

LOWER MINNESOTA RIVER WATERSHED DISTRICT NEWS

what you should know about your water resources

District joins effort to monitor river and build water-quality model

Following the mandates of the federal Clean Water Act (1972), the State of Minnesota created a list of impaired water bodies, such as lakes and rivers, that are too polluted to be used for swimming, fishing, drinking, or other designated purposes. Prominent on this list is the lower Minnesota River, mainly because it contains too little oxygen and too much pollution and turbidity.

Now the District has joined major partners (see box at right) in funding an ambitious new water-quality study. This \$1 million Lower Minnesota River Model will consist principally of a computer-generated water-quality model and, from 2004 to 2006, a monitoring of the river, its tributaries and dischargers.

The study is needed to assess water quality and determine allowable pollutant loads.

Beside the computer modeling and stream monitoring, the study will include:

- ✿ Mapping of sediment deposits on the river bed;
- ✿ A new river flow-gaging station at Ft. Snelling (see pp. 2–3);
- ✿ A study of mixing characteristics at five lower Minnesota River monitoring stations, which will help determine the best sampling methods and the model's complexity;



Here's looking at you, a young possum in the river bottom seems to be saying. Photo: Scott Sharkey.

Modeling and monitoring

The new Lower Minnesota River Model for water quality, to include the lower 40 miles of the Minnesota River from Jordan to its mouth at the Mississippi, will cost about \$1 million, in funds and services — about half for the computer model and half for monitoring and field studies.

To date, the following agencies have committed funds and services:

- ✿ Metropolitan Council Environmental Services (MCES)
- ✿ Minnesota Pollution Control Agency (MPCA)
- ✿ US Geological Survey (USGS)
- ✿ Lower Minnesota River Watershed District (District)

Requests for assistance have also been submitted to the Metropolitan Airports Commission (MAC) and other entities.

The study period is 2004–2006, and will continue through all seasons and flow patterns so that water-quality differences can be captured over time. To capture periods of high algae and low oxygen, monitoring will increase during summer low flows. The project will not be complete till about 2008.

✿ An assessment of oxygen dynamics, including measurement of oxygen sources and oxygen sinks; and

✿ Nutrient and sediment studies.

The new Lower Minnesota River Model will fill in the gaps between two other large modeling projects: the Minnesota River Basin Model, from Lac Qui Parle to Jordan, and the Advanced Eutrophication Model of the Mississippi River from Lock & Dam 1 through Lake Pepin. The Lower Minnesota model will enable accurate assessment of how resource management in the Minnesota River affects water quality in the Mississippi River.

The basic science of pollution

The river is polluted, first, because there's too little oxygen in many reaches fully to support

fish and other aquatic life. Second, there are too many pollutants, such as sediment, nutrients, bacteria, and toxic substances. These degradations come from both point and non-point sources.

Point sources are easily identified places where pollution originates, like major municipal wastewater treatment plants and industrial outflows. According to the MPCA, just 14% of pollution today is attributable to point sources, suggesting we've done a pretty good job of

[Monitor, continued on p. 2](#)

Contents

New flow-gage at Ft. Snelling	2
Water-quality meta-analysis	3
Supreme Court affirmed District	4
New board managers	5
District web site up & running	6
Seminary Fen acquisition	6



Grass Lake, as seen from Hwy. 212, near the Flying Cloud airport. The new Lower Minnesota River Model will help assess how the lake and the river influence each other's water quality. Photo: Terry Schwalbe.

Monitor, continued from p. 1

regulating discharges into our water bodies.

Non-point sources, sometimes hard to identify, may be human or natural, for example:

- ✿ Erosion-generated sediments, which choke aquatic habitats;
- ✿ Fertilizer-generated nutrients, which feed algae and reduce oxygen for aquatic life;
- ✿ Bacteria like *E. coli*, which come from septic systems and animals;
- ✿ Stormwater, which may be loaded with organic and chemical materials; and
- ✿ Toxic substances like mercury and PCBs (polychlorinated biphenyls, over 200 man-made chemicals used primarily as electrical equipment insulators: for more information, see <http://www.pca.state.mn.us/publications/mnenvironment/impaired-waters-edition/futurewater.html>).

Cathy Larson, principal environmental scientist with Met Council Environmental Services, points to a 1985 MPCA study that “found we can put strict limitations on what a wastewater treatment plant like Blue Lake, in Shakopee, discharges, but that’s still not enough to resolve the problem of dissolved oxygen in the river. To meet water quality standards, we also need to reduce the amount of organic matter coming into the river from upstream.” So, the study called for a 40% reduction in oxygen-using material that enters the river at Shakopee and via tributaries in the lower 22 miles.

The good news and the bad news

Since the 1985 study, a lot of water — and pollutant loads — has passed through the Jordan and other lower Minnesota River gaging stations.

Some of the water is cleaner than before, for several reasons, says Larson:

- ✿ *Wastewater treatment plants*, like Blue Lake and Seneca, have been required to reduce their discharges of organic matter and ammonia. Furthermore, the plants have moved on their own to reduce phosphorus loads.

- ✿ *Best management practices*, like stormwater detention ponds, have resulted in dramatic improvements in the quality of the water flowing into the Mississippi at Fort Snelling. A recent MPCA study of the 1976–2001 period shows substantial reductions in ammonia, total suspended solids, phosphorus, and oxygen demand. Only nitrates and nitrites showed no decline. (See <http://www.pca.state.mn.us/publications/wq-b3-02.pdf>.)

- ✿ Federal/state partnerships like CREP (Conservation Reserve Enhancement Program) have taken environmentally sensitive lands along the river banks out of agricultural production and halted erosion through the planting of vegetation.

At the same time, degradations continue:

- ✿ Excessive algae growth continues because of continuing high phosphorus loads.

- ✿ Many reaches of the Minnesota River have become impaired because of excess turbidity, which harms aquatic

life, recreation, and esthetics. Both erosion and the COE’s commercial dredging of the lower Minn contribute to this turbidity.

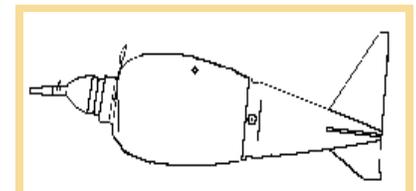
- ✿ Lake Pepin in the Mississippi River is impaired through excess nutrients and sediments. According to one study, the sediments that are rapidly filling the lake, plus a good deal of its phosphorus, originate predominantly in the Minnesota River Basin.

Time and the river will tell just how healthy the lower Minn can be again. ✿

District helps fund new flow-gaging station at mouth of river

As part of the Lower Minnesota River Model (see previous article), the District is funding construction and operation of a new high-tech flow-gaging station at Fort Snelling, where the Minnesota River joins the Mississippi.

With the addition of this gaging station, water flow and quality data from the final 40 miles of the lower Minnesota, from Jordan to the mouth, will be instrumental in developing the advanced water quality model for the Lower Minnesota River.



A US D-95 sampler used to collect river water. Illustration: Federal Interagency Sedimentation Project, Waterways Experiment Station, Vicksburg, Mississippi.

LOWER MINNESOTA RIVER WATERSHED DISTRICT NEWS

For years, water flow and quality have been measured at Jordan, so we know the pollutant loads entering the lower Minnesota River. While water quality has been also been measured for years at Fort Snelling, water flow data have been missing here. As a result, we haven't been able to calculate pollutant loads that leave the lower Minnesota River or loads that accumulate along this 40-mile reach.

The Fort Snelling station will also allow us to do this and to estimate loads from ungaged sources, especially ground water, and provide valuable data on backwashing from the Mississippi River, for which there are no data on timing, magnitude, or effect on water quality.

The District has invested \$41,450, or half the gaging project's total, matching the funding by the US Geological Survey (USGS) and taking over the Metropolitan Council Environmental Services' (MCES) share of the project. The District is making this grant for two reasons, says administrator Terry Schwalbe: 1) the study area lies within the District, and 2) the grant will free up Council funds for other portions of the modeling project.

The new technology in question is called a side-scanning AVM, or acoustic velocity meter. Because of the occasional backwash of the Mississippi River into the mouth of the Minnesota, this high-tech instrument is necessary to provide accurate readings of velocity. Once velocity is known, it's multiplied by the area of the channel, says Thomas Winterstein of the USGS, yielding water discharge or volume.

In addition to the velocity meter, the station contains a rain gage and a satellite transmitter. With this equipment, the USGS will be able to continuously monitor velocity, discharge, flow direction, stage, and precipitation. Meanwhile, MCES continues to monitor water quality here, collecting weekly grab samples for a suite of laboratory analyses.

As data are recorded, during a 3-year period from January 1, 2004 through December 31, 2006, they will be transmitted by satellite to the USGS's district office in Mounds View and uploaded within six hours, along with the discharge calculations, to the service's real-time

National Water-Information System (NWIS) web site. You'll soon be able to see the data for yourself — river velocity, water temperature, and rainfall — by going to the Minnesota River Basin charts at <http://waterdata.usgs.gov/mn/nwis/current/?type=flow>. ❖

District hires Bonestroo engineers to gather & analyze water-quality data

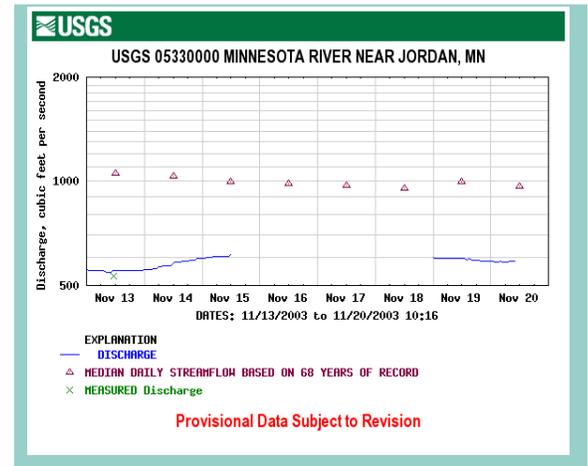
As an important first step in implementing the district's new watershed management plan, the District has hired Bonestroo engineers, of St. Paul, to gather an array of data on the lower Minnesota River and assemble it into a comprehensive and comprehensible report.

Without this information on the water quality within the district, it would be difficult if not impossible to implement further studies and projects intelligently and cost-effectively.

Begun September 2003, the \$22,500 Bonestroo study will finish early in 2004 with the presentation of a report and executive summary to the District.

"Our job," explains Bonestroo's Dan Edgerton, "is to collect and compile data that has been gathered over the years.

It's a real conglomeration of different things, so we have to bring it all together, compile it, do a review, look for gaps in the information." Without knowing



clearly what they have on hand, and what they need to collect, the District would be embarking on its new plan in the dark.

One of the big challenges for the engineering firm is to make the various data it gathers as compatible as possible. A city in the District may have collected data on certain pollutants, and a county may have collected other data. If that's the case, "the data won't be strictly additive," says Edgerton. "But that itself might be the basis for recommending that the various entities should collect data in a certain way to make it more complete and useful."

The typical studies that Bonestroo will be collecting include data on various pollutants, for example:

- Phosphorus and nitrogen from waste water treatment plants, animal waste, fertilizer, and acid rain — nutrients that grow algae in lakes and streams and, thus, increase oxygen demand.

- Heavy metals, such as mercury and chlorides, which may be deposited on industrial sites, fall off vehicles, or fall in the form of precipitation. ❖

District won right to exist in 1965 Supreme Court case

In 1965 two river-bottom landowners sued the District, challenging its constitutionality and a levy it was imposing in order to condemn certain properties and construct a navigable channel. The plaintiffs challenged the District's work with the federal government, specifically the Army Corps of Engineers (COE), in a commercial navigation project that would dredge the river and straighten out three big bends between the present 494 bridge and Cedar Avenue.

Founded in 1960, the District was the second in the state and the nation. The idea of a self-governing, independent entity that helped control water resources, for commercial, esthetic, natural, and recreational purposes, offended people whose interests might be adversely affected.



A dragonfly in the river bottom. Photo: Minn. Valley National Wildlife Refuge.

As part of its first water management plan, the District required that the Minnesota River be deepened from four feet to nine feet so barges could navigate it from its confluence with the Mississippi River to mile 14.7 upstream. This increased depth would aid commercial shippers like grain handlers in getting their product down the river from the point in Shakopee where the old Continental Grain elevator stood. According to Larry Samstad, Scott County manager and, from 1960 through 2002, District engineer, the river was at the time "navigable, but barely navigable. The Corps was eager to do the work needed to create the nine-foot channel, and the pressure was on because users like Cargill, Continental Grain, Peavey, and NSP all were concerned about getting a better channel for their transportation needs."

The COE's job, thus, was to acquire the river bottom property, straighten the bends,

dredge the channel, and develop sites for depositing the dredge spoils.

The plaintiffs contended that the onetime levy the District had imposed was unconstitutional, like the existence of the District itself. Paying for acquisition of land and easements, the levy accounted for \$414,000 out of the total river channel project cost of \$3 million.

In October 1965 the Supreme Court heard the plaintiffs' case on appeal from the Minnesota Supreme Court, and decided that the Minnesota court had proper jurisdiction and it did not. It upheld the District's contention that Minnesota's Watershed Act of 1955, which established the authority of watershed districts in the state, was constitutional and that such districts in fact had the right to levy taxes in pursuit of "the protection of the public health and welfare," as



The showy lady-slipper, or *Cypripedium reginae*, is the state flower of Minnesota. It blooms in June and July in bogs, swamps, and springs such as are found in the river bottom. Photo: Minnesota Valley National Wildlife Refuge.

the Act had it, "and the provident use of the [state's] natural resources."

In its own words, the High Court concluded that the Watershed Act gave the District's board of managers the

District is handing out black-eyed susans (no shoving, please)

Administrator Terry Schwalbe has been passing out free packets of black-eyed susans to people attending various water-related meetings.



If you're interested in getting a packet, come by the District office in the Scott Cty. Government Center.

The seeds will remind you of the natural beauty that abounds throughout the District and whose preservation is essential to our mission. Oh, yes: sow when danger of frost is past!

power to

- ☼ Deal with problems of water use ...
- ☼ Cooperate or contract with any Federal agency [such as the COE] ...
- ☼ Also acquire by purchase, gift, or by eminent domain, any necessary personal or real property and ... contract for any construction project authorized under the act.

In dismissing the plaintiffs' appeal, the High Court confirmed the District's right to exist and to authorize the levy. Without this victory the District might never have undertaken its work to manage and protect water resources. ❖

LOWER MINNESOTA RIVER

New managers join the board

Leo Forner, Carver County Manager

I am very pleased to have been appointed Carver County Manager as of January 2003. It is an honor and privilege to serve the people of the Lower Minnesota River Watershed District.



For 57 years I've lived on the remnants of the farmland in Carver that my grandparents homesteaded in 1901, land on the bluffs overlooking the beautiful Minnesota River Valley. I recall admiring as a youngster the view across the valley. Oh, how it has changed through the years.

With Linda, my wife of 38 years, we have raised three great kids — Scott, Michelle, and Jeff — and have two wonderful grandkids who are the light of our lives.

Besides my family, community service and church activities have been important to me. I have served as charter president of the Chaska Area Jaycees, as a Lions Club member, and as a board member of the pastoral council at my church.

A facility manager for 27 years, I am currently employed at Minntech Corporation in Plymouth.

Lawrence Samstad, Dakota County Manager

I was born in Minneapolis in 1930. Before graduating from Vocational High School, I began attending the University of Minnesota, from which I graduated with two degrees, B.C.E. and honorary B.S.C.E. (1953) and M.S.C.E. (1955). I worked for three years on a Ph.D. in civil engineering and completed course work



but not the thesis. In 1959 I registered as a professional engineer in Minnesota and seven other states, and in January 1960 began Itasca Engineering, Inc., which has remained in business since then.

The Lower Minnesota River Watershed District engaged me as engineer from 1960 until 2002, the last five years of which I also served as consultant administrator.

While serving the District, I helped oversee:

- * Construction of a 9-foot navigation channel in 1965;
- * Control of the floods of 1965, 1969, 1993, etc.;
- * Development of the flood plain ordinance;
- * Writing of the first grant report under the Department of the Interior's Office of Water Resources in 1970; and
- * Preparation of the Watershed's overall plans.

Appointed Scott County manager in 2002, I am in a position to help my fellow managers with my knowledge of past activities and can help find new areas where they may direct their attention. I can put practical knowledge into decisions regarding the District's role in protecting our natural resources, getting the best results for the dollar spent.

Leonard Kremer, Hennepin County Manager

In 1968 I graduated from the U of M with a B.S. in civil engineering, and for more than 30 years have enjoyed a career in water resource management. I was appointed to the District's board in the spring of 2003.



Career highlights include:

* Technical advice to Bassett Creek Water Management Commission since 1973, including a \$40 million flood control project;

* Technical services for the city of Minnetonka since 1982, revising storm management plan;

* Surface water projects for the city of Lakeville since 1990;

* Assessment of engineering requirements for a 250-slip marina on the Mississippi River near Prairie Island; and

* Direction of more than 100 flood insurance studies for the Federal Emergency Management Agency (FEMA).

In my tenure at the lower Minn, I will dedicate myself to

* Protecting the natural resources of the District;

* Developing education programs on water quality improvement;

* Working with adjacent watershed organizations to control the quantity and improve the quality of tributary water; and

* Implementing the District's 1999 watershed management plan.

My wife Lorna and I have lived on the bluff of the Minnesota River for over 20 years. We have two daughters and five grandchildren. ❖

WATERSHED DISTRICT NEWS

District launches new web site

This fall the District launched a new web site at the simple and memorable address www.watersheddistrict.org.

The site will serve as a point of contact between District managers and stakeholders, including residents, government agencies, and commercial entities such as developers.

Indeed, the new site is structured around the needs and interests of the District's various constituents. A "Learning about the Watershed District" page provides a gateway to pages about nature, commerce, government, development, residences, farming, and recreational uses and appreciations of the river. Each page is accompanied by interesting photos.

Besides the learning pages, or tutorial, the site also contains a full-text version of the District's new management plan, Adobe Acrobat versions of our annual newsletters, links to government and other water-management web resources, and full contact information. ❖

Seminary Fen to be acquired

The state Department of Natural Resources (DNR), the city of Chanhassen, and the Friends of the Minnesota River Valley are joining the District, this spring, to negotiate the purchase of the 160-acre Seminary Fen from a private party.

On the site of an old seminary, in southwest Chanhassen on Highway 212, the rare calcareous fen contains several threatened plant species and is connected to a rare remaining trout stream, Assumption Creek, and the Minnesota River floodplain.

A calcareous fen forms over the course of thousands of years as ground waters rich in calcium and magnesium well up.

The District is contributing \$150,000 to the \$2.5 million fen-acquisition project. For more details, visit our new web site at www.watersheddistrict.org. ❖



A white lady's slipper such as might be found in Seminary Fen. Photo: Minnesota Valley Natl. Wildlife Refuge.

Board of Managers

Edward A. Schlapp: President, Treasurer, Hennepin County Manager
 Ron Kraemer: V.P., Dakota County Manager
 Leo Forner: Carver County Manager
 Lawrence E. Samstad: Secretary, Scott County Manager
 Leonard Kramer: Assistant Treasurer, Hennepin County Manager
 Bruce D. Malkerson: Staff Attorney
 Terry L. Schwalbe: Administrator

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Monthly meetings, open to the public, are usually held beginning 7:00 P.M. on the third Wednesday of each month. Phone the number above for confirmation; then come to:

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web site: www.watersheddistrict.org

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