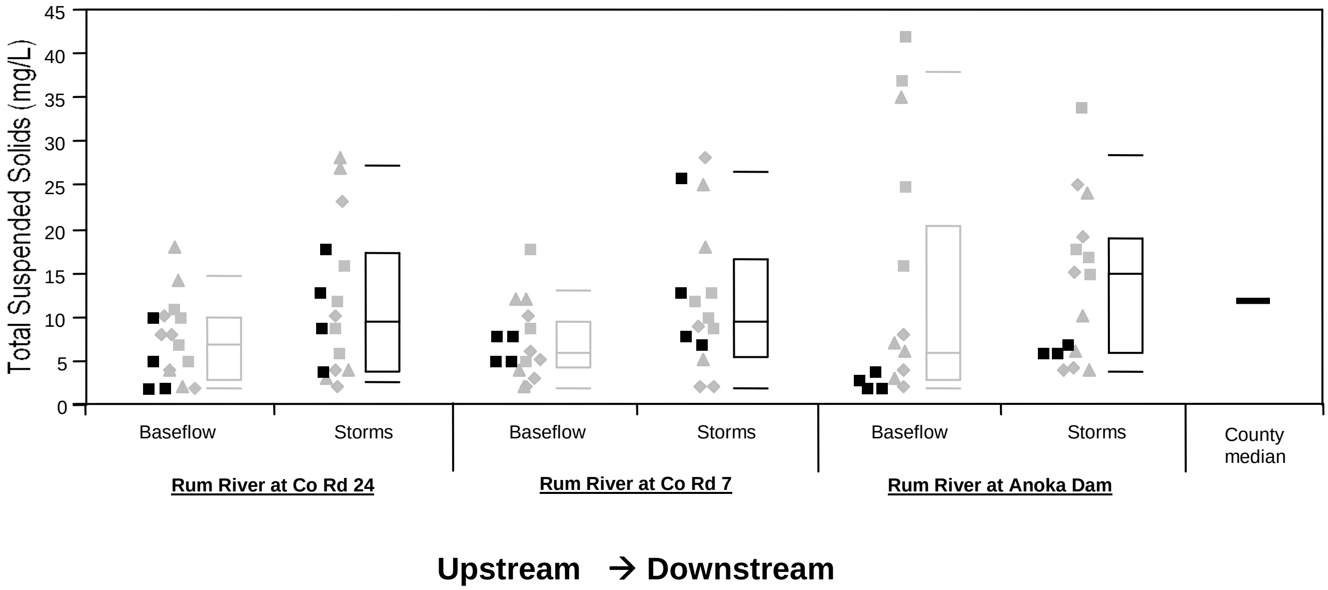
In 2011 TSS during storms was very low at the two farthest downstream monitoring sites, and this is likely due to hydrologic conditions. The first half of 2011, when our storm samples were taken, was an extremely wet period. River levels were chronically high. While we did sample immediately following storms, the runoff from that storm was a relatively low percentage of overall flow. Because TSS was low during these periods of very high flow, sediment from the stream bed and bank erosion is relatively low in the Rum River. Sediment carried by storm runoff is the larger source of suspended solids.

It should be noted that the data presented here do not include monitoring of any large flood events. The water is known to become muddier during such floods.

Turbidity during baseflow and storm conditions Grey squares are individual readings from 2004, grey diamonds are 2009 readings, grey triangles are 2010 readings, and black squares are 2011 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



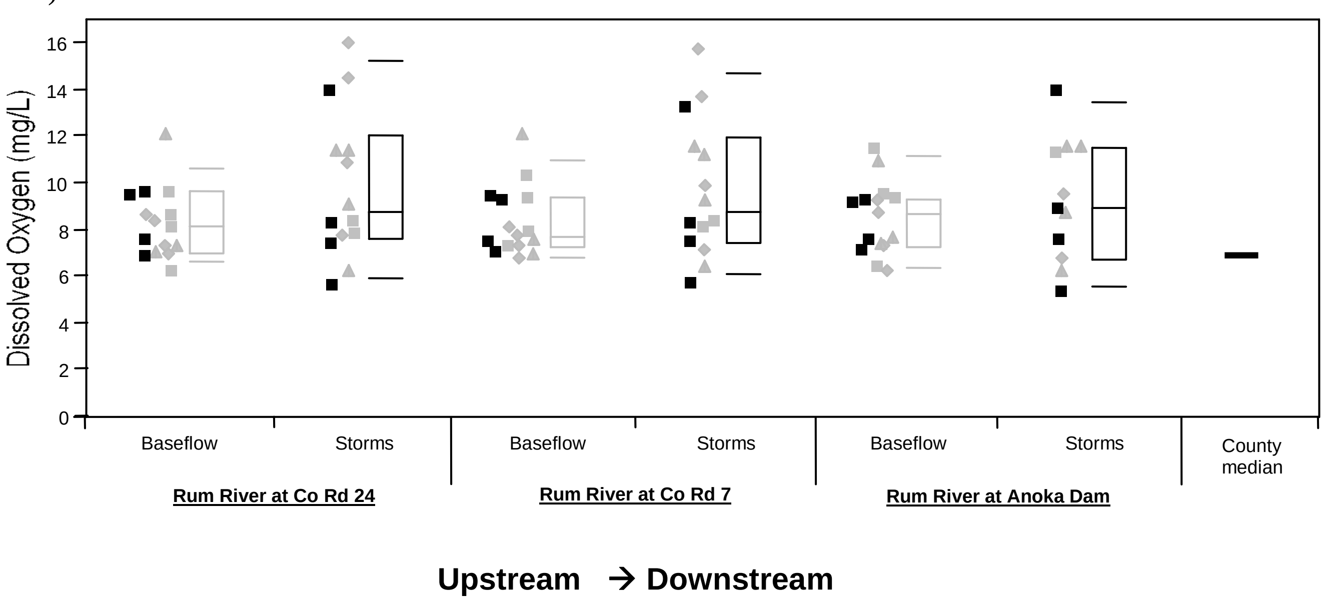
Total suspended solids during baseflow and storm conditions Grey squares are individual readings from 2004, grey diamonds are 2009 readings, grey triangles are 2010 readings, and black squares are 2011 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Dissolved Oxygen

Dissolved oxygen is necessary for aquatic life, including fish. Organic pollution consumes oxygen when it decomposes. If oxygen levels fall below 4 mg/L aquatic life begins to suffer. In the Rum River dissolved oxygen was always above 5.5 mg/L at all monitoring sites.

Dissolved oxygen during baseflow and storm conditions Grey squares are individual readings from 2004, grey diamonds are 2009 readings, grey triangles are 2010 readings, and black squares are 2011 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).

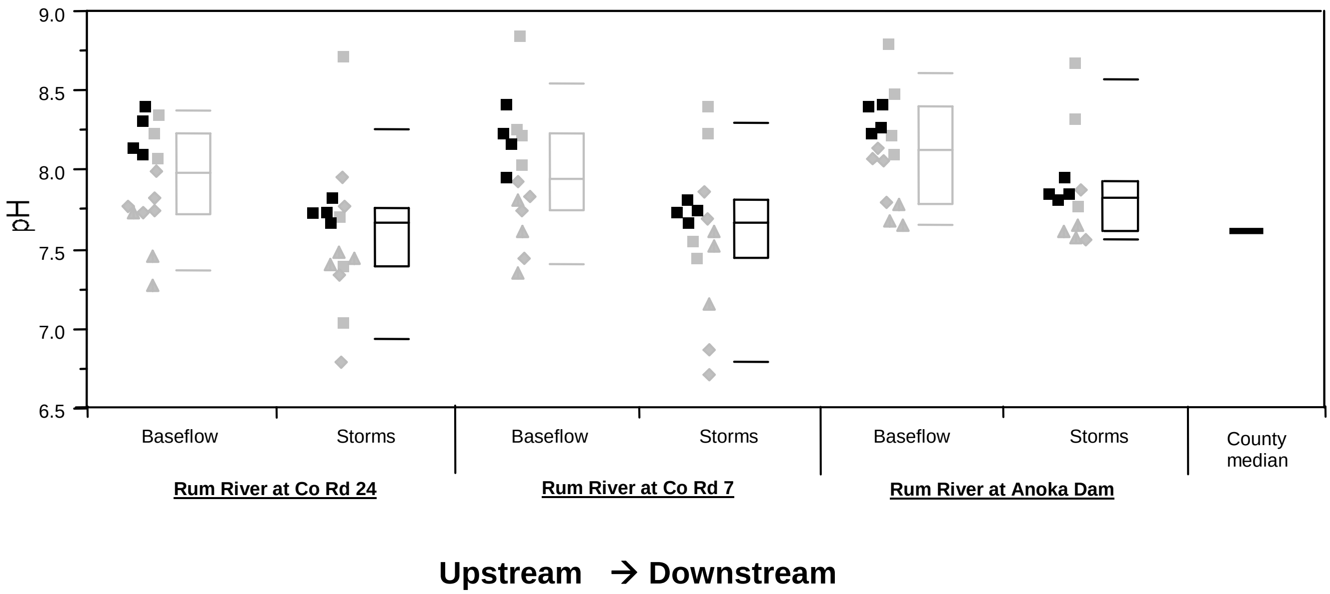


pH

pH refers to the acidity of the water. The Minnesota Pollution Control Agency's water quality standard is for pH to be between 6.5 and 8.5. The Rum River is regularly within this range (see figure below). Each of the three sites exceeded 8.5 on one occasion, but the highest was only 8.85. This rare and modest exceedance of the state water quality standard is not concerning.

It is interesting to note that pH is lower during storms than during baseflow. This is because the pH of rain is typically lower (more acidic). While acid rain is a longstanding problem, its affect on this aquatic system is small.

pH during baseflow and storm conditions Grey squares are individual readings from 2004, grey diamonds are 2009 readings, grey triangles are 2010 readings, and black squares are 2011 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Summary and Recommendations

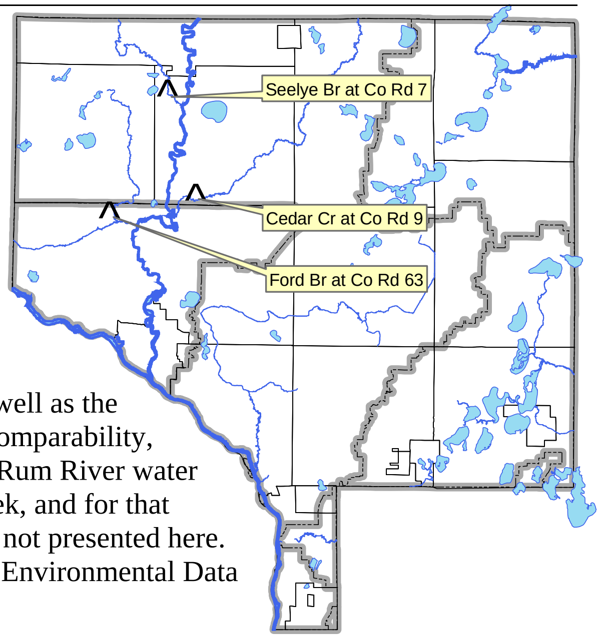
The Rum River's water quality is very good. It does show some deterioration in the downstream areas that are most developed. Protection of the Rum River should be a high priority for local officials. Large population increases are expected for the Rum River's watershed within Anoka County and have the potential to degrade water quality unless carefully sited and managed. Development pressure is likely to be especially high near the river because of its scenic and natural qualities. Measures to maintain the Rum River's good water quality should include:

- Enforce the building and clear-cutting setbacks from the river required by state scenic rivers laws to avoid bank erosion problems and protect the river's scenic nature.
- Use the best available technologies to reduce pollutants delivered to the river and its tributaries through the storm sewer system. Any new development should consider low impact development strategies that minimize stormwater runoff production. Aggressive stormwater treatment should be pursued in all areas of the watershed, not just those adjacent to the river. The area's soils are well suited to stormwater treatment by infiltration.

- Seek improvements to the existing stormwater conveyance system below County Road 7. Total suspended solids in the river increase in this portion of the watershed during storms.
- Utilize all practical means to reduce road deicing salt applications. These may include more efficient application methods, application only in priority areas, alternate chemicals, or others. Road salt infiltration into the shallow groundwater has become a regional problem. Deicing salts are apparent year-round in the groundwater that feeds area streams.
- Survey the river by boat for bank erosion problems and initiate projects to correct them. Both the Lower and Upper Rum River Watershed Management Organizations, which serve Anoka County, have completed this work. It should be periodically repeated.
- Continue education programs to inform residents of the direct impact their actions have on the river's health.
- Continue regular water quality monitoring. A reasonable baseline of four years of data that has been collected, so future monitoring every 1-3 years seems reasonable. Frequency of monitoring should be most frequent in the next few years and following any major projects that might positively or negatively impact the river. Additionally, periodic monitoring of the primary tributary streams should also occur every 2-3 years. Coordinating simultaneous monitoring across communities and watershed organizations is highly desirable.
- Investigate E. coli bacteria. In 2011 the MPCA sampled for E. coli at the outlet of the Rum River into the Mississippi River. They found levels that exceeded state standards. It is unknown how much of the Rum River's length might be declared "impaired" based upon this data. It is desirable to do additional bacteria monitoring upstream to define the extent of the problem. Bacteria is a difficult pollutant to reduce.
- Engage the entire watershed. To date, most efforts to monitor the Rum River have occurred in Anoka County by the Upper and Lower Watershed Management Organizations. This is the farthest downstream part of the watershed. A broader scale effort is needed to protect the river. Strong encouragement from already-active partners is needed to engage those who are inactive.

SEELYE BROOK, CEDAR CREEK, AND FORD BROOK

Seelye Brook at Co Rd 7 (Roanoke St), St. Francis	STORET SiteID =	S003-204
Cedar Creek at Co Rd 9 (Lake George Blvd), Oak Grove	STORET SiteID =	S003-203
Ford Brook at Co Rd 63 (Green Valley Rd), Ramsey	STORET SiteID =	S003-200



Years Monitored (# occasions)

Seelye Brook at Co Rd 7 –	1998 (4), 2002 (2), 2005 (2), 2011 (8)
Cedar Creek at Co Rd 9 –	1998 (4), 2002 (1), 2003 (1), 2005 (2), 2006 (8), 2011 (8)
Ford Brook at Co Rd 63 –	1998 (4), 2001 (9), 2002 (1), 2003 (8), 2004 (1), 2005 (2), 2006 (1), 2011 (8)

Years Reported

This report analyzes only data from 2011 when all three sites, as well as the Rum River, were monitored simultaneously. This allows direct comparability, and examination of whether these tributaries improve or degrade Rum River water quality. The analysis also examines the water quality in each creek, and for that purpose may occasionally refer to pre-2011 data that is otherwise not presented here. All data, including pre-2011 data, is available through the EQuIS Environmental Data Access tool on the MN Pollution Control Agency website.

Background

The Rum River is regarded as one of Anoka County's highest quality and most valuable water resources. It is designated as a state scenic and recreational river throughout Anoka County, except south of the county fairgrounds in Anoka. It is used for boating, tubing, and fishing. Much of western Anoka County drains to the Rum River. Within the Upper Rum River Watershed Management Organization (URRWMO), three majoro tributaries drain to the Rum River, including Seelye Brook, Cedar Creek, and Ford Brook.

Limited monitoring has been done to determine water quality in these creeks, and they have never been compared to the Rum River to determine whether positively or negatively impact the river's water quality. In 2011 all three tributaries and the Rum River were monitored simultaneously so that direct comparisons can be done without confounding factors.

Methods

In 2011 monitoring was conducted at the bottom of each creek's watershed, as well as in the Rum River at the top and bottom of the URRWMO. The Anoka Conservation District did the field work at all sites ensuring simultaneous monitoring and consistent methods. Eight water quality grab samples were taken; half during baseflow and half following storms. Storms were generally defined as one-inch or more of rainfall in 24 hours or a significant snowmelt event combined with rainfall. Parameters tested with portable meters included pH, conductivity, turbidity, temperature, salinity, and dissolved oxygen. Parameters tested by water samples sent to a state-certified lab included total phosphorus, total suspended solids, chlorides, sulfates, and hardness. Water level was recorded during each monitoring event with a surveyed staff gauge. Water level and flow for the Rum River was obtained from the US Geological Survey, who maintains a hydrological monitoring site at Viking Boulevard.

2011 was a year of weather extremes. Spring and early summer were characterized by record rainfall and continuously high flows. All storm sampling happened during this period. Beginning in August, there were record low rainfalls and stream flows were low. All baseflow monitoring happened during this period.

The data analysis in this report displays only 2011 data. This is because 2011 was the only year when all the creeks were monitored simultaneously with the Rum River for direct comparability. This allows us to examine whether inflows from each creek are a positive or negative impact on the river, as well as compare the creeks to each other. In this report there is also discussion of each creek's water quality, and for that purpose pre-2011 data is periodically referenced.

Results and Discussion

On the following pages data are presented and discussed for each parameter. The last section outlines management recommendations.

Conductivity and chlorides

Conductivity and chlorides are measures of dissolved pollutants. Dissolved pollutant sources include urban road runoff, industrial chemicals, and others. Metals, hydrocarbons, road salts, and others are often of concern in a suburban environment. Conductivity is the broadest measure of dissolved pollutants we used. It measures electrical conductivity of the water; pure water with no dissolved constituents has zero conductivity. Chlorides tests for chloride salts, the most common of which are road de-icing chemicals. Chlorides can also be present in other pollutant types, such as wastewater. These pollutants are of greatest concern because of the effect they can have on the stream's biological community. They can also be of concern because the Rum River is upstream from the Twin Cities drinking water intakes on the Mississippi River.

Conductivity in each of the tributaries was typical for local streams, but higher than in the Rum River. The median for streams in Anoka County is 0.362 mS/cm. The median value in 2011 for Seelye, Cedar, and Ford Brooks were 0.339, 0.323, and 0.350 mS/cm, respectively. If we look at all the available data from each stream, including non-2011, the medians are similar. Generally, this is acceptably low. However, conductivity in the Rum River before these tributaries enter it averages 0.230 mS/cm, or approximately one-third lower.

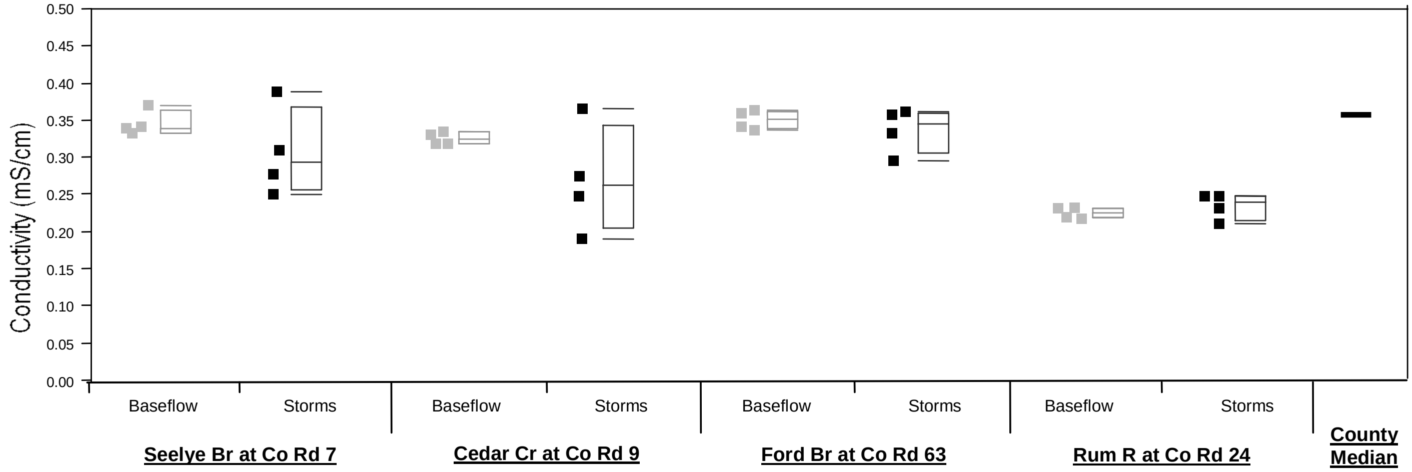
Conductivity in all the streams was similar during baseflow and stormflow, but more variable during storms. Higher variability during storms is expected, as storms vary in intensity and the amount of runoff generated. However it is notable that the median conductivity all the streams was slightly lower during storms. This suggests that surface runoff is not always the source of dissolved pollutants. Groundwater contributions to flow during baseflow may be a more important source of dissolved pollutants.

Chlorides in these streams were often higher than the median for Anoka County streams, double that of the Rum River, but well below the MCPA's chronic water quality standard of 230 mg/L. The median chloride for Anoka County streams is 17 mg/L. Median chloride in Seelye, Cedar, and Ford Brooks were 25, 29, and 22 mg/L, respectively. The median in the Rum River was less than half, at 11 mg/L. Looking at all readings from all years, the medians are slightly lower in the streams (18-22 mg/L) but identical in the Rum River.

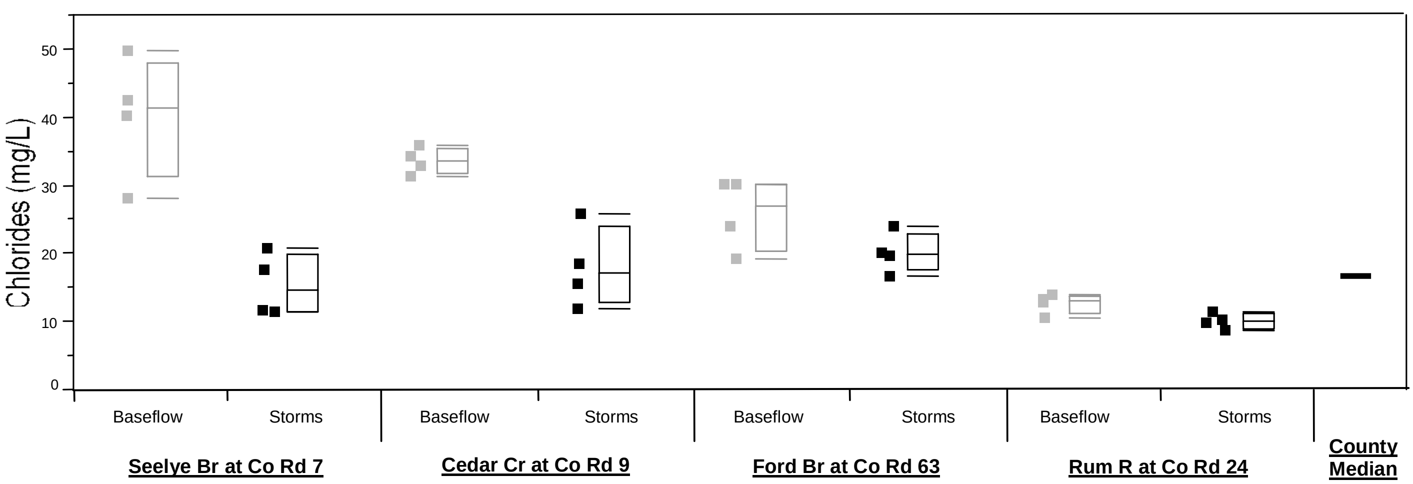
Conductivity was lowest at all sites during storms, suggesting that stormwater runoff contains fewer dissolved pollutants than the surficial water table that feeds the river during baseflow. At Cedar and Seeyle Brooks the baseflow chlorides were more than double that of storms. At Ford Brook the difference was much less, and only the slightest difference between storms and baseflow was observed in the Rum River. High baseflow conductivity and chlorides has been observed in most other nearby streams, studied extensively, and the largest cause has been found to be road salts that have infiltrated into the shallow aquifer. Geologic materials also contribute, but to a lesser degree. We speculate that differences in chlorides among the streams probably are due to road densities in their subwatersheds and subwatershed size.

Overall, dissolved pollutants in Seelye, Cedar, and Ford Brooks are relatively reasonably low, but 33-50% higher than in the Rum River. All well below the levels at which stream biota is negatively affected. The most important management strategy to reduce dissolved pollutants is to reduce road deicing salt application to the greatest degree practical. Trainings for public works employees are available from the University of Minnesota and others.

Conductivity during baseflow and storm conditions Baseflow data is in grey, storm data is black. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Chloride during baseflow and storm conditions Baseflow data is in grey, storm data is black. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Total Phosphorus

Total phosphorus is the nutrient most responsible for eutrophication (excessive algal growth) in freshwaters. Eutrophication is problematic for recreational uses of waterbodies, and decomposition of the excessive growth can deplete dissolved oxygen that fish and other aquatic life require. The Minnesota Pollution Control Agency is developing phosphorus standards for rivers; the recommended upper limit for rivers in this region is 100 ug/L.

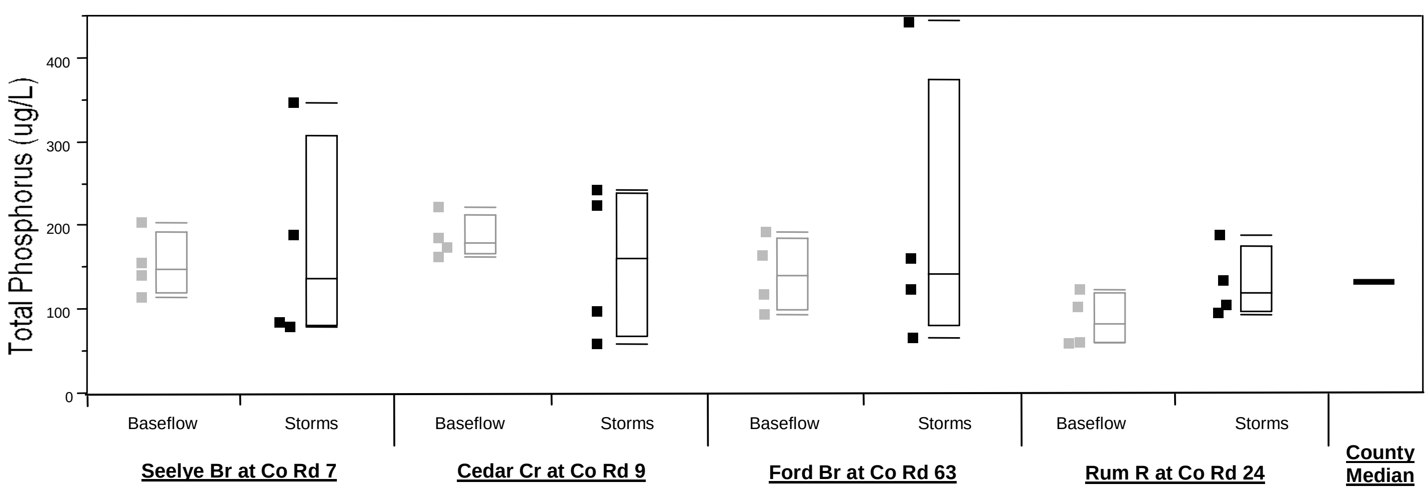
Total phosphorus in these streams, as well as the Rum River, was often above 100 ug/L. The streams had slightly higher phosphorus than the River. The median total phosphorus in Seelye, Cedar, and Ford Brooks was 129, 144, and 145 ug/L, respectively, while for the Rum River it was 106 ug/L. Likewise, the maximums recorded at each stream in 2011 were higher than the Rum River. The maximum phosphorus at Seelye, Cedar, and Ford Brooks was 348, 245, and 448 ug/L, respectively, while for the Rum River it was 191 ug/L.

For the streams, median total phosphorus was similar during base and storm flows but levels were much more variable during storms. The higher variability during storms is expected, as the magnitude and nature of storms varies. It is noteworthy that in the Rum River phosphorus was slightly higher during storms than baseflow (84 vs 122 ug/L).

All three streams appear to have relatively similar total phosphorus, though this is difficult to determine from just eight readings in 2011. If we look at all years, there is slightly more data – 12 total readings for Seeyle Brook, 20 for Cedar Creek, and 29 for Ford Brook. Using this data, the median phosphorus in Seelye Brook was 129 ug/L, in Cedar Creek was 144 ug/L, and in Ford Brook was 145 ug/L. There is no large or apparent difference. While the median for Seeyle Brook is lowest, this is also the site with the fewest readings.

Overall, total phosphorus in Seelye, Cedar, and Ford Brooks are slightly elevated and approximately 35-71% higher than in the Rum River. The median phosphorus levels seen in each of these streams is only slightly higher than the median for all Anoka County streams (135 ug/L).

Total phosphorus during baseflow and storm conditions Baseflow data is in grey, storm data is black. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Turbidity and Total Suspended Solids (TSS)

Turbidity and total suspended solids (TSS) are two different measurements of solid material suspended in the water. Turbidity is measured by refraction of a light beam passed through a water sample. It is most sensitive to large particles. Total suspended solids is measured by filtering solids from a water sample and weighing the filtered material. The amount of suspended material is important because it affects transparency and aquatic life, and because many other pollutants are attached to particles. Many stormwater treatment practices such as street sweeping, sumps, and stormwater settling ponds target sediment and attached pollutants. The turbidity and TSS results for these streams are similar.

Seelye Brook stands out for having lower turbidity and TSS than the other streams or the Rum River. Median turbidity and TSS in Seelye Brook were 5 FNRU and 5.5 mg/L, respectively, in 2011. It was similar during base and storm conditions. Looking at other years of data there were a total of 12 readings, but the median values were the same as the 2011 medians.

Ford Brook had the next lowest turbidity and TSS. Median turbidity and TSS in Ford Brook were 11.5 FNRU and 8.5 mg/L, respectively, in 2011. Like Seelye Brook, readings were similar during base and storm conditions. Using all years' data (nearly 30 observations), the median turbidity was 7 FNRU and the median TSS was 10 mg/L, similar to in 2011 alone.

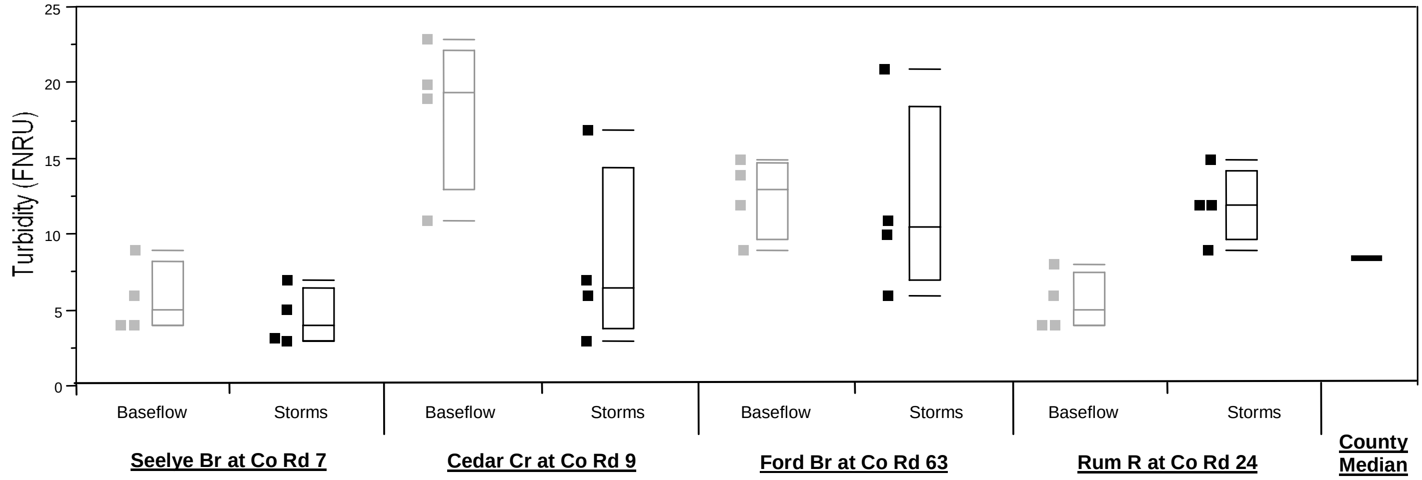
Cedar Creek had the highest turbidity and TSS of these streams, but it was not excessively high. Median turbidity and TSS were 14 FNRU and 15 mg/L, respectively, in 2011. Using all years' data (nearly 20 observations), the median turbidity was 8 FNRU and the median TSS was 12 mg/L.

None of these streams approaches or exceeds state water quality standards for total suspended solids or turbidity. The state standard for turbidity is violated when three observations, and at least 10% of all observations are >25 NTU. In 2011 none of the observations at any of these streams exceeded 25 NTU. The highest was 23 in Cedar Creek. Looking at all years of available data, Cedar Creek exceeded turbidity of 25 NTU two of 24 occasions, Ford Brook one of 32 occasions, and Seelye Brook zero of 16 occasions. The Rum River also has low turbidity, exceeding 25 NTU in only three of 47 monitoring occasions.

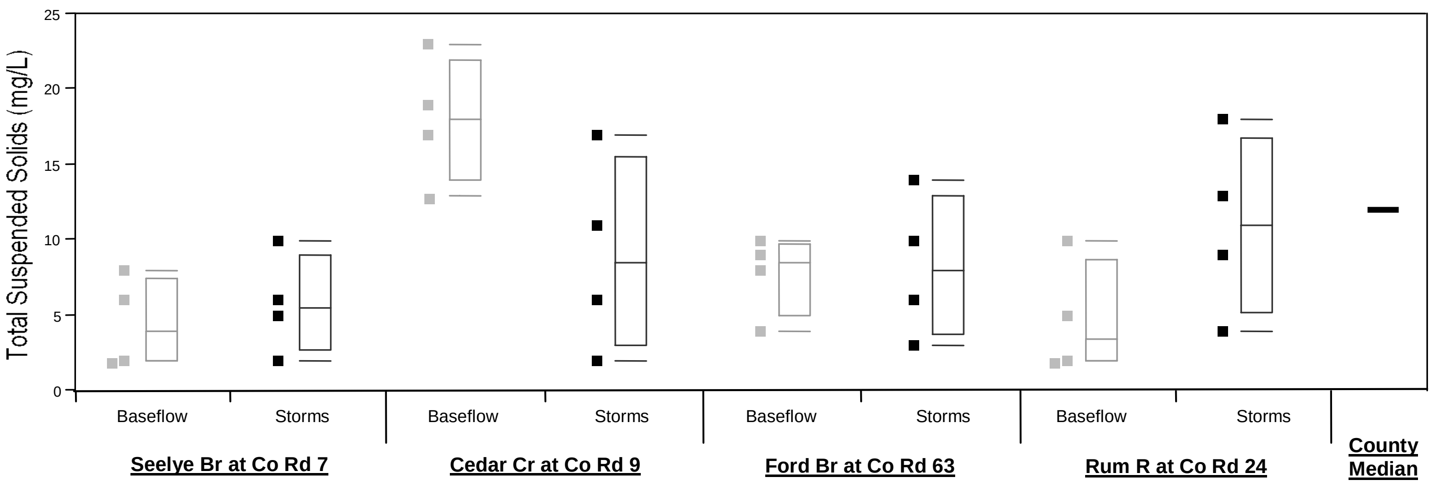
When turbidity data is lacking, the MPCA has a surrogate water quality standard for TSS of 100 mg/L. The maximum observed at any of these streams in 2011 was 23 mg/L. Examining all years of data at all the sites the maximum TSS observed was 74 mg/L at Ford Brook. It is clear that none of these streams is impaired, nor close to being impaired, for excessive turbidity or suspended solids.

In comparison to the Rum River, Seelye Brook has lower suspended solids while Ford and Cedar Creeks have more. In 2011 median turbidity and TSS in the Rum River at County Road 24 were 8.5 FNRU and 7 mg/L. In 2011 Ford Brook's median turbidity was 23% greater than the Rum River, and Cedar Creek's was 65% greater. Median turbidity in each stream was more than double that of the Rum River. It is important to keep in mind that these percentages are large in part because we are dealing with relatively small numbers. While we should strive to make sure these streams do not contribute to degradation of the Rum River, we must also note that their water quality is not excessively poor.

Turbidity during baseflow and storm conditions Baseflow data is in grey, storm data is black. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Total suspended solids during baseflow and storm conditions Baseflow data is in grey, storm data is black. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Dissolved Oxygen

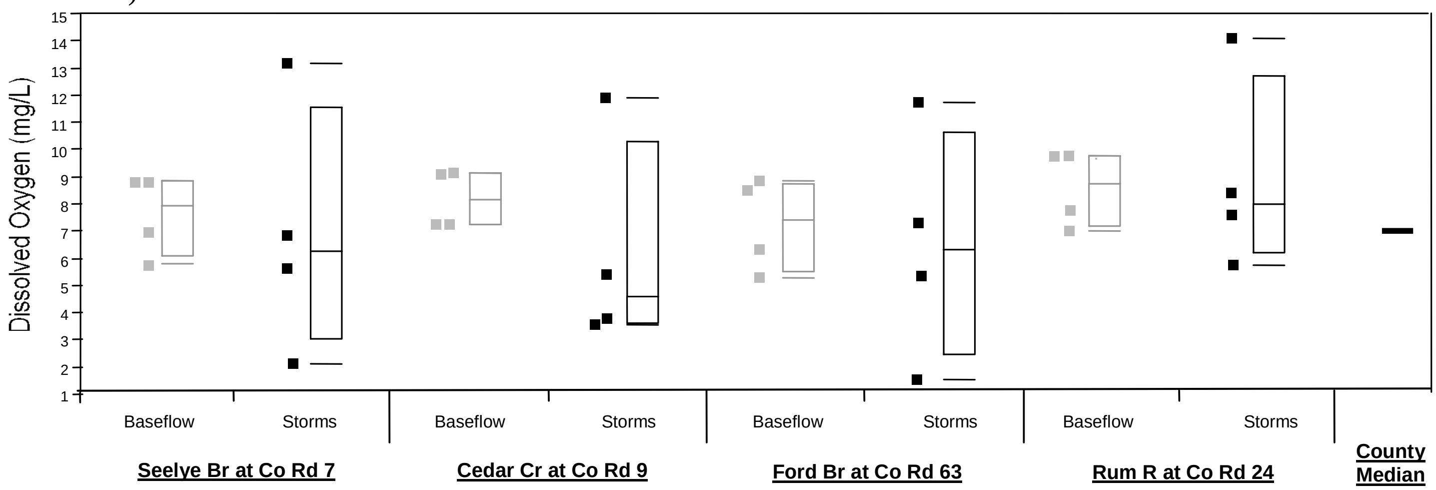
Dissolved oxygen (DO) is necessary for aquatic life, including fish. Organic pollution consumes oxygen when it decomposes. If oxygen levels fall below 4 mg/L aquatic life begins to suffer.

In the Rum River dissolved oxygen was always above 5.5 mg/L at all monitoring sites, however it occasionally dips lower in each of the tributary streams. All three streams had their lowest observed reading on July 27, 2011, a storm event. At that time, dissolved oxygen in Seelye, Cedar, and Ford Brooks was 2.09, 3.52, and 1.48 mg/L, respectively. This was a period of extended high flows, and a modest storm fell before sunrise on the morning of sampling. Because all streams had their lowest DO on this day, climatological factors are likely responsible.

If we exclude the lowest DO readings on July 27, 2011, only one other reading below 5 mg/L was observed. Cedar Creek's dissolved oxygen was 3.76 mg/L on June 22, 2011. Looking back through all years of data collected from these sites, there are no other instances if DO below 5 mg/L. It is reasonable to conclude that low dissolved oxygen is not a chronic problem in any of these streams, nor in the Rum River.

Median DO in these tributary streams are similar to that of the Rum River.

Dissolved oxygen during baseflow and storm conditions Baseflow data is in grey, storm data is black. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).

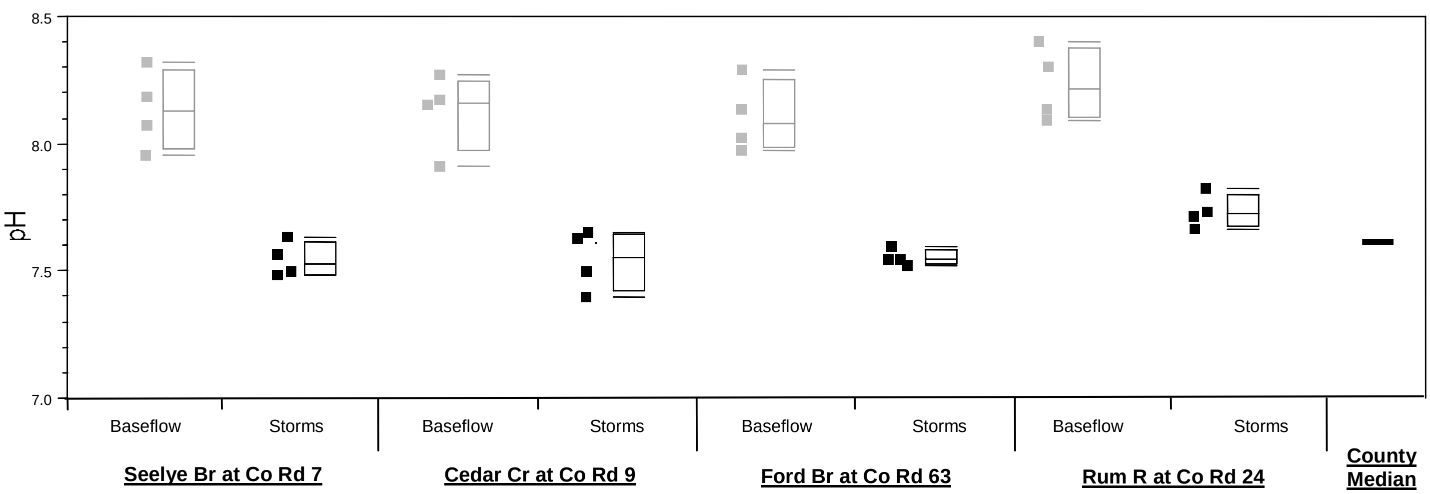


pH

pH refers to the acidity of the water. The Minnesota Pollution Control Agency's water quality standard is for pH to be between 6.5 and 8.5. Seelye, Cedar, and Ford Brooks, as well as the Rum River, were consistently within this range (see figure below).

It is interesting to note that pH is lower during storms than during baseflow. This is because the pH of rain is typically lower (more acidic). While acid rain is a longstanding problem, its affect on this aquatic system is small.

pH during baseflow and storm conditions Baseflow data is in grey, storm data is black. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Summary and Recommendations

While Seelye, Cedar, and Ford Brooks all generally have good water quality, Seelye Brook stands out for having the best water quality of the three. While dissolved pollutants were similar in all three streams, Seelye Brook had lower phosphorus and suspended solids, the pollutants that are most often of concern in the region. The next best water quality is arguably Ford Brook, although it is similar to Cedar Creek. Ford Brook had slightly lower suspended solids than Cedar Creek.

While water quality is generally good in these streams, it is not as good as the Rum River. The streams have a moderately negative impact on the Rum River when they join it. Conductivity in the Rum River is approximately one-third lower than in the tributary streams. Chlorides in the streams are approximately double that found in the Rum River. Phosphorus is variable among the streams, and 35-71% higher than in the Rum River. Ford Brook's median turbidity was 23% greater than the Rum River, and Cedar Creek's was 65% greater.

While the streams have poorer water quality than the Rum River, monitoring upstream and downstream of the confluences with Seeyle and Cedar Creeks have not found a deterioration in river water quality. The river has been monitored in multiple years at County Road 24 in St. Francis and County Road 7 in Ramsey/Andover to make upstream to downstream comparisons. Between these monitoring sites are the confluence of Seelye and Cedar Creeks with the Rum River. All off the parameters monitored are essentially the same at the two monitoring sites. The exception is a slight increase in conductivity and chlorides.

It is noteworthy that monitoring sites further downstream do find an overall decline in Rum River water quality before and after Ford Brook enters (via Trott Brook). However Ford Brook is not the only influence that might cause this, and likely plays a minor role.

Seelye, Cedar, and Ford Brooks do not violate state water quality standards, with the possible exception of total phosphorus. Currently, the state has not adopted a standard for this parameter, but will do so soon using 100 ug/L. The standard will likely apply to larger rivers, not streams. These streams all exceed 100 ug/L total phosphorus on a regular basis. All the streams are better than the state standards for chlorides, turbidity, total suspended solids, and dissolved oxygen.

Overall, Seelye, Cedar, and Ford Brooks have good water quality, but efforts should be made to improve them for the benefit of the Rum River. Given that degradation of the Rum River is not readily apparent when comparing upstream and downstream of each stream in the river, the urgency for such improvements could be argued. If nothing else, it is clear that a heavy emphasis should be on maintaining the existing water quality whenever new development occurs in the watershed.

Measures that could be used to improve or protect water quality include:

- Minimize road deicing salt applications to the greatest extent possible. Train public works employees in methods for maximizing effectiveness of deicing agent applications.
- Retrofit stormwater treatment practices in areas that are served by curb-and-gutter and were built prior to stormwater treatment requirements.
- Require adequate stormwater treatment for all new development.
- Enforce existing erosion and sediment control rules, as well as scenic river district rules.
- Use a variety of water quality best management practices across the landscape, but particularly in areas with a direct connection to the streams.
- Encourage agricultural operators to adopt best management practices, such as livestock exclusions along waterways and appropriate manure disposal. Many properties with a few horses each exist in the watershed, and they should be using conservation practices to avoid water quality impacts.

Stream Water Quality – Biological Monitoring

Description: This program combines environmental education and stream monitoring. Under the supervision of ACD staff, high school science classes collect aquatic macroinvertebrates from a stream, identify their catch to the family level, and use the resulting numbers to gauge water and habitat quality. These methods are based upon the knowledge that different families of macroinvertebrates have different water and habitat quality requirements. The families collectively known as EPT (Ephemeroptera, or mayflies; Plecoptera, or stoneflies; and Trichoptera, or caddisflies) are pollution intolerant. Other families can thrive in low quality water. Therefore, a census of stream macroinvertebrates yields information about stream health.

Purpose: To assess stream quality, both independently as well as by supplementing chemical data. To provide an environmental education service to the community.

Locations: Rum River at Hwy 24, Rum River North County Park, St. Francis

Results: Results for each site are detailed on the following pages.

Tips for Data Interpretation

Consider all biological indices of water quality together rather than looking at each alone, as each gives only a partial picture of stream condition. Compare the numbers to county-wide averages. This gives some sense of what might be expected for streams in a similar landscape, but does not necessarily reflect what might be expected of a minimally impacted stream. Some key numbers to look for include:

Families — Number of invertebrate families. Higher values indicate better quality.

EPT — Number of families of the generally pollution-intolerant orders Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (caddisflies). Higher numbers indicate better stream quality.

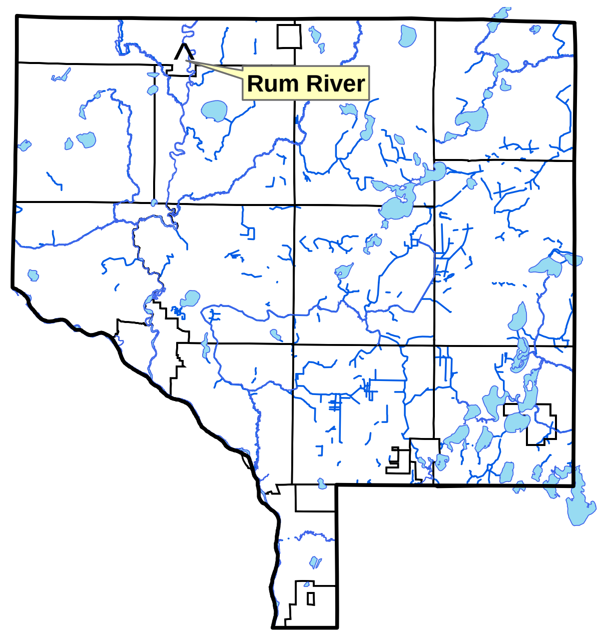
Family Biotic Index (FBI) — An index that utilizes known pollution tolerances for each family. Lower numbers indicate better stream quality.

FBI	Stream Quality Evaluation
0.00-3.75	Excellent
3.76-4.25	Very Good
4.26-5.00	Good
5.01-5.75	Fair
5.76-6.50	Fairly Poor
6.51-7.25	Poor
7.26-10.00	Very Poor

% Dominant Family — High numbers indicates an uneven community, and likely poorer stream health.

RUM RIVER

at Hwy 24, Rum River North County Park, St. Francis



Last Monitored

By St. Francis High School in 2011

Monitored Since

2000

Student Involvement

50 students in 2011, approximately 1,120 since 2000

Background

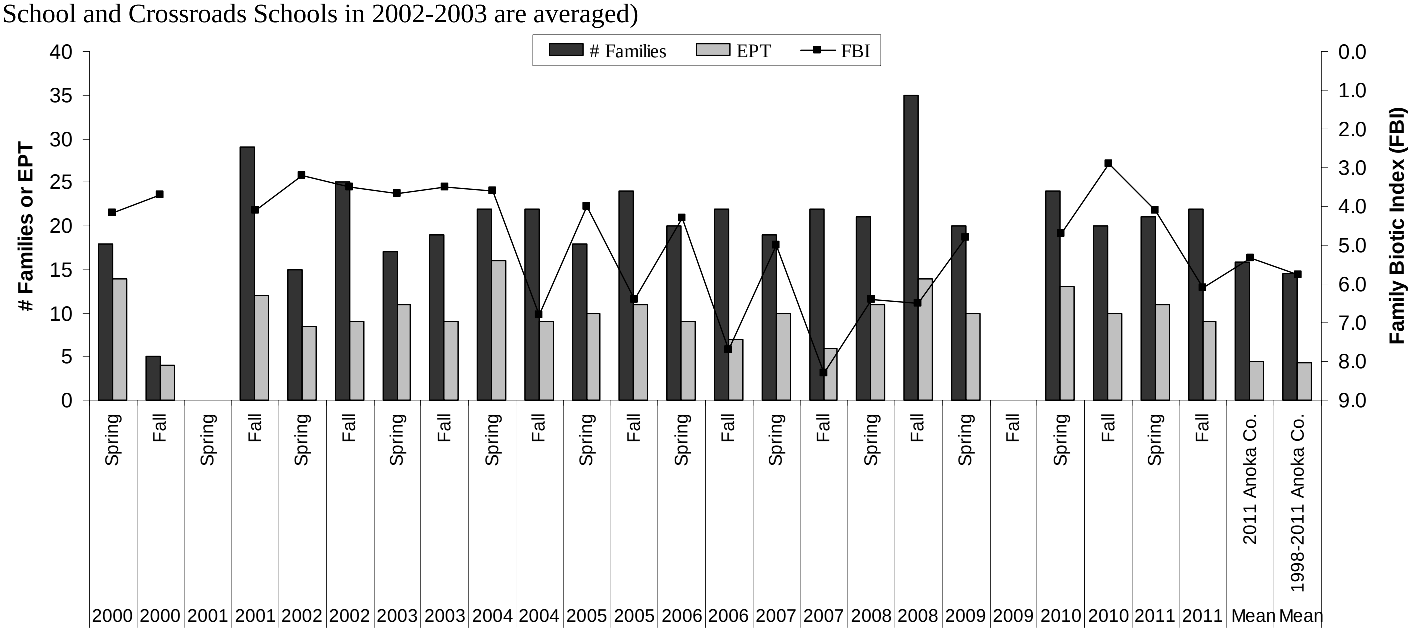
The Rum River originates from Lake Mille Lacs, and flows south through western Anoka County where it joins the Mississippi River in the City of Anoka. Other than the Mississippi, this is the largest river in the county. In Anoka County the river has both rocky ripples as well as pools and runs with sandy bottoms. The river's condition is generally regarded as excellent. Portions of the Rum in Anoka County have a state "scenic and recreational river" designation.

The sampling site is in Rum River North County Park. This site is typical of the Rum in northern Anoka County, having a rocky bottom with numerous pool and ripple areas.

Results

St. Francis High School classes monitored the Rum River in fall 2011, with Anoka Conservation District (ACD) oversight. ACD staff sampled in spring 2011 when high water persisted past the end of the school year. Biological data for 2011, and historically, indicate the Rum River in northern Anoka County has the best conditions of all streams and rivers monitored throughout Anoka County. In 2011 the number of families and number of EPT families were substantially above the county averages. The Family Biotic Index (FBI) was slightly lower than the county average in fall 2011.

Summarized Biomonitoring Results for Rum River at Hwy 24, St. Francis (samplings by St. Francis High School and Crossroads Schools in 2002-2003 are averaged)



Biomonitoring Data for Rum River at Rum River North County Park, St. Francis

Data presented from the most recent five years. Contact the ACD to request archived data.

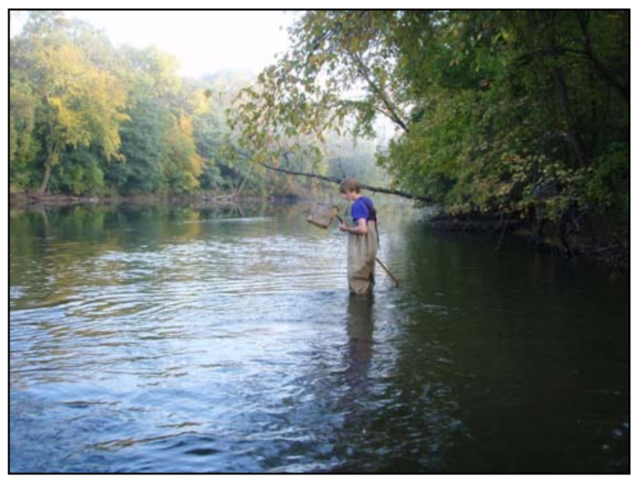
Year	2007	2007	2008	2008	2009	2009	2010	2010	2011	2011	Mean	Mean
Season	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	2011 Anoka Co.	1998-2011 Anoka Co.
FBI	5.00	8.30	6.40	6.50	4.80	Unusable	4.7	2.9	4.1	6.1	5.3	5.8
# Families	19	22	21	35	20	Sample	24	20	21	22	15.8	14.5
EPT	10	6	11	14	10		13	10	11	9	4.4	4.3
Date	16-May	11-Oct	27-May	30-Sep	29-Apr	13-Oct	27-Apr	29-Oct	10-Jun	28-Sep		
Sampled By	SFHS	SFHS	SFHS	SFHS	SFHS	SFHS	SFHS	ACD	ACD	SFHS		
Sampling Method	MH	MH	MH	MH	MH	MH	MH	MH	MH	MH		
Mean # Individuals/Rep.	262	502	348	156	267		142	274	418	443		
# Replicates	2	2	2	4	2		3	1	1	2		
Dominant Family	Hydropsychidae	Corixidae	Corixidae	Corixidae	Corixidae		Nemouridae	Leptophlebiidae	baetidae	hydrophilidae		
% Dominant Family	42.7	58.8	57.5	61.4	24.3		28.1	39.4	66.3	21.4		
% Ephemeroptera	17.2	2	11.9	17.9	18.7		23.9	51.1	81.3	3.6		
% Trichoptera	44.3	1.0	5.9	6.9	20.2		10.8	6.2	6.0	4.3		
% Plecoptera	8.0	0.2	17.1	2.1	27.7		32.8	26.6	3.8	9.7		

Supplemental Stream Chemistry Readings

Data presented from the most recent five years. Contact the ACD to request archived data.

Parameter	5/16/2007	10/11/2007	5/27/2008	9/30/2008	4/29/2009	10/13/2009	4/27/2010	10/29/2010	4/27/2010	9/28/2011
pH	8.53	7.76	7.73	7.7	7.62	7.87	na	7.51	na	8.35
Conductivity (mS/cm)	0.278	0.242	0.284	0.341	0.266	0.291	0.324	0.249	0.324	0.228
Turbidity (NTU)	11	17	7	4	6	na	2	362	2	362
Dissolved Oxygen (mg/L)	10.34	9.66	10.18	7.83	10.53	12.22	9.14	na	9.14	8.7
Salinity (%)	0.01	0	0.01	0.01	0.01	0.01	0.01	0	0.01	0
Temperature (°C)	16.8	12.3	15.3	13.4	12.2	5.2	12	7.2	12	13.8

Discussion



Both chemical and biological monitoring indicate the good quality of this river. Habitat is ideal for a variety of stream life, and includes a variety of substrates, plenty of woody snags, riffles, and pools. Water chemistry monitoring done at various locations on the Rum River throughout Anoka County found that water quality is also good. Both habitat and water quality decline, but are still good, in the downstream reaches of the Rum River where development is more intense and the Anoka Dam creates a slow moving pool.

Water resource management should be focused upon protecting the Rum's quality. Some steps to protect the Rum River could include:

- Enforce the building and clear cutting setbacks from the river required by state scenic river laws.
- Use the best available technologies to reduce pollutants delivered to the river and its tributaries through the storm sewer system. This should include all of the watershed, not just those adjacent to the river.
- Education programs to encourage actions by residents that will benefit the river's health.
- Continue water quality monitoring programs.

Wetland Hydrology

Description: Continuous groundwater level monitoring at a wetland boundary, to a depth of 40 inches. County-wide, the ACD maintains a network of 18 wetland hydrology monitoring stations.

Purpose: To provide understanding of wetland hydrology, including the impact of climate and land use. These data aid in delineation of nearby wetlands by documenting hydrologic trends including the timing, frequency, and duration of saturation.

Locations: Alliant Tech Reference Wetland, Alliant Tech Systems property, St. Francis

Cedar Creek, Cedar Creek Natural History Area, East Bethel

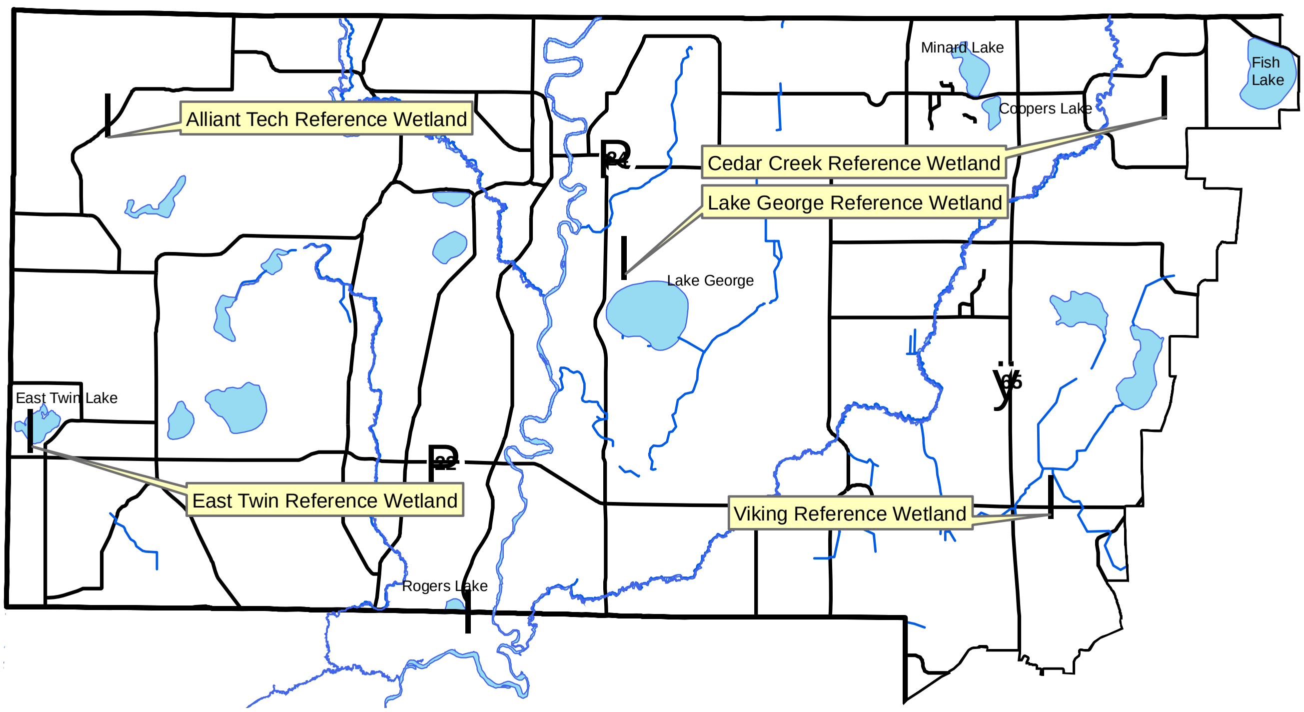
East Twin Reference Wetland, East Twin Township Park, Nowthen

Lake George Reference Wetland, Lake George County Park, Oak Grove

Viking Meadows Reference Wetland, Viking Meadows Golf Course, East Bethel

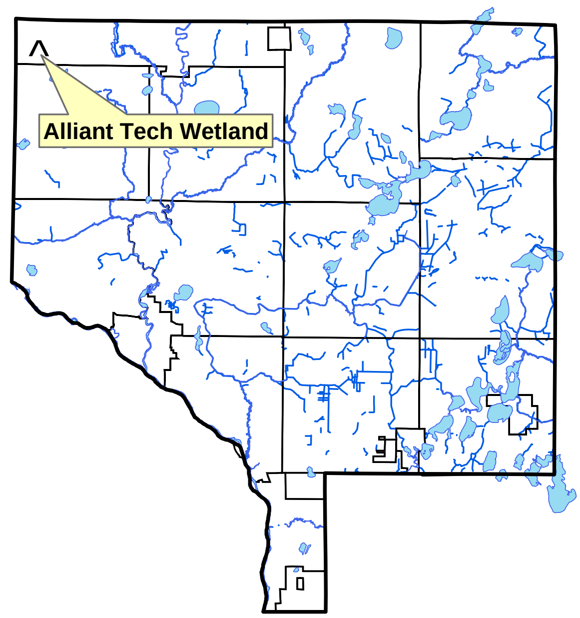
Results: See the following pages. Raw data and updated graphs can be downloaded from www.AnokaNaturalResources.com using the Data Access Tool.

Upper Rum River Watershed Wetland Hydrology Monitoring Sites



ALLIANT TECH REFERENCE WETLAND

Alliant Techsystems Property, St. Francis



Site Information

Monitored Since: 2001

Wetland Type: 5

Wetland Size: ~12 acres

Isolated Basin? Yes

Connected to a Ditch? No

Soils at Well Location:

Horizon	Depth	Color	Texture	Redox
A	0-8	N2/0	Mucky loam	-
Bg	8-35	5y5/1	Sandy loam	-

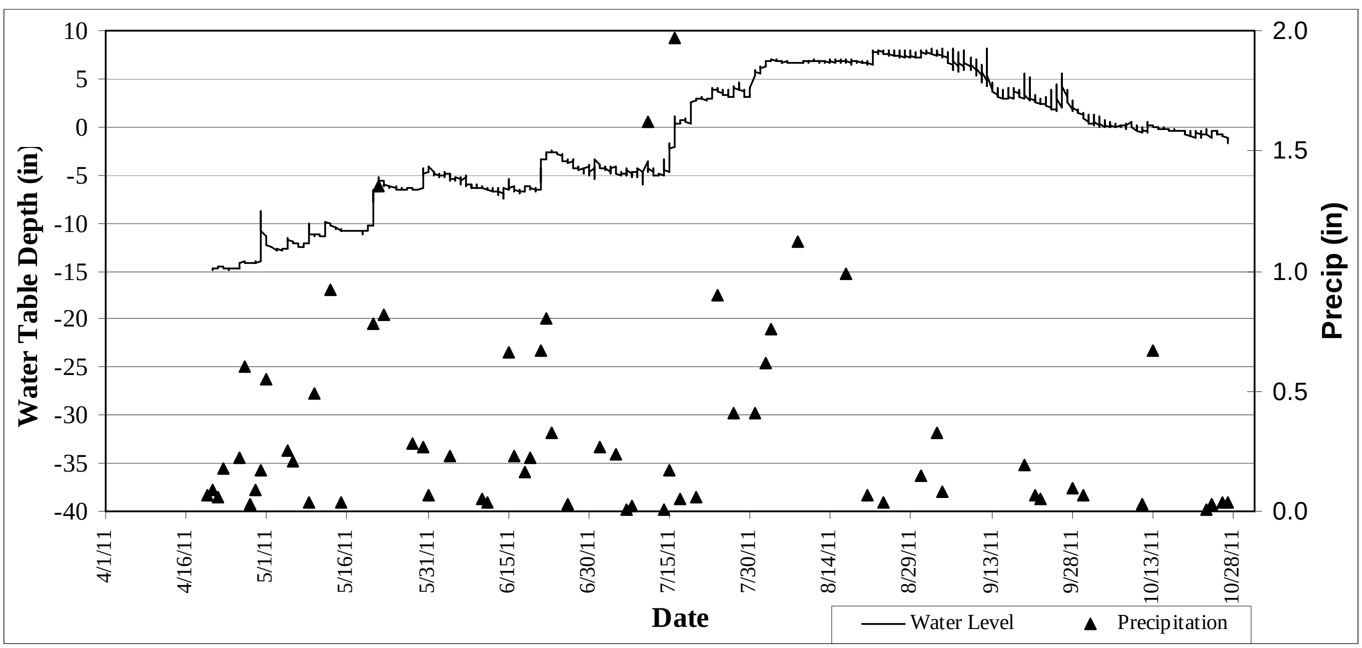
Surrounding Soils: Emmert

Vegetation at Well Location:

Scientific	Common	% Coverage
Carex Spp	Sedge undiff.	90
Lycopus americanus	American Bungleweed	20
Phalaris arundinacea	Reed Canary Grass	5

Other Notes: This wetland lies next to the highway, in a low area surrounded by hilly terrain. It holds water throughout the year, and has a beaver den.

2011 Hydrograph

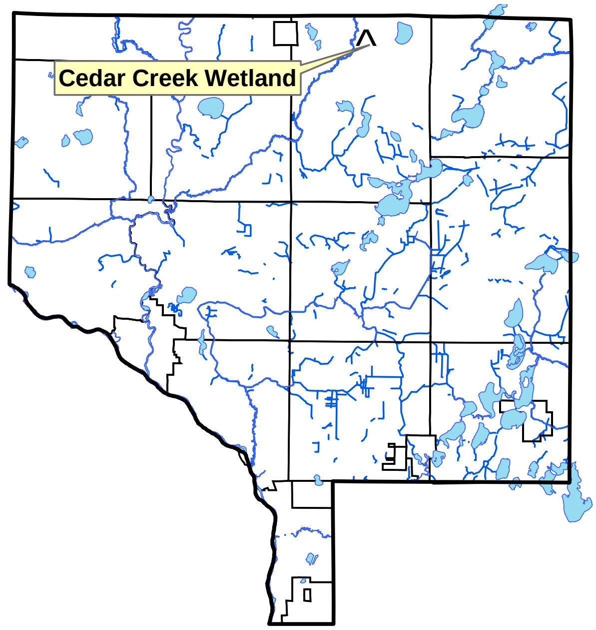


Well depth was 40 inches, so a reading of –40 indicates water levels were at an unknown depth greater than or equal to 40 inches.

Wetland Hydrology Monitoring

CEDAR CREEK REFERENCE WETLAND

Univ. of Minnesota Cedar Creek Natural History Area, East Bethel



Site Information

Monitored Since: 1996

Wetland Type: 6

Wetland Size: unknown, likely >150 acres

Isolated Basin? No

Connected to a Ditch? No

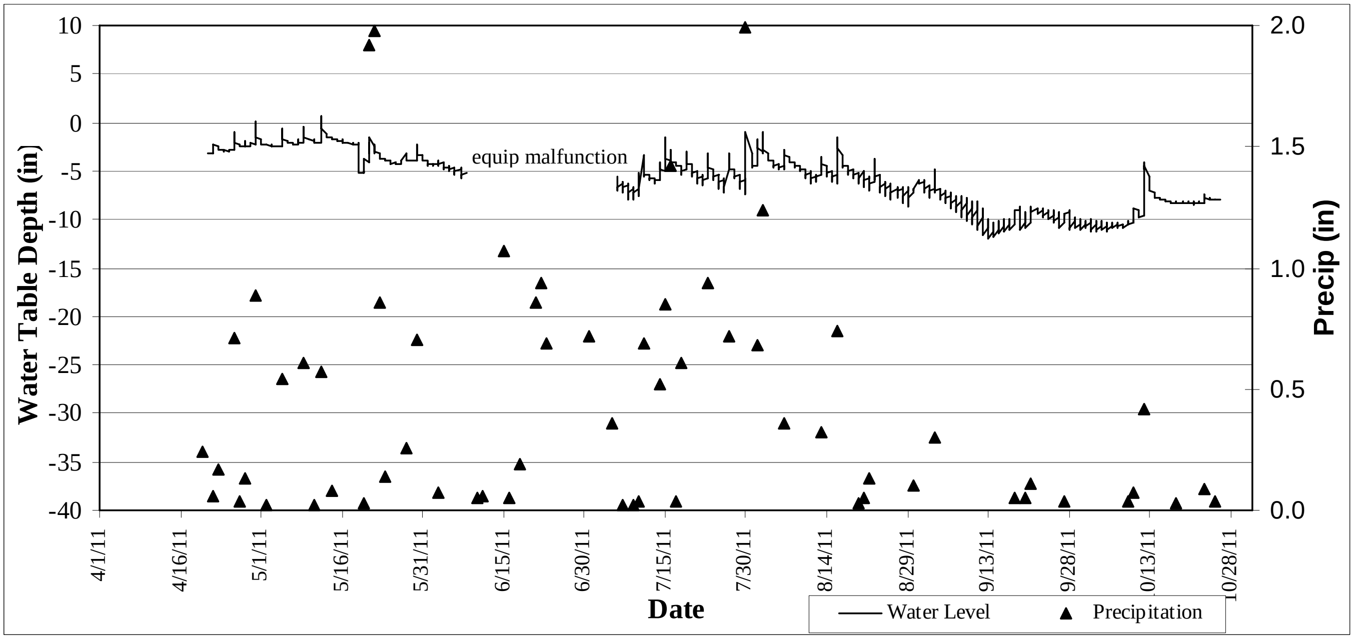
Soils at Well Location: not yet available

Surrounding Soils: Zimmerman

Vegetation at Well Location: not yet available

Other Notes: The Cedar Creek Ecosystem Science Reserve, where this wetland is located, is a University of Minnesota research area. Much of this area, including the area surrounding the monitoring site, is in a natural state. This wetland probably has some hydrologic connection to the floodplain of Cedar Creek, which is 0.7 miles from the monitoring site.

2011 Hydrograph

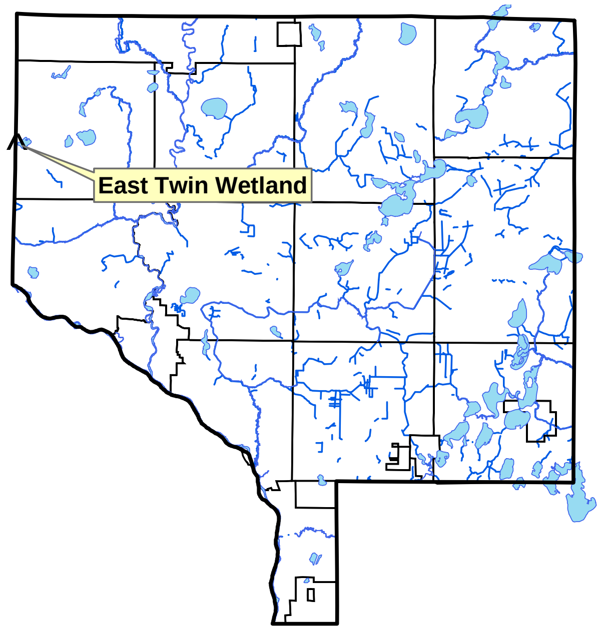


Well depth was 37 inches, so a reading of –37 indicates water levels were at an unknown depth greater than or equal to 37 inches.

Wetland Hydrology Monitoring

EAST TWIN REFERENCE WETLAND

East Twin Lake Township Park, Nowthen



Site Information

Monitored Since:	2001
Wetland Type:	5
Wetland Size:	~5.9 acres
Isolated Basin?	Yes
Connected to a Ditch?	No

Soils at Well Location:

Horizon	Depth	Color	Texture	Redox
A	0-8	10yr 2/1	Mucky Loam	-
Oa	Aug-40	N2/0	Organic	-

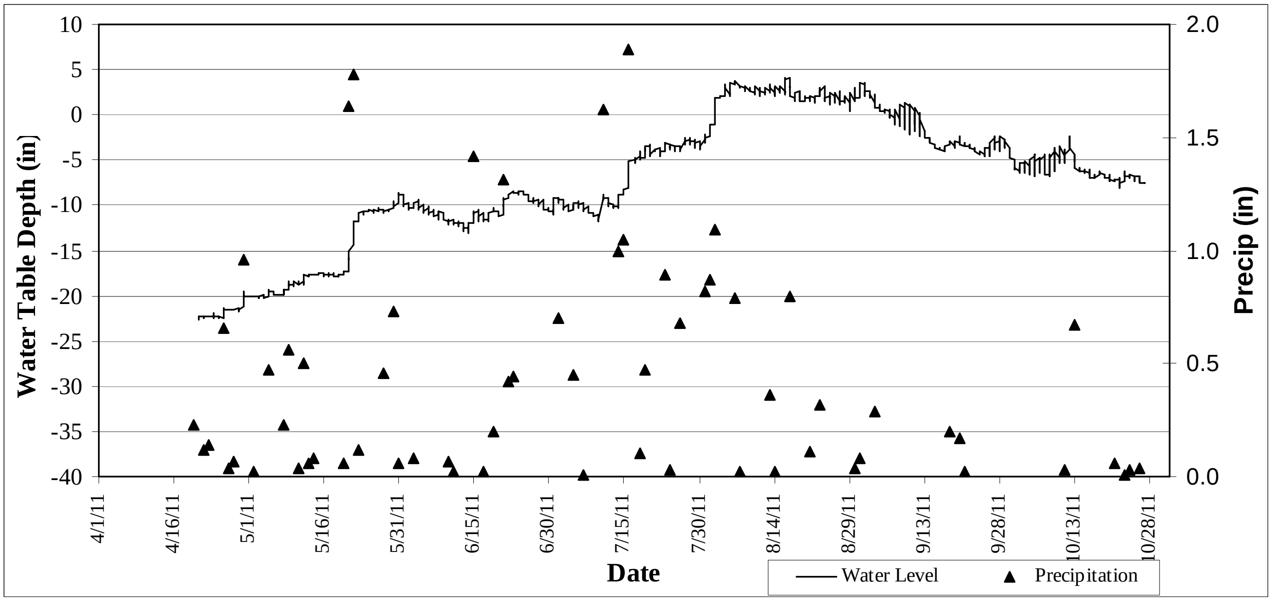
Surrounding Soils: Lake Beach, Growton and Heyder fine sandy loams

Vegetation at Well Location:

Scientific	Common	% Coverage
Phalaris arundinacea	Reed Canary Grass	100
Cornus amomum	Silky Dogwood	30
Fraxinus pennsylvanica	Green Ash	30

Other Notes: This wetland is located within East Twin Lake County Park, and is only 180 feet from the lake itself. Water levels in the wetland are influenced by lake levels.

2011 Hydrograph

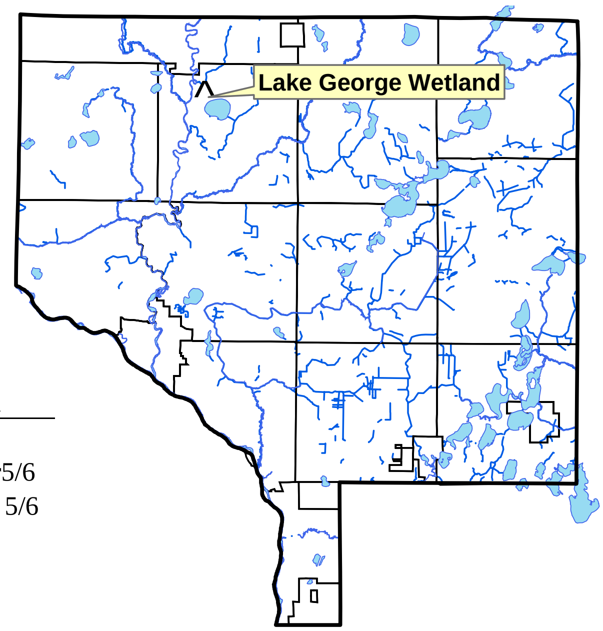


Well depth was 40 inches, so a reading of –40 indicates water levels were at an unknown depth greater than or equal to 40 inches.

Wetland Hydrology Monitoring

LAKE GEORGE REFERENCE WETLAND

Lake George County Park, Oak Grove



Site Information

Monitored Since: 1997

Wetland Type: 3/4

Wetland Size: ~9 acres

Isolated Basin? Yes, but only separated from wetland complexes by roadway.

Connected to a Ditch? No

Soils at Well Location:

Horizon	Depth	Color	Texture	Redox
A	0-8	10yr2/1	Sandy Loam	-
Bg	8-24	2.5y5/2	Sandy Loam	20% 10yr5/6
2Bg	24-35	10gy 6/1	Silty Clay Loam	10% 10yr 5/6

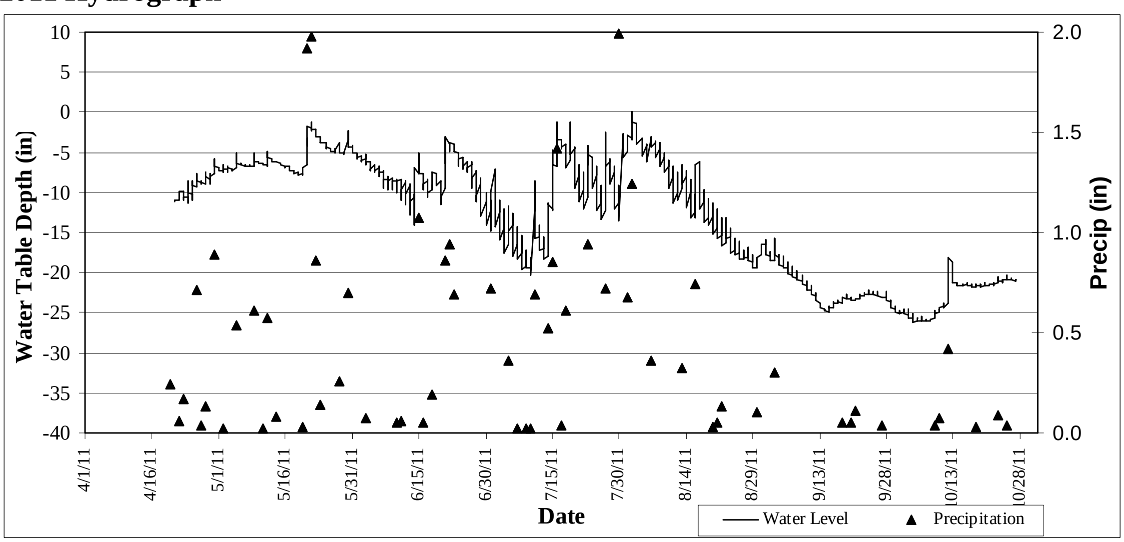
Surrounding Soils: Lino loamy fine sand and Zimmerman fine sand

Vegetation at Well Location:

Scientific	Common	% Coverage
Cornus stolonifera	Red-osier Dogwood	90
Populus tremuloides	Quaking Aspen	40
Quercus rubra	Red Oak	30
Onoclea sensibilis	Sensitive Fern	20
Phalaris arundinacea	Reed Canary Grass	10

Other Notes: This wetland is located within Lake George County Park, and is only about 600 feet from the lake itself. Much of the vegetation within the wetland is cattails.

2011 Hydrograph

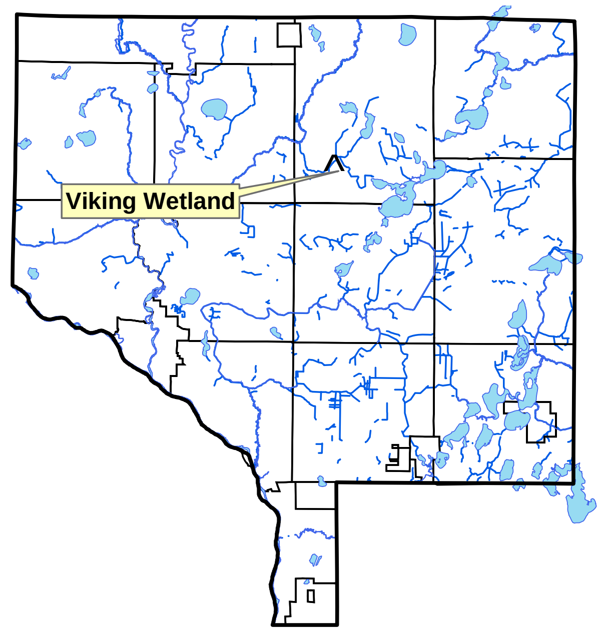


Well depth was 40 inches, so a reading of –40 indicates water levels were at an unknown depth greater than or equal to 40 inches.

Wetland Hydrology Monitoring

VIKING MEADOWS REFERENCE WETLAND

Viking Meadows Golf Course, East Bethel



Site Information

Monitored Since: 1999

Wetland Type: 2

Wetland Size: ~0.7 acres

Isolated Basin? No

Connected to a Ditch? Yes, highway ditch is tangent to wetland

Soils at Well Location:

Horizon	Depth	Color	Texture	Redox
A	0-12	10yr2/1	Sandy Loam	-
Ab	12-16	N2/0	Sandy Loam	-
Bg1	16-25	10yr4/1	Sandy Loam	-
Bg2	25-40	10yr4/2	Sandy Loam	5% 10yr5/6

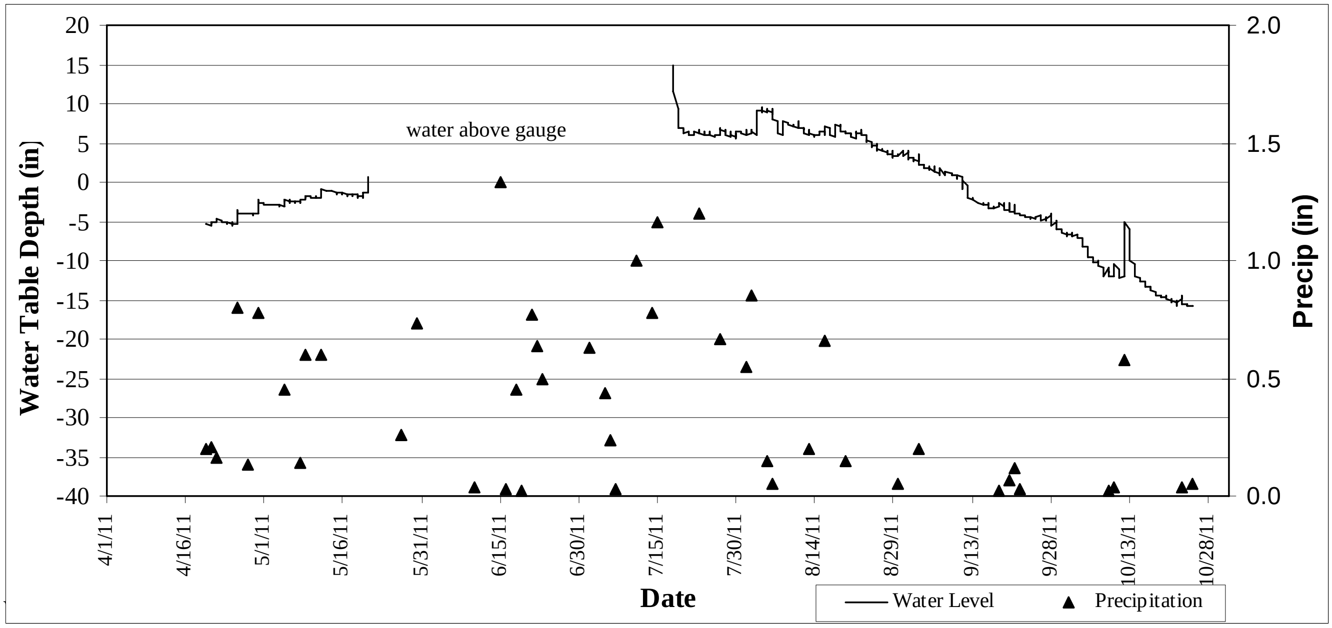
Surrounding Soils: Zimmerman fine sand

Vegetation at Well Location:

Scientific	Common	% Coverage
Phalaris arundinacea	Reed Canary Grass	100
Acer rubrum (T)	Red Maple	75
Acer negundo (T)	Boxelder	20

Other Notes: This wetland is located at the entrance to Viking Meadows Golf Course, and is adjacent to Viking Boulevard (Hwy 22).

2011 Hydrograph



Water Quality Grant Fund

Description: The Upper River Watershed Management Organization (URRWMO) partners with the Anoka Conservation District's (ACD) Water Quality Cost Share Program. The URRWMO contributes funds to be used as cost share grants for projects that improve water quality in lakes, streams, or rivers within the URRWMO area. The ACD provides administration of the grants. Grant awards follow ACD policies and generally cover 50% or 70% of materials (see ACD website for full policies). The ACD Board of Supervisors approves any dispersements.

Grant administration is through the Anoka Conservation District for efficiency and simplicity. The ACD administers a variety of other similar grants, thus providing a one-stop-shop for residents. Additionally, the ACD's technical staff provide project consultation and design services at low or no cost, which is highly beneficial for grant applicants. ACD staff also have expertise to process and scrutinize grant requests. Lastly, the ACD Board meets monthly, and can therefore respond to grant requests rapidly, while URRWMO meetings are much less frequent.

The Anoka Conservation District (ACD) and Upper Rum River WMO have both undertaken efforts to promote these types of projects and the availability of grants. For example, in 2007 the URRWMO did a customized mailing to 20 homeowners on East Twin and George Lakes who had been identified with erosion problems or likely to develop problems. The ACD mentions the grants during presentations to lake associations and other community groups, in newsletters, and in website postings. In order to promote these types of projects the ACD also assists landowners throughout projects, including design, materials acquisition, installation, and maintenance.

Purpose: To improve water quality in area lakes, streams and rivers.

Locations: Throughout the watershed.

Results: Projects are reported in the year they are installed. In 2010 installation began on a Crooked Brooked (Ditch 67) streambank stabilization at the Petro Property.

URRWMO Cost Share Fund Summary

2006 URRWMO Contribution	+	$ 990.00
2006 Expenditures		$ 0.00
2007 URRWMO Contribution	+	$ 1,000.00
2007 Expenditures		$ 0.00
2008 Expenditures		$ 0.00
2009 Expenditures		$ 0.00
2010 URRWMO Contribution	+	$ 500.00
2011 URRWMO Contribution	+	$ 567.00
2010-11 Expenditure Petro streambank stabilization	-	$1,027.52
2011 Expenditure Petro streambank stabilization (encumbered)	-	$ 76.98
2011 Expenditure Erickson lakeshore restoration (encumbered)	-	$ 371.60
Fund Balance		**$ 1,580.90**

Petro Streambank Stabilization Summary

Full project details are available in the Anoka Conservation District's Annual Water Quality Projects Report.

Brief Description:

Crooked Brook flows to Cedar Creek and eventually the Rum River. The project location is 0.8 miles west of Highway 65 and 0.1 mile south of Viking Boulevard. Prior to the project the stream bank was actively eroding. The project will involve invasive species removal, grading, stabilization using fabrics and biologs, and a buffer planting using native plants. The project serves as an example for neighboring property owners, all of whom mow to the edge of the streambank and have varying degrees of streambank erosion. Project installation began in September 2010 and will conclude in 2011.

Funding sources**:**

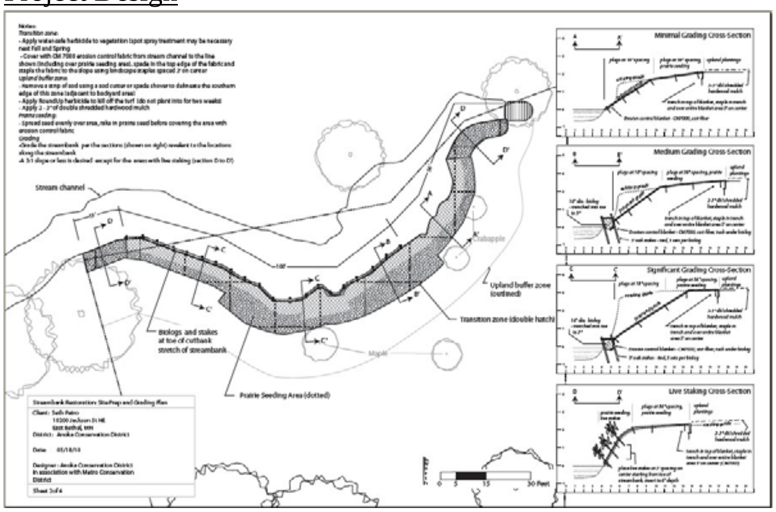
State native buffer cost-share grant	$ 755.33
URRWMO water quality cost share grant	$1,027.51
Landowner	$1,782.85
TOTAL	$3,565.69

In-kind contributions:

Landowners provided labor

Project design was provided by the Anoka Conservation District.

Project Design



Site after grading and stabilization, but before planting

Erickson Lakeshore Restoration Summary

Brief Description:

This project will restore 54 feet of Lake George shoreline with native plants and correct minor erosion. Site is at the bottom of a moderately steep slope on a residential property. This shoreline restoration will provide native plants that filter stormwater runoff to the lake and provide habitat benefits. Habitat benefits will be for all shoreline animals including fish, insects, birds, and others. Because the project includes aquatic plantings the benefits to fish and in-lake ecology are greater.

The landowner is active member of the Lake George Improvement District and plans to promote lakeshore restorations with others who live around the lake.
The project is anticipated to be completed by June 30, 2012.

Funding sources:

URRWMO water quality cost share grant	$ 371.60
Landowner	$ 371.60
TOTAL	$ 743.20

In-kind contributions:
Landowner provides installation labor
Project design was provided by the Anoka Conservation District and landowner

URRWMO Website

Description: The Upper Rum River Watershed Management Organization (URRWMO) contracted the Anoka Conservation District (ACD) to design and maintain a website about the URRWMO and the Upper Rum River watershed. The website has been in operation since 2003.

Purpose: To increase awareness of the URRWMO and its programs. The website also provides tools and information that helps users better understand water resources issues in the area.

Location: www.AnokaNaturalResources.com/URRWMO

Results: The URRWMO website contains information about both the URRWMO and about natural resources in the area.

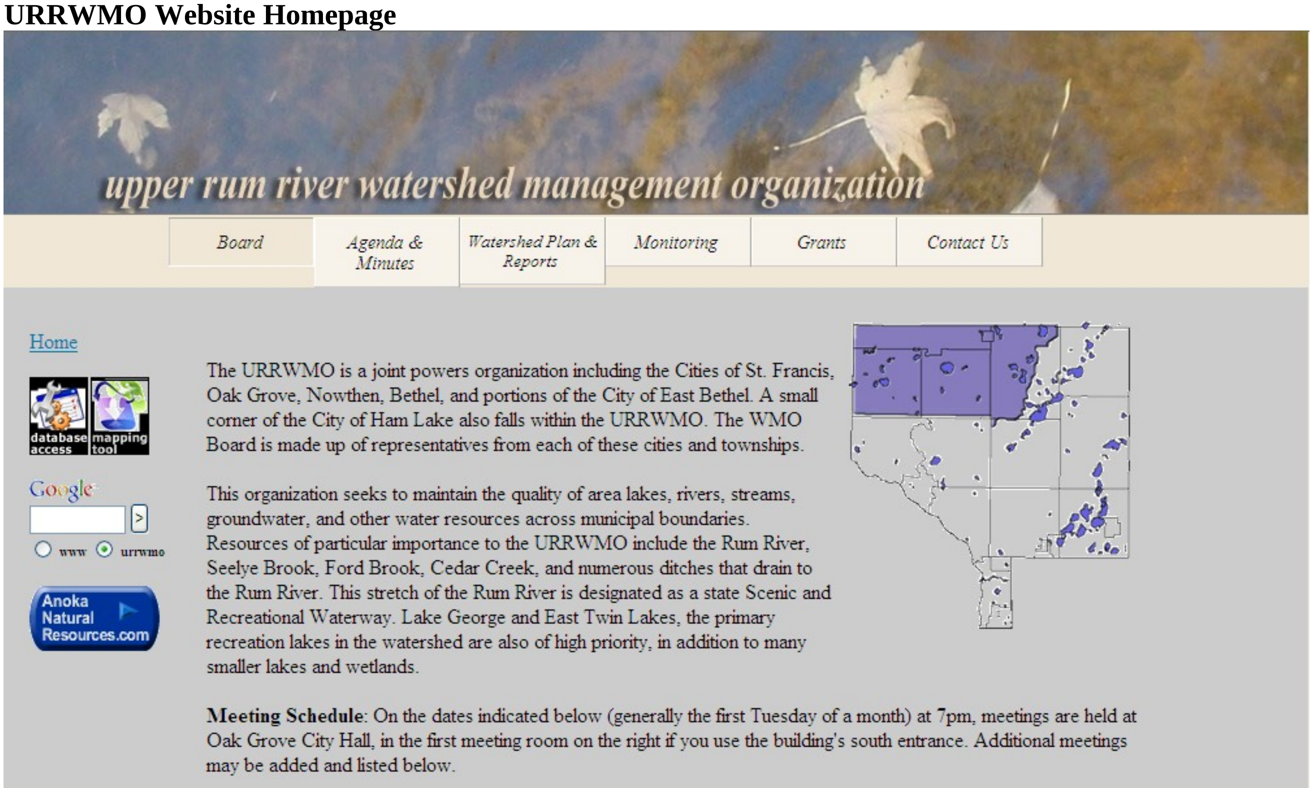
Information about the URRWMO includes:

- a directory of board members,
- meeting minutes and agendas,
- watershed management plan and annual reports,
- descriptions of work that the organization is directing,
- highlighted projects.

Other tools on the website include:

- an interactive mapping tool that shows natural features and aerial photos
- an interactive data download tool that allows users to access all water monitoring data that has been collected
- narrative discussions of what the monitoring data mean

URRWMO Website Homepage



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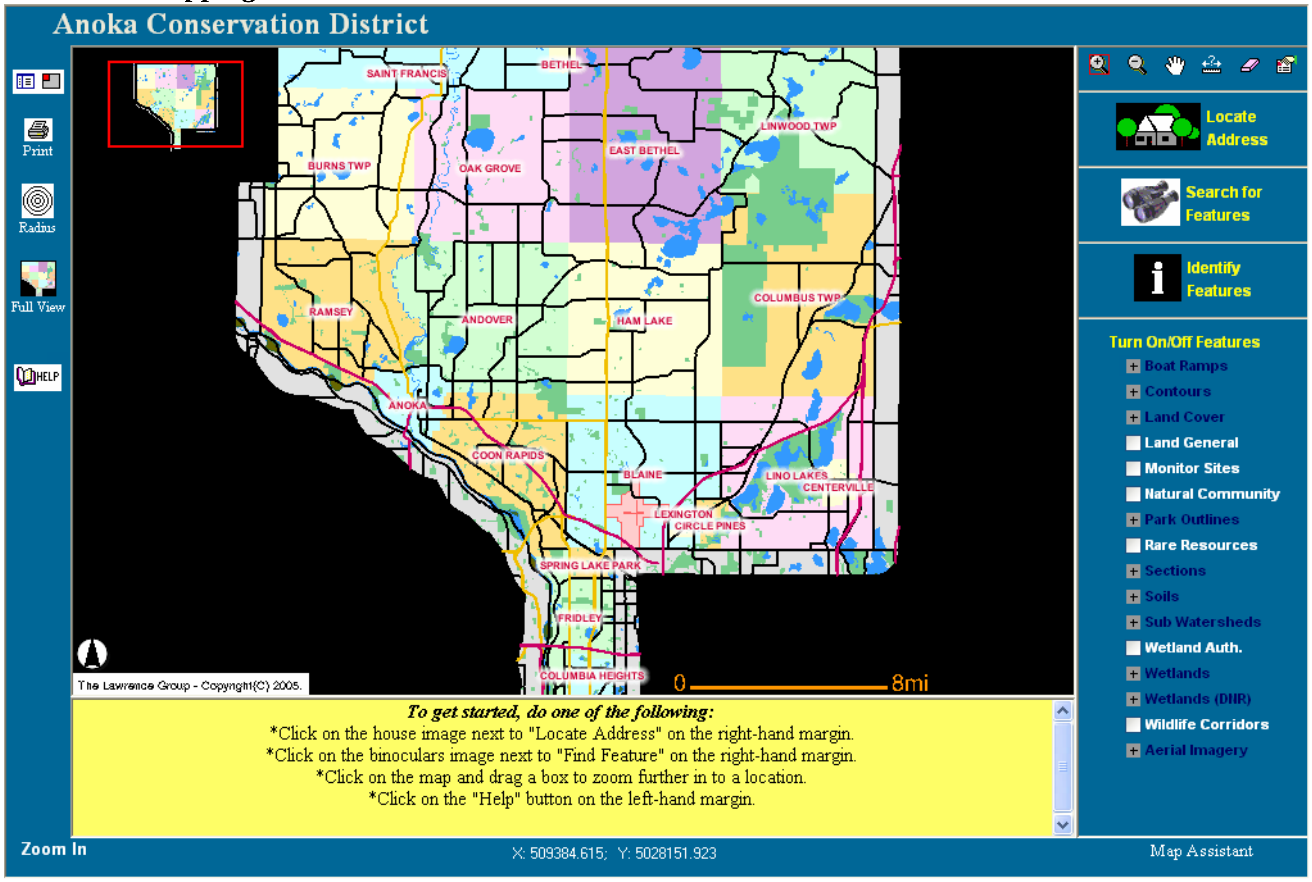
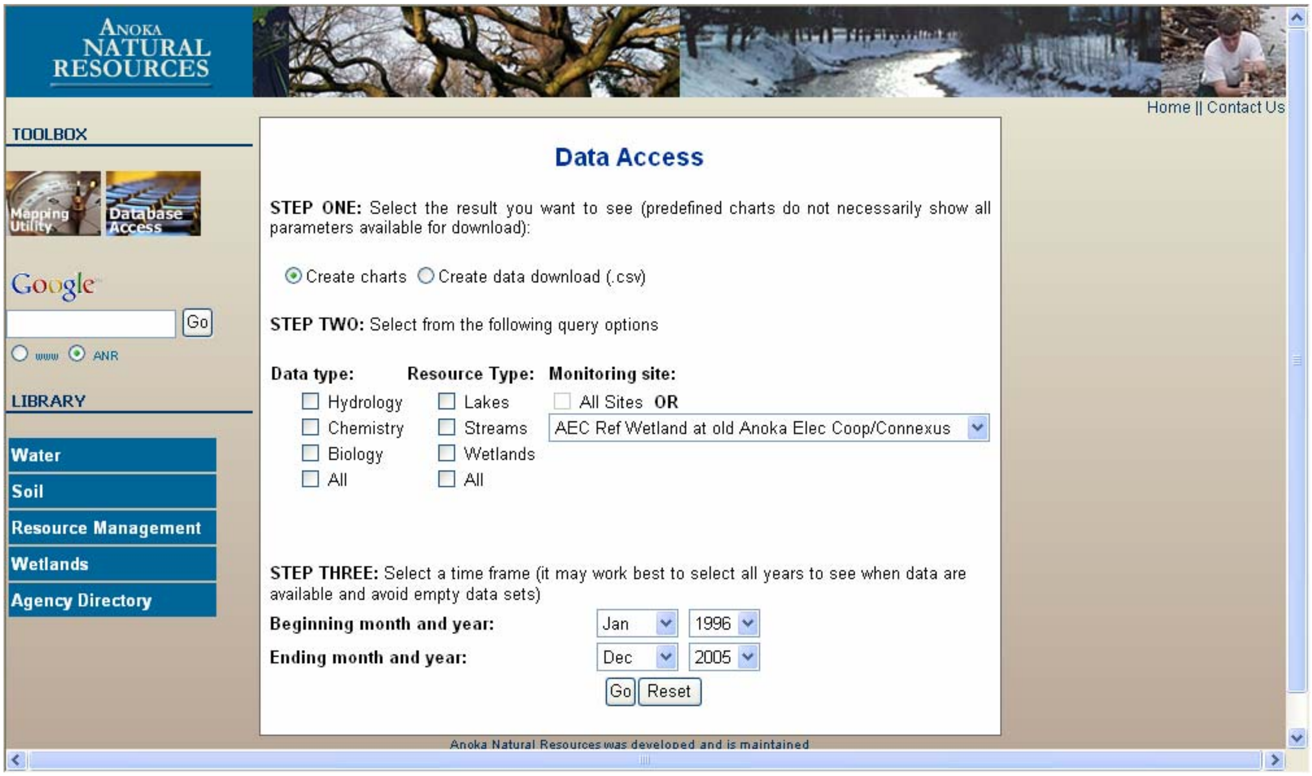
Interactive Mapping Tool



Interactive Data Access Tool



URRWMO Annual Newsletter

Description: The URRWMO Watershed Management Plan and state rules call for an annual URRWMO newsletter in addition to the website. The URRWMO will produce a newsletter article including information about the URRWMO, its programs, related educational information, and the URRWMO website address. This article will provided to each member city, and they will be asked to include it in their city newsletters.

Purpose: To increase public awareness of the URRWMO and its programs.

Locations: Watershed-wide.

Results: The Anoka Conservation District (ACD) assisted the URRWMO by drafting the annual newsletter article. At their January 5, 2011 the URRWMO discussed topics to be covered in the article. Those contents included:

- a map of the URRWMO area,
- description of the URRWMO role,
- the URRWMO cost share grant program,
- water levels in lakes and wetlands, if drought continues,
- how wetland laws work,
- URRWMO meeting dates and times, website, and a phone number for more information.

On May 20 ACD staff sent a draft to the URRWMO Board for review. The URRWMO Board reviewed and edited the draft article. The finalized article was sent to each member community on June 2, 2011 with a request that they include it in their city newsletter. Additionally, it was sent to the Independent School District 15 publication, "The Courier."

The ACD received one resident inquiry as a result of this publication. A landowner was concerned about water quality in Seelye Brook and suspected a nearby feedlot as a source of some problems. ACD staff verified the problem, and have since been working with Isanti County and MN Pollution Control Agency staff to correct the situation.

2011 URRWMO Newsletter Article

Local Government Helping Landowners Clean up Lakes, Streams, and the Rum River

Assistance, Grants offered

While state agencies like the DNR and Pollution Control Agencies do play a major role in managing our lakes and rivers, there is a lesser known local government agency that plays a role. The Upper Rum River Watershed Management Organization (URRWMO) is a special purpose unit of government formed jointly by the Cities of Bethel, East Bethel, Ham Lake, Nowthen, Oak Grove, and St. Francis. Made up of local officials, it serves as the most local level of government that is working to manage water quality in area lakes and rivers. Work includes monitoring, water quality improvement projects, and public outreach.

Grants to Residents for Water Quality

Water quality is, in many ways, the result of our activities on the land. What we do in our own yards impacts our lakes and streams. For waterfront properties the connection is obvious. But properties draining through curb-and-gutter stormwater systems, wetlands, or creeks have an impact too. The URRWMO, and its partner agency the Anoka Conservation District, offer friendly advice to homeowners on landscaping that will be beautiful and good for our lakes and streams. To encourage landscaping for water quality, grants are offered. The most common grant-funded project types are lakeshore restorations, rain gardens, and erosion correction.

Lakeshore restorations are buffers of native wildflowers and grasses that replace turf grass at the water's edge. Turf grass does a very poor job of holding the shoreline and filtering pollutants. The native plants stabilize the shoreline, preventing the loss of additional land. They also do a great job of filtering yard runoff before it goes into the lake. Given that the shore is so important for wildlife, it makes sense to use native plants along much of the shoreline. Most lakeshore projects still leave traditional access to the water for boating, swimming, and fishing.

A lakeshore restoration with native plants.

Rain gardens also filter runoff, but work differently. They are small basins. Usually, they are dry gardens. When it rains, water is directed into the garden, and it fills. The water soaks into the ground within 48 hours, a process that does a great job removing pollutants. An ideal place for a rain garden is next to the street's curb, just uphill from a storm drain. Anything that flows into a storm drain generally ends up in a river, wetland, or lake.

A rain garden during a rain storm.

For people who live on a stream or river, bank erosion can be a serious issue. On one hand, it is a loss of property and unsightly. On the other hand, it is adding sediment to the river that hurts water quality. Some erosion occurs naturally, but more significant erosion demands attention. The Anoka Conservation District and URRWMO assist homeowners with correcting this streambank erosion.

Bank erosion along the Rum River.

The URRWMO competitive grants can cover 50-70% of materials for a project. The landowner is responsible for the remainder, plus the labor. Advice and design assistance is available through the Anoka Conservation District. A competitive grant application process is open as long as funds are available. More information and application materials are available at www.anokaswcd.org/fin_assist/acd_wq_share.htm or contact Jamie Schurbon at 763-434-2030 ext. 12.

To learn more about these types of projects, see the brochures at http://www.anokaswcd.org/acd/tech_assist/brochures/brochures.htm

URRWMO 2010 Annual Report to BWSR

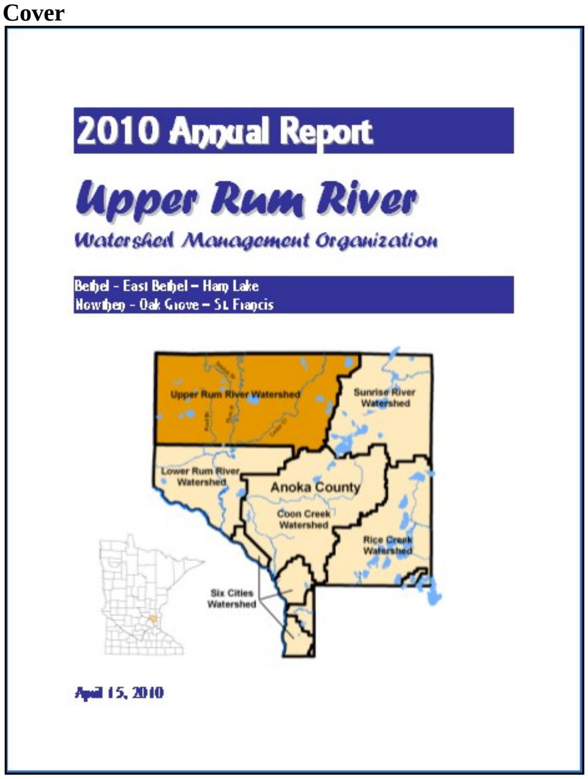
Description: The Upper Rum River Watershed Management Organization (URRWMO) is required by law to submit an annual report to the Minnesota Board of Water and Soil Resources (BWSR), the state agency with oversight authorities. This report consists of an up-to-date listing of URRWMO Board members, activities related to implementing the URRWMO Watershed Management Plan, the status of municipal water plans, financial summaries, and other work results. The report is due annually 120 days after the end of the URRWMO's fiscal year (April 30th).

Purpose: To document required progress toward implementing the URRWMO Watershed Management Plan and to provide transparency of government operations.

Locations: Watershed-wide

Results: The Anoka Conservation District assisted the URRWMO with preparation of a 2010 Upper Rum River WMO Annual Report. ACD provided copies of this report and a cover letter to the entire URRWMO Board on April 15, 2011 for review. On April 20, 2011 the final draft was sent to the URRWMO Chair, Todd Miller. The Chair submitted the report to BWSR. The full report can be viewed at the URRWMO website.

Cover


2010 Annual Report

Upper Rum River

Watershed Management Organization

Bethel - East Bethel - Ham Lake
Nowthen - Oak Grove - St. Francis

April 15, 2010

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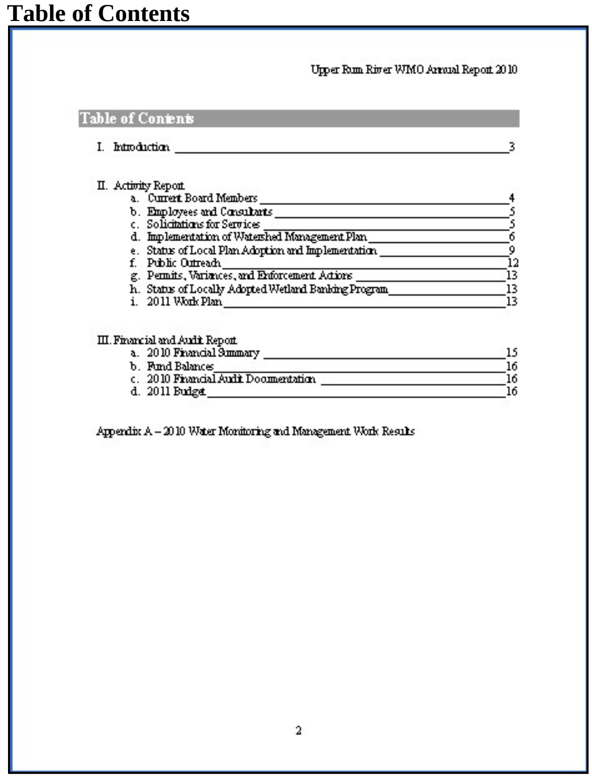

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Financial Summary

ACD accounting is organized by program and not by customer. This allows us to track all of the labor, materials and overhead expenses for a program. We do not, however, know specifically which expenses are attributed to monitoring which sites. To enable reporting of expenses for monitoring conducted in a specific watershed, we divide the total program cost by the number of sites monitored to determine an annual cost per site. We then multiply the cost per site by the number of sites monitored for a customer.

Upper Rum River Watershed Financial Summary

Upper Rum River Watershed	WMO Asst	WMO Websites	Reference Wetland	Lake Level	Lake WQ	Stream WQ	WOMP	Student Biomon	WMO annual rpt	Total
Revenues										
URRWMO		620		940	2090	6060			630	10340
State										
Anoka Conservation District	1600		853		1216		1613	19	96	5397
County Ag Preserves								558		558
Regional/Local							500			500
Other Service Fees										
Local Water Planning			1862					583		2445
TOTAL	1600	620	2715	940	3306	6060	2113	1159	726	19240
Expenses										
Capital Outlay/Equip	4	2	7	1	4	15	4	2		38
Personnel Salaries/Benefits	1368	330	2364	658	2151	2289	1825	1000	628	12612
Overhead	117	29	182	49	988	2931	156	68	56	4576
Employee Training	4	2	14	4	6	8	5	8	1	52
Vehicle/Mileage	26	5	37	11	43	36	36	14	14	222
Rent	64	15	97	25	102	118	85	36	28	569
Program Participants						0				
Program Supplies	16		15	5	11	132	2	32		213
Equipment Maintenance						0				
TOTAL	1600	382	2715	752	3306	5529	2113	1159	726	18282

Recommendations

- **Become actively involved in the MPCA Rum River WRAPP planned to start in 2012.** This Watershed Restoration and Protection Plan is an assessment of the entire Rum River watershed. MPCA will use the results to determine if portions of the river are "impaired" and set overall management. This is a chance for the URRWMO to work with upstream entities.
- **Coordinate Rum River monitoring during the MPCA WRAPP, or suspend monitoring if duplication would occur.**
- **Consider a St. Francis stormwater assessment** that is aimed at identifying and installing cost effective stormwater treatment opportunities before water is discharged into the Rum River. The assessment should be focused on those portions of the city that are generally lacking sufficient stormwater treatment.
- **Create a new water monitoring plan to cover 2013-17.** The monitoring schedule in the URRWMO Watershed Management Plan covers through 2012.
- **Promote groundwater conservation.** Metropolitan Council models predict 3+ft drawdown of surface waters in parts of the URRWMO by 2030, and 5+ft by 2050.
- **Correct water quality issues discovered during the 2010 Rum River survey**. Several locations of riverbank erosion were documented. Landowners were contacted, and some responded, however none have committed to corrective work. Part of the reason is that these projects are expensive and the landowner would bear some of the cost.
- **Encourage public works departments to implement measures to minimize road deicing salt applications**. These salts are the most noticeable form of Rum River deterioration in the URRWMO. MN DOT, University of Minnesota Extension, and others offer training on this topic.
- **Investigate the condition of Ditch 19, the only inlet to Lake George**. Residents have complained that condition of the ditch and water control structures are contributing to low lake water levels in recent years. Anoka County is the legal ditch authority.
- **Facilitate resident efforts to control aquatic plant growth on Rogers Lake** as a means to improving low dissolved oxygen problems. In 2010 a neighborhood meeting was held, and while there was enthusiasm from residents, the needed follow-up by residents did not occur.
- **Promote water quality improvement projects** for lakes, streams, and rivers. Cost share grants are available through the URRWMO and ACD to encourage landowners to do projects that will have public benefits to water quality. Technical assistance for landowners is available through the Anoka Conservation District.

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