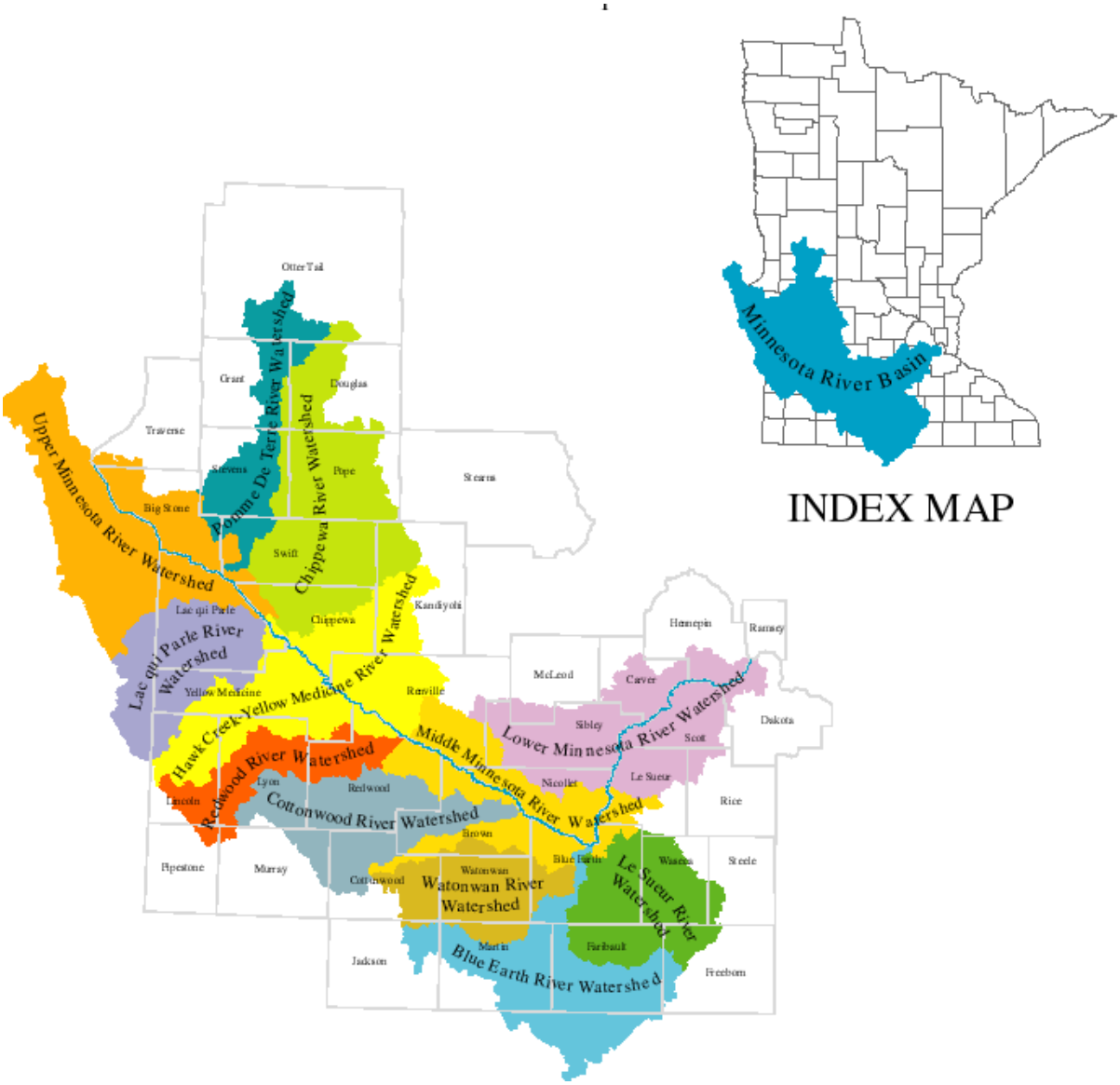
Minnesota River Basin Progress Report 2010

Minnesota River Basin: 2010 Progress Report



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December 2010

Acknowledgements

We want to thank everyone – citizens, landowners, recreational users, nonprofit organizations, farmers, government and many others - who have contributed to helping improve water quality in the Minnesota River Basin. The list of dedicated people in the Minnesota River Basin is long and crosses over all social and economic lines. In particular we want to thank all those people who contributed to writing this report by providing feedback, information and editorial content.

Thank you to Tom Kalahar, Cory Netland, Brooke Patterson, Joel Wurscher, Sarah Duda, Mary Homan, Ed Hohenstein, Shaun McNally, Cindy Potz, Brad Cobb, Doug Goodrich, Shawn Wohnoutka, Lauren Klement, Tom Maher, Steven Pahs, Marla Watje, Lisa Coons, Michelle Stindman, Julie Conrad, Lori Nelson, Chris Hughes, Mike Wanous, Bill VanRyswyk, Katie Brosch, Chris Domeier, Emily Deaver, Scott Bohling, Jeff Nielson, Forrest Peterson, Matt Drewitz, Diane Radermacher, Tim Fredbo, Paul Nordell, Terry Schwalbe, Tammy Neubauer, Dan O'Connor, Luan M Johnson, Ryan Wendt, Loran Kaardal, Karen Wilhelmi, Marilyn Bernhardson, David Bucklin, Pete Moulton, Kevin Bigalke, Jim Bruender, Jeff Jenson, Scott MacLean, Patrick Moore and Lina Wang.

We want to specially thank photographers Ron Bolduan and John Cross for allowing us to use their photos in this publication and the Minnesota Board of Water and Soil Resources for assisting with securing the funds to complete this report.

We also want to send out a special thank you to the members of the Minnesota River Citizens' Advisory Committee who took the time to provide feedback on the ten recommendations they put forward in 1994 to improve water quality in the Minnesota River Basin. Their collective knowledge and understanding of the issues and the basin was very helpful. Thank you Jack Frost, Greg Payne, Scott Sparlin, Joe Dugan, Del Wehrspann, Garfield Eckberg, Greg Mikkelson, Jan Willette, Larry Gunderson, Marcie McLaughlin, Jeff Nielson, Lynne Kolze, and Bob Finley.

The Minnesota River Watershed is very rich with culture and in many cases very misunderstood. It goes without saying that our modern life styles impact this diverse entity in both subtle and not so subtle ways. We as a people have, in most cases, unknowingly, contributed to the degradation of her water quality, to the point that it has become unusable and just plain socially unacceptable. The problem is one that encompasses all of us. It cannot be narrowed down to one source. We are all partners in it, and as partners we are also the solution.

I have had feelings like many people, the problem is too big, I'm just one person, I don't know what I can do anyway, I'm not the one doing it, and so on. Most of these feelings come from a lack of knowledge and understanding. I have found that once people are given the tools, they become confident and act boldly, especially when it comes to something where feelings run so deep and culture, heritage and economics are such a large factor.

– Scott Sparlin, Coalition for a Clean Minnesota River

Comments from the Minnesota River Board Executive Director

Dear Reader,

Progress measurements, at first glance, appear to be relatively straight forward; however, how do we measure the results of all the work done by entities in the Minnesota River Basin in a meaningful way? This document strives to provide a cross-section of the multitude of initiatives done in the Minnesota River basin to improve watershed health and water quality. The following collection of case studies and summarized data showcase the work that so many dedicated people have completed in the Minnesota River basin – people that have elected to make a difference in our watershed by getting off the sidelines and taking action.

Since coming to the Minnesota River Board in 2005, I have been inspired by the creativity and dedication of those working to conserve and protect our soil and water resources – from SWCD staff to grassroots citizens, from elected officials to members of the clergy, and from agencies to agricultural producers – it has been apparent to me that we are all in this together. Although there are many times that various stakeholders seem to be at odds with each other, common ground is always within reach. Tom Barrett, a former U.S. Representative from the state of Wisconsin stated that "If the rain spoils our picnic, but saves a farmer's crop, who are we to say it shouldn't rain?" I have always found a strong sense of reality and truth in this simple statement. As a modern society, we are all part of an ever-changing landscape in which we shape our lives, from earning an income to raising our children – and we have to understand that our future depends on our ability to understand each other's needs. We all have a vested interest in sustaining and improving the Minnesota River basin for future generations and we all need to continue to take action and work together.

Progress is not made by those that sit back and wait for someone else to ask them to dance, but rather by movers and shakers that generate concepts, build support, and implement ideas. There is much work yet to be done, but the accomplishments of those that serve in this basin have made a difference, and evidence of progress is everywhere. How we measure progress is not an easy question to answer, but I hope that as you work your way through this document, you gain an appreciation for the amazing quality, quantity, and diversity of conservation and restoration efforts implemented here - dedication to a resource that has made the Minnesota River basin a better place to work, live, and recreate.

Sincerely,
Dr. Shannon J. Fisher, Minnesota River Board Executive Director

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Introduction

Watershed and water quality management has changed dramatically in the Minnesota River basin over the past 20 years, but how do we measure progress associated with these efforts? One might add up the number of conservation practices installed or the amount of sediment reduced as a result of those practices. We may want to look at the diversity of fish found in the river or the growing interest in fishing. Maybe it is as simple as who comes out to pick up trash and haul away leaves to the compost site before it ends up in the river. Signs of progress are everywhere in the basin; from the significant reduction of phosphorus flowing out of wastewater treatment plants to the rising level of civic engagement, and the resurgence of people using the river for recreational purposes. Progress may be difficult to measure, but it is nonetheless evident.

One of the many media-related organizations taking a special interest in the Minnesota River basin is the Mankato Free Press, who has been writing about a healthier river but also reminding people there is still much more to be done to improve, restore and protect this significant state and national resource. A recent editorial spelled out their opinion of Minnesota River progress:

> *In many ways, the ongoing restoration of the Minnesota River is a story of success. The water is less polluted, animals and aquatic organisms are seeing an encouraging rebound and appreciation for the value of the river continues to grow.*
>
> *A rebound in the fish population has been one of the more obvious success stories. Anglers will attest that there are more fish and more species of fish. Mussel numbers, too, have improved although not to the extent of the resurgence of fish.*

Every year in July, the community of Franklin – Catfish Capitol of Minnesota - holds Catfish Derby Days on the Minnesota River. This event attracts both diehard fishermen and those just looking for a family-fun event. People come from all over the Midwest to try their luck at catching one of the large catfish found in the Minnesota River.

Minnesota River near Franklin

> *The return of one animal in particular – the otter – is certain to bring enjoyment and encouragement to those in the river valley. Wiped out by pollution and trapping early in the last century, the re-introduced otter population is steadily making the river and its tributaries home. For most people, seeing the playful otters is a sight matched perhaps only by the now common sight of bald eagles.*
>
> *Stricter state regulations have led to phosphorus levels dropping significantly. Cities across the basin have built new treatment plants that discharge a fraction of the phosphorus of the old plants. A ban on phosphorus in lawn fertilizer has further helped. It attests to the value of targeted and sensible regulation accompanied by the financial assistance needed to meet goals.*

Even with a multitude of progress indicators, there are still problems and concerns to be addressed and solutions to be found. Research has suggested that runoff from our landscape is having potentially serious consequences on our downstream neighbors – from Lake Pepin to the Gulf of Mexico. Agriculture remains critical to our basin's economic vitality, but it has also often been implicated as a significant contributing factor to our water quality challenges.

> *Not everything has shown improvement. Nitrate levels are still a concern and the pressure of development and farming has a growing impact on the rivers. Being in the midst of some of the richest farmland in the country brings special challenges. Increased farmland drainage the past decade or so appears to have brought one of the biggest challenges to the basin. Water from millions of acres of land is rushing too fast to the rivers, bringing increased erosion, pollution and flooding threats.*

The statement above brings forth several arguments that require additional research and agricultural drainage is only one factor influencing water quality in the Minnesota River basin. Others, like emerging contaminants of concern (*e.g.*, endocrine disuptors), are only beginning to be understood and their ecological impacts need further assessment. Other issues certainly include ongoing loss of wetlands, prairie, forests and set-aside land; the rising level of water used by industries, cities and others; stormwater management, availability of funding to continue cleaning up the Minnesota River; and how to balance volunteer efforts versus regulation.

Ultimately, all of us living in the Minnesota River basin can be proud of the work that has been done. The level of commitment and innovation exhibited by our citizens, nonprofit organizations, landowners, civic groups, farmers, government agencies and others to improve, protect and restore water quality demonstrates that people deeply care for this resource. At the same time, however, we need to remain vigilant regarding what still needs to be accomplished to create a healthy, vibrant Minnesota River we all can enjoy today and in the future.

The Minnesota River near Redwood Falls

Those new problems, like the past ones, can be improved with dedication, reasonable regulation, technological advances and public support. The public support is easier to get these days. That, perhaps, is one of the biggest successes in our valley: a renewed appreciation for the value and beauty of the Minnesota River.

Background

The Minnesota River cuts through south-central Minnesota on a 335 mile journey from Big Stone Lake on the South Dakota border to its confluence with the Mississippi River at Fort Snelling. Encompassing close to 20 percent of Minnesota's landmass, this large basin drains 16,770 square miles or roughly 10 million acres in the state, along with a small portion of northern Iowa and

eastern South Dakota. Twelve major watersheds make up the Minnesota River Basin, with the Yellow Medicine-Hawk Creek Watershed split into two administrative units. Over 10,000 years ago when the water from glacial Lake Agassiz spilled southward it created the glacial River Warren. This immense and powerful glacial river carved out the present-day Minnesota River Valley during a catastrophic event. As a result, the channel of the Minnesota River is constantly shifting and changing due to the large amount of space it has available on the valley floor.

> *A great gash, 335 miles long and as much as 250 feet deep and five miles wide, runs diagonally across central Minnesota from Browns Valley through Mankato to Minneapolis. This gash cuts through young glacial materials, older marine and terrestrial deposits, and into ancient heat-borne stone. It exposes some of the world's oldest known rocks. Across its floor flows a relatively diminutive silt-laden, meandering river. The valley and river, as the state, is known as the Minnesota – "cloudy waters."* – Constance Jefferson Sansome

The Minnesota River as it twists and winds between New Ulm and Mankato

The Minnesota River valley is truly the most striking and scenic feature of all south-central Minnesota. It is a narrow sliver of wooded hill slopes in the vast plains to north and south, and it holds within it a diversity of geologic features such as rugged granite knobs on the valley floor, boulder-gravel river bars, broad sandy terraces, gentle colluvial slopes – and a stream along the axis that is almost tiny in context of these major features. – H.E. Wright, Jr.

The Dakota called the river Minnesota or *Minnay Sotar* which has been translated a number of different ways. Some say it means "smoky-white water" or "like the cloudy sky water," expressing the notion the Minnesota River has always had a somewhat turbid condition – especially downstream of its confluence with the Blue Earth River. The French named it *Riviere St. Pierre* and then it became known as St. Peter's River by early trappers and traders.

Some of the earliest explorers like Jonathan Carver, Joseph Nicollet and George W. Featherstonhaugh filled their journals with entries of both transparent and turbid waters, riverbanks of white sands, extensive wild rice beds, and abundant wildlife.

> *From the brink of this prairie I had a fine view of the river and the country around. The stream had a graceful serpentine course, and the trees on its left bank were beautifully distributed in natural clumps and lines, and everything assisted in the perfect and general embellishment of the scene; even the uninterrupted solitude of the full enjoyment.* – George W. Featherstonhaugh, "Canoe Voyage up the Minnay Sotar"

American and European settlers started to push into the Minnesota River Valley after the signing of the Traverse des Sioux Treaty in 1851. From that time on this landscape filled by native prairie, wetlands and shallow lakes began its transformation into one the most productive agriculture regions in the world. Today over 92 percent of the land-use tied to primarily corn and soybean crop rotation and livestock production.

All of this alteration including the construction of cities, roads and other infrastructure changed the Minnesota River in ways not fully understood until people started to notice the water quality problems of our rivers and declining aquatic and terrestrial life. By the 1980s, the river was increasingly being described in a degraded condition – algal blooms, unhealthy fish populations, murky waters, excessive nutrients, bacteria and sediment, not able to support aquatic life and recreation, etc.

> *If Featherstonhaugh were alive today, he would find a different river. Once clear waters are murky and brown. White sand bottoms have turned to mud. Streambanks are eroded and bare. Much of the wildlife are long since gone. Wetlands, which once protected the valley against flooding and erosion have all but disappeared. Soil, pesticides, fertilizers, oil and grease, toxic chemicals, garbage, and septic system wastes have all found their way to the river.* – The Minnesota River Reclaim a Legacy handout

On September 22, 1992, Governor Arne Carlson stood on the banks of the Minnesota River in Bloomington holding up a jar of dirty river water and declared it was time to clean up this waterway. "Our goal is that within 10 years, our children will be swimming, fishing, picnicking and recreating at this river," said Governor Carlson.

Carlson's bold statement followed with the completion of a four-year comprehensive study of the Minnesota River Basin. The report issued in January of 1994 stated, *The Minnesota River is one of the state's most highly polluted waters, particularly from nonpoint sources of pollution.* Recommendations were brought forward by this study and later through the "Working Together: A Plan to Restore the Minnesota River" by the Minnesota Citizens' Advisory Committee.

Governor Arne Carlson's call for action and the concentration of resources by the federal, state and local government, nonprofit entities, farmers and citizens resulted in far-reaching initiatives including the enrollment of over 100,000 acres in the Conservation Reserve Enhancement Program (CREP) and in conservation programs including other efforts involving civic engagement, water quality monitoring, installation of conservation practices, and government action. Many people agree that improving and protecting water quality in the Minnesota River Basin has a lot farther to go but we seem to be on the right track.

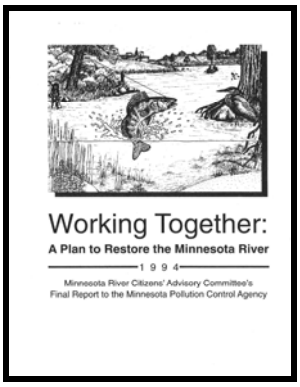
Mussel Survey on the Chippewa River

New Ulm Capitol for a Day

Paddling the West Branch of the Lac qui Parle River

Executive Summary

In December of 1994, the Minnesota River Citizens' Advisory Committee issued "Working Together: A Plan to Restore the Minnesota River" as part of the ongoing effort to improve and protect water quality in the basin. The Minnesota Pollution Control Agency (MPCA) created this citizen's advisory committee to help define reasonable and effective ways to reach established water quality goals.



A group of 30 people including citizens, farmers, business owners, nonprofit and government staff from across the Minnesota River Basin met more than 30 times over a two-and-half year period to gather information on the river, discuss the river's problems and come up with potential solutions. According to the report, they represented the basin's geographical and cultural diversity along with *members from Big Stone Lake to the mouth of the river and representatives from several state and local agencies.*

This committee developed ten recommendations for improving water quality, biodiversity and the natural beauty of the Minnesota River and to help achieve the goal of a fishable and swimmable river by the year 2002:

- Restore floodplains and riparian areas,
- Restore wetlands,
- Manage drainage ditches and storm sewers as tributaries,
- Improve land management practices,
- Monitor water quality throughout the Minnesota River basin,
- Establish a "Minnesota River Commission" to oversee the cleanup effort,
- Establish local joint powers agreements,
- Improve technical assistance to local governments,
- Engage the general public,
- Enforce existing laws.


Monitoring the Rush River

The Minnesota River Board has been charged by the State Legislature to assess or evaluate the *results and progress of projects in the 12 major watersheds of the Minnesota River Basin* (language from the Minnesota River Board Bill). This report will examine a number of factors including the ten recommendations set forth by the Citizens' Advisory Committee to serve as a reference point to see how far the original members feel the efforts to improve water quality in the basin has come since 1992 when Governor Arne Carlson said, "Our goal is that within 10 years, our children will be swimming, fishing, picnicking and recreating at this river."

The Minnesota River Progress Report is one example of telling the story of what has been happening under the effort to improve and protect water quality in the basin. We will also highlight individual success stories and provide information related to conservation practices, land-use, and water quality data to provide a fuller understanding of what has been accomplished in the Minnesota River Basin over the last twenty-five years.

To help evaluate the ten recommendations we surveyed all reachable members of the Minnesota River Citizens' Advisory Committee to give us their perspectives about what has been accomplished and what areas still need improvement. Each committee member ranked the recommendations on a scale from 1 to 6 (1 low and 6 high) and also provided examples of its progress and challenges. Survey excerpts and summarized comments follow:

Recommendations:

1. **Restore floodplains and riparian areas – 4.2 ranking:**

Land enrolled in CREP in Renville Co.

- ✓ What worked: This has probably been the single greatest accomplishment [from the Citizens' Advisory Committee recommendations], principally because of the Conservation Reserve Enhancement Program (CREP). Timing was also critical, following on the heels of large flood events in '93 and '97. Many acres in the floodplain had become unfarmable, making programs such as CREP and Reinvest in Minnesota Resources (RIM) very attractive. There was a reason this recommendation was number one on the list. It has become more and more culturally unacceptable to farm the floodplains.
- ✓ Lack of success: Originally, the plan called for enrolling 200,000 acres under Conservation Reserve Enhancement Program but only half was completed. There is limited value in restoring floodplain and riparian areas if you don't also address serious hydrologic alterations in the uplands from agricultural drainage and urban development. Anything done in the riparian areas will quickly be overwhelmed by floodwaters consistently reaching the mainstem from the developed uplands. The entire system of land use must be addressed at once if this river is ever going to improve significantly. We have reached a point where opposition to public ownership precludes new or expanded permanent easement-type land retirement programs.
- ✓ Additional progress is needed: More funding for programs like CREP targeted in critical areas within a sub-watershed. Much more work is needed to obtain compliance with ordinances requiring a 50 foot setback from public waters. In addition, target the first and second order streams with riparian vegetated cover. Tackle hydrology issues by using riparian areas, water storage, etc. to temporarily hold water to decrease the energy in the system and reduce sediment transport.

2. **Restore wetlands - 2.8 ranking:**

- ✓ What worked: There are some wetlands restored through RIM, Wetlands Reserve Program (WRP) and CREP, although it is still a small amount compared to the amount drained.
- ✓ Lack of success: Until we address drainage as a fundamental root cause of poor water quality, we will not see an improvement in water quality. Non-floodplain

wetlands are hard to get restored because of the valuable cropland needed in the restoration.

- ✓ Additional progress is needed: Reducing the volume of water during runoff events (rain, snowmelt) is the number one challenge facing the Minnesota River. Wetland restoration needs to be a big part of the solution. We need to significantly increase the percentage of land that is wetland. What is needed is a serious initiative to restore large complexes, including drained lake basins, throughout the basin.

3. **Manage drainage ditches and storm sewers as tributaries – 2.9 ranking:**
   - ✓ What worked: There seems to be some awareness that ditches and storm sewers are part of the tributary system, thanks to education efforts. A Board of Water and Soil Resources (BWSR) study looking at buffers on ditches identified many of the county ditches have a one-rod buffer. The only progress on this front is through the state's regulatory program for major cities NPDES permitting [National Pollutant Discharge Elimination System]. Storm sewers are getting a lot of attention these days through stepped up management by cities and citizen involvement by the Friends of the Minnesota Valley, which has helped raise awareness and created measurable reductions in phosphorus from community storm water.
   - ✓ Lack of success: The point here was to make landowners accountable for the quality of water that left their property and to hold them to water quality standards. Much more needs to be done. Participation varies greatly from county to county, ranging from very high to almost no buffers in some areas. There has been a lot of attention given to this area of research but little implementation on a large scale. Politically, it is not possible to manage drainage ditches in any way other than what we are seeing. With respect to public drainage ditches, this seems like an untenable proposition and not worthy of pursuing at this time.


Beauford Ditch

   - ✓ Additional progress is needed: It may be that some of the emphasis on "two-stage ditches" and similar technologies will lead to improved ditch management over time. The education process needs to continue, especially with regard to tile. The BWSR ditch study identified that there is still a need for buffers in some areas. In critical areas the one-rod buffer is insufficient for water quality protection.

4. **Improve land management practices – 3.8 ranking**
   - ✓ What worked: Respondents gave this a fairly high rating owing mostly to the widespread adoption of conservation tillage, reduced tillage, and no tillage management across most of the Basin. The change is very noticeable compared to conditions in the early 1990's. The results are very noticeable as well. There are fewer blackened snowdrifts in winter, there seems to be a lot fewer rills and gullies following rainstorms, and fewer instances of dust storms. I think one of the most effective concepts is the "farm the best, buffer the rest" slogan. Encouraging producers to enroll marginally producing land in the various set-aside programs seems to be a win/win undertaking. These marginal lands often are in or near riparian corridors, making them all the more valuable from a water-quality perspective.
   - ✓ Lack of success: Cropping systems have not changed over the years; it is still predominantly corn and soybeans. For example, in the agricultural areas, we are still farming corn and soybeans the way we are because of farm commodity payment schemes. In urban areas, we continue to plan far-flung, low-density communities because the price of oil has been and remains artificially cheap.
   - ✓ Additional progress is needed: We need fundamental reforms in the national farm legislation if we are ever to get away from the destructive effects of corn-soybeans rotations. Local zoning could address poor urban/suburban development plans. More attention is needed to inventory priority management areas within the basin, watersheds, and sub-watersheds so that resources can be directed toward landscapes that are most critical. A gradual introduction of regulatory controls would also be helpful.

Breaking drainage tile for a wetland restoration in Hawk Creek Watershed

5. **Monitoring water quality throughout the Minnesota River Basin – 4.6 ranking**
   - ✓ What worked: This continues to be a very successful activity across the basin, yielding data that can be used to influence decisions leading to changes on the landscape. The data has also been valuable in evaluating change over time. The mainstem, major tributaries, and selected tributaries are now being monitored using consistent methodologies across the basin, with the data collected into a central data base (MRBDC) at the MSUM Water Resources Center. Much more data is available in an easy to understand format with it being analyzed and interpreted. *The State of the Minnesota River* Water Quality Monitoring Reports are an example of this.

- ✓ Lack of success: It will be difficult to sustain the level of monitoring we have been accustomed to, but it may also become more important owing to growing demands for measuring the results of the range of Best Management Practices (BMPs) being promoted and installed across the basin.
- ✓ Additional progress is needed: Monitoring will need to be applied at smaller and smaller scales as we move our work to the Priority Management Zones. We will need to determine whether BMPs are effective at that scale. It is important to make sure the monitoring results and dissemination of findings from the major and minor tributaries get reported back to the people who live in the respective watersheds. There is a need for a single website that provides access to all the monitoring data. As the Citizens' Advisory Committee report states, we need to know where we are now, what effect our cleanup efforts are having, and when we have reached our goals.

6. **Establish a "Minnesota River Commission" to oversee the cleanup effort - 2.7 ranking:**
   - ✓ What worked: The Minnesota River Board (MRB) went a long way toward this. The MRB was created as an alternative to the Commission. Adding a technical advisory committee is a good step.
   - ✓ Lack of success: Success of the MRB has been limited by the nature of its charter. MRB is good but a broader representation would enrich the group. There are groups that do not have representation on the Minnesota River Board. The MRB does not really oversee the cleanup efforts.
   - ✓ Additional progress is needed: Strengthening the resolve of the MRB to enact policies and promote actions that may, at times, be unpopular could lead to more effective results. Communication among the myriad stakeholders remains spotty at best, limiting the ability of the stakeholders to collaborate.

Senator Dennis Fredrickson and Representative Terry Morrow speaking at a Minnesota River Board meeting in Gaylord.

7. **Establish local joint powers agreements - 3.6 ranking:**
   - ✓ What worked: There are a great many boards and organizations functioning within the basin. Not all are joint powers based, but that doesn't limit their productivity. Groups of this nature play an important role in focusing attention on major watersheds and offer an easy access point for local residents.
   - ✓ Lack of success: There is a lot of concern about the financial viability and credibility.
   - ✓ Additional progress is needed: Some form of local funding needs to be developed to alleviate near total reliance on state, federal and foundation grants. All the major watersheds need to have a focused organization that people can call to discuss implementation issues.

8. **Improve technical assistance to local governments - 3.6 ranking:**
   - ✓ What worked: The state provides financial and technical services to local government to help build local capacity to enact land use changes to restore water quality. The MPCA has done a good job providing local governments with technical guidance regarding their stream monitoring efforts, standardizing methods and providing technical training.
   - ✓ Lack of success: We may be seeing a decline in the level of technical assistance from its peak in the late 1990s due to chronic state and local budget shortfalls. There have been no real changes over the past 10 to 15 years. Budgets have limited almost all staff growth. Once local capacity begins to erode (which is beginning to happen) we will have a very difficult time restoring it.

Gneiss Granite Outcrop Hike led by Ron Bolduan

9. **Engage the general public – 3.7 ranking:**
   - ✓ What worked: This was and is a good idea. Much work has been done to try to engage the public. They should get an A for effort. We have seen steady progress in recent years on this recommendation, and we expect to see more in the years to come. This has arisen as a consequence of many longtime, dedicated people living and working in the basin that have simply not given up. Nonprofit organizations in cooperation with government agencies have done an outstanding job here.
   - ✓ Lack of success: There is so much more that needs to be done to encourage true civic engagement – not just citizen consultation. It's hard to have a sense of urgency when people are not connected to the river. We could do a better job on the social side of things. Most of the focus is technical (acres of BMPs, model results, TMDLs, monitoring). We are only reaching a very small percent of the public. The public is not responding. They seem to be too busy trying to make a living to be engaged or it just isn't high on their priority list.
   - ✓ Additional progress is needed: We need to continue to reach out to people at their level of understanding and in ways that are comfortable for them, rather than us. At minimum we need more people "in the field" with social science skills to match the natural science skills already in play. A serious paradigm shift is needed. We need to encourage the development of local citizen leaders that can lead neighbors to change land practices rather than the government doing it. Citizen-led watershed

management is the future. Government should play the role of consultant, supporter, educator at a small and personal scale (Township or smaller). We need to understand that civic engagement is not education. Education is a part of civic engagement, but the two are fundamentally different in their goals. Harnessing the power of the web and creating interactive (Web 2.0) sites would go a long way toward enabling citizens to engage in the process. Agencies need to recognize citizens as equal partners and identify ways to collaborate with the public. Providing funding to citizen-based initiatives through the Clean Water portion of the Legacy Amendment funds would help. Marketing of proven methods for conservation farming, set-aside of marginal lands, application of buffer strips, etc. still needs more effort.

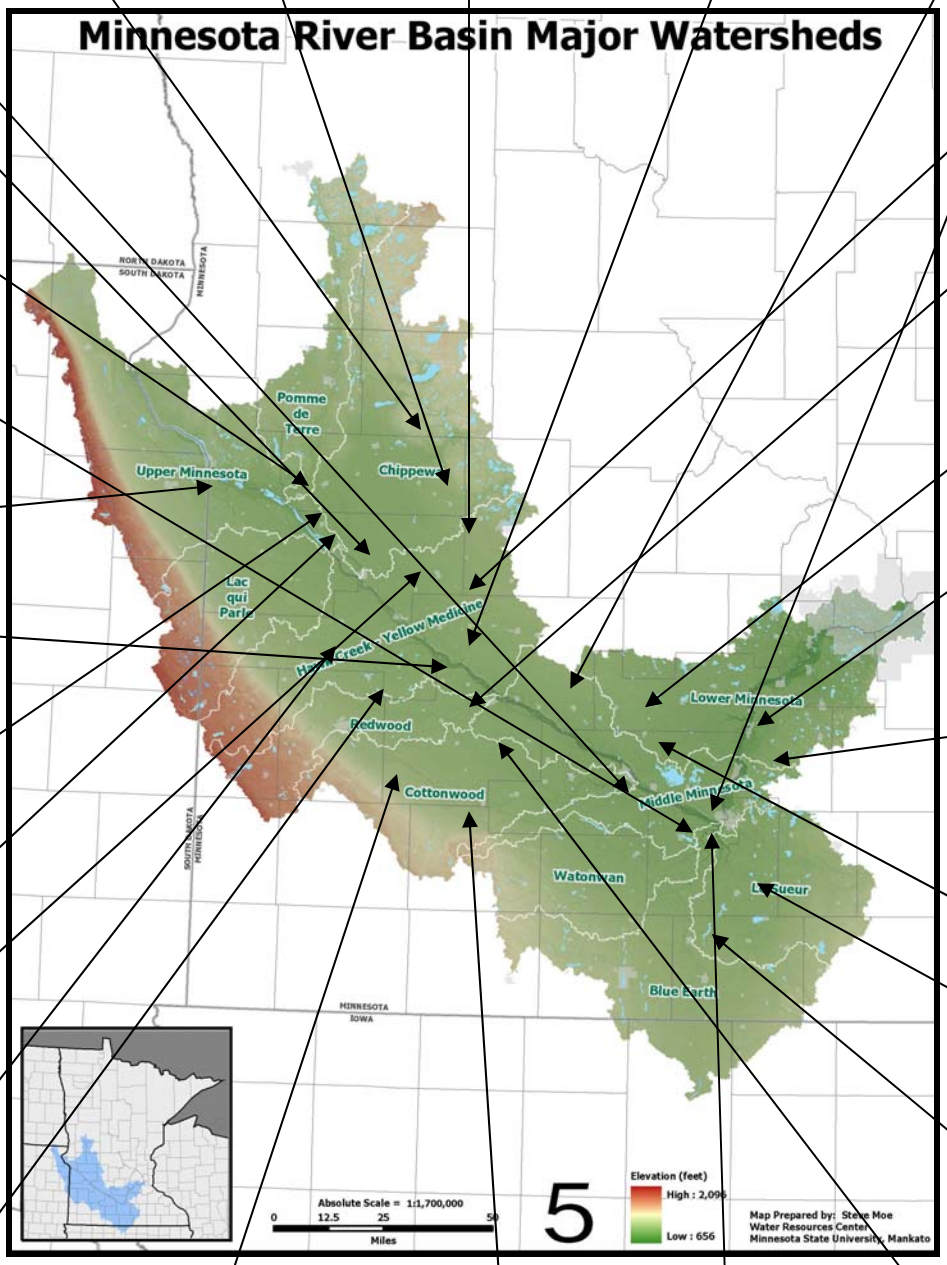
10. **Enforce existing laws – 3.2 ranking:**
    - ✓ What worked: Unsewered communities, regulated MS4 (Municipal Separate Storm Sewer System) communities, and decreased phosphorus discharges by point sources are results of regulatory requirements (especially enforced phosphorus reductions in WWTP permits).
    - ✓ Lack of success: Non-compliant septic systems, inadequate buffers, and other issues are still not enforced. Many counties are still allowing farmers to break buffer strip laws.
    - ✓ Additional progress is needed: Studies and reports over the last few decades have consistently called for better enforcement of existing laws, rules, and regulations. Yet, as we know, there are many constraints to carrying forward with the recommendation. It would seem that until such time as a majority of local residents demand adherence to the law, we will be left with the sort of lax enforcement we've come to know.

Nine Mile Creek Watershed

MINNESOTA RIVER BASIN

At ten million acres and covering all or parts of 37 counties in the state and smaller sections of Iowa and South Dakota, the Minnesota River Basin is large and under constant threat of its water resources. The basin starts at the South Dakota border and moves from a mostly rural landscape to a major urban setting at its confluence with the Mississippi River. In between you will find communities of all sizes dominated by cropland along with a few remaining sections of native prairie, forests, wetlands and shallow lakes all connected by the Minnesota River and its many tributaries. Approximately 870,000 people call the Minnesota River Basin home with a vast majority of them living in the Lower Minnesota River Watershed.


MN River Valley near Franklin



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13. State of the MN River Water Quality Monitoring Reports

MINNESOTA RIVER BASIN

Organizations across the Minnesota River Basin have formed partnerships to develop basin-wide strategies to improve water quality and focus more on public outreach. These partnerships feature nonprofit organizations, government agencies, citizens, landowners, recreational users, farmers and many others all interested in protecting the Minnesota River as a valuable and unique resource.

1. Minnesota River Board

Formed in 1995, the Minnesota River Board (MRB) is a joint powers board comprised of 27 counties within the Minnesota River Basin. The mission of this organization is to provide leadership, build partnerships, and support efforts to improve and protect water quality in the Minnesota River Basin. Led by county commissioners, the MRB strives to seek ongoing input from stakeholders across the basin including citizens, nonprofit organizations, and government agencies.

The MRB assists in the coordination of cleanup and promotion efforts among the 12 major watersheds: (1). It advises on the development and use of monitoring and evaluation systems; (2). Conducts public board meetings including an annual forum and watershed tours along with ongoing information and education programs; and (3). Advises on the development of projects within the basin including the distribution of funding.

One of the MRB's strongest partnerships is with the Minnesota Pollution Control Agency (MPCA). These two entities have worked together to improve water quality through financial support, monitoring assistance, along with conducting workshops, seminars and conferences. Both organizations played key roles in putting on the Minnesota River Summit in 2007 and keep political leaders informed about important issues impacting the Minnesota River Basin.

The MRB has also worked with organizations like the Greater Blue Earth River Basin Alliance to develop and launch the Conservation Marketplace of Minnesota, an ecosystem credit trading program in three watersheds including the Blue Earth River and the middle and lower stretches of the Minnesota River (see page 73). Another important outreach program the MRB is involved with is the annual Shallow Lakes Forum, partnering with the DNR, MPCA, Ducks Unlimited, BWSR and other organizations.

2. MN River Water Resource Professionals Assembly

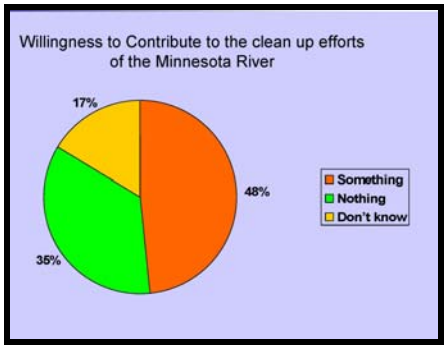
An assembly sponsored by the Minnesota River Board on October 1, 2009 brought out over 200 people to hear presentations on a variety of basin-related issues, participate in discussions related to those topics and network with other professionals. Held at Jackpot Junction, the group heard from Kevin Bigalke on "Approaches for Effective Watershed Management; Kay Clark and Dave Bucklin on "Partnering Opportunities," an overview of progress since the Minnesota River Assessment Project by Scott Kudelka, along with Matt Drewitz and Larry Gunderson on funding opportunities for conservation practices. Out of this assembly came the formation of a proposed Basin Professionals Advisory Team to provide input about technical matters to the Minnesota River Board.

3. Resident Perceptions of the MN River

Minnesota State University Mankato, Minnesota Pollution Control Agency, Friends of the Minnesota Valley and Minnesota River Board partnered to hire St. Cloud State University to conduct a random phone survey of over 4,000 people in the Minnesota River Basin on their perceptions of the basin.

Over 79 percent of the callers participated with 673 adults being interviewed. Eighty percent of the respondents felt the Minnesota River was somewhat or very polluted. Over 80 percent of the respondents said it will take 5 to 10 or over 10 years to clean up the Minnesota River with 76% saying it should take less than 5 years and 16 percent identifying 5 to 10 years.

In terms of being responsible for protecting water quality for future generations, 96 percent agreed or strongly agreed with this statement. When it came to willingness to contribute to the clean-up efforts of the Minnesota River, 48 percent said they would be willing to contribute something compared to 35 percent who said no and 17 percent responded with I don't know.



4. Conservation Reserve Enhancement Program (CREP)

As the largest, private-lands conservation effort in the state, the Conservation Reserve Enhancement Program (CREP) brought together local, state, and federal officials, conservation groups, and interested landowners to work collectively to restore critical floodplain areas in the Minnesota River basin. Over 100,000 acres with more than half being wetland restorations were enrolled into permanent easements over a four year period, officially ending in September of 2002.

CREP combined the U.S. Department of Agriculture's Conservation Reserve Program (CRP) with the state's Reinvest in Minnesota Resources Program (RIM) to set aside environmentally sensitive land in the 37 county Minnesota River Basin for natural resource benefits including water quality improvements, soil erosion prevention and wildlife habitat benefits.

Facts on CREP: 2,456 easements, average easement size: 41 acres, median easement size: 24 acres, 45,296 riparian acres, 54,495 wetland restoration acres and 673 marginal pasture acres.

CREP plot north of Mankato along the MN River

5. CREP Land Stewardship Project

This educational assistance campaign informed landowners about proper land management practices and opportunities to implement them in the Minnesota River Basin. Sponsored by the Minnesota Association of Soil and Water Conservation Districts, Minnesota River Board, BWSR, NRCS, and DNR, the project hired three foresters to provide technical assistance to help private landowners design riparian buffer plantings to reduce sedimentation and nutrient loading into the Minnesota River and its tributaries. Forest Stewardship Plans were prepared to give landowners information needed to make ecologically sound management decisions.

These foresters helped prepare 26 stewardship plans covering more than 3,000 acres; technical assistance on tree plantings for over 7,590 acres of riparian buffers and 1,608 acres of timber stand improvements of non-CREP acres within the basin, technical assistance for livestock exclusion on 290 acres of forests and riparian areas, and to improve wildlife habitat and water quality on 1,150 acres of non-CREP land.

6. Minnesota River Integrated Study

The U.S. Army Corps of Engineers (Corps), St. Paul District recently received an appropriation of $350,000 from the U.S. Congress to launch an integrated study of the Minnesota River Basin. Depending on continual funding from Congress, this study is estimated to cost $8.4 million over a four year period. Models will be developed utilizing both new and old data to provide a guide how best to meet water quality goals.

Confluence of the Minnesota and Mississippi Rivers, St. Paul, MN

In order to create effective models, the Corps will be partnering with organizations like the Minnesota Environmental Quality Board and the State of Minnesota, who will be providing aerial reconnaissance data to be used to develop a detailed, topographical analysis of the basin and land-use practices. The Corps also plan to work with the Minnesota River Board to help coordinate the work.

According to the Corps, these tools will enable examination of existing conditions, forecasting of future conditions and simulation of alternative to identify ecologically sustaining and economically and socially desirable management actions. The system will address watershed, water quality and ecosystem restoration needs at the minor and major watershed scales.


Eroding banks on the Minnesota River

7. Minnesota Elevation Mapping Project

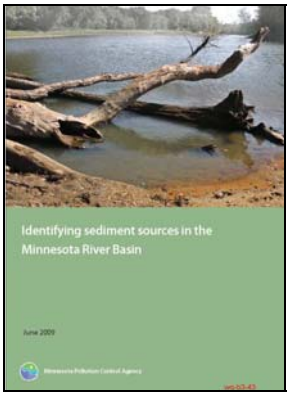
The goal of this project to develop and deliver a seamless high-accuracy digital elevation map of the State of Minnesota including the Minnesota River Basin to better manage resources, provide decision-makers with more accurate information, and to facilitate the flow of data among all levels of government from local, state and, federal agencies. Accurate topographic information will greatly enhance the ability of decision makers and resource managers to understand how water interacts with the landscape and provides the foundation for developing innovative, effective, and defendable resource management strategies.


Minnesota River near Ortonville

Data will be collected to FEMA flood plain mapping standards to support integration with existing data and generation of two foot contours. For the first phase of the project a set of counties will take part in the mapping including Brown, Chippewa, Cottonwood, Douglas, Faribault, Jackson, Kandiyohi, Lac qui Parle, Le Sueur, Lincoln, Lyon, Martin, Murray, Nicollet, Pipestone, Pope, Redwood, Renville, Sibley, Swift, Waseca, Watonwan, and Yellow Medicine.

8. Minnesota River Basin Sediment Report

A multi-agency group led by Johns Hopkins University issued a report summarizing current research on sediment sources in the Minnesota River Basin in August of 2009. The "Identifying Sediment Sources in the Minnesota River" report stated much of the evidence indicates most of the of the sediment entering Lake Pepin comes from the Minnesota River Basin and the rate of the sediment delivery has increased ten-fold over the past 150 years. Primary factors in the report point to the basin's geological history, climate, and land use. The report cites other findings and also the need for more research. Sponsored by MPCA, other organizations involved in the project included the National Center for Earth-Surface Dynamics, U.S. Geological Survey, Minnesota Geological Survey, Water Resources Center at MSUM, NRCS, University of Minnesota, and Science Museum of MN.



Key Findings:

1. Most of the sediment delivered to Lake Pepin comes from the Minnesota River, and the rate of this supply has increased ten-fold over the past 150 years.
2. Some subwatersheds contribute most of the sediment to the Minnesota River.
3. Sediment sources within tributaries, including those with large sediment yield, are not evenly distributed.
4. In order to direct restoration efforts, it is necessary to determine not only the regions that contribute the most sediment to the Minnesota River, but also the specific location and mechanism by which sediment is introduced.
5. Changes in sediment storage along the Minnesota River influence sediment delivery at the mouth.


Morgan Creek Vineyard

9. Farmfest's AgriPreneurship Pavilion

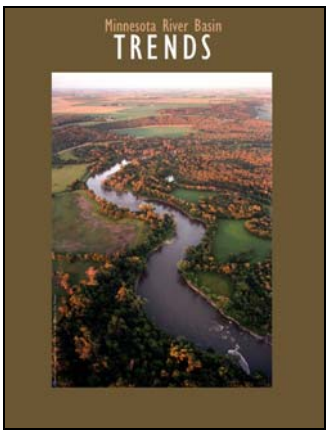
A diverse selection of partners come together annually to promote rural and sustainable economic opportunities in the Minnesota River Basin at FarmFest in early August each year. This tent focuses on Sustainable Agriculture, Rural Entrepreneurs and related issues. Visitors to this pavilion can find out about alternative energy, alternative animal farming, conservation development, organic agriculture, orchards, sustainable agriculture and vineyards. One initiative over the last two years has involved promoting conservation drainage. The Agricultural Drainage Management Coalition and AgriDrain Corp. of Iowa, along with the Minnesota Department of Agriculture, the Minnesota River Board, Friends of the Minnesota Valley are key partners in this initiative designed to make the greater public aware of drainage options for producers.

10. Water Resources Center

Based out of Minnesota State University Mankato, the Water Resources Center (WRC) was created in 1987 by biology professor Henry Quade to serve as a regional research center and study water quality. Today, the WRC employees both full-time researchers along with graduate and undergraduate students from a wide range of departments including: biology, civil engineering, city planning, environmental science and geography to assist with a diverse selection of research practices. The students receive both academic and practical applications along with a hands-on experience. The full-time staff manage projects with assistance from the students in wetland assessments, use of global information systems, and analysis of bacterial and sediment pollution. In 2008, the WRC received $1.2 million to continue its applied research, including water quality monitoring, communication efforts, and civic engagement in the Minnesota River Basin.

11. Minnesota River Basin Trends Report

A comprehensive, reader-friendly overview of the Minnesota River Basin was completed in fall 2009 by the Water Resources Center in conjunction with MPCA and other organizations. The report covers the basin's history, land use, demographics, water quality, recreation and emerging trends. Charts, graphics, maps and photos help explain how some parameters have been improving while others are either static or continuing to decline. The report's forward reads, "As you will see, many actions and projects have been put in place to try to understand and improve the water quality across the basin. Cleaning up the rivers and lakes in the basin is a complex and challenging endeavor that will take time. Some progress has been made and much still needs to be accomplished. Many diverse groups across the basin are working together to improve ecosystem health for future generations." According to the Minnesota River Basin Trends Report, there has been a decrease in phosphorus and sediment levels, River otters and bald eagles are making a comeback, while mussel numbers remain static, and nitrate levels are a mixed story.



12. Project Spotlight - Minnesota River Experts: An Educational Field Trip Online

A team at the MN State University Mankato WRC will be creating a one-stop online resource for questions and information related to the Minnesota River Basin. The proposed web site will bring together scientists and advocates as experts to cover a wide range of topics – erosion, water quality, improving fish populations, conservation practices and the wildlife that make the river their home. Visitors to the site will have a chance to take a natural resource journey through the Minnesota River Basin and have their questions answered by experts in the field with videotaped responses. A committee of agency staff and citizens will be assembled to come up with a wide range of perspectives to help people understand a complex, diverse Minnesota River Basin. People will be able to access the site through the web and at four public sites across the basin – St. Peter Treaty Site History Center, Ney Nature Center near Henderson, Regional River History Center at New Ulm and the offices of Clean Up the River Environment in Montevideo.

13. State of the MN River Water Quality Report

First published in March of 2002, this report assembles data collected by multiple agencies and organizations to present the information that allows for relative comparison between the mainstem Minnesota River sites as well as the major tributaries in the basin. The report presents water quality data on sediment, phosphorus, nitrogen, bacteria, nitrates in drinking water, pesticides and mercury from most of the major tributaries, four mainstem sites and a number of minor tributaries. Agencies involved in preparing the report include MPCA, MN Department of Agriculture, and the MSUM Water Resources Center.

14. Minnesota River Focus Area

Clean Water Partnership Phase I diagnostic assessments were completed in nine major Minnesota River watersheds through local government partnerships and assistance by the U.S. Geological Survey. The assessments identified priority water quality problems and directed best management practices to specific land areas primarily intended to reduce nonpoint source pollution. The Natural Resource Conservation Service expanded the delivery of the Wetland Reserve Program to improve water quality in these major watersheds by entering into cooperative agreements with the U.S. Fish and Wildlife Service, the Minnesota Waterfowl Association, and Ducks Unlimited. Over 7,000 acres enrolled in the program within the Minnesota River Basin. Other partners in the project include the National Park Service, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, BWSR, DNR and MPCA.

15. Effects of Agricultural Land Retirement

The U. S. Geological Survey and BWSR secured a grant from the Legislative-Citizen Commission on Minnesota Resources (LCCMR) to evaluate the effect of agricultural retirement (set-aside) on stream quality. The research partnership chose three small watersheds with similar landscape features in the Minnesota River Basin with the exception of the amount and location of agricultural set-aside land.

Two watersheds – the Chetomba Creek and West Fork Beaver Creek of the Hawk Creek Watershed – have seen dramatic water quality improvement after the implementation of a variety of conservation practices including land retirement. These two sub-watersheds were compared to the South Branch Rush River which hasn't seen the level of Best Management Practices installation.


Rush River in Sibley County

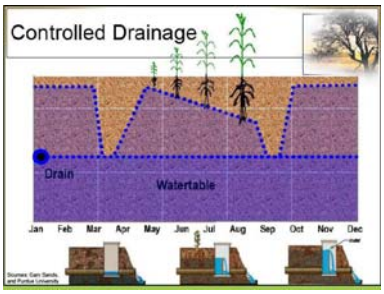
Results of the study came to a number of conclusions: (1). Increasing Index of Biotic Integrity (IBI) scores with increasing percentage of retired land; (2). Decreasing total nitrogen concentrations with increasing percentage of retired land; (3). Lowest nitrogen and phosphorus concentrations in the sub-basin with the highest retired land percentage and (4). Better correlation of IBI score with percentage of land retired closer to the stream.

16. Conservation Drainage Symposiums

In 2008 and 2009 a diverse group of organizations – Clean Up the River Environment (CURE), Coalition for a Clean Minnesota River (CCMR), the Friends of the Minnesota Valley, Minnesota River Watershed Alliance, Minnesota Department of Agriculture, and a Conservation Drainage Coalition held a total of six Conservation Drainage Symposiums across the Minnesota River Basin.

Overall, the goal of the symposiums focused on educating the public about conservation drainage, a relatively new technology for holding water on the land and providing water quality benefits such as reduced levels of nutrients and sediment.

Each symposium highlighted the opportunity to learn about the use of conservation drainage technology to increase farm profitability while addressing water quality and quantity issues in the Minnesota River Basin. The public events were designed to build relationships among producers, citizens and government agencies to work toward finding common ground by establishing trust and constructive interaction.

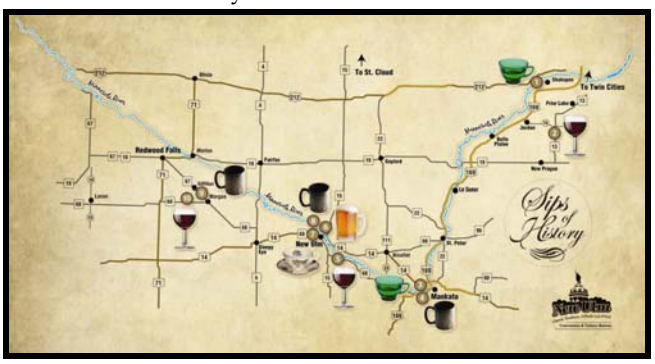


17. Fingerprinting Glacial Sediment

The overall goal of this pilot project was to involve the University of Minnesota students in the testing methods to determine the sources of turbidity in the Minnesota River. During the course, the program instructors introduced multiple methods to allow students to apply critical thinking skills and identify the most promising approach. Two choices to determine sources of turbidity in the Minnesota River were looked at –(1). To collect samples and geo-chemically map the entire watershed and (2). Conduct a reference-lake approach, which was determined to be a more economical method. Using the reference-lake approach, students and instructors studied the radionuclide abundance in sediment accumulating naturally in "reference lakes" to determine the best way to integrate the nature of surface erosion over time in small watersheds.

18. Minnesota River Sips of History Trail

A coalition of wineries, breweries and historical sites developed and are promoting a "Minnesota River Sips of History Trail" highlighting unique features of the Minnesota River Valley. The trail promotes sustainable agricultural, tourism and the importance of a diversified economic community.



People can visit three wineries – Crofut Family Winery & Vineyard (rural Jordan), Morgan Creek Vineyards (rural New Ulm) and Fieldstone Vineyards (Morgan), two breweries – August Schell Brewing Company (New Ulm) and Brau Brothers Brewing Company (Lucan) and three historical sites – R.D. Hubbard House, Blue Earth County Historical Society Heritage Center (both of Mankato) and the John Lind House (New Ulm) to experience the diversity of the Minnesota River Valley and efforts to showcase locally owned businesses.

19. Organization Spotlight – Minnesota River Watershed Alliance

A network of citizens, nonprofit organizations and government agencies, the Minnesota River Watershed Alliance (Watershed Alliance) communicates the benefits of an ecologically healthy Minnesota River Watershed to others and who actively work towards its improvement and protection. The Watershed Alliance is a loosely organized action-oriented group of watershed advocates that meets four times a year.

Every year the Watershed Alliance picks one action item to focus on. In the past this has included a Conservation Lands Easement Initiative to permanently protect critically sensitive land, assisting with putting on the Minnesota River Summit in 2007 and launching the MN River Paddler Program that rewards people who paddle rivers in the Minnesota River Basin with a patch or decal as a positive way to connect people to this valuable resource. The Watershed Alliance has also been involved with communication initiatives – a weekly update, quarterly newsletter and bi-weekly newspaper column all focusing on the Minnesota River Basin.

20. Minnesota River Celebration

Over 175 people gathered at the Mankato Hilton in September of 2008 to talk about issues related to the Minnesota River Basin and see a presentation by Tim Krohn and John Cross of the *Mankato Free Press*. Tim and John paddled down the entire length of the Minnesota River – 335 miles – from Big Stone to Fort Snelling. People packed in to hear them talk about their experiences and see incredible photos of their adventure during three presentations. A number of tables were set up with people talking about river-related issues including Lawnscaping and Water Quality, Saving the Granite Outcroppings, Citizen Efforts and Monitoring, and Fishing and Recreation Opportunities. Other adventures, Sean Bloomfield and Colton Witte were there to discuss their drip from Chaska to the Hudson Bay.


Sean Bloomfield and Colton Witte talk to the public

21. Chaska to York Factory in Forty-Nine Days

Two high school teenagers started out on April 28, 2008 as snowflakes blew in the air to paddle from Chaska to the York Factory on the Hudson Bay in Manitoba Canada. Colton Witte and Sean Bloomfield paddled 49 days up the Minnesota River, down the Red River of the North, across the massive Lake Winnipeg and through some amazing whitewater rivers on a 2,250 mile journey. They retraced the same canoe trip that Eric Sevareid and Walter Port took in 1930 starting at Fort Snelling and ending up in the same place. Witte and Bloomfield like many Minnesotans had read Sevareid's book "Canoeing with the Cree" and inspiration became reality. Along the way they were helped by people all over the Minnesota River Basin with food, notes of encouragement and even a ride to help portage their canoe. After the journey, Sean and Colton made presentations on their incredible journey all over the basin including the Twin Cities, Montevideo, New Ulm and St. Peter.


Sean Bloomfield and Colton Witte paddling toward the Hudson Bay

22. Voyage down the Minnesota River

Tim Krohn and John Cross of the *Mankato Free Press* newspaper paddled the entire length of the Minnesota River in 1998 to see first-hand what was happening with the river after the initial push to improve water quality. The two men wrote a series of articles on their 11-day trip covering a wide range of topics and opinions about the status of the Minnesota River.

On the 10th anniversary of their initial journey, Krohn and Cross paddled the 335 miles of the Minnesota River and again produced 11 days of stories for the Mankato Free Press. On this trip the two men were able to compare what they saw on both paddles to get a better understanding of how the Minnesota River and its surrounding landscape has changed both in positive and negative terms. After their 2008 trip, Tim Krohn and John Cross made numerous presentations across the basin highlighting their unique observations of the Minnesota River.

The MN River below Upper Sioux Agency State Park

23. Minnesota River Summit

On January 10 and 11, 2007, over 180 people from a diverse selection of backgrounds gathered for an extended conversation on how to build a more powerful and collaborative effort to protect and improve all facets of the Minnesota River Basin. An interactive discussion took place over the day and half between participants representing agriculture, business, tribal, local, state and federal government, education, nonprofit organizations, watershed projects, elected officials and individuals.

One member from each of the different groups sat together to take part in an ongoing conversation on how build new networks and brainstorm how to improve water quality in the Minnesota River Basin. Out of this positive atmosphere the group identified a number of critical issues and trends facing the basin: Hydrology – water supply and demand; Population Changes – sprawl and uncontrolled development; Energy Issues – ethanol and biofuels; The Farm Bill; and Lack of responsibility – leadership.

Participants at the MN River Summit

River Advocate – Senator Dennis Fredrickson

Senator Dennis Fredrickson of New Ulm has served in the Minnesota Senate since 1980 and been an advocate for the Minnesota River including the efforts to restore and protect this valuable resource. Senator Fredrickson has also been a champion of the Clean Water, Land and Cultural Legacy Amendment and serves on the Legislative – Citizen Commission on Minnesota Resources (LCCMR).

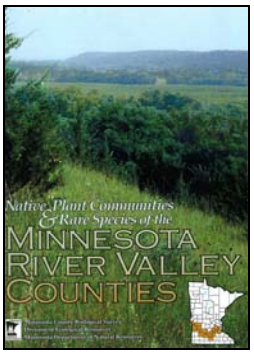
Senator Fredrickson has been a champion of the Minnesota River including water quality efforts and improving recreational opportunities. He helped designate a number of MN Water Trails in the basin including on the Redwood and Cottonwood Rivers. As a long-time advocate of the environment, Senator Fredrickson has received many awards – Minnesota Center for Environmental Advocacy's Long Portage Award and the Nature Conservancy's Government Relations Award. Here are a few reflections from Senator Fredrickson about the Minnesota River: *Citizen involvement is especially important in cleaning up non-point pollution. People get involved when it is an issue about which they care. Activities that get people to the river like canoeing or boating, fishing, enjoying a multitude of activities with friends by the river remind people that they don't have to travel "up north" to enjoy our water resources. Community events like River Blast, river clean-up days, and canoeing flotillas bring people to the river which builds support for enhancing water quality.*

Senator Dennis Fredrickson at the dedication of the Redwood River as a State Water Trail

An excellent place to start engaging citizens with the river is youth activities. The activities can be entirely recreational, or they may be scientific or educational. I have never seen a student stand in water with a seine and not get excited at seeing for the first time the small critters living in the water. Curiosity leads them to wonder why they find few riffle beetles but many pouch snails for example. The answer helps them understand water pollution and how human activity affects the river.

24. Native Plant Communities and Rare Species of the Minnesota River Valley Counties

The DNR's Minnesota County Biological Survey focused on 17 counties bordering the Minnesota River to pull together information on the geological history, pre-settlement vegetation, current vegetation, rare plants and animals (mammals, birds, reptiles and amphibians, fish, and freshwater mussels). The report also covers a complete county by county checklist of vascular plants for the region. Surveys of the MN River Valley began in 1990 and wrapped up ten years later.



25. Working Together for the Minnesota River

A diverse group of partners in the Minnesota River Basin have come together to produce a video documentary and create a data clearinghouse and interactive website to accelerate the cleanup of the Minnesota River. This ground-breaking project has been endorsed and supported by a wide range of partners: Friends of the Minnesota Valley, Coalition for a Clean Minnesota River (CCMR), Clean Up the River Environment (CURE), Water Resources Center at MSUM, Minnesota River Watershed Alliance, MPCA, U.S. Geological Survey and the High Island Creek and Rush River Watershed Implementation Projects.

A one-hour documentary, produced in collaboration with Ron Schara Productions, will air on KARE 11 television in late summer or fall 2010. The documentary will cover the geological history of the river (depicted in a state-of-the art computer animation) and cultural history of the basin from the earliest inhabitants through the development of large-scale agriculture and urban centers. Part of the documentary will cover water quality issues, successful conservation stories and the history of civic engagement.

Working Together for the Minnesota River: Collaboration Through Communication will also develop a comprehensive website to bring more attention to the Minnesota River and work to inspire the public to continue restoration efforts. This website will become a gateway for citizens, academic institutions, nonprofit organizations, government agencies, businesses, and natural resource professionals interested in the Minnesota River Basin to communicate, share information and develop ongoing partnerships.


Minnesota River in Big Stone National Wildlife Refuge

26. Minnesota River Valley National Scenic Byway

From the South Dakota border near Browns Valley all the way down to Belle Plaine, the Minnesota River National Scenic Byway (MRVSB) promotes the diversity of attractions, communities and recreational opportunities found in the Minnesota River Basin. The Byway focuses on three themes: Agricultural – "Food for a Nation," "A River Legacy" – natural history and beauty of the valley, and "Struggles for a Home" – the history and tradition of people who have lived here.

The Minnesota River Valley National Scenic Byway Alliance is made up organizations, agencies and citizens working together to highlight what is happening in the Byway. Alliance members have led the effort on a variety of projects including hosting the 2008 Minnesota Scenic Byway Workshop in Montevideo, developing and producing a series of interpretive panels marking significant discovery sites along the Minnesota River, and releasing a 20-minute Scenic Byway DVD. The Alliance has also looked at a National Heritage Area designation for the Minnesota River Valley.

SCENIC BYWAY
MINNESOTA RIVER VALLEY

27. Wetland Restoration Program

A local, state and federal partnership brings together two easement programs to restore wetlands on privately owned lands. The state's Reinvest in Minnesota (RIM) Program leverages federal funds through the Federal Farm Bill with the Wetlands Reserve Program (WRP). This valuable partnership offers competitive payment rates for landowners to restore wetlands that have been drained with a history of being cropped.

Funding comes from the Natural Resources Conservation Service (NRCS) and the Minnesota Board of Water and Soil Resources (BWSR). Priority for the program is given to those areas that have experienced the greatest wetland losses like the Minnesota River Basin, which has seen over 90 percent of it original wetlands drained or filled.

Wetland Restoration

According to BWSR, restoring wetlands on privately owned lands provides many public benefits including enhancing wildlife habitat, improving water quality and reducing potential flood damage in targeted areas. In the Minnesota River Basin over 12,200 acres (154 contracts) have enrolled into the program.

28. CRP Riparian Permanent Easement Program

The Minnesota Board of Water and Soil Resources (BWSR) began to offer a new conservation easement option called the RIM reserve Clean Water Fund Riparian Buffer program. Any land enrolled in the federal USDA Conservation Reserve Program (CRP) along a waterway can be permanently protected with a conservation easement. Landowners receive a competitive payment rate to establish native vegetation buffers along lakes, streams and ditches of no less than 50 feet and no more than 100 feet. Over 623 acres our of 73 contracts have been enrolled into this permanent easement program in the Minnesota River Basin. Monies for the program come from the Minnesota Clean Water Fund. This conservation program received the 2009 Partnership of the Year award from the Minnesota Environmental Initiative.

Wetland Buffer

29. Wastewater Treatment Plants

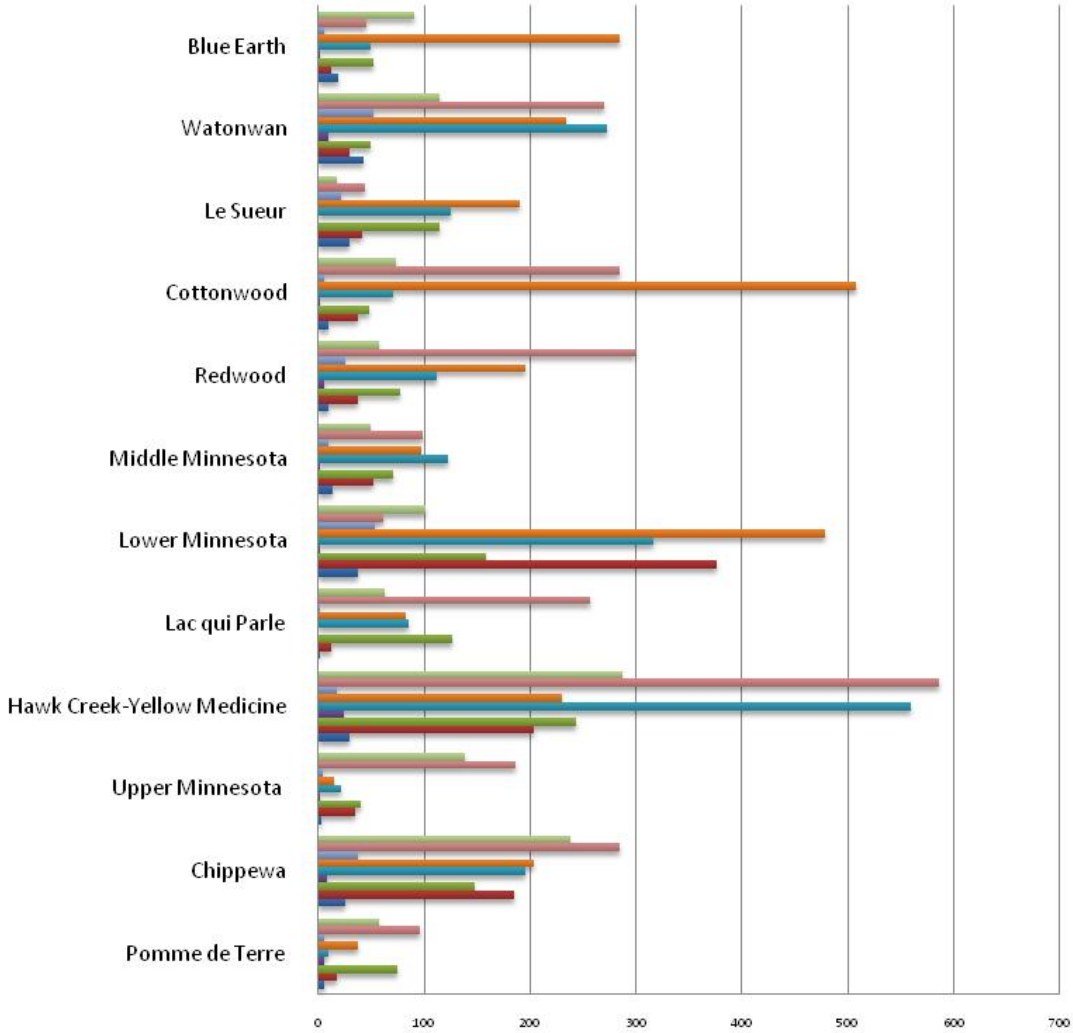
In the Minnesota River Basin hundreds of millions of dollars have been invested to upgrade wastewater treatment plants, concentrating on reducing the discharge of phosphorus into waterways. A Phosphorus General Permit was developed by the State of Minnesota in 2005 to reduce phosphorus discharged by point sources including 47 of the 152 permitted municipal and industrial wastewater treatment facilities. These facilities were given the choice of upgrading their systems or purchasing trading credits to meet the water quality-based effluent limits. Facilities across the basin have build new or upgraded their current systems with 47 meeting the 2010 limits ahead of schedule.

Willmar Wastewater Treatment Plant

One of the new wastewater treatment facilities was built by the City of Willmar to meet the new regulatory requirements and meet the projected growth over the next 20 years. The $86.2 million project includes the construction of a new wastewater treatment facility and conveyance system that replaces the city's aging and outdated wastewater treatment process with emerging treatment technology to protect the Minnesota River. Phosphorus discharge will be reduced from 9 milligrams per liter to less than 1, the current State standard.

Minnesota River Watershed Conservation Practices

Best Management Practices
A diverse selection of government agencies, watershed projects and nonprofit organizations offer technical assistance and cost-share for a wide variety of conservation practices to help improve water quality by holding both soil and nutrients on the landscape. The following charts illustrate Best Management Practices (BMPs) recorded in the Minnesota River Basin from 1997 to 2008. Data Source: the Board of Water and Soil Resources (BWSR) LARS (Local Government Annual Reporting System) 1997-2002 and eLINK reporting system (2003-2008). The number of BMPs in the chart reflect only the actual contract for the BMP and not the acres contained in that BMP or other BMPs installed in the basin but not recorded in either of these two programs.



	Pomme de Terre	Chippewa	Upper Minnesota	Hawk Creek-Yellow Medicine	Lac qui Parle	Lower Minnesota	Middle Minnesota	Redwood	Cottonwood	Le Sueur	Watonwan	Blue Earth
WIND EROSION	57	238	139	287	63	101	50	57	74	18	115	90
WELL SEALING	96	284	186	586	257	61	98	299	284	44	270	46
STREAM/DITCH BANK STABILIZATION	5	37	4	17	1	53	10	25	5	21	52	5
SHEET/RILL AND EPHEMERAL CONTROL	38	204	15	230	83	479	97	196	508	190	234	285
OTHER CALCULATED POLLUTION REDUCTION	10	196	21	559	86	317	122	112	71	125	272	50
NOT SPECIFIED	6	8	2	24		2	1	5	1		9	1
GULLY STABILIZATION	75	148	40	243	126	159	71	78	48	114	50	52
FILTER STRIP PROJECTS	18	185	35	203	12	376	52	38	38	42	29	12
FEEDLOT POLLUTION REDUCTION	6	26	3	30	2	37	13	10	9	29	43	19

Definitions:

Wind Erosion – practices that prevent the movement of soil by wind including cover crops and buffer strips.

Well Sealing – sealing of abandoned wells to prevent groundwater contamination.

Stream/Ditch Bank Stabilization – using materials like rip rap, willow cuttings, rock weirs, etc to stabilize the banks of streams and ditches.

Sheet/Rill Ephemeral Control – prevents soil erosion through practices like crop rotation, grass waterways, critical area plantings, contour buffer strips, etc.

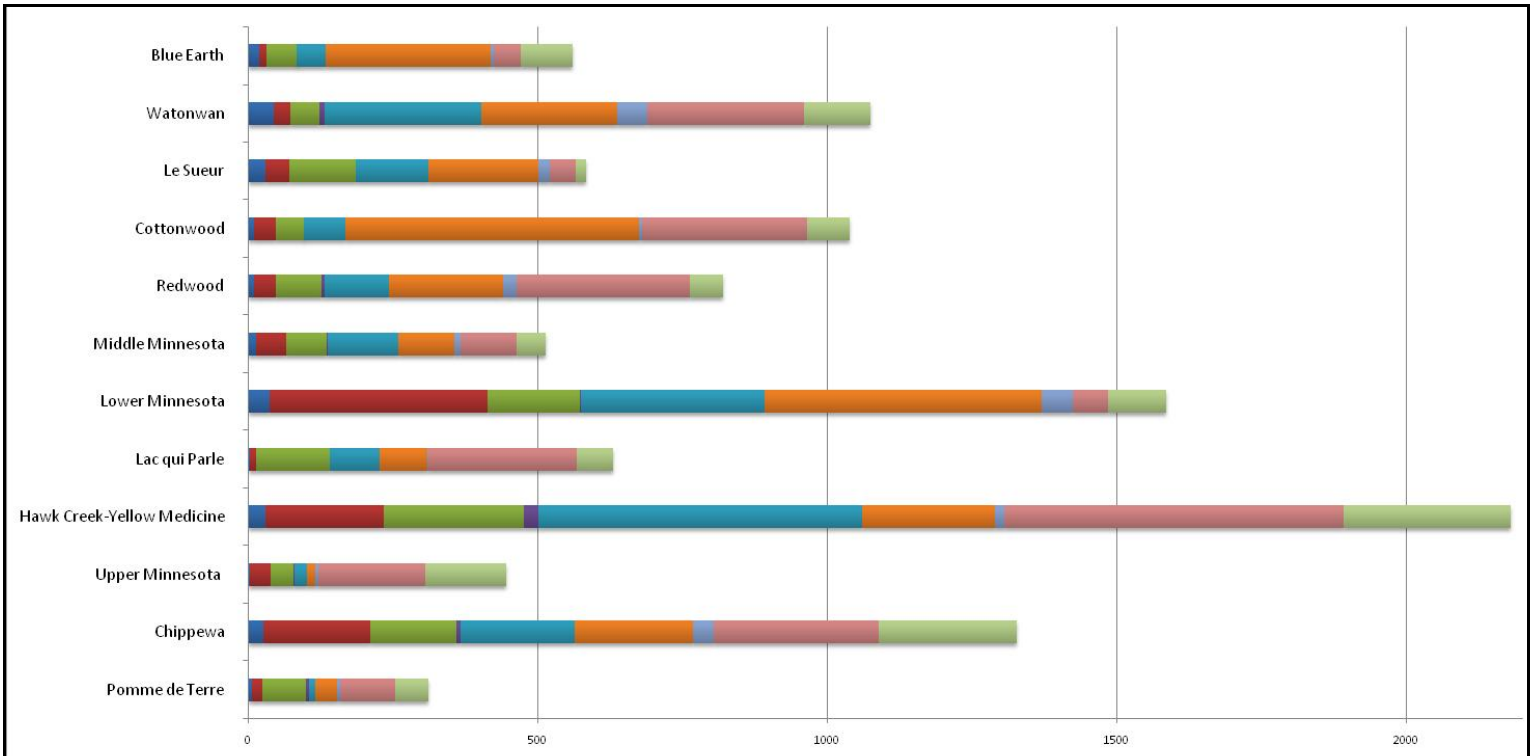
Gully Stabilization – practices include terraces, diversions, water and sediment control basins, etc.

Filter Strip Projects – planting of native grasses, trees and other plants to act as a buffer along waterways.

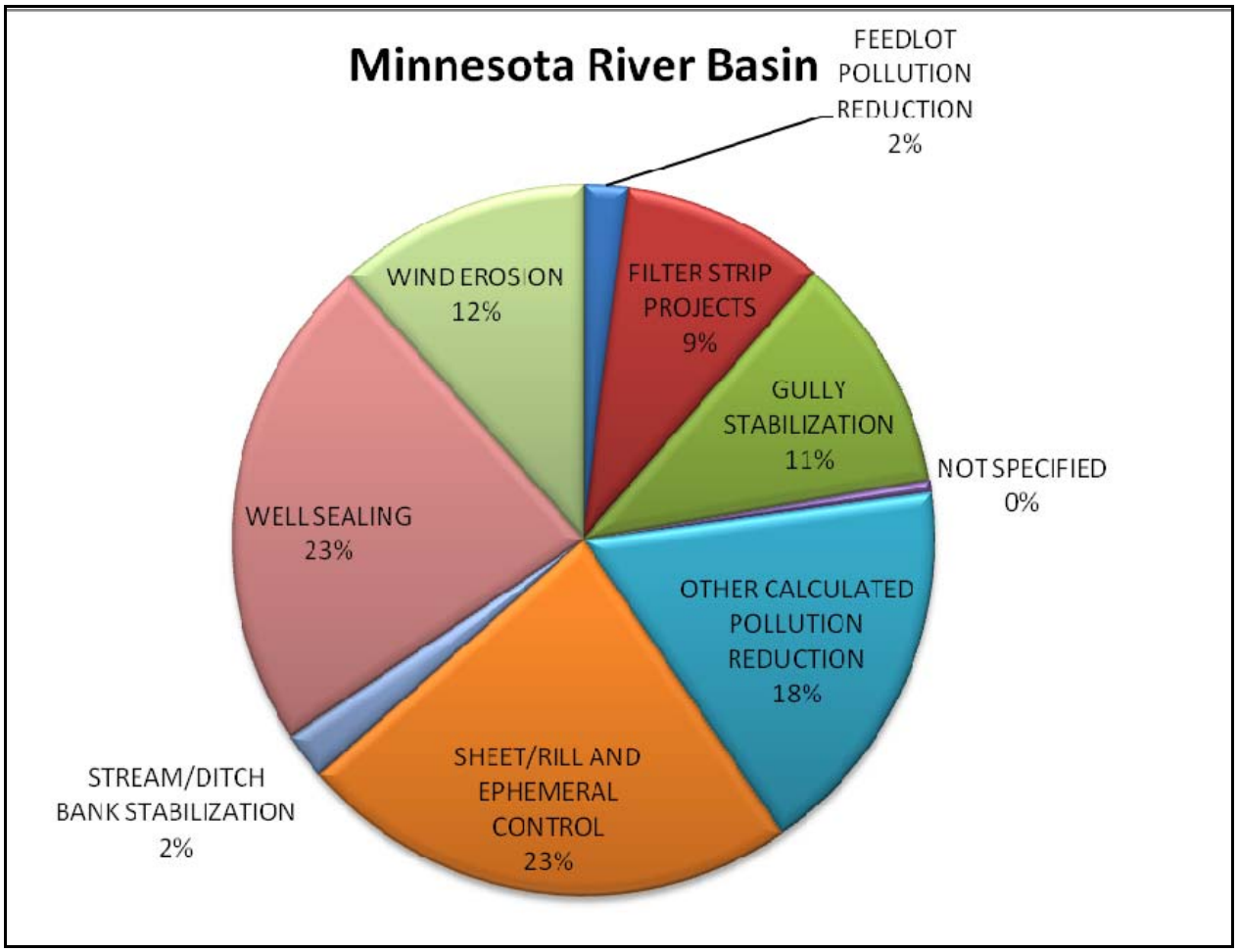
Feedlot Pollution Reduction – the use of waste storage facility, composting facility, nutrient management, etc.

Other – this included categories labeled education, existing public road, agricultural development, mulching, etc.

Minnesota River Watershed Conservation Practices

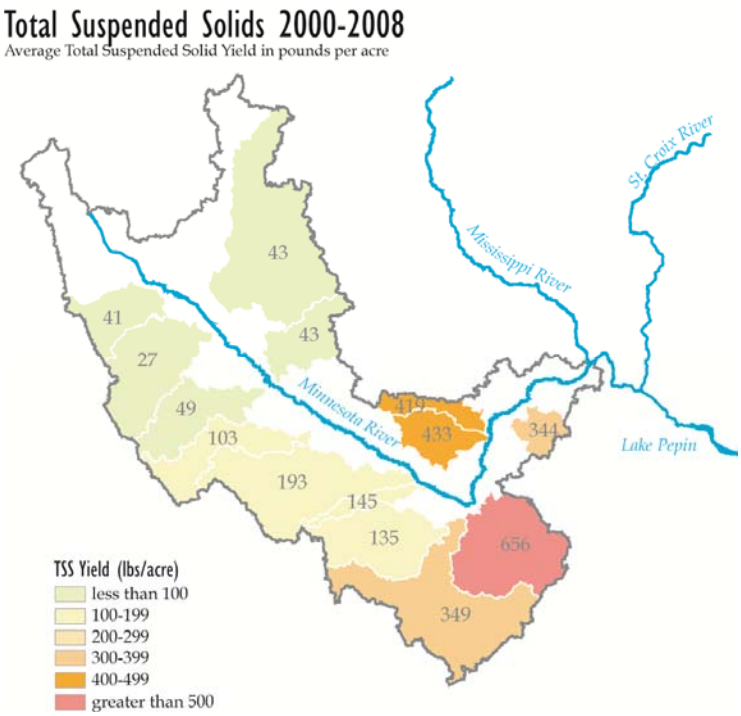


The color codes in this figure correspond with the categories in the pie chart below.



Minnesota River Watershed Water Quality

Water quality data have been collected throughout the Minnesota River Basin during the past thirty years and studies have shown excessive nutrient and sediment concentrations. Large portions of the basin do not meet state water quality standards for bacteria, turbidity, dissolved oxygen, ammonia, and biota. Researchers have analyzed almost thirty years worth of water quality data from the Minnesota River at Jordan and Fort Snelling. Trend analyses indicated increasing nitrate-N concentrations in the last ten years. Decreasing trends in total suspended solids and total phosphorus were found over the entire period.



Total Suspended Solids (TSS)

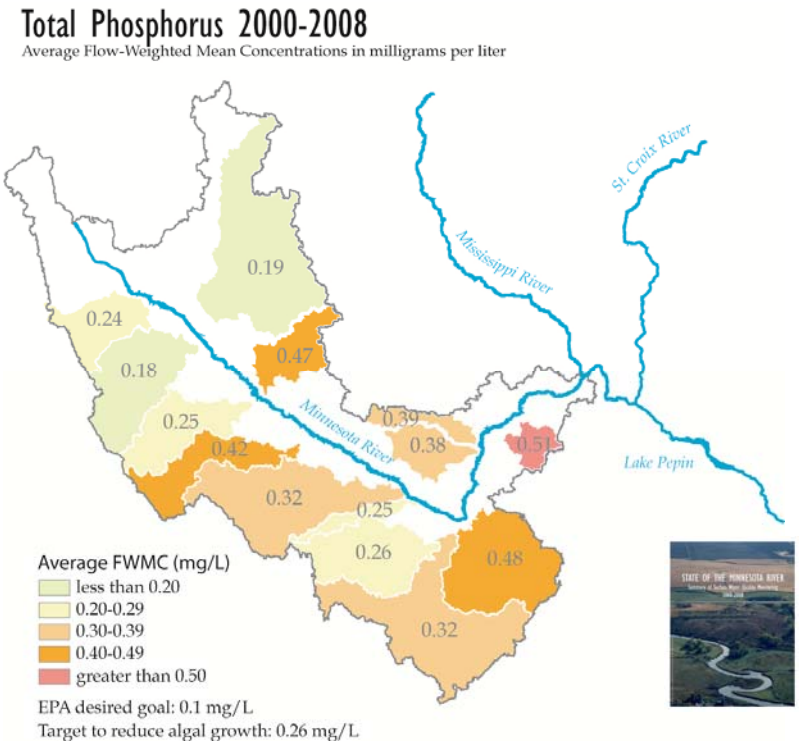
The transport of sediment is a natural function of rivers. Modification of the landscape has accelerated the rate of erosion of soil into waterways. Increased runoff has resulted in stream bank erosion. Elevated sediment (suspended soil particles) has many impacts. It makes rivers look muddy, affecting aesthetics and swimming. Sediment carries nutrients, pesticides, and other chemicals into the river that may impact fish and wildlife species. Sedimentation can restrict the areas where fish spawn, limit biological diversity, and keep river water cloudy, reducing the potential for growth of beneficial plant species.

For a five year period starting in 2002, the TSS load was 1.8 million tons at Judson and 5.4 million tons at St. Peter, a 300% increase. Nearly all of the increased load can be attributed to the TSS supply from the Blue Earth and Le Sueur rivers, which discharge into the Minnesota between the two gauges. The 2002-2006 TSS load of these rivers was measured at 3.2 million tons. (Wilcock, 2009)

Phosphorus

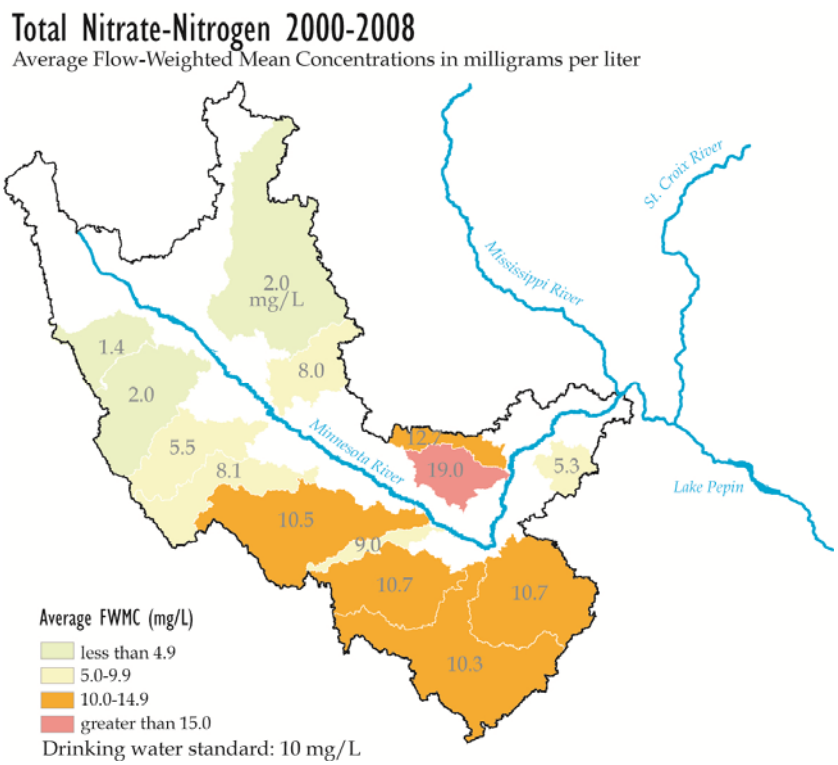
Phosphorus-enriched streams are commonplace in the Minnesota River Basin. Phosphorus stimulates the growth of algae and elevated phosphorus concentrations often lead to eutrophication, which is characterized by undesirably high levels of algal growth. An overabundance of algae and sediment contributes to increased turbidity and reduced light penetration. Water clarity is greatly reduced under these conditions, impairing recreational use and aesthetics of the river environment.

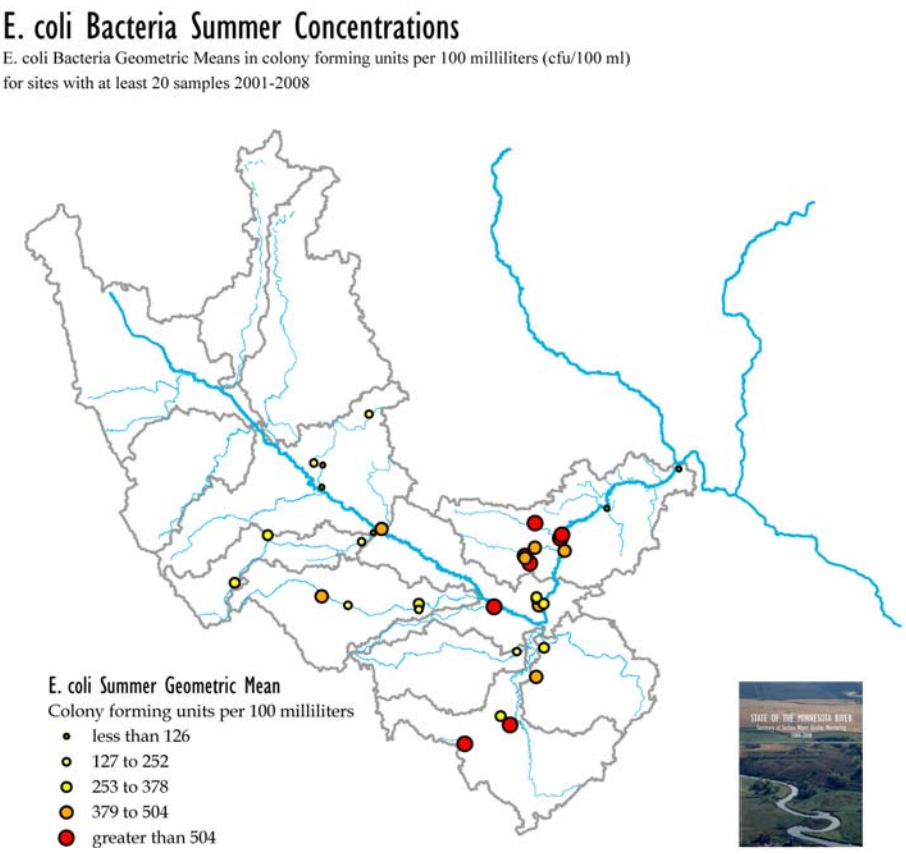
Total Phosphorus (TP) concentrations in the tributaries show substantial variation across the Basin. During 2000 to 2008, the median TP concentration in the Minnesota River mainstem reach from Judson to Fort Snelling was 0.31 mg/L. Concentrations in the major tributary streams show excessive leaves of TP leading to high levels in the mainstem.



Nitrate-nitrogen
Nitrate-nitrogen is important because it is biologically available and is the most abundant form of nitrogen in the Minnesota River Basin streams. Like phosphorus, nitrate can stimulate excessive and undesirable levels of algal growth in waterbodies. In recent years, this problem has been particularly severe in the Gulf of Mexico where development of a hypoxia zone (low oxygen levels) has been linked to excessive amounts of nitrate carried to the Gulf by the Mississippi River.

The watersheds shown in orange and red on the map have concentrations that exceed the drinking water standard (10 mg/L). Most of the nitrate in the Minnesota River comes from agricultural drainage. The highest concentrations in the basin are found in the Greater Blue Earth River (Blue Earth, Watonwan and Le Sueur), Cottonwood River Watershed, High Island Creek Watershed and the highest in the Rush River Watershed.





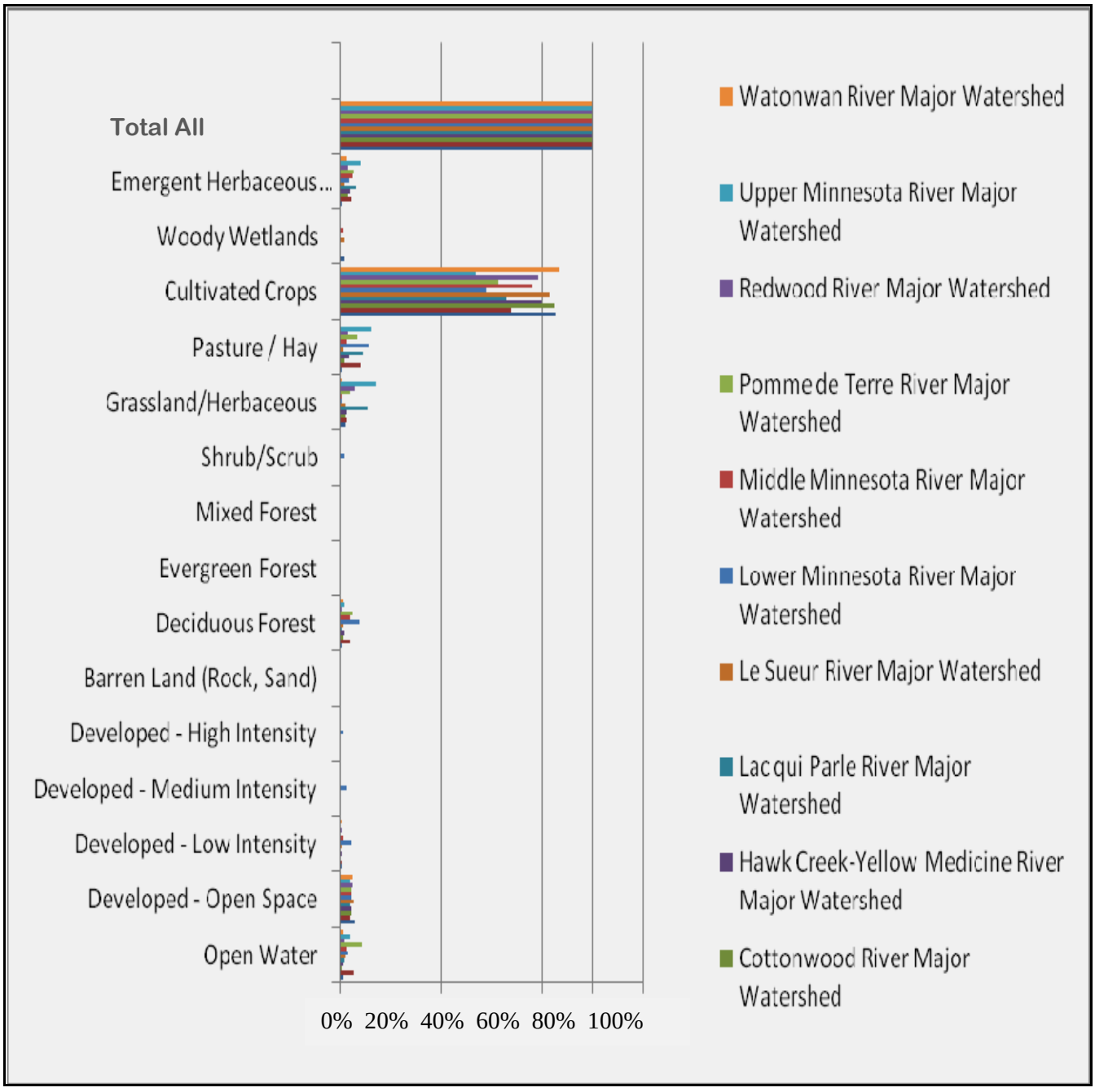
E. coli
Disease-causing organisms (pathogens) in water bodies are difficult to measure, so indicators like *E. coli* bacteria are used to illustrate the likelihood that a water body contains pathogens. Although viruses and protozoa cause many of the illnesses associated with swimming in polluted water, monitoring for *E. coli* will tend to indicate fecal contamination.

In the Minnesota River Basin, streams monitored for *E. coli* are often to exceed water quality standards. *E. coli* levels are elevated across the entire Minnesota River Basin with over 90 percent of monitored streams exceeding health standards (126 cfu/100 ml for *E. Coli*). Data show the highest concentrations in the eastern portion of the Basin. Many streams require a 80 to 90 percent reduction in bacteria levels to meet standards. Many of the rivers and streams across the basin have been listed as "impaired waters" and not suitable for swimming because they exceed water quality standards for bacteria.

Minnesota River Watershed Land Use

Row crop agriculture is the predominant land use in the basin. The Minnesota River Basin consists of 10.85 million acres (9.5 million acres within Minnesota). In 1992, there were 8.52 million acres of agricultural land (78.6%) and ten years later showed a slight reduction to 8.46 million acres (78%). Other land uses are classified as grassland/shrub, urban, wetlands, open water, forest, and barren land. Notable changes in land use from 1992-2001 includes a slight decrease in agricultural lands and an increase in wetlands, open water, and urban lands. The amount of land in crops remained relatively stable over the same time period.

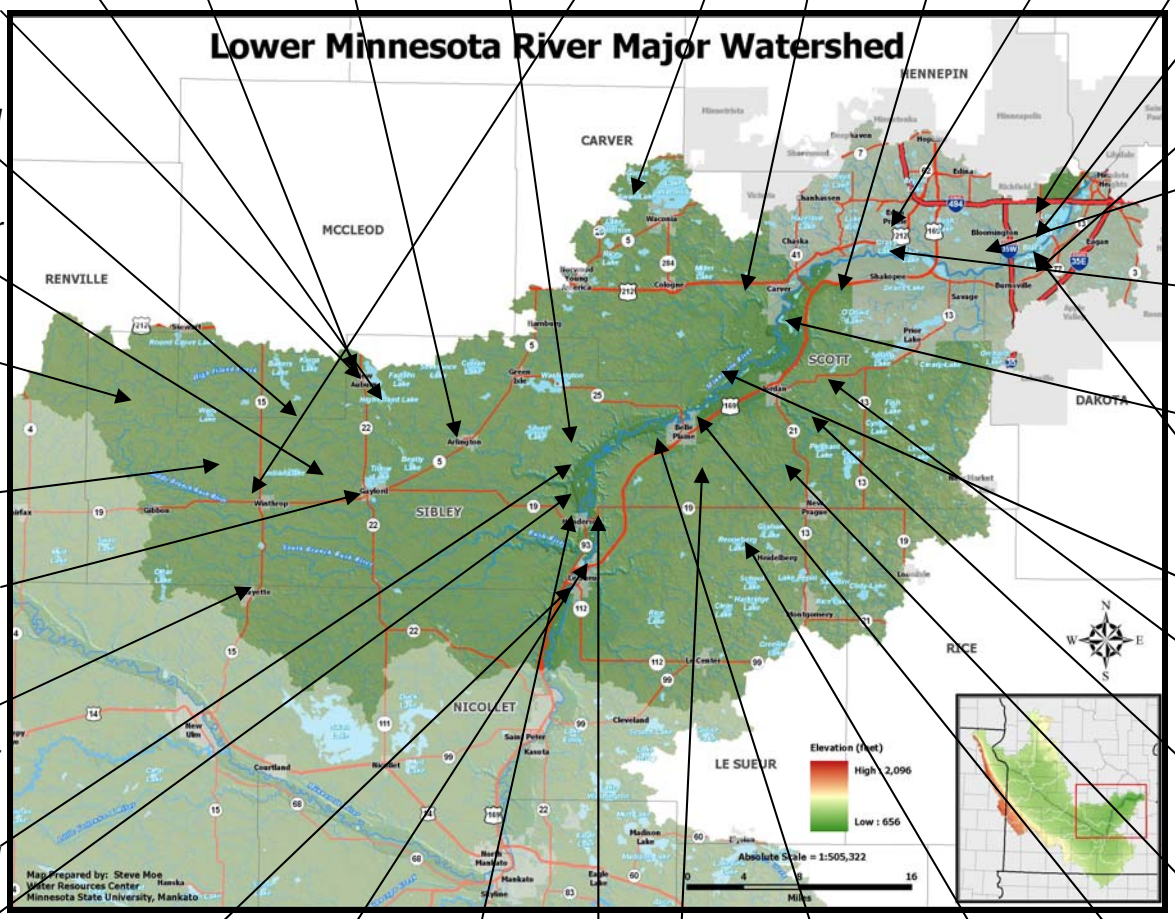
Early explorers' accounts and paintings provide glimpses of what the landscape resembled before widespread European settlement. Many explorers wrote descriptions about the rich flora and fauna, describing a landscape covered in tall grass, wetlands, shallow lakes and forested areas.



Lower Minnesota River Watershed

As the most populated major watershed in the Minnesota River Basin with over 500,000 people, the Lower Minnesota River Watershed is a mixture of urban, suburban and rural areas. The watershed starts out in the western end dominated by agriculture and small communities before transforming into a major metropolitan region with a mixture of industry and the Minnesota River Valley National Wildlife Refuge along the river channel. This type of geographic diversity is not found anywhere else in the basin. Today, the rapidly growing and changing watershed is vulnerable to urban sprawl, increased stormwater runoff, invasive species, sand and gravel mining, plus the loss of cropland and natural areas to ongoing development pressures.

Barge traffic on the lower MN River



1. Nine Mile Creek Watershed District
2. Friends of the MN Valley
3. Black Dog Lake Clean-up
4. Eagle Creek Riparian
5. Lower MN River Watershed District
6. Slope & Riverbank Erosion Study
7. MN River Valley NWR
8. Long Meadow Lake Drawdown
9. Seminary Fen
10. Scott County Landowner
11. Sand Creek TMDL Resource Investigation
12. Cedar Summit Farm
13. Streambank Stabilization Project
14. Lake Renneberg Project
15. Belle Plaine State Wayside Clean-up
16. Seven Story Farm
17. Ney Nature Center
18. Henderson Hummingbird Count
19. Straub Land Restoration
20. City of Le Sueur
21. Sibley County Illegal Dump Clean-
22. Jessenland Unit
23. City of Lafayette Stencil Project
24. Lake Titloe Project
25. Mueller Farm
26. Jaus Organic Farm
27. Rush River CWP
28. High Island Creek CWP
29. New Auburn Rain gardens
30. Friends of High Island Lake
31. Barley Straw Project
32. Thomas Wetland Project
33. CREP Wetland
34. Carver SWCD Wetland Reserve Program
35. Jean Williams Farm
36. Wetlands Conservation Initiative

The final 15 miles of the Minnesota River remain isolated from the world in spite of being amid a major metropolitan area. White egrets, bald eagles, great blue heron and a doe with her fawn on the river bank were still present, if not as great of numbers as farther upstream. Still, it's easy to know you are no longer on a rural river. – Tim Krohn, July 16, 2008

LOWER MINNESOTA RIVER WATERSHED

Projects involving improving water quality in the Lower Minnesota Watershed have been undertaken by Soil and Water Conservation Districts, Watershed Districts, Clean Water Partnerships, state agencies, nonprofit organizations, landowners, and individual citizens. Projects have ranged from protecting unique natural features to city cleanups, to restoring wetlands, to a variety of conservation practices and transforming an individual's farming operation.

1. Nine Mile Creek Watershed District

As the first urban watershed district (1959) formed in Minnesota, Nine Mile Creek was awarded DNR's Watershed District of the Year in 2009 for its innovative approaches to improve water quality, their extensive public input processes, robust education and outreach programs, and their efforts to work with the DNR on legislative issues.

One major project of the District involves re-meandering or re-channeling approximately 8,500 feet of the creek in the city of Hopkins to stabilize the steambanks, its natural habitat and make it more suitable for fish and wildlife. The ambitious $4.5 million project will transform this "glorified drainage ditch" that had been straightened in the 1960s and 70s back to its original meandering channel to stop erosion and make it more attractive to fish and wildlife. By adding curves and stones to the stream bottom, the District hopes to slow down water letting sediment settle out of the current and inject more oxygen into it. This type of channel restoration work may expand into Edina.

Nine Mile Creek in Eden Prairie

In the Bloomington section of Nine Mile Creek, the city has began to stabilize the bank by adding rip-rap in some places and putting in rock veins – boulders placed at strategic angles in the water to direct flow to the center of the creek, away from the banks and edges of walking trails.

Nine Mile Creek Watershed District offers cost-share grants to residents, corporations and local governments in Eden Prairie, Minnetonka, Edina, Richfield and Hopkins to install stormwater and water quality improvement measures. Eligible projects include rain gardens, porous asphalt and pavers, green roofs, cisterns and restoring stream banks and shorelines with native plants.

One such project involves the City of Bloomington working with homeowners to plant large rain gardens to filter storm water runoff before flowing into the Nine Mile Creek. Cuts in the curb system will direct this runoff from streets, yards and buildings allowing water to soak into the ground and reduce the volume of flow into Nine Mile Creek.

Other projects implemented by Nine Mile Creek Watershed District include a lake drawdown on Northwest and Southwest Anderson lakes in Eden Prairie conducted to control curly-leaf pondweed and reduce phosphorus-feeding algae blooms. Chemicals were also used on approximately 20 acres to kill off the weeds in NW Anderson Lake and 20 acres in SW Anderson where water remained to kill off the curly leaf pondweed.

In addition, Nine Mile Creek Watershed District constructed water quality and infiltration basins, monitored water quality, and sampled fish. The District also produced a 50th anniversary book documenting the history of Nine Mile Creek Watershed.

2. Organization Spotlight: Friends of the MN Valley

Formed in 1982 as a nonprofit entity to advocate for the Minnesota River Valley National Wildlife Refuge, the Friends of the Minnesota Valley partner with a wide range of organizations to improve and protect the lower valley's natural resources. In addition to their city clean-ups and restoration work, Friends are involved in promoting water level control structures that allow producers to seasonally adjust field water levels depending on the season to either lower it or preserve soil moisture.

Friends of the Minnesota Valley
Leadership in Stewardship.™

In 2010, Friends will be launching a "Community Clean-Ups for Water Quality Toolkit" Project in partnership with the Freshwater Society. This toolkit will feature a set of DVDs and manual explaining the importance of clean-up projects and provide practical information on how communities can conduct their own clean-ups.

Other initiatives involve restoring the old Cedar Avenue Bridge trail connection, publishing the book "Dream Hunter: A National Wildlife Refuge Manager's Memoir" by Ed Crozier and will be working in New Ulm, Le Sueur and Henderson to generate new entrepreneurship business opportunities linked to natural resource conservation.

3. Community Clean-ups for Water Quality

Over the last eight years, the Friends of the MN Valley has put on 66 community clean-ups across the Lower Minnesota River Watershed. As a result over 8,400 pounds of phosphorus (equal to 6 million pounds of oxygen-depleting aquatic growth) and 47,000 pounds of trash have been removed from waterways. Volunteers cleaned up leaves, dirt and other organic materials from city streets to keep it out of storm water systems.

One example is the City of Arlington who has been conducting a month-long effort since 2004 to collect organic debris from all runoff-sensitive areas. This prevented 4,200 pounds of phosphorus and nitrogen from entering surface water.

Another successful event was the Black Dog Earth Clean-up sponsored by Excel Energy saw 32 volunteers haul over 700 large bags of garbage from parking areas, the wildlife observation deck, around Black Dog Lake and part of the Black Dog Road. Items collected included sofa cushions, a television set, a bag filled with eighteen diapers, a metal headboard and a car engine.

4. Eagle Creek Riparian Protection

As the last known stream with a self-sustaining trout population in the Metro Area, the DNR, City of Shakopee and a property developer worked together to protect Eagle Creek with a 200-foot buffer on both sides of the creek's western branch. Thirty-five acres have been designated as an aquatic management area with an earthen berm or grassy swale built behind houses that diverts storm water from running into the creek protecting the creek and Minnesota River. Eagle Creek Watershed also contains the unique geologic feature, "boiling spring."

5. Lower Minnesota River Watershed District

This watershed district was established in 1960 to provide local participation for the construction of a nine foot navigation channel by the U.S. Army Corps of Engineers. Today, the Lower Minnesota River Watershed District continues to be actively involved in the channel's ongoing maintenance.

On the water quality side of its work, the District assisted the DNR in negotiations with property owners to purchase sections of the Seminary Fen site, conducted a gully inventory in the cities of Carver, Chaska, Chanhassen, Eden Prairie and Bloomington with field work done by the Minnesota Conservation Corps and retrofitting of storm water drainage at the Minnesota River Wildlife Refuge Center in Bloomington by modifying catch basin and adding rain gardens in partnership with the USFWS and the Friends of the Minnesota Valley.

6. Slope and Riverbank Erosion Study

The Lower Minnesota River Watershed District hired Wenck & Associates to conduct a study on slope and riverbank erosion issues and develop a plan to protect bluff-top homes overlooking the Minnesota River Valley in Eden Prairie. Structure concerns focus along a 1,200 foot section of the river's north bank and about 540 feet of the bluff face above the water. According to this report, the overall stability of the slope shows that the properties on the bluff are well within the acceptable minimum factor of safety. Over the last few years, the natural erosion process has been accelerated due to numerous factors ranging from increased drainage to climate change. By using historical records and river photos, it has been determined the Minnesota River has cut 115 into its north bank since 1967 at a rate of about three feet a year.

To stabilize the streambank without pushing the problem downstream, Wenck recommended building about seven bumper-like rock vanes along the river's north bank at a cost of about $1 million to stop erosion and rebuild the bank. Strategically placed piles of rock or rock vanes into the current will direct the water flow away from the bank while encouraging sediment to drop out and reinforce the river's edge.

To control storm water erosion of the bluff face, Wenck prescribed grading it, planting it with vegetation and conveying storm water down the side of the slope directly into the river with pipes or on a riprap channel. The Lower Minnesota River Watershed Board will select an erosion-control strategy before drawing up engineering plans to determine the cost.

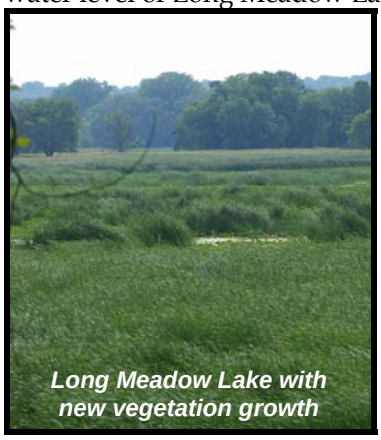

Hiking Path in the Carver Unit

7. Minnesota River Valley National Wildlife Refuge

A $26 million settlement from the Metropolitan Airports Commission has been used to purchase over 4,000 acres for one of four urban national wildlife refuges, along with the construction of a new visitor center. One 600-acre section was acquired within the MN River floodplain near Carver with help from the Friends of the MN Valley and NRCS. The site features five miles of hiking trails. To restore the land back to a more natural landscape, former cropfields have been stripped of tile and drainage systems and seeded to native prairie along with wetland restoration and construction of dikes. Part of the land purchases has focused on waterfowl production areas.

8. Long Meadow Lake Drawdown

In fall 2009, the U.S. Fish and Wildlife Service lowered the water level of Long Meadow Lake low enough for native plants favored by ducks and herons to reestablish themselves. This 1,200 to 1,500 acre lake in the Minnesota River Valley National Wildlife Refuge is a key stop for waterfowl on their spring and fall migrations. Unfortunately, a variety of native plants diminished after repeated flooding from the Minnesota River, creating water levels too high for some of the plants that ducks like to eat.


Long Meadow Lake with new vegetation growth

A new water control structure installed by the U.S. Army Corps of Engineers at the cost of $805,000 prevents the river from backing up into the lake. A drier than average summer emptied the lake along with help from a Youth Conservation Corps crew that battled dam-building beavers throughout the summer.

9. Seminary Fen

One of only about 500 calcareous fens in the world, 106-acres of the Seminary Fen was purchased by the DNR for $1.3 million in 2008. Seventy-three acres have been designated as a Scientific Natural Area (SNA), allowing allowing for public access and some limited improvements. Located along Assumption Creek in Carver County, the DNR, Lower Minnesota River Watershed District and others are working to buy additional land to protect this important natural area, once home to a seminary and before that a sanitarium.


Seminary Fen SNA

10. Scott County Landowner Outreach

Over 200 Best Management Practices (BMPs) have been installed under the Scott County Cost Share and Incentive Project. Started in 2006, the project prevented 5,275 tons of sediment and 7,380 pounds of phosphorus from flowing into lakes, rivers and other waterbodies in Scott County on an annual basis. The main focus of this project is to encourage landowners to make wise stewardship decisions by reducing or removing barriers. Funds were secured from the Scott County Watershed Management Organization and local project participants to supplement state and federal monies. More than $2.75 million has been leveraged to assist landowners with the installation of conservation practices. The project utilized new scientific information to target those BMPs and areas that would have the most effect on improving water quality in Scott County.

11. Sand Creek Watershed

Scott County Watershed Management Organization is conducting a TMDL and impaired waters resource investigation of the Sand Creek Watershed. The purpose of the project is to compile watershed information – land cover, feedlot locations, geomorphology, drained wetland inventories, erosion surveys, collect two years of water quality data, develop water quality models and complete a diagnostic study and implementation plan. The study set the following reductions in order to meet the TMDL or impaired water requirement: 59 percent in sediment and 85 percent in phosphorus.

12. Cedar Summit Farm

This family farm located 50 miles southwest of the Twin Cities has quit applying herbicides on their crops and moved to a rotational grazing system with a grass-legume pasture for their dairy cattle. They wanted to cut costs and are proud of the benefits to the environment and community. Surveys by the DNR and other researchers have documented an abundance of frogs, grassland nesting birds, and fish. This family-operation is an organic certified, grass-based creamery.

13. Streambank Stabilization Project

Scott Soil and Water Conservation District stabilized a DNR public watercourse with a direct outlet into the Minnesota River. Prior to this stabilization project, the banks had a vertical drop of up to 20 feet, causing a soil loss of about 255 tons and 400 pounds of phosphorus annually.

A series of six weir dams and rock chutes were installed and the banks reshaped, mulched and seeded to grass and stabilized the side slopes on this site that had become unstable and hazardous for farming equipment. Funding was provided by the Metropolitan Environmental Partnership and the Environmental Quality Incentive Program (EQIP) through the Natural Resource Conservation Service (NRCS).

14. Habitat Restoration Projects

Monies from the Environmental Trust Fund and the Carl & Verna Schmidt Foundation were used to restore 580 acres of wetland, upland and shallow lake habitat within the Lower Minnesota River Watershed and some of the Minnesota River Basin. A coalition of partners including Friends of the Minnesota Valley, Le Sueur SWCD and U.S. Fish & Wildlife Service restored Lake Renneberg, a 120 acre shallow lake drained by a county ditch by installing a variable crest water control structure. Temporary drawdowns of water levels on Lake Renneberg will help stimulate plant germination and invertebrate populations.

Pulling a boat from the Belle Plaine State Wayside area

15. Belle Plaine State Wayside Clean-up

One of the toughest areas for a clean-up project along the Minnesota River is an old salvage area at Belle Plaine filled with large metal objects protruding from or lying in an landscape filled with dense willow thickets, tall grass and nettles, beaver ponds and dams, washed out roads and frequent flooding bringing siltation from the Minnesota River. Less than 10,000 tires remain at this difficult site compared to 300-400,000 that have been removed, and over 135 truckloads of salvage yard scrap. Starting in 1999, the DNR's Adopt-a-River Program has been leading the clean-up effort on the 60 acre site.

On June 7, 2008 – National Trails Day – the DNR and the Minnesota 4-Wheel Drive Association hauled out over 100,000 pounds of rubbish and scrap from the sites' wetlands. Over one-third of the material was shipped to recycling firms, including 227 car and heavy truck tires and metals. Other partners involved in the clean-up were DNR Parks & Recreation, Metropolitan Mosquito Control District and Alter Metal Recyclers.

In October of 2009, 48 club members of the Minnesota 4-Wheel Drive Association brought their 4 x 4 trucks to tackle the debris-laden former auto-parts junkyard with added machine muscle. The trucks were used along with trailers and skid loaders to get at some

of the harder items using electric winches to pull heavy objects out of the river silt. More than 100,000 pounds of auto and truck metal and junk were hauled out filling 16 dumpsters. Some of the more interesting objects included fuel-oil tanks and a fiberglass boat embedded in almost a foot of silt. A total of 600 partially buried tires were also pulled out and disposed of by the Metropolitan Mosquito Control District. More tires and scrap will need to be removed to restore and manage this site as a unit of the Minnesota Valley State Recreation Area.

Removal of tires from the Belle Plaine State Wayside

16. Seven Story Farm

A small-scale, diversified enterprise specializing in woody florals, small fruits and nuts, Seven Story Farm is located near Belle Plaine. Grower, Heidi Morlock, is very concerned about biodiversity on her farm and works to integrate native plants into her marketing and farm plans. Seven Story Farm also showcases an example of an on-site, restored wetland. The farm, along with Rural Advantage and the University of Minnesota Extension sponsored a "Sustainable Small Farm Experience" to people interested in sustainable agriculture, the small farm, small-scale renewable energy, and much more. Morlock shared her experiences with establishing, managing, and marketing the many diverse features of the farm. Another discussion focused on her experiences with beginning a sheep production and on-farm renewable energy via a wind generator.

Heidi (far right) with 3rd crop sign

17. Ney Nature Center

Located a bluff overlooking the Minnesota River Valley near Henderson, this nonprofit, learning center has been offering environmental-related education programs to the public since 1996. The Ney Nature Center consists of a learning center and 450 acres of restored wetlands and native prairie and wooded areas. An additional 300 acres donated by the Ney family is a DNR wildlife management area.

The center is also known as the site where local junior high students discovered a large number of deformed frogs which helped led to extensive scientific research across the country. Today, college professors and students from local institutions continue to conduct research including a frog-migration project tracking frog movement from wetlands to the river and a Monarch Butterfly Tagging Program. The program is designed to educate families about the monarch butterfly and create an interest in conservation issues.

Macroinvertebrate identification at the Ney Nature Center

18. Henderson Birding Focus

Civic leaders from the river town of Henderson sponsored a hummingbird count and public event in August of 2009 to draw attention to the importance of the Minnesota River Valley to song birds, especially during migration. Staff from the University of Minnesota Extension Service conducted a humming bird banning exercise with help from citizens to track the migration of these birds. Experts were also on hand during "Hummingbird Hurrah, a celebration of everything hummingbird" to answer questions. The Minnesota River Valley is identified as an Important Bird Area, one of only 35 places in Minnesota because it has good habitat – a variety of trees, cover and water.

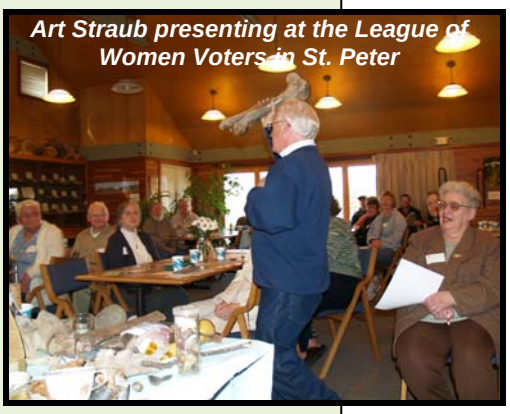
The City of Henderson also features Henderson Feathers, a resource center on birds operated as a mini-Minnesota Valley Birding Science Museum. One of the highlights is an expansive collection of salvaged bird specimens that Art and Barb Straub have collected for years and used for school presentations. To let people see the preserved birds up close, each species is stored in clear plastic storage tubes. The collection also contains nests, habitat examples and other general information about bird identification.

Art and Barb Straub at the MN Valley Birding Science Museum

19. River Advocate Spotlight – Art & Barb Straub

Art and Barb Straub chose to live in an apartment instead of a fancy home in order to focus on restoring the 200 acres of wooded and prairie land they own overlooking the Minnesota River near Le Sueur. Owned by the Straub family for over 150 years, it is becoming an island of trees and grasses in an ever-expanding sea of development.

As ceaseless educators and good stewards of the land the Straub's enjoy bringing people of all ages out to their property to get a taste of the natural world and see what the valley was like before being transformed by Euro-American settlement. Over the years they developed an intimate knowledge of the landscape along with an understanding of both the positive and negative.


Art Straub presenting at the League of Women Voters in St. Peter

They take their environmental show on the road, showing off all the artifacts found in the Minnesota River at a wide range of public presentations. For all their conservation efforts, Art and Barb Straub were presented the first-ever Elaine Mellot Award from the Friends of the MN Valley.

20. City of Le Sueur

After years of turning its back on the Minnesota River, this community of 4,300 has embraced an effort to do its part improving water quality. In 2006, the Cities of Le Sueur and Henderson joined together to construct a wastewater facility outside the river's floodplain to prevent untreated sewage from being discharged during high water events.


Cleaning out gutters in Le Sueur

Over the last few years city-wide cleanups have resulted in the removal of both garbage and phosphorus-bearing debris from roadsides and riverbanks and ultimately keeping it out of the Minnesota River. The City of Le Sueur also changed its street sweeping schedule to remove leaves and soil from the streets before spring rains washed the undesirable material into the storm sewers. Future ideas for improving water quality include moving the city's compost area – a huge potential source of phosphorus pollution, out of the floodplain, along with planning additional parks and trails.

21. Illegal Dump Site Cleanups

Many counties across the basin are plagued by illegal dumpsites. In 2006, Sibley County Environmental Services began to tackle the job of cleaning up long-time illegal dump sites, especially those near the Minnesota River Valley. Under a pilot program with Kelso Township, Sibley County cleaned up a 40 to 50 year dump site located in Rush River Watershed. Funded through a solid waste fee placed on real estate taxes by the county, these illegal dump sites are a serious environmental and community concern. Runoff and leaching of chemicals can contaminate both surface- and ground-water which has an effect on public health, public safety and health of aquatic organisms.

22. Jessenland Unit of the Minnesota Valley National Wildlife Refuge

The Minnesota Valley Trust and the U.S. Fish and Wildlife Service worked together to purchase 512 acres in Faxon and Jessenland townships in Sibley County. Frequently flooded cropland will be restored by planting native grasses and establishing an oak savannah along with breaking tile lines to create a 25 acre wetland restoration. The Trust sees this as an important piece of property to protect critical habitat for wildlife and public enjoyment. Funding came from a number of sources including a Metropolitan Conservation Corridors from the Minnesota Environment and Natural Resources Trust Fund and the Carl and Verna Schmidt Foundation. The U.S. Fish and Wildlife Service say the land is an integral part of the 7,000-acre restoration of floodplain forest, wetland and bluff habitat along the Minnesota River.


Restored native prairie

23. City of Lafayette Stormwater Project

On August 21, 2009, the City of Lafayette completed a storm drain stenciling project to raise awareness about the link between city storm drain systems and water quality. A water conscious Lafayette citizen by the name of John Paulson headed up the project with assistance from city and watershed staff. A message "No Dumping, Drains to River" with an image of a fish among aquatic plants was stenciled at all the storm water drain openings in the city.


John Paulson marking storm water drains in Lafayette

24. Lake Titloe Beautification Project

A group of residents, business owners, government staff and others have been working for the last seven years to improve water quality in Lake Titloe, located on the north side of Gaylord. A monitoring project run by Dr. Bryce Hoppie from Minnesota State University Mankato is collecting samples in the Lake Titloe Watershed (3 lake inlets, 2 lake sites and the lake outlet) to help the Lake Titloe Committee get a better understanding of how much water is entering the lake and the level of pollutants including sediment. Part of this effort includes a weather/monitoring station set up in the lake recording real-time measurements including temperature, rainfall, chlorophyll a and total phosphorus.

Lake Titloe Monitoring and Weather Station

Efforts to improve the lake's water quality started with a bonded grant from the State of Minnesota to redirect the stormwater draining off Lincoln Avenue away from the lake into a retention pond. Partnering with MSUM, SEH Engineering, Sibley SWCD, Rush River CWP and the DNR, the Lake Titloe Group will assist in the implementation of conservation practices to reduce the amount of pollution entering the lake. Promotion of the practices will range from wetland restorations to sediment holding ponds to rock tile inlets to rain gardens, with three already constructed in the City of Gaylord near the lake.

25. Mueller Farm

Landowners in the Rush River Watershed, Mike and Mary Mueller have transformed their farm of mostly cropfields into a native prairie / wetland restoration by embracing the economic benefits of various conservation practices. Over the years they have enrolled their farm land into a diverse selection of federal and state programs (Reinvest in Minnesota, Conservation Reserve Program, Wetland Mitigation Bank Program and Conservation Reserve Enhancement Program).

Mary and Mike Mueller in their prairie restoration

The wetland restorations have increased the number of waterfowl, pheasants, white-trail deer and other wildlife on their land. The Mueller's understand the importance of agriculture and a need to balance it with wetlands and native prairie to help improve water quality and wildlife habitat. Their ultimate goal is to put most of the land into perpetual conservation easements and had some of their land accepted into the Wetland Reserve Program in 2008. Finally, they hope to see their second farm placed under public ownership to let people enjoy the work they have done.

26. Jaus Organic Farm

On land his great-grandfather homesteaded in 1877, Martin and Loretta Jaus run an organic dairy farm in western Sibley County. The Jaus don't use chemicals or genetically modified organisms in their dairy operation and use a rotational grazing system. Their cattle move between 25 paddocks allowing each one to rest for almost a month, allowing the root system to rebuild. A rotational grazing system and diverse crop rotations build up the soil's organic matter on their 410-acre farm.

They have also restored an 11-acre wetland prairie, planted five miles of shelterbelts and enrolled land into the Conservation Reserve Program. The Jaus see their operation benefiting the small family farmer because it shows how you don't need to maintain hundreds of cattle on thousands of acres utilizing chemicals and the need for larger machinery – all which need major capital.

Martin and Loretta Jaus stand in front of their dairy barn built in 1928

27. Rush River Clean Water Partnership (CWP)
As one of the most polluted tributaries to the Minnesota River, Rush River has excessive concentrations of sediment, phosphorus and nitrogen. To help improve its water quality the Rush River Clean Water Partnership (CWP) has helped install/fund close to 200 Best Management Practices since 2006: Cover Crops (2,161 acres), Filter Strips (102 acres), Rock Tile Inlets (127), Slotted Risers (40), Terraces (8), Water & Sediment Control Basins (2), Wetland Restorations (12 acres), Rain Barrels (50), Rain Gardens (1), and Septic System Upgrades (111).

In conjunction with High Island Creek CWP, Rush River CWP puts out the quarterly River Watcher newsletter, held a rock tile inlet field demonstration and hosted three Fecal Coliform Bacteria TMDL public open houses. The Rush River CWP has also put on two small group manure and nutrient management planning workshops, continued the long-term monitoring effort at the Rush River outlet site and hosted a display booth at the annual Sibley County Fair.

Construction of a rock tile inlet

28. High Island Creek Clean Water Partnership (CWP)
This CWP got started in 2001 with a diagnostic study of this 153,000 acre watershed. Spread out across the counties of Sibley, Renville and McLeod, the watershed suffers from high levels of fecal coliform bacteria, total phosphorus, nitrate-nitrite nitrogen, and total suspended solids along with excessive peak flows.


Bendway Weir Project

Under an implementation phase initiated in 2004 the CWP has helped install a wide range of BMPs: Slotted Risers (37), Rock Tile Inlet (87), Removal of Open Intakes (6), Grade Stabilization Project (1), Water & Sediment Control Basin (3), Terrace Repair (6), Terrace (1), Diversion (1), Bendway Weir Project (1), Cover Crops (2,908 acres), Wetland Restorations (206 acres) and Filter Strips (123.9 acres), Rain Gardens (3), Rain Barrels (50), SSTS Upgrades (Sibley – 43, McLeod – 15 and Renville – 4).

High Island Creek Clean Water Partnership also put on two small-group manure and nutrient management workshops, and three fecal coliform bacteria open houses, developed a web site, published 24 six-page River Watcher newsletters sent out to over 2,000 people.


Volunteers construct rain garden in New Auburn

29. City of New Auburn Rain Gardens
The City of New Auburn located on the western shore of High Island Lake has launched a program to treat all its stormwater draining directly into the lake and creek with 43 rain gardens instead of installing an expensive curb and gutter system that would result in putting extensive piping under the city. Residents and other volunteers have committed to the project by providing labor and equipment to construct seven rain gardens over the last years with a large one planned for 2010 on the north end of town.

30. Friends of High Island

Friends of the Minnesota Valley sponsors a Watershed Initiative Program to develop a strong citizen network, coordinate with partners on habitat and wetland restoration projects, and work with landowners to reform land use practices to help reduce pollution entering the Minnesota River. In conjunction with the Friends of High Island, this program has installed 16 slotted risers, 32 rock tile inlets, four open tile inlets, planted 610 acres in cover crops, distributed 50 rain barrels, closed a manure pit, and completed nine septic system upgrades in the High Island Creek and Rush River watersheds.

Cover Crop in Rush River Watershed

Baling barley straw for Phosphorus Project

Friends of High Island are also working with the DNR, High Island Creek Watershed District, High Island Creek Clean Water Partnership, Friends of the Minnesota Valley and other partners to conduct a drawdown of High Island Lake to improve water quality, encourage submergent vegetation growth and benefit wildlife habitat. Walleye fry will be stocked in the lake come spring by the DNR if there is a hard freeze. Repopulating the lake with more desirable fish like walleye will help improve water quality by keeping flathead minnow populations in check.

A new culvert installed at the outlet was paid for by the Friends of High Island through their annual fundraisers and will facilitate current and future drawdowns. The group also launched a barley straw erosion control project to decrease the amount of phosphorus entering High Island Lake. Monitoring of water quality will be done downstream to determine the effectiveness of the barley straw as a pollutant filter and erosion control measure.

Construction of new High Island Lake outlet

31. Project Spotlight – Barley Straw

The idea behind utilizing barley straw to reduce phosphorus levels came to the Friends of High Island after seeing a presentation on this unique conservation practice at the 2009 Shallow Lakes Forum. After a number of discussions the group decided it was worth testing out on water flowing into High Island Lake. In May, twenty-eight volunteers gathered to bale the barley straw into 15 to 20 feet long bales using a Christmas Tree Baler. Over two days the group put together the bales and installed them in two of the lake tributaries in 5 separate locations. Water quality samples collected throughout the summer and fall showed a localized significant reduction of phosphorus. The group felt it was a positive learning experience and plan to fine tune the process for the 2010 season.

32. Thomas Wetland Project

Doug and Dee Thomas of Henderson converted land that had been cropped into wetlands and upland buffers on property they own near High Island Creek. The Friends of the Minnesota Valley helped the Thomas' complete a project creating two wetlands and planting native plants and grasses. Located adjacent to the bluffs of both the Minnesota River and High Island Creek, the land is sensitive to erosion and runoff issues. According to Doug Thomas, "This project is a way for us to do our part in helping the health of the two rivers. There is a lot of erosion coming off those gullies and we want to do something about it."

"It is our hope that others situated in similar areas will consider this option for their land and see the benefits of ownership." – Doug Thomas

Wetland Restoration

Doug and Dee Thomas founded the New Minnesota Country School Henderson to help young people understand the real world and consequences of uninformed decision making, with an emphasis on nature, sustainability and personal responsibility. The New Minnesota Country School has been recognized with numerous awards and selected as one of eight charter schools in America to be successfully closing the achievement gap.

33. CREP Wetland Restorations – Sibley County

The largest wetland restoration in Sibley County is located along State Highway 19 creating a highly visible educational opportunity. Completed in 2003 under the Conservation Reserve Enhancement Program (CREP), the 161 acre site features 91 acres of restored wetlands and 70 acres of native prairie. Sibley SWCD manages this permanent easement along with assisting the High Island Creek and Rush River clean water partnerships with installing conservation practices including promoting the use of alternative open intakes and conservation tillage practices.

Wetland Restoration

34. Jean William's Farm

Over the last 50 years, this landowner in Carver County has restored almost 78 acres of native prairie grasses and wildflowers, 43 acres of wetlands and additional conservation enhancements. These practices include six acres of tree planting, and installations of four cross vane rock weirs, and three cedar tree revetments to stabilize the banks of Carver Creek running through the property. Some of the land has been enrolled into the Big Woods Heritage Forest Stewardship program along with other permanent protection easements.

Cross Vane Rock Weirs

35. Wetland Reserve Program – Carver County

Carver SWCD staff worked in cooperation with the National Resource Conservation Service (NRCS) to convince landowners Donald and Barbara Wagener (73 acres) and an adjoining site (6 acres) owned by Ronald and Miriam Hilk to enroll these two pieces of property just west of Lake Waconia into a permanent easement under the Wetlands Reserve Program (WRP). NRCS highlighted the enrollment with a WRP 2-million acres ceremony to mark the national goal of increasing wetlands across the United States.

Wetland Reserve Program Ceremony

36. Lower Minnesota Valley Wetlands Conservation Initiative

The Migratory Bird Conservation Commission awarded a $1 million grant to fund Phase II of a multi-year initiative to restore and enhance breeding and migratory habitats for waterfowl and other wildlife in the Lower Minnesota River Valley.

Funded from the North American Wetlands Conservation Act (NAWCA), seven partners – Pheasants Forever, Ducks Unlimited, Gary Renner, DNR, MN Valley National Wildlife Refuge Trust Inc, Shell Rock River Watershed District and the U.S. Fish and Wildlife Service – pledge to complete over $3.2 million in habitat restoration and enhancement, easement acquisition, and fee-title acquisition over a two-year period.

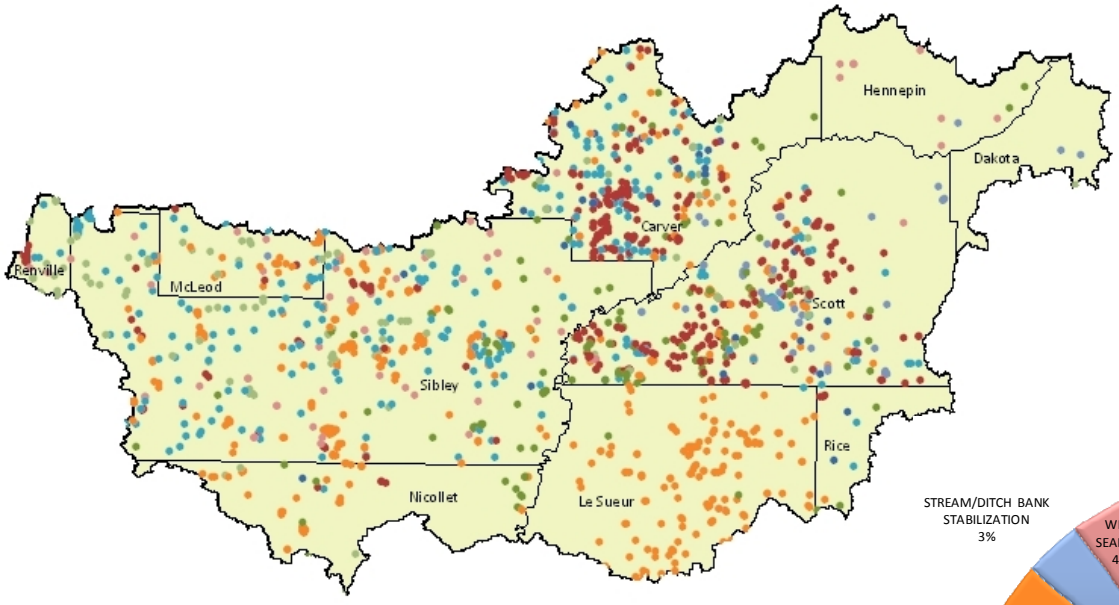
This partnership of federal, state and private entities propose to restore 405 acres of wetland and grassland habitats, enhance habitat on 2,067 acres, and acquire fee-title on 527 acres within the project area on both public and private lands. The initiative focuses on accelerating the restoration and enhancement of grasslands and wetlands along with the associated wildlife populations which depend on those habitats.

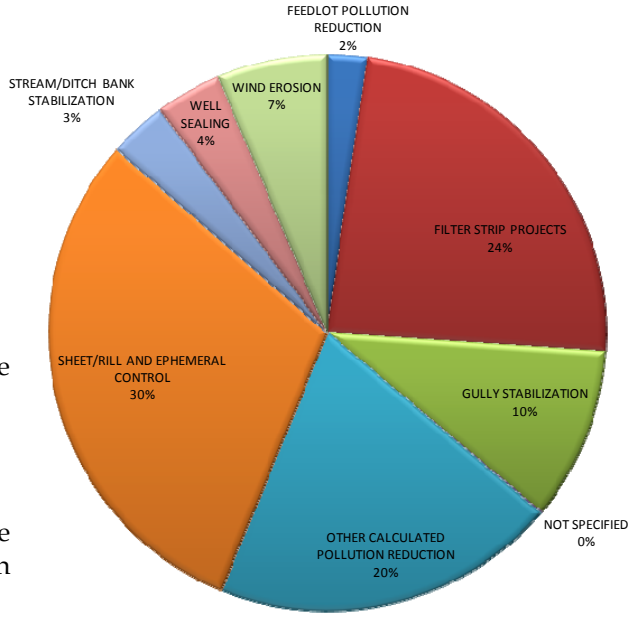
Tim Krohn of the Mankato Free Press padding the Minnesota River near the confluence

Future Project Spotlight – Blue Lake WTP

Named for the an obscure backwater on the Minnesota River, the Metropolitan Council is spending $28 million to extract methane gas from wastewater solids. According to officials, in addition to energy savings the biomethane production adds to the reliability of the wastewater system. The plant is required to reduce discharge into the Minnesota River to meet water quality standards. As the third largest wastewater plant in the state, the Blue Lake Wastewater Treatment Plant (WTP) serves 275,000 people from Lake Minnetonka to Prior Lake and treats 26 million gallons of wastewater daily.

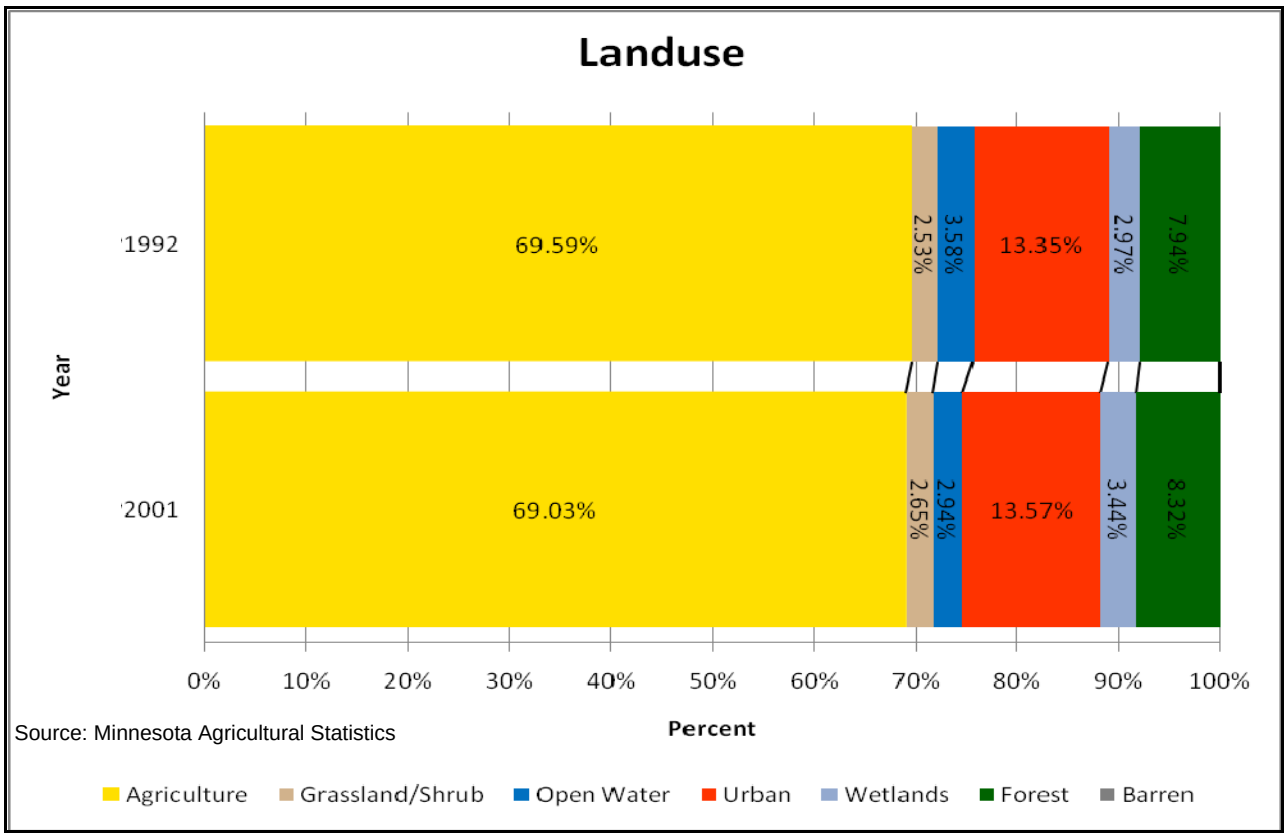
Lower Minnesota River Watershed Conservation Practices and Land Use





Conservation Practices

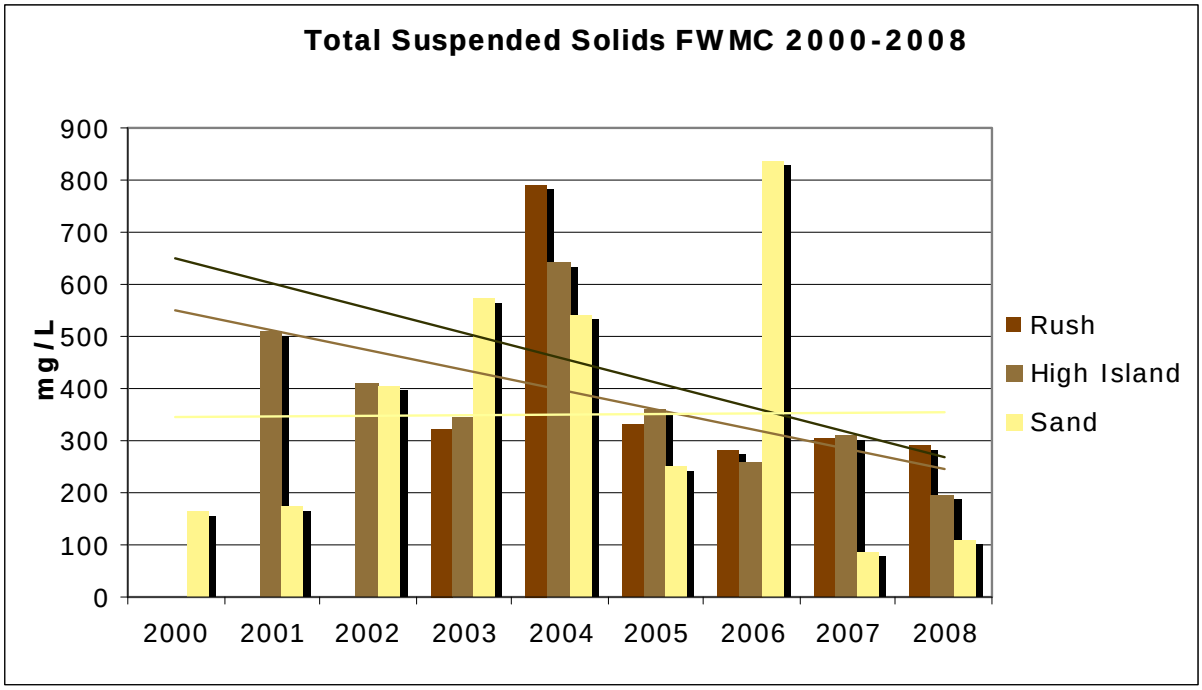
As one of the largest and most diverse watersheds in the Minnesota River, the effort to improve water quality has been the focus of groups like the Friends of the Minnesota Valley and High Island Creek and Rush River watershed projects since the late 1990s. The map above and pie chart at the right illustrates conservation practices in the Lower MN Watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) programs that compile information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Minnesota River Basin but not recorded in either LARS or eLINK.



Source: Minnesota Agricultural Statistics

Lower Minnesota River Watershed Pollution Reduction

The charts below summarize water quality data from 2000-2008 in the Lower Minnesota River Watershed for High Island Creek, Rush River and Sand Creek. These charts illustrate Flow-Weighted Mean Concentration (FWMC). FWMC is calculated by dividing the total load (mass) for the given time period by the total flow or volume. It refers to the concentration (mg/L) of a particular pollutant taking into account the volume of water passing a sampling station over the entire sampling season. Conceptually, a FWMC would be the same as routing all the flow that passed a monitoring site during a specific time frame into a big, well-mixed pool, and collecting and analyzing one sample from the pool to give the average concentration (State of the Minnesota River 2000-2008 Report).

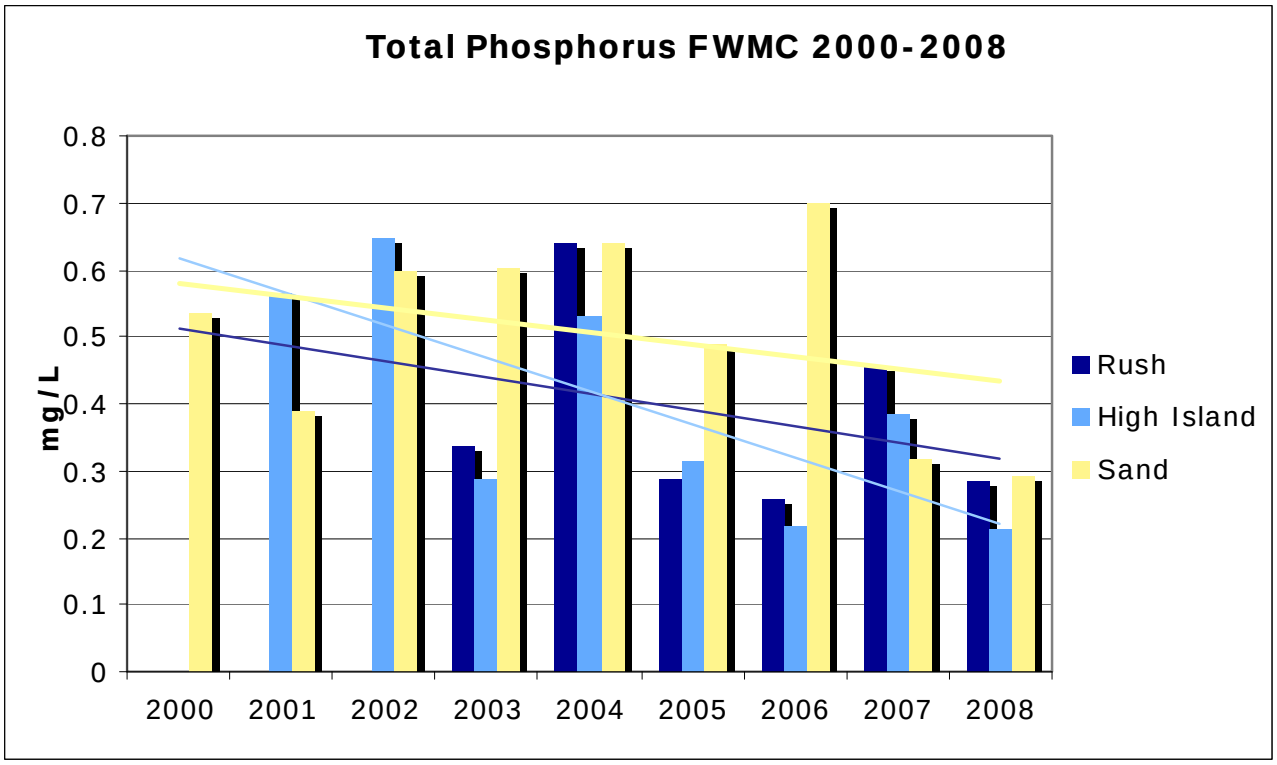


High Island Creek

The High Island Creek Watershed (HICW) started monitoring in 2001. There were two spikes in TSS levels, one in 2001 and the other is 2004. Successive years after these spikes, the trends show a steady decline. In 2004, HICW began its first phase of implementation, providing landowners with a variety of ways to reduce sediment from entering the nearby waterway. This could have possibly affected the downward trend in TSS with the landowner participation in these programs. In HICW, the highest TSS rates occur at the eastern end of the watershed located in the Minnesota River bluff-land. This area is characterized by its steep ravines and gullies leaving it vulnerable and highly erodible.

Rush River

The Rush River Watershed (RRW) started monitoring in 2003. In 2004, TSS levels peaked and have stayed relatively stable to slightly decreasing ever since then. In 2003 the Rush River began with a diagnostic study to determine the water quality. March 2006 started the Rush River Watershed Implementation Project, in which the project provides cost share and incentives to keep the sediment in place and prevent further erosion. Like HICW, the RRW sees its highest TSS rates at the eastern end of the watershed which is also located in that Minnesota River bluff-land area.

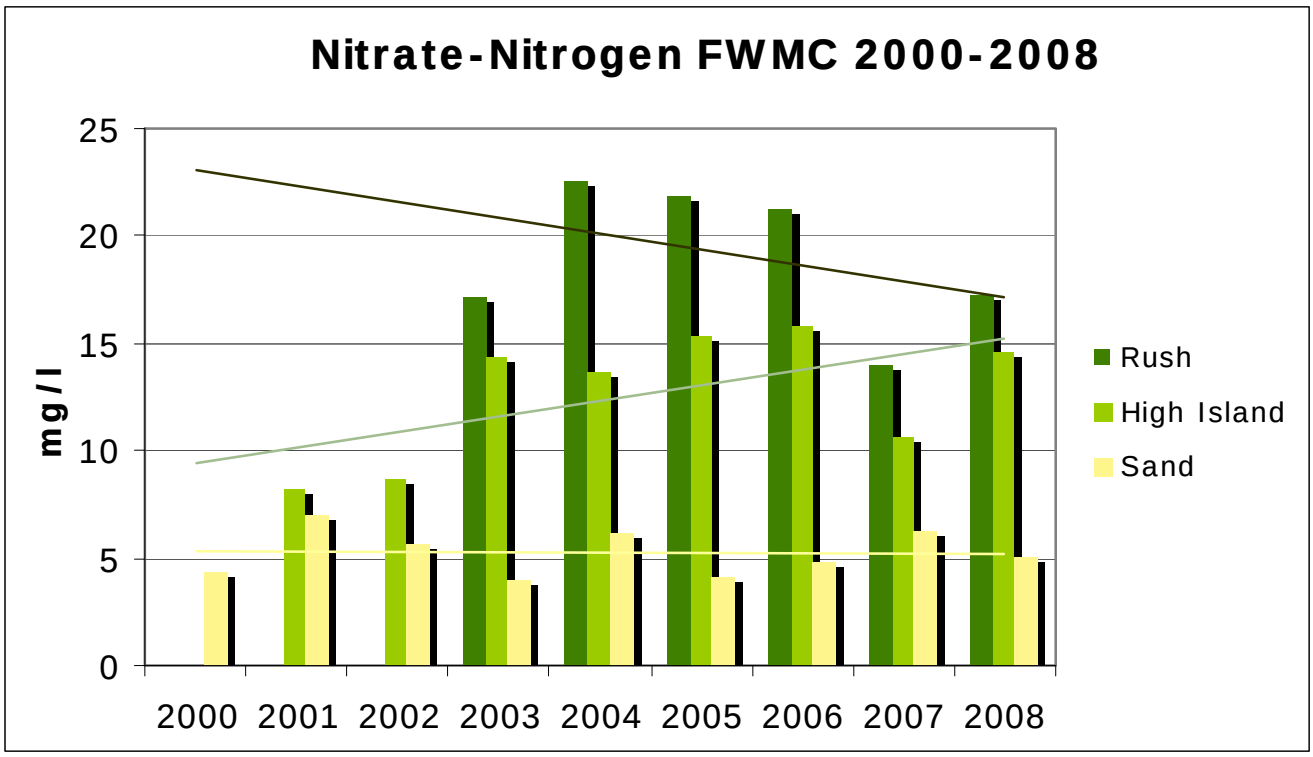


High Island Creek

Like TSS, levels of TP in High Island Creek peaked in 2004. Levels of TP in 2001 through 2004 were very high, but the overall trend shows a major decline through 2008. In HICW, phosphorus loading is attributed mostly to agricultural runoff and stream bank/gully erosion. In both cases, the phosphorus input is closely associated with soil erosion. With the TSS levels trending downward, it is assumed that TP levels will also continue its downward trend.

Rush River

The Phosphorus levels in the Rush River Watershed (RRW) peaked in 2004 but overall the trends show a slight decline. With the TSS trends the way they are, Phosphorus levels are expected to decrease slightly in the future as well. In RRW the TP levels are highest in the North Branch of the Rush River as well as on the eastern end of the watershed. During the diagnostic study it was discovered that Gaylord, Winthrop, Gibbon, Lafayette and Waldbaum treatment plants accounted for only 4% of the TP load at the outlet of the watershed. The majority of the TP load was occurring from non-point sources.



HI-Nitrate-Nitrite (NO2-NO3)

Unlike the parameters of TSS and Total Phosphorus, Nitrate levels continue to steadily increase at all the monitoring sites. Monitoring results from 2001-2008 show an overall average of 12.7 mg/L which would be elevated above the Minnesota state drinking water standard of 10.0 mg/L. However, the highest levels in the watershed consistently have been found at monitoring site 9P, representing the outlet of the sub-watershed Buffalo Creek before it enters High Island Creek.

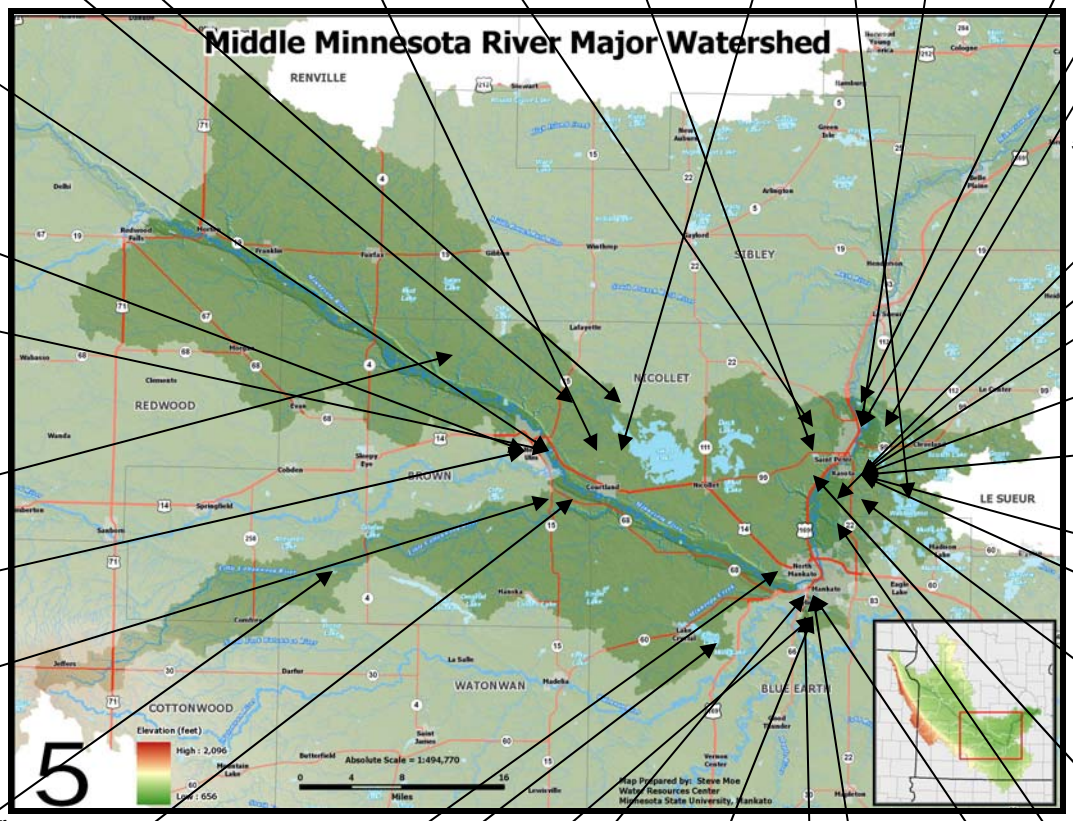
RR-Nitrate-Nitrite (NO2-NO3)

Nitrate levels of the RRW have displayed a slight decline through the years. Monitoring results from 2003-2008 show an overall average of 19.0 mg/L which is much higher than the Minnesota state drinking water standard of 10.0 mg/L. Nitrate levels peaked in 2004 with a FWMC of 22.57 mg/L. RRW is noted in the State of the MN River Report to have the highest concentrations of nitrogen in all of the MN River Basin. This could be due to the extensive tile drainage system this watershed has in place as well as the over application of Nitrogen from producers.

MIDDLE MINNESOTA RIVER WATERSHED

This major watershed is characterized by its irregular shape compared to the other major watersheds in the Minnesota River Basin and the fact it is drained by a numerous smaller tributaries but no major river. The only other major watershed not defined by a main stem tributary in the basin is the Lower Minnesota River Watershed. Little Cottonwood River is the largest sub-watershed, a total of 230 square miles. Ranked sixth in size compared to 12 major watersheds, the Middle Minnesota is approximately 1,347 square miles or 862,060 acres. Agriculture dominates much of the watershed with a number of major river communities found within its boundaries including parts of Redwood Falls, New Ulm and Mankato along with St. Peter, located right before the Minnesota River flows into the Lower Minnesota River Watershed.


Morgan Creek Vineyard



- 1. St. Peter Water Treatment Plant
- 2. St. Peter Treaty Site History Center
- 3. GAC Recycle Mania
- 4. Lake Emily Clean-up
- 5. Seven Mile Creek Watershed Project
  - 6. Wetland Restorations
  - 7. Conservation Highlights
  - 8. Farm Practice Survey
  - 9. Groundwater Vulnerability Study
  - 10. Fecal Coliform Bacteria Study
  - 11. Nitrogen Validation
  - 12. Sediment Fingerprinting
- 13. Brown Nicollet Cottonwood Water Quality Board
- 14. Water Testing, Health and Conservation Road shows
- 15. Seven Mile Creek Park
- 16. Center for Earth Spirituality & Rural Ministry
- 17. One Million Trees by 2020 Initiative
- 18. Mankato Area Environmentalists
- 19. Farm in the City
- 20. Mankato Healthy Lawn Team
- 21. Indian Creek Clean Water Partnership
- 22. Hutton Junior Fisheries Biology Grant
- 23. Crystal Loon Mills CWP
- 24. Morgan Creek Vineyards
- 25. Little Cottonwood River Watershed Project
- 26. Brown SWCD CREP Wetland Restorations
- 27. Putting Green Inc. Sustainable gardens
- 28. Coalition for a Clean Minnesota River
- 29. River Regional River History & Information Center
- 30. Capitol for a day – New Ulm
- 31. New Ulm Wastewater Treatment Plant
- 32. Mississippi River Basin Health Watersheds Initiative
- 33. Wetland Litigation
- 34. Paired Watershed Studies for Nutrient Reduction
- 35. Red Top Farms Demonstration Site
- 36. State Highway 169 Erosion Control
- 37. Pehling Farm
- 38. Lake Washington Water Quality Project

We paddled away at the rate of four or five miles an hour, the men singing Canadian boat-songs, and only interrupting them to halloo at top of their voices, now and then, when the otters were seen swimming amongst the zizania. As we advanced through these low rice-grounds, clouds of wild ducks rose on the wing, and we killed them at our leisure from the canoe. – George Featherstonhaugh, 1835

MIDDLE MINNESOTA RIVER WATERSHED

No one organization is coordinating water quality efforts in this watershed with Brown Nicollet Cottonwood Environmental Health Board taking a lead in those counties and the sub-watersheds of the Little Cottonwood and Seven Mile Creek. Other water quality improvement efforts come from SWCDs, non-profit organizations, clean water partnerships and individuals. A unique initiative in the Middle Minnesota features the wetland litigation by the Swan Lake Area Wildlife Association.

1. St. Peter Water Treatment Plant

In July 2009, the City of St. Peter approved a $16.8 million drinking water improvement plant that involves wells, a new treatment plant and an improved filtration system for the existing St. Julien Street plant. This new plant complies with increasingly stringent government standards for water quality and a growing demand for water usage. Part of the plan will let the city seal up wells located at the Jefferson Street treatment plant tapping into three different aquifers at different depths. State water regulars frown on this type of practice because it allows contaminants to flow from one aquifer to another. By adding a reverse osmosis water filtration system to the both new Broadway and St. Julien plants, the level of chloride discharged into the Minnesota River will be reduced. The estimated completion date of the project is May or June 2011.

Construction of the plant

2. St. Peter Treaty Site History Center

Located along Hwy. 169 just north of St. Peter, the Treaty Site History Center was constructed in the late 1990s to tell the story of the Traverse des Sioux and its importance to the state of Minnesota and the Minnesota River Basin. The center serves as a natural and historical gateway to the Minnesota River with its exhibits, interpretive trail and the former Traverse des Sioux, or Oiyuwege (place of crossing).

In fall 2006, this important crossing to the Dakota Indians on the Minnesota River was rediscovered by the Bolton and Menk Engineering Firm used historic documents and modern survey techniques to locate the original crossing. Originally, the Traverse des Sioux had been a shallow gravel bend in the river, reportedly making it an easy walk across the river year- round except at flood stage.

Native Prairie Restoration

Managed by the Nicollet County Historical Society, the Treaty Site History Center sponsors a wide range of presentations related to the Minnesota River Basin including a photography and literature exhibit titled "Giving Vision and Voice to the Minnesota River Valley," John Cross and Tim Krohn's 2008, 335-mile, 11 day "Trip Down the Minnesota River," and the 2,000 plus mile journey of Sean Bloomfield and Colton Witte from Chaska to the Hudson Bay in 45 days.

3. Recycle Mania at GAC

Students and staff at this St. Peter institution – Gustavus Adolphus College (GAC) – got involved with Recycle Mania, a friendly competition for college and university recycling programs to promote waste-reduction activities on campus. Over 400 schools are competing by reporting recycling and trash data that will be turned into rankings according to who collects the largest amount of recyclables per capita, the largest amount of recyclables per capita, the largest amount of recyclables and the least amount of trash per capita. The competition ran through the spring of 2009 and part of it measured how much material went into a landfill, with GAC successfully diverting 85 percent of its waste.

4. Project Spotlight – Lake Emily Clean-up

A different-type of clean-up took place on Lake Emily on Le Sueur County in the spring of 2008 when scuba divers spread out across this 235 acre lake. The scuba divers used a forensic grid and sonar surveys to methodically recover dozens of debris piles located in the south and southwest portions of the lake. They were hauling away debris deposited by the 2006 tornado including a dented steel dumpster, computers, lawnmowers, sheet metal and aluminum lawn chair. Only environmentally incompatible items were removed while biodegradable debris that didn't threaten fish habitat stayed. Located near St. Peter, the lake has a maximum depth of 37 feet with an average depth of five feet. All clean-up was handled at 10 feet or above. Le Sueur County Emergency Services sponsored the Lake Emily Clean-up.

5. Seven Mile Creek Watershed Project (SMCWP)

In 1999, a Middle Minnesota Basin Project undertook a water resource study of Seven Mile Creek Watershed. Initially this one-year project on the 23,550 acre watershed focused on resource investigation involving hydrology and water quality Parameters along with public outreach. To help increase awareness of the watershed boundaries, seven "Entering Seven Mile Creek Watershed" signs were installed along all the major roads entering he watershed. The project also sponsored nitrogen rate demonstrations on cropfields in the watershed. Cooperating producers applied a wide range of different application rates of nitrogen including zero pounds on a 2.5 acre strip. By using combines equipped with global positioning to harvest the soybean crop, it showed the producers how much money could be saved by using less fertilizer.

Water quality-related accomplishments in Seven Mile Creek Watershed include being part of a large scale groundwater study in the area that defined the connection between groundwater and surface water quality. A grant from BWSR resulted in digitally archiving aging ditch maps and physically inventorying the ditches in Seven Mile Creek Watershed. The inventory allowed the staff to ground truth and document location, size and condition of tile outlets in the system.

A partnership with the Minnesota Department of Agriculture, University of Minnesota and other agencies set up a demonstration farm site under the Conservation Innovations Grant. The project was developed to support quantifying the environmental benefits of conservation drainage practices and to help establish / reinforce cost share standards for accelerating their adoption.

Conservation buffer protection increased from 10 to 21 percent on drainage ditches in Seven Mile Creek Watershed and from zero to 15 percent for cropland ravine interface. In addition to wetland restorations, project accomplishments included the installation of three grade stabilization structures, installation of targeted grassed waterways, 12 on farm nitrogen rate demonstrations, replacement of 13 open tile intakes, installation of a 100 acre conservation drainage demonstration farm, three grade-stabilization structures and stabilizing 1,000 feet of stream bank. Fifty one septic systems were upgraded during the project, resulting in the increased septic compliance rate from 41 to 67 percent.

6. SMCWP Wetland Restorations

Prior to Euro-American settlement of Seven Mile Creek, this watershed was dominated by wetlands with over 11,000 acres. By 1985, most of the wetlands had been drained with only 1,307 acres remaining. To show the effectiveness of wetland restorations on water quality in Seven Mile Creek, the Seven Mile Creek Watershed Project worked hard to build relationships with the landowners and producers to restore wetlands on cropfields that had a history of flooding and planting native grass and wildflower buffers.

In 2004, Seven Mile Creek Watershed Project led the effort to request a first-of-its kind petition in Nicollet County to route a county drainage tile line into a restored wetland. A 50 acre wetland easement was developed through the CREP and CRP programs designed to store 55 acre feet of water during a 100 year flood event. Two drainage tiles (a 12" county tile and an 8" private tile) were routed into the wetland with a water level control structure placed at the outlet.

On one restoration project, a field tile line was angled upward on one end to force the water to the surface to use the wetland to purify it by allowing sediment to settle out and plants to utilize the excessive nitrogen before flowing back out the tile line at the other end. Water quality monitoring on these wetland restoration projects found nitrates dropped 50 to 80

percent from the tile system, reduced peak flows and increased wildlife diversity. One grant from the McKnight Foundation funded the restoration of 300 acres of wetlands at 16 locations. Other agencies involved in the project were: NRCS, BWSR, Farm Service Agency (FSA), DNR, and Nicollet County SWCD. At the end of the six-year project, a total of 168 acres of tile intercepting wetlands and associated buffers were restored along with the installation of 60 acres of conservation buffers. These wetlands are expected to remove 6,300 pounds of nitrate per year from the drainage tile system.


Wetland Restoration

7. SMCWP Conservation Highlights for 2004

Seven Mile Creek Watershed Project, under the direction of the Brown Nicollet Cottonwood Water Quality Board has seen impressive results for implementing conservation practices and educating the public about water quality problems. In 2004 alone, the project enrolled five CRP filter strip contracts (25 acres) along drainage ditches ravines, completed the petition to rout a branch of County Ditch (CD) 58 county drainage tile into a restored wetland and completed the construction of a 20 acre CREP/CRP wetland restoration and a 30 acre upland buffer on the CD58 impoundment project.

Other accomplishments include coordinating an EQIP contract for 250 acres of no-till on highly erodable soybean ground near ravines of Seven Mile Creek, replaced 12 open intakes with rock inlets, conducted On Farm Nitrogen Rate Demonstrations on five farms covering 250 acres, and upgraded 18 septic systems. Project staff also assisted with the seeding of 15 acres of filter strips and coordinated the maintenance (mowing, spot spraying) of 100 acres of CRP filter strips and wetlands.


Slotted Riser

8. SMCWP Farm Practice Survey

In 2004, the project undertook a farm practice survey to gather information on current nutrient, tillage and pesticide use on farms within the Seven Mile Creek Study Area. The purpose of the study was to: Help determine realistic water quality goals by documenting current practices; Use information as a "benchmark" to measure the effectiveness of the watershed project; Use information to help model what impact selected BMPs will have on water quality; and Help watershed managers identify current environmental stewardship practices and future conservation needs. The survey found strong evidence that producers were voluntarily adopting the recommended nitrogen management strategies with the help of educational materials.

9. SMCWP Groundwater Vulnerability

A Groundwater Vulnerability Zoning Pilot Project used 16 years of well water data in conjunction with hydrogeologic land use, and other information to develop County Nitrate Probability maps. The maps identify areas with a higher probability for nitrate – nitrogen groundwater contamination, provide probability information for the land-use application process at the country level and alerts county Planning and Zoning staff of potential groundwater concerns that merit the addition of possible conditions to a land use permit to further protect or improve water quality.

10. SMCWP Fecal Coliform Bacteria Study

Staff of the BNC Water Quality Board came across a tile drain connected to a house while assisting a farmer with the installation of a filter strip. After convincing the homeowner to upgrade its non-complaint septic system the BNC staff capitalized on the opportunity to test the effectiveness of these systems for reducing fecal coliform bacteria. Water sampling was conducted by the MSUM Water Resources Center before and after the installation of the septic system.


Monitoring station

Before the upgrade, water concentrations from the pipe for fecal coliform bacteria averaged 350 colonies per 100 ml of water (state standard is 126 colonies per 100 ml of water) and reached as high as 7,000 colonies per 100 ml of water. Concentrations decreased by 98 percent (eight colonies per 100 ml of water) after the system was upgraded.

11. SMCWP Nitrogen Validation Project

From 2000 to 2003, 15 farmers participated in the nitrogen validation project within the St. Peter Wellhead Protection Area to study how much nitrogen needed to be applied for growing corn while balancing profit and water quality. Nitrate levels in some of the aquifers tapped by the City of St. Peter for drinking water had been steadily increasing since the 1980s.


Farmer Nitrogen Workshop

In 2002, 34 additional farmers in Nicollet and Blue Earth counties participated in the validation trail. Nitrogen application rates (0, 60, 90, 120, and 150 pounds per acre) were replicated three times at each site. Results from the study involving the 15 farmers showed that nitrogen rates of 90 to 120 lbs were the most economically optimum, validating the University of Minnesota recommendations.

By reducing rates from 150 to 120 lbs allowed producers to save an average of $6 to $10 per acre on fertilizer costs and preventing 38 tons of nitrogen from leaching into the drinking water system. Trials for the 35 farmer study showed the maximum profit rate hit at 105 lbs of nitrogen applied per acre.


Seven Mile Creek

12. Seven Mile Creek Sediment Fingerprinting

A collaborative effort among county and government agencies and the University of Minnesota is using innovative sediment isotopic fingerprinting techniques to identify suspended sediment sources tied to a specific geologic sources area in the watershed.

The data will be inputted into the Middle Minnesota Basin Model HSPF to stimulate pollutant transport from land segments to water bodies. Samples for Total Suspended Solids are being collected from Seven Mile Creek along with nearby sites in the Minnesota River (Kasota Backwater) and comparable tributaries (Le Sueur River, Blue Earth River, Carver and Bevens creeks) to determine chronology, sediment accumulation rates and amount of radioisotopes ^{210}Pb or ^{137}Cs.

The data is being collected for the sediment fingerprinting study by St. Croix Watershed Research Station in partnership with the Brown-Nicollet-Cottonwood Water Quality Board and MPCA. The study is synthesizing the relationship of radioisotope fluxes to sediment accumulation rate for a number of reference lakes and combine it with the existing dataset of Minnesota watershed reference to define the regional fingerprint of field and nonfield erosion sources.

13. Organization Spotlight - BNC

As a multi-county alliance, the Brown Nicollet Cottonwood (BNC) Water Quality Board collaborates with public and private organizations and institutions that share an interest and commitment toward the long-term protection and improvement of water quality. The BNC focuses on conservation and protection efforts in the Middle Minnesota River Watershed, primary in the Seven Mile Creek and Little Cottonwood watersheds. Promotion of conservation practices and education about water quality issues are two major directives of this joint-powers board. This effort is accomplished through partnerships with federal, state and local government agencies, industry and business representatives, university personnel, scientists and citizen groups.

Accomplishments of the BNC Water Quality Board include loaning out a million dollars for septic system upgrades over a three year, funding for alternative intake structures (primarily rock tile intakes), and ravine stabilization projects (earthen berms, drop structures, sediment basins and in the future – controlled drainage structures). Other BNC projects include implementation of filter strips and wetland restorations under CRP, installation of stream bank stabilization projects, and funds for nutrient and conservation tillage practices. The BNC has also completed a conservation drainage pilot project, expansion of water quality monitoring on 15 streams and a transparent-tube survey of the entire Little Cottonwood River.

Top five accomplishments of the Brown Nicollet Cottonwood Water Quality Board are: (1). Enrollment of 116 permanent easements covering approximately 5,200 acres under CREP; (2). Enrollment of 800 CRP contracts for a total of 11,330 acres; (3). Installation of 100 rock tile intakes replacing open tile intakes; (4). Signing up producers for a variety of practices – conservation tillage, nutrient management and pest management – with Environmental Quality Incentives Program (EQIP); and (5). Installation of other BMPs like terraces, grass waterways, water and sediment control basins and grade stabilization structures.

BNC Water Quality Board

14. Water Testing, Health & Conservation Road Shows

Brown Nicollet Environmental Health Board worked with commissioners from Brown, Nicollet and Cottonwood counties to offer rural residents with private well water tests for free or at a reduced rate in all the townships. Tests covered nitrates, arsenic and bacteria along with information on cost-share and land conservation program information, Conservation Reserve Program calculation estimates, free manure and soil tests to watershed residents for nutrient management, information on low interest loan septic system upgrades, home radon test kits, along with free blood pressure screening, information on asbestos, mold, home food safety and West Nile Virus.

15. Seven Mile Creek Park

Created in 1967 with the purchase of the Sid Meyer property by Nicollet County, the park has grown to 628 acres with an estimated annual visitation of over 150,000 people. Improvements over the years have included the construction of a duck pond, release of wild turkeys and streambank restoration project. Located between the communities of Mankato and St. Peter, the public has access to eight miles of multi-use trails, a Minnesota River boat landing and a stocked Brown Trout stream by the MN DNR.


Trail at Seven Mile Creek Park

To maintain a cold-stream habitat for the trout, numerous water quality improvements have been completed (construction of cross and j-hook vanes in the stream) to redirect water from the stream banks, reestablishment of riparian vegetation with willow cuttings and the planting of native plants – trees, shrubs, grasses and wildflowers. Information kiosks were put up in the park including one as part of an Eagle Scout project to educate the public about the park, water quality in Seven Mille Creek and watershed.

Construction of stream barbs on Seven Mile Creek to reduce bank erosion.


Entrance to Seven Mile Creek Park

16. One Million Trees By 2020 Initiative

An urban reforestation project for the Mankato-North Mankato area kicked off in 2007 driven by volunteers to plant one million trees by 2020. Benefits of reforestation will include beautification, carbon sequestration, hardwood and biomass production, wildlife habitat, summer cooling, groundwater recharge and soil stabilization, fuel savings, recycling of auto tailpipe emissions and noise abatement. Community service groups, boy and girl scout troops, Future Farmers of America (FFA) chapters, along with adopt a hillside/roadside type programs along with citizen volunteers come together every spring for a two-week period to plant trees.


Planting trees in Mankato

In 2008, close to 400 people came out to put in almost 10,000 hours and plant 13,500 trees, this included 86 school kids and their parents. Money to pay for the trees came from individual and corporate donors. The vision is to a plant a million trees in Mankato and North Mankato, reforesting areas that had been needlessly cleared of trees during construction projects and park development. Sites for the tree plantings have included Highway 14, Good Counsel, ADM and County Road 90.


Community Gardens

17. Center for Earth Spirituality and Rural Ministry

Founded in 1996 by the School Sisters of Notre Dame of Mankato, this center exists to work collaboratively toward a sustainable future for all. The Center for Earth Spirituality and Rural Ministry promotes living interdependently within the community of life through four major initiatives: (1). Educational and Spiritual Enrichments; (2). Community Garden; (3). Advocacy and Networking; and (4). Earth Education and Resource Centers. A main focus of the Center is an annual Earth Conference that covers issues like water, food justice and the natural environment.

Under the Community Garden Initiative, the center provides a two acre organic garden to let families and individuals grow their own food and in turn create a self-sufficient community. This program also provides educational workshops, Sprouts Pre-school garden class, and a variety of events highlighting sustainable living. One of the environmental-friendly outreach products offered through this initiative is a natural fertilizer, sold to the public on a limited basis.

18. Mankato Area Environmentalists (MAE)

This loosely organized, totally grassroots nonprofit organization works on issues affecting the natural environment in the Mankato area. One of their main focuses is promoting environmental efforts by other organizations and groups.

The mission of MAE is to be an ongoing voice for environmental quality, a resource to other environmental and community groups, and a source of action to shape environmental policies and practices in the Minnesota River Valley – Bend of the River area of south-central Minnesota.


Erosion on the banks of Indian Creek

The group meets monthly to discuss environmental issues related to the Mankato area and also on the state, national and world level. MAE advocates cleaning up polluting feedlots, setting aside flood plain and riverbank buffer land, enhancing water quality through sustainable agricultural and urban storm water management.


Watering the garden

19. Farm in the City

A new summer program for kids was launched in spring 2009 by South Central College in North Mankato to teach kids about sustainable living through hands-on activities. Targeted for the ages of 7 to 12, the kids learned about gardening and cooking along with writing about their experiences, going on field trips and working with technology. A $20,000 grant from the Southern Minnesota Initiative Foundation got the three-week program up and running.

20. Mankato Healthy Lawns Team

This group started to spread the word of growing healthy, organically-maintained lawns, school playgrounds and public parks is possible and preferable to using lots of weed killers/pesticides and chemical fertilizers. Funding from the Minnesota Pollution Control Agency has been used for an "Organic Turf grass Project" in the Mankato / North Mankato community to test the effectiveness of organic methods of maintaining school playing fields and playgrounds.

21. Indian Creek Clean Water Partnership

The City of Mankato, Blue Earth County and the MPCA worked together to study Indian Creek located partially within the city limits. The project undertook studies of several elements – water quality monitoring, geomorphology assessment, urban design strategies for water quality and stormwater management. Watershed and engineering studies used to determine sediment sources attributed the source of the problems areas to erosion caused by older, ineffective storm water management systems in the Indian Creek Watershed. A number of locations were identified including a subwatershed holding part of the Minnesota State University Mankato campus.

After the project findings and recommendations were presented to the City Council and Planning Commission during several workshops focused on stormwater and land development, the City of Mankato implemented many of the recommendations with more planned. The City of Mankato revised their set back requirements for steep slopes to reduce encroachment by residential development and increased their stormwater fee. Other recommendations to be put into action consist of preparing a Stormwater Pollution Prevention Plan and using cheaper and more attractive stormwater management systems for new city developments.


Indian Creek Wetland

22. Hutton Junior Fisheries Biology Grant

Lina Wang, a high school student was one of 35 across the United States to receive a Hutton Junior Fisheries Biology grant and the one of only three who received the award for a second consecutive year. The $3,000 grant is designed to stimulate interest in fish science and water management careers, especially among minorities and women.


Lina Wang studies fish

Wang's second year study focused on analyzing darter populations in rivers of the Minnesota River Basin to shed light on the effects of pollution on ecological systems. Some species of this small, finger-size fish are pollutant-sensitive and are used as an indicator of water quality. Her first study examined parasites in snail populations, also looking at the effects of pollutants on water ecologically systems.

These two studies were conducted under the leadership of the Water Resources Center (WRC) at Minnesota State University Mankato. According to WRC staff, the studies are important on a large scale and represent a divergence from previous research in the Minnesota River Basin, especially with determining how water quality impacts ecology.


Netting fish on the Le Sueur River

23. Crystal Loon Mills Clean Water Partnership

This locally managed project addresses water quality issues in three Southern Minnesota lakes: Crystal, Loon and Mill. The goal of the Crystal Loon Mills Clean Water Partnership (CWP) is to install Best Management Practices in the watershed to improve water quality along with educating the public on ways to restore and protect the natural resource of these three lakes.

City of Lake Crystal Parade

The top five accomplishments of the Crystal Loon Mills CWP are the Enrollment of over 35% of the agricultural watershed in soil testing and/or associated nutrient management practices; Organization of fishing festival for Take a Kid Fishing Weekend with over 40 kids and their families participating; Promotion and offering of cost-share for over 80 rain barrels; The coordination of 22 community outreach and education events; and The creation and launching of an interactive web site.


Lake Crystal Take A Kid Fishing

Cost-share for conservation practices has included rain gardens (18), rain barrels (82), wetland restorations (11 acres), vegetative buffers (1 acres), alternative tile intakes (15) and nutrient management/soil sampling (4,078 acres). Interest in the project started out on a high note when over 70 people attended the first open house. Presentations at this evening meeting focused on water quality, conservation practices and other project initiatives. One clean-up effort involved a boy scout troop Lake Crystal coming out to pick up trash and other debris around the lake. They also learned about water quality issues from the project staff. An open house was held as an informational session for the general public to learn about a TMDL study.

24. Morgan Creek Vineyards

Paula and Georg Marti established this vineyard in 1993 located in the Little Cottonwood River Watershed, They produced their first crop in the fall of 1998 and opened Minnesota's only underground winery. An ambient temperature of 55 degrees in the underground earth shelter creates a perfect cellar temperature for wine production and aging, along with an inviting atmosphere for a tasting its many wines. Morgan Creek Vineyards offers a wide range of events in a scenic location along a tributary of the Little Cottonwood River. There are live jazz and classical, art events, an October grape stomp, winter sleigh rides, and author readings. To develop a more sustainable product, the winery will be producing its own biodynamic (organic) wines and producing solar power.


Georg & Paula Marti

25. Little Cottonwood River Watershed Project

This watershed project entered the implementation phase in 2001 after the completion of a three-year water quality study of the Little Cottonwood River and surrounding 108,000 acre watershed. Promotion of conservation practices included mailing out information on the Continuous CRP filter strip program. In 2004 alone, they helped secure 10 new CRP contracts covering 268 acres. Another educational component of the project involved conducting a tour of conservation practices in the watershed and promoting septic system upgrades (a total of 8 completed in 2004).

The project achieved an 11 percent decrease in sediment. Nutrient levels have continued to increase on an upward trend of 23 percent, including a 61 jump in nitrate levels.

Nearly 90 percent of the watershed's landscape is tied to row-crop cultivation with this watershed project utilizing two staff positions to help facilitate the adoption of conservation practices. These positions were instrumental in leveraging the skills of conservation partners, new and existing conservation programs, and ultimately increasing conservation adoption rates. The project surpassed its CREP goal by enrolling 2,835 acres, with 45 percent located within the floodplain. In addition, the project helped to restore another 1,500 acres of wetlands and 60 miles of buffer strips. As a result of these conservation practices, the project achieved an 11 percent decrease in sediment. Nutrient levels have continued to increase on an upward trend of 23 percent, including a 61percent jump in nitrate levels.

26. Brown SWCD CREP Wetland Restorations

A total of 26 wetland restoration projects on easements totaling 1,974 acres with 975 acres of wetland restorations were completed by the Brown SWCD. According to the Brown SWCD staff, CREP was a very successful program for the county. They pointed to the important economic benefits for both the landowner and contractor along with larger benefits when it came to water quality and wildlife habitat.

CREP Easement

The Brown SWCD office also worked with the Brown Nicollet Cottonwood Water Quality Board to promote conservation practices in the Little Cottonwood River Basin including the enrollment of CREP and CRP acres. Funding of this promotion work came from the Brown SWCD, BWSR and local Pheasants Forever chapter.

27. Putting Green Inc. Sustainable Gardens

Putting Green Environmental Adventure Park was planned, developed and operated by local high school students to offer an environmentally themed mini golf course, a concession offering eco-friendly foods, an interpretive river trail, solar-powered clubhouse, native plant gardens and walkways with educational exhibits.

Putting Green 9-hole miniature golf course

The mission of this nine acre riverside park and environmental learning center is to educate and also inspire people to make choices to create a healthier planet. Field trip opportunities are offered to schools and other organizations and groups to learn about Putting Green and the natural environment of the Minnesota River. Putting Green Inc. stresses the involvement of high school students in the overall operation of the site and programs.

A cooperative project between MRCI Worksource New Ulm (creates opportunities for people with disabilities or disadvantages to help them to play a role in the community) and Putting Green, Inc. was launched in the spring of 2008 to develop a sustainable farm on the Putting Green property along the Minnesota River in New Ulm. The goals of the project included providing sustainable work opportunities for MRCI clients while enhancing community engagement and providing healthy, locally-grown fresh food.

Two acres of the property not being used were cultivated to produce flowers, herbs, vegetables and fruits under the title of "Growing Green Mini-Farm." The food is grown in environmentally-friendly ways by using no herbicides or pesticides and sold locally to protect environmental resources and reduce transportation costs. Over 30 different vegetables and herbs have been grown and distributed in weekly allotments through the Community Support Agriculture Program (CSA).

Sustainable Gardens at Putting Green

28. Coalition for a Clean Minnesota River (CCMR)
Founded in 1990 by New Ulm area citizens concerned with water quality problems in the Minnesota River, this non-profit organization continues to celebrate the river, promote the potential of the river and fight for its future. CCMR works with over 40 organizations and hundreds of citizens to build effective networks on the state and national level to develop public policy to improve and protect the Minnesota River.

Accomplishments have ranged from successfully lobbying for the establishment of Conservation Reserve Enhancement Program (CREP) in the Minnesota River Basin, producing the Minnesota River Watershed Drainage Policy Reform Report and hosting the successful Riverblast celebration annually at Riverside Park in New Ulm. CCMR works closely with the other two major citizen groups in the basin – Clean Up the River Environment (CURE) and Friends of the Minnesota Valley – on a variety of projects including Conservation Drainage workshops, Community Clean-ups and raising the profile of a citizen-based effort to stop the construction of the proposed Big Stone II Coal Plant.


Water Parade at Riverblast

CCMR sponsors an annual Minnesota River Banquet focusing on issues and success stories related to the basin. Experts have come across the basin to answer questions about Fish and Fishing on the river, Hard Rock Outcroppings, Conservation Drainage Symposiums, Community Clean Ups for Water Quality and The Minnesota River.

29. Minnesota River and Cottonwood River Regional River History & Information Center
The Coalition for a Clean Minnesota River along with local citizens worked together to renovate and open the old Riverside Park schoolhouse into a Regional River History and Information Center. The center provides the public access to online water quality data information on the Minnesota River and Cottonwood River watersheds, along with displays highlighting historical and cultural artifacts. Educational outreach is a main focus of the center including offering environmental education programs and public presentations. Curator and nature photographer Ron Bolduan offers a wide range of presentations including "Bison Skulls to Turtle Shells," "Camouflaged Critter Hunt," and "Life on the River" throughout the basin.


Interior of the River Center

River Advocate – Scott Sparlin
Scott Sparlin first became interested in the degraded water quality of the Minnesota River in the 1980s when his son asked why they weren't catching more fish. As a result, Sparlin helped organize the Coalition for a Clean Minnesota River (CCMR) in 1989, becoming its first and only executive director. Focusing on the middle portion of the Minnesota River, CCMR and Scott Sparlin work with over 40 organizations and hundreds of citizens to create and nurture relationships among the public and provide an extensive network to link river supporters together. Sparlin also works as a watershed coordinator for the Friends of the Minnesota Valley focusing on the watersheds of Le Sueur Creek, Rush River and High Island Creek. As one of the first people to recognize the need for a healthy Minnesota River, Scott has spent a lot of time exploring, fishing and observing this important resource.


Joe Michel, Scott Sparlin and Del Wehrspann

30. New Ulm Wastewater Treatment Plant
To meet the new state phosphorus standards for the Minnesota River phosphorus, the City of New Ulm built a new $3 million system to biologically reduce phosphorus levels. Single-cell organisms in the wastewater, similar to amoebas, eat the phosphorus and after dying off they are collected along the produced sludge. New Ulm wanted to be proactive and lead by example as one of the largest municipal wastewater treatment plants in the Lower Minnesota River to protect the river environment. In 2007, the wastewater plant discharged over 30,000 pounds of phosphorus into the Minnesota River and now reduced by 80 percent or fewer than 6,000 pounds annually with the new wastewater system.


New Ulm Wastewater Treatment Plant

31. Capitol for a Day – New Ulm

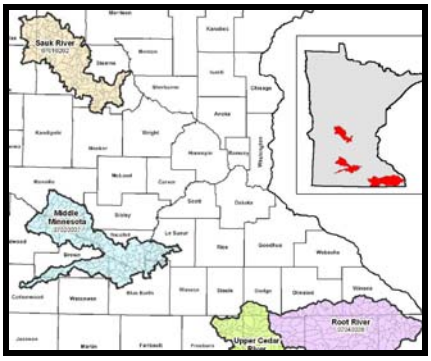
In May 2009, New Ulm hosted Capitol for a Day to celebrate the Minnesota River at the Riverside Park. The main focus of the event was the release of a huge, tagged flathead catfish by Lt. Governor Carol Molnau and an elementary school student who won a catfish essay contest. The fish was released by a boat in the middle of the Minnesota River.

Release of a catfish into the Minnesota River

A variety of activities for kids were offered including learning how to cast for fish, making fish prints and learning about fish species who make their home in the Minnesota River along with informational booths on invasive species, a turtle telemetry study, shoreline planting, invertebrates and mussels. The goal of the day was to highlight New Ulm as a proud historic town, promote a greater understanding of why our state's namesake river deserves better treatment than it has received in the past, and provide a fun outdoor recreation experience for kids. The event was sponsored by the DNR, City of New Ulm, the New Ulm Sport Fishermen's Club and KNUJ Radio.

32. Miss. River Basin Healthy Watersheds Initiative

Launched by the U.S. Department of Agriculture, this initiative will provide $320 million to 41 watersheds in 12 states including the Middle Minnesota River Watershed to implement BMPs on agriculture land to reduce hypoxia in the Gulf of Mexico. Smaller watershed projects will be selected through a competitive process under the Cooperative Conservation Partnership Initiative, overseen by the NRCS. Federal funds will be used to help farmers implement conservation practices to prevent, control and trap runoff, primarily nutrients like nitrogen and phosphorus – from agricultural land. Practices under this program include planting buffers and restoring wetlands to controlling soil erosion, improving water quality and providing wildlife locally while also shrinking the Gulf of Mexico's "dead zone," a large area affected by low dissolved oxygen.



33. Swan Lake Wetland Litigation

The Swan Lake Area Wildlife Association has been pursuing a lawsuit against the Nicollet County Board of Directors since 2003 over county officials approving the drainage of two shallow lakes and associated surrounding wetlands. The two lakes – Little Lake and Mud Lake – are located two miles east of the City of Nicollet. Mud Lake is part of Little Lake's tributary system. Both lake's water levels had been maintained by a dam built in 1949 at Little Lake's outlet.

After the dam began to fall apart in 1960s, the county requested a permit to build a new, longer dam. When the Commission of Natural Resources (now the Department of Natural Resources) noted the natural elevation of the lake should be higher, the county didn't repair or replace the dam. Under a recent court ruling, the county will be responsible for maintaining water levels set by the DNR. Ultimately, the Swan Lake Area Wildlife Association is hoping 1,200 acres of wetlands will be restored.

Swan Lake

34. Paired Watershed Studies for Nutrient Reduction

Two adjacent watersheds in Nicollet County were part of a study to evaluate the effectiveness of Best Management Practices for improving water quality. A coalition of partners – University of Minnesota, Nicollet SWCD, Nicollet County Environmental Services and United Farmers Cooperative worked with 26 producers in the two 2,800 acre watersheds. To obtain a baseline water quality data, three years of monitoring was conducted in both the treatment and control watersheds along with conducting farmer surveys to determine management practices and production costs.

During the implementation phase during the 2003 to 2005 crop years, a number of BMPs were utilized: grid soil sampling for phosphorus (41 percent of the crop acres, 20 percent of total watershed acreage), fall no till of soybean residue (10 percent of eligible acreage), manure hauling, replacing surface tile inlets with rock tile intakes (33 percent of inlets), replacing surface tile inlets with hinkenbottom risers (20 percent of inlets), and installation of riparian buffer strips (12 acres along one mile of the drainage ditch).

The control watershed implemented no BMPs. Water quality data showed no significant reduction in sediment, phosphorus or nitrogen rates were observed. Farmers were very receptive to reduced tillage of corn residue, grid soil sampling for variable rates phosphorus application and elimination of surface tile inlets. The installation of riparian filter strips and fall no-tillage of soybean residue were moderately accepted by farmers. They showed little desire to make changes in nitrogen fertilizer management.

35. Red Top Farm Demonstration Site

In 1993, the Minnesota Department of Agriculture established a long-term research/demonstration site to show the effects of farm practices on tile water quality in Section 23 of Oshawa Township in Nicollet County. The field tiles drain to County Ditch #13 and into Seven Mile Creek. The 80 acre site provides a unique opportunity to study the quality and quantity of water and agricultural chemicals moving through the subsurface tile drainage system from a field scale setting. The overall concept of the Red Top Farm is to provide an educational hands on site for farmers, agricultural professionals and the non-agricultural community to learn about the effects of subsurface drainage system. The site has hosted many educational field days, featured in numerous agricultural magazines and newspaper articles, and allowed opportunities for educational outreach at various meetings. Long term data has proven to be instrumental in understanding water quality from field scale drainage under different management strategies.

Field Tour at Red Top Farm

36. State Highway 169 Erosion Control

Nicollet Soil and Water Conservation District worked NRCS on behalf of the Minnesota Department of Transportation to reduce sedimentation along State Highway 169 between Mankato and Le Sueur. The NRCS and SWCD worked together on intensive engineering and construction inspection, saving the project thousands of dollars over hiring a private firm to do the work. Seven landowners in upland areas used cost-share from the SWCD and NRCS to complete 25 sedimentation reduction projects with an estimated 657 tons of soil saved annually and a total of 150 percent reduction of peak flow.

Sediment Control Basin

37. Pehling Farm

Joe and Liza Domeier run a pasture-fed livestock and poultry on a 30 acre farm near Nicollet. Instead of going the row crop farming route, the Domeier's choose to raise pasture-fed animals like sheep, hogs, chickens and beef. While it may mean slower growth, it also makes for healthier and more flavorful meats. To be profitable on this small of acreage, they sell their meat and fiber from their sheep flock wholesale directly to their customers from their web site. Direct marketing allows more money to be generated from the land. Along with livestock and fiber, the couple are involved in community-supported agriculture (CSA) by selling shares of their farm's garden. The long-term goal of the Domeier's farm is to make a living. They help promote the CSA program through presentations including at the Organic Community Gardening sponsored by the Center for Earth Spirituality and Rural Ministry.

38. Lake Washington Water Quality Project

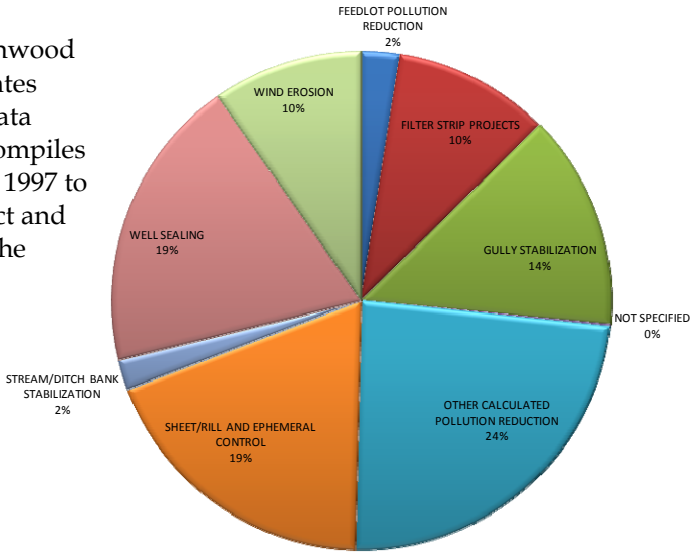
Le Sueur County sponsored a project organized by the Lake Washington Improvement Project Board to conduct a watershed assessment, stream and lake monitoring, an information and awareness programs and comprehensive planning for this 1,600 acre lake. Other cooperators involved in the project were Blue Earth County, Blue Earth SWCD, Minnesota State University Mankato WRC, and MPCA. Results of the implementation phase included the establishment of a Lake Washington Sanitary District that provided wastewater hook-ups to about 500 properties by connecting it to the City of Mankato's wastewater treatment plant. Other water quality improvements included upgrading 39 septic systems, construction of three water retention ponds and five rain gardens to reduce sediment and nutrient loading and seasonal lake monitoring to analyze any potential water quality changes. A wetland bank has also been established in the watershed.

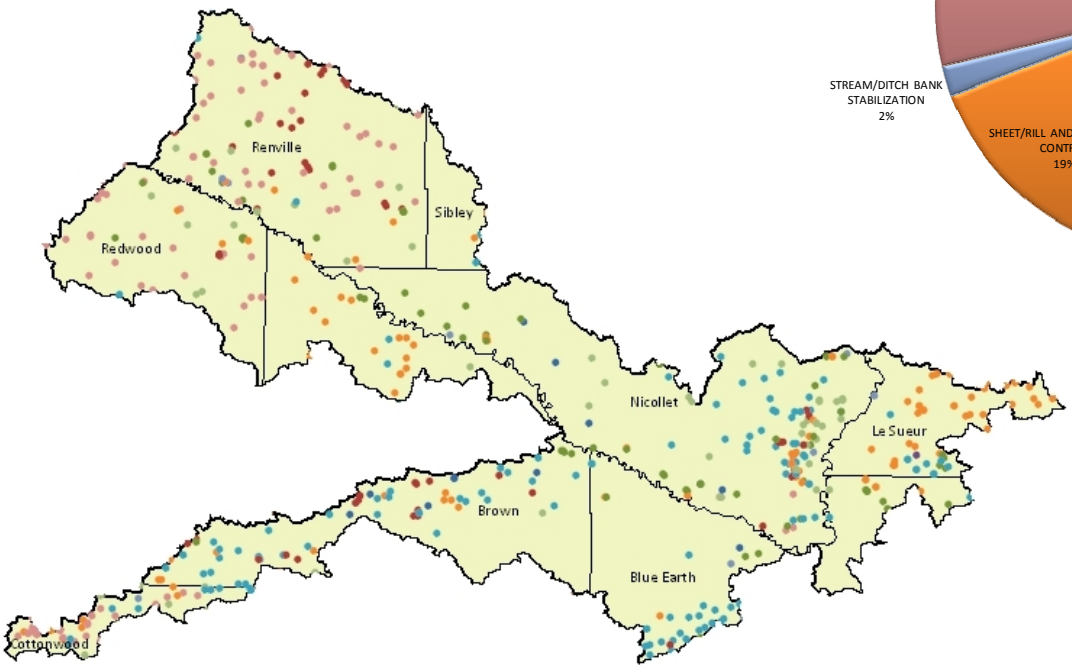
Middle Minnesota River Watershed Conservation Practices and Land Use

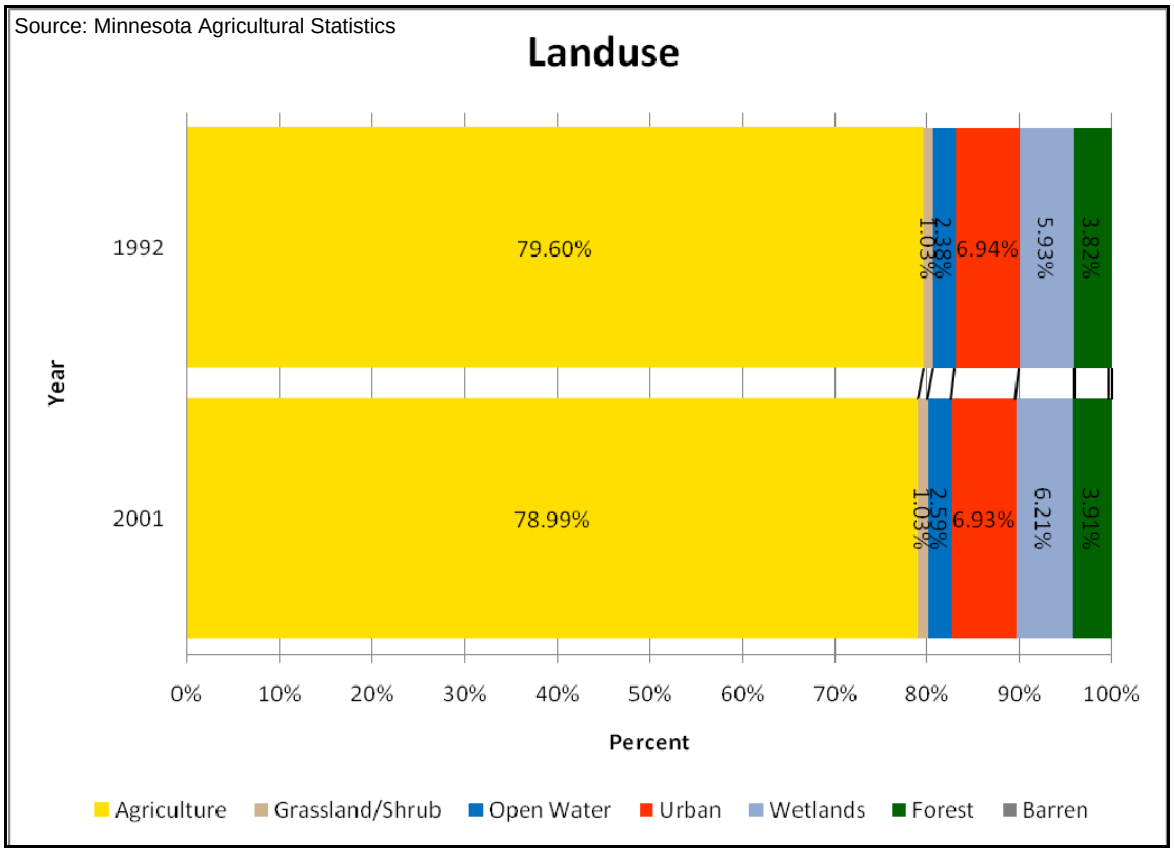
Conservation Practices

Work on understanding water quality issues in the Middle Minnesota Watershed started in the late 1990s with the Brown Nicollet and Cottonwood Water Quality Board. The map below and pie chart at the right illustrates conservation practices in this watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Minnesota River Basin but not recorded in either LARS or eLINK.

Middle Minnesota River Major Watershed



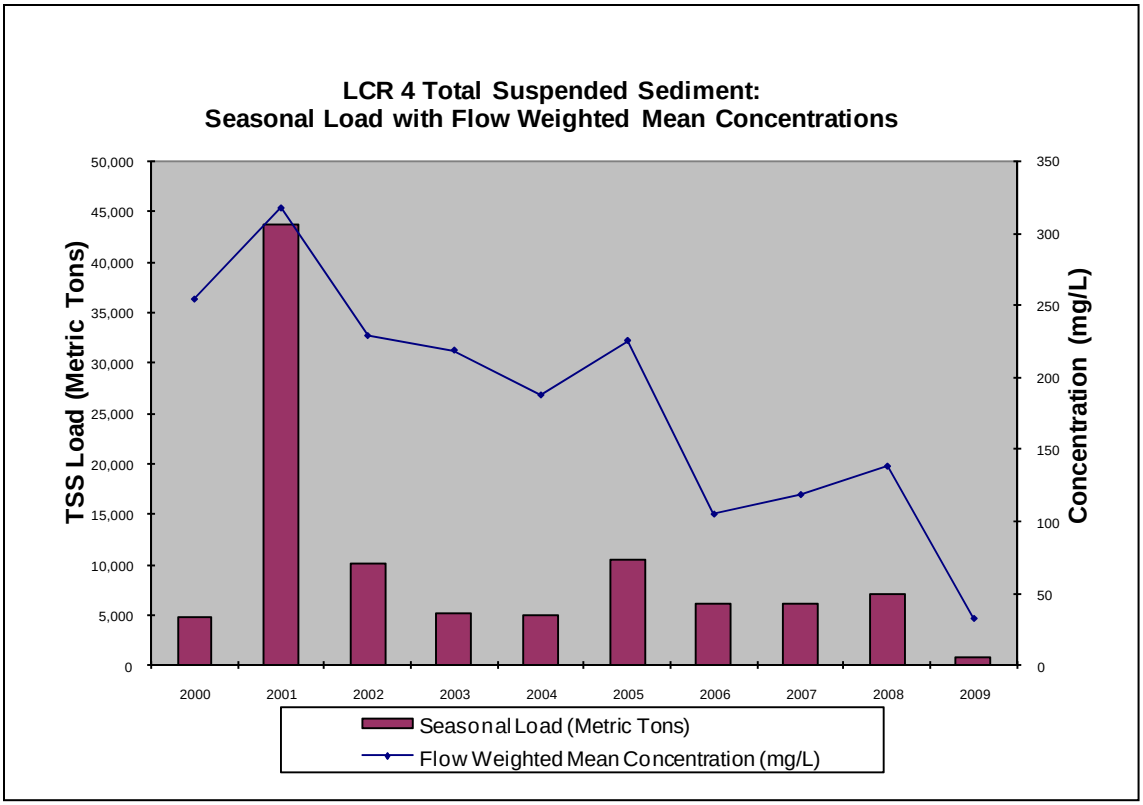




Middle Minnesota River Watershed Pollution Reduction

Water quality sampling for the Middle Minnesota River Watershed has primarily focused on the Little Cottonwood River, the watershed's majority tributary. The Brown Nicollet Cottonwood Water Quality Board (BNC) handled water quality monitoring on the Little Cottonwood River from 1996 to 2009.

Analysis of the general runoff conditions in the watershed must be considered when evaluating possible trends in pollutant loads. In an effort to determine relative deviations from normal, runoff values were compared for each year. The 30 year runoff average or normal for the Little Cottonwood River Watershed has been calculated to equal 5.8 inches.

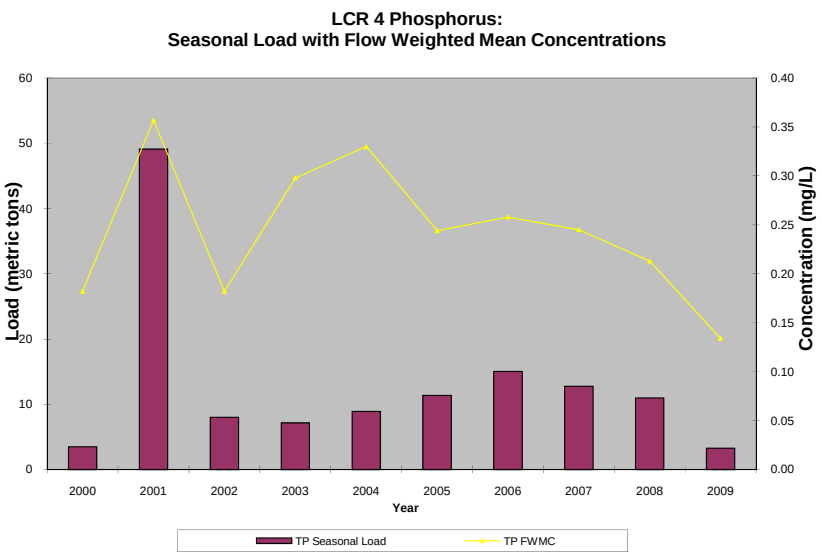


Total Suspended Solids

A total of 203 Total Suspended Solids (TSS) samples were taken between 1996 and 2009 by the Brown – Nicollet – Cottonwood Water Quality Board (BNC) at the outlet of the Little Cottonwood River. When concentrations are plotted by year, a statistically non - significant decreasing trend is observed from 1996-2009 ($p < 0.12$, $n=203$). In addition to total annual runoff, timing and intensity of precipitation drives sediment transport and delivery. Because of seasonal differences in precipitation and land cover, the watershed also shows seasonal differences in water quality.

TSS concentrations are typically higher early in the monitoring season with peak concentrations occurring in June. By late June to early July, the Little Cottonwood River generally has receding flows due to limited precipitation and high rates of evapotranspiration. These factors combined with a developed vegetative canopy reduce surface runoff and near channel erosion, resulting in lower TSS concentrations as the season progresses.

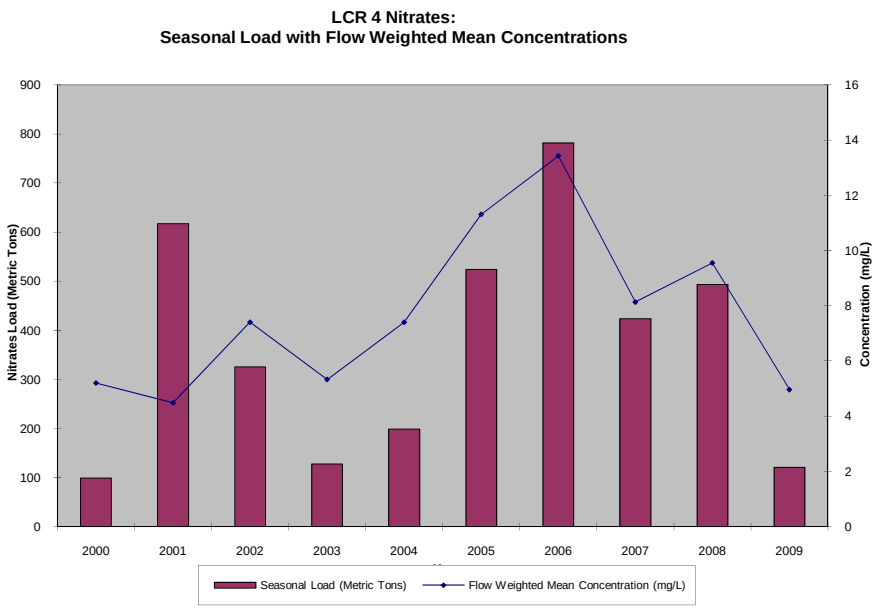
On average, a total of 9,963 metric tons or 203 lbs./acre of sediment was delivered to the Minnesota River from the Little Cottonwood River per year. This resulted in an average flow weighted mean concentration of 183 mg/l. Despite these concentrations the figure does indicate a decreasing trend for sediment load delivery to the Minnesota River. This "trend" might be partially an artifact of the extreme 2001 sediment loading event rather than an actual marked improvement to water quality. However, thousands of acres of marginal land were enrolled in conservation programs such as CREP and CRP in the Little Cottonwood Watershed over the past decade. These efforts have likely reduced sediment delivery to the river and therefore improved water quality.



Total Phosphorus

A total of 203 Total Phosphorus (TP) samples were taken between 1996 and 2009 by BNC at the outlet of the Little Cottonwood River. TP concentrations did not show a statistically significant trend when plotted by year. As with TSS, TP shows temporal concentration differences. This can be seen by average monthly concentrations of TP with relatively high phosphorus levels during the early season high flow conditions followed by gradually declining concentrations as the season progresses.

On average, a total of 13 metric tons or 0.26 lbs./acre of TP was delivered to the Minnesota River from the Little Cottonwood River per year. This resulted in an average flow weighted mean concentration of 0.244 mg/l. Phosphorus has an affinity to bind to soil particles. Therefore, it is not surprising that seasonal TP loads closely mirror the TSS loads shown in Figure 4. Likewise, conservation measures such as CREP and CRP that reduced sediment transport likely reduced the amount of sediment bound phosphorus reaching the Little Cottonwood River.



Nitrate Nitrogen

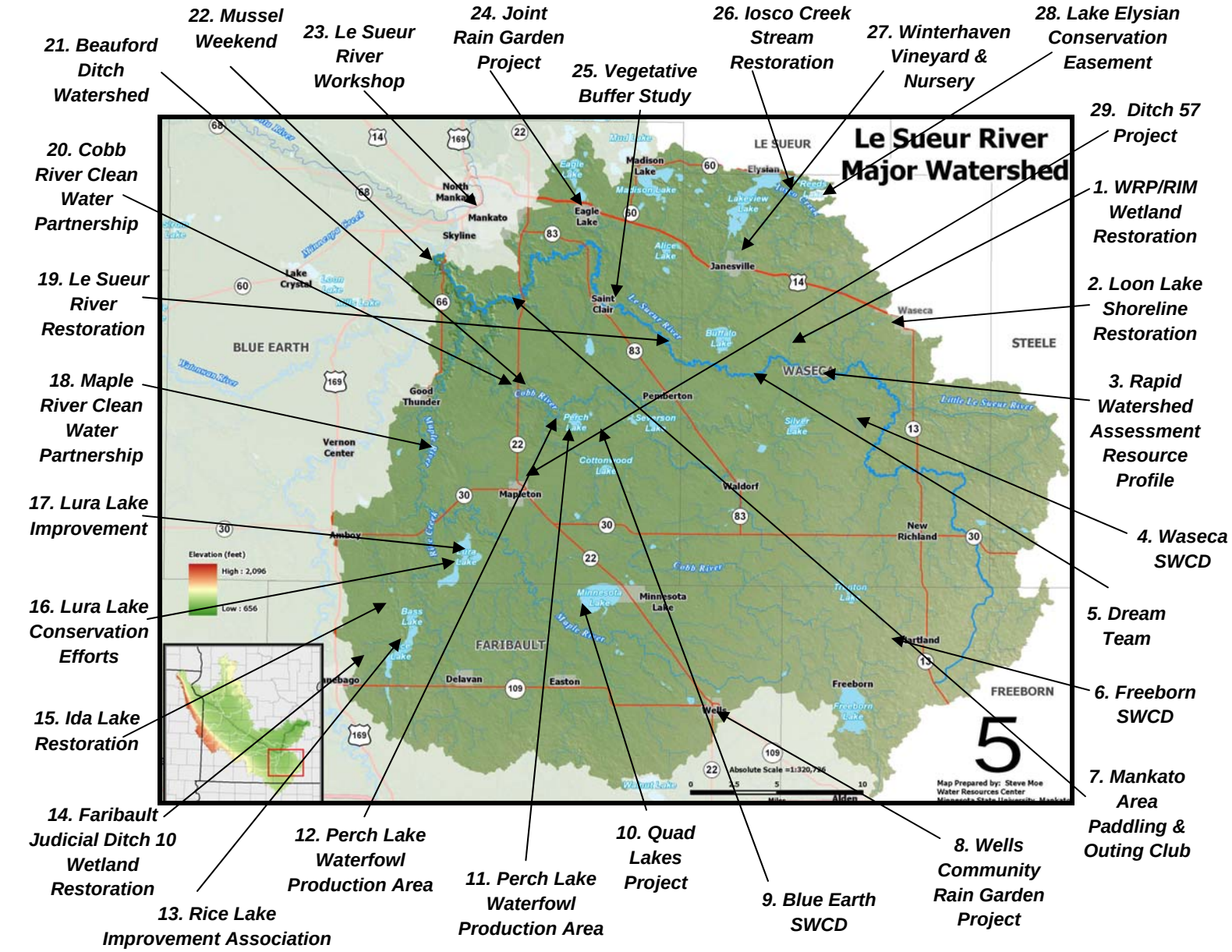
A total of 201 samples have been analyzed for nitrate-nitrogen from the Little Cottonwood River outlet site by BNC. The median NO_3-N concentration at the outlet of the watershed was 7.97 mg/L. When NO_3-N concentrations are plotted by year, no statistically significant trend exists ($n = 201$; $p < 0.63$). According to average monthly concentrations of NO_3-N at the Little Cottonwood River outlet, concentrations rose to a peak in June, followed by a steady decline until fall rains and reduced evapotranspiration increased tile and ditch run-off.

On average, a total of 371 metric tons or 7.57 lbs./acre of NO_3-N was delivered to the Minnesota River from the Little Cottonwood River per year. This resulted in an average flow weighted mean concentration of 7.72 mg/l. Peak nitrate loads were observed in 2006, though this year experienced only slightly higher than normal runoff conditions (9.5% greater than normal). Nitrogen application rates and crop rotations might have played a part in the elevated nitrate loading.

LE SUEUR RIVER WATERSHED

As the seventh largest watershed in the Minnesota River Basin, the Le Sueur drains approximately 1,112 square miles or 711,838 acres. The Le Sueur River Watershed is part of the Greater Blue Earth River Basin along with the Watonwan River and Blue Earth River watersheds. The watershed's population of less than 45,000 people is divided among 20 communities and farmsteads with Waseca and Janesville being the largest cities. There are over 30 lakes in the Le Sueur River with 1,200 miles of streams including the Cobb, Maple and Little Le Sueur rivers. Starting out in Freeborn County, the Le Sueur River flows north and west to its confluence with the Blue Earth River, three miles upstream of Minnesota River confluence. The watershed is characterized by its gently rolling glacial moraine along with bluffs outlining the lower reach of the Le Sueur River.

Mussel Survey on the Le Sueur River



21. Beauford Ditch Watershed
22. Mussel Weekend
23. Le Sueur River Workshop
24. Joint Rain Garden Project
25. Vegetative Buffer Study
26. Iosco Creek Stream Restoration
27. Winterhaven Vineyard & Nursery
28. Lake Elysian Conservation Easement
29. Ditch 57 Project
20. Cobb River Clean Water Partnership
1. WRP/RIM Wetland Restoration
19. Le Sueur River Restoration
2. Loon Lake Shoreline Restoration
18. Maple River Clean Water Partnership
3. Rapid Watershed Assessment Resource Profile
17. Lura Lake Improvement
4. Waseca SWCD
16. Lura Lake Conservation Efforts
5. Dream Team
15. Ida Lake Restoration
6. Freeborn SWCD
7. Mankato Area Paddling & Outing Club
14. Faribault Judicial Ditch 10 Wetland Restoration
13. Rice Lake Improvement Association
12. Perch Lake Waterfowl Production Area
11. Perch Lake Waterfowl Production Area
10. Quad Lakes Project
9. Blue Earth SWCD
8. Wells Community Rain Garden Project

The Le Sueur River flows past many high cliffs of glacial drift. Sand and gravel bars, softened by willow thickets, are common along the river. The marrow river occasionally sprawls into wide shallows. In its last five miles, high wooded bluffs flank a channel that has grown considerable in width and depth. – Lynne and Robert Diebel, Paddling Southern Minnesota, 2007

LE SUEUR RIVER WATERSHED

The Greater Blue Earth River Basin Alliance focuses on improving water quality in the three watersheds that make up the Greater Blue Earth River Basin including the Le Sueur River Watershed. Other water quality efforts are handled by a diverse group of organizations including the Mankato Paddling and Outing Club, Lura Lake Association and two clean water partnerships – Maple River and Cobb River.

1. Waseca Wetland Restoration Program

A joint federal Wetlands Reserve Program (WRP) and the state's Reinvest in Minnesota Resources (RIM) combine funding and technical expertise to pay landowners to permanently protect critically sensitive land by taking it out of cropland and restoring wetlands and prairie uplands. One farmer and conservationist in Waseca County has enrolled 77 acres in the federal-state program, restoring a 15 to 25 acre wetland and improving upland cover for wildlife. In addition to paying land owner, Tom Bauman for the permanent easement, the program also pays for the wetland and upland restorations. Originally this piece of property had been part the 200 acre Canfield Lake prior to the 1930s when it was drained by digging a ditch.

Wetland Restoration in Waseca County

2. Loon Lake Shoreline Restoration

Waseca SWCD has been working with volunteers and local citizen groups including the Waseca Garden Club, Waseca Lakes Association and Loon Lake Lakeshed Committee to improve water quality in Loon Lake located on the outskirts of Waseca. A DNR Shoreline Habitat Restoration grant helped restore 1,100 feet by 35 feet of degraded shoreline by planting over 8,000 aquatic and upland native forbs and grasses. This successful project has motivated the Waseca SWCD to work with other Loon Lake landowners on other conservation projects. They have also completed several shoreline restoration sites on Lake Elysian in the far northern part of Le Sueur River Watershed.

Shoreline Buffer at Loon Lake Park

3. Rapid Watershed Assessment Resource Profile

The Natural Resources Conservation Service (NRCS) conducted a rapid watershed assessment resource profile on the Le Sueur River Watershed. According to the NRCS, these rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of the landowners, conservation districts, and other community organizations and stakeholders. Ultimately, these assessments help landowners and local leaders set priorities and determine the best actions to achieve their goals. The resource profile takes in account the physical description, ownership/land use, water assessment, geology/soils, drainage, land capability and other factors. The watershed's SWCDs' identified seven resource concerns as top priorities for conservation and cost-sharing efforts: (1). Sediment and erosion control; (2). Storm-water management; (3). Drinking water and source water protection; (4). Feedlot and management; (5). Nutrient management; (6). Wetland management; and (7). Drainage management. The report states that many of the resource concerns relate directly to topography, agricultural practices and increased development in the region resulting in increased sediment and pollutant loading to surface and ground water.

Eroding banks on the Le Sueur River

4. Waseca SWCD

The Waseca Soil & Water Conservation District has primarily worked with agricultural water quality/ quantity issues and erosion concerns, focusing on the need for wetland restorations, nutrient and pesticide use reduction, wildlife habitat and other conservation practices. Today, this SWCD has also been assisting with urban issues including residential lakeshore restorations and rain garden installations.

In addition to helping with the Tom Bauman's WRP/RIM project, Waseca SWCD also worked with a 160 acre WRP/RIM project on the Le Sueur River. To the south of this tract is a 127 acre CREP permanent easement and another 30 acres on the west edge. On the Little Le Sueur River approximately 470 acres have been enrolled into CREP.

CREP easement along the Le Sueur River

5. Dream Team

A diverse group of organizations participated in a Le Sueur River study to identify sediment sources for one of the most impaired watersheds in the Minnesota River Basin. This ground-breaking research project involved the Minnesota Geological Survey, Minnesota Pollution Control Agency (MPCA), Minnesota State University WRC, Mankato, University of Minnesota's St. Anthony Falls Lab, John Hopkins University, and the National Center for Earth Dynamics, part of the National Science Foundation. Known as the "dream team," the university research groups conducted a variety of tests and ongoing research to pinpoint how much sediment is flowing from the river and its sources. MPCA took part in the research by conducting a biological study of all living creatures – macroinvertebrates, fish and turtles.


Carrie Jennings on a MN River bluff

6. Freeborn SWCD

About 100,000 acres of the northwest corner of Freeborn County is part of the Minnesota River Basin and Freeborn SWCD is a member of the Greater Blue Earth River Basin Alliance (GBERBA). As part of this alliance, Freeborn SWCD installed 13 water and sediment control basins on land owned by five different landowners. Just under $20,000 was paid to the landowners as cost-share to encourage them to install needed erosion control measures. Over 500 acres of marginal cropland was converted into productive wetlands under the CREP signup. The native grasses and forbs planted on the fringe areas are now well established and depict the original prairie/pothole landscape that once covered much of the county.


Sediment & Water Control Basin

7. Organization Spotlight - Mankato Area Paddling and Outing Club

The mission of this volunteer-based group is to participate and lead a wide variety of outdoor activities including canoeing, kayaking, biking, cross country skiing, etc. and network with people of similar interests. Founded in 1993 by Bob Zoet, the Mankato Paddling and Outing Club (MPOC) holds regularly monthly meetings, puts on a annual River Valley Cleanup on area rivers in the spring and hosts a picnic every year in the summer. MPOC adopted a stretch of the Le Sueur and Blue Earth rivers to pick up garbage and other junk along the shoreline and at the access points. In 2001, the club undertook a coordinated survey of all the dumpsites and navigation hazards on every river in the Blue Earth Watershed for county environmental services. Over the next four years they paddled 305 miles on six different rivers and recorded 300 dumpsites or roughly every mile. Blue Earth County wanted to spur interest in cleaning up the dumpsites including a large one in Good Thunder.


MPOC Summer Picnic

8. Wells Community Rain Garden Project

A new, innovative and proactive project was initiated by the community of Wells to promote the construction of the rain gardens by residents in the city. City staff, elected officials and residents worked together to organize an event with two different work-shops to develop rain gardens. The Greater Blue Earth River Watershed Basin's Small Community Stormwater Program participated in the event along with the Minnesota Erosion Control Association to teach citizens how to plan and construct rain gardens.

Broadway Apartments' Rain Garden

Triple Falls on the Blue Earth River

9. Blue Earth SWCD

A total of 172 permanent easements for a total of 5,329 acres have been established on privately owned lands in Blue Earth County through CREP. One group project involved six different landowners who enrolled 340 acres in a large wetland restoration project. Some project work continues to be completed with routine maintenance to many of the easements. The program brought together local, state, and federal officials, conservation groups, and interested landowners to work collectively to restore the Minnesota River Basin. The Blue Earth SWCD has also led efforts with the Greater Blue Earth River Watershed Initiative through a partnership with Three Rivers Resource Conservation & Development (RC&D) to install conservation practices, the Maple River Watershed Clean Water Partnership and Cobb River Watershed Project.

10. Quad Lakes Project

A diverse selection of partners along with funding from the State of Minnesota has been involved in the preservation of Minnesota Lake through the Quad Lakes Project. The goal is to capitalize on the public's growing interest in non-game wildlife and bird watching to improve the quality of life and promote tourism in southern Minnesota.

On Minnesota Lake, the project will stabilize the shoreline to improve water quality. As one of three nest areas of the American Pelican in the state, Minnesota Lake provides habitat for thousands of ducks, geese and other waterfowl. Minnesota Lake also provides recreational opportunities for fishing, paddlers and photography.

Old Mill Pond at Minnesota Lake

Faribault SWCD has been cooperating with various partners - DNR divisions, Pheasants Forever, Faribault County Deer Hunters Association, Martin and Faribault County Turkey Association, Blue Earth SWCD, the University of Minnesota Extension Service, and others to restore and protect Minnesota, Rice, Bass and Lura lakes along with other area lakes and wetlands.

11. Perch Lake Waterfowl Production Area

The Minnesota Valley Trust utilized funding from a settlement between the U.S. Fish and Wildlife Service and Metropolitan Airports Commission to purchase and restore habitat on Perch Lake. This important migratory waterfowl lake located in Blue Earth County will be donated to the U.S. Fish and Wildlife Service to serve as a waterfowl production area (WPA). One parcel located on the south end of the lake has seen the retirement of cropland and planted with a diverse grass and prairie seed mix along with restoring wetlands on the 150 acre parcel. Adjacent to the 586 acre Cobb River WPA (under USFWS management since 1995), the Perch Lake WPA will provide significant waterfowl and wildlife habitat benefits for more than 10,000 migrating waterfowl.

12. Living Lakes Initiative – Perch Lake

Perch Lake is a 480 acre shallow lake that is part of the Ducks Unlimited's "Living Lakes Initiative. The other parcels of the Perch Lake WPA are located on the northwest side including the lake's outlet, allowing the DNR to manage water levels through a new control structure installed by Ducks Unlimited. In addition, the buildings and concrete pads of an abandoned dairy site on the lake's west end have been removed and the site graded and seeded with native mixes to promote diversity, prevent erosion and create wildlife habitat. Other funding and habitat restoration work for this Perch Lake improvement project has come from the Minnesota Environment and Natural Resources Trust Fund, North American Wetland Conservation Act, Blue Earth SWCD, Minnesota Pheasants, Inc – Blue Earth, and the U.S. Fish and Wildlife Service.

River Advocate – Brand Frentz

One of the most dedicated paddlers in the Greater Blue Earth River Basin is Brand Frentz, a long-time member of the Mankato Area Paddling and Outing Club. Brand has paddled many of the rivers in the Minnesota River Basin. His favorite is the Cobb River, especially the last eight to 10 miles. He also includes the Blue Earth, Maple, Watonwan and Le Sueur rivers as ones he likes to paddle. As a member of the Mankato Area Paddling and Outing Club, Brand helped coordinate the survey of all the dumpsites and navigation hazards on every river in the Blue Earth Watershed. In addition to Brand helping organize many of the river clean-ups sponsored by the club, he has also been a dedicated member of the Friends of Minneopa State Park.


Brand Frentz and Bob Zoet paddling the MN River

13. Rice Lake Improvement

Designated as a wildlife management lake by the DNR, the 1,166 acre Rice Lake will be part of a shallow lake enhancement project. Ducks Unlimited will use grant monies from the Outdoor Heritage Fund to build a water control structure and fish barrier. Rice Lake is considered one of the most important duck migration and brood-rearing habitat in the state and will see periodical drawdowns of water levels to induce winterkill of invasive fish and rejuvenate the aquatic ecology of these large wetland basins. According to Ducks Unlimited, these temporary, periodic draw-downs that mimic natural drought cycles are used to be rejuvenate wetlands, much like fire does to prairie grassland systems. Staff from Ducks Unlimited and DNR will work together to conduct assessment surveys, develop a design and oversee construction of the structure.

14. Faribault Judicial Ditch 10 Wetland Restoration

This project restored two large drained wetland basins along the upper reaches of the Judicial Ditch 10 drainage system. The system drains approximately 2,920 acres of land before emptying into nearby Rice Lake in northwestern Faribault County. The state of Minnesota, through the Board of Water and Soil Resources partnered with Faribault SWCD, local drainage authority and several landowners to secure four perpetual conservation easements from two landowners covering 156 acres to facilitate this project. An alternative to major repair or drainage improvement of the JD 10 system, the intended functions of the project are flood control, drainage system improvement, improved water quality, and wildlife habitat.


Wetland Restoration

15. Ida Lake Restoration

This 120 acre lake located in southern Blue Earth County has been the focus of the Lura Lake Association to improve water quality and public access. The Association helped purchase an 11-acre public access on the northeast shoreline and installed an aeration system to stabilize the lake's fish habitat. A lake reclamation completed in 1998 and the protection of almost one mile of shoreline as the Ida Lake Aquatic Management Area (AMA) has helped to improve fish populations in the lake, now stocked with bluegills, largemouth bass, northern pike and walleyes.

16. Lura Lake Improvement

After Blue Earth County established a park on Lura Lake – a mostly shallow 1,200 acre lake – local residents through a Lura Lake Association began a campaign to improve its water quality by encouraging farmers to reduce phosphorus entering the lake and installing shoreline restoration practices. Over the years, six miles (out of 13 miles) of shoreline have been restored using fieldstone, willow cuttings and grass seeding that cost $130,000 instead of an estimated $1.3 million because of donated labor and materials.

Money was raised through a variety of fundraisers including lutefisk feeds while volunteers installed the rocks, trees and prairie grasses to stabilize the shoreline. Outreach to the farmers was done by kitchen meetings and word-of-mouth. According to Association members, community participation was key to making this a successful project and an outstanding example of how an agricultural community pulled together to restore the landscape.

Lura Lake Fair

After the DNR treated the lake to kill rough fish like carp, they restocked it with game fish and installed two aeration systems to prevent winter fish kills. Lura Lake now supports a healthy fish population of walleye, northern crappies and sunfish. Every year, the Lura Lake Association sponsors a Lura Lake Fair to encourage children to fish and protect water quality. Over 10,000 kids have participated in the annual fair started in the early 1990s.

17. Lura Lake Association Conservation Efforts

In addition to its focus on Lura Lake, the Lura Lake Association has taken on other projects to improve water quality Other conservation efforts by the Lura Lake Association include purchasing 293 acres of farmland along the Blue Earth River near Winnebago and an adjacent 72 acres of land that was never broken.

On Rice Lake, the Association helped purchase a 148 acre wildlife management area with 3,200 feet of shoreline. The property was planted with prairie grasses and flowers and features a grass walking trail through a 35 acre oak savanna along with bird houses. The purchase of 47 acres known as Wissner Grove for $77,000 was donated to the DNR. The Lura Lake Association has also purchased land on Ida Lake and the construction of a four-acre fishing pond and bird observation station at Minnesota Lake.


Maple River

18. Maple River Watershed Implementation Project

This rural watershed drains approximately 220,000 acres or 340 square miles in Blue Earth, Faribault and Freeborn counties and is a sub-watershed of the Le Sueur River Watershed. The Maple River flows from Penny Lake just over 80 miles into the Le Sueur River upstream of Red Jacket Park near Mankato. From 2003 to 2006, the Maple River Watershed Implementation Project completed the following accomplishments: established three nutrient management plots on 500 acres; upgraded six out-of-compliance septic system; installed six rock grass waterways; restored three wetlands; conducted a hydrologic/hydraulic analysis on Judicial ditch 20; developed a project web site and hired Blue Earth Consulting to do demonstrations of nutrient management plots.


Water & Sediment Control Basin Inlet structure

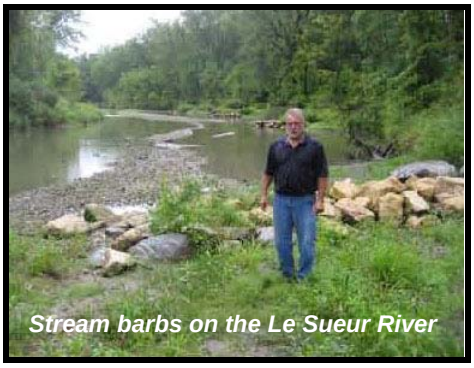
Two educational sites were established, one on a CREP wetland restoration and a native prairie planting on a waterfowl production area. Two rain gardens were installed as demonstration/education sites (Eagle Lake and Faribault) and conducted a storm drain stenciling project in the cities of Amboy and Mapleton. Two newsletters were published and distributed to watershed residents, several public meetings were held and several presentations in the Maple River School District.

Under a continuation grant, the Maple River Watershed Project continued to install a variety of Best Management Practices (BMPs): 12 water and sediment control basins, three rain gardens, six grass waterways, two terraces, 23 alternative tile intakes and four grade stabilizations. Pollution reduction estimates on possible practices came in at 153 pounds of phosphorus, 102 tons of sediment and 324 tons of soil annually. To increase the public awareness of water quality and quantity issues, the project awarded 15 educational grants to schools in the watershed including an environmental field day at the Mapleton River, purchasing trees for a conservation planting and sponsoring the Prairie Ecology Bus.


Environmental Field Day

19. Le Sueur River Restoration

Eugene Braam was selected as the Conservationist of the Year by the Blue Earth Soil and Water Conservation District for his ongoing conservation efforts. On one of the most recent projects, Braam installed stream barbs on a portion of the Le Sueur River to stabilize the stream banks. Most of his land has been enrolled into conservation practices as Braam spends a majority of his free time maintaining habitat through plantings, controlling invasive plants, removing garbage, managing tree habitat. He enjoys offering tips about the benefits of well managed conservation areas.

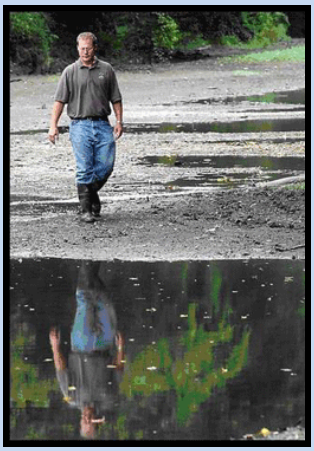

Stream barbs on the Le Sueur River

20. Project Spotlight - Cobb River Watershed

In 2006, the Greater Blue Earth River Basin Alliance (GBERBA) received a Clean Water Partnership grant for $300,000 from the Minnesota Pollution Control Agency to install Best Management Practices in the Cobb River Watershed. Landowners and producers too advantage of cost-share to install a variety of Best Management Practices – grass buffer strips, grass waterways, buffers around open-field tile intakes, wetland restorations and animal feedlot improvements.

There is also $100,000 available in low-interest loans to upgrade septic systems. The Cobb River is on the state's impaired waterway list and is a major pollutant contributor including sediment and nutrients to the Le Sueur River, which empties into the Minnesota River. Counties in this 195,000 acre watershed are Blue Earth, Waseca, Freeborn and Faribault.

In 2009, the Cobb River Watershed Project provided incentive payments for planting Continuous CRP buffers, installing a grade stabilization structure and implementing an upland wildlife habitat planting to help stabilize bare soil on a newly acquired waterfowl production area (WPA). In the fall, five projects started construction but were delayed due to wet weather. A Clean Water Partnership one year Extension Grant was awarded to continue providing Best Management Practices through 2010.




Cobb River

21. Beauford Ditch Watershed

One of the most intensively cropped and studied sub-watershed in the Le Sueur River Watershed is the Beauford Ditch Watershed which has seen a significant effort to improve water quality. Multi-agencies became partners to promote a wide range of Best Management Practices (BMPs) including conservation tillage, upgrading septic systems, filter strips, alternative tile intakes and using wetlands to filter or slow water runoff to initiate a total watershed cleanup. The Beauford Ditch Watershed Project identified a number of key points to help water quality efforts including longer time periods to allow BMPs to work, a broader educational program, an openness by all those involved, local leadership, a need for a combination of education, incentives and enforcement and economics playing an important role.

Le Sueur River Mussel Survey

22. Mussel Weekend

The Minnesota Department of Natural Resources and Minnesota River Watershed Alliance partnered to host a mussel hike on the Le Sueur River for the public. Held at Red Jacket County Park, a DNR macologist led a group of 25 plus people including children (as young as four year-old) on the Le Sueur River to look for mussels. The event focused on introducing citizens to the importance of mussels in the river ecosystem and also conducted a survey of the organisms. By finding and holding live mussels in their hands, DNR and Minnesota River Watershed Alliance hope to help people connect to the Le Sueur River's rich natural resources.

Le Sueur River Mussel Survey

23. Le Sueur River Workshop

On May 12, 2008, citizens, agencies and organizations working in the Le Sueur River Watershed came together for a collaborative workshop. The one day event focused on monitoring and ongoing research to better understand sediment loading and stream health in the Le Sueur River Watershed. Over 30 people attended the workshop to share information about what work has been done and discuss future plans for data collection. The group spent the morning hearing ten minute presentations on numerous watershed project including ones by MPCA about intensive biological monitoring, the National Center for Earth Surface Dynamics on the Le Sueur Sediment Sources and John Hopkins University about creating an economic framework for improving water quality. In the afternoon the group visited a number of monitoring sites on a field trip.

24. Joint Rainwater Garden Project

The Blue Earth and Faribault SWCDs worked together on a joint rain garden project in the two counties. Over 20 rain gardens were installed in the communities of Mankato, Eagle Lake, St. Clair, Delavan, Winnebago and Blue Earth with funding from a DNR Conservation Partners grant. Completed in December of 2005, the $15,000 grant was matched by over $90,000 worth of in-kind from homeowners, volunteers and master gardens helping to construct, plant, and maintain the new gardens. The rain gardens became a teaching tool with numerous articles by area media sources and a tour by Blue Earth County officials.

Rain Garden in Eagle Lake

25. Effect on Vegetative Buffers Study

The Acetochlor Registration Partnership (ARP) in collaboration with the Minnesota Department of Agriculture (MDA) is studying the effect of vegetative filter strips at side-inlet drains on acetochlor concentrations and loads from cropland treated with a registered acetochlor product runoff. Over two phases this project located in the Le Sueur River Watershed will monitor water flowing from side inlets without vegetative buffers for acetochlor concentrations during the first year of the study. In the second phase the study will sample side-inlets on vegetative filter strips to assess how this practice affects acetochlor transport. MDA will use the data to evaluate how Best Management Practices like vegetative buffers have an effect on water quality from Acetochlor concentrations. The Le Sueur River Watershed is listed for acetochlor on the Minnesota's impaired waters. In addition, the study will also look at how the BMPs affect nutrient and sediment transport in agricultural watersheds. Water quality will be monitored in four watersheds of differing types to replicate the results for greater statistical power.


Monitoring water flow from field


Monitoring Equipment


Tour of monitoring equipment

26. Iosco Creek Stream Restoration

To benefit water quality and fish habitat, the Waseca SWCD partnered with the DNR to install fish ladders on culverts blocking fish passage upstream on Iosco Creek. This creek had historically been used by fish for spawning. Other conservation projects benefitting Iosco Creek has included the restoration of a 30 acre wetland that had been partially drained after the construction of a culvert on a township road. Rock cross veins and weirs were installed downstream of the wetland to help prevent the down cutting of the creek, allowing suspended sediment to settle out and re-establish the original creek bed.


Wetland Restoration on Iosco Creek

27. Winterhaven Vineyard and Nursery

Established in the spring of 2000, Winterhaven Vineyard and Nursery currently covers over 10 acres with over 6,000 vines and 17 varieties of grapes. This vineyard located in rural Janesville is constantly expanding and now focusing on the newest cold hardy varieties. To supply new varieties as quickly as possible, the bare-root grape vines are grown as potted plants in a greenhouse. Winterhaven sells many of their bare-root grape vines. Owned by the Winter family, the enterprise expanded in April of 2010 with Indian Island Winery opening its doors to the public, located in close proximity to the vineyard.


Grape Vines at Winterhaven

28. Lake Elysian Conservation Easement

Bryan Jewison has spent his life living along Lake Elysian in the northwest section of the Le Sueur River Watershed and farming the same 300 acres of land his family owned since the mid-1880s. This 60-year bachelor milks 80 head of cattle on a simple, three-generation farm without TV or the internet.

Part of Jewison's land is 3,000 feet of shoreline on Lake Elysian, abutting 50 acres of crop fields and flood plain forest. This pristine property has attracted numerous offers from people to buy the land for development. Instead, Jewison decided to keep the land as is by entering into a permanent conservation easement with the Minnesota Land Trust, a nonprofit organization protecting lands and waters that define communities and enrich the quality of life.


Lake Elysian forested shoreline

The natural shoreline slows the amount of phosphorus entering into the lake helping protect water quality and also preventing erosion problems. Under this conservation easement, the Jewison family and any future farmer will be able to continue producing crops while still protecting the lake shore's natural habitat that Bryan has loved since childhood. Jewison grew up swimming in Lake Elysian and playing on the high ground overlooking the water.

According to Land Trust Executive Director Kris Larson, "A conservation easement is a powerful tool that helps private landowners protect their land today and for future generations. Each easement is unique, tailored to the conservation values of the land while respecting the needs and desires of the landowner." The Minnesota Land Trust works in partnership with interested landowners and communities across the state to preserve important natural and scenic resources by limiting the use and development of their land.


Bryan Jewison

29. Ditch 57 Project

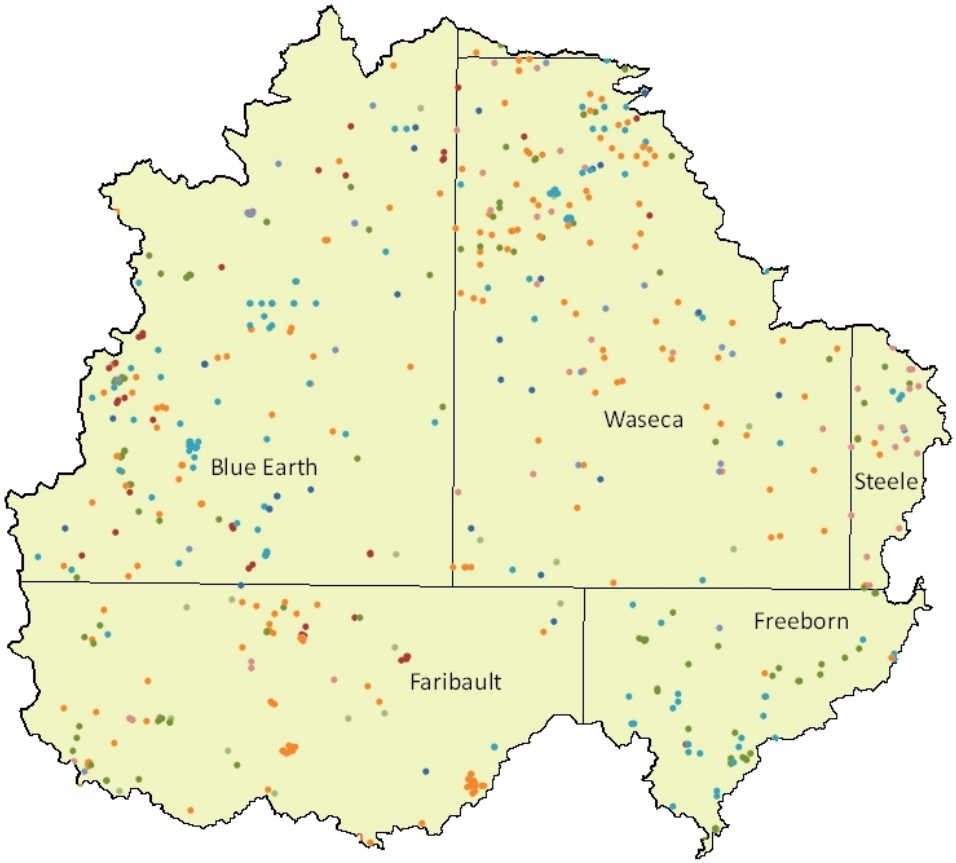
Landowners along Blue Earth County Ditch 57, the city of Mapleton and others received a $485,000 grant from the Legislative-Citizen Commission on Minnesota Resources (LCCMR) to balance the need for draining water off cropfields as quickly as possible with protecting the water resource. The idea behind the project is to "improve water quality, enhance ecological value, and provide a model/tool for agricultural drainage improvements. The results will be beneficial to producers and the environment on future projects."

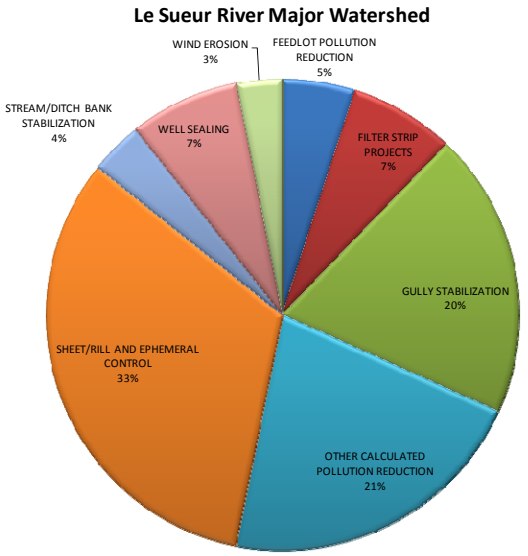
Now with the approval of funding as the first step, next this local group will begin discussions and negotiations with landowners to gage their interest in the installation of conservation practices – i.e. developing a water reservoir or wetland, planting a buffer strip, constructing an erosion structure – to help slow down water and allow sediment to settle out before reaching a waterbody.

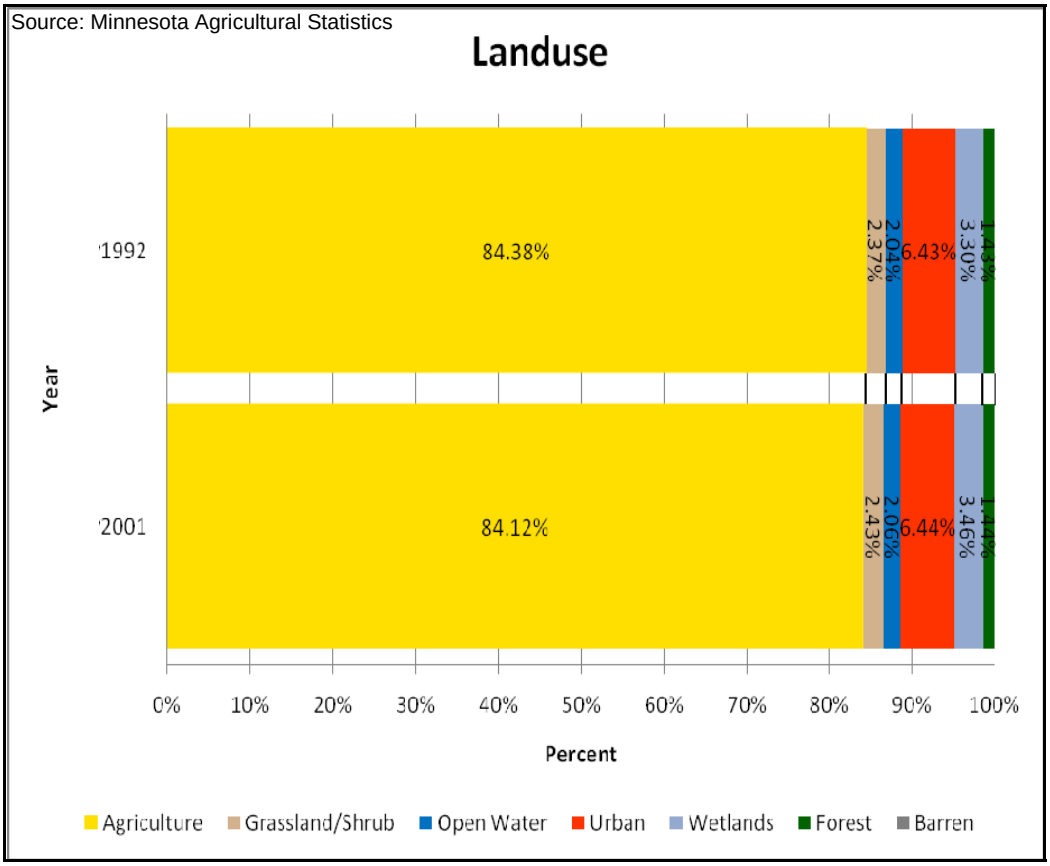
Ditch 57 serves close to 6,000 acres of land and Mapleton's stormwater system. The LCCMR funding would be used to add conservation practices to the ditch system to reduce the sediment load flowing through it and further downstream including the Big Cobb and Minnesota rivers. Landowners will still be responsible to pay for any drainage improvements related to how it benefits their property. Part of the project involves monitoring the water quality to identify any reduction in pollutants like sediment and nutrients.


Ditch 57

Le Sueur River Watershed Conservation Practices and Land Use



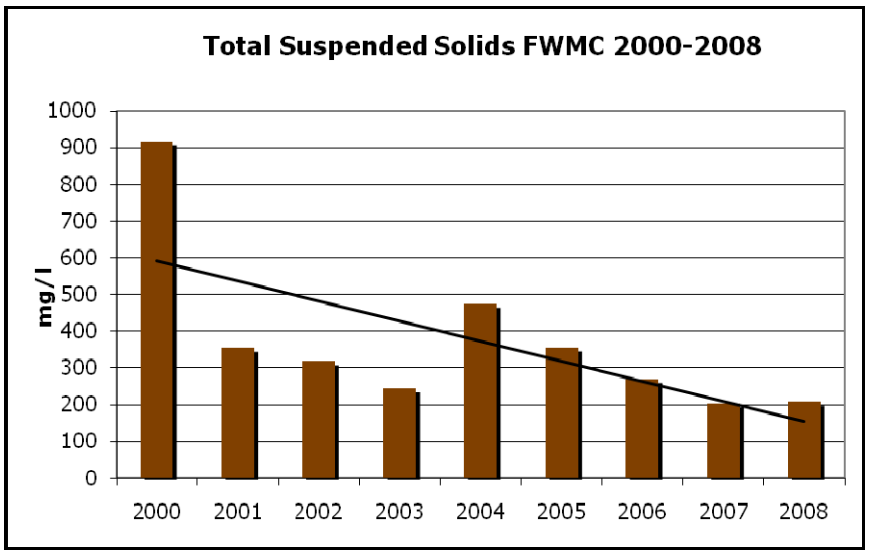




Conservation Practices

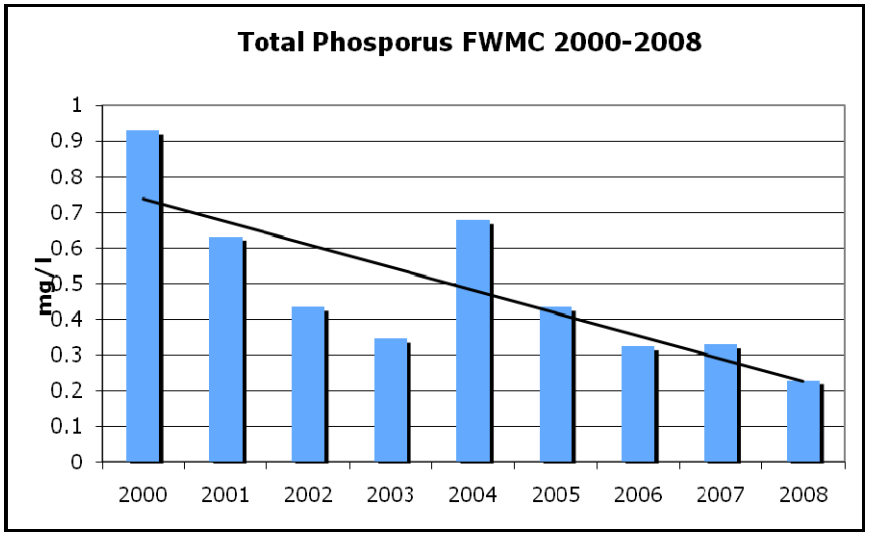
Improvement of water quality through the installation of BMPs has been a focus in the Le Sueur River Watershed since the 1990s along with the rest of the Greater Blue Earth River Basin. The map to the left and pie chart above illustrates conservation practices in this watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Le Sueur River Watershed but not recorded in either LARS or eLINK.

Le Sueur River Watershed Pollution Reduction



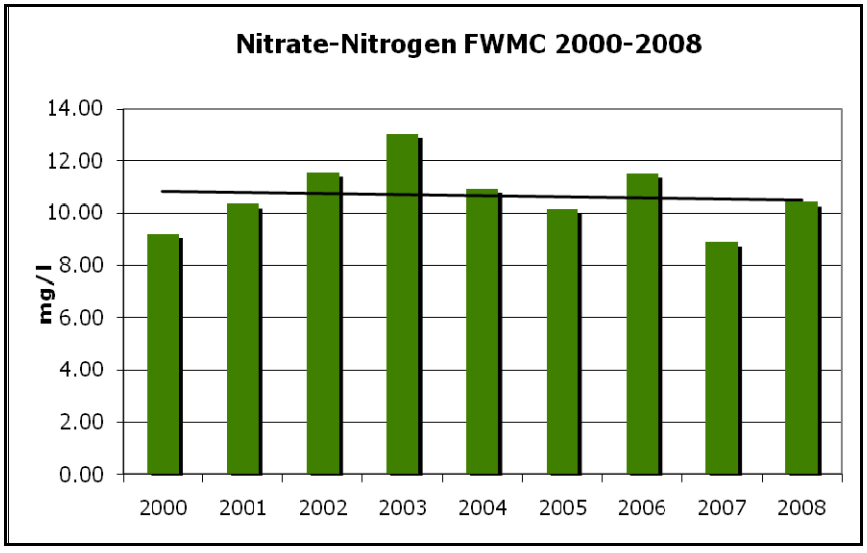
Total Suspended Solids

The Le Sueur River Watershed has been the focus of numerous research projects looking at sediment sources and erosion. In 2000, two huge rain storms produced the high level of Total Suspended Solids. Over the last ten years there has been some improvement in buffers (lesser degree compared to Hawk Creek). There has also been more drainage due to increased tiling resulting in the water running at an almost constant rate. Geology plays a major role in sediment levels especially near the confluence with the Blue Earth River.



Total Phosphorus

The two major sources of phosphorus come from nutrient application and wastewater. Agriculture production (corn and soybeans) dominates the landscape with only a few small cities in the watershed. The small town of St. Clair is the only community located on the Le Sueur. Eagle Lake and Mapleton are the largest cities with both at over 1,500 people. There has been a concentrated effort to upgrade wastewater treatment plants in the Minnesota River Basin and improve stormwater through the use of rain gardens and other BMPs.



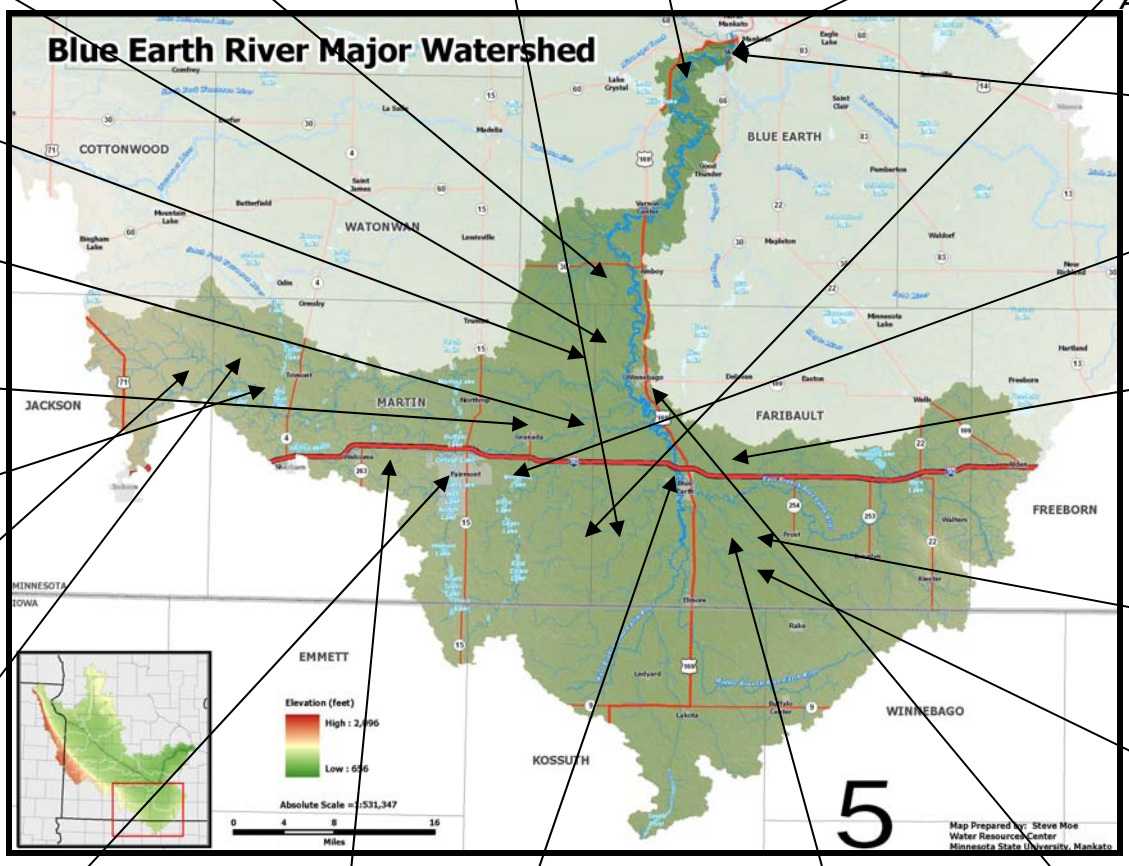
Nitrate-Nitrogen

Increased drainage from both agricultural and urban sources has contributed to the increased levels of nitrogen. Water soluble, nitrogen moves through the extensive tiling of cropfields into the numerous rivers in the Le Sueur River Watershed like the Maple and Big Cobb rivers. Some effort to reduce nitrate levels has been accomplished through BMPs like wetland restorations and rain gardens. Typically the nitrate levels peak at the end of May all within two weeks from year to year.

BLUE EARTH RIVER WATERSHED

Part of the Greater Blue Earth River Basin, which also includes the Le Sueur River and Watonwan River watersheds, the Blue Earth River Watershed is characterized by a terrain of gently rolling prairie and glacial moraine with river valleys and ravines cut into the landscape. The Blue Earth River Watershed drains approximately 1,550 square miles or 992,034 acres with a total of 775,590 acres located in Minnesota and the rest in Iowa. Located in the intensive row-crop agriculture areas of south central Minnesota, this watershed carries one of the highest nutrient loads in the Minnesota River Basin. Major tributaries are the East, Middle and West branches, Elm and Center creeks along with smaller streams, public and private drainage systems, lakes and wetlands. Fairmont is the largest city in the Blue Earth River Watershed with part of the City of Mankato flowing into the river as it meets the Minnesota River.


Monitoring the Blue Earth River



15. BERBI Comprehensive Nutrient Management Plan

16. Conservation Marketplace of MN

17. Greater Blue Earth River Basin Initiative

18. Blue Earth River Landing

19. Mankato Sibley Parkway

20. Greater Blue Earth River Basin Alliance (GBERBA)

14. Blue Earth River Basin Initiative (BERBI)

21. Mankato Wastewater Treatment Plant

13. BERBI Intake Initiative

22. Simply Homemade

12. Rural Advantage

1. Faribault SWCD Conservation Practices

11. Dutch Creek Farms

2. Small Community Stormwater Project

10. Elm Creek Restoration Project

3. Faribault SWCD Rain Barrel Program

9. Center & Lily Creek watersheds CWP

7. Martin SWCD

6. Small Community Stormwater Workshop

5. GBERBA Clean Water Legacy Grant

4. Faribault Co Septic System Upgrade Project

8. Fairmont Rain Gardens

The river banks are from 20 to 80 feet high. The country is still more beautiful – we proceeded on about 5-8 miles more and encamped on the Mankato from which [Blue Earth River] rocky banks we could see above the woods and the windings of the river. This scenery is beautiful; the river is often interrupted by rocks and rapids. - Joseph Nicollet, August 16, 1838; Joseph N. Nicollet on the Plains and Prairies: The Expeditions of 1838-39 with Journals, Letters, and Notes on the Dakota Indians.

BLUE EARTH RIVER WATERSHED

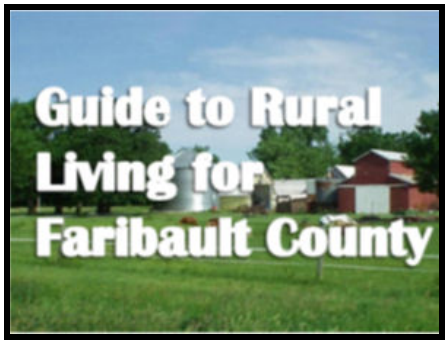
The Greater Blue Earth River Basin Alliance (GBERBA) formed in the summer of 2003 to create an organization dedicated to improving and protecting water resources in the Blue Earth River, Le Sueur River and Watonwan River watersheds. GBERBA works with the counties, SWCDs, state agencies, nonprofit organizations and others to work together installing conservation practices throughout the watershed along with connecting citizens to the Blue Earth River.

1. Faribault Soil and Water Conservation District

To improve water quality, reduce soil erosion and enhance wildlife habitat in Faribault County, the SWCD office works with the Faribault Planning and Zoning Department, Greater Blue Earth River Basin Alliance and many other organizations and citizens. In 2008, Faribault SWCD installed 17 projects utilizing state and Clean Water Legacy cost-share funding reducing 14,967 tons of sediment and 13,661 pounds per year from flowing into local waterways. Nine rock tile inlets were installed, saving 328 tons of sediment and reducing phosphorus by 488 pounds annually. The Stormwater Management Program assisted in the installation of six rain gardens, organized five workshops and worked with 11 communities providing stormwater education and outreach.


Grass Waterway

One recent effort included hiring of a resource conservation technician to assist Faribault SWCD in implementation of the Drainage Maintenance Program involving ditch inspections, inventories, and providing assistance to the County Drainage Authorities. This combined position will also assist with the county septic program, noxious weed program, and tile camera program. Faribault SWCD has also developed a "Guide to Rural Living" on their website to educate new, existing and potential homeowners within county about the rules and regulations that exist regarding rural living. One of the major conservation efforts has been the installation of rock tile inlets.




Storm Water Field Da

2. Small Community Stormwater Project

This project was developed to increase the understanding of the causes of storm water pollution, the consequences of stormwater, and options for managing stormwater in small, non-MS4 communities. An Urban Outreach Specialist works with individual communities' educational efforts and assisting with stormwater projects.

In July of 2008, a Stormwater U: Designing for Volume Control workshop was held in Faribault County by the University of Minnesota Extension Service, Washington Conservation District and BARR Engineering. The comprehensive training focused on designing large and small scale bioretention and infiltration practices for stormwater volume and quality control. Designers, engineers, SWCD technicians, and others attended the day-long training to learn about the most up-to-date techniques to ensure successful projects in their communities.

3. Faribault SWCD Rain Barrel Program

To promote stormwater conservation practices, Faribault SWCD through its urban outreach program offered rain barrels made out of recycling materials including old plastic or oak (wine) barrels for sale along with new hardware purchased from local stores. Faribault SWCD stresses this is a good way to transform something old into a functional rain barrel that captures and stores rain water preventing it from flowing untreated


Rain Barrel Giveaway

into local waterways. The program is promoted in local newspapers, flyers, a newsletter, and on the SWCD web site. During a rain barrel truckload sale on August 27 – 28, 2009 a total of 125 rain barrels were purchased through a multi-county region. The barrels were offered to the homeowners at wholesale cost through the county's Small Community Stormwater Project.

4. Faribault County Septic System Upgrade Project

Septic system upgrades have been the focus of a partnership between the Faribault SWCD and the county Planning and Zoning Office. Both organizations have been actively involved in establishing a plan to get all non-compliant septic systems upgraded throughout the county, including all unincorporated areas. Faribault County adopted an Subsurface Sewage Treatment Systems (SSTS) Ordinance requiring a septic system upgrade at property transfer and upon application of a building permit. This ordinance will enhance the current 12-year plan and effort to increase the compliance rate. Both groups have also been actively involved with an ongoing wastewater project in the unincorporated village of Huntley by piping wastewater from 50 homes and 10 businesses to a nearby municipal wastewater treatment facility.

Village of Huntley

5. GBERBA Clean Water Legacy Grant

The Greater Blue Earth River Basin Alliance (GBERBA) was awarded two Clean Water Legacy grants from BWSR to provide targeted technical assistance to landowners along with cost-share funds for agricultural and riparian BMPs in 2007. GBERBA focused on accelerating basin-wide projects to lower phosphorus levels during low flow conditions in the Greater Blue Earth River Basin to work towards meeting standards of the Lower Minnesota River Dissolved Oxygen TMDL.

Cost share to install seven different BMPs were offered landowners to for phosphorus and sediment reduction in the basin along with holding back and slowing down overland flow into these waterways. BMPs included Alternative Tile Intakes (46), Diversion (634 feet), Grade Stabilization Structure (2), Grass Waterways (23,930 feet), Pond (1), and Streambank and Shoreline Protection (1,150 feet) and Terraces (2).

6. Small Community Stormwater Workshop

In July 2008, a Stormwater U: Designing for Volume Control workshop was held in Faribault County by the University of Minnesota Extension Service, Washington Conservation District and BARR Engineering. The comprehensive training focused on designing large and small scale bioretention and infiltration practices for stormwater volume and quality control. Designers, engineers, SWCD technicians, and others attended the day-long training to learn about the most up-to-date techniques for ensuring successful projects in their communities.

Constructing a rain garden

7. Martin SWCD

Most of Martin County is located in the Blue Earth River Watershed with a portion in Watonwan River Watershed and the southwest part is out of the basin (Des Moines River Watershed. Martin SWCD offers a wide range of programs for county residents ranging from cost-share to conservation practices to an information and education initiative. Each year this SWCD office publishes a "Conservation Update" for the county-wide paper and hosts an Environmental Awareness Day for 5th grade students to help them become more aware of their responsibility to the environment.

The Native Buffer Cost-share Program concentrates on declining species and incorporates only local ecotype plants that are of a high priority. Martin SWCD has received a LCCMR grant to develop a Prairie Ecosystem Restoration Project to establish local ecotype native plants on land protected by perpetual conservation easements. Plant materials will be collected from remaining prairie remnants, propagated seeds planted on RIM easements.

For the Martin County Centennial, the SWCD office established a native planting on three sides of the

Courthouse and has been used as an educational tool. A total of 150 contracts were enrolled in CREP with 4,547 acres put into permanent easements. Out of these contracts, 93 were for wetland restorations at 1,965 acres. Several of these wetlands have been monitored by the University of Minnesota to collect data on water quality and water retention.


Wetland Restoration

8. Fairmont Rain Gardens

Two rain gardens – a 4,500-square foot and a 2,500-square foot – were constructed by Martin SWCD and city officials to help clean up stormwater before entering into local waterways. Both located in Lincoln Park, the rain gardens will hold rain water to let it slowly seep back into the soil. Martin SWCD has also offered to work with citizens in the City of Fairmont to build rain gardens on their own property including providing technical assistance and 75 percent cost-share. Native plants will be used in the rain gardens because of their massive root systems, which help filter the water and reduce erosion.


Lincoln Park Rain Garden

9. Center and Lily Creek watersheds CWP

Based on the 1996 Phase 1 Diagnostic Study of the Blue Earth River Watershed, Center and Lily Creek Watersheds were chosen as a priority area for an implementation project. Over the life of the project, 266 acres were put into filter strips, restored 1,361 acres of wetlands, set aside 24 acres for riparian buffers, enrolled 6,071 acres into residue management and 50 acres in an alternative easement for a total of 7,773 acres contributing to improving water quality. These conservation practices helped reduce total phosphorus by 41% and some reduction of total suspended solids.

In addition the project paid cost-share for the installation of 21 rock tile inlets, 1 bio-retention pond, 1 grade stabilization, 1 streambank stabilization, 19 rain gardens, and 250 rain barrels. The project helped out Martin SWCD with a rain barrel program by conducting classes on the use and construction of these plastic barrels. The barrels were supplied by Fairmont Foods and Hormel in Austin, who had been sending them to the landfill.


Wetland Restoration

Other educational efforts included a "No Dumping" in our storm sewer campaign, publishing a yearly newsletter and conducting a rain garden workshop. The project held nutrient management meetings, citizen stream monitoring workshops and presentations for schools and community events. The Center and Lily Creek watersheds CWP was also instrumental in sponsoring the Prairie Ecology Bus and also created an informational kiosk at Everret Park on Fox Lake.

10. Elm Creek Restoration Project

Martin SWCD along with the University of Minnesota and MPCA started a stream restoration project on an impaired section of Elm Creek in November 2007 to stabilize and restore the riverbank. The project demonstrated cost-effective methods to reduce channel erosion, sediment load and enhance channel stability. To divert stream-flow away from actively eroding banks by reducing erosive peak flows, construction activities involved re-grading channel banks and place-ment of natural tree structures and root wads, into an abandoned oxbow channel. The final construction phase stabilized the streambank by planting native grasses on the upland areas and willows on the creek's perimeter.


Planting native vegetation

11. Dutch Creek Farm

On their 4,460-acres of cropland, Dick and Diane Gerhardt are using innovative farm technology by utilizing no-till on all of their acres and using mostly hog manure as fertilizer with nitrogen side-dressed as needed. Under the EQIP program, the Gerhardt's are converting to strip till to avoid building up excessive nutrients in the soil along with reducing soil erosion and improving water quality. Under the Conservation Security Program (CSP) program they have planted filter strips and trees around the farmstead and hog sites, established waterways, and improved their pasture.

Diane and Dick Gerhardt

12. Rural Advantage

This nonprofit organization based out of Fairmont works with farmers to utilize third crops in addition to their soybean and corn rotation. Some of these alternative crops include alfalfa and native grasses from which seeds are harvested and sold or be used as bioenergy to make ethanol. These types of crops hold soil in place better than row crops and filter out fertilizers that carry phosphorus into streams. To promote third crops, Rural Advantage hosts a series of producer meetings annually. One meeting focused on the production of four different fruits – Aronia Berries, grapes, serviceberries, and apples.

Rural Advantage is heavily involved with a program using conservation efforts to reduce nutrient runoff by keeping it in the soil and out of the water. Some of the conservation practices range from perennials, water storage and cover crops, with the goal of promoting markets for third crops instead of land retirement. Recognized as an expert on nitrogen runoff, Company President and founder Linda Meschke was interviewed by filmmakers producing a film on the dangers of hypoxia in the Gulf of Mexico.

Conservation Tour

13. Blue Earth River Basin Initiative (BERBI)

In thirteen years of existence (1993 to 2006), the Blue Earth River Basin Initiative (BERBI) was one of the first groups to join forces to create a new alliance for developing conservation-related projects in the basin. A coalition of Soil and Water Conservation Districts from seven counties came together to work on watershed management by using grant money to provide cost-share on conservation projects for landowners and farmers.

Over its lifespan, BERBI brought in nearly $5 million in grant funding to help install terraces, Agricultural waste improvements, sediment control structures, buffer strips around open tile intakes, streambank stabilizations, individual septic system upgrades, and community wastewater projects. The number of projects installed by BERBI has been estimated to have reduced 75,000 tons of sediment and 72,000 pounds of phosphorus annually from reaching the Blue Earth River. Officially formed in 1993, this Joint Powers Organization of Soil and Water Conservation Districts (SWCDs) came from Blue Earth, Cottonwood, Jackson, Martin, Steele, Waseca and Watonwan counties.

Launch of the Blue Earth River Basin Initiative

14. BERBI Comprehensive Nutrient Management Plan

In 2004, the U.S. Department of Agriculture and the Natural Resources Conservation Service (NRCS) initiated the Conservation Security Program (CSP) to provide financial rewards to farmers and ranchers practicing conservation on their working lands that meet NRCS soil and water quality criteria.

BEBRI was selected to pilot this program that also provides financial incentives to those who expand their conservation efforts through implementing management activities that involve enhanced protection beyond minimum requirements. As a result of the CSP, comprehensive nutrient management was applied to approximately 25,000 acres of corn/soybeans with annual pollution reductions of 125 tons of nitrogen and 187.5 tons of phosphorus. Twenty-four producers participated in a three-day field seminar that had soil analyses conducted and a discussion on state feedlot regulations.

15. BERBI Tile Intake Initiative

Funding from the US EPA 319 program concentrated on elevating awareness about the environmental impacts of open tile intakes in the Blue Earth River Basin. The project promoted this issue through the wide distribution of a fact sheet, holding nine field demonstrations and working with county and SWCD staff on the environmental impacts of tile intakes. By removing 23 open tile inlets, installing rock tile inlets or more concentrated buried tile at 347 locations and planting of nine vegetative buffers helped reduce an estimated 379 tons of sediment per year. Education activities resulted in contacts with landowners owning 25 percent of the watershed's open tile intakes.


Construction of a rock tile inlet

16. Project Spotlight: Conservation Marketplace MN

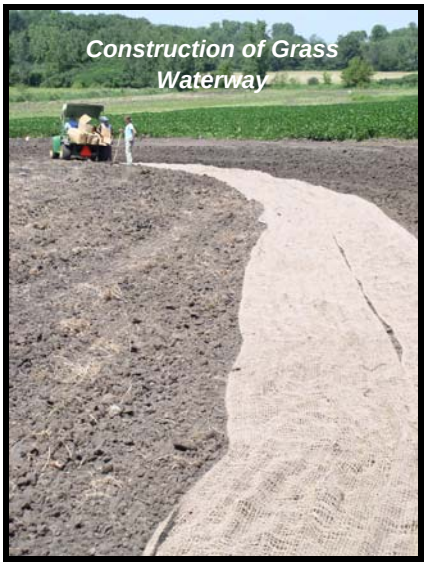
The Minnesota River Board is working with three watershed groups representing the Sauk River, Blue Earth River, and the middle and lower reaches of the Minnesota River to launch an ecosystem credit trading program. Landowners who put in conservation practices to reduce targeted pollutants like phosphorus in waterways would be compensated under this new program called Conservation Marketplace of Minnesota. Cities who need to upgrade wastewater treatment plants to meet new tougher water quality standards could buy these eco-credits from farmers who in turn would make a profit off of their conservation practices. Grant funding and in-kind services totaling more than a $1 million have been committed to successfully getting this program up and running. The goal is to create a voluntary marketplace like the Chicago Carbon Trading Market. In addition, the program could offer more flexibility than a government program because it would allow selling credits for multiple benefits.


Conservation Marketplace Team

17. Greater Blue Earth River Watershed Initiative

This initiative to improve water quality came together in 2003 to install conservation practices in the Greater Blue Earth River Watershed. In a short four years the Greater Blue Earth River Watershed Initiative helped provide cost-share and technical assistance on 232 Best Management Practices (BMPs) and put in 190 acres of riparian buffers.

BMPs installed in the watershed have included twenty-six traditional implementation cost-share projects (13 agricultural waste projects, four stream bank stabilization projects, four terrace/ sediment blocks, three waterways and one grade stabilization; 17 innovative implementation cost-share projects (six tile intake conversions, four wetland restorations, four innovative stream/ stream bank projects and three water storage retention projects and initiated seventeen 20-year easements converting 120 acres of environmentally sensitive land to perennial crops.


Construction of Grass Waterway

Part of this effort was to look at alternative farming methods like organic livestock production. An Organic Livestock Production and Marketing Seminar was attended by over 30 people to learn about marketing and production of organic livestock. The initiative wanted to encourage productive conservation measures to make improvements to environmental quality and continuing productive use of the land. In addition, an Ag Waste Pit Abandonment Training was conducted by the Watonwan SWCD.


Information Booth


Paddling on the Blue Earth River

19. Blue Earth River Landing

In the summer of 2009, Blue Earth County constructed a new landing and parking lot on the Blue Earth River at the intersection with County Road 90. Paddlers now have a safe access to the river including a place to park their vehicles and a 500-foot trail down to the water. Before this new landing, paddlers used the Jones Ford Crossing for access after the Rapidan Dam but there were safety issues because of no parking except along the roadway.


View of the Minnesota River from Riverfront Park in Mankato

20. Mankato Sibley Parkway

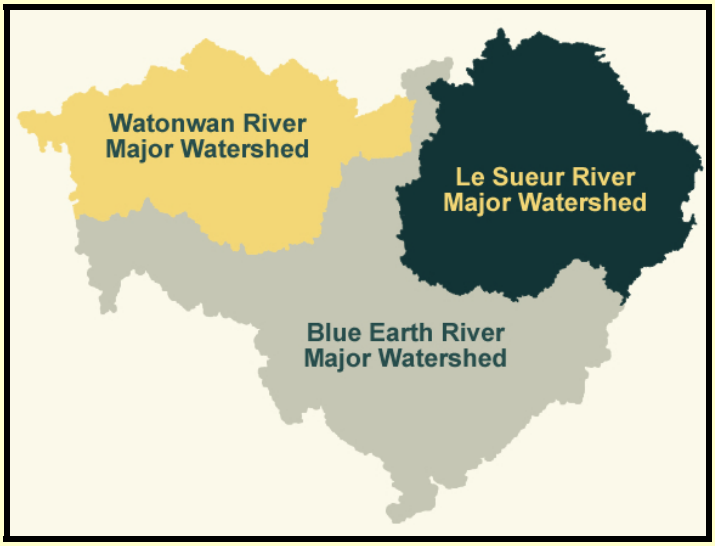
The City of Mankato worked with the DNR and U.S. Corps of Engineers to develop a new park along the Minnesota River and cover up an old lime sludge pit, once used to store a chemical used to treat drinking water. To redirect water back into the channel and prevent streambank erosion, four rock weirs extending up to 100 feet into the river and angled upstream were constructed. These weirs and other boulders placed in the water will also help create fish habitat. The seven acre mini-park will slope down to the river with native plants to add an aesthetic quality to the Minnesota River as it flows past the floodwall.

21. Organization Spotlight - Greater Blue Earth River Basin Alliance

The mission of the Greater Blue Earth River Basin Alliance (GBERBA) is to lead in the promotion of economically viable watershed activities through the combined efforts of partners and this Alliance. Formed during the summer of 2003 when two natural resource groups (Blue Earth River Basin Initiative and the South Central Minnesota Comprehensive Water Planning Project) joined forces to form GBERBA.

GBERBA brought together the educational, regulatory, inventory, monitoring, planning and land & water treatment capabilities of local government within the Greater Blue Earth River Basin. This alliance consists of Commissioners and County Local Water Management staff, Soil and Water Conservation (SWCD) Supervisors and staff of nine counties – Blue Earth, Cottonwood, Faribault, Freeborn, Jackson, Le Sueur, Martin, Waseca, and Watonwan.

GBERBA has a vision to restore and revitalize local water resources to improve the quality of life, local communities and its citizens. Part of this effort has been sharing resources among the partners by securing funding for positions to conduct resource programs including a Small Communities Stormwater Project, a Conservation Agronomist and a Nutrient Management.



The group also hosts field tours to highlight effective conservation practices like the July 2007 tour of the Judicial Ditch 10 wetland restoration. The Small Communities Stormwater Project created an Urban Outreach Specialist position to assist Faribault and Martin counties' communities with issues revolving stormwater. A Conservation Agronomist promotes sustainable farming systems and the Nutrient Management position develops nutrient management plans for landowners.

This joint-powers organization has received Clean Water Legacy funding in excess of $1.5 million to be used as loans for agricultural BMPs, upgrading non-compliance septic systems, and to hire a number of conservation resource positions. These funds along with contributions from landowners and other agencies have led to the installation of a variety of conservation practices: one diversion (634 feet), two grade stabilization structures, 20 grass waterways (26 acres), one pond, four streambank and shoreline protection projects (1,150 feet), two terraces (0.8 acres), nine water and sediment control basins and 46 alternative tile intakes.


Grass Waterway

River Advocate – Linda Meschke

As the founder and president of Rural Advantage, Linda believes in developing a balance between agriculture and protecting water quality in the Minnesota River Basin. Rural Advantage is a nonprofit organization dedicated to continuing the Third Crop Initiative started under the Blue Earth River Basin Initiative (BERBI). Linda and Rural Advantage promotes the connections between agriculture, the environment and rural communities in order to improve ecological health, economic viability and rural vitality. This Park Rapids native grew up on a family beef farm and came to southern Minnesota in 1988 to work as an agriculture inspector for Martin County before getting involved in BERBI. Linda serves on the Martin SWCD Board of Supervisors.

22. Mankato Wastewater Treatment Plant

The recently constructed water reclamation facility in Mankato not only treats effluent from its wastewater treatment plant but also supplies treated water for a nearby privately owned electric power generation plant. Built by Calpine Corp, an independent power producer that focuses on clean natural gas and geothermal electricity generation, this project is the first in the state to treat municipal wastewater for industrial use.


Mankato Wastewater Treatment

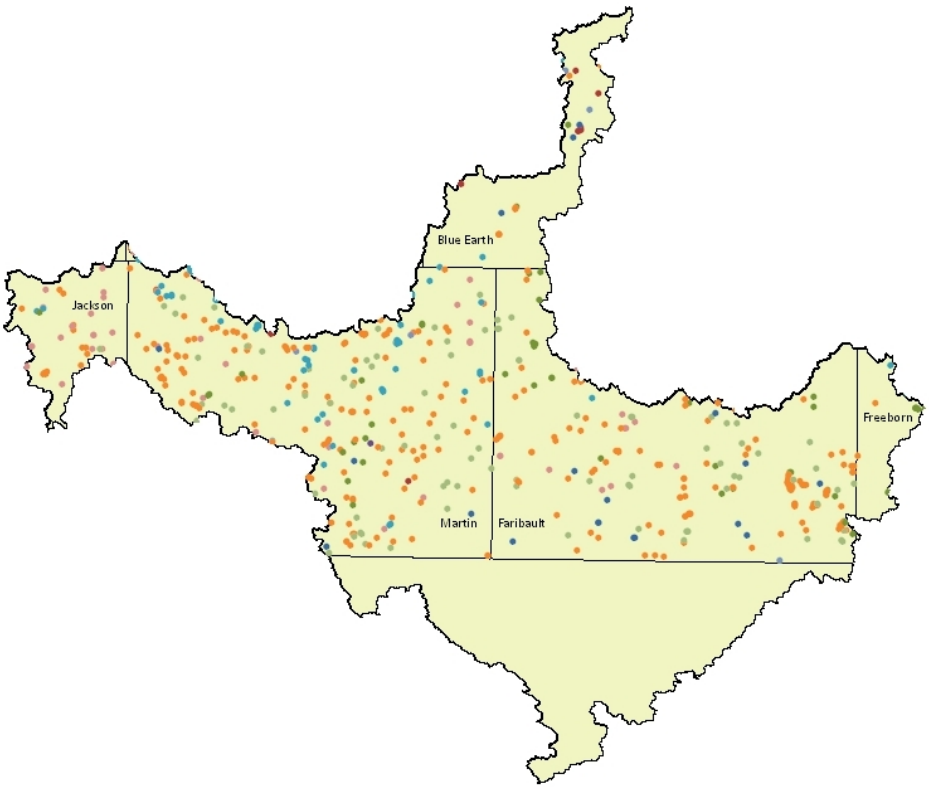
The $20 million, two-state tertiary treatment facility is also helping improve water quality in the Lower Minnesota River and preserve the city's drinking water supply. The first stage removes phosphorus to a concentration well below the state's requirements, and the second stage filters and chlorinates the water to a level suitable for cooling and process use. In 2007, the facility earned Project of the Year in the Environment category (for projects greater than $10 million) from the Minnesota Chapter of the American Public Works Association.

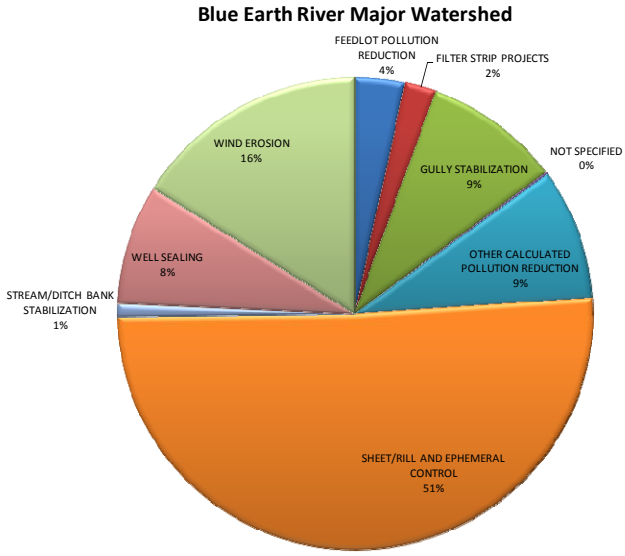
23. Simply Homemade

Sandy Kuhlers or better known as "The Jam Lady" has created her own profitable business by making and selling home-made jam. After starting out in the late 1980s by selling a few years at a garage sale, Kuhlers has expanded her business – Simply Homemade – enough to make it a sustainable venture.

Most of the fruit she uses in the nearly 30 products comes from area growers, opening up new markets for them, including specialty growers supplying her with organic elderberries. Kuhlers sells her jam at local farmers' market along with about 20 retailers in Minnesota, Iowa and Nebraska along with the St. Peter Food Co-op. Many of her customers are health conscious people looking for real sugar, gluten-free and handmade items.

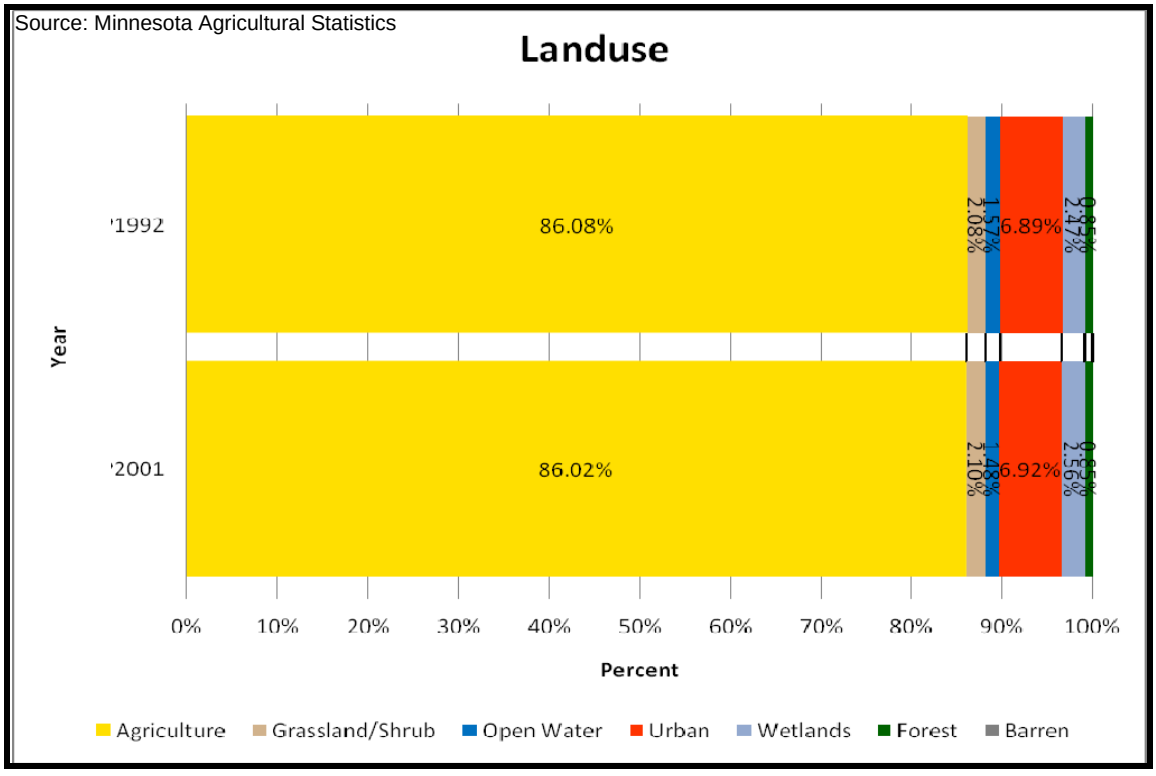
Blue Earth River Watershed Conservation Practices and Land Use



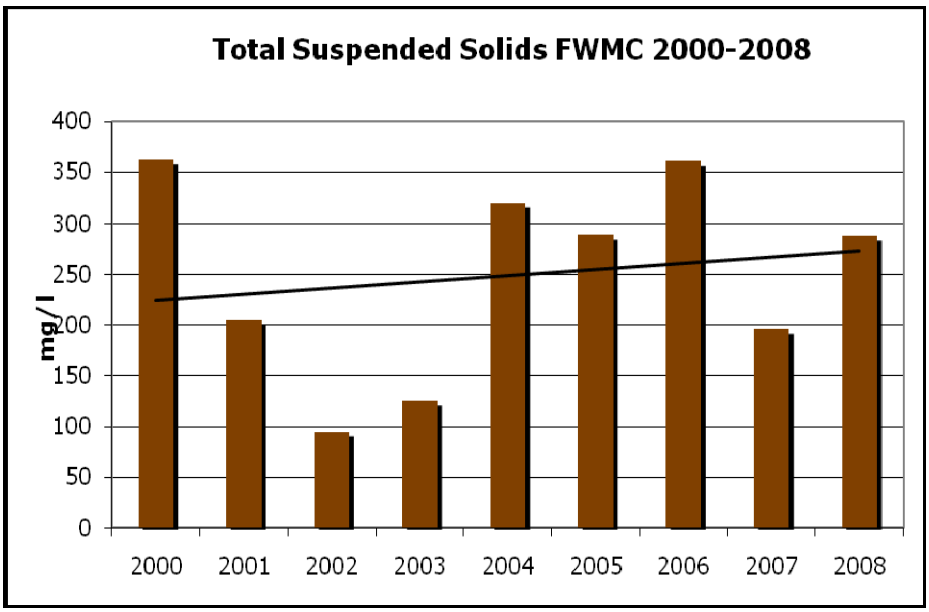


Conservation Practices

A concentration effort to improve water quality began with the Blue Earth River Basin Initiative in 1993 and continues with the Greater Blue Earth River Basin Alliance. The map above and pie chart to the right illustrates conservation practices in the Blue Earth River Watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the B but not recorded in either LARS or eLINK.

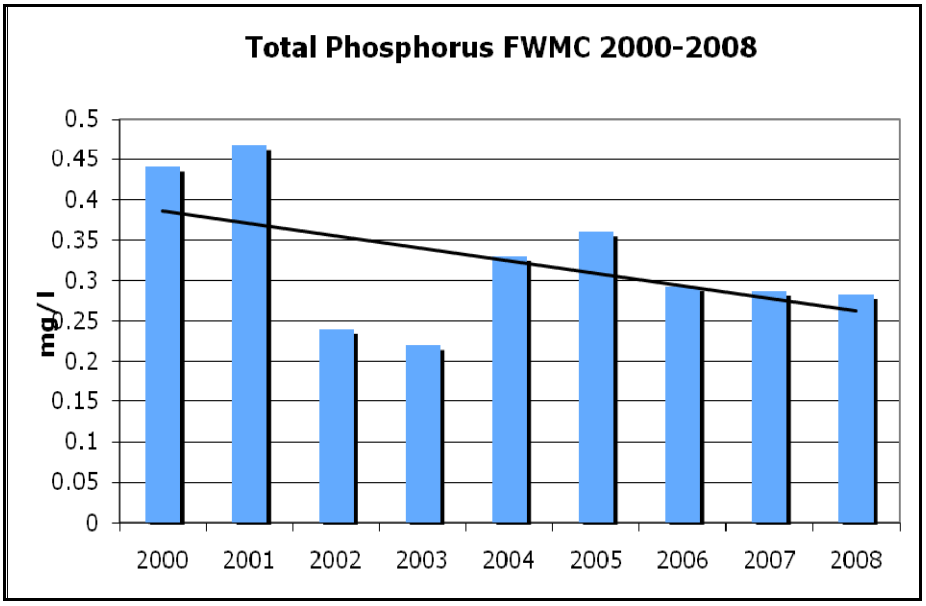


Blue Earth River Watershed Pollution Reduction



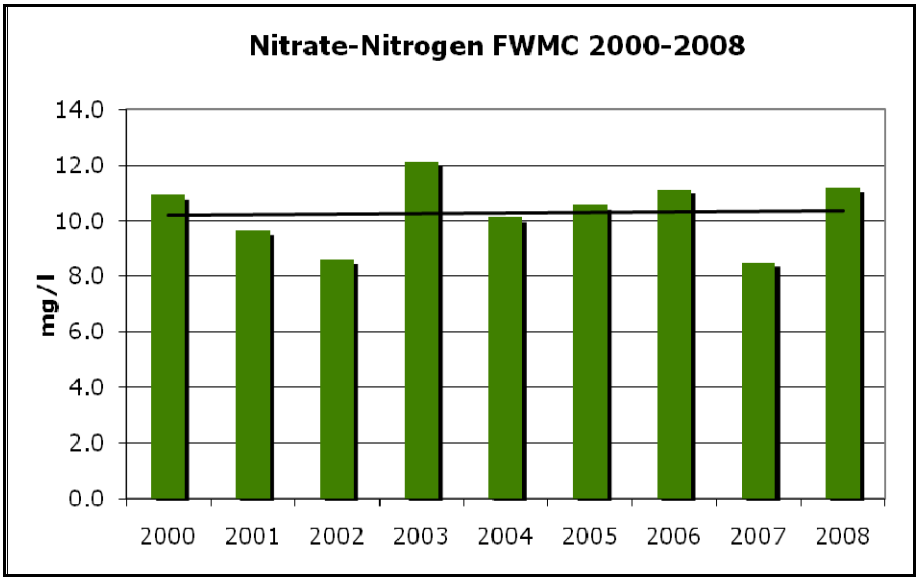
Total Suspended Solids

The Blue Earth River Watershed is one of the most intensively cropped (corn and soybeans) watersheds in the Minnesota River Basin. Geology plays a significant role in the amount of sediment in the Blue Earth River (early explorers reported turbid conditions at the confluence of this stream and the Minnesota River) and the dominance of agricultural in the watershed. In the last decade there has been a dramatic increase in the amount of drainage including denser pattern tiling resulting in water levels on the rivers rising faster and more power for eroding the streambanks.



Total Phosphorus

The main sources of phosphorus in the rivers come from cropfield and urban runoff along with the discharge of wastewater treatment facilities and other septic systems. Snowmelt runoff in the spring is normally high in phosphorus. A concentrated effort by local governments with the assistance of MPCA has seen the upgrading of wastewater treatment plants and individual septic systems.



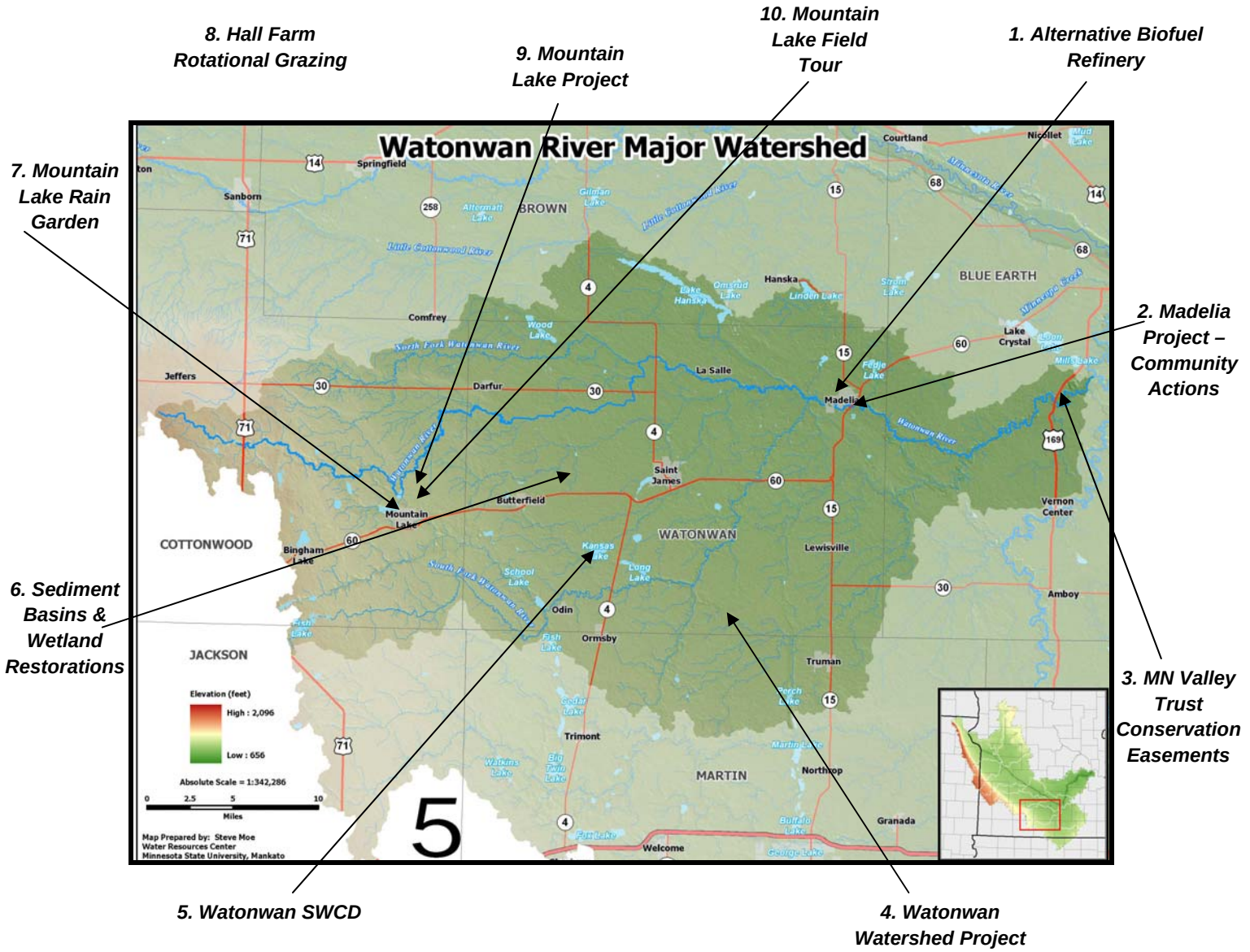
Nitrate Nitrogen

Climate plays a major factor with nitrate levels in the Blue Earth River along with field application the timing of rain events. A dramatic increase in tiling and drainage increases the loss of nitrates from the landscape into the rivers.

WATONWAN RIVER WATERSHED

The Watonwan River Watershed drains 544,543 acres or 851 square miles and lies in south-central and south-western Minnesota including a major portion of Blue Earth, Watonwan and Cottonwood counties and a smaller portion of Jackson, Brown and Martin counties. As the eleventh largest watershed in the Minnesota River Basin, the Watonwan River Watershed supports a population of around 21, 000 with over 30 lakes, a stream network of 561,620 miles and 12 towns. St. James is the largest municipality in the watershed. The Watonwan River begins as small creek in northwest Cottonwood County flowing to the east for over 110 miles to its confluence with the Blue Earth River near Garden City.


Paddling on the Watonwan River



Where the Watonwan River enters the Blue Earth, there is an angular piece of land that once was the center of a beautiful valley, shaded by great oaks on the river's bluffs and containing a sparkling, clear-water lake and outlet stream. Wild game, fish, berries, and other wild fruit were abundant. – Thomas F. Waters, The Streams and Rivers of Minnesota, 1977

WATONWAN RIVER WATERSHED

As part of the Greater Blue River Basin, the Watonwan River Watershed receives a lot of attention from the joint-powers organization the Greater Blue River Basin Alliance (GBRBA). Other major initiatives in the watershed for conservation and water quality benefits are the Madelia Project sponsored by Rural Advantage and the purchase of land for conservation easements through the Minnesota Valley National Wildlife Refuge Trust.

1. Project Spotlight - Alternative Biofuel Refinery

One of the major projects of Rural Advantage is the potential construction of an alternative biofuel refinery near Madelia. The goal is to encourage local farmers to grow alternative or third crops for the refinery, helping to increase biodiversity on the landscape and promote soil health. Third crops can also improve water quality by reducing nutrient runoff and minimizing erosion. The Madelia Project is about growing biomass crops for bio energy and bio processing in a 25 mile radius of Madelia to support rural revitalization, clean water and economic sustainability in the region. Financial support has come from the Minnesota Pollution Control Agency for the "Madelia Model" to assess how rural sustainable development could be pursued to improve the area's water quality and create a unique competitive advantage to benefit rural community members.

One proposed option called for converting marginal agricultural land into perennial prairie grasses with the idea this biomass would be as profitable as corn when used as energy production and also have a water quality benefit. The Madelia Model proposes conversion of about 20 percent of the 1.9 million acres in row crop cultivation in the 25 mile radius for energy production, allowing of corn and soybeans to grow on the most productive land. Three steps are outlined in the model as necessary for eco-industrial development in Madelia: (1). A biomass supply; (2). A facility for energy conversion and (3). A demand for the energy to make it profitable.

Hay bales would provide a fuel source for the Alternative Biofuel Refinery

2. Creating Community Principles for the Madelia Model

Located in south central Minnesota, Madelia is a rural farming community of about 2,500 people and a rich history of settlement conflict. Today, a growing immigration population, primarily Latinos, has been drawn to jobs at local agricultural processing plants. As demographics and economic realities continue to evolve for these rural communities, Madelia undertook an evaluation of individual and community needs to decide the best approach for implementing the Madelia Model.


The Madelia Model [continued]

Emerging Bioindustrial Development

Five focus groups were developed to represent five sectors: Agriculture, Government and Public Service, Business and Industry, and Community Residents, and the immigrant population. Out of these vision sessions, three Madelia principles were created including one on the Environment: (1). Manage the landscape in a diversified and sustainable manner through alternative and perennial crops; (2). Utilize local products for value-added processing; (3).Create and utilize sustainable and renewable energy; and (4). Have a clean air and water with no noxious fumes. The other two principles dealt with Social/ Community and Economic factors.

3. Minnesota Valley National Wildlife Refuge Trust – Conservation Easements

In 2000, this private, nonprofit corporation was established during the settlement between the U.S. Fish and Wildlife Service and the Metropolitan Airports Commission over a Minneapolis – St. Paul International Airport runway expansion into the Minnesota River Valley National Wildlife Refuge.


Jessenland Unit

The Minnesota Valley Trust partners with a diverse selection of organizations including U.S. Fish & Wildlife Service, Blue Earth SWCD, Carl and Verna Schmidt Foundation, Minnesota Pheasants Inc., Friends of the Minnesota Valley, Minnesota Environment and Natural Trust Fund, and Minnesota River Watershed Alliance through collaboration to collectively conserve and restore critically environmentally sensitive land. .

One project involved the purchase of 520 acres to be added to the Lincoln WPA located in near Lake Crystal and the head of Judicial Ditch 15. Now almost 1,000 acres have been permanently restored in the Lincoln WPA with major a major wetland restoration in 2010 and the possibility of removing land from the county ditch, break a significant number of private lines and restore 120 acres of wetlands. A diverse mix of native prairie grasses and forbs will be seeded on the associated uplands. According to the U.S. Fish and Wildlife Service, restoring marginal cropland will benefit wildlife habitat, help improve water quality in the Watonwan and Minnesota rivers and provide public recreational opportunities. The property was purchased from three landowners.


Native Prairie Restoration at Lincoln WPA

4. Watonwan River Watershed Project

A group of five SWCD and NRCS offices worked together to install a series of Best Management Practices to reduce pollutant loading from nonpoint source pollution through targeted, planned implementation of management strategies. The partnership also strived to increase public awareness of water quality and quantity issues in the watershed along with access and evaluating the project's effectiveness through stream water quality monitoring, land use management changes and tracking the implementation of management strategies.

A U.S. EPA grant helped complete 481 water quality related projects creating reductions of 4,107 tons/yr in soil loss, 8,899 tons/yr of sediment and a reduction in phosphorus of 15,703 lbs/yr. Twenty self-designed and determined school grants were supported during the project involving nine schools along with thirteen education events (county fairs, Green Saturdays, etc.) and sponsorship of the Prairie Ecology Bus.

Prairie Ecology Bus

5. Watonwan SWCD

Nearly all of Watonwan County is located within the Watonwan River Watershed and the local SWCD office works with landowners to install conservation practices including a partnership with Rural Advantage to plant six shelterbelts, pay for a stream bank stabilization project and promote third crops. A total of 19 tons of sediment will be prevented from flowing into the stream. The Watonwan SWCD also worked with landowners on a 50 acre wetland road bank site and 50 acres to be deposited in the wetland banking program.

Over 100 people attend the 3rd Habitat Workshop to hear presentations and updates from the NRCS, Farm Service Agency, and one on pollinators by the DNR. Other presentations focused on Managing Predation of Upland Birds and Riparian Buffers. The SWCD office also put on a 6th Grade Environmental Awareness Day from all over the county at the Environmental Learning Center.

6. Watonwan SWCD – Sediment Basins and Wetland Restoration

A series of sediment basins and streambank stabilization sites have been installed on a one mile section of Watonwan County JD #7 to reduce sediment and phosphorus from entering the Watonwan River. Six sediment basins have been constructed for a total of 1,300 feet and three riprap sites have been installed for a total of 1,100 feet. In addition, a one rod filter strip was established on this one mile section. This project will have a sediment reduction of 27 tons per year and a phosphorus reduction of 29 pounds per year. Another series of four sediment basins ranging from 400 to 500 feet long were installed to protect the water quality of Perch Creek. Besides saving many tons of soil and sediment from entering Perch Creek and also phosphorus, the basins will be farmable.


Construction of Sediment Basins

Many hours of effort among a wide variety of people got the Goose Lake wetland restoration project off the ground. A 438 acre Conservation Reserve Enhancement Program (CREP) easement, this is a large basin approximately 95 acres with three smaller basins of approximately 20 acres restored on the south side of the lake. Watonwan SWCD also has developed two educational opportunities for area residents – Green Saturday started to introduce environmental issues and Habitat Workshop targeting property owners who have developed wildlife habitat on their property. An Arbor Day Program is given to all the county first grade students and an Environmental Awareness Program is conducted for the sixth grade students.


Environmental Awareness Program

7. Mountain Lake Rain Garden

A newly installed urban rain garden received a major workout during a wetter-than-normal October. The garden is located along a city street with a curb cut to allow storm water to enter the garden to take-up pollutants and reduce flow into nearby waterways. Built with help from many local volunteers, the boulevard style rain garden is about 10 feet by 20 feet and six inches deep. Funded by a Coteau Des Prairies RC&D grant, the Metro Blooms of Minneapolis staff provided the expertise and also brought the plants for the garden. The Mountain Lake's Lake Commission and Tree Commission are promoting rain gardens and hope to see more built in the city.


Mountain Lake H.S. students removing buckthorn

8. Hall Farm Rotational Grazing

This one-time row-crop farmer began to move toward a rotational grazing system in the mid-80s after losing a lot of money operating a more traditional feedlot. By 1993, Hall's operation consisted of 200 acres of grass pasture without borrowing any capital to make the change. Hall has been satisfied with the results of balancing the natural environment with his 160 cattle and 80 ewes' farm. According to Hall, grazing is more peaceful due to less need for machinery, an astonishing reduction in use of fossil fuels and bypassing the need for fertilizers since grass-fed cattle fertilize the pastures as they go. Now Hall sees this as a way of life and it has become a viable post-retirement option because it's not labor-intensive.


An example of rotational grazing system

9. Mountain Lake Project

The City of Mountain Lake cooperated with Cottonwood County, Cottonwood SWCD, Mountain Lake Improvement Commission, Mountain Lake Sportsmans' Club, NRCS, MPCA, DNR and citizens to improve water quality on largest body of water in Cottonwood County. The project undertook a public information and education campaign, fertilizer management, conservation tillage, gully erosion control, mechanical weed harvesting, and effectiveness monitoring. A MPCA Clean Water Partnership Project seeded 30 acres of a critical area filter strip and 72 acres of land was enrolled into CREP on highly erodible land immediately upstream and adjacent to Mountain Lake. Other accomplishments was the addition of a storm sewer removal plunge pool added to the Mountain Lake municipal storm sewer and a 5.2 mile trail built around the lake to increase environmentally awareness, and finally the construction of a rain garden adjacent to the lake and the trail.

Mountain Lake Storm Water System

10. Mountain Lake Field Day

To provide a better understanding of a new concept called "Ecosystems Services," the Greater Blue Earth River Basin Alliance (GBERBA), Minnesota River Board, Rural Advantage, and University of Minnesota Extension hosted a field tour outside of Mountain Lake. Participants learned about the development and advancements in environmental markets on a two hour walk-n-talk. This is part of the effort to establish an ecosystem service market in the state by the Conservation Marketplace of Minnesota (CMM). The field tour also included background information on CMM's demonstration site, agricultural best management practices well-suited for credits, and opportunities for market-based conservation and water quality trading from local, regional, and state professionals.

River Advocate – Pat Baskfield

A hydrologist with the Minnesota Pollution Control Agency (MCPA), Pat Baskfield spends his days studying and monitoring rivers across the state. Pat worked most of his MPCA career on water quality issues in the Minnesota River Basin before becoming the state-wide monitoring coordinator for the Clean Water Legacy Watershed Load Monitoring Program. During this time he has played an important role in training and offering guidance to many of the people currently monitoring rivers in the Minnesota River Basin.

Pat Baskfield taking a water sample

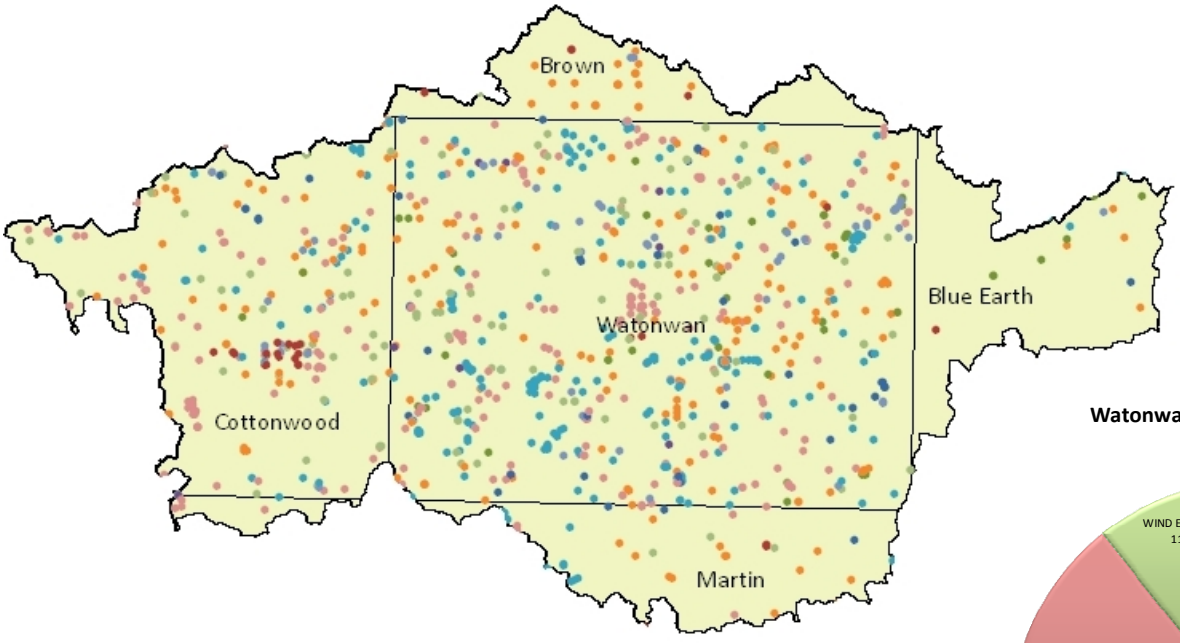
Living in the area allows me the opportunity to observe. Watching the landscape, climatic patterns and how the rivers respond to varying conditions gives me the best feel for what is going on. – Pat Baskfield

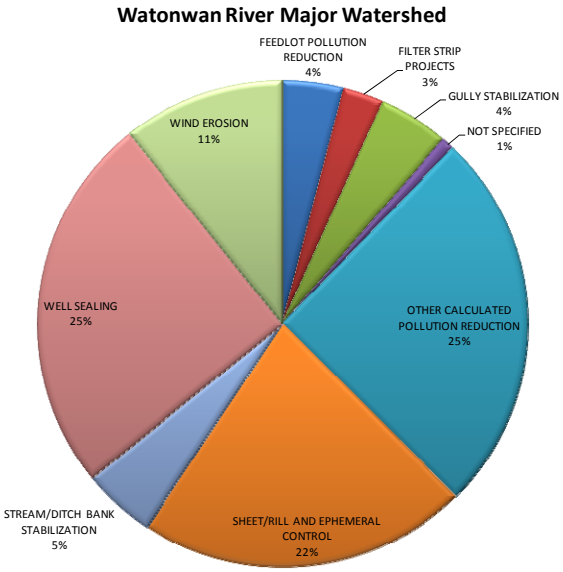
In his downtime, Pat has relished living along the Watonwan River by getting out to paddle it as often as possible depending on flow and if the walleyes are biting. Pat has enjoyed paddling many of the rivers in the area including the Big Cobb and Blue Earth. He finds the lower Blue Earth River absolutely beautiful with its incised valley and scenic spots like the Devil's Gorge and Triple Falls. All this time on the rivers has allowed Pat to become a major advocate of getting people out paddling and helping keep them clean by volunteering with the Mankato Paddling and Outing Club.

Pat Baskfield paddling the Blue Earth River

Early morning trips, especially during the spring when the birds are migrating; hard to deny the hand of God during a sunrise trip in May. – Pat Baskfield

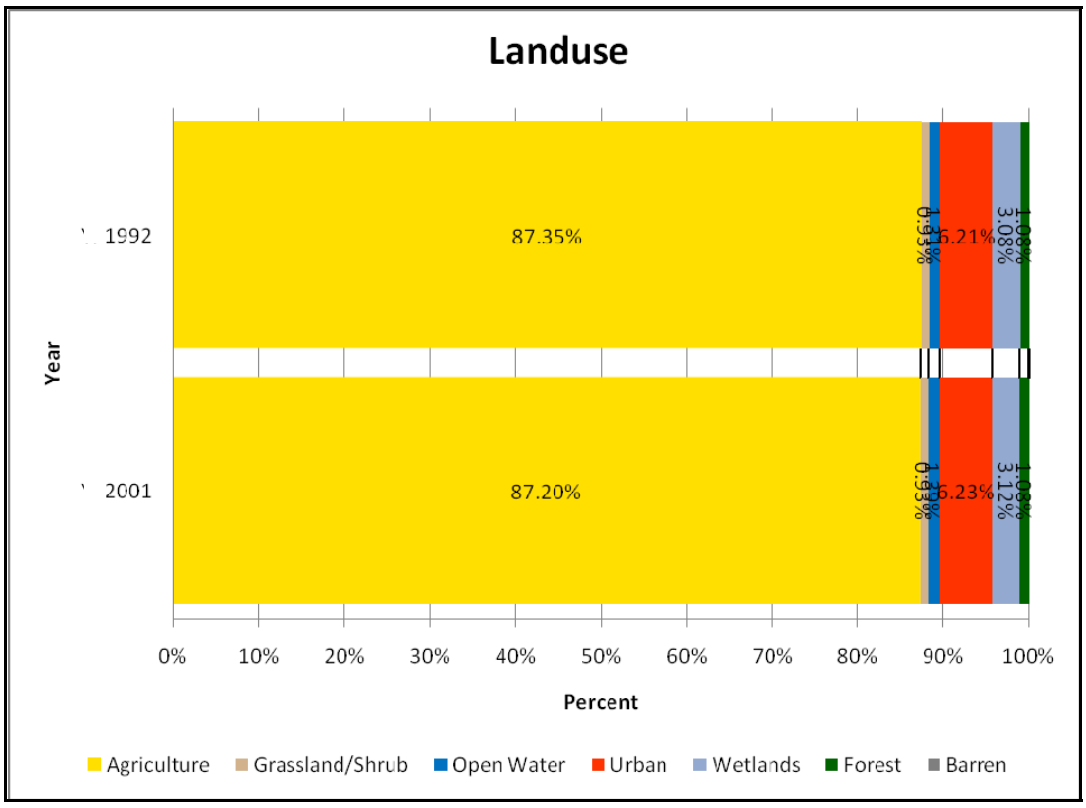
Watonwan River Watershed Conservation Practices and Land Use



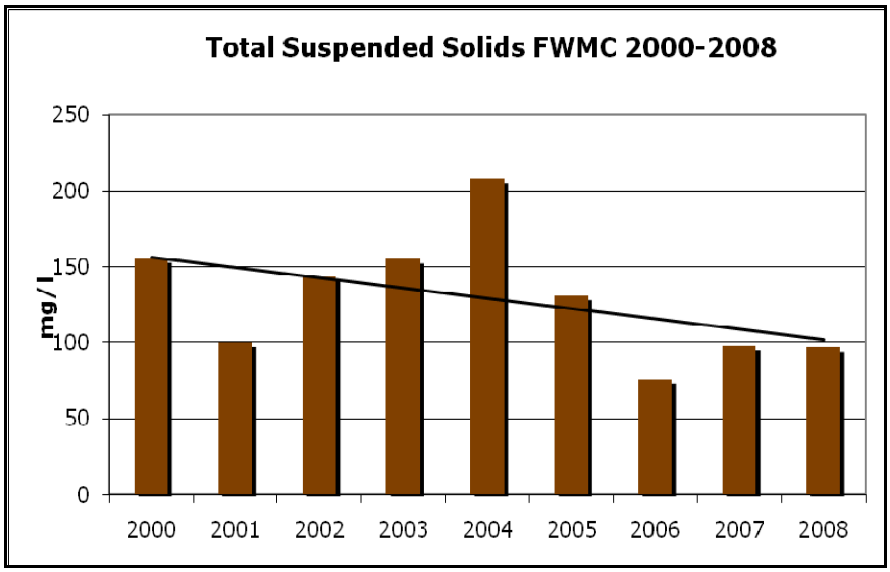


Conservation Practices

As part of the Greater Blue Earth River Basin, the Watonwan River Watershed has been part of the work to improve water quality since the 1990s. The map above and pie chart to the right illustrates conservation practices in this watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Watonwan River Watershed but not recorded in either LARS or eLINK.

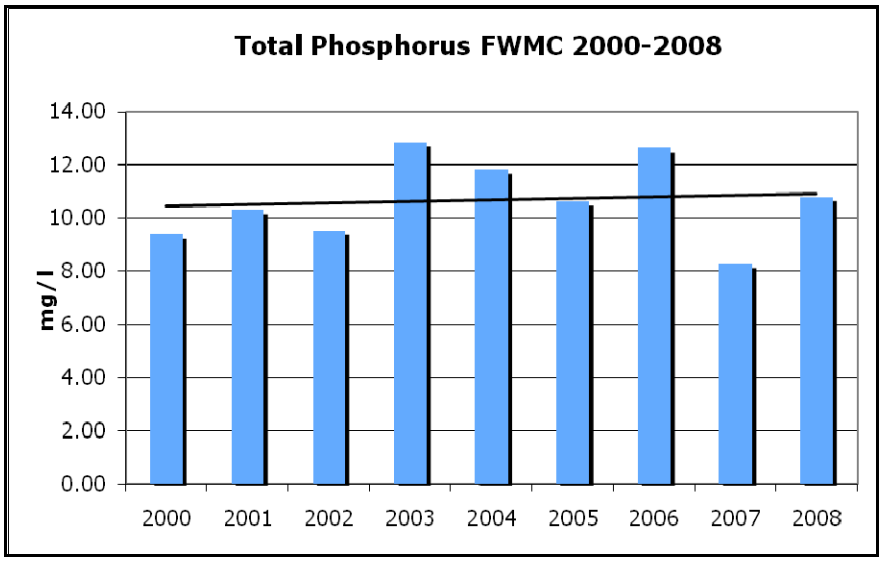


Watonwan River Watershed Pollution Reduction



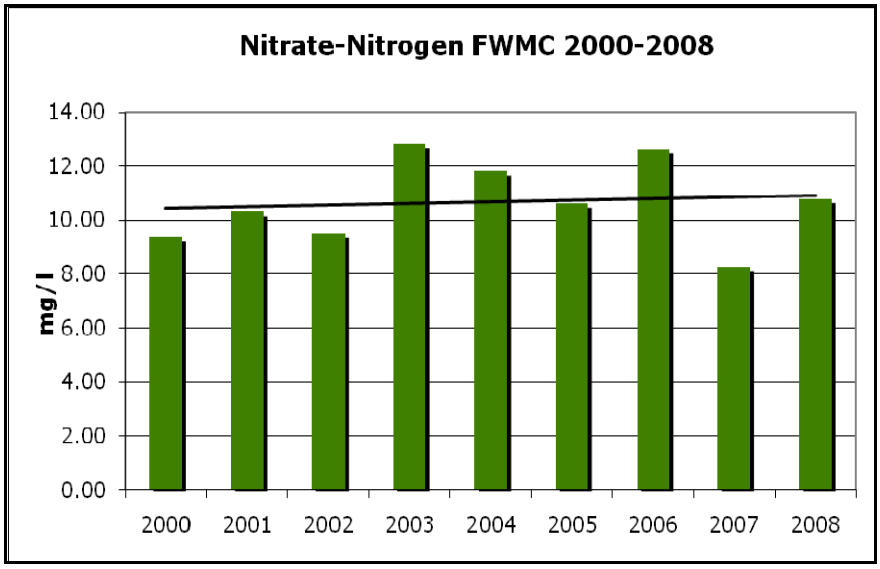
Total Suspended Solids

The level of sediment in the Watonwan River has been affected by the large chunks of CRP and other temporary or permanent easements along the stream. Other BMPs like residue management, wetland restoration and planting of native grass have also been positive for water quality in the watershed. According to local paddlers, they aren't seeing the piles of sediment on boat landings along the river in the last few years. As part of the Greater Blue Earth River Basin, there has been a concentrated effort to provide funding for a large selection of Best Management Practices.



Total Phosphorus

Over the last two decades there has been a large scale effort by federal, state and local government agencies to improve wastewater treatment systems (a major source of phosphorus) in the Minnesota River Basin. This includes upgrades systems at communities like Madelia. There is still the issue of phosphorus runoff from cropfields, urban stormwater, out of compliance septic systems, and unincorporated towns without an adequate wastewater system. Local paddlers have observed the Watonwan River does look cleaner with the elimination of toilet paper and other waste.



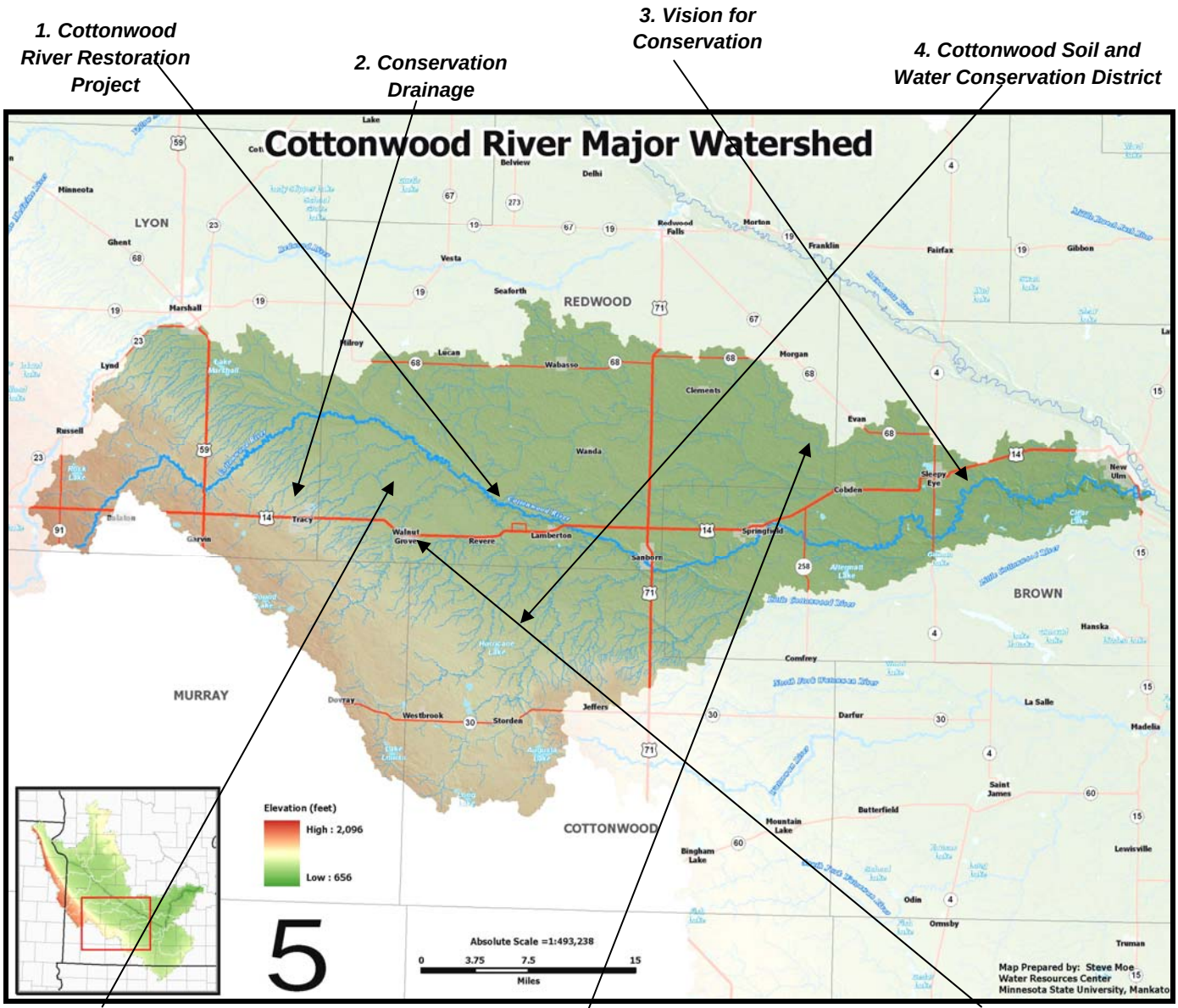
Nitrate Nitrogen

The level of nitrate continues to peak at the end of May usually within two weeks each year. An extensive drainage system that increases with additional tiling has been a major factor in the level of nitrogen in the Watonwan River. Nitrate rates are driven by climate more than other water quality parameters like Total Suspended Solids and Total Phosphorus especially the timing of rain events.

COTTONWOOD RIVER WATERSHED

Located on the west side of the Minnesota River, the Cottonwood River Watershed encompasses 1,310 square miles or drains approximately 840,200 acres. Originating on the Coteau des Prairies (an impressive morainal plateau and important drainage divide), the Cottonwood River flows eastward approximately 150 miles to the Minnesota River with a drop in elevation of about 750 feet. Nearly all wetlands have been drained by a highly efficient and interconnected artificial drainage system. Major tributaries of the Cottonwood River are Highwater/Dutch Charley Creek, Plum Creek, Lone Tree Creek, Meadow Creek and Sleepy Eye Creek. There are over 36,000 people living in the watershed that includes parts of Brown, Cottonwood, Lyon, Murray and Redwood counties.

Cottonwood River at Flandrau State Park



The Cottonwood River is a translation of the Dakota name for cottonwood Waraju. The river was named from the abundance of this tree on its banks. Early French explorer Joseph Nicollet stated that the most important village of the Sisseton Dakota was on the its north bank near its junction with the Minnesota River. – Warren Upham, Minnesota Place Names – A geographical Encyclopedia

COTTONWOOD RIVER WATERSHED

The joint-powers organization, Redwood-Cottonwood River Control Area (RCRCA) has been a major influence with studying and partnering with other groups and government agencies to improve water quality in this major watershed. The Cottonwood River Watershed also features a lot of innovative farmers and conservationists working on solutions to protect and restore rivers and other water bodies.

1. Cottonwood River Restoration Project

Initiated in 1997, the goals of the Cottonwood River Restoration Project was to achieve the highest water quality attainable for ecoregion streams; to have watershed residents take an active role in enhancing and protecting the Cottonwood River, and to develop the Cottonwood River as a major recreational resource within the Minnesota River Basin.

A diagnostic study recorded an average of 55.7 tons of suspended sediment per square mile at the mouth of the Cottonwood River near New Ulm. From 2000 to mid-2009, a diverse selection of Best Management Practices were funded through this project: Ag Waste Systems (4), Pond/Small Dam Repair (12), Grade Stabilization Structure (5), Grassed Waterway (44 – 50,798 feet), Drainage Water Management (1), Streambank & Shoreland Protection (7 – 2,385 feet), Terraces (17 total at 15,575 feet), Tile Intake Replacements (397), Water & Sediment Control Basins (31), and CSA (7).

Cottonwood River Golf Outing

During the project, RCRCA conducted numerous outreach events resulting in over 2,500 individual contacts. Outreach activities focused on school presentations, "Coffee on the Project" where staff met informally with watershed residents at local cafes to discuss water quality issues, canoe trips, golf day event, and radio interviews.

2. Conservation Drainage

On Brian Hicks' farm near Tracy in southwest Minnesota, a box extending more than ten feet into the ground and a large drainage pipe from nearby cropfield entering at the bottom of the structure is helping control excessive runoff along with nutrients and sediment from entering the Cottonwood, the Minnesota, the Mississippi rivers and eventually contributing to the Gulf of Mexico's 'dead zone.'

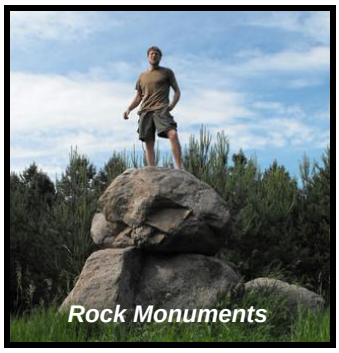
By controlling the amount of water leaving his cropfield. Hick's is able to hold back far more water than he releases especially in the summer months when the plants need the extra moisture. According to the University of Minnesota, monitoring the tile water flow, annual loads of nitrate and phosphate have seen significant reductions.


An example of conservation drainage

3. Vision for Conservation

The conservation legacy of one man continues to be felt despite being gone for over a decade. Burton Tellefsen established grass buffer strips, created holding ponds for runoff and planted tens-of-thousands of trees to preserve surface water and water quality years before anyone began to see the value of conservation practices. He saw the value of keeping soil on the land and out of the water by planning native grass strips around ponds, ditches, and streams on his own without any subsides from the government.

To encourage others to engage in conservation efforts, Tellefsen set out thousands of trees in his front yard for their own plantings and had ordered 1 million trees from the Arbor Day Foundation. Tellefsen also experimented by digging a series of holding ponds on gullies set back from the Cottonwood River and used all sizes of rock for erosion control and wildlife habitat including on the Sleepy Eye Creek headwaters. In addition to all of the conservation practices, Tellefsen also created a series of four large rock monuments along the ridge of the Cottonwood River in perfect alignment from east to west.


Rock Monuments

4. Cottonwood Soil and Water Conservation District

Portions of three major watersheds in the Minnesota River Basin – Cottonwood River, Middle Minnesota and Watonwan River – are found in Cottonwood County. The mission of the Cottonwood SWCD is "to help maintain a better environment for future generations through programs and education" including the promotion of Best Management Practices (BMPs), educational programs for all ages, and technical assistance. Cottonwood SWCD staff provides administrative and technical oversight for the Greater Blue Earth River Basin Alliance (GBERBA) which involves securing funding for BMPs and projects like the Nutrient Management Program.


CREP Easement near Mountain Lake

Cottonwood SWCD enrolled 3,317 acres of environmentally sensitive land into the Minnesota River Conservation Reserve Enhancement Program (CREP) under a total of 103 individual easements to help protect wildlife habitat and improve water quality. This SWCD office has also been a significant partner with the Cottonwood River Watershed Project including assisting with the installation of BMPs: three acres of waterways and two grade stabilizations in 2009. During the same year, one pond, one sediment basin and three alternative tile intakes were installed in the Watonwan River Watershed. They have also been involved in the Mountain Lake Project to improve water quality in Cottonwood County's largest water body.

Environmental education plays an important role in the mission of the Cottonwood SWCD. The staff is involved with the Fifth Grade Conservation Day, Sixth Grade Environmental Fair and Women's Day Conference. In 2010, participants learned about the benefits of trees. Other educational efforts involve the Windom Farm & Home Show, Cottonwood County Fair and school presentations.


Mountain Lake Public School Education Expo

5. Redwood Soil and Water Conservation District

Established in 1953, the Redwood SWCD concentrates on promoting and installing Best Management Practices to reduce soil erosion from wind and water to positively affect water quality. Redwood County sits in the middle portion of the Minnesota River Basin broke into three major watersheds: Redwood River, Cottonwood River and Middle Minnesota. The Redwood SWCD has concentrated some of its conservation efforts in the southwest portion of the county through conservation easements to provide cover on some of the most vulnerable areas. As one of five SWCD offices in the MN River Basin, the Redwood SWCD is part of the Granite Rock Outcrop Easement Program, protecting 376 acres of land through a permanent easement.


On the Road Meeting

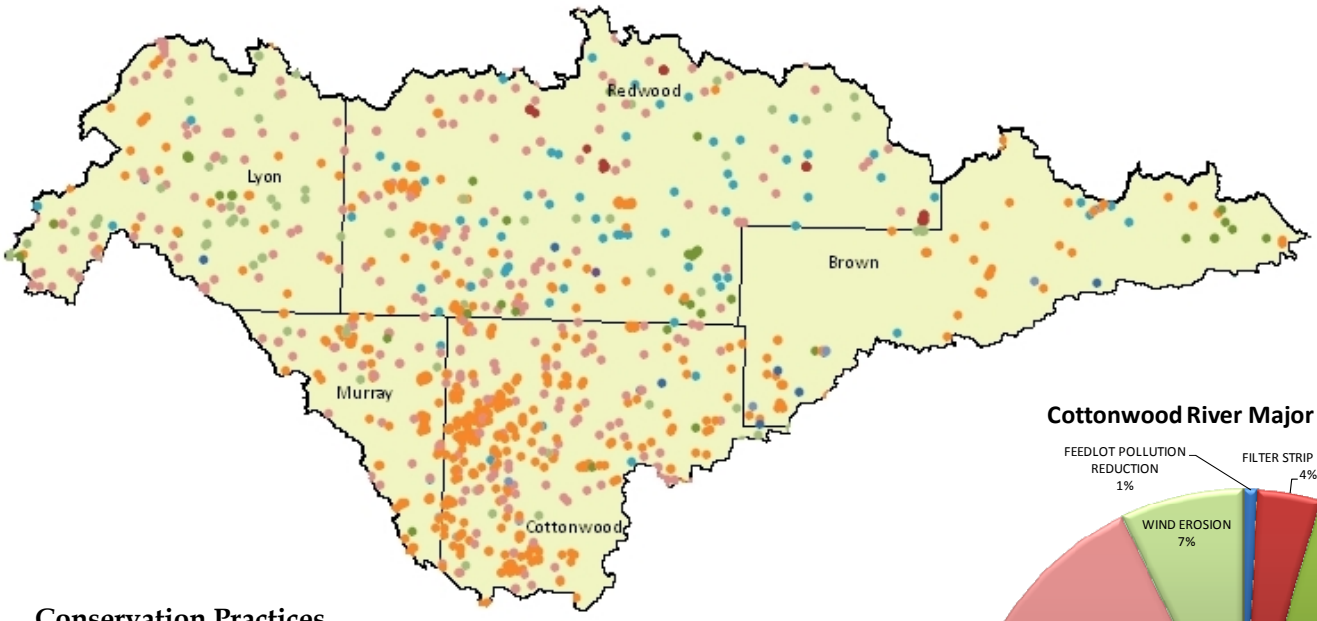
6. Redwood SWCD – Wetland Restorations

More than 4,000 acres of wetlands have been restored by Redwood SWCD utilizing programs like Reinvest in Minnesota (RIM) Reserve, Conservation Reserve Enhancement Program (CREP) and Farm Wetland Program. These restorations along with other grassland plantings have helped improve water quality and wildlife habitat throughout the county.

7. Redwood SWCD - On-the-Road Meetings

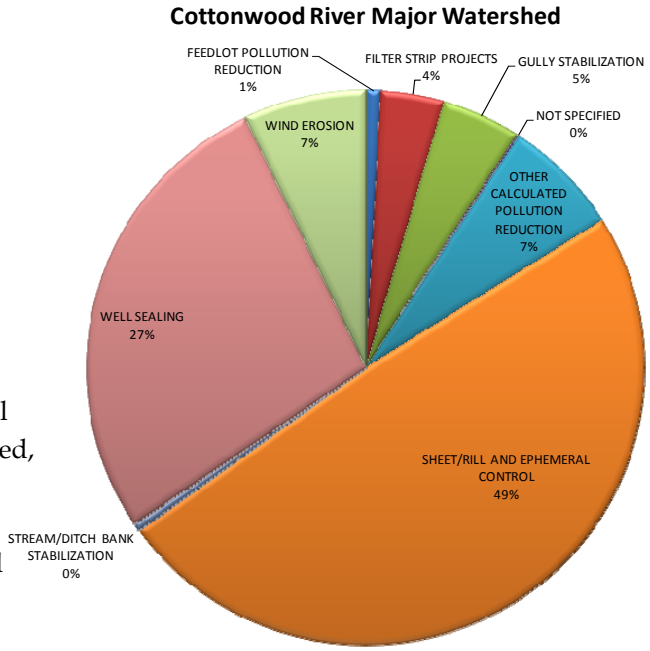
Because the Redwood SWCD office is located in northern part of the county the staff held meetings in six of the 14 communities to inform more people about conservation and their programs. To draw interest to this "Taking the Office on the Road," the SWCD office advertised through posters, news releases and radio programs. These meetings were deemed a high success with the staff meeting 53 individuals who would have not traveled all the way across the county to attend a SWCD meeting.

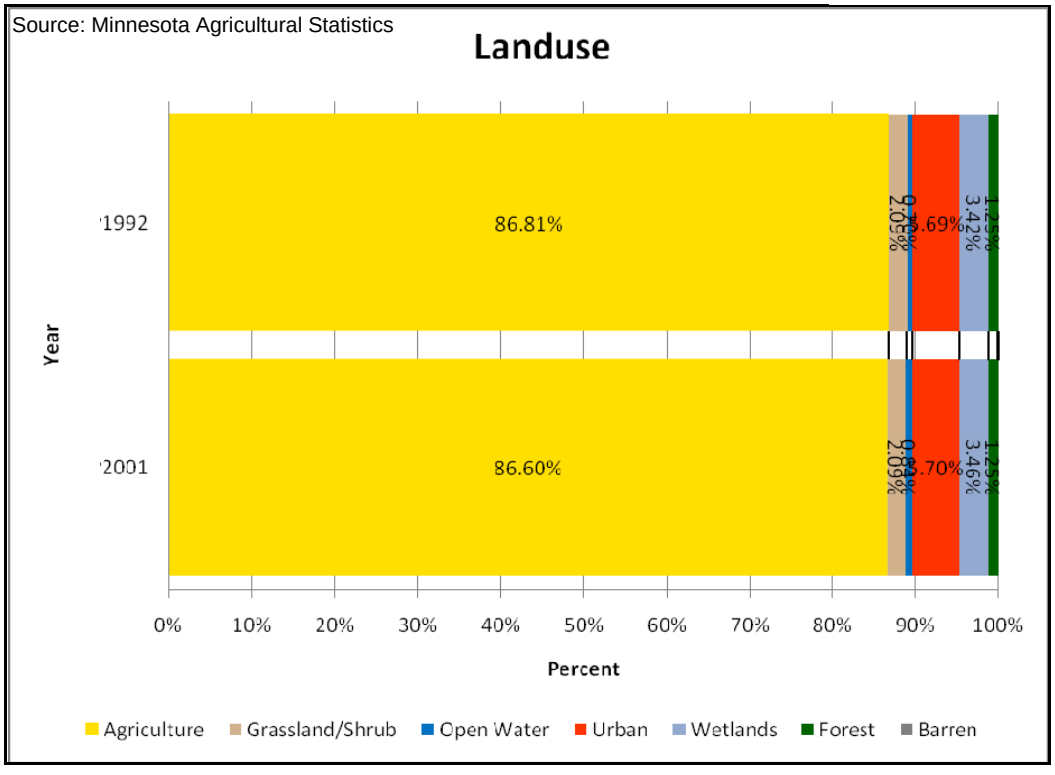
Cottonwood River Watershed Conservation Practices and Land Use



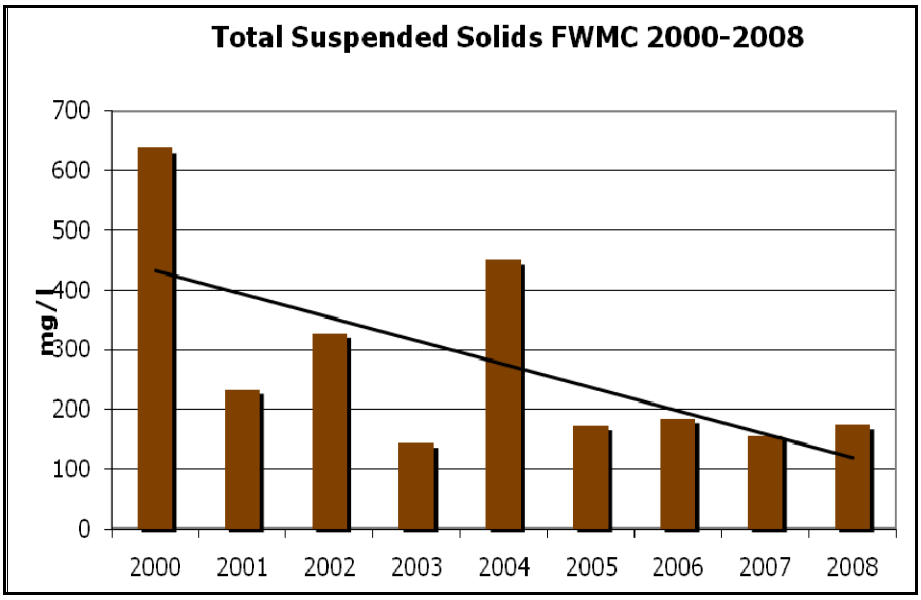
Conservation Practices

In the late 1990s, the Redwood Cottonwood Rivers Control Area along with a diverse selection of partners began to concentrate on improving water quality through BMPS. The map above and pie chart to the right illustrates conservation practices in the Cottonwood River Watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Cottonwood River Watershed but not recorded in either LARS or eLINK.



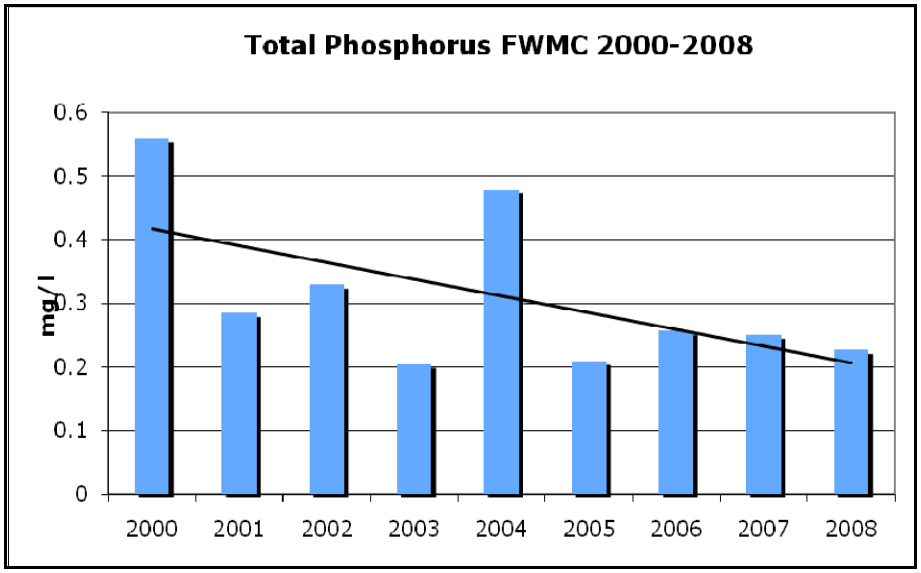


Cottonwood River Watershed Water Quality



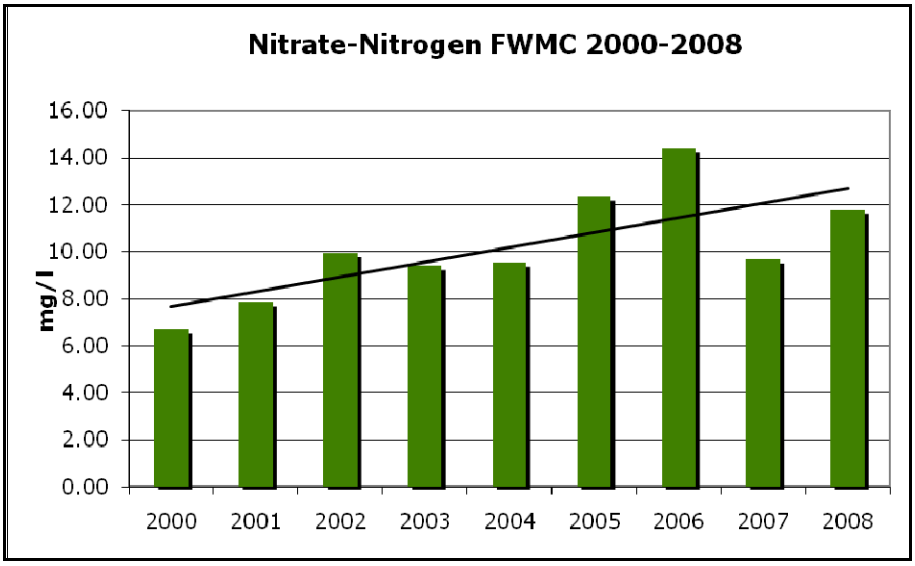
Total Suspended Solids (TSS)

The Redwood – Cottonwood Rivers Control Area (RCRCA) has been monitoring the Cottonwood River since 1997. Over the 2000 to 2008 monitoring seasons we have seen a steady downward trend in TSS levels (FWMC). Sampling done throughout the watershed continues to reflect a general reduction trend of Total Suspended Solids from 2000 to 2008 with 2004 being an exception to that trend. Overall, we believe conservation projects have helped to reduce sediment runoff from agricultural lands and stream bank stabilization projects have reduced stream bank sediment contributions.



Total Phosphorus (TP)

Phosphorus levels are often correlated with sediment levels (TSS). The mass of Total Phosphorus (TP) values mirror that of TSS over this period, though the ratio of TP to TSS appears to have increased in the past 4 years. The trend for the FWMC for TP is very similar to that of the TSS as well. A downward trend in phosphorus concentration appears to have steadied in the Cottonwood River Watershed. Given the relationship between TSS and TP, we feel future reductions in TSS should result in a corresponding reduction in TP.



Nitrates tend to trend in proportion to the volume of water in storm events in non-canopy periods of the sampling season. In other words, high rains generally bring high nitrates with lack of vegetation.

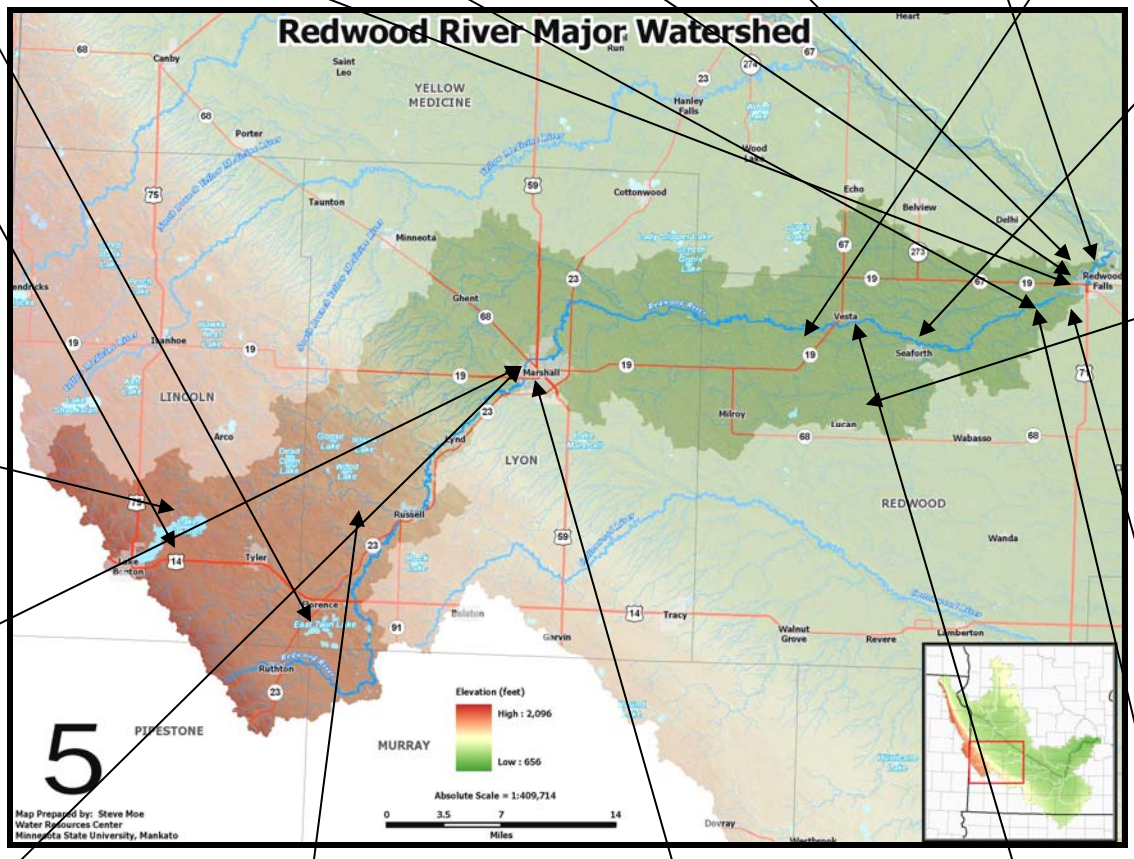
Nitrate-Nitrite (NO2-NO3)

Nitrogen values have fluctuated from year to year, but there is an upward trend to the data. Increased planting of corn acres and the associated fertilizer inputs required for corn production could be contributing to this trend. The 2005 season saw no major spikes in flow, but a long time of consistently high water levels and correspondingly high levels of nitrogen until late June or early July. In 2006, there were some high water flow spikes, but also a sustained period of high water flows similar to 2005. This resulted in persistent high nitrogen sample results during the time that the majority of water flow was occurring. The low nitrogen test results later in the year were associated with minimal flow conditions and thus had little effect on annual FWMC for 2006.

REDWOOD RIVER WATERSHED

Originating from the imposing hills of the Prairie de Coteau ("Highland of the Prairies") of western Minnesota, the Redwood River falls nearly 300 feet over a span of approximately fifteen miles. The Redwood River Watershed drains 705 square miles or 451,257 acres. A shallow drainage channel, the valley of the Redwood River is no more 25 to 50 feet deep above the City of Redwood Falls. A forty-foot dam at Redwood Falls impounds the river and then the Redwood River drops 100 feet in a succession of cascades and rapids before entering the broad flat Minnesota River floodplain. Coon Creek, Three Mile Creek, and Ramsey Creek are the main tributaries of the Redwood River. One of the unique natural features is the Ramsey Creek falls equal to the most remote waterfalls of northern Minnesota.


Ramsey Creek Falls



13. City of Florence Wastewater Treatment

14. Waukon RIM

15. Tatanka Bluffs

16. Green Corridor Project Inc.

17. MN River Waterway Trail

18. Green Corridor Bus Tour

1. Redwood River Watershed Restoration Project

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4. RCRCA Area II Legislative Meeting

5. Redwood River Water Trail

6. Paddle the Redwood

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8. Lyon SWCD – Livestock Facilities

9. Schwan Food Company

10. Biggest Reducer Project

11. Lincoln/ Redwood River Watershed Restoration Project

12. Lake Benton Rehabilitation & Reclamation Project

The Redwood River, which rises in the Coteau des Prairies, meanders along until it plunges over granite ledges into a spectacular heavily wooded gorge, flows down an irregular valley and moves between the banks of heavy soil to the Minnesota.- Wayne E. Webb and J.I. Swedberg, Redwood – The Story of a County

REDWOOD RIVER WATERSHED

The Redwood-Cottonwood Rivers Control Area (RCRCA) works along with numerous partners including SWCDs, cities, nonprofit organizations and many others to install a wide range of Best Management Practices (BMPs). One of the most unique projects is the Green Corridor Project purchasing land along the Minnesota River to put in public access areas for people to use and enjoy the natural resources.

1. Redwood River Watershed Restoration Project

In the mid 1980s, Redwood Cottonwood Rivers Control Area (RCRCA) took on the job of leading the effort to develop and implement a plan to help restore Lake Redwood. By 1994, RCRCA began to push the adoption of best management practices to reduce excessive levels of sediment and nutrients up to thirty percent. To help promote the installation of BMPs and highlight water quality problems, RCRCA undertook a comprehensive information and education program.

"Coffee on the Project" radio broadcast

Best Management Practices funded by the Redwood Cottonwood Rivers Control Area as of 2009 include Agricultural Waste System (5), Critical Area Planting (4), Multi-purpose Dam (2), Sediment Basin (1), Clean Water Diversion (3), Pond/Small Dam Repair (4), Filter Strips (3 – 12 acres), Grade Stabilization Structure (2), Grassed Waterways (83 – 122,318 feet), Streambank & Shoreland Protection (14 – 3,539 feet), Water Control Structure (1), Terraces (2 – 3,660 feet), Tile Intake Replacements (15), Water & Sediment Control Basins (213), Wetland Restoration (1), and CSA (2).

Streambank Stabilization Project, 2008

2. RCRCA Top Accomplishments

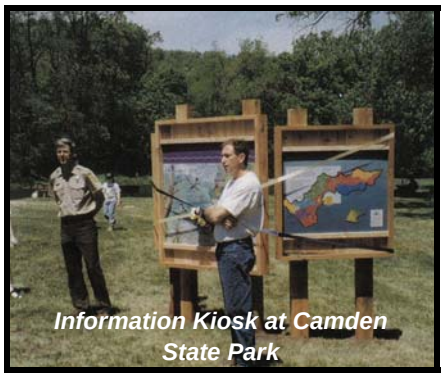
After twenty-five plus years of existence, the Redwood Cottonwood Rivers Control Area has been monitoring water quality since 1990 with the long-term trend analysis showing reduction of most pollutant concentrations during this time period. The organization has provided funds toward 880 different Best Management Practices (BMPs) with $1.7 million spent on cost-share since 1994 not including septic loan funds. RCRCA has operated as Joint Powers Organizational structure of government entity for 26 years. Four TMDL studies have been finished or in the process of being completed. Three diagnostic studies are finished or in the process of being completed. RCRCA has secured $13.6 million dollars in funds for the Redwood River and Cottonwood River watersheds since 1994.

3. RCRCA Information and Communication Activities

The objectives of this program was to provide watershed residents with knowledge of problems and solutions related to water quality; to supply information about priority watershed areas; to educate landowners about practices that will result in reduced nonpoint source pollution; and teach management skills needed by landowners to implement soil and water conservation practices. RCRCA accomplished these objectives by holding a Redwood River Clean Water Project Open House, conducting a storm drain stenciling project in several communities through coordinated efforts with local youth groups and developing newspaper inserts and newsletters featuring current information and available programs. The project also held a water quality campaign highlighting a different water-related topic called "Water Wednesday," an annual event – "Coffee on the Project" - serving coffee and rolls at a variety of local cafes to visit informally with landowners about watershed concerns and put on an annual canoe trip on the Redwood River.

Environmental Education

Other projects included coordinating efforts with the Retired Senior Volunteer Program and MN Department of Transportation to plant native grasses and wildflowers next to the Redwood River and a wayside rest area; They held a carp fishing contest to facilitate grassroots interest in exploring options to enhance the lake's recreational opportunities, and put up an informational display on the Redwood River Watershed at Camden State Park, and produced a Best Management Practices (BMP) booklet highlighting the producer's conservation efforts. Finally, RCRCA set up displays at various community events including Farm Fest and the Redwood County Fair, conducted water quality radio interviews, produced four segments on the project for KARE 11 and collaborated with local schools to develop a water quality curriculum focusing on the Redwood River.



Information Kiosk at Camden State Park

RCRCA – Area II Legislative Meeting

4. RCRCA – Area II Legislative Meeting

On December 12, 2009, the Redwood-Cottonwood River Control Area and Area II jointly hosted their annual legislative meeting. Bruce Wilson and Jeff Strock of the University of Minnesota gave a presentation on 2-stage ditches and controlled drainage to more than 60 people including county commissioners and SWCD supervisors from the eight counties in the RCRCA watersheds. Local landowner and farmer Brian Hicks spoke about the positive aspects of using controlled drainage in his operation. In conjunction with this presentation, Jeff Strock reviewed data covering nutrient removal and crop yield benefits from the Hicks' fields with an installed controlled drainage system.

5. Redwood River Water Trail

Senator Dennis Fredrickson of New Ulm worked with the Minnesota Department of Natural Resources and Redwood Cottonwood Rivers Control Area (RCRCA) to establish a stretch of the Redwood River as an official state water trail. The official water trail starts in Marshall and ends at Redwood Lake in the City of Redwood Falls. RCRCA sponsors a canoe trip on a portion of the Redwood River to help people take advantage of the resource and highlight efforts to improve in the Redwood River Watershed. This is one of 30 plus water trails found in the state including others in the Minneota River Basin – the Cottonwood, Pomme de Terre, Chippewa, Watonwan, Blue Earth and the Minnesota rivers.

Paddling the Redwood River

6. Paddle the Redwood

On June 24, 2010, the Redwood Cottonwood Rivers Control Area (RCRCA) held a ribbon cutting ceremony for the Redwood River State Water Trail. A group of fifty plus people came out to hear Senator Dennis Fredrickson talk about how the efforts to improve water quality in the river impacts recreation usage and how it can fit into a larger tourism promotion. "The Minnesota River, its valley and all of its tributaries, like this one, are a tremendous resource to Minnesota and to those of us who live in this watershed," Senator Fredrickson offered to the crowd of recreation users and river advocates. "There has been a new awakening as to what a wonderful asset this is to fishing, for hunting, having trails and enjoying the river valley for its wildlife and vegetation." After Senator Fredrickson cut the ribbon with help from one of the youngest paddlers, the group made their way down the Redwood River in canoes and kayaks to Perks Park in Redwood Falls.

Senator Fredrickson speaking at the Redwood River

7. Project Spotlight - Community River Cleanup

Close to 100 volunteers came out on a chilly April day in 2009 to clean up trash along the banks of the Redwood River in Marshall including students and staff from Southwest Minnesota State University (SMSU) and Archer Daniels Midland (ADM) employees. Some of the trash they collected included a water heater, 55-gallon drum, parts of a TV, chicken wire, foam, shingles and a refrigerator. Together these two organizations adopted a three mile section of the Redwood River as part of the DNR's Adopt-A-River Program, a clean-up effort modeled after the successful Adopt-A-Highway Program.

In 2006 alone, volunteers collected a total of 2,420 pounds of trash including 13 tires and one motorcycle battery. The next year it was 1,680 pounds and in 2008 on a different section of the Redwood River a total of 15,860 pounds of garbage (51 tires, 2 couches, 1 lazy boy chair, 4 TVs, 1 air conditioner, 1 exercise bike, and 2 stolen purses that were returned - collected by 63 volunteers. SMSU and ADM see this as an annual project to generate public awareness and community support for cleaning up and caring for all sections of the Redwood River. For 2010, students from the group Youth Energy Summit will join the effort to help expand the number of miles of river to be cleaned.

8. Lyon SWCD – Livestock Facilities

To implement as many conservation-related projects as possible, the Lyon SWCD maintains strong partnerships with the Yellow Medicine River Watershed District, Lyon County Water Task Force, Area II, Redwood Cottonwood Rivers Control Area (RCRCA) and area sportsman groups. Examples of projects have included a streambank stabilization project that saved a township road from serious erosion and a major safety concern, wildlife enhancement projects featuring wetland restorations and tree plantings, and the installation and repairs of small impoundment structures to reduce sediment loading and also used for flood water storage.

Lyon SWCD has provided over $1.2 million in low-interest Agriculture BMP loads for agricultural waste facilities, manure handling equipment, conservation tillage equipment and upgrades of septic systems. Among these livestock improvements were eight agricultural waste systems through grants and low-interest loans along with partnerships among watershed, federal and state programs.

9. Schwan Food Company

Located in Marshall, this ice cream manufacturing operation reduced its annual phosphorus emission of 11,000 pounds by 74 percent to the Marshall Wastewater Treatment Plant by using alternative cleaning materials. Schwan partnered with its cleaning chemical supplier, Anderson Chemical Company of Litchfield, to formulate phosphorus-free cleaning products. Over a two-month period the new cleaning chemical system was tested on actual production equipment with detailed oversight by corporate microbiologists before being adopted as the standard sanitation procedure for the

plant. The system showed improved cleaning and sanitation performance with no net increase in combined chemical and labor cost. As a result of the phosphorus reduction, the Schwan Food Company received the Governor's Award for Excellence in Waste and Pollution Prevention at the 2006 Air, Water and Waste Environmental Conference.


Setting up monitoring equipment

10. Biggest Reducer Project

Members of the Youth Energy Summit (YES!) or the Marshall Renewable Energy Club visited families in the city to teach people about recycling tips on can and cannot be recycled. In addition, the high school students provided other information about energy conservation including unplugging chargers, turning off lights and using shorter extension cords because they all save money. YES! Members left behind brochures on CFL light bulbs, a Smart Strip, and Kill A Watt. The YES! group is also teaching Marshall Middle School students about wind energy through hands-on activities with a grant from East River Electric.

11. Lincoln/Redwood River Watershed Restoration Project

From January of 2005 to February of 2009, the Redwood Cottonwood River Control Area (RCRCA) continued to promote and install Best Management Practices in the Redwood River Watershed to reduce direct sediment and phosphorus delivery to Redwood River and Lake Benton. During this time period, RCRCA installed 100 grassed waterways, 10 terraces, and 24 sediment control basins in Lincoln County along with bringing four livestock operations into compliance. The grant funds also replaced the outlet on Dead Coon Lake, installed tile intake replacement, 12 acres of buffer strips and a project to divert feedlot runoff from entering Coon Creek. These conservation practices have the potential to reduce phosphorus losses by 178 pounds per year and reduce net sediment in surface water by 154 tons per year. Over the ten year life expectancy of each BMP there is the potential to reduce phosphorus by 8,876 tons or 709,960 pounds of algae. A total of 14 out-of-compliance septic systems were also upgraded.


Native Prairie Restoration


Grassed Waterway


Lake Benton Public Use Area

12. Lake Benton Rehabilitation and Reclamation Project

A diverse group of partners came together to improve water quality in Lake Benton, a 2,875 acre lake located in southwestern Minnesota in the Norwegian Creek Watershed and outlets to the Minnesota River through Coon Creek and the Redwood River. This multi-year project consisted of three separate results: (1). Chemically remove exotic aquatic plant called curly leaf pondweed over five years with Fluidone Treatment; (2). Conduct a native plant restoration program to re-establish and (3). Control future outbreaks of exotic plants and annual

application evaluations for public information. The partners were Lake Benton Lake Improvement District, Lincoln Co. Commissioners, Lincoln Co. Environmental Office, City of Lake Benton, Lincoln SWCD, Redwood-Cottonwood Rivers Control Area, MN DNR Fisheries and Eco-Services divisions, MPCA and NRCS.

14. City of Florence Wastewater Treatment

In the fall of 2008, Florence crossed itself off the list of out-of-compliance wastewater systems through the assistance of Lyon County. Florence's location in the Redwood River and Minnesota River watersheds made it a high priority for MPCA. Many of the homes had straight pipe systems which simply drain untreated sewage and can contaminate ground and surface water. The city was able to opt out of a more expensive central system and install individual treatment systems and drain fields because of large city lots and a low water table. Cost-share from the city and low interest loans provided by the county helped the residents pay for the systems without too much of financial burden.

Aerial View of Florence

River Advocate – Loran Kaardal

You will find it hard to find anyone as dedicated to protecting and creating more public access along the Minnesota River than Loran Kaardal. As one of the founders and current co-director of the nonprofit organization Tatanka Bluffs, Loran has his sights set on developing a public trail system between the Upper Sioux Agency State Park and Fort Ridgley State Park in the Redwood and Renville counties area. Loran has played an important role in the Green Corridor Project (purchasing land for public enjoyment) and many other conservation-related programs including the establishment of a Minnesota River Valley Water Trail.

Mike Hewitt and Loran Kaardal

15. Organization Spotlight - Tatanka Bluffs

Citizens of Renville and Redwood counties have banned together to form the nonprofit organization "Tatanka Bluffs." The mission of this group is to protect the natural resources of the Minnesota River Corridor between the Upper Sioux Agency State Park and Fort Ridgely State park and areas surrounding the two counties. Tatanka Bluffs facilitates others to take action within five focus areas including the outdoors (public recreational land acquisition and trail development); renewable tourism; celebrations, entertainment and gaming; education and green energy.

Tatanka Bluffs
A Partnership of Redwood and Renville Counties
Heart of the Minnesota River Valley!
www.tatankabluffs.com

The vision of Tatanka Bluffs is to develop one of the top tourism destinations in Minnesota by using its trademark brand and developing a multi-faceted plan highlighting an effort of communication, collaboration and cooperation among citizen leaders and volunteers. Ultimately, the group feels this will help businesses in the area to build on their vision and offer future generations a place – "Tatanka Bluffs" – to live, work, and prosper.

Some of the projects that are going on in the Tatanka Bluffs region includes a plan to build a Minnesota History Learning Center – a 600 bed, 40 to 80 acre campus to tell the stories of the Minnesota River Valley by collecting, preserving, and sharing the rich cultural and natural history of Minnesota. The goal is build the facility within five years to be place students, educators, researchers and citizens can come together. Another project is a Minnesota Prairie Line's "Vintage" Passenger Service to offer a chance for people to travel by train from Carver County to Yellow Medicine County.

16. Waukon RIM

Waukon Rim was organized in the middle 1990's by a saddle club, a snowmobile club, two sportsmen's club, the Redwood County Pheasants Forever and Minnesota Deer Hunters Association chapters. They acquired about 600 acres of conservation lands from owners, who were hesitant to enroll their riparian properties in conservation programs if they had to continue maintaining these properties. These properties were managed as a shared public landscape that allowed fishing, hunting, trail riding and snowmobiling.


Minnesota River

Properties included the 202 acre Kotval farm which straddled the Redwood River near Vesta. This property was donated to the DNR in 2005 as an addition to the Fox Vaug WMA. The 400 acres of the Mann's Lake, Bollum and Parker farms are riparian areas along the Minnesota River near North Redwood. Two of these farms were donated to the DNR in 2009 and the final donation should occur in 2010.

These last donations did include trail corridors that are managed by the NDR Parks & Trails Division. The North Redwood Trail leads from the Redwood Valley Riders Saddle Club grounds to the Redwood River. The Dick Brown Recreational Trail encircles Mann's Lake. These cumulative donations have created over $500,000 in critical habitat credits. The credits have been used to acquire riparian round outs along the Redwood River, for the acquisition of state managed properties. Waukon RIM initiated the paradigm of sharing a common landscape for multiple recreational opportunities and passed the baton forward to the Green Corridor Team.


Waukon Reinvest in Minnesota site

17. Green Corridor Inc. Project

This citizen-based collaboration is working in the Renville and Redwood counties' area of the Minnesota River to connect the Upper Sioux Agency State Park with Fort Ridgely State Park by purchasing land along the Minnesota River. The overall goal of the Green Corridor Project is to enhance and expand the two state parks and connect them with hiking and biking trails along the 45 mile corridor.


Rock Outcrop at the Goldmine Area

A selection of partners – Great River Greening, Trust for Public Land, Parks and Trails Council, Minnesota Department of Natural Resources and National Park Service Trails and Conservation Assistance – are working together to build upon conservation, cultural and historical aspects of this area. The project has also been recommended to receive $1.67 million as part of the first year (2010) appropriations from the new Outdoor Heritage Fund to help acquire at least 4 more properties and also recommended for another $1.6 million in 2011.

One of the key property purchases was the Whispering Ridge Aquatic Management Area funded from the Legislative-Citizens Commission on Minnesota Resources (LCCMR). This acquisition has spurred three adjoining landowners into serious discussions with the DNR to sell 1,000 acres of critical habitat lands to help connect much of a three-mile corridor from Vicksburg County Park to Cedar Rock Wildlife Management Area. Two of the properties in this Gold Mine Lake Corridor are already active acquisition projects.


Whispering Ridge Aquatic Management Area

To fund the land acquisitions, the Green Corridor Project received a $1 million grant from the LCCMR with the goal of purchasing 220 acres. The project was able to buy 249 acres in the Green Corridor area: 7 acre Beaver Fall AMA, 182 acre Whispering Ridge AMA (contains significant rock outcroppings, river frontage and a developed park area – a significant "connecting acquisition" to help fill in the gap between the east end of Vicksburg County Park and the west end of the Gold Mine Lake Area), 60 acres of wooded creek acquired at the Fort Ridgely State Horse Camp (expanded the existing 13 acre site), 30 acre Firle Woods (transferred to Fort Ridgely State Park), and 30 acre Belt Woods (added to Fort Ridgely State Park).


Goldmine Lake

A number of partners assisted with the land acquisitions including the DNR and Redwood chapter of the National Wild Turkey Federation. The Green Corridor Project assisted the DNR with the 44 acre Brickyard AMA purchase (located at the old Morton Brickyard along the Minnesota River) and the Waukon Rim donations for a total of 304 acres (Bollum Farm and the Mann's Lake Farm). Another tract of land is the 60 plus acre Parker Farm.

18. Green Corridor Mid-Minnesota River Watershed Water Trail

As part of the effort to purchase land along the Minnesota River in Renville and Redwood Counties for public access, the Green Corridor Project has also begun to partner with organizations like the Minnesota River National Scenic Byway Alliance and the Minnesota River Watershed Alliance to develop a 45-mile waterway trail on the mainstem river. The effort is spearheaded by a variety of stakeholders, communities, citizens, and organizations who share a common vision for creating and enhancing this waterway trail.


Skalbekken County Park

In August of 2009, the project received a technical grant from the National Park Service to develop a master plan. As a result of this plan, the project will help identify new resource infrastructures and improvements to existing infrastructure to provide better public access, safety improvements, camping and water/waste facilities. For their efforts the group received an award from the Mid America Trails and Greenways organization.

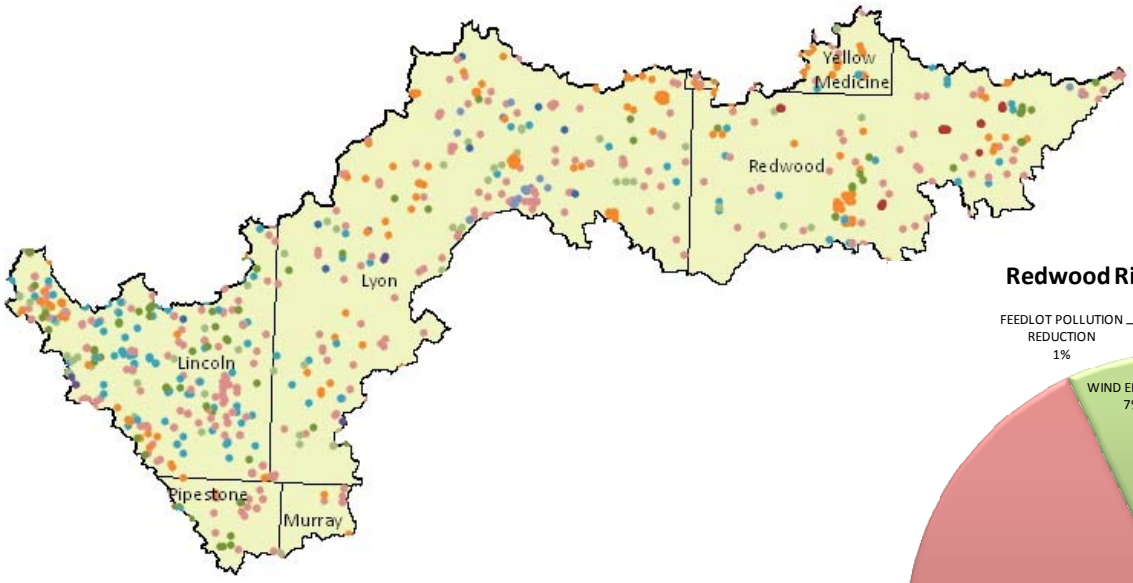

Paddling the Minnesota River

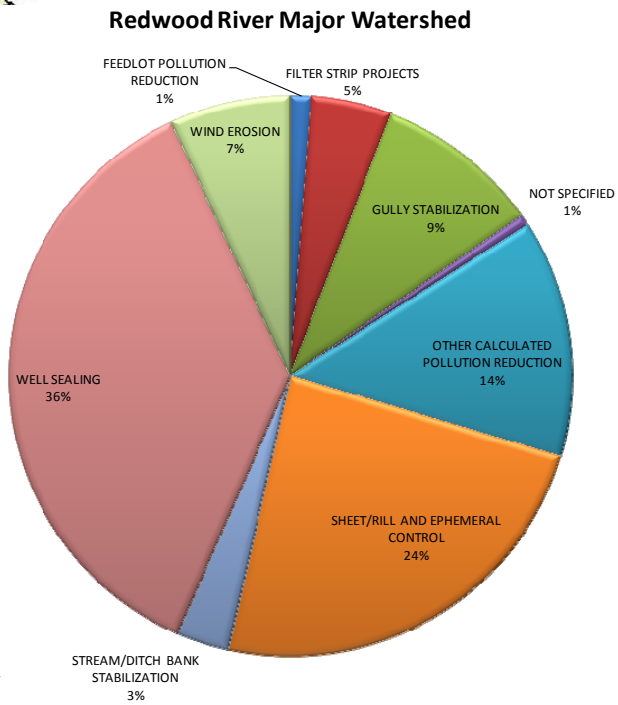
19. Green Corridor Bus Tour

On July 9, 2009, Redwood and Renville counties sponsored a bus tour of the Minnesota River Valley Waterway Trail from Granite Falls to Fort Ridgely. Commissioners Bob Fox (Renville) and Al Kokesch (Redwood) joined about 20 others, including DNR Fisheries and Parks & Trails, National Park Service, CURE, member of the Lessard-Sams Outdoor Heritage Council, Minnesota River Watershed Alliance and reporters from West Central Tribune and Granite Falls Advocate to explore multiple sites for potential improvements. The group viewed a number of significant sites along the Minnesota River including the riverside park in Granite Falls, Minnesota Falls Dam, Gold Mine Lake and numerous Renville County Parks.


Minnesota River Bridge

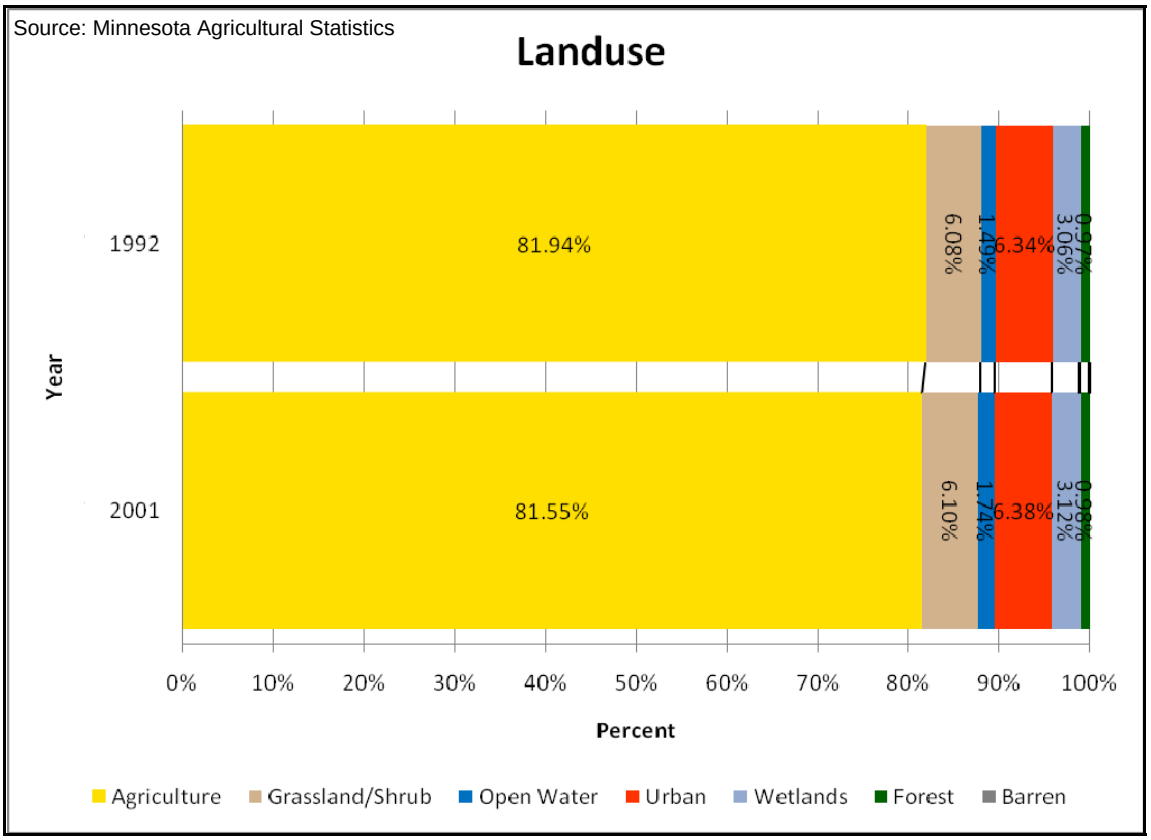
Redwood River Watershed Conservation Practices and Land Use



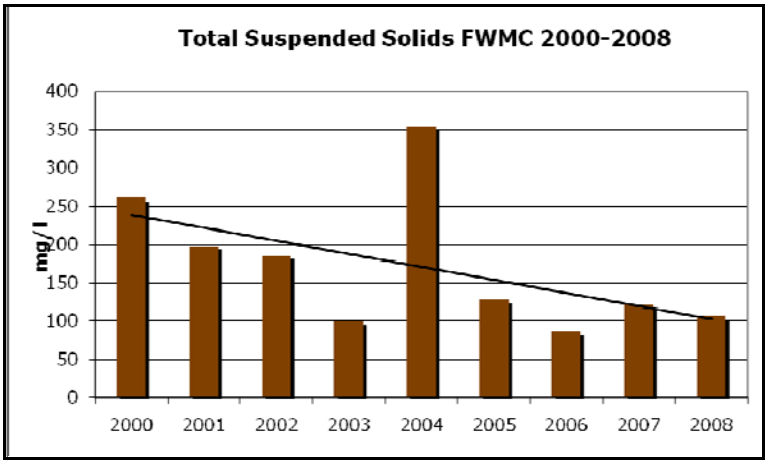


Conservation Practices

As one of the longest effort to improve water quality, the Redwood Cottonwood Rivers Control Area started in the 1980s. The map above and pie chart to the right illustrates conservation practices in the Redwood River Watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Redwood River Watershed but not recorded in either LARS or eLINK.

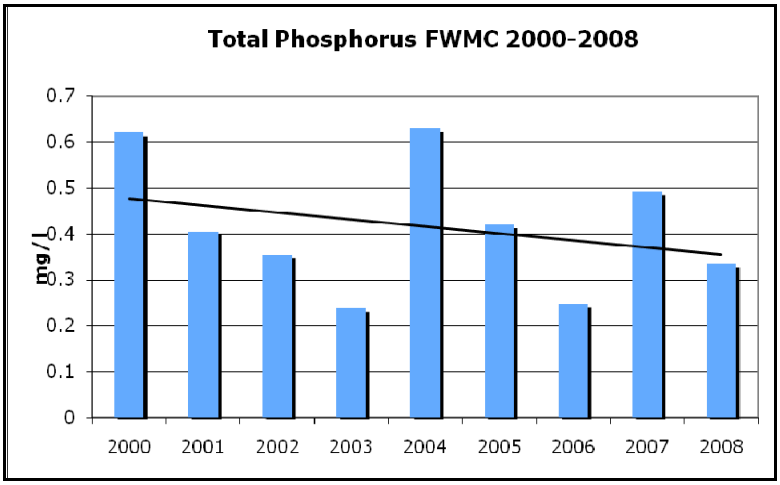


Redwood River Watershed Water Quality



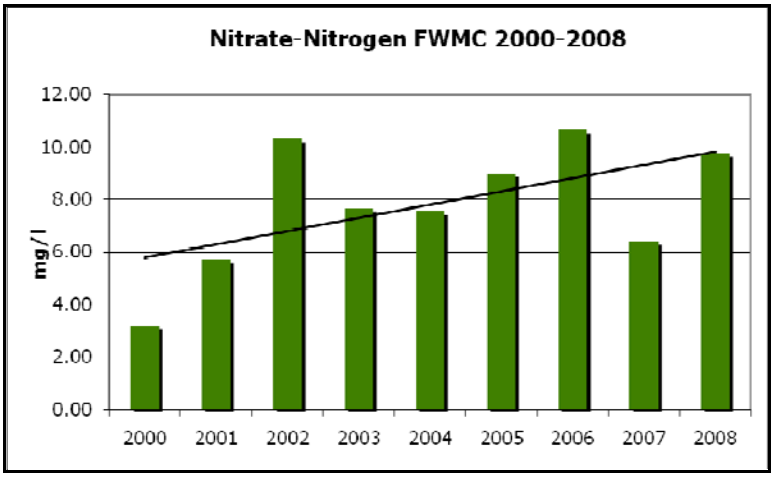
Total Suspended Solids (TSS)

The Redwood – Cottonwood Rivers Control Area (RCRCA) has been monitoring the Redwood River since 1990. Over the 2000 to 2008 monitoring seasons we have seen a steady downward trend in TSS levels (FWMC). Sampling done throughout the watershed continues to reflect a general reduction trend of Total Suspended Solids from 2000 to 2008 with 2004 being an exception to that trend. Snowmelt flows in the spring of 2004 were much tamer than normal and the spring of 2004 was most uneventful. On Memorial Day weekend of 2004 the watershed received rains in excess of four inches which spiked the river to its highest (non-snowmelt) level of this nine year period. The highest yearly mass of sediment came in 2004. The average concentration was elevated in 2004, from a few major rain events in the spring and perhaps from steady smaller rain events through the rest of the year. Overall, we believe conservation projects have helped to reduce sediment runoff from agricultural lands and stream bank stabilization projects have reduced stream bank sediment contributions.



Total Phosphorus (TP)

Phosphorus levels are often correlated with sediment levels (TSS). The mass of Total Phosphorus (TP) values mirror that of TSS over this period, though the ratio of TP to TSS appears to have increased in the past 4 years. The trend for the FWMC for TP is very similar to that of the TSS as well. A downward trend in phosphorus concentration appears to have steadied in the Redwood River Watershed. Two municipalities within the watershed are in the process of upgrading or establishing wastewater treatment facilities. This should help continue the downward trend in concentrations.



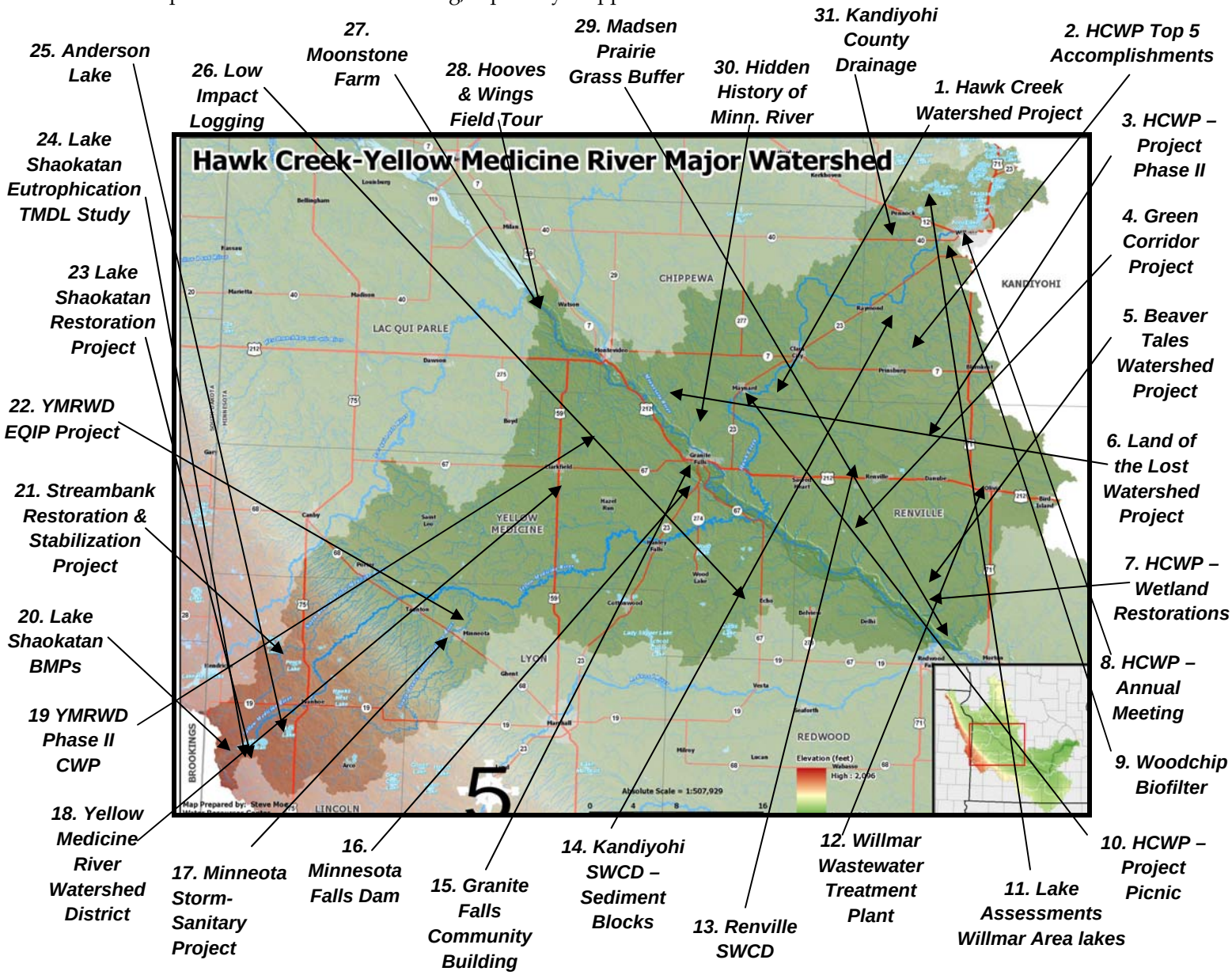
Nitrate-Nitrite (NO2-NO3)

Nitrogen values have fluctuated from year to year, but there is an upward trend to the data. Increased planting of corn acres and the associated fertilizer inputs required for corn production could be contributing to this trend. The 2007 planting season saw the most acres (going back 35 years) planted into corn for the 3 largest counties that make up 91% of the Redwood River Watershed. Fertilizer is often applied during the fall the year prior to utilization, thus the most fertilizer was probably applied during the 2006 season. The 2007 season was also relatively dry, with only 2 rain events that exceeded 1 inch until mid-August when a large rain event had very little effect on flow as most rain probably went to groundwater recharge. Nitrates tend to trend in proportion to the volume of water in storm events in non-canopy periods of the sampling season. In other words, high rains generally bring high nitrates with lack of vegetation.

Hawk Creek and Yellow Medicine River Watershed


Hawk Creek

Classified as a major hydrologic watershed in the Minnesota River Basin, Hawk Creek and Yellow Medicine are separated into two management units. A section of land extending from the Lac qui Parle Reservoir to just below the mouth of the Redwood River along the Minnesota River's mainstem is part of the Hawk Creek & Yellow Medicine Watershed. There are also a number of smaller tributaries draining directly to the Minnesota River in the watershed including Beaver Creek on the north side. Hawk Creek and Yellow Medicine Watershed drains 2,020 square miles with approximately 85 miles of the Minnesota River flowing through this large basin. The watershed is primarily agricultural with over 80 percent of acres tied to farming, especially cropped lands.



Hawk Creek was named for the European Kestrel (a small falcon). Translation of Dakota name for hawk is chetambe. The Yellow Medicine River got its name from the Dakota for the bitter, yellow roots of the moonseed plant, growing as lush vines in thickets along the streams banks. The Dakota dug the yellow root of the moonseed and used it as a medicine - Warren Upham, Minnesota Place Names – A geographical Encyclopedia

HAWK CREEK – YELLOW MEDICINE RIVER WATERSHED

Normally, this major watershed is divided into two different management units with the Yellow Medicine River Watershed District involved in water quality issues on one half and the Hawk Creek Watershed Project handling water quality efforts on the other half. Both entities have made major strides in restoring and protecting the water resource along with assistance from government agencies, citizens, and nonprofit groups.

1. Project Spotlight - Hawk Creek Watershed Project

Established in 1999, the Hawk Creek Watershed Project (HCWP) focuses on implementing Best Management Practices (BMPs) to correct and prevent land use challenges that negatively affect water quality and quantity. By working with a variety of partners, the HCWP provides assistance to landowners and others to implement BMPs through both cost-share programs and a septic system upgrade low interest loan program.


Installing Alternative Tile Inlet

Hawk Creek Information Booth

Cost-share as of August 31, 2009: Abandoned Wells Sealing (7), Ag-waste structures (10), Alternative Intakes (100), Bank Stabilizations (7), Tile Bioreactor (1), Buffer Strips (133 at 1,192 acres), Critical Seeding (1), Field Windbreaks (2), Grade Stabilization (9), Nitrogen Management (7), Rain Gardens (3), Sediment Basins (34), Sediment Retention Ponds (1), Septic System Upgrades (370), Shelterbelt (1), Side Inlets (246), Terraces (7), Waterways (10 – 563 acres) and Wetland Restorations (9 at 2,264 acres).

2. Top 5 Accomplishments of HCWP

According to Cory Netland, project manager, one of the top accomplishments is the established reputation as a trusted partner with the agricultural producers of the watershed. This was done by working with, not against, farmers in the watershed. A visible example is the highly successful annual meetings that are attended by nearly 140 people each year, many of whom are people that have cooperated with the project on in-field Best Management Practices (BMPs).


Erosion on Drainage Ditch

Two, the project has developed an excellent network of partnerships with the conservation professionals in the watershed. They have partnered with most, if not all, of the entities who work on conservation related issues in our watershed, including NRCS, SWCDs, DNR, US Fish & wildlife Service, Ducks Unlimited, Pheasants Forever, County Drainage Authorities, County Environmental Offices, Prairie Woods Environmental Learning Center, among others.

Three is the routine success in obtaining grant dollars in highly competitive situations. More importantly, the project has encumbered and spent every dime it has been awarded, with a high percentage of the funds going to on-the-ground BMPs implemented on a 100 percent voluntary basis.

Four, the project along with its partners has contributed to dramatically reduced Total Suspended Solids (TSS) in all of the streams they monitor. The buffer initiative and other BMPs have had a direct impact on the amount of sediment in the waterways.

Five and final top accomplishment is how the project has directed its focus to on-ground BMPs and those efforts have been very successful with an impressive 949 BMPs implemented since 2001. The amount of phosphorus and sediment saved from these BMPs has been quite astounding. If an average project life span of 20 years is met, these projects will reduce sediment by 205,802 tons, total phosphorus by 415,792 pounds, and reducing fecal coliform bacteria by 4,023,380,000 organisms.

3. Hawk Creek Watershed Project Phase II

From August of 2004 to August of 2005, the Hawk Creek Watershed Project conducted a Phase II Clean Water Partnership Continuation Grant by helping installing Best Management Practices (BMPs) and upgrading out-of-compliance septic systems along with educational and monitoring activities. Results of this continuation grant were as follows: cost-share for 117 BMPs treating 5,177 acres; maintained an active Citizen Monitoring Network with 27 volunteers; continued water sampling at six primary and four additional sites; continued to hold the annual public information meeting; promoted the project at county fairs and made presentations to schools, local organizations and agricultural shows. Water quality benefits of the BMPs translate into sediment and phosphorus reductions of 2,302 tons and 3,368 pounds per year.


Environmental Education Program

4. Green Corridor Project

Hawk Creek Watershed Project (HCWP) received a Clean Water Partnership grant to work exclusively in the Green Corridor area of the watershed. Over the lifespan of the project – July, 2006 to July, 2009 – HCWP helped install 43 side/drop inlets affecting 549 acres, 22 alternative intakes and tile intake protection projects affecting 106 acres, 17 buffer strips of 106 acres, restoring 553 acres of wetlands and 4 additional BMPs affecting 59 acres. This total of 89 BMPs affects 1,419 acres with an estimated soil loss reduction of 474 tons per year and reduced phosphorus loading by 539 pounds per year. Major accomplishments of the information and education program included the distributing 6,000 newsletters to watershed residents, hosting public meetings, and presenting at local schools and community organizations.


Drainage Ditch Repair

5. Beaver Tales Watershed Project

As one of the smaller, direct tributaries to the Minnesota River in the Hawk Creek Watershed, the "Beaver Tales" project is sponsored by the Hawk Creek Watershed Project and consists of approximately 122,302 acres over 161 miles of water courses. Beaver Creek and similar tributaries can play a significant role in determining the health of the Minnesota River. A U.S. EPA 319 grant funded the installation of 23 buffer strips (122 acres), two side inlet/drop inlets affecting 54 acres, four alternative surface drainage systems intakes and tile intake protection projects affecting 21 acres, eight projects with 21 individual sediment basins affecting 196 acres and six additional BMPs affecting 1,319 acres. These BMPs provided an estimated soil loss reduction of 705 tons/yr. and reduced phosphorus loading by 561 lbs. /yr.


Hawk Creek at 810th Avenue

6. Land of the Lost Watershed Project

Sponsored by the Hawk Creek Watershed Project (HCWP), the "Land of the Lost" project focuses on 25 small streams along the Minnesota River an area comprising of approximately 197,765 acres and over 191 miles of watercourses. According to the HCWP, these tributaries are often forgotten about but play a significant role in determining the health of the Minnesota River. The HCWP installed 12 buffer strips affecting 178.2 acres, 22 side inlet/drop inlets affecting 257.1 acres and 13 additional BMPs affecting 977 acres. A total of 86 BMPs have been installed since the project started in 2002 affecting 1,627 acres. These BMPs provide an estimated soil loss reduction of 1,193 tons/yr. and reduced phosphorus loading by 1,485 lbs. /yr.


Eroding bank on Hawk Creek

7. HCWP - Wetland Restorations

Incentives are being offered by Hawk Creek Watershed Project in an effort to reduce the phosphorus runoff into the Minnesota River, suffering from low oxygen levels in its lower reaches. The basin-wide effort will use $326,768 in grant funds to restore wetlands in Chippewa, Renville and Kandiyohi counties. In addition, other agencies will be offering funding and technical assistance to help address the problem of low oxygen levels.


Wetland Restoration

Wetland restorations will help improve the basin's water quality by holding and absorbing nutrients now being carried by smaller tributaries to the Minnesota River. Hawk Creek Watershed Project hopes to see 320 acres of wetland restored and another 120 acres of vegetative buffers. Other incentive and technical assistance will be offered by the project for additional Best Management Practices ranging from installing alternative intake structures and upgrading feedlots to stop run-off.

8. Hawk Creek Annual Meeting

To thank supporters of the Hawk Creek Watershed Project and offer water quality-related presentations, the Hawk Creek staff holds an annual meeting in February at the Kandi Entertainment Center in Willmar. More than 100 people come out to hear presentations on the status of the Hawk Creek Watershed Project, effects of land retirement on water quality and aquatic biology in the streams of the Minnesota River Basin, Discovery Farms – Understanding Agricultural Water Impacts, Basin-wide studies to understand turbidity in the Minnesota River and tributaries, and use of 210Pb and 137Cs to fingerprint sources of sediment to agricultural rivers.


Hawk Creek Annual Meeting

9. Hawk Creek Woodchip Biofilter

A woodchip "bioreactor" was installed on a subsurface drain tile line near Willmar to remove nitrogen and phosphorus from the water before it reached a waterway. Hawk Creek Watershed Project installed the demonstration project on June 20, 2009 to treat a six acre portion of a cornfield. The filtered tile water will be monitored to determine reductions in sediment and nutrients on the estimated $1,800 project. A second biofilter was installed to treat runoff from an area draining a pasture and residential homes. Water quality monitoring will provide data on pollutant reduction from the two different land-use areas. The Hawk Creek Watershed Project worked with the Kandiyohi County Public Works and BWSR on the project.


Constructing Biofilter

10. Hawk Creek Watershed Project Picnic

To help nurture and strength relationships and shared ideas in a casual setting, the Hawk Creek Watershed Project has developed an annual appreciation picnic for project partners, active citizens and landowners. A group of 34 people gathered at the Maynard Lions Park located along Hawk Creek on September 11, 2009 to enjoy grilled foods, positive conversation and informally network to discuss issues related to the mission of the project. Keeping it simple and informal there was no formal presentation.


Hawk Creek Picnic at Maynard Lions Park

11. Lake Assessments of Willmar area lakes

Hawk Creek Watershed Project undertook an assessment project of lakes in the Willmar area. The watershed project is overseeing separate, two-year studies to analyze the water quality on Long and Ringo Lake. The second study the Hawk Creek Basin: Eagle, Skataas, Swan, Willmar and Foot. The testing will help determine what is flowing into these lakes, and what that means to water quality. It's generally recognized that some of these lakes hold excess nutrients, which trigger algae blooms and other problems.


Pulling lake samples

12. Willmar Wastewater Treatment Plant

On August 25, 2010, city staff began to incrementally redirect flow from Willmar's old wastewater treatment plant to the new $86.2 million facility located about five miles west of the city. The new facility includes the treatment plant, two pump stations and separate pipelines for conveying the industrial waste from the Benson Avenue and Willmar Avenue Jennie-O Turkey Store plants and municipal waste. The new plant improves the conveyance system in order to address more stringent requirements for phosphorus and ammonia along with meeting projected population and industrial growth to the year 2030.

Unlike the old plant, the new treatment system removes both ammonia and phosphorus along with reducing the pollutant load from 97.2 to 99.3 percent. The plant is expected to reduce the discharge of phosphorus concentration from 7-8 milligrams per liter (mgL) to less than 1 mgL. When fully operating, the plant will treat more than 5 million gallons of waste per day. Downstream of the plant discharge is a Hawk Creek Watershed Project monitoring site.


Hawk Creek Watershed Project staff tour the new Willmar wastewater treatment plant

13. Renville Soil and Water Conservation District

Established in August of 1955, the Renville SWCD concentrates on promoting conservation practices to protect water, soil and natural resources in the county. Renville SWCD also partners with Renville County to conduct feedlot inspections to help landowners obtain cost-share to upgrade systems and assists the Renville County Environmental office with technical assistance with mine reclamation plans, rain garden design and installation and other conservation activities. A major focus of Renville SWCD is to assist a number of watershed projects including Hawk Creek Watershed Project and High Island Creek Clean Water Partnership in the Minnesota River Basin.


Wetland Restoration

In 2008, Renville SWCD conducted education programs for county schools, put on Green Career Day for all Renville County West High School students and hosted the BWSR Board meeting in August which featured a tour of conservation practices. A total of 553 acres involving 60 new contracts were enrolled into the federal CRP program. One roadbank easement of 153 acres was recorded and restored the following year.

Under the RIM/WRP program one 103 acre project was accepted in Renville County. Other projects involved partnering with MN DOT on a Living Snow Fence project, cost-sharing on nine local water management projects and assisting with the design of three rain gardens. Renville SWCD led the effort with Redwood SWCD to develop the Granite Outcropping Easement Program in the Upper Minnesota River portion of the basin.

14. Kandiyohi SWCD – Five Sediment Blocks

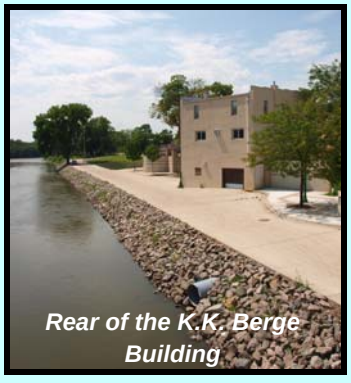
Five sediment blocks were installed to reduce soil erosion and improve water quality, especially benefiting Eagle Lake and other downstream waters. Prior to the installation of the sediment blocks, water overtopped the township road adjacent to the project during rain events and created farming problems. Erosion has been reduced and water volume controlled after the completion of the project. Funding came from BWSR's State Cost-Share, Hawk Creek Watershed Project and Kandiyohi County Water Plan funds.

Sediment Blocks

15. Project Spotlight - Granite Falls

The City of Granite Falls has embraced the Minnesota River flowing through the heart of this community along with suffering from its destructive powers. After the devastating 1997 flood and to lesser extent those in 2001 and 2009, Granite Falls worked to counter balance the beauty of the river and the undesirable side. One neighborhood overlooking the river was removed and is now being replaced by a community park.

On the business side of the river the construction of a floodwall incorporated some of the buildings and better public access to the river. Like many other structures along the riverbank, the K.K. Berge Building was slated to be removed before a group of citizens recognized its unique aspects and saw a lot of potential for community and river related activities. Now, the effort has moved to preserving the building to be used as the Chamber of Commerce office, public space for a new Arts Council, Historical Society displays along with other uses including rentals on the second floor. In the basement, CURE plans to have an office to help host river-based events along with a canoe/kayak and bike rental shop.



Rear of the K.K. Berge Building

16. Minnesota Falls Dam

Xcel Energy and Minnesota DNR sponsored a collaborative study to determine the condition of the Minnesota Falls Dam downstream of Granite Falls and analyze future use scenarios. To study the dam's structure, water levels in the reservoir were lowered in incremental stages to protect against any significant negative effects. BARR Engineering was commissioned to determine the dam's status along with how the structure alteration or removal would affect the upstream area. Three options have been outlined: (1). Fix the dam and leave it as is; (2). Augment the dam, adjusting its height lower; and (3). Remove the dam completely. Constructed in 1905, the dam originally produced electricity until 1961 and then as a cooling reservoir for the Minnesota Valley Generating Plant, which closed in 2004. While the dam serves no purpose for Xcel Energy, it does maintain a higher water level for the Granite Falls Ethanol Plant and local golf course. Recreation enthusiasts see positive benefits in removing the dam for the migration of fish and paddling opportunities.

Minnesota Falls Dam

17. Minneota Storm-Sanitary Sewer Separation Project

Many communities historically combined the storm and sanitary system resulting in water quality problems. The city of Minneota has undertaken a $2.5 million project to complete the separation of storm water and sanitary sewer lines. Currently the system backs up during heavy rains and sends sewage sludge into the Yellow Medicine River, impaired with excessive levels of fecal coliform bacteria. A Fecal Coliform Bacteria TMDL has been approved to reduce this pollutant.

18. Yellow Medicine River Watershed District

On the south side of the Minnesota River, the Yellow Medicine River Watershed District came into existence on August 27, 1971 as the result of a county petition. Today, the watershed is a mixture of smaller lakes, tributaries to Yellow Medicine River and numerous ditch systems. The District works with landowners on tiling and drainage permits, flood control projects and watershed ditch berm inspections.


Yellow Medicine River

A major focus of the District is implementing best management practices with assistance from the MPCA and the three SWCDS in the watershed to reduce nonpoint source pollution in the Yellow Medicine River and its tributaries. One recent initiative launched by the District is the South Branch of the Yellow Medicine River Fecal Coliform Bacteria TMDL Implementation Project to provide incentive funds for installing filter strips, feedlot upgrades, alternative tile intakes, rotational grazing, nutrient/manure management plans, and a residue management incentive program.

Over the last ten years, the Yellow Medicine River Watershed District has completed many water quality and quantity projects to prevent flooding and improve water quality in the watershed. The District has partnered with other agencies to design and fund eight major flood control projects, retention structures and six road retention structures incorporating road and flood control repair projects. On the Alta Vista 36 Road retention project, the District worked with the landowner, Lincoln County and Lyon County highway departments and Area II Minnesota River Basin Project to make the project cost effective.


Road Retention Structure

The Yellow Medicine River Watershed District successfully completed two Clean Water Partnership Implementation Programs from 2001 to 2008. They installed a diverse selection of BMPs: filter strips (214 acres), water-control basins (47), clean water diversion and grassed waterways (5,700 feet). By implementing these practices, the District has met its goal of improving water quality by at least 25 percent in the six year period. Other efforts by the District include holding public informational meetings, mailings, and working with citizens and groups on water quality issues.

19. Greater Yellow Medicine River Phase II CWP

During the initial Phase II CWP from 2001 to 2005, the Yellow Medicine Watershed District worked with its project partners – Lyon, Lincoln and Yellow Medicine SCWDs – to install Best Management Practices (BMPs) across the Yellow Medicine River Watershed. The priority centered on installing filter strips, for a total of 445 acres.

Other successful tasks included upgrading a total of 105 out-of-compliance septic systems and 57 nutrient management assessments to reduce nutrient loading. Information and education was an important part of the project with the District sending out newsletters and fact sheets, holding public open houses, hosting a booth at the county fairs and conducting watershed tours. Other education activities focused on classroom and on-site presentations to local junior and senior high school students.


Water Quality Education Program

Initiated by the Yellow Medicine River Watershed District, the Greater Yellow Medicine River Phase II CWP during the time period of February, 2005 to January, 2009 focused on providing incentives to promote the installation of conservation practices with an emphasis on addressing Conservation Reserve Program (CRP) lands along the corridors of the Yellow Medicine River. The District partnered with Lincoln, Lyon and Yellow Medicine SWCD offices and NRCS to install numerous BMPs)including filter strips, sediment basins and septic system upgrades.

A total of 67 septic system upgrades were completed during this project – Lyon County (14), Lincoln County (37) and Yellow Medicine County (16). Conservation practices installed during the project included 31 sediment basins, one clean water diversion, 333 acres of filter strips and 5,700 feet of grassed waterways. As part of the education and information effort, the District worked with the Minneota Public School students to make classroom presentations and field trips to learn about monitoring and river assessment.

20. Lake Shaokatan Best Management Practices

Lincoln SWCD worked in cooperation with the Yellow Medicine River Watershed District to promote and install BMPs in the Lake Shaokatan Watershed to improve the lake's water quality. BMPs installed included 20 rock/blind intakes and a drainage tile diversion and wetland enhancement under a partnership with the Lake Shaokatan Sportsman's Club and a private landowner. Finally, the two organizations along with the DNR, Lake Shaokatan Sportsmen Club, Lincoln Co. Parks and Southwest Prairie Technical Service Area restored a wetland on a 48 acre pasture site, rerouted the tile line through the wetland and built a control structure at the outlet to reduce nutrients.

Drainage Tile Diversion

21. Clean Water Legacy Streambank Restoration and Stabilization Project

Lyon SWCD partnered with the Yellow Medicine River Watershed District and City of Minneota with engineering assistance from the SW MN Technical Service Area on a streambank restoration and stabilization project. Funds from the Clean Water Legacy grant program and in-kind stabilized the streambank to protect water quality and reduce erosion. Located in Minneota on the Yellow Medicine River, this area is next to a ball park used by the school and private groups. This project also addressed safety issues for the children and public utilizing the park and several privately owned buildings on the other side of the river.

22. Yellow Medicine River Watershed EQIP Project

Lincoln Soil and Water Conservation District sponsored a 319 project to increase the implementation of best management practices, enhance water quality and overall benefits in the entire watershed by reducing soil erosion, improving water quality and reducing flooding. Project staff worked with willing landowners to implement a variety of projects, using existing program processes such as ranking, cost-share and contracting.


Water and Sediment Control Basin

A result of this project was the installation of 86 water and sediment control basins, and one dam structure along with upgrading and improving one grazing system. The implementation of 88 BMPs reduced soil loss by 1,214 tons per year, sediment reduction of 897 tons per year and phosphorus reduction of 1,015 pounds per year.

23. Lake Shaokatan Restoration Project

A CWP-continuation grant helped modify various watershed land use practices to significantly reduce inputs to Lake Shaokatan. This resulted in a measurable improvement to water quality. Lincoln County Environmental Office led the effort to re-route and relocate a large 12 inch tile line that directly outlet into the lake. The tile line carried runoff from land around a nearby dairy, which was a major contributor of phosphorus to the lake. By relocating the tile line, it reduces phosphorus and treats water flowing from the tile into the lake. A total of 34 out-of-compliance septic systems have been upgraded for a 69 percent compliance rate. As a result, there is a resurgence of native plant populations in the lake including Sago Pondweed, Richardson's Clasping Leaf Pondweed, cattail and coontail.

Interpretive Sign in front of wetland

24. Lake Shaokatan Eutrophication TMDL Study

Located in west central Lincoln County, Lake Shaokatan has a watershed area of 8,400 acres. Lake Shaokatan itself has a surface of 1,018 acres with an average depth of eight feet and a maximum depth for 12 feet. Historically, the lake was once home to American Indian encampments. Water quality monitoring data showed a declining trend in water quality due to excessive watershed loading and lake sediment phosphorus sources. These sources of phosphorus are mostly human influenced including improper fertilizer application, livestock manure runoff, noncompliant septic systems, and runoff from uplands.

The focus of this TMDL study is to better characterize phosphorus levels, probable sources, and estimated reductions required to meet water quality standards. From 2005 to 2007, water quality samples were collected throughout the watershed to determine phosphorus concentrations.

Nutrient Management

In addition, surveys, GIS data and personal contact were completed to quantify the individual nonpoint sources of pollution. The study determined that the annual watershed load is 4,575 kg/yr as total phosphorus under average conditions with the average lake phosphorus concentration at about 150 ug/L. To meet the water quality goal a 67 percent reduction of all watershed phosphorus and a 90 percent inhibition of lake sediment phosphorus fertilization is needed.

Sixty five comments were received during the initial comment period in 2009 resulting in the study being revised. A public meeting was held at the Picnic Point County Park on Lake Shaokatan to present information on the TMDL report and provided an opportunity for public comment. On an earlier project, Yellow Medicine River Watershed District cooperated with the Yellow Medicine SWCD, Lake Shaokaton Association, Sportsman's' Club, Lincoln County Water Task Force, Lincoln County, Ducks Unlimited, U.S. Fish & Wildlife Service, Farm Service Agency, NRCS, DNR and MPCA to implement priorities like feedlot containment systems, wetland restorations, livestock exclusion, drain-tile rerouting and agronomic BMPs.

25. Anderson Lake

At one time this 350 acre shallow lake of 3 to 4 feet deep of water functioned as a feeding ground for waterfowl until Lincoln County constructed County Ditch 37 in 1920. After being drained it was used as a wet pasture, for hay and then plowed up until the landowners found it poorly suited for crops. In 1956, DNR purchased 60 acres of the lake bed and another 58 acres of adjoining upland to be included in the wildlife management area program.

When Lincoln County proposed making drainage improvements to County Ditch 37 in 1979, a lawsuit by DNR stopped the project. In turn, the DNR partnered with The Nature Conservancy through a large loan from the Richard King Mellon Foundation to purchase the remaining tracts of land, 290 acres of lake bed and 130 acres of adjoining upland. Today, the DNR manages water levels at a depth of 2.5 feet with a dam on County Ditch 37. Anderson Lake Wildlife Management Area at 600 acres is considered one of best birding locations in southwestern Minnesota.

Anderson Lake

26. Low Impact Logging

Seven Belgian and Belgian-cross horses were an important part of the effort to restore and protect a unique native prairie on 160 acres on Minnesota River Valley bluff land. Landowner Gary Lenz worked with the horses' owners to remove red cedar trees on more sensitive areas of the prairie to protect its integrity with its light soils, hills and steep ravine slopes. They are working with Green River Greening of St. Paul to develop a management plan and NRCS to fund conservation practices for cedar removal. In the future, the Lenz family hopes to make the site an outdoor classroom for students.

Hauling Logs by horse power

River Advocate – Tom Kalahar

A self-described river rat and district technician for the Renville SWCD, Tom Kalahar has spent over thirty years embracing the Minnesota River and doing his part to protect and restore this unique resource. Kalahar has been a leader in the conservation field by helping to enroll thousands of acres into conservation easements and installing hundreds of conservation practices on the ground. As a result, Renville County supports the most acres in the Conservation Reserve Enhancement Program (CREP) more than any other county in the Minnesota River Basin.

Tom Kalahar on the right confers with a landowner

Recently, Tom Kalahar played a leading role in the development of the Granite Outcropping Easement Program for a number of counties in the Upper Minnesota River portion of the basin. This program will help protect unique granite outcroppings and associated wetlands from hard rock mining. In his free time you will find Kalahar on the Minnesota River introducing people to the beauty of the river valley and its thriving fishery. He runs his own canoe rental business and leads paddling trips down to the Minnesota River to people of all ages.

Tom Kalahar set forth his vision for the Minnesota River: *Leaving as many perpetual easements both riparian and wetland restorations as possible on this agriculture dominated landscape. Protection of the Minnesota River valley and its rock outcrops. Raise a generation of kids that get it when it comes to how we need to live sustainable life style. Pass this earth on to other generations in better shape then when we inherited it. Change the federal farm policy in the country to be the solution and not the problem.*

27. Moonstone Farm

Located on a small watershed draining directly into the Minnesota River, Moonstone Farm is 240 acres of gently rolling bluff land offering a varied landscape, plenty of trees, and home to humans, cattle, alfalfa and hay, beaver and coyote, coneflowers and big blue stem. Moonstone produces natural, organic, grass-fed beef through perennial and multi-year cropping to reduce soil loss and increase organic matter. Most of the moisture falling on Moonstone Farm is absorbed by this grass and forested landscape before entering Moon Creek. Established in 1872 by the Handeen Family, today the goal is to profit from crops and livestock by producing food for home consumption. Moonstone Farm also produces grapes, nut trees and other third crops along with their pasture grazing system to protect the creek and river from runoff.


Vineyard Production Work

28. Hooves and Wings Farm Field Day

Pheasants Forever, Sustainable Farming Association and the Land Stewardship Project sponsored a farm field day at Moonstone Farm in July of 2009 to learn about the multiple benefits of a diversified, grass-based farm and what individuals can do to create a healthy environment for the land and wildlife. Participants took in a number of presentations including a prairie flora and fauna tour of native prairie led by Kylene Olson of the Chippewa River Watershed Project. Moonstone Farm owners Richard Handeen and Audrey Arner along with regional birding experts led a walking tour of the farm highlighting this unique working landscape. Moonstone Farm has been transformed over the years from conventional row-crop agriculture into a diversified enterprise with grass-fed beef, herbs, grapes, and vegetables.


Prairie Flora and Fauna Tour

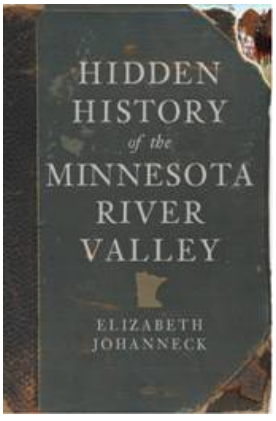
29. Madsen Prairie Grass Buffer

Steve Madsen and his sons farms 1,100 acres near Hwy. 71 running through Renville County in the Minnesota River Basin. A thousand of those acres produce the traditional crops of corn and soybeans. The other 100 acres have been strategically planted into prairie grasses, tree windbreaks and shelterbelts. Enrolled into the Conservation Reserve Program (CRP), 50 of those acres are planted in a riparian buffer along a bluff overlooking the Minnesota River. This native plant buffer filters sediments and nutrients off of cropfields to keep it from reaching public waters along with providing valuable wildlife habitat.

Madsen became inspired to take land out of production when the Minnesota DNR purchased 320 acres near his farm. He saw how the restored wetlands and native prairie protected water quality and attracted a wide variety of wildlife like whitetail deer and Ringneck pheasants. A Renville County farmer since the early 1970s, Madsen has served on the local Soil and Water Conservation Board for 12 years. Madsen has also put in shrubs and trees like lilac and red cedar to help keep snow off Hwy. 71 and wildlife plantings. Originally this story came from "Minnesota Water Stories," a MPCA program highlighting videos of people working to protect and restore the state's waterbodies.

30. Book: Hidden History of the Minn. River Valley

People, places, events, lore, and other stories of the Minnesota River Valley can be found in this nonfiction book by Elizabeth Johanneck known for her Minnesota County Mouse Folk Blog. Learn about Andrew J. Volstead, the Olof Swenson Farm, the Granite Falls Grinder, Bootlegger's Supper Club, Jerry Ostensoe, among other stories of what is unique about this river valley. This is especially true of the characters that have made it their home.



31. Kandiyohi County Drainage

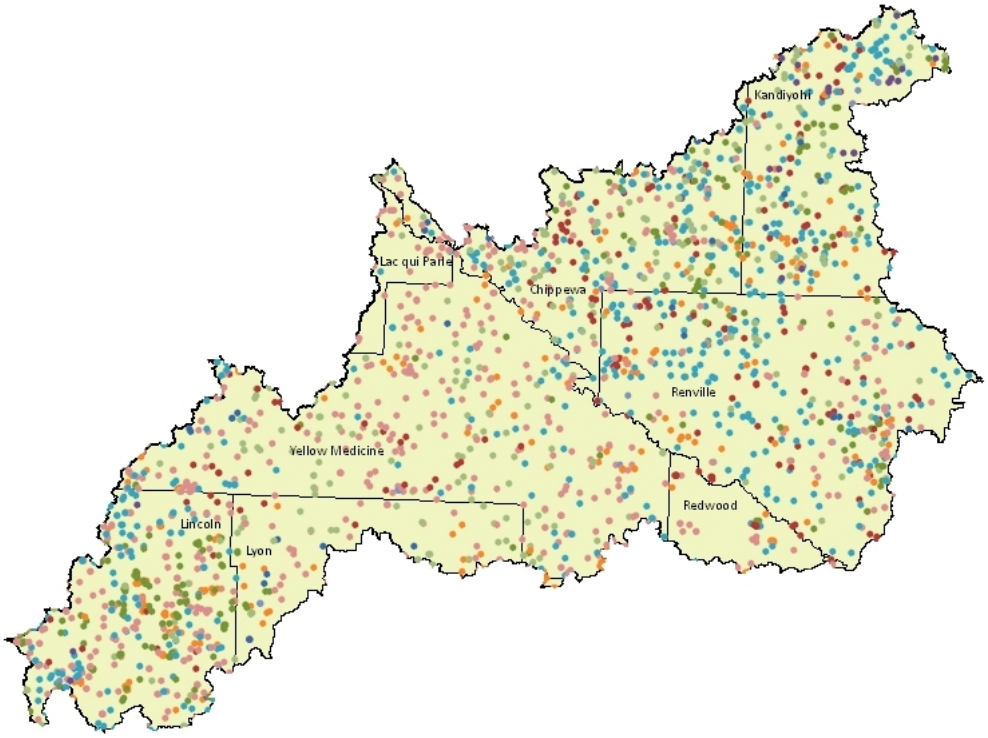
To reduce sediment, nutrients and other pollutants from reaching lakes and rivers, Kandiyohi County began to implement Best Management Practices (BMPs) like biofilters, rock inlets, drop inlets and stream barbs. According to the county Drainage Inspector Loren Engelby, they are focusing on water quality by taking responsibility for these issues in the agriculture community through improvements to the 850 miles of publicly owned drainage ditches and tile lines.

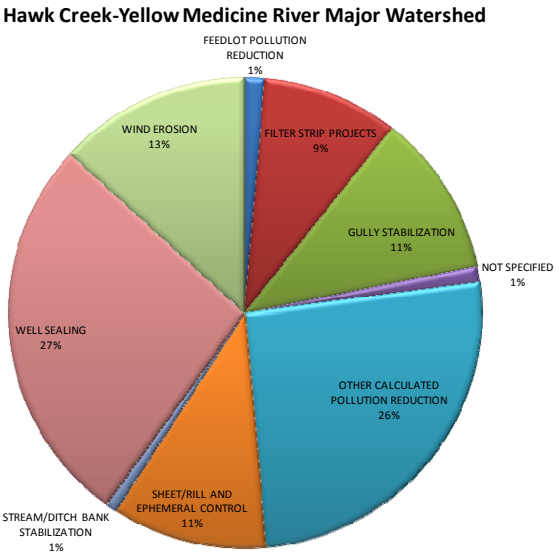
One of the BMPs the county has initiated is an underground bed of wood chips or biofilter to slowly filter water runoff from cropfields. The biofilter is a seven foot deep hole measuring 10 by 30 feet filled with 30 cubic yards of woodchips. Engelby said research has reported this construction practice has the potential of removing 90 percent of nitrates from water flowing through tile lines. Half of the $3,000 project came from the Hawk Creek Watershed Project and water quality monitoring to measure the effectiveness of the biofilter will be paid by the county water plan.


Installing Biofilter

Kandiyohi County is installing additional BMPs like alternative intakes in fields by using a bed of rocks to filter out sediment and phosphorus. Stream barbs (large rocks along the ditch banks) are being used to push the water current back into the middle of the ditch to prevent erosion. All of this work is paid by the landowners benefiting from the drainage. Eight of the drainage systems will go through a redetermination of benefits process to make sure all landowners are paying their fair share. The county is also reaching out to landowners with private drainage systems by providing information on research, installation and cost share of BMPs.

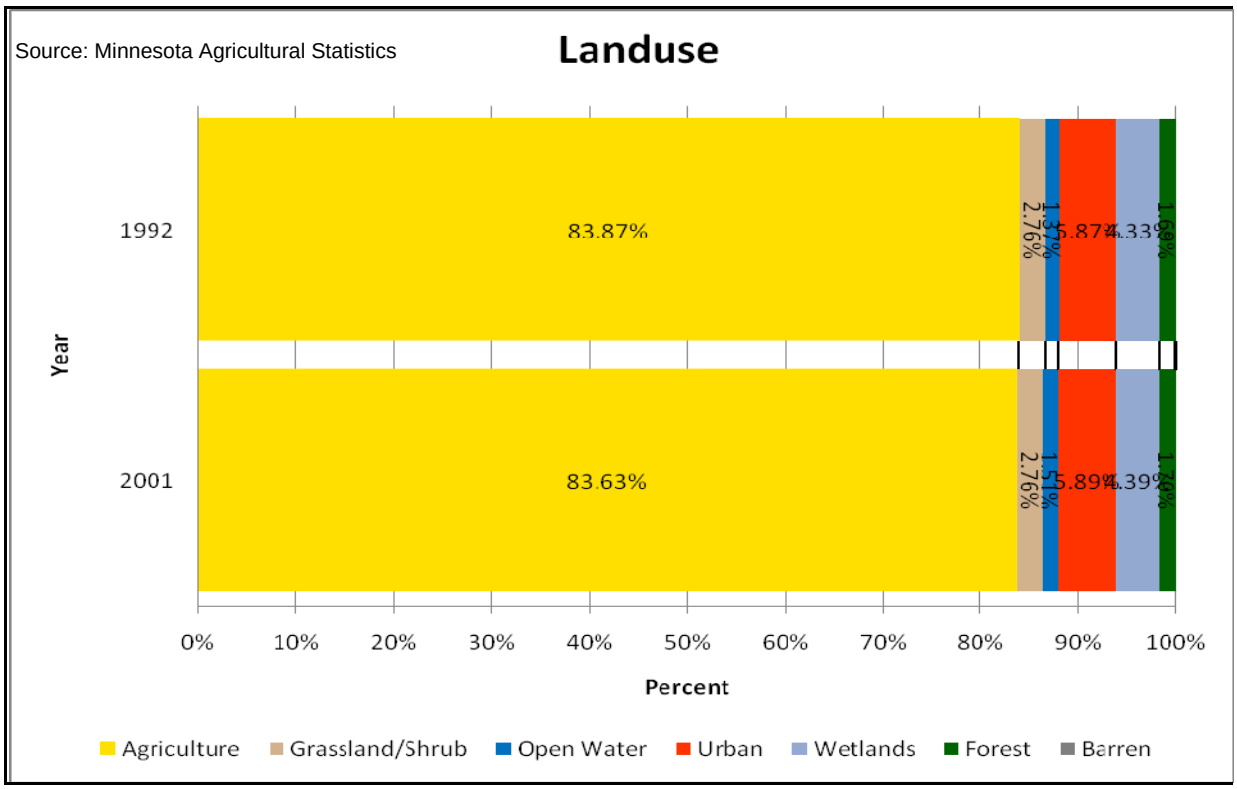
Hawk Creek & Yellow Medicine River Watershed Conservation Practices



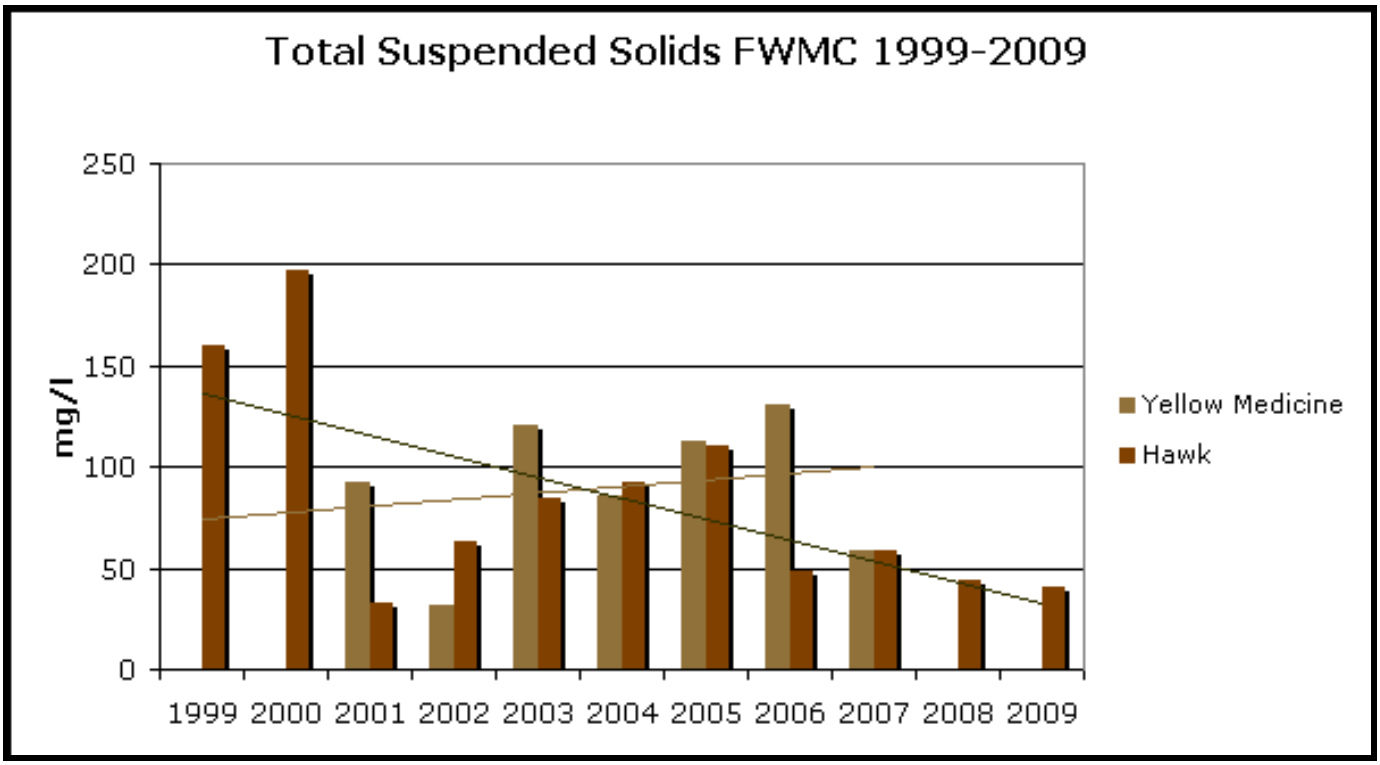


Conservation Practices

An effort for improving water quality picked up steam in the 1990s on both sides of the Minnesota River. The map above and pie chart to the right illustrates conservation practices in the Hawk Creek – Yellow Medicine Watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Hawk Creek and Yellow Medicine Watershed but not recorded in either LARS or eLINK.



Hawk Creek & Yellow Medicine River Watershed Pollution Reduction

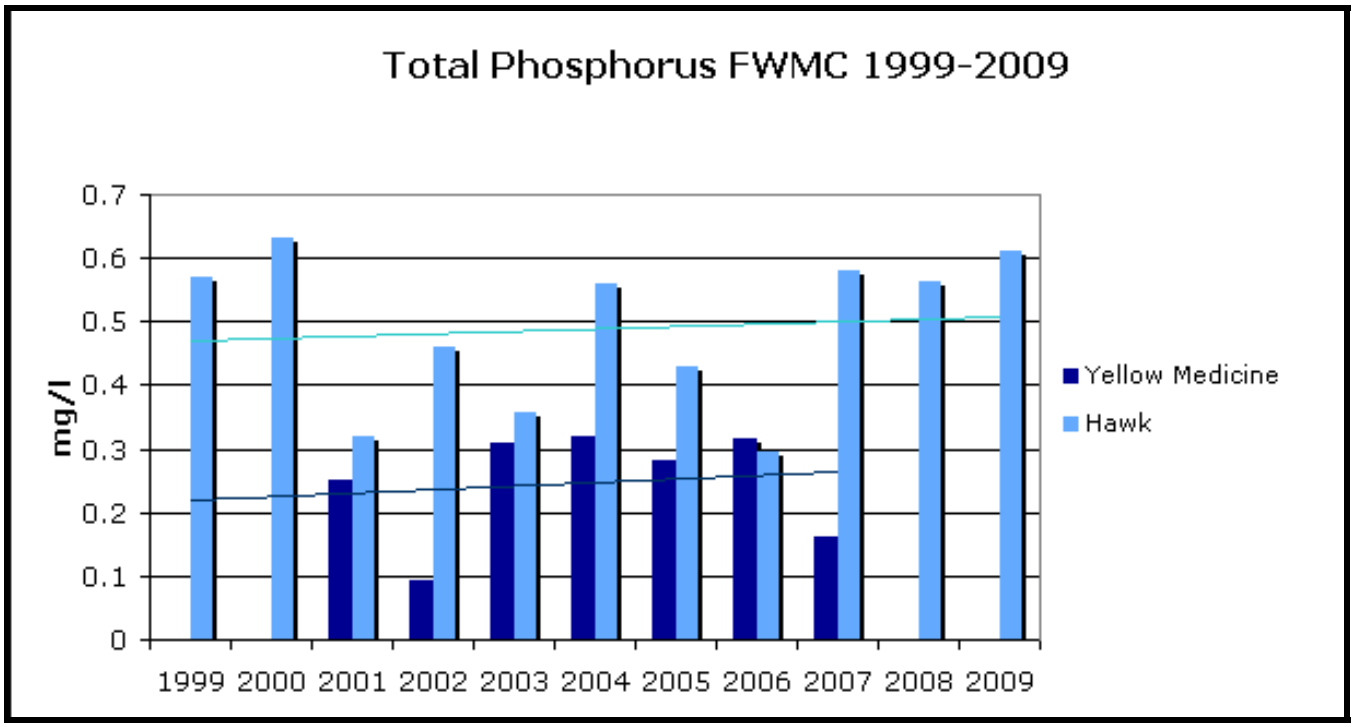


Hawk Creek

The Hawk Creek Watershed Project (HCWP) started monitoring water quality in 1999. The first two years of monitoring revealed very high TSS in nearly every stream in the watershed. In 2001, a dramatic decrease in TSS was observed in Hawk Creek. While TSS has fluctuated since, the 2008 and 2009 results represent two of the three lowest over the past decade. The MN River Conservation Reserve Enhancement Program (CREP) began in the fall of 1998 and by 2001 a noticeable change was occurring in the riparian landscapes in the watershed. The newly established native grasses and wetlands, both in and out of the floodplain, were beginning to make a measurable impact with respect to sediment levels in adjacent streams. Along with CREP, the Hawk Creek Watershed Project received agricultural best management practice (BMP) cost-share dollars in 2001. These dollars have undoubtedly made an impact in reducing sediment transport in the watershed as well.

Yellow Medicine River

Water quality monitoring was collected over a series of time periods (1997 to 1999, 2002 to 2005 and 2005 to 2008) by the Yellow Medicine River Watershed District (YMRW). The 2001 to 2007 represent the years after the YMRW District began to work with its partners including the three county Soil and Water Conservation Districts of Lincoln, Lyon and Yellow Medicine on an implementation phase. Under the Greater Yellow Medicine River Phase II CWP implementation project, a wide variety of conservation practices were installed using incentive dollars and technical assistance along with utilizing the CREP, CRP and RIM programs. This effort also included upgrading septic systems and several information and education initiatives. According to the YMRW District, the Yellow Medicine River watershed discharges are highly variable in both runoff and nutrient discharges. However, much of the data could be explained by random occurrence. A need for continuing monitoring to bring further certainty to the data interpretations has been stressed. The YMRW District reports that reductions in total suspended solids appear to be substantial in most of the sub watersheds and indicate a dampening of erosion rates.



Hawk Creek

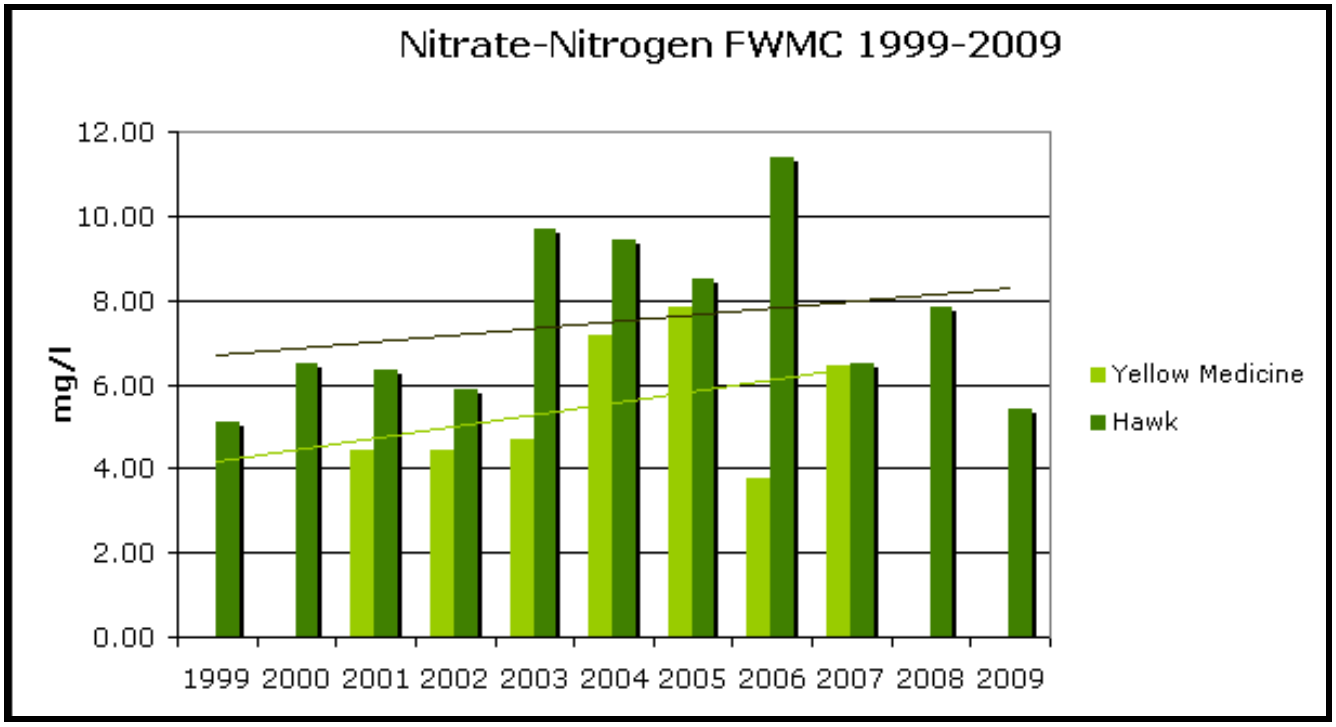
Phosphorus levels in Hawk Creek were high at the on-set of the HCWP monitoring efforts in 1999 and 2000. Levels were lower from 2001 through 2006, only to rise again in the later part of the decade. The overall trend line is basically flat over the past ten years. While the elevated levels over the past three years are a little discouraging, it is an accomplishment to have weathered the ethanol boom years and not have increased phosphorus levels in the watershed as compared to a decade ago. If TSS continues to trend downward, we (HCWP) expect that phosphorus will eventually follow that downward trend as well. One significant contributor, the City of Willmar, is scheduled to have a new wastewater treatment facility up and running in the fall of 2010.


Monitoring Station on Hawk Creek

Yellow Medicine River

Water quality monitoring data indicates that total phosphorus remained approximately the same within most of the sub-watersheds; however the data indicates a reduction at site 1 which is near the river mouth (confluence with the Minnesota River at Upper Sioux Agency State Park) and represents the entire watershed discharge according to the Yellow Medicine River Watershed District. Starting in the 1980s,a partnership between federal, state and local agencies has made it a priority to upgrade wastewater treatments which is a major source of phosphorous throughout the Minnesota River Basin the community of Minneota.


Collecting monitoring data



Hawk Creek

Nitrogen levels within the watershed have exceeded ecoregion standard for much of the past 10 years. The middle of the decade, from 2003-2006, a marked increase was noticed. This is likely due to the fact that these years coincided with an increase in corn production as the ethanol industry was booming. Many producers began to crop corn in the same field year after year, a practice that requires significant nitrogen inputs. Since 2006, nitrogen levels have dropped significantly. This is due in part to the price of corn falling and the price of fertilizer inputs rising. Simply from an economic standpoint, producers are becoming more cognizant of the amount of nitrogen they are applying, as it is expensive to over-apply. The 2009 season revealed the lowest nitrogen concentration in over a decade, a trend that hopefully continues.


Hawk Creek Confluence with the Minnesota River


Yellow Medicine River Confluence with the Minnesota River

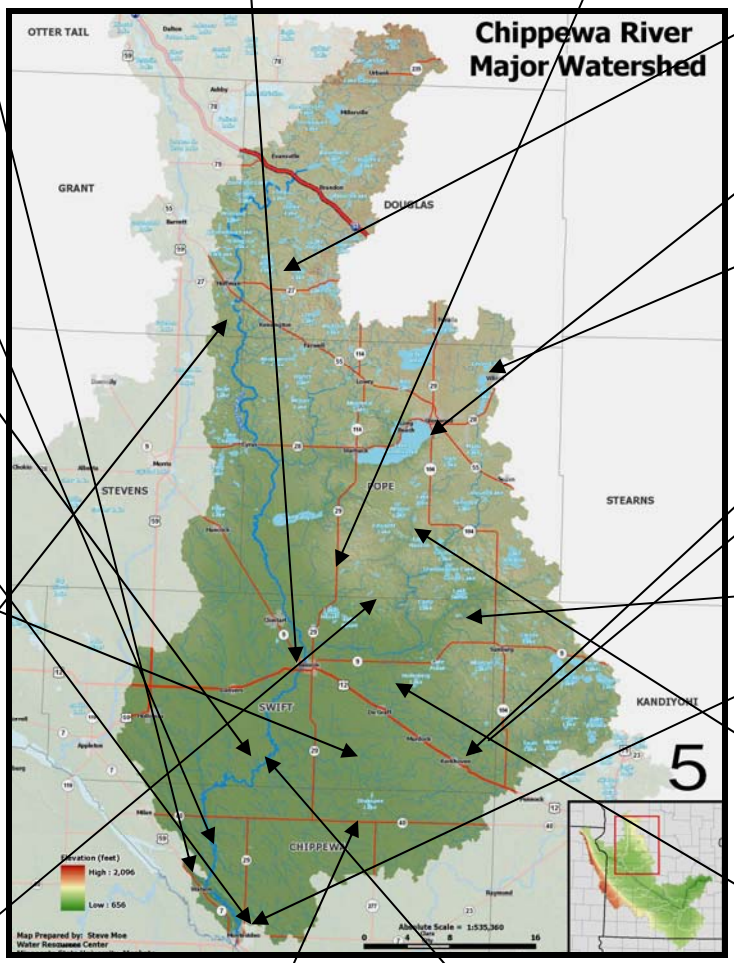
Yellow Medicine River

In a Greater Yellow Medicine River Phase II CWP Final Report to MPCA, the Yellow Bank River Watershed District stated, "nitrate-nitrite nitrogen and the total nitrogen [levels] seem to be less influenced by the implementation activities. Water quality studies have pointed that nitrate rates are driven by climate compared to other water quality parameters including Total Suspended Solids and Total Phosphorus.

CHIPPEWA RIVER WATERSHED

One of the largest major watersheds in the Minnesota River Basin, the Chippewa River Watershed drains 2,085 square miles or 1,333,541 acres. The Chippewa River starts out in the headwater lakes of central Minnesota flows south to Montevideo dropping an average gradient of 4.5 miles before it enters the Minnesota River. Major tributaries of the Chippewa are the Little Chippewa River, East Branch Chippewa and Shakopee Creek, concentrating nearly half the flow of the main stem. The Chippewa River is connected to Lac qui Parle River through a glacial river channel called the Watson Sag, which has been modified to allow high flows of the river to be diverted to reduce floodwaters in the lower watershed and Minnesota River. At the western end of the Watson Sag the landscape is an imposing swamp of floating vegetation and bare trees, called the "Big Slough."

Mussel Survey on the Chippewa River



11. Chippewa River Bank Erosion Project

12. Benson Wastewater Treatment Plant

13. Prairie Horizons Farm

14. Red Rock Lake Watershed BMP Project

10. Mussel Public Survey

15 Pope SWCD – 20th CRP Anniversary

16. Ditch Stabilization

9. CRWP – Canoe/kayak Excursion

17. Pastures A' Plenty Farm

8. CRP Land Forum

18. Pastures A' Plenty Farm Conservation Tours

19. Simon Lake

7. Chippewa River Watershed Project Outreach

20. Montevideo Rain Garden Project

6. Chippewa River Upper Main Stem Project

1. Chippewa River Watershed Project (CWRP)

2. CRWP – Continuation Grant

5. East Branch Chippewa River Implementation Project

4. Shakopee Creek Headwaters Creek

3. Lower Main Stem Chippewa River Project

When I sat on the overhanging limb of a willow tree dangling my bare feet into the brown Chippewa River, feeling the slow, steady tug of its unfailing current against my toes, I became connected to the great body of the continent. I was linked not merely with a small river in western Minnesota but swept up into the gigantic stream of life. – Paul Gruchow, 1995: Grass Roots – The Universe of Home

CHIPPEWA RIVER WATERSHED

The effort to improve water quality in this large watershed involves a wide range of partners including all the SWCD offices, the Chippewa River Watershed Project, landowners, cities, nonprofit organizations and many other people. Many of these projects have strong collaborative efforts and shown improvements in water quality, recreational opportunities, citizen engagement, wildlife habitat and much more. The Chippewa River Watershed Project has been a leader in this work for well over ten years.

1. Organization Spotlight - Chippewa River Watershed Project

An association of non-government organizations and government agencies came together to address water quality and flooding related problems in the Chippewa River Watershed in 1998 under the leadership of the Land Stewardship Project. A staff of three people concentrates on installation of a wide range of Best Management Practices (BMPs), educating citizens about the benefits of conservation and monitors water quality. In order to effectively promote and implement BMPs across this large of a landscape, the Chippewa River Watershed Project (CRWP) broke down this major watershed into six focus areas: Shakopee Creek Headwaters; East Branch Chippewa River; Lower Main Stem; Upper Main Stem; Dry Weather Creek, Spring Creek, Lines and Cottonwood Creek; and Little Chippewa.

Kylene Olson on the right talks to citizens of the Chippewa River Watershed

2. CRWP Citizen Engagement

The CRWP offers a comprehensive information and education effort by distributing data, project goals, objectives, information on BMPs through their participation in SWCD field days, numerous conferences, county fairs, newsletters, e-newsletters, water festivals and demonstrations in schools. In a three year period the CWRP sent out newsletters to a database of 7,500 landowners, e-newsletters posted on the CRWP web site, 600 students attending conservation field days over the course of three years, and 1,400 elementary students reached through water festivals in the watershed. Another effective way to connect with its constituents is by holding an annual meeting each spring that routinely brings out over 100 watershed residents to hear about monitoring data and opportunities for solutions to enhance water quality in the Chippewa River.

Another outreach program is the Citizen Monitoring Network with the CRWP conducting open house training sessions to continue increasing the number of citizen monitors in the watershed. The CRWP also assisted counties with upgrading out-of-compliance septic systems through a low interest loan program – Chippewa County (12 septic system upgrades), Swift County (13) and Pope County (5) from May, 2004 to May, 2007.

One new partnership created during this time was with the MN DNR and their Working Lands Initiative program to remove and control invasive species for grassland/pasture management and provide support for grazers. Ultimately, the CRWP helps build capacity with the local elected officials, both County Commissioners and Soil and Water Conservation District Supervisors, as well as cooperating partners and landowners in the watershed.

3. Lower Main Stem Chippewa River

As one of the six major sub-basins of the Chippewa River Watershed, the Chippewa River Watershed Project received a U.S. EPA 319 grant to install BMPs, monitor water quality and quantity of the sub-basin and educate the public by holding public events and by providing information that is easily accessible. The project achieved significant results by enrolling 720 acres into the CRP continuous sign-program, achieving a success rate of 169% of the original goal. Other BMPs installed were two side inlets, 900 feet of streambank stabilization, one feedlot upgrade, and six projects using stream barbs to alleviate streambank erosion. Education activities included hosting two annual meetings reaching 230 watershed residents, participation at county fairs, bus tour of installed BMPs, canoe trip viewing streambank stabilization project for 60 residents and numerous presentations at area schools and monthly updates on the CRWP web site.

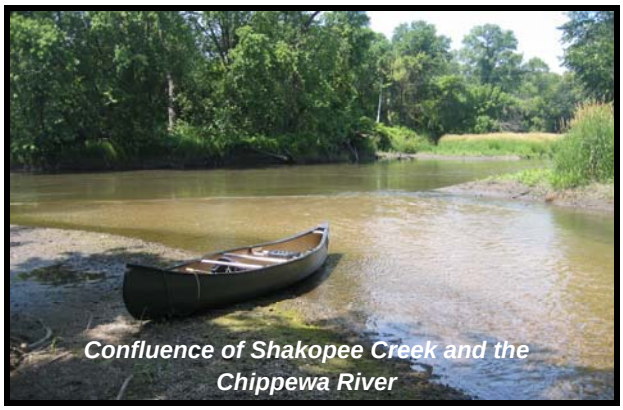
Streambank Stabilization Project

4. Shakopee Creek Headwaters Project

The Chippewa River Watershed Project secured a U.S. EPA 319 grant to improve water quality in Shakopee Creek through the implementation of Best Management Practices by providing cost-share, incentives and technical assistance along with effectiveness monitoring and educational outreach. Results of the project were as follows: completed 216 acres of filter strips, installed 17 alternative tile intakes, restored two wetlands, and completed one shoreline restoration and one stream bank restoration along with a special project. The project worked with 38 landowners to implement the BMPs, coordinated a citizen monitoring program and participated in public outreach events to help educate hundreds of watershed citizens about water quality issues.

5. East Branch Chippewa River Implementation Project

The largest of the six major subbasins of the Chippewa River Watershed, the East Branch Chippewa River joins the main stem at Benson with its drainage basin



Confluence of Shakopee Creek and the Chippewa River

encompassing 323,630 acres in the east-south-eastern portion of Pope County and northeast quarter of Swift County. Dotted with numerous lakes at its headwaters, agricultural row cropping is the predominant land use downstream to its mouth. The Chippewa River Watershed Project (CRWP) installed a wide range of Best Management Practices (BMPs) to reduce high levels of nitrates/nitrites and total suspended solids.

Over the time period of June 2006 to July 2009, the CRWP implemented the following BMPs: 404 acres of buffer strips, three shoreline naturalization projects, three sediment basins, two bank stabilization projects, four manure management plans, 12 alternative tile intakes, 41 acres of wetland restorations, one feedlot improvement and two terraces. Education activities were also a big part of the water quality effort with the CRWP sponsoring canoe trips for high school students, conducting biomonitoring with high school science classes and promoting BMPs at the county fairs. The Chippewa River Watershed Project partnered with Swift Environmental Services, Swift SWCD, Pope SWCD, Swift County Parks and Drainage and Kandiyohi Soil & Water Conservation District.

Shoreline Restoration

6. Chippewa River Upper Main Stem Project

Encompassing close to 200,000 acres of the 1.3 million acre Chippewa River Watershed, the Upper Main Stem reach is the river's headwaters, consisting of many lakes among a landscape dominated by traditional agriculture. Funds from a U.S. EPA 319 grant helped install the following BMPs: 519 acres of buffer strips, 43 sediment blocks, two terraces, one streambank protection, one erosion control project, two shoreline restorations, two ag waste pit closures, two alternative tile intakes, one feedlot runoff improvement and 18 septic system upgrades. The Chippewa River Watershed Project also participated in the Douglas County Water Festival, presenting watershed concepts to over 400 fifth graders.

By 2006, the Chippewa River Watershed Project had moved forward with implementation activities in five out of six of the watershed's sub-basins with the entire watershed eligible for septic system loan funding. Progress had been made with the installation of 831 acres of filter strips, 57 septic system upgrades, 32 sediment blocks, seven shoreline naturalizations, four wetland/ pond restorations, three nutrient management plans, one streambank protection and one manure separator/ composter. Monitoring data showed that the 1,141 tons of nitrate-nitrogen flowing in the river would be enough to fertilize 23,571 acres of corn at 120 pounds per acre. The 111 tons of phosphorus would fertilize 6,344 acres of corn at 35 pounds per acre and 92 percent of the sediment comes from the Chippewa River's lower sub-basin making up only 30 percent of the basin with the rest contributing relatively little.

7. Chippewa River Watershed Project Outreach

To reach out to the public, the Chippewa River Watershed Project sponsors a variety of efforts including hosting an annual canoe trip on the Chippewa River and other presentations including an Alternative Tile Intakes for landowners, contractors and technicians, along with a Chippewa River Watershed Geology presentation by Carrie Jennings of the Minnesota Geological Survey and a Mussel Weekend with DNR malacologists. The CRWP has also published a newsletter called "The Citizen Connection" with a circulation of 8,000, held a photo contest and put on a Nutrient Management and Farm Bill Update Seminar (held jointly with Hawk Creek and Crow River watershed organizations).

8. CRP Land Forum

A forum co-sponsored by West Central Minnesota Regional Partnership, Land Stewardship Project, Chippewa River Watershed Project and Clean Up the River Environment (CURE), brought out a large crowd on January 14, 2010 to hear David Mulla of the University of Minnesota talk about the impact of expiring CRP land on water quality and wildlife. Held at the Montevideo Community Center, Mulla presented research ranking the ecological sensitivity of CRP parcels to identify those that should be protected, and develop a plan to create and maintain wildlife corridors. A citizen forum held after the presentation focused on a discussion covering the CRP land expiration in the upper Minnesota River Basin and strategies to encourage protection of sensitive lands.

9. CRWP Canoe-Kayak Excursion

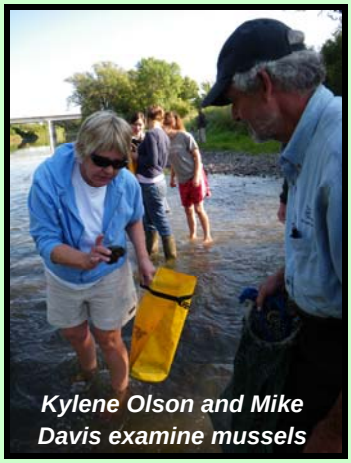
Despite the drier than normal conditions in southwestern Minnesota, the Chippewa River Watershed Project was able to hold its annual paddling adventure due to remnants of winter snowmelt that helped sustain a high enough mid-June water level on the Chippewa River. A flotilla of colorful kayaks and canoes carried more than 20 people on an eight plus mile stretch of the river from Big Bend to County Road 12 on June 12, 2009. The event drew people from a wide area ranging from Willmar to Alexandria and Montevideo on a clear day. A brisk current helped make it a relaxing, pleasant, 2-2 ½ -hour paddle that ended with a box lunch at the end.


Paddling the Chippewa River

River Advocate – Kylene Olson

A native of Watson, Kylene Olson has been leading the Chippewa River Watershed Project since its inception in 1998. As its executive director, Olson provides motivation to her staff and partners through her love of the river and her beliefs and values in enhancing the water quality of the Chippewa River, the largest tributary of the Minnesota River. Some of the programs created under her leadership, such as the Citizen Monitoring Program and the High School Biomonitoring Program have been used as a model in other watersheds like the Hawk Creek and Lac qui Parle – Yellow Bank projects.

Kylene Olson received an honor from the Minnesota River Board in 2008 after being recognized with their "Minnesota River Confluence Award." A graduate of Southwest State University with a Bachelor of Science degree – emphasis in Environmental Biology, her efforts in the local community runs deep. She served as the mayor of her hometown Watson and a founding director of the Zion Restoration Society, along with being instrumental in restoring the 125 plus year old church overlooking the Chippewa River Valley. As a member of the Watson Lion's Club, Kylene has served as the president of the organization.


Kylene Olson and Mike Davis examine mussels

10. Public Mussel Survey

At the end of August, the Chippewa River Watershed Project collaborated with the Minnesota Department of Natural Resources to conduct a mussel survey on the Chippewa River. Over two years, the two groups have worked together to survey the health of mussels by engaging the public to help out. As a result of this partnership, the DNR has selected the Milan site as one of three long-term, statewide monitoring project to understand and monitor the status and distribution of all mussel species in Minnesota.


Collecting mussels

According to the DNR mussel experts, the Chippewa River has some of the best remaining mussel assemblages in the entire Minnesota River, a good indication that this river is healthier than other main stem river tributaries. These mussel surveys are designed to help the public connect to the resource – the Chippewa River – and assist the DNR with an important research study.

11. Project Spotlight - Chippewa River Bank Erosion Project

Erosion along the Chippewa River had been a concern of the Big Bend Church for many years, with many graves in danger of sliding into the stream. The Chippewa SWCD and the Montevideo Field Office of the USDA NRCS provided assistance along with funding from the U.S. Army Corps of Engineers. The project stabilized a 60 foot bluff on 900 linear feet of streambank, protecting 300 graves. Nearly 9,000 tons of rip-rap was used along with 1,700 tons of topsoil. The total cost of the project was $572,000. Other cooperating partners were Chippewa County, Swift SWCD, DNR, the Chippewa River Watershed Project, and the Big Bend Lutheran Church.


Streambank stabilization Project

12. Benson Wastewater Treatment Facility

The two year, $2 million upgrade of the Benson Municipal Wastewater Treatment Plant increased capacity, replaced existing equipment with an expanded trickling filter, added more sludge storage, and increased treatment of phosphorus, reducing the discharged level into the Chippewa River to only 0.4 milligrams per liter. Originally built in the early 1980s, the project also added a digester to produce methane, providing much of the facility's heating needs. Today, the plant is well below the Minnesota River discharge limit of 1 milligram per liter of phosphorus.

13. Prairie Horizons Farm

Part of the Upper Minnesota River Valley Food Cooperative, Prairie Horizons Farm features a rotational grazing on certified organic pasture system, Lowline Angus cattle, third crops and an organic garden featuring cucumbers, beets, cantaloupe, carrots, squash, multi-colored maize and pumpkins. Located in the rolling glacial moraine of Western Minnesota between Benson and Starbuck, Prairie Horizons Farm uses a rotation grazing system for a special breed of grass-loving black Angus cattle on Certified Organic pastures and native prairie. They are proud of using no grain, no antibiotics, no drugs, no hormones, and only a half gallon of fossil fuel to raise each of their beef cattle. In the summer of 2009, Prairie Horizons Farm was part of a 3rd Crop Walk-n-Talk Tour sponsored by Rural Advantage, Productive Conservation on Working Lands, U.S. Fish and Wildlife Service, Minnesota DNR, Pope County Working Lands Initiative, Chippewa River Watershed Project, Pope SWCD, NRCS, and FSA.

Feeding the animals at Prairie Horizons Farm

14. Red Rock Lake Watershed BMP Project

Located in Douglas County and west of Alexandria, Red Rock Lake is a shallow 708 acre lake. The project is sponsored by Douglas SWCD with the goal of reducing nutrient loading and fecal coliform levels in the Red Rock Lake Watershed. Funding will be made available to livestock producers within the watershed for fencing, alternative water sources, and reseeding degraded shoreline. Priority will be given based on the proximity to the lake, current farming practices, and risk potential of contributing fecal coliform, sediment, and/or phosphorus to the water body.

15. Pope SWCD – 20th CRP Anniversary

To celebrate the 20th Anniversary of CRP, Pope SWCD helped coordinate a banquet with the USDA's Farm Service Agency and the Natural Resources Service that brought in 285 people. In addition to the banquet, other events were a conservation tour, five seminars, 18 booths, a conservation forum and a locally grown meal. As the only location to hold an event of this magnitude, the day was sponsored by Pheasants Forever, Inc., Pope County Pheasant Restoration; Gobblers of Glacial Ridge; Harrison Company; Agassiz Seed; Glacial Ridge Cattleman's Association; Arnie Gerzewski; and Lake-land Foods, Inc.

Lake Leven Project

16. Ditch Stabilization

In conjunction with Pope County Land and Resource Department, Pope SWCD stabilized a portion of Judicial Ditch 4 (JD4) with rock rip rap in the Chippewa River Watershed. Located near Lake Leven, JD4 contributes erosion from its banks to one of Pope County lakes on the impaired water list for excess nutrients. Pope SWCD did the survey and assisted with the implementation phase.

17. Pastures A' Plenty Farm

Jim VanDerPol and his family operate a farm near Kerkhoven that combines a mix of corps, livestock, and pasture for a balanced approach to sustainability. A bulk of the land is set aside for grazing intermixed with a rotation of hay, corn, soybeans and barley plus dairy and beef cattle, poultry and a farrow-to-finish hog operation. VanDerPol understands you need livestock for a balanced sustainable agricultural operation.

His Berkshire cross hogs gestates in a pasture much of the time with some farrowing in pens. Pastures A Plenty Farm is an organic operation except for the hogs (which get some nonorganic feed) that markets its products throughout the state. To be sustainable, VanDerPol uses manure from the livestock to add nutrient to the perennial grass pastures, which in turn helps hold the soil together and provides biodiversity for wildlife. He sees his operation as being economic feasible, repeatable without damaging the land, farmers or customer, friendly to the future and the environment.

18. Pastures A' Plenty Farm Conservation Tours

The Pastures A' Plenty Farm has also been the focus of conservation tours including one on "Carbon Sequestration by using grasses and legumes in pastures to be a highly effective method for removing excess carbon dioxide from the air and storing it in the soil. The Land Stewardship Project and Sustainable Farming Association of Minnesota held the tour at the Pastures A' Plenty Farm which featured a local foods dinner. Part of the tour focused on a working demonstration on how to construct a rolling chicken house station for raising birds on pasture and VanDerPol's innovative approach for supplying their customers with nitrate-free brats.

Jim VanDerPol and family

19. Lake Simon

A new, state-of-the-art, high velocity, tube fish barrier was installed on 569 acre Lake Simon by Ducks Unlimited with assistance from private landowners. This new barrier will limit the number of undesirable species of fish like carp from getting into this shallow lake in southern Pope County. Over time the lake has suffered like many shallow lakes in Minnesota from continuous high water levels, low water clarity, severely reduced aquatic plants and way too many undesirable fish. On the positive side, the Lake Simon Watershed still contains many small wetlands and upland grass fields helping limit nutrient runoff from agricultural production. Ducks Unlimited and the DNR met with the landowners to discuss management options and acquire an outlet easement to construct and maintain the new structure. Historically, this lake had supported large numbers of migrating waterfowl. The DNR is now looking at giving Lake Simon a wildlife management designation allowing the agency to improve the quality of habitat and increase duck numbers.

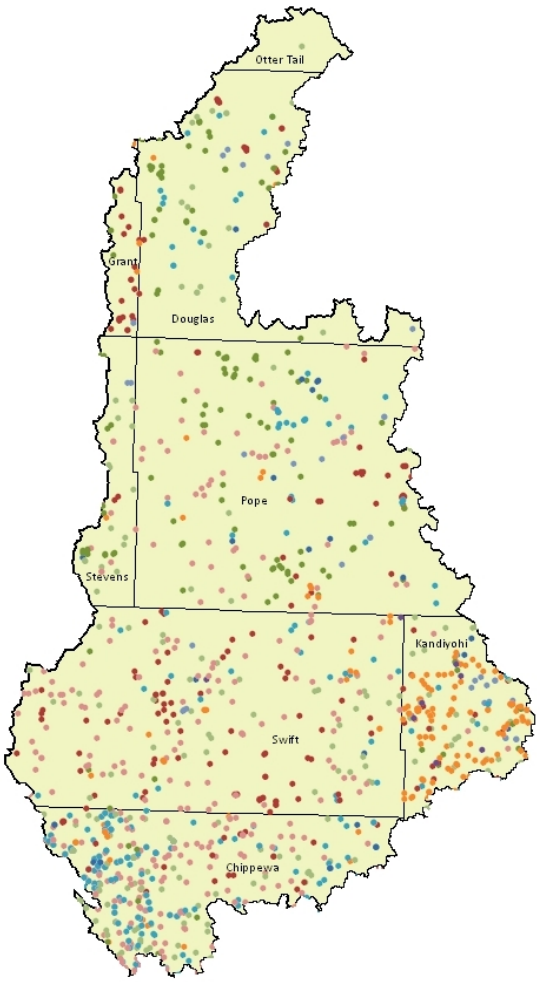
Fish Tube Barrier

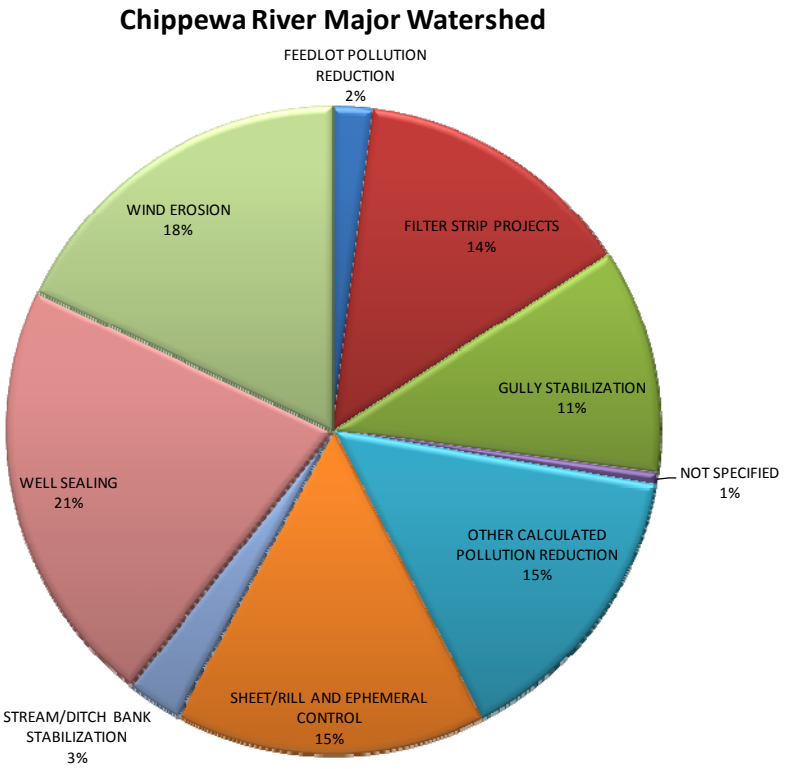
20. Montevideo Rain Garden Project

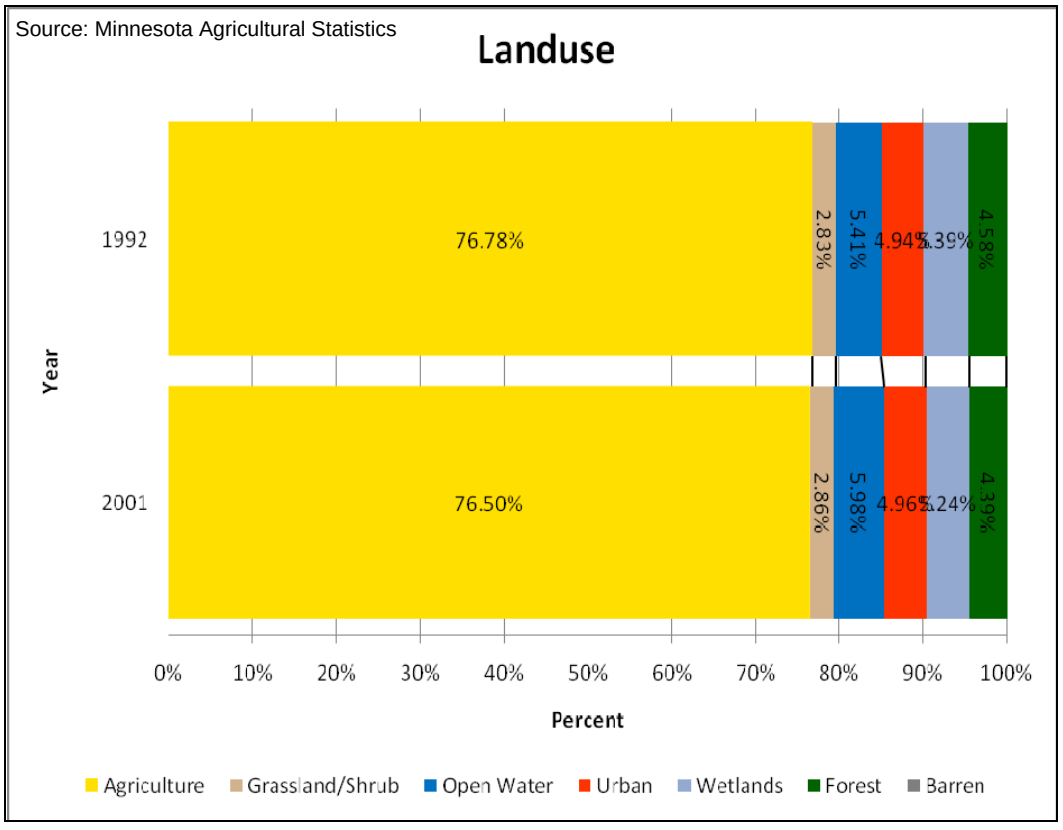
A coalition of groups – Chippewa SWCD, Hawk Creek Watershed Project, University of MN Extension Service, Chippewa Co. Land & Resource Management office, Chippewa County Commissioners, Chippewa Co. Highway Dept., Montevideo HS Ag Dept., NRCS, City of Montevideo, and the Chippewa Co. Master Gardeners – came together to begin the planning process to install trail rain gardens in Montevideo on city and residential property to positively effect stormwater runoff. One of the projects dealt with the installation of a rain garden next to the parking lot at the Chippewa County Courthouse. Native wildflowers and plants were planted to soak up stormwater flowing off the parking lot.

Montevideo Rain Garden

Chippewa River Watershed Conservation Practices and Land Use



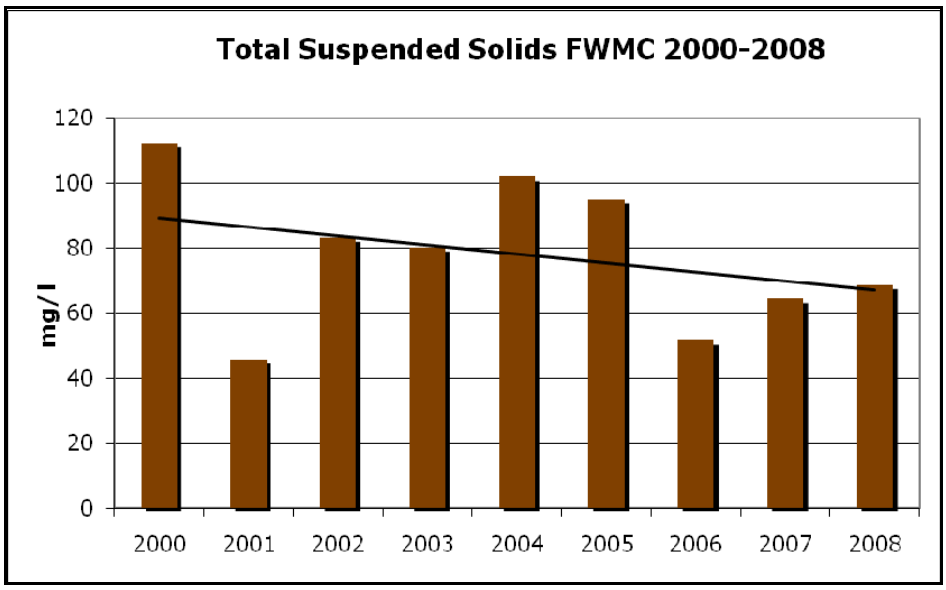




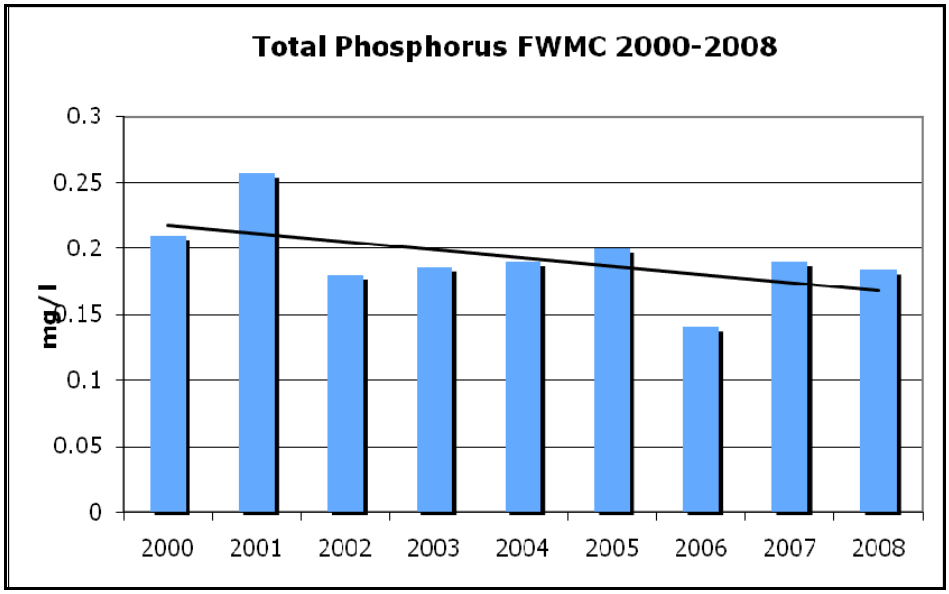
Conservation Practices

In 1998, a group of organizations came together to form the Chippewa River Watershed to focus on water quality efforts. The map to the left and the pie chart above illustrates conservation practices in the Chippewa River Watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Chippewa River Watershed but not recorded in either LARS or eLINK.

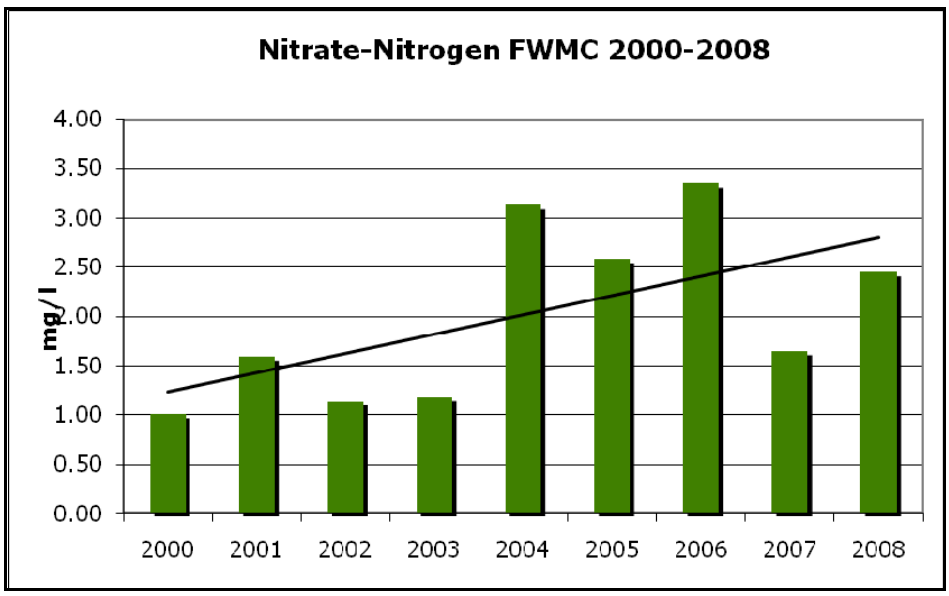
Chippewa River Watershed Pollution Reduction



Total Suspended Solids
Overall the trend for Total Suspended Solids (TSS) concentration and load in the Chippewa River appears to be decreasing. Not all years fit the trend. Years in which there is more rain in the months of March through June see higher levels of TSS. Additionally, the Chippewa River is comprised of several tributaries and not all of these tributaries are equal contributors of TSS. Those areas that are heavily drained and row cropped in the southern clay soil basins are yielding more TSS than the western sandy soil basins or the northern glacial moraine basins. Also areas with less overall row cropped acres tend to yield lower levels of TSS.



Total Phosphorous:
Overall the trend for Total Phosphorous (TP) in the Chippewa River appears to be decreasing. Not all years follow the trend. Additionally, the Chippewa River is comprised of several tributaries and not all of these tributaries are equal contributors of TP. Those areas that are heavily drained and row cropped are yielding more TP than basins that have more perennial land use types. Data shows that the high levels of TP seen in row cropped basins are largely a result of higher levels of the soluble phosphorous portion of TP.

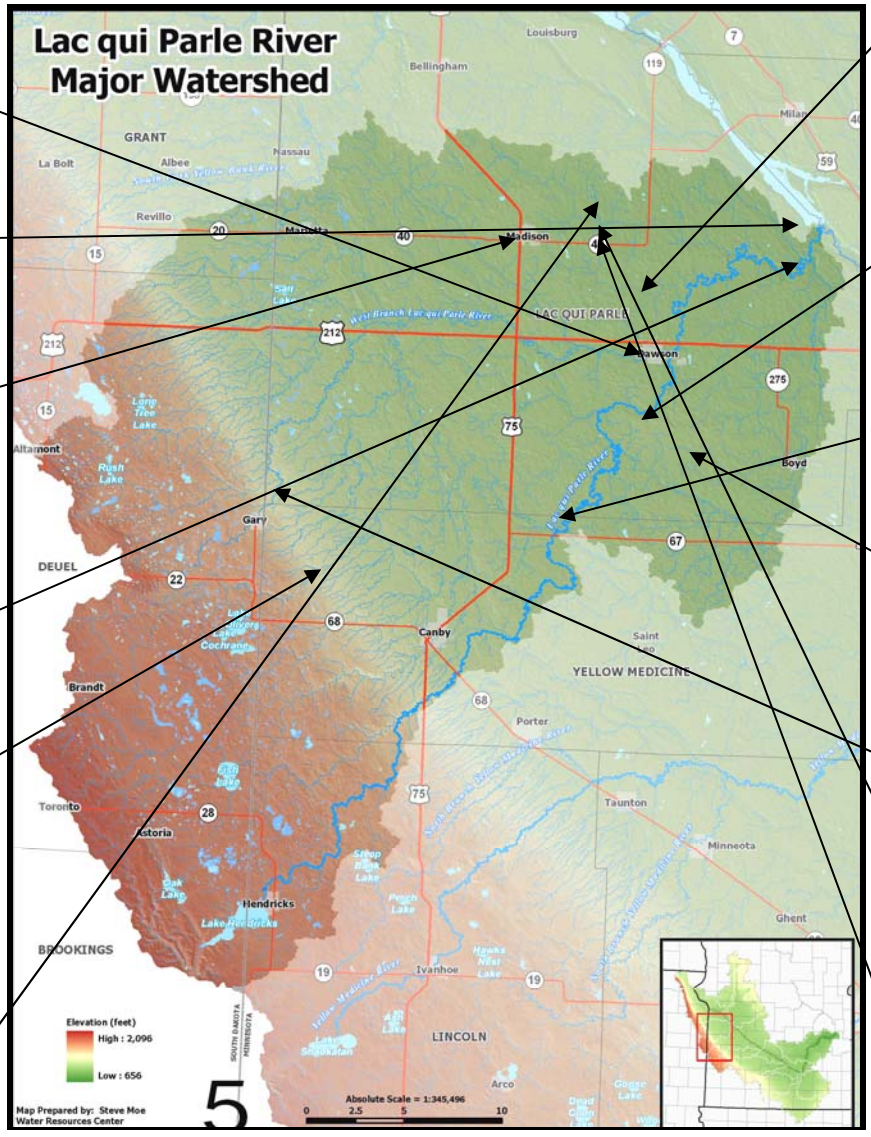


Nitrogen:
Overall the trend for Nitrate-Nitrite Nitrogen (NO2-3) concentration and load in the Chippewa River appears to be getting higher. Not every year fits the trend but there is a definite trend and it is increasing. Years with more rain in the months of March through June see higher levels of NO2-3. Nearly half of the NO2-3 entering the Chippewa River comes from its' Shakopee Creek Tributary a silty-clay soil basin that is dominated by row cropping and intensive drainage.

LAC QUI PARLE RIVER WATERSHED

Draining 1,712 square miles with 976 in Minnesota and the remaining 736 in South Dakota, the Lac qui Parle Watershed starts out at Lake Hendricks in Lincoln County. The Lac qui Parle River flows northeastward through Yellow Medicine and Lac qui Parle counties before entering the Minnesota River near Watson into Lac qui Parle Lake. In the first 60 miles of drainage, the elevation drops more than a thousand feet from the Prairie Coteau. Some people say Lac qui Parle means "The Lake Which Talks," a French translation of the Dakota name for the impounded lake. Major tributaries of the Lac qui Parle are the Florida, Canby and Ten Mile creeks.

Lac qui Parle River at the county park



13. Dawson Dam Removal

12. Killen Moist Soil Management Area

11. Lac qui Parle Outdoor Expo

10. Lac qui Parle County Highway 31 Project

9. Lac qui Parle SWCD

8. Earthrise Farm

1. Lac qui Parle – Yellow Bank Clean Water Partnership

2. Lac qui Parle River Mainstem Water Quality Enhancement Project

3. Lac qui Parle – Yellow Bank CWP TMDL Study

4. Lac qui Parle – Yellow Bank Watershed District

5. Dave Vesall Wildlife Management Area

6. A-Frame Farms

7. Nutrient & Greenhouse Gas Benefits

I am driving; it is dusk; Minnesota. The stubble field catches the last growth of sun. The soybeans are breathing on all sides. Old men are sitting before their houses on car seats. In the small towns. I am happy, The moon rising above the turkey sheds. The small world of the car Plunges through the deep fields of the night, On the road from Willmar to Milan. This solitude covered with iron. Moves through the fields of night. Penetrated by the noise of crickets. Nearly to Milan, suddenly a small bridge, And water kneeling in the moonlight. In small towns the houses are built right on the ground; The lamplight falls on all fours on the grass. When I reach the river, the full moon covers it. A few people are talking, low, in a boat. – Robert Bly, "Driving toward the Lac qui Parle River"

LAC QUI PARLE RIVER WATERSHED

A strong partnership between the Lac qui Parle – Yellow Bank Clean Water Partnership and Watershed District along with the three SWCD offices from Lac qui Parle, Yellow Medicine and Lincoln counties have helped install a wide range of BMPs and educational programs related to water quality. There is also a strong movement for organic farming in the watershed and the development of wildlife management areas.

1. Lac qui Parle – Yellow Bank Clean Water Partnership

Launched in 2001 to complete a diagnostic study on both the Lac qui Parle and Yellow Bank watersheds, this project moved into an implementation phase in January of 2005. The top five projects over the last ten years are: a bus tour of watershed projects in priority areas; Women Educational Opportunities including the Wine, Women & Water Event (a finalist for the Minnesota Environmental Initiative Award); Weekly Radio Program with Lac qui Parle SWCD and NRCS; Study of Dissolved Oxygen, Turbidity and Bacteria; and completing a Clean Water Legacy Grant for installing BMPs and Buffers along with replacing open intakes six months early. The Lac qui Parle – Yellow Bank CWP has been providing bi-weekly columns in county newspapers, hosting canoe trips, facilitating manure management workshops and educational programs for K-6 grade students.

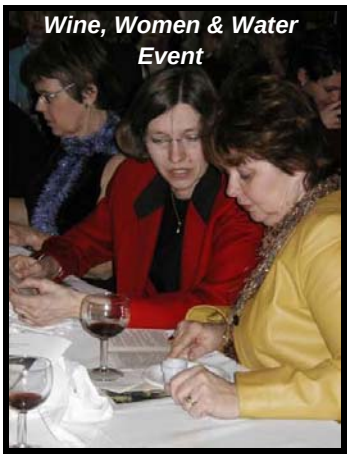
Information Booth


Septic System Construction

2. Lac qui Parle River Mainstem Water Quality Enhancement Project

The Lac qui Parle – Yellow Bank Watershed District received a U.S. EPA 319 grant to concentrate water quality efforts on the middle reach of the south branch of the Lac qui Parle from Canby to Dawson due to high levels of suspended solids. Designed to reduce suspended solids, turbidity and bacteria in the Lac qui Parle River, the project addressed the impaired waters listing for turbidity and fecal coliform bacteria. In addition, the project considered the unique watershed characteristics and keeping local economic factors in perspective. Goals of the project were: Improve water quality in middle reach of the Lac qui Parle River; Provide educational opportunities for residents in the watershed; Install Best Management Practices in the priority areas. At the end of the grant period, the project reported a reduction in the average level of bacteria at all the monitoring sites along with turbidity and Total Suspended Solids were reduced at three of the five monitoring sites.

The project offered a wide variety of educational opportunities: women workshops, biweekly news column; school presentations; canoe trips; manure management workshops and educational bus tour for 54 people. Under BMPs, the project installed 133 acres of buffer strips, six water and sediment control basins, 3,930 feet of grass waterways, one grade stabilization structure, 3,250 feet of terraces and two diversions. Funds from the project upgraded a total of 94 septic systems in three counties – Lac qui Parle, Lincoln and Yellow Medicine. Partners in the project with the District included the Lac qui Parle SWCD, Yellow Medicine SWCD, Lincoln SWCD, Lac qui Parle Water Management Plan, Lac qui Parle Environmental Office, Yellow Medicine Water Plan, Yellow Medicine County, Lac qui Parle County, Lincoln Environmental Office, Area II MN River Basin Projects Inc, Lac qui Parle, and Yellow Medicine NRCS, Prairie Country Resource Conservation & Development office and Minnesota Department of Natural Resources.


Wine, Women & Water Event

3. Lac qui Parle – Yellow Bank CWP launches TMDL study

Two kick-off meetings on November 24, 2009 brought out close to 50 people to hear about the Lac qui Parle – Yellow Bank TMDL project for turbidity, bacteria, and low dissolved oxygen. People at the meetings in Canby and Madison heard a project overview by Rich Brasch of Wenck the contractor of this study. Stakeholders were invited to participate in future meetings as the project proceeds and later with the development of an implementation plan to reduce excessive levels of turbidity and bacteria while increasing the level of dissolved oxygen in the water.

Paddling the Lac qui Parle River

4. Lac qui Parle – Yellow Bank Watershed District

Established on April 19, 1971 by a citizen petition, this watershed district manages both the Lac qui Parle Watershed and the Yellow Bank Watershed, part of the Upper Minnesota Watershed. Accomplishments by the District have included a $1.4 million Lazarus Creek Dam project for floodwater retention in Yellow Medicine County, repaired the control outlet on Fish Lake to control flooding, erosion, water quality and quantity by partnering with the East Dakota Watershed District in South Dakota, and annually removing tree snags in rivers and streams to improve erosion and water quality. Other projects involve constructing a learning center at Del Clark Lake / Stone Hill Park, providing support and cost-share for a streambank restoration project on Lqp County Highway 31, and partnering with Yellow Medicine River Watershed District to repair three stream bank restorations to control cross over flooding from the two watersheds.

Wetlands Education Tour

5. Dave Vesall Wildlife Management Area

A square mile of land of native prairie and shallow wetlands became a wildlife management area nine miles west of Madison. The 640 acre site is named for David B. Vesall, former director of the DNR fish and game department and dedicated conservationist who served on the Pheasants Forever initial board of directors. Vesall helped get the first state wetland protection program set up in the state with the first one purchased by the state in 1953 in Lincoln County along the South Dakota border now named Kvernmo State Wildlife Management Area (WMA). These WMAs are critical public access areas for hunting and other recreational activities along with offering water quality and wildlife habitat benefits.

6. A-Frame Farms

In 1973, Carmen Fernholz started a long transition from conventional farming practices into an organic management system completing it by 1991. To maintain adequate moisture and nitrogen levels for the fields a three-year rotation of small grain/legume, corn and soybeans and a five year rotation of small grain/alfalfa, alfalfa, alfalfa, corn and soybeans are used. Fernholz controls weeds primarily by the mechanical route with a rotary hoe, spring tooth harrow and a front mount/rear mount combination cultivator. As an organic farmer in Lac qui Parle County, Carmen Fernholz utilizes alternative inputs instead of the traditional use of spraying herbicides. Fernholz uses livestock manure as fertilizer, does frost seeding by charting the comparison of crop and weed germination, and a crop rotation of corn, soybeans, small grain and alfalfa.

Organic Farming Tour

7. Nutrient and Greenhouse Gas Benefits

As an organic farmer and conservationist, Carmen Fernholz plants radishes after harvesting his main crop for nutrient benefits. Instead of applying commercial fertilizer the radishes decompose when temperatures start to rise in the spring and slowly release nutrients into the soil. Planting radishes has another side benefit by offsetting climate change. Through photosynthesis, the radishes convert carbon dioxide, a greenhouse gas, into organic plant matter. When the radish dies and decomposes, the carbon in the plant also remains stored in the soil. Fernholz plants the radishes for the nutrient benefits but likes the idea of helping reduce greenhouse gases.

8. Organization Spotlight - Earthrise Farm

Sisters Kay and Annette Fernholz established an organic, community-supported garden on their Lac qui Parle located family farm in 1996. As members of the Schools Sisters of Notre Dame, the sisters see the 11 acre garden as both a community and educational effort. As a result of their efforts, the University of Minnesota honored Kay and Annette with the "2006 Family of the Year" for Lac qui Parle County. They grow a large selection of vegetables including green beans, peppers, cauliflower, zucchini, summer squash, carrots, potatoes, and purple basil. In 2004, the Fernholz sisters established the Earthrise Farm Foundation, a nonprofit organization founded to fulfill the mission of renewing our Earth connections. Other community-focused efforts at the farm have ranged from helping establish a Farmers' Market in Madison, offering classes on a variety of topics and a place for young people to learn about organic farming. The rest of 240 acres of the family-owned land is managed by three Fernholz brothers who also farm organically.

Kay and Annette Fernholz

9. Lac qui Parle SWCD

The Lac qui Parle Soil and Water Conservation District (SWCD) provides technical, financial and education resources to citizens, landowners and farmers in the county. Conservation practices installed with help from Lac qui Parle SWCD include terraces, water and sediment control basins, and grass waterways along with an active tree planting and living snow fence programs. Lac qui Parle SWCD conducts a variety of education programs for all age groups ranging from classroom and group presentations to workshops and organic farming tour. The Lac qui Parle SWCD partners with organizations like the Lac qui Parle – Yellow Bank CWP to promote conservation practices and work to improve water quality.

County Highway 31 Bridge Project

One of the major projects involving the Lac qui Parle SWCD and other partners was the streambank stabilization at the County Highway 31 Bridge. After installing a series of stream barbs to divert flow back into the river channel, re-sloping the bank, placing selective rip-rap, and seeding native plants, water clarity improved from transparency tube readings of 30s to almost 60 cm. The local paper ran a quote from a veteran paddler saying, ". . . the river was the clearest I have seen it in the last 10 years."

County Highway 31 Bridge Project

10. Project Spotlight - Lac qui Parle County Highway 31 Project

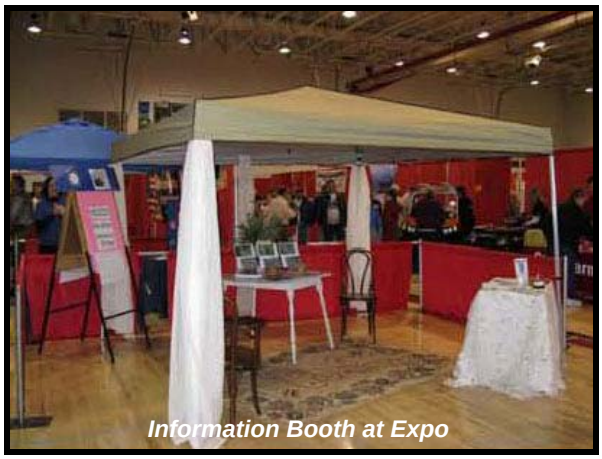
A streambank stabilization project was undertaken by a collection of partners along the Lac qui Parle River near a county highway bridge. An existing CREP buffers did prevent cropland sediment from entering the river but 100 tons of soil per year were being added to the river from the streambank. In addition, the stability of a county bridge was increasingly being threatened. The Lac qui Parle SWCD worked with Lac qui Parle County, DNR, NRCS, Lac qui Parle – Yellow Bank Watershed District and the Lac qui Parle Lake Association to stabilize the streambank with a combination of stream barbs, selective riprap, and bank re-sloping with reseeding of native grasses protected by erosion control blanket held in place with willow stakes. In the spring of 2009, necessary repair to the streambank project included reshaping and reseeding covered by erosion control blanket, a small amount of rock at the edge of the riprap, and dogwood and plum planted on the lower shelf.

Before Restoration

After Restoration

11. Lac qui Parle Outdoor Expo

The first-ever Outdoor Expo held in Lac qui Parle County on April 28-29, 2007 attracted approximately 1,200 people to hear presentations by Tony Dean and James Meger among other topics. Lac qui Parle SWCD, Madison Chamber of Commerce, Lac qui Parle – Yellow Bank Clean Water Partnership and other partners hosted the event at the county fairgrounds. Other speakers gave presentations on topics like rain gardens, dog training and first aid, bird watching 101, healthy soil, healthy plants, healthy people along with outdoor activities including a kids fishing derby, archery and sporting clay shooting. The event focused on increasing awareness of relationships between people, wildlife and a healthy environment.



Information Booth at Expo

12. Killen Moist Soil Management Area

The Lac qui Parle Wildlife Management Area is 33,000 acres of prime habitat for waterfowl and now on the cutting edge of a new look at the State of Minnesota's vision for producing more ducks. Five years ago the DNR partnered with Ducks Unlimited to develop the Killen Moist Soil Unit. Named for Jim Killen, a wildlife artist, the unit cost $350,000 with a goal to mimic natural wet-and-dry cycles in order for vegetation like smartweed and pigeon grass to germinate before flooding the areas in the fall. The clean, clear, carp-free water and ample vegetation provide migrating waterfowl a place to feed and rest on their way south. Another 150 acres surround the unit serves as a buffer with no hunting allowed. To manage the water level a 1.7-mile dike was built and 65 to 100 million gallons of water pumped from Marsh Lake to flood the area. Cost to operate and maintain the site is about $34,000, partially paid out of duck stamp funds. Now the State of Minnesota has began to explore the idea of adding more of these "moist soil" management areas across the state.

13. Dawson Dam Removal

In the fall of 2009, the 1920-era low head dam in Dawson was removed by the Minnesota Department of Natural Resources (DNR) to allow for fish migration up the Lac qui Parle River and also provide a safer passage downstream for paddlers. A series of 15 rock weirs or steps built from boulders were put in place of the concrete structure. These pools will allow fish to migrate 60 miles upstream for the first time since the dam was built to provide ice for homes and businesses during the winter before electric power came to Dawson. The top rock weir is only six inches lower than the original height of the dam. According to DNR staff, the removal of dam will help with water quality issues including low dissolved oxygen levels in the Lac qui Parle River. There was also a lot of community support for the project and this should increase as the new set-up allows for better and safer public access to the river for both fishing and paddling.

Construction Rock Weirs on the Lac qui Parle River

Construction Rock Weirs on the Lac qui Parle River

River Advocate – Dave Craigmile

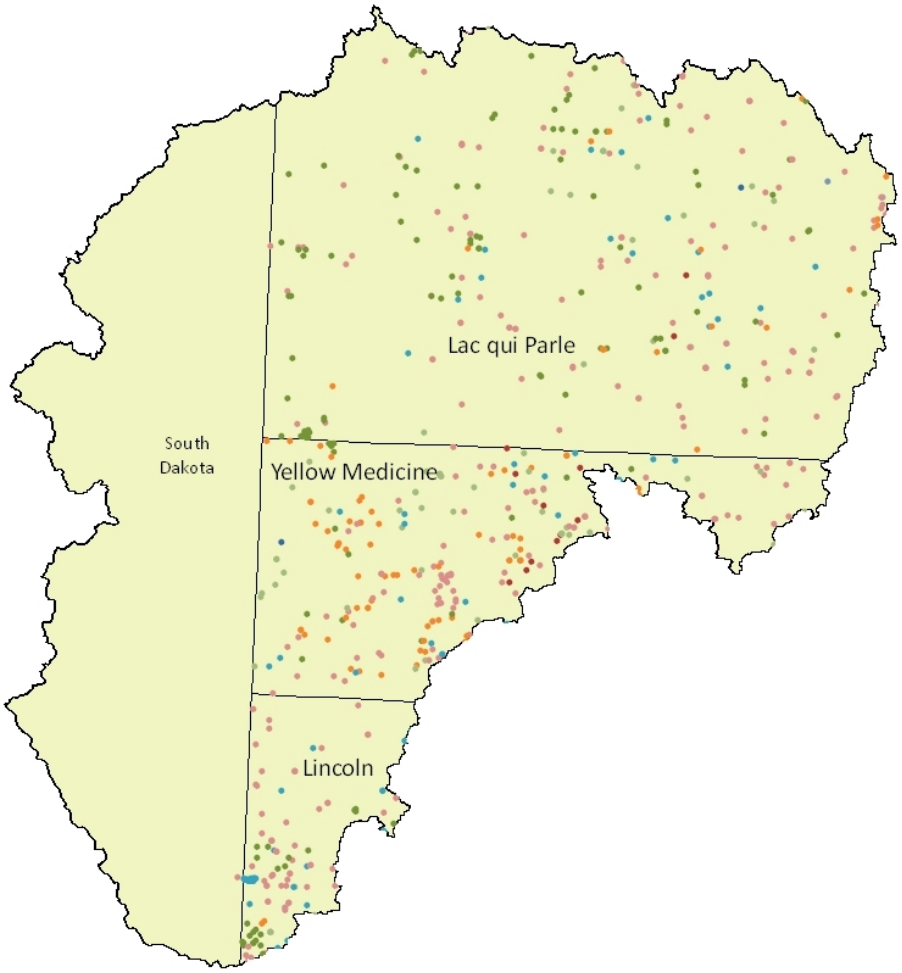
Dave Craigmile grew up on a farm near Boyd where he became interested in science as a young boy, including the study of geology, water and other physical properties in the environment around him. After graduating from college, Dave taught physical and earth science for seven years in the Osseo School District before going back into farming. Today, he raises traditional crops like wheat, soybeans and corn while being involved in a variety of water-related activities, everything from paddling to serving on the Lac qui Parle – Yellow Bank Watershed District board and volunteering as a citizen monitor. His strong interest in science and geology continues as Dave serves on the Minnesota River Turbidity TMDL stakeholder advisory committee and technical advisor for the Lac qui Parle – Yellow Bank Clean Water Partnership.

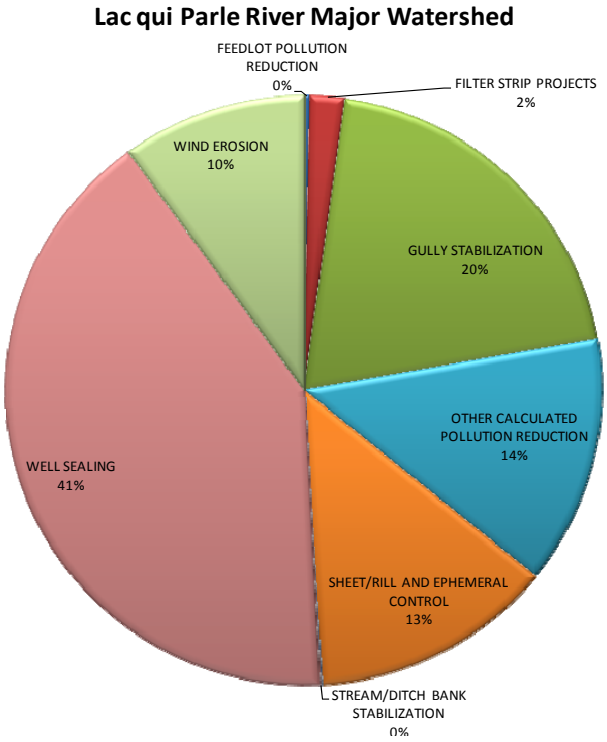
Dave Craigmile on the West Branch of the Lac qui Parle River

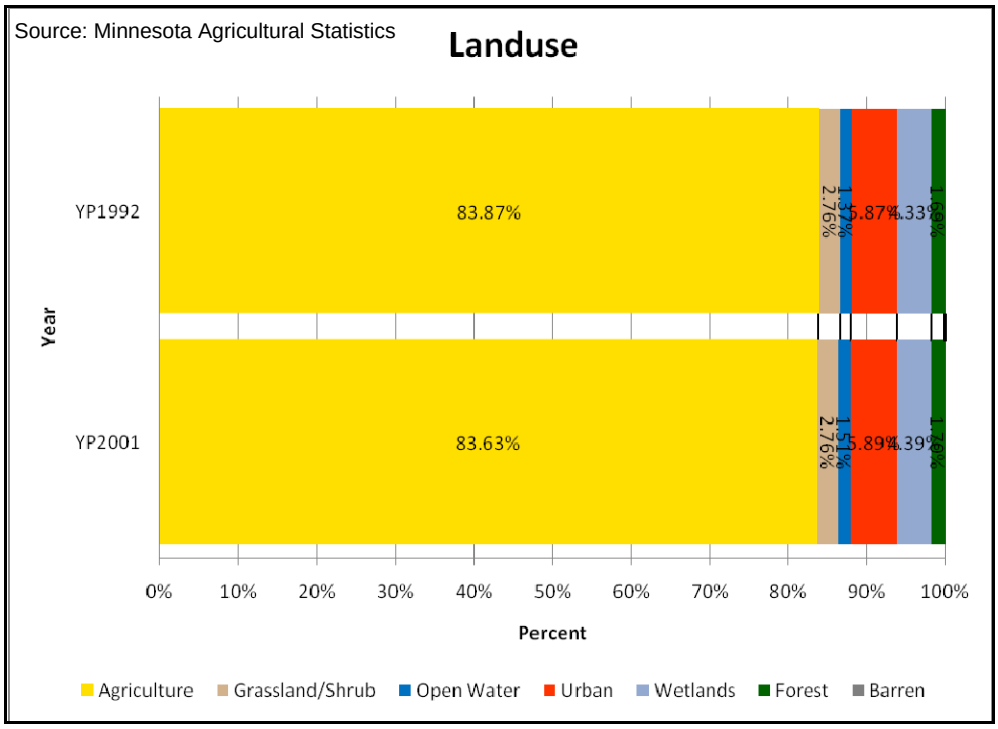
Dave Craigmile on the West Branch of the Lac qui Parle River

On his free time, Dave spends a lot of time paddling the local rivers, especially the Lac qui Parle. *You've got to understand the river to get in it or on it and that is why I've always enjoyed canoeing and later days, kayaking on a river. It gives you that seat of the pants feel for the river and you can feel the river moving under you. You can observe how the bars are forming in the river and you can certainly observe all the wildlife and the flora and fauna in general that are part of the river system. It's always easy to look over the river bank and assume what's going on, but it's quite a bit more work to track it down and try to understand the issues that are involved behind it.*

Lac qui Parle River Watershed Conservation Practices and Land Use







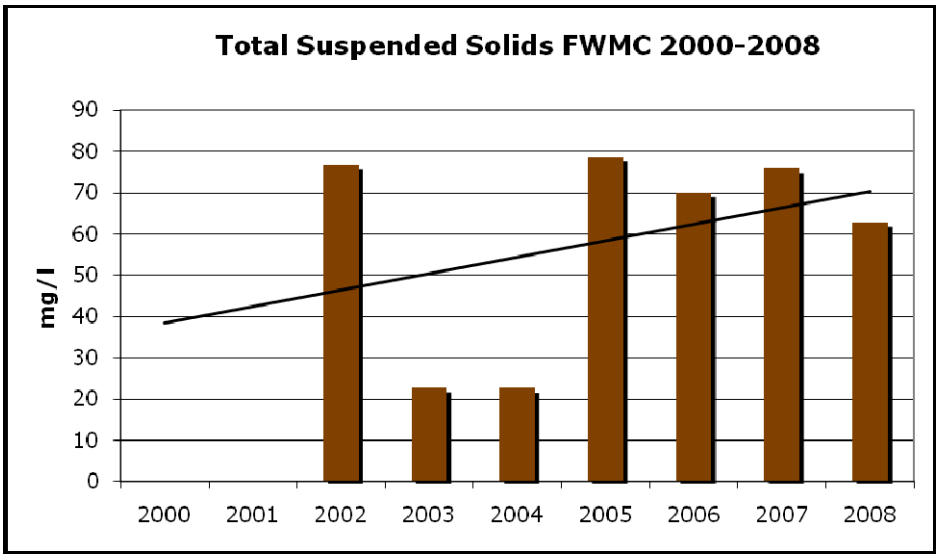
Conservation Practices

After the initiation of the Lac qui Parle – Yellow Bank Clean Water Partnership in 2001, the work of improving water quality began a few years later. The map to the left and the pie chart above illustrates conservation practices in the Lac qui Parle Watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Lac qui Parle River Watershed but not recorded in either LARS or eLINK.

Lac qui Parle River Watershed Pollution Reduction

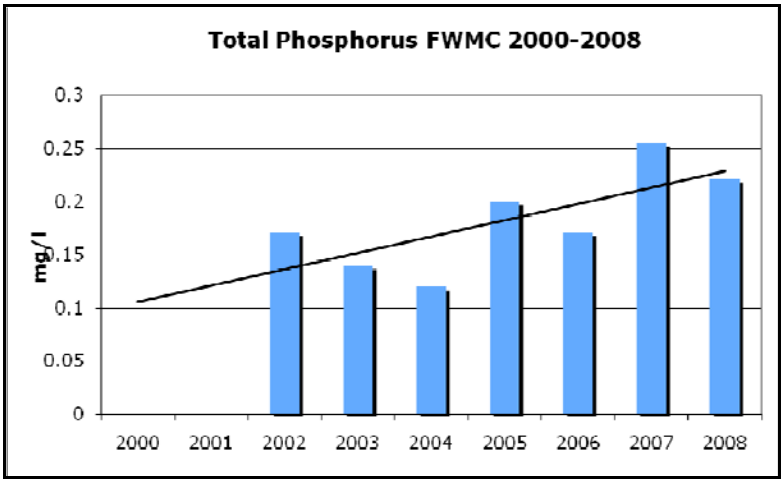
Introduction

The Lac qui Parle-Yellow Bank Clean Water Partnership began sampling in 2001 after the spring floods. From 2001-2003 sampling was done every two weeks with additional monitoring following rain events throughout the watershed. When the Diagnostic Study and Implementation Plan were completed funding was very limited. Monitoring continued but on a different level and some baseline monitoring was not in included so the average yearly results reflected in the charts are at a higher amount. A unique feature of the Lac qui Parle River is the elevation change of 1,070 feet from the highest point in the watershed to Lac qui Parle Lake. From Lac qui Parle Lake to New Orleans there is an elevation change of 970 feet thus the water flows very fast and transports sediment nutrients and bacteria to the Minnesota River.



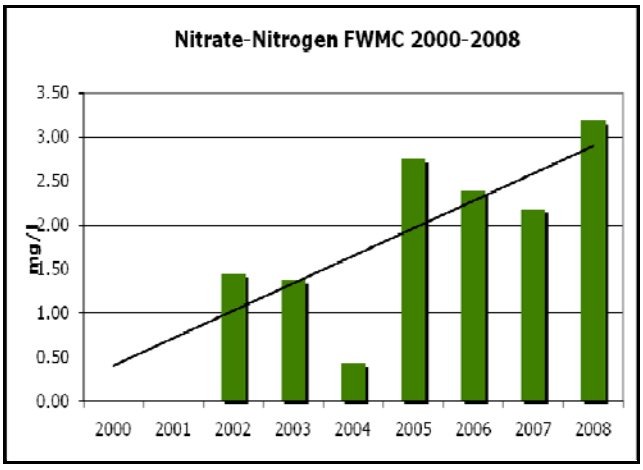
Total Suspended Solids

With the elevation change in the watershed the water flows very quickly and then slows down as it reaches the flatter land near Canby. Filter strips were targeted along the mainstem of the Lac qui Parle and as they become more established the banks should become stable. The mainstem of the Lac qui Parle and some of the tributaries are listed on the 303(d) list for turbidity and a TMDL assessment is currently underway. A river bank restoration project was worked on in the fall of 2007 just upstream of this site.



Total Phosphorus

Total Phosphorus levels in the Lac qui Parle are under the threshold value of 0.26 mg/L. The lower reach of the Lac qui Parle River has an impairment for low dissolved oxygen and a TMDL assessment study is currently in progress. Each spring during snowmelt is when the highest phosphorus is found in the Lac qui Parle River.



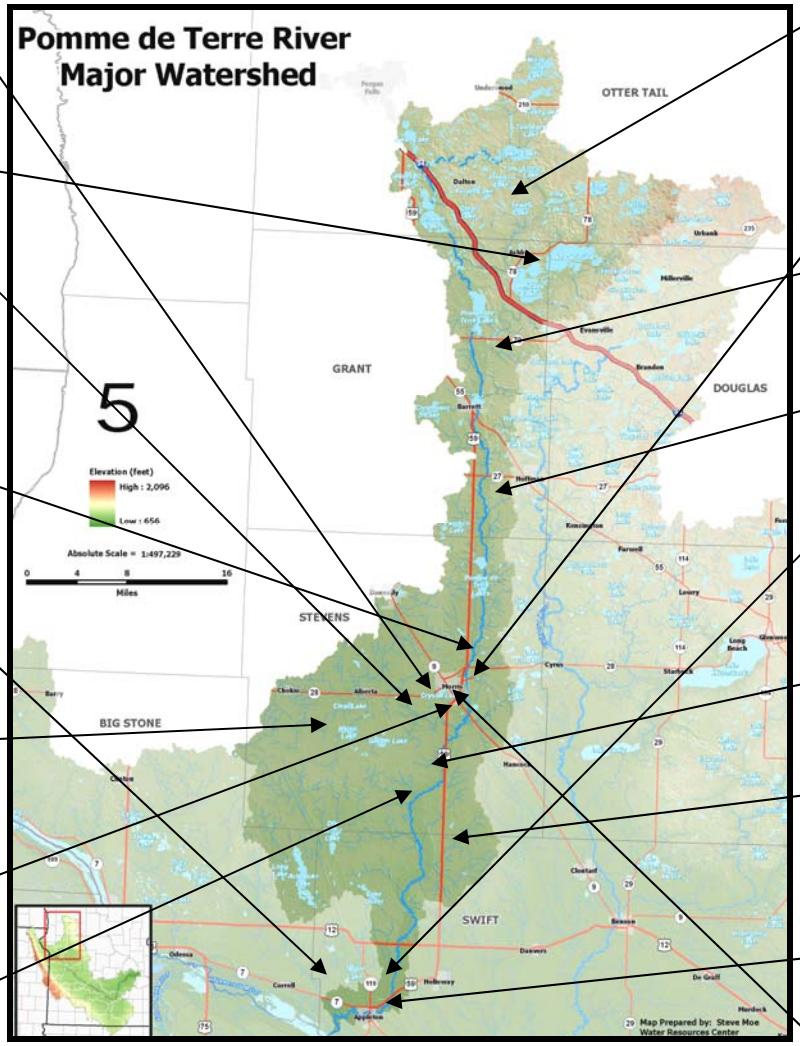
Nitrate-Nitrite (NO2-NO3)

Nitrogen levels within the watershed are continually well below the drinking water standard of 10 mg/L.

POMME DE TERRE RIVER WATERSHED

Located in western Minnesota in the upper Minnesota River Basin, the Pomme de Terre Watershed drains approximately 905 square miles or 559,966 acres and is largely rural with crop cultivation as the major land use. As the most northern watershed in the Minnesota River Basin, the Pomme de Terre Watershed has about 115 named lakes and about 750 miles of streams. Tributaries of the Pomme de Terre River include Artichoke, Dry Wood, Muddy and Pelican creeks. Named for the prairie turnip (a potato-like food of the Dakota known as Indian Breadroot, *psoralea esculenta*), the Pomme de Terre is French for "potato." Starting out in southern Otter Trail County the Pomme de Terre begins as a cool and clear stream tumbling out of the Stalker and Long lakes. On its upper portions, the Pomme de Terre meanders through cattail and reed canary grass marshes. The Pomme de Terre River drops an average of 3.5 feet per mile before out-letting into Marsh Lake below Appleton.


Pomme de Terre River at Highway 12



1. Pomme de Terre Clean Water Partnership
2. Pomme de Terre Stakeholder Meeting
3. Fecal Coliform Bacteria TMDL
4. Fecal Coliform Bacteria Implementation Plan
5. Pomme de Terre River Paddle
6. Pomme de Terre Association
7. Pomme de Terre River Watershed Project
8. Crazy Kayak Race
9. Shoreline Restoration
10. Minnesota River Board Tour
11. Stevens & Pope Conservation Day
12. Hattie & Page Lakes Project
13. Echoes of Cry of the Marsh
14. Stevens SWCD Stream Barb Projects
15. Stevens SWCD Conservation Days
16. Lake Christina
17. University of Minnesota Morris Environment Major

The Pomme de Terre begins in the high country of Minnesota's famed lake region. Its origins are in lakes and ponds of the rugged glacial moraines; it begins as a distinct stream tumbling cool and clear from Stalker and Long lakes in southern Otter Tail County. Bordered by wooded hills and grassy meadows, the Pomme de Terre River has no major outlets. – Thomas F. Waters, The Streams and Rivers of MN

POMME DE TERRE RIVER WATERSHED

Stevens Soil and Water Conservation District works with partners on the local, state and federal level to improve water quality in the watershed through the use of conservation practices, education and public involvement. The University of MN Morris has expanded their environmental-theme mission by offering an environment major in 2009. One of most important educational outreach tools has been Bob Hartkopf's *Cry of the Marsh* film about the loss of wetlands.

1. Pomme de Terre Clean Water Partnership

Efforts to study and improve water quality in the Pomme de Terre Watershed have been ongoing since the 1970s with the Pomme de Terre River Association taking a lead role. Today, a project coordinator works out of the Stevens Soil and Water Conservation District office in Morris. The role of the coordinator is to complete the development of TMDL studies of the watershed for turbidity and fecal coliform, promote the enrollment of conservation practices and educate residents on water quality issues. Examples of this work includes a set of articles featured in the Morris *Sun Tribune* including topics like stream biology and water quality, hosting public information meetings and sponsoring a paddle on the Pomme de Terre River. Currently the Pomme de Terre Watershed is listed for fecal coliform bacteria and turbidity water quality impairments.

Pomme de Terre River at Appleton

2. Pomme de Terre Stakeholder Meeting

A diverse group of people volunteered to help develop the implementation plan for the Pomme de Terre River turbidity TMDL. Close to 50 people attended a November 13, 2009 watershed meeting that focused on a draft turbidity TMDL discussion undergoing the review and approval process. Part of the conversation during the meeting concentrated on load duration curves and data contained in the TMDL along with the upcoming implementation plan process. Pomme de Terre coordinator also gave an overview of the recently approved fecal coliform TMDL implementation plan and a U.S. EPA 319 grant covering practices to reduce bacteria levels in the river. The grant will cover funds for incentives and cost share to utilize livestock exclusion fencing, rotational grazing, plus buffer strips for cattle pastures, between waterways and manured fields and feedlot runoff control.

Cattle in the Pomme de Terre River

3. Fecal Coliform TMDL Study

From Muddy Creek to Marsh Lake, this stretch of the Pomme de Terre River has been listed as impaired for fecal coliform bacteria. Samples were collected at the Appleton monitoring site from October 5, 1983 to September 27, 1993 with 23 of them exceeding the water quality standard of 200 colonies for 100 milligrams of water. The Pomme de Terre Association Advisory Committee determined additional information was needed to make a sound assessment of the watershed. As a result, the project focused to better characterize fecal coliform bacteria levels, identify the probable sources, and estimate the reduction required to meet the TMDL water quality standards. Three goals were developed: (1). Analysis the data that put the Pomme de Terre River on the impaired waters list; (2). the effects of Muddy Creek on the lower Pomme de Terre Watershed will be analyzed; and (3). To develop and initiate an implementation plan to attain and maintain water quality standards of fecal coliform bacteria in the river.

Livestock Stream Exclusion

4. Pomme de Terre River fecal coliform TMDL implementation plan

In 1994, the Pomme de Terre River from Muddy Creek to Marsh Lake was listed impaired for aquatic recreation as a result of high levels of fecal coliform bacteria. A strong positive correlation between precipitation and fecal coliform bacteria concentration was shown by supporting TMDL data. According to the TMDL, the river's water quality failed to meet state standards primarily during rain events, pointing to weather-driven sources. Stakeholder meetings were held in February, March and April of 2008 to develop an implementation plan along with a facilitated visioning session to determine priority issues and desired outcomes.


Native Prairie Restoration

As a result, a fecal coliform bacteria stakeholder group of 20 people formed and priority management measures were determined: (1). Riparian buffers – between manured fields and waterways or grazed pasture and waterways along with cropfield sites that have a documented history of manure application, (2). On-site sewer systems, (3). Manure management, (4). Pasture management – install livestock exclusion fencing to keep livestock out waterways and incentive payments for landowners to enroll pasture acres into prescribed rotational grazing plans, and (5). Urban stormwater management.

5. Pomme de Terre River Paddle

The Pomme de Terre Watershed Project along with Clean Up the River Environment (CURE) hosted a paddle on this prairie river to bring attention to the resource and highlight its current condition. A group of 30 paddlers took off from Larson's Landing for a total of five miles to the Appleton City Park. On this stretch of the Pomme de Terre River the paddlers experienced both open and wooded sections along with signs of agricultural and rural development. At the end of the paddle, everyone enjoyed a series of rock weirs built by the DNR after the removal of low-head dam.


Paddling the Pomme de Terre River

6. Organization Spotlight - Pomme de Terre River Association

Formed as a joint powers board, the Pomme de Terre River Association has been working to improve water quality in the watershed since 1981. This Association is dedicated to engaging local people to become informed and active in cleaning up the Pomme de Terre River along with being committed to making the river a great resource for all to enjoy. County commissioners and SWCD supervisors from each of the counties – Otter Trail, Douglas, Grant, Stevens, Swift and Big Stone – make up the joint powers board. A study titled "Sedimentation Rates and Changing Water Quality Pomme de Terre River Watershed West Central Minnesota" was completed in 1985 by Dr. Van Alstine under a contract with the Association. Out of this study the Joyce Foundation and Minnesota Environment Education Board developed curriculum materials for elementary school classrooms. The Association completed a diagnostic study of the watershed and held four public input meetings. Today, the Pomme de Terre River Association continues to work on improving water quality in the watershed.


Environmental Education

7. Pomme de Terre River Watershed Project

In 2000, the Pomme de Terre River Association Joint Powers Board began to use funds from the Minnesota Pollution Control Agency (MPCA) to study and assist in efforts to improve water quality in the watershed. A $50,000 grant compiled all of the studies that had been conducted in the watershed along with other activities. Part of the project involved educating and informing the public about the water quality issues through newsletters, bus tours, information booths at two community events, county public meetings, citizen monitoring picnic, presentations, Kids Groundwater Days and created the Appleton Outdoor Classroom on the Pomme de Terre River. Finally, the grant created a comprehensive report on the existing data and the accomplishments of the Association since the early 1980s.

Water Quality Monitoring

8. Crazy Kayak Race

Clean Up the River Environment (CURE) hosted a "Crazy Kayak Race on the Pomme de Terre River in conjunction with the City of Appleton's annual Applefest Celebration. Paddlers started at the top of the newly established rapids on the river and dash paddle (navigating the rocks) past several flags which they grabbed under the foot bridge to an access point further downstream. The goal of the race is to help people connect to the Pomme de Terre River as a valuable resource and embrace what it has to offer. Immediately after the kayak race, people participated in a rubber duck race on the river.

Paddling the rapids at Appleton

9. Shoreline Restoration

Stevens SWCD partnered with the Morris High School environmental science class on a joint restoration project at the Pomme de Terre Park. The local partnership planted a shoreline restoration in the area that had been the park's swimming hole. Students weeded the area and replaced the failed plants. Another benefit for water quality at the park was the reconstructed parking lot featuring a rain garden in the center to help reduce runoff from the pavement. Stevens SWCD shared information on the rain garden with the high school class.

Planting shoreline vegetation

10. Minnesota River Board Tour

County commissioners, government agency staff, citizens and others from across the basin traveled to Morris for a September 21, 2009 Minnesota River Board meeting and a tour of the Pomme de Terre Watershed. A presentation on the Pomme de Terre Watershed and project activities was given at the meeting to help set the stage for the bus tour going from Morris to the confluence with the Minnesota River at Marsh Lake and southwest of Appleton. Stops on the tour included the new Pomme de Terre scenic overlook at the University of Minnesota West Central Research and Outreach Center; the shoreline restoration project at the Pomme de Terre Park in Morris; phase II biological monitoring site on Drywood Creek, starting point of the DNR canoe trail; old mill dam site in Appleton and the Marsh Lake dam and Minnesota River confluence.

Pomme de Terre Interpretive Site

11. Stevens and Pope Conservation Day

Fifth grade students from all the Pope and Stevens schools came together at the Scandia Wood Environmental Learning Lab (SWELL) just east of Morris to learn about conservation and the environment. Over 200 students and teachers enjoyed the third year of this event featuring a variety of hands-on learning stations including Raptors, Mammals, In the Woods, Soils, Wetlands, Waterfowl, Prairie Wildlife, Water Quality, Mini Envirothon, Nature's Stockmarket, Scavenger Hunt and Orienteering. Presenters and sponsors of event included Stevens and Pope SWCDs, Stevens County Environmental Services, NRCS, U.S. Fish and Wildlife Service, Lawn & Driveway Service, Hancock Sportsmen Club, Stevens County Pheasants Forever, Prairie Country RC&D, Chippewa River Watershed Project, and University of Minnesota.

12. Hattie and Page Lakes Project

Stevens County Environmental Services, Stevens SWCD and NRCS partnered together to conduct an inventory to identify critical erosion and pollutant sources for the watersheds of Hattie and Page lakes. The inventory identified ditches, field drain tile outlets, critical erosion sites, feedlots, septic systems and other pollutant sources. Once completed, the inventory was used to target financial assistance and voluntary labor to correct water quality problems.

13. Echoes of Cry of the Marsh

The University of Minnesota Morris, the Upper Minnesota River Watershed District and the U.S. Fish and Wildlife Service produced a one-hour documentary on the impact of the 1960s documentary "Cry of the Marsh" by Bob Hartkopf. As a young boy, Hartkopf wandered through a shallow wetland called Mud Lake next to his father's cropland. He used the wetland as a classroom by studying the plant and migration patterns of local waterfowl, inspiring him to become a high school science teacher. After his beloved Mud Lake and many other wetlands were drained for additional cropland, Hartkopf picked up a 16 millimeter camera in 1959 to document all the ditching work near his family farm. "Cry of the Marsh" came out of this filmmaking and released in 1970, winning a number of awards at festivals in New York, Washington D.C. and Berlin. Since the release of his film, Hartkopf has worked tirelessly to promote it, promote the benefits of conservation, of biodiversity and wetland restoration.

River Advocate – Bob Hartkopf

Bob grew up on a farm near Appleton where he explored the natural environment as a young child and read books by Aldo Leopold and Rachel Carson. One of his favorite places was a nearby marsh or wetland called Mud Lake. After graduating from college Bob went off to teach high school in Fargo, North Dakota and began to see the dramatic changes to the landscape on his family farm – the draining of wetlands, loss off tall grass and no more ducks and geese. The land was being transformed to grow more crops. Hartkopf felt the need to record what was happening. In 1959, he started to film the digging of ditches near his family home. Later Bob produced a 12 minute documentary called Cry of the Marsh in April of 1970, which coincided with the first Earth Day. Today, Bob Hartkopf continues to be an advocate for the protection and restoration of wetlands, rivers and other valuable waterbodies.

14. Stevens SWCD – Stream Barb Projects Two stream barb projects were completed on sensitive areas of the Pomme de Terre and Chippewa rivers with assistance by Stevens SWCD through planning and funding. Stream barbs are low rock structures installed on a meandering stream to protect the outside edge of the bank from washing away as water flows around a curve. The rock structures transfer the flow of the stream from the outside edge to the middle of stream, deepening the flow in that area and causes silt to fill in behind the barbs. The concentrated flow in the middle makes the stream become narrower and cuts down bank erosion.


Conservation Practices Tour

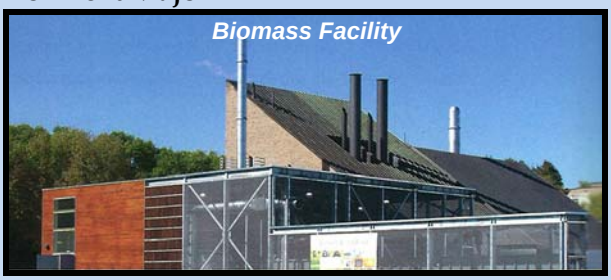
15. Stevens SWCD – Conservation Education
Stevens SWCD has made conservation education for both youth and adults an important focus with many of these efforts done in partnership with one or more other area SWCD offices. Most of the opportunities offered are outdoor, hands-on sessions for youth through the Water Fest, Conservation Day and Area II Envirothon, coordinated by Stevens SWCD for over 10 years. A partnership has been developed with Morris Area Schools through their Service America program to teach students of all ages about various environmental topics including nitrates, water testing, watersheds, and community tree planting while meeting the state graduation standards.


Conservation Day

16. Lake Christina
Located in the northern part of the Pomme de Terre Watershed, Lake Christina has been referred to as a 4,000 acre duck pasture. The abundance of waterfowl have made this a hunting Mecca since the beginning of the last century. Tens of thousands of ducks and hundreds of thousands of coots can be found on the lake when it is in good condition.

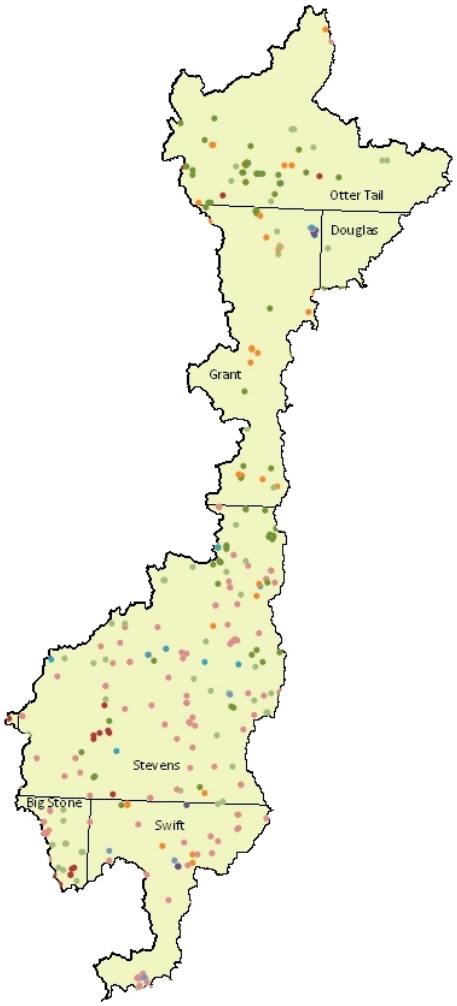
The Minnesota Department of Natural Resources, local lake association, Ducks Unlimited and other partners have used a number of different management methods to control invasive species of fish from getting into the lake including the use of the chemical Rotenone, fish barriers and water control structures. One proposed method for lake management is the use of a permanent pump structure to allow for periodic drawdowns of the water level.

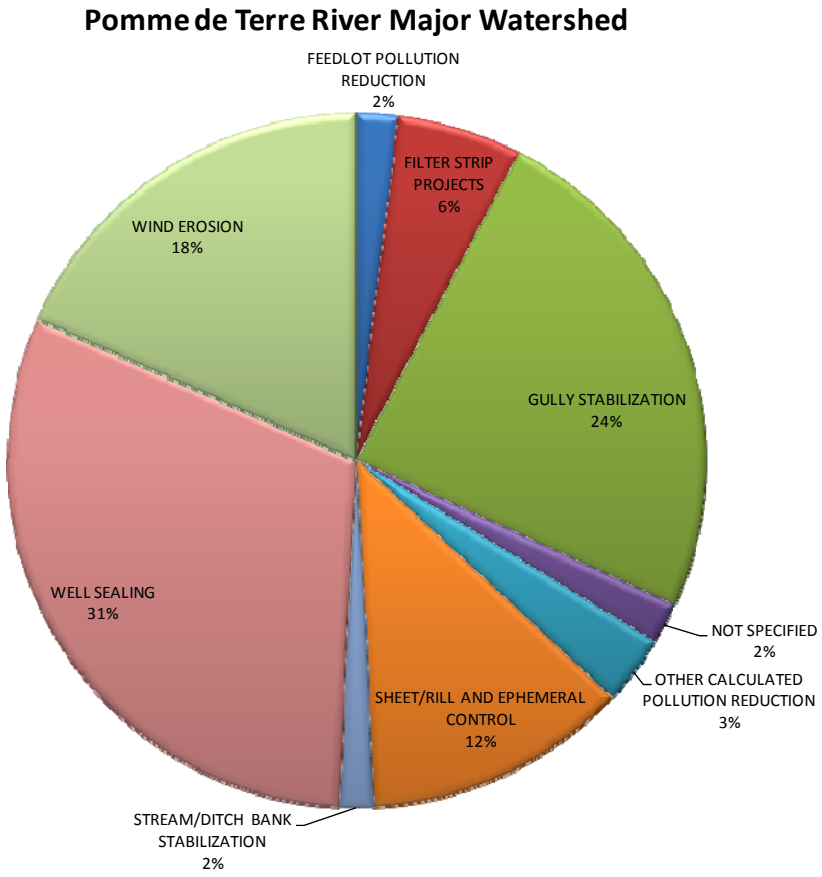
17. Project Spotlight - University of Minnesota Morris Environment Major


Biomass Facility

Over the years, the University of Minnesota Morris has moved towards a more sustainable and green campus with buses fueled by corn, dorms heated by a biomass furnace and serving food grown on nearby farms. After adding two new majors – environmental studies and environmental science – the previous year, Morris began to offer an environmental major in 2009. The fully developed green curriculum of this multidisciplinary degree offers classes ranging from microeconomics to a course called "Evolution of the Minnesota Prairie." These classes utilize the college's facilities by visiting the biomass heating and cooling plant to discuss biomass gasification, and work with small-scale gasifiers.

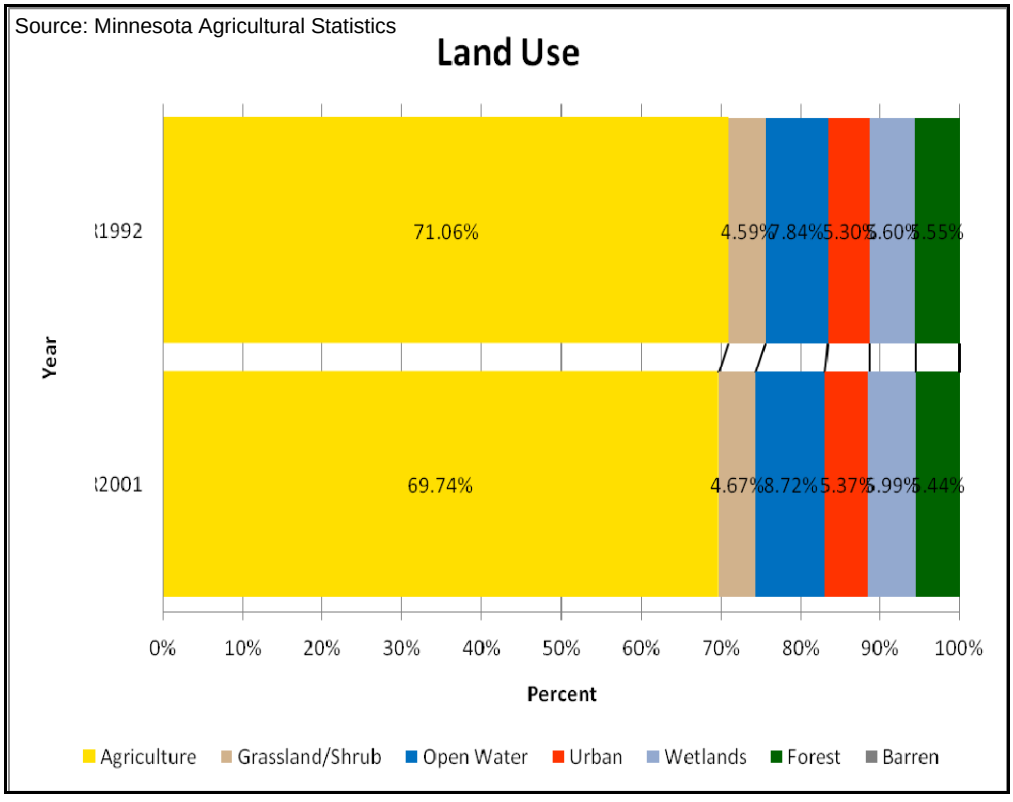
Pomme de Terre River Watershed Conservation Practices and Land Use





Conservation Practices

One of the first efforts to improve water quality in 1981 came with the formation of the Pomme de Terre River Association. The map above and the pie chart to the right illustrates conservation practices in the Pomme de Terre River Watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Pomme de Terre River Watershed but not recorded in either LARS or eLINK.



Pomme de Terre River Watershed Pollution Reduction

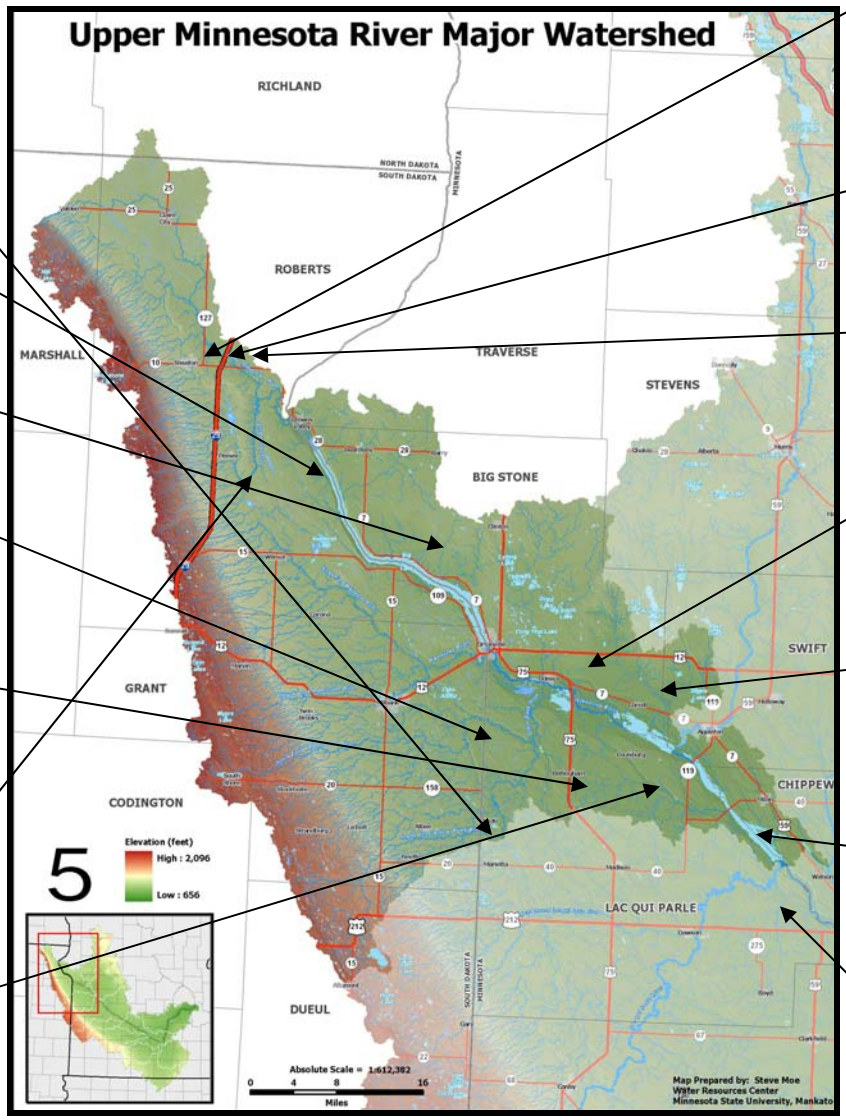
Water Quality Monitoring

Over the last few decades there has been some effort to measure water quality including the collection of fecal coliform bacteria samples. Monitoring near the outlet of the Pomme de Terre River didn't began until 2007 when the Minnesota Pollution Control Agency set up a station for collecting samples and measuring flow at Appleton. As a result there isn't enough data to develop a trend line for water quality measurements in the Pomme de Terre Watershed. The quality of water in this watershed is impacted by the number of lakes, extensive groundwater flow into the river and limited drainage network. The Pomme de Terre River Watershed can be compared to the upper Chippewa River Watershed.

Upper Minnesota River Watershed

Draining 2,020 square miles, the Upper Minnesota River Watershed features a number of significant landscape features including the Continental Divide at Browns Valley, a low area of land separating the Mississippi River Basin from the Red River Basin. The watershed's headwater is found in South Dakota on the Coteau des Prairies, with the Little Minnesota River flowing into the northern edge of Big Stone Lake. In addition to the Little Minnesota, the other major tributaries are the Whetstone River found at the lake's southern end and further downstream is the Yellow Bank River. Two major impoundments are located on the Minnesota River in the Upper Minnesota River Watershed – Marsh and Lac qui Parle reservoirs. Both of these lakes are incorporated into some of the largest and most important wildlife management areas and public hunting grounds in Minnesota and stopovers for great concentrations of migrating waterfowl.


Minnesota River



1. Yellow Bank & Whetstone Monitoring Program
2. Big Stone Lake Restoration Project
3. Citizens for Big Stone Lake
4. Clean Up the River Environment (CURE)
5. CURE – Civic Engagement
6. CURE – Hard Rock Mining Issues
7. Raise Your Voice
8. Granite Outcrop Easement Program
9. Big Stone National Wildlife Refuge
10. Upper Minnesota River Watershed District
11. Area I MN River Basin Project Inc.
12. Big Stone SWCD
13. Upper MN Fisheries Management
14. Prairie Winds Farm

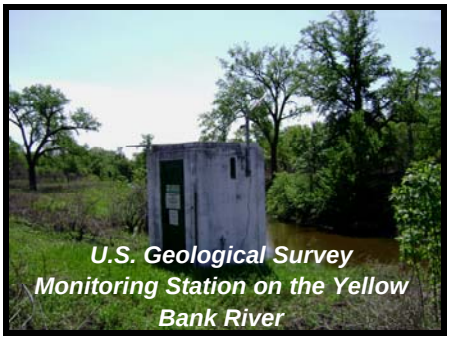
A most delightful country, abounding with the necessaries of life that grow spontaneously. Wild rice grows here in great abundance; and every part is filled with trees bending under their loads of fruit, such as plums, grapples and apples. – Jonathan Carver, Travels Through Interior Parts of North America in the Years 1766, 1767 and 1768

UPPER MINNESOTA RIVER WATERSHED

Water quality efforts in this major watershed crosses state lines with Citizens for Big Stone Lake taking a lead role to install conservation practices and engage citizens. Other efforts involve the non-profit group Clean Up the River Environment (CURE), Minnesota DNR, Lac qui Parle and Big Stone SWCD, Area II, the Upper Minnesota River Watershed District along with the East Dakota Water Development District.

1. Yellow Bank and Whetstone Monitoring Program

An extensive two-year monitoring program is being launched in 2010 to analyze water quality in two tributaries – the Yellow Bank River and Whetstone River – flowing out of South Dakota into Minnesota. Fourteen sites will be set up in the two sub-watersheds of the Upper Minnesota River Watershed by the East Dakota Water Development District. Only limited monitoring has been conducted in the Yellow Bank and Whetstone watersheds, which hasn't provided a thorough understanding of the two watersheds. This form of comprehensive monitoring will help South Dakota determine the types of water quality issues that may need addressing.



U.S. Geological Survey Monitoring Station on the Yellow Bank River

2. Big Stone Lake Restoration Project

To reduce nuisance algae blooms in Big Stone Lake, a group of organizations came together to install a diverse selection of agricultural-related Best Management Practices (BMPs). The Upper Minnesota River Watershed District partnered with Big Stone SWCD, City of Ortonville, Big Stone County, Citizens for Big Stone Lake, DNR, U.S. Fish & Wildlife Service, and MPCA along with state and local groups from South Dakota.

Streambank Restoration Project

BMPs ranged from wetland restorations, no-till drill program, nutrient management, shoreline, more than 50 animal waste management systems, and streambank erosion control and Whetstone River flow management, resulting in significant lake water quality improvements. Other water quality improvements came from the upgrading of six municipal wastewater treatment systems. The restored Steen wetland located on Meadowlark Creek in Big Stone County demonstrated that significant reductions in concentrations and loads of suspended sediments and nutrients could be achieved. An important component in developing project goals and management involved both public input and involvement.

3. Organization Spotlight - Citizens for Big Stone Lake

An 800-member nonprofit organization in Minnesota and South Dakota, the Citizens for Big Stone Lake initiated and coordinated projects and activities related to water quality of Big Stone Lake. This dedicated group of citizens has been working since 1977 including a number of state and federal grants, achieving significant water quality improvement.

Big Stone Lake

The group has helped get more lake monitors, tougher feedlot ordinances, lobbied for clean water through the Clean Water Alliance, created a resource library, held public events including a shoreline restoration seminar with assistance from the Minnesota DNR, contributed to the CRP native grass program for field runoff control and provided funds for water-related programs at the Bonanza Education Center in Big Stone State Park. Their biggest success came by working with farmers to secure grants to pay for conservation practices like no-till planting, wetland restorations, permanent easements of cropland and 50 livestock waste management systems.

4. Clean Up the River Environment (CURE)

CURE is a grassroots, nonprofit organization working with citizens, government staff and many others to restore and protect and cultural change. For close to twenty years the group has sponsored or funded river observation trips, wetland restorations, cleanup campaigns, river celebrations, publicity, and informational meetings. CURE works in the Upper Minnesota River Watershed to "focus public awareness on the watershed and to take actions to restore its water quality, biological integrity and natural beauty for all generations."

This nonprofit organization services a 16 county region involving approximately 3.5 million acres and a watershed encompassing many of the most economically-depressed counties in the southwest part of Minnesota. Historically, CURE focused on changing the federal farm policy as a way to improve the water quality of the Minnesota River before positioning itself to serve the region in developing new economic opportunities centered on green tourism concentrating on natural and cultural resources.

High School Paddle Trip

5. CURE – Civic Engagement

This citizen-based organization is constantly involved and leading programs tied to civic engagement and getting people involved in issues that focus on the natural environment and water quality. CURE hosted the "Green Carpet Film Festival" at the Hollywood Theater in Montevideo to highlight environmental-related films and promote locally produced videos. Every year CURE sponsors the annual River and History Weekend drawing more than 100 people to experience area rivers and learn about the history of the Upper Minnesota River Watershed.

The organization has also been involved in restoring and revitalizing downtown Granite Falls, promoting the annual Meander Upper Minnesota River Arts Crawl, and organizing river trips including a three day adventure for high school students. On annual basis CURE conducts a clean-up along the Minnesota River and a two mile stretch of the highway between Granite Falls and Montevideo. Recently, the group raised public awareness about concerns over the construction of a second coal-fired plant at Big Stone Lake.

Annual MN River Clean Up

Patrick Moore (center), Executive Director of CURE talks at Minnesota River Watershed Alliance meeting

6. CURE - Hard Rock Mining Issues

One effort by CURE involved hosting a public reception on hard rock mining in the Minnesota River with the Rivers Council of Minnesota. Over 50 people came out to take part in a group discussion on concerns over hard rock mining in the Minnesota River Valley including how it impacts the natural resource, local communities and citizens. The issue of hard rock mining revolves around the Minnesota's Wild & Scenic Rivers Program with the parts of the Minnesota River added in 1977. Two segments – Lac qui Parle Dam to the U.S. Highway 212 bridge and Great Lakes Pipeline to the Redwood County Highway 11 Bridge have been classified as scenic and one as recreational – U.S. Highway 212 bridge in the city limits of Montevideo to Great Lakes Pipeline one-quarter mile downstream of the Minnesota Falls dam.

River Advocate – Patrick Moore

Patrick Moore grew up at Fort Snelling next the confluence of the Minnesota and Mississippi rivers, married a girl from Mankato and has made his home in Montevideo. In the early 1990s, Moore helped launch the nonprofit organization Clean Up the River Environment (CURE) and became its executive director on March 24, 2005 on a unanimous vote after serving as its Development Director. After moving to southwest Minnesota, Patrick worked as an editor of the Milan Standard Journal and a producer with Pioneer Public TV in Appleton. From there he went onto work for the Land Stewardship Project as an organizer and program director for 17 years before starting the Java River coffeehouse in Montevideo.

Audrey Arner (center) and Richard Handeen (right) receive the CURE's River Keeper Award

7. Raise Your Voice

The Higher Education Consortium on Urban Affairs and Clean Up the River Environment (CURE) has sponsored an annual literary gathering at the Java River Coffee house in Montevideo. College students from the Twin Cities and community members of the Upper Minnesota River Watershed come together for an interchange of ideas and a way to celebrate the arts and their power to impact social issues and create vibrant communities. This collaboration between higher education and the community can have a lasting impact for everyone, especially on the students.

8. Project Spotlight - Granite Outcrop Easement Program

Renville SWCD and Redwood SWCD partnered in 2007 to secure funding from the Legislature-Citizen Commission on Natural Resources (LCCMR) to secure funding to protect outcrops of granite along the Upper Minnesota River. These outcroppings are among the oldest rocks in North American dating back more than 3 million years and home to rare plants and animals, including several types of cactus and Minnesota's only lizard, the five-line skink. Over the last few years, these rock outcroppings have increasingly been threatened by mining, overgrazing and development. The original two SWCDs are now working with Lac qui Parle, Chippewa and Yellow Medicine SWCDs to acquire permanent easements to preserve close to 1,000 acres of endangered habitat and also restore their ecological integrity by removing non-native plants.

Granite Outcrops

Renville and Redwood SWCDs approached the LCCMR in 2007 for funding to protect critically sensitive rock outcrops and associated wetlands along the Minnesota River. LCCMR provided $563,000 in funds to pay for 212 acres of permanent easements and assist in restoring the areas to their natural conditions. In 2009, the easement program received another $1.5 million from LCCMR to protect rock outcroppings in three additional counties – Chippewa, Yellow Medicine and Lac qui Parle. Thirty applications were accepted for a total of 1,417 acres. For 2010, the Granite Outcropping Easement Program requested another $4.4 million from LCCMR for its final allotment.

Granite Outcrops

9. Big Stone National Wildlife Refuge

Encompassing almost 12,000 acres of the Upper Minnesota River Valley, the Big Stone National Wildlife Refuge features tall-grass prairie, scenic granite rock outcrops, two large wetland complexes known as the east and west pools, and 11 miles of the Minnesota River. Recreational opportunities at the refuge include hunting, hiking, bird watching, sightseeing and the popular Auto Tour Route recently reopened to the public.

Water Control Structure at Big Stone National Wildlife Refuge

In addition to the roadway, the upgrades in the $1 million project included hiking trails, observation platforms, fishing piers and restrooms. In 1975, the refuge opened on lands managed for flood control by the U.S Corps of Engineers. One project involved the 1,662-acre West Pool Project that used funds from Ducks Unlimited, Minnesota DNR, the Legislative-Citizen Commission on Minnesota Resources, the Christina-Ina-Anka Lake Association, private landowners, Independence Tube Corporation and the U.S. Fish and Wildlife Service to improve this large wetland habitat by developing water level management.

Information Kiosk at Big Stone National Wildlife Refuge

10. Upper Minnesota River Watershed District

Petitioned in 1967 by Big Stone County, the Upper Minnesota River Watershed District starts at Browns Valley and ends at Appleton with portions of Big Stone, Stevens, Swift, Traverse and Lac qui Parle counties. Projects by the District include partnering with the University of Minnesota Morris, Pioneer Public TV and the U.S. Fish & Wildlife Service to produce a one-hour education documentary *Echoes of Cry of the Marsh*. The District has helped restore 832 acres of wetlands, constructed a new sediment retention basin and completed over 15 years of the Fourth Wetland Restoration Educational Project. Currently, the Upper Minnesota River Watershed District is working with Big Stone National Wildlife Refuge, DNR, U.S. Corps of Engineers and East Dakota Water Development District to partially restore flows to the Whetstone River, which had been diverted in the early 1940s. The District is also cost-sharing on a rain garden program and restoring flows to the old Minnesota River Channel within the Big Stone Lake/Whetstone River Flood Control Area.

11. Area II Minnesota River Basin Projects, Inc.

In 1978, nine counties – Brown, Cottonwood, Lac qui Parle, Lincoln, Lyon, Murray, Pipestone, Redwood and Yellow Medicine – formed a joint powers organization to provide cost-share and technical assistance for the implementation of flood retarding and retention projects. Six major watersheds make up of Area II Minnesota River Basin Projects, Inc. (Area II) – Yellow Bank River, Lac qui Parle River, Yellow Medicine River, Redwood River, Cottonwood River, and the Little Cottonwood River. After thirty years of existence, Area II has assisted in the planning and construction of nine reservoirs and numerous road retention/culvert downsizings throughout the six watersheds in the Minnesota River Basin. In the Yellow Medicine River Watershed, Area II has helped install conservation practices ranging from streambank stabilizations, wetland restorations and road retentions.

Water Storage Facility

12. Big Stone SWCD

A total of 450 acres including 156 wetland acres have been enrolled into the Conservation Reserve Enhancement Program (CREP) with one 45 acre wetland featuring a weir that regulates the water level. Five different landowners came together to restore 200 acres of land including 110 acres of wetlands that had been drained more than 50 years. Named and dedicated to Charles Hanson, a lifelong resident and area conservationist. The restored wetlands filter sediment and pollutants from runoff water before it enters Artichoke Lake. The upland areas and wetland fringes have been seeded to native grasses. the project was coordinated by Big Stone SWCD with a large number of cooperating agencies – USDA Farm Service Agency and Natural Resources Conservation Service, Big Stone County Highway Department, Artichoke Township, Stevens Township (Stevens County), Board of Water and Soil Resources, the Upper Minnesota River Watershed District and area fourth grade students.

Charles Hanson Wetland Restoration and Waterfowl Area

13. Fisheries Management

Fish populations in the Upper Minnesota River are evaluated annually by DNR Fisheries staff by using a special boat that produces electricity. The fish are temporarily stunned, netted, examined, measured and released. Over 50 species of fish have been sampled in recent years with unique catches including American eel, gizzard shad, greater redhorse, northern hog sucker, and river carpsucker. The DNR Fisheries staff has stocked the Upper Minnesota with approximately 20,000 trout since 2004 to help "boost" the natural reproducing population. To encourage fishing, the DNR works with communities to provide access for anglers including a fishing platform in Granite Falls and Ortonville. Another example of fish management is the removal of man made barriers like channel plugs to restore the connectivity of rivers and their floodplains.


Fish Survey on the Minnesota River

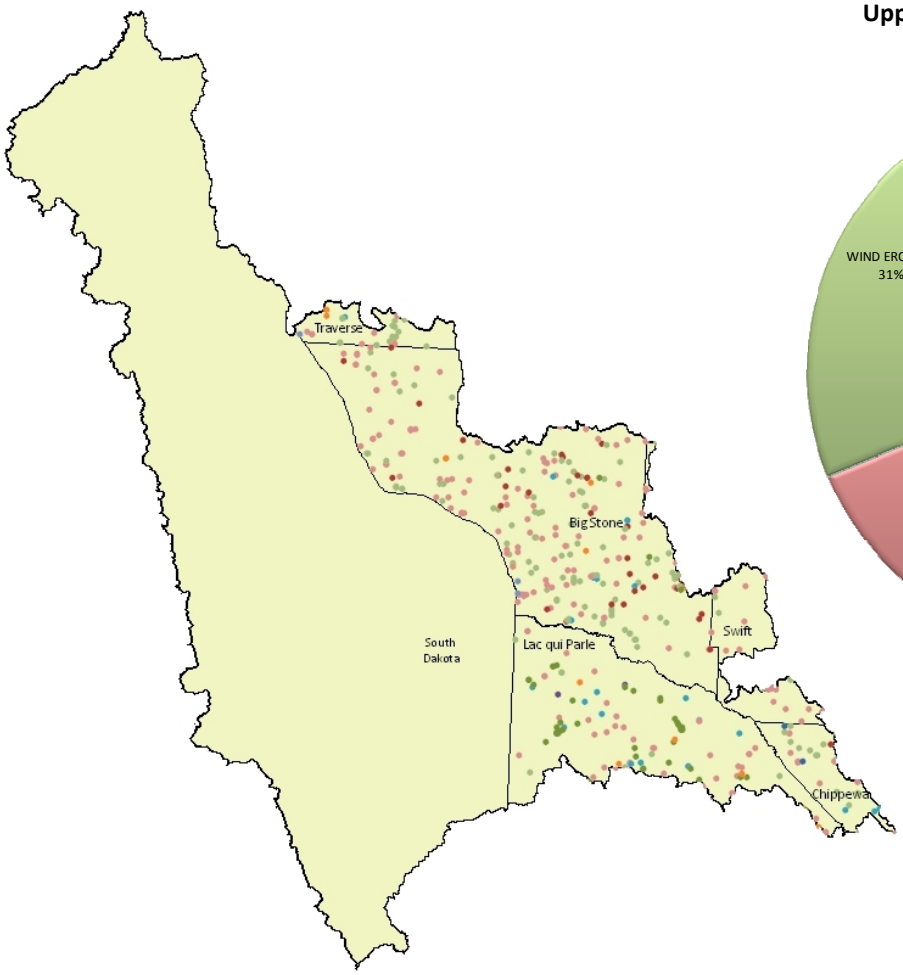

Fishing on Big Stone Lake

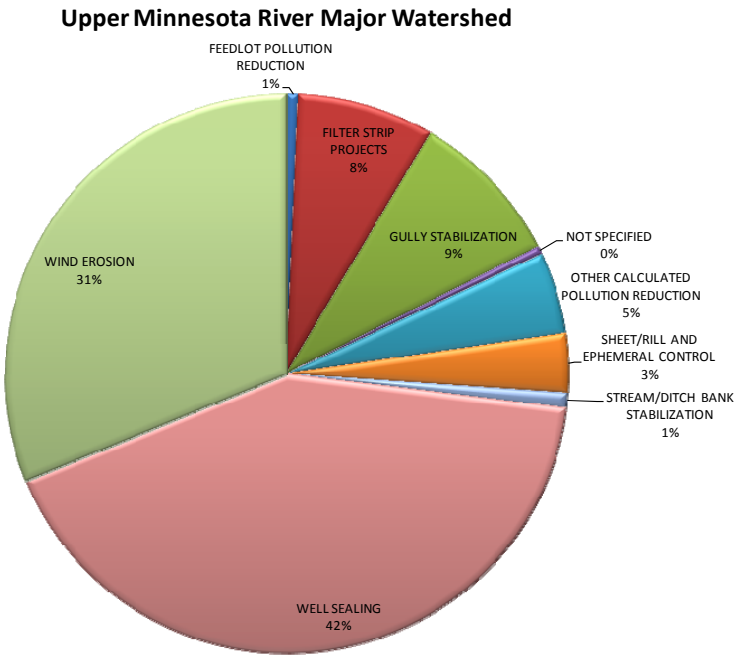
The Radermacher Family has transformed their farm operation to an organic one to provide healthy food for consumers. In 1977, their farm was certified organic and thirteen years later with the cattle. They utilize manure from 30 dairy cattle through a compost system on their cropfields instead of purchasing commercial fertilizer.

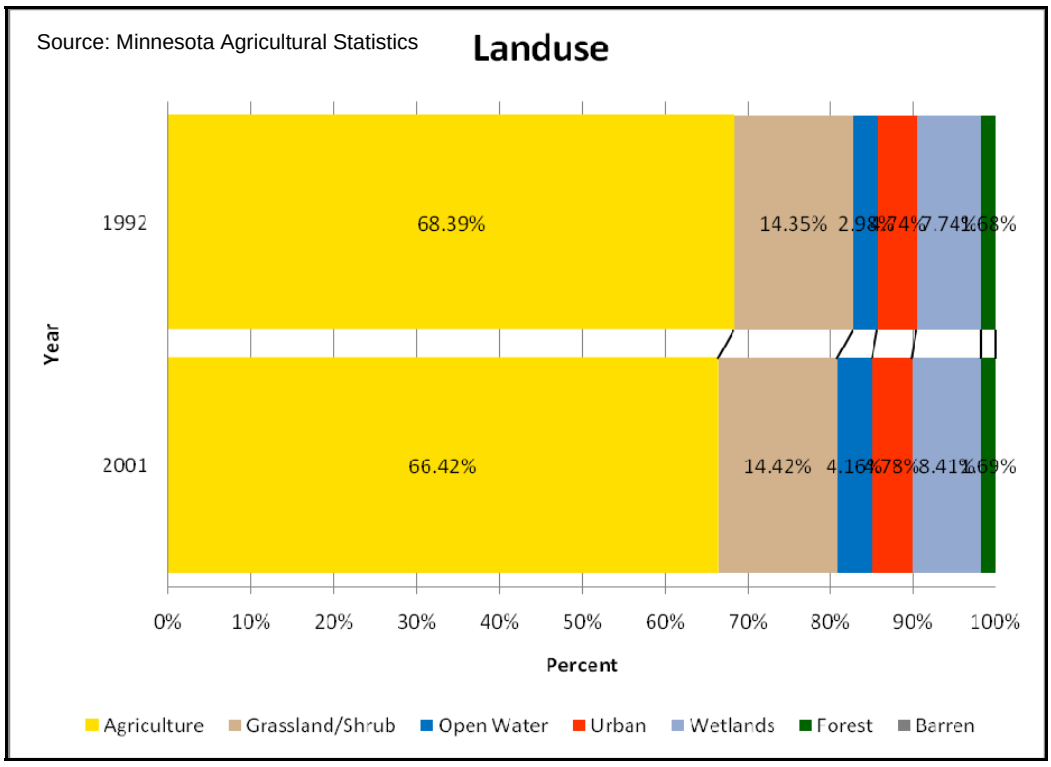

Sustainable Farming Tour

Prairie Wind Farms raise organic wheat, millet and soybeans for markets in the Twin Cities and Europe. To continue improving their soil and water quality, the Radermacher's have participated in a Holistic Resource Management Course sponsored by the Land Stewardship Project that helped them develop a rotational grazing system with high tensile and polywire fences. To help promote these healthy land-use practices they have hosted 6th grade Soil and Water Conservation District Tours, Sustainable Farming Tours and Pasture Walks.

Upper River Watershed Conservation Practices and Land Use







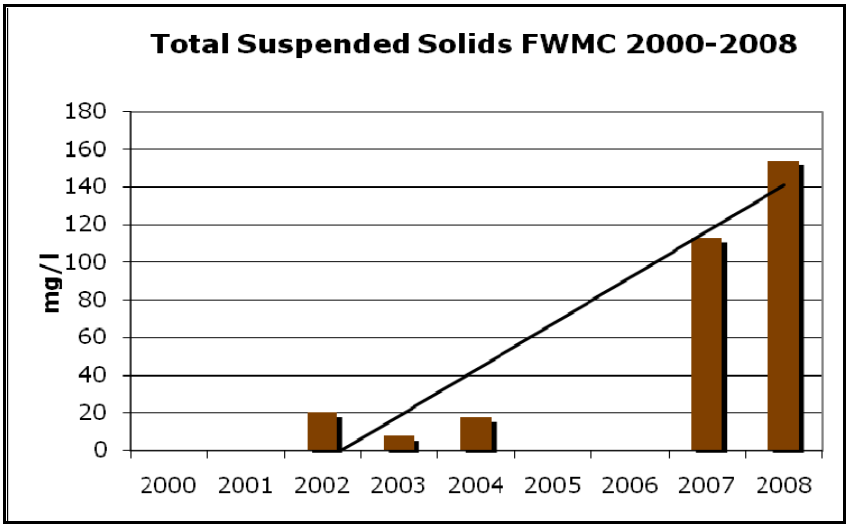
Conservation Practices

Numerous groups including the Upper Minnesota River Watershed District, Lac qui Parle – Yellow Bank CWP and East Dakota Water Development District have been involved in the water quality effort since the late 1990s and early 2000s. The map to the left and the pie chart above illustrates conservation practices in the Upper Minnesota River Watershed. The conservation practices data comes from the Board of Water and Soil Resources (BWSR) program compiles information on a county, watershed, and individual-project basis from 1997 to 2008. The number of conservation practices reflects only actual contract and not the acres. There are additional conservation practices installed in the Upper Minnesota River Watershed but not recorded in either LARS or eLINK.

Upper Minnesota River Watershed Pollution Reduction

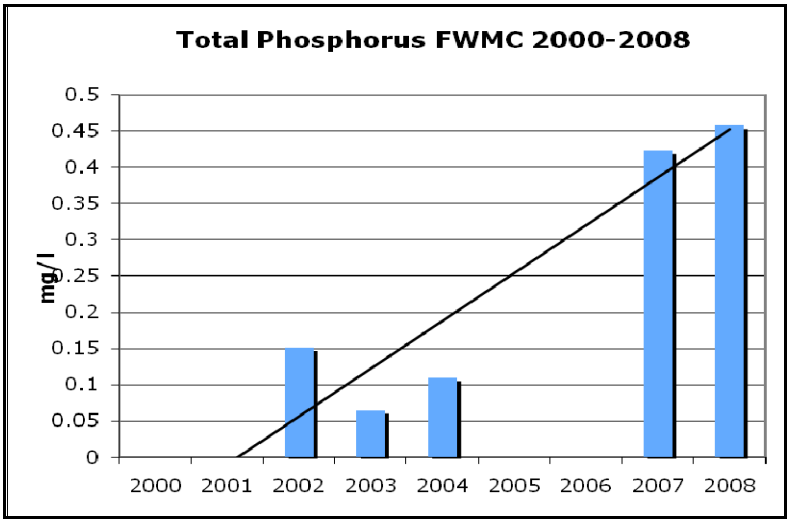
Yellow Bank River - Introduction

The Yellow Bank River located in the northern portion of Lac qui Parle County with the majority of watershed being in South Dakota. Monitoring styles changed in the yellow Bank because the samples sent in did not show a serious problem. In 2005 and 2006 there was not funding available for sampling. The Yellow Bank River is currently being monitored by MPCA as part of the Major Watershed Loading Project.



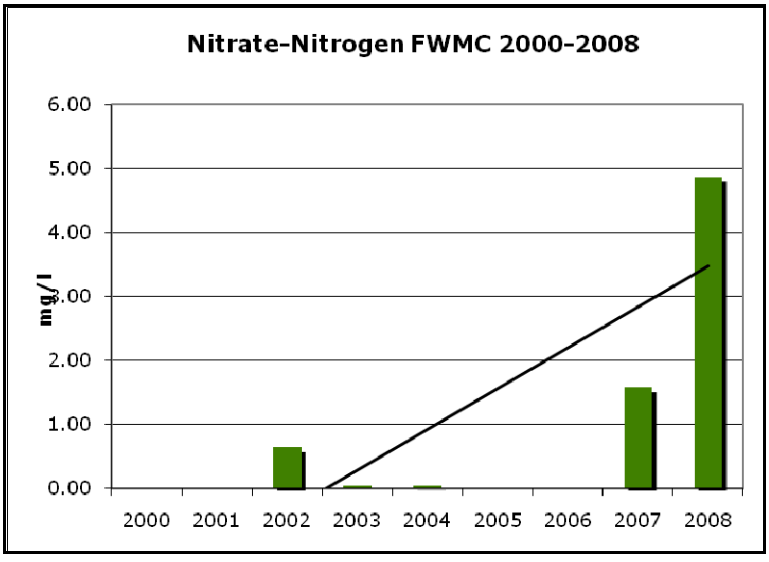
Total Suspended Solids

The Yellow Bank River is very flashy and rain events have a large impact on this river. The type of monitoring changed from 2002-2004 to 2007 and 2008. The Major Watershed Loading Project is now doing the monitoring at this site. From personal visits to the river the transparency tube often reads 60+ and mussels can be seen on the river bed.



Total Phosphorus

The monitoring styles are again reflected in this chart. During snowmelt is when the phosphorus reads the highest. This site is in a protected grassland area of the Big Stone Wildlife Refuge.



Nitrate-Nitrite

Nitrogen levels within the watershed are continually well below the drinking water standard of 10 mg/L. The difference in monitoring objectives are clearly shown here.

MINNESOTA RIVER ONGOING CONCERNS

Clean water is one of the most important signs of a healthy community and economy. There are many benefits to having plenty of inexpensive water for both drinking and industrial production. In the Minnesota River basin, there has been a lot of progress made toward cleaning up the rivers, with much more needed to be accomplished along with constant vigilance with ongoing and new pressures. Unfortunately as a society, we take this seemingly ubiquitous resource for granted, treating it like it is limitless and inexhaustible. Here in the Minnesota River basin we know what happens when we allow too much sediment, nutrients, bacteria and other pollutants into our waterways and the amount of money it costs to fix those problems. We are also faced with an almost constant onslaught of issues, ones that we have not fully grasped or understood. In order to protect the Minnesota River and continue the movement toward a healthier river for future generations, we have to continue to address and study these ongoing concerns. Listed below, in alphabetical order, are some of the concerns identified by government agencies, nonprofit organizations, citizens and others.

Arsenic – Odorless and tasteless, this chemical is both naturally and artificially produced, resulting in the contamination of groundwater. Arsenic poisoning over an extended period of time (people who consume water with arsenic levels over 100 micrograms per liter for many years) can result in many health issues including nervous system effects, diabetes, and several circulatory diseases.

Aquifers – One of the most important water sources in the State of Minnesota is underground aquifers, a major source of water for household and industrial usage. Currently little is known about how much these aquifers are being recharged (infiltration) from surface water. In addition to the concern about the amount of water found in aquifers, little research has been done about possible contamination of underground water sources.

Atrazine – This popular herbicide used for corn has some people concerned about levels of atrazine in the groundwater and protecting the public's drinking water supply. Some scientific research has linked development impacts and birth defects to atrazine. To keep track of atrazine levels in drinking water the Minnesota Department of Agriculture has called for additional water monitoring efforts.

Blue-green algae: Excessive nutrients including phosphorus flowing into lakes has resulted in blue-green algae blooms that produces thick mats on the surface. This type of algae becomes toxic as it decomposes it produces some of the most powerful natural poisons. People who come in contact with blue-green algae can experience skin rashes and other irritations. Numerous animals including dogs have died after swimming in lakes infested with blue-green algae.

Clean Water Act – Enacted in 1972, the goal of this law is to "restore and maintain chemical, physical, and biological integrity of the Nation's waters." As one of the most effective environmental laws it has been responsible for a major cleanup of the nation's waterways which is still ongoing. After a 2001 Supreme Court Decision, there has been an effort by some to weaken law by removing protection for headwater streams, seasonal rivers and wetlands.

Conservation Reserve Program – A major loss of acres enrolled in the Conservation Reserve Program (CRP) is happening across the Midwest after the high price of food and ethanol pushed farmers to plow up more land to meet this demand. Most of the land put into CRP has been marginal for farming and provided both water quality and wildlife benefits. In 2009, Minnesota lost an estimated 61,000 acres of CRP land according to the USDA's Farm Service Agency.

Drinking Water – The Minnesota Department of Health is responsible for drinking water issues and in its most recent report it said the state has high quality drinking water but there needs to be constant vigilance. Minnesota's public water supply systems are tested on a regular basis for bacteria, nitrate and other inorganic chemicals, radiological elements, and up to 118 different industrial chemicals and pesticides.

Dirt – cultivation has increased the erosion process either by blowing or washing away sediment (dirt) much more quickly. This life-giving material also wears out easier than people realize, especially by expensive, high-tech machinery compared to smaller farms producing a variety of crops.

Drainage – Formed by glaciers ten thousand years ago, the Minnesota River Basin is blessed with some of the richest soils and as a result one of the most intensively cropped regions in the country. Much of the landscape has been ditched and tiled in order to produce crops for human and animal consumption along with increasing biofuel demands. Millions of feet of subsurface tile lines have been installed dramatically increasing how quickly water flows off the landscape as water levels on rivers bounce up and down at a faster rate. Urban areas also contribute to the drainage issue due to more impervious surfaces like buildings, streets and parking lots. Most of this increased drainage allows untreated water carrying a wide range of pollutants into the water bodies.

Endocrine Disrupting Chemicals – Pharmaceuticals, hormones, pesticides, personal care products, and compounds or Endocrine Disrupting Chemicals have made their way into the state's lakes and streams with the consequences on the health of living organisms mostly unknown at this time. According to a MPCA's study on these compounds, there is evidence of vitellogenin (feminization of male fish) in some of the 12 lakes and four rivers and that the fish "are probably being affected by estrogenic chemicals."

Ethanol – Minnesota is one of the largest producers of this type of biofuel in the country. To produce a single gallon of ethanol gas it takes four gallons of water not counting the amount of water – 2,500 gallons per 1 gallon -used for irrigation of corn. Studies have also shown there is negative effect on wildlife and water quality as land is removed from CRP and other grass-based crops for the production of corn.

Groundwater Contamination – At least 35 communities in the Twin Cities have found groundwater laced with chemical pollution leaking from landfills and industrial sites. Wells are being contaminated as this polluted water is sliding beneath lakes, flowing through stream banks and slipping across subterranean valleys. These chemicals have included 3M's perfluorochemcials or FCS, a degreaser TCE, and vinyl chloride.

Hard Rock Mining – The demand for gravel and rock to be used in road, structure and other construction especially in the Twin Cities has created a high demand for granite outcroppings found in the Minnesota River Basin. Many of these granite outcroppings support numerous endangered and threatened species in Minnesota along with unique habitat including wetlands. Once the granite outcroppings are mined they cannot be restored back to their original form.

Hypoxic Zone – Excessive nutrients including phosphorus and nitrogen have spurred the growth of filamentous algae in the Gulf of Mexico, choking out sunlight needed for vegetation that benefits marine organisms. Eventually, the large amounts of nitrogen-fueled phytoplankton die off, sinking to the bottom where bacteria feed off the material and in the process use up all the available oxygen. This so-called dead zone kills off all living animals including fish and clams.

Individual Septic Systems – There has been an ongoing effort to upgrade out-of-compliance septic systems through low interest loans, incentives and by regulation. Some progress is being made with most counties still reporting an estimated 50 to 60 percent out-of-compliance septic systems. Few counties have produced a complete inventory of septic systems.

Lake Pepin – Located downstream of the Minnesota River, this lake on the Mississippi River has been placed on the U.S. EPA's Impaired Waters List for too much sediment and nutrients. Lake Pepin is filling in with silt at 10 times the rate as pre-settlement meaning it could completely fill in within 340 years. A number of studies have identified the Minnesota River as the biggest contributor of sediment (about three quarters) and phosphorus (close to half) to Lake Pepin.

Out-of-State Pollution: Minnesota has the power to regulate and also provide cost-share funding and technical support for pollution problems in its borders. This isn't the case when it comes to those areas that fall outside state lines including areas of the Minnesota River Basin in South and North Dakota and Iowa. There has been some effort to collaborate with organizations in these three states to tackle water quality issues but it has been limited.

Pharmaceuticals – Proper disposal of pharmaceuticals including out-of-date pills, old cough medicine and unused drugs have become a concern as residue from these products especially the endocrine disruptors are showing up in the state's rivers and lakes. Few counties or cities have the resources to properly collect the pharmaceuticals, which should be incinerated.

Pesticides – More than 28 million pounds involving a couple hundred different types of pesticides are sold annually in Minnesota. Most of the pesticides don't have a set water quality standard to allow for judging environmental impacts. The U.S. EPA has been slow in providing states with the scientific research needed to establish these water quality standards. In addition, responsibilities for overseeing the pesticides have been divided among many agencies.

Road Salt – In order to provide safe driving conditions during the winter huge amounts of salt have been dumped our roads, directly impacting the state's waterbodies including lakes, streams and groundwater. An estimated 350,000 tons of salt is used in the Twin Cities on an annual basis according to the University of Minnesota. All of this salt can produce high levels of chlorides in waterbodies, which can interfere with fish reproduction and even cause death in some animals.

Wetlands – A loss of wetlands continue to outpace restoration efforts in Minnesota despite the state spending millions of dollars. The U.S. Fish and Wildlife Service estimated a net loss of more than 96,000 acres of wetlands since 1980. The study pointed out most of the loss is due to maintenance on old farm drainage systems that improved drainage and emptied wetlands.

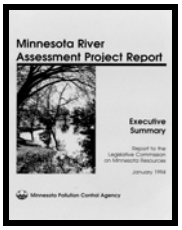
MINNESOTA RIVER RECOMMENDATIONS

Progress in improving, restoring and protecting water quality in the Minnesota River basin has been made; however, effort needs to continue at all levels – both large and small. Citizens are leading and helping with city cleanups to reduce stormwater runoff. Nonprofit organizations, such as Clean Up the River Environment (CURE), Coalition for a Clean Minnesota River (CCMR) and Friends of the Minnesota Valley have been assisting communities and citizens with river clean-ups, voicing water quality concerns to both state and national legislators and securing grant funds to protect our water resources. Farmers of all sizes have utilized the latest technology to install Best Management Practices, switch to rotational grazing, and retire marginal farmland for permanent buffers. Government agencies have collaborated with many partners to provide funding, technical assistance and leadership on water quality monitoring, conservation practices and research involving impaired waters, aquatic and terrestrial organisms. Ultimately, everyone has a role in this effort to create and maintain a healthier natural environment. The *Mankato Free Press* spelled it out by stating it is important to share resources, work together, and develop some type of public report card. Numerous reports have come out identifying a wide range of recommendations to improve water quality in the Minnesota River Basin. Below, we organized recommendations from major Minnesota River Reports by themes.

Each publication referenced is shown graphically on the left. For more information about the reports, please see pages 193-194.

Conservation Practices

- ✓ Restore floodplain and riparian areas to its natural purpose. Vegetative buffers along river banks should be reestablished along all of the Minnesota River's major tributaries. Special attention should be given to connecting riparian areas to non-riparian natural areas to create wildlife corridors.
- ✓ Restore wetlands by purchasing perpetual easements on lands that will be inexpensive to restore, offer the biggest "return" for pollution reduction, water retention and habitat restoration, and that landowners want to restore.
- ✓ Improve land management practices by providing more financial incentives for whole-farm resource planning, and in cases where voluntary compliance is not working, we much establish mandatory land-use practices.



- ✓ Reduce phosphorus and nitrogen through agricultural best management practices, feedlot runoff control, septic system upgrades, and control of inadequately treated point sources.
- ✓ Restore wetlands in carefully selected locations to settle solids, remove nutrients, and reduce peak flows, thereby protecting stream banks.

- ✓ Where practical, work with local water managers to develop projects that divert runoff and streamflow through riparian floodplains to limit and treat excessive erosion.
- ✓ Increase the percentage of row-crop acres under conservation tillage.

Stormwater Protection

- ✓ Implement the Phase II Storm Water NPDES Permit Program and work with communities (cities and counties) in developing their storm water programs to reduce sediment loading from urbanized areas.

Regulations and Enforcement

- ✓ Manage drainage ditches and storm sewers as tributaries. We must revise the state drainage code to weigh the environmental costs against the economic benefits of ditch projects, and we must require treatment of all urban storm water before it is discharged into natural bodies of water.
- ✓ Enforce existing laws. A strengthened and coordinated system of enforcing existing environmental laws is needed at both the state and local levels. A conference on enforcement to develop a thorough assessment of enforcement problems should be convened. Additional resources will be needed to train enforcement staff. We should appoint a Minnesota River ombudsperson who will act to ensure that violators of the law are prosecuted. And the Office of the Legislative Auditor should conduct periodic audits of state and local governments charged with enforcement activities.

- ✓ Enforce existing laws – ISTS laws prohibiting discharges to surface water and require regular maintenance, rules governing the rate and location of livestock manure application to fields, rules governing abatement of runoff to waters from open feedlots, and rules requiring point source discharges to limit phosphorus discharges to 1 milligram per liter.
- ✓ Enforce existing drainage law – maintenance of a permanent 16 ½ foot grass strip along all drainage ditches in the State; Specific consideration by drainage authorities of impacts on water quality, fish, and wildlife resources, shallow groundwater impacts, and overall environmental impacts before establishing or improving drainage systems; environmental review when drainage work has the potential for significant environmental effects; and meeting the tests that drainage project benefits must exceed costs and that benefited landowners are not assessed costs that exceed their actual benefits

- ✓ Work with counties to accelerate ISTS compliance through adoption of new ordinances (e.g. adding inspection triggers such as property transfer and adding and enforcing stronger compliance language.

Partnerships and Collaborations

- ✓ Establish local joint powers agreements. The strategies used to accomplish the goals of the Citizens' Advisory Committee and Minnesota River Assessment Project should be developed and managed at the local level. The counties and other units of government within each of the 12 major watersheds in the Minnesota River basin should establish joint powers agreements which allow them to collaborate and share responsibilities for improving the water quality in their particular watershed.
- ✓ Improve technical assistance to local governments. State government, through its agencies and university system, has an obligation to guide local governments in building the expertise that is needed to successfully implement water cleanup projects. Guidance is needed in a number of areas, such as designing surface water monitoring networks, establishing water quality goals, training in the use of Geographical Information Systems, creating design standards for pollution abatement measures, and interpreting research findings.

- ✓ The legislature should establish and fund a Minnesota River Commission, as recommended by the Citizens Advisory Committee. Comprised of agency representatives, citizens, Dakota representatives, and local organizations, the Commission's duties should be to: set priorities; establish an overall implementation plan (including but not limited to the Minnesota River Basin Plan prepared by the MPCA); report biennially on plan progress; direct use of all state resources; speak for the state regarding use of federal resources; and establish and oversee a compatible water quality monitoring program useful for both water quality assessments and long-term trends analysis.
- ✓ The Natural Resource Conservation Service, Soil and Water Conservation Districts, soil and water researchers, natural resource and pollution control specialists, local and state policymakers, and conservation and sustainable agriculture groups need to work together to insure that all agricultural subsidy programs intended for environmental improvement be targeted

- ✓ Establish a Basin team through the Minnesota River Basin Joint Powers Board to deal with the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force Hypoxia Action Plan in the Minnesota River Basin.
- ✓ Work with other agencies and organizations to assist watershed partnership teams with (1). Identification of water quality problems and the prioritization of water resources of concern, (2). Identification of water quality indicators (biological, physical, and chemical) and measurable targets for indicators, (3). Assessments of sources of pollutants, (4). Identifying linkages

between sources of pollutants and measurable targets, (5). The determination of loading allocations and reductions needed to meet water quality goals, (6). The development of implementation plans, and (7). Implementation activities as needed. Involve Minnesota River Basin Data Center.

Education and Information Outreach

- ✓ Engage the general public. Within each of the 12 major watersheds, citizens should be involved in developing shared visions of social, economic, and environmental health. The emphasis should be on encouraging citizen participation. Existing information exchange and peer support networks will be utilized and supplemented as necessary.

- ✓ Continue educational focus on pollutants of concern identified in the MRAP including bacteria, phosphorus, sediment, nutrients, and oxygen demanding materials. Identify one pollutant or issue annually as a target, develop educational materials/programs around issue. Work in cooperation with other agencies and organizations, such as the Minnesota River Basin Data Center and Minnesota River Basin Joint Powers Board (MRB).
- ✓ Support Rivers Curriculum in an effort to include water quality information in the classroom.
- ✓ Develop materials to provide communities with useful information on more environmentally sound development patterns.
- ✓ Plan and coordinate a Minnesota River Summer Conference.

Water Quality Monitoring

- ✓ Monitor water quality throughout the Minnesota River Basin. To establish a permanent and state-of-the art monitoring network and stations on all the major tributary outlets and throughout the watersheds. All data gathered should be housed in an academic institution and made readily available to the public.

- ✓ An appropriate water quality monitoring program for drainage system discharges should be developed, perhaps as a pilot project in the heavily drainage-impacted Greater Blue Earth River basin.

- ✓ Create an official multi-agency task force operating as a subcommittee of the Minnesota River Basin Joint Powers Board to coordinate the development and implementation of the Basin monitoring strategy and an ensuing long-term physical, chemical, and hydrologic monitoring plan.
- ✓ Promote and expand the Citizen Stream-Monitoring Program to enhance volunteer stream monitoring at the basin, major watershed, and minor watershed scales.
- ✓ Support other (non-MPCA) volunteer monitoring efforts in the Basin by providing technical support.
- ✓ Develop a macroinvertebrate multimetric index for the Minnesota River Basin and validate the fish index of biotic integrity (IBI) developed during Minnesota River Assessment Project.

Water Quality Standards

- ✓ Establish a phosphorus standard for the Minnesota River basin.

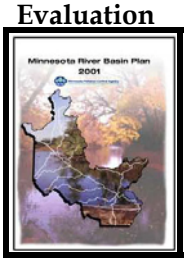
- ✓ All point source discharges of phosphorus in the Minnesota River basin should be required to meet a one milligram per liter phosphorus limit.

- ✓ Develop stream criteria for turbidity and suspended sediment concentrations throughout the Basin for high, medium and low flows.

Research and Studies

- ✓ Develop and use computer models to characterize and predict pollutant loads and water quality responses.
- ✓ Promote the research on the effects of surface tile intake management on water quality.
- ✓ Promote research for improved assessment including measurement or estimation of sediment loads coming from stream bluff and bank erosion in the Minnesota River main stem and its major tributaries.
- ✓ Promote research on deep aquifer recharge. Deep aquifer recharge is an issue during drought conditions. Promote studies to delineate and quantify useable ground water supplies, especially in southwest Minnesota.
- ✓ Determine people's attitudes on the Minnesota River. Work with other organizations to identify current information on social attitudes.

Evaluation



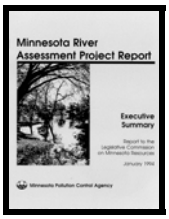
- ✓ Incorporate monitoring of additional sites for use in problem investigation and/or effectiveness monitoring. Efforts will be made to partner with watershed or stream restoration projects currently underway.
- ✓ Measure the change in sediment delivery in terms of load and concentration due to implementation activities.
- ✓ Track the implementation of riparian corridors and flood plain area practices.
- ✓ Incorporate monitoring of additional sites for use in problem investigation and/or effectiveness monitoring. Efforts will be made to partner with watershed or stream restoration projects currently underway.
- ✓ Generate and publish an annual "State of the Minnesota River" report documenting annual monitoring results and long-term trends as a means of establishing a baseline for assessing trends.
- ✓ Begin measuring nitrate-nitrogen concentrations in point source effluent.

Funding

- ✓ Utilize funding sources in addition to assessments on benefited landowners to construct drainage systems designed (or redesigned) to improve water quality. Among the key sources to consider are the tiered payments to farmers under the new Conservation Security Program of the 2002 Farm Bill.

- ✓ Seek better coordination of multi-agency funding. Work with Minnesota River Basin Joint Powers Board (MRJPB) and other agencies and organizations to develop a five-year multi-agency plan for financial support for critical activities.
- ✓ Maintain a stable level of funding by the MPCA for the Basin as well as from other state and federal agencies for implementing of state programs in the Minnesota River Basin and for priority in statewide project funding.
- ✓ Provide funding for continued assessment, planning and evaluation.
- ✓ Fund the highest priority local projects both strategically and environmentally.

Coordination and Planning



- ✓ Strategies should be set to meet a 10-year goal for addressing pollution in the basin. Watersheds should be prioritized so that resources can be used to address critical problems first.

- ✓ Key stakeholders should be convened to develop and disseminate consistent guidance to local authorities, state agencies, and the public on environmental considerations in decision-making for drainage improvement and repair projects.

- ✓ Provide clear information on state and national priorities to local resource managers so that where possible, they may coordinate a "win-win-win" approach so that projects are identified that have benefits to the implementor, as well as meet local, regional and national water quality goals.

1962: More than one million gallons of oil begin to spill onto a frozen Minnesota River from a broken pipeline in Savage. For over a month a steady stream of oil flows from the Richards Oil Company work site.

1967: Minnesota Pollution Control Agency is established by the State Legislature, taking over authority from Water Pollution Control Commission with added air quality and solid waste authority.

Minnesota Pollution Control Agency

1963: A 40-foot high soybean-oil storage tank collapses in Mankato, releasing a 3 million-gallon tidal wave of soybean oil. It flooded several blocks of the city near the junction of the Blue Earth and Minnesota rivers. The gooey wave also topples storage tanks and rail cars, releasing an additional half-million gallons of salad oil and other substances into the Blue Earth River.

Spring, 1963: By the end of March the ice begins to break up on the Minnesota River as oil flows into the Mississippi. Dead ducks start to turn up on the river's backwaters at the end of the month. When it is all over, the final toll for dead ducks is estimated at 10,000 with 177 muskrats, 26 beavers, along with uncounted numbers of fish, turtles and songbirds.

1972: The federal Clean Water Act begins the process of eliminating point-source pollution charges and helps build wastewater treatment systems across the nation. This investment, along with regulatory programs helps significantly reduce pollution from cities and industries discharging wastewater to Minnesota rivers.

1987: The United States Congress enacts Section 319 of the federal Clean Water Act to establish a national program to control nonpoint sources of water pollution. MPCA develops the Clean Water Partnership Program to address pollution associated with runoff from agricultural and urban areas.

1960 1970 1980

1992: Governor Carlson stands on the banks of the Minnesota River in Bloomington, holds up a jar of dirty river water and declares it is time to clean up the waterway. "Our goal is that within 10 years, our children will be swimming, fishing, picnicking and recreating at this river," stated Governor.

1994: MRAP

The Minnesota Pollution Control Agency brings together 30 stakeholders including citizens, farmers and government staff from across the basin to come up with ten recommendations on how to improve water quality.

1995: The State Legislature establishes the Minnesota River Basin Joint Powers Board (now called the Minnesota River Board) consisting of 37 county commissioners to coordinate the effort to improve water quality in the watershed. The board meets every other month to work with river-related funding and education programs.

1996: For two years in row, American Rivers – a national conservation group – places the Minnesota River on its list of twenty "Most Endangered U.S. Rivers" because of pollution.

1998: The Conservation Reserve Enhancement Program (CREP) – a federal-state effort – is launched to permanently protect critically sensitive land by taking it out of cropland production. More than 100,000 acres of ecologically sensitive riparian land was enrolled into permanent conservation easements across the entire Minnesota River Basin in just four years.

2000: The first State of the Minnesota River Report is produced to consolidate surface water quality monitoring information collected throughout the Minnesota River Basin by a variety of partners.

2008: American Rivers - a national organization - names the Minnesota River the 5th most endangered river in the United States due to the threat of a proposed $1.6 billion coal-fired power plant and the potential drawdown of 3.2 billion gallons of water from Big Stone Lake and the Minnesota River.

1990 2000 2010

Photo Credits

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New Ulm: page 54 (Story 30)

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Thompson, Tony: page 91 (Story 2)

For More Information

To lean more about the success stories found in this document check out the following contact information for the corresponding organizations, government agencies, individuals and more. We encourage people to reach out these entities to learn what worked, ideas for improvement and how learn more and get involved. This section also provides background information on numerous reports highlighting progress in the Minnesota River Basin over the last two decades including the *Minnesota River Basin Trends Report* and the most recent *State of the Minnesota River Report* both published in 2009.

Minnesota River Basin

- MN River Board: 507-389-5491; http://minnesotariver.org/
- MN Pollution Control Agency (Mankato office): 507-389-5977; http://www.pca.state.mn.us/about/regions/mankato.html
- MN Board of Water and Soil Resources (Southern Region Office – New Ulm): 507-359-6074; http://www.bwsr.state.mn.us/contact/index.html
- MN Department of Natural Resources (Southern Region Office – New Ulm): 507-359-6000; http://www.dnr.state.mn.us/contact/locator.html
- MN Association of Soil and Water Conservation Districts: 651-690-9028; http://www.maswcd.org/
- Natural Resources Conservation District (St. Peter Area office): 507-931-2530 ext. 5; http://www.mn.nrcs.usda.gov/
- U.S Corps of Engineers, St Paul District: 651-290-5200; http://www.mvp.usace.army.mil/regulatory/default.asp?pageid=691
- U.S. Geological Survey (Mound View Office): 763-783-3100; http://mn.water.usgs.gov/
- MN Geological Survey: 612-627-4780; http://www.geo.umn.edu/mgs/
- Minnesota State University Mankato, Water Resources Center: 507-389-5492; http://cset.mnsu.edu/wrc/
- University of Minnesota Water Resources Center: 612-624-9282; http://wrc.umn.edu/
- Science Museum of Minnesota: 1-800-221-9444; http://www.smm.org/
- MN Department of Agriculture: 1-800-967-2474; http://www.mda.state.mn.us/
- U.S. Fish & Wildlife Service (St Paul Office): 612-713-5360; http://www.fws.gov/midwest/maps/minnesota.htm
- MN Waterfowl Association: 952-767-0320; http://www.mnwaterfowl.com/
- Ducks Unlimited (MN State Office): 952-820-8174; http://www.ducks.org/states/48/index.html
- National Park Service (St. Paul Office): 651-290-4160; http://www.nps.gov/miss/index.htm
- Legislative-Citizen Commission on Minnesota Resources: 1-800-657-3550; http://www.lccmr.leg.mn/
- Minnesota River Watershed Alliance: 507-389-2304; http://www.watershedalliance.blogspot.com/
- Agricultural Drainage Management Coalition: 507-451-0073; http://www.admcoalition.org/
- Morgan Creek Vineyards: 507-947-3547; http://www.morgancreekvineyards.com/
- Crofut Family Winery & Vineyard: 952-492-3227; http://www.crofutwinery.com/
- Fieldstone Vineyards: 507-627-9463; http://www.fieldstonevineyards.com/
- August Schell Brewing Company: 507-354-5528; http://www.schellsbrewery.com/
- Brau Brothers Brewing Company: 507-747-2337; http://www.braubrothersbrewing.com/
- R.D. Hubbard House: 507-345-5566; http://www.bechshistory.com/
- Blue Earth County Historical Society Heritage Center: 507-345-5566; http://www.bechshistory.com/
- John Lind House: 507-354-8802; http://www.newulmweb.com/citylights/lind/lind.htm
- Mankato Free Press: 507-344-6397; http://mankatofreepress.com/
- Chaska to York Factory in 49 Days: http://www.colton-seanhudsonbay.com/
- MN County Biological Survey: 651-259-5084; http://www.dnr.state.mn.us/eco/mcbs/index.html
- Working Together for the MN River: http://mnriver.org/
- MN River Valley National Scenic Byway: 1-888-463-9856; http://www.mnrivervalley.com/
- City of Willmar: 320-235-4760; http://www.ci.willmar.mn.us/menu/departments/pw/wtp.htm

Lower Minnesota River Watershed

- Nine Mile Creek Watershed District:952-835-2078; http://www.ninemilecreek.org/
- Friends of the MN Valley: 952-881-9055; http://www.friendsofmnvalley.org/
- City of Arlington: 507-964-2378; http://www.arlingtonmn.com/
- City of Shakopee: 952-233-9300; http://www.ci.shakopee.mn.us/
- Lower MN River Watershed District:952-856-5880; http://www.watersheddistrict.org/
- Wenck & Associates: 763-479-4200; http://www.wenck.com/

- Minnesota River Valley NWR: 952-854-5900; http://www.fws.gov/refuges/profiles/index.cfm?id=32590
- Carver County: 952-361-1500; http://www.co.carver.mn.us/ppe.asp
- Scott County WMO: 952-445-7750; http://www.co.scott.mn.us/wps/portal/ShowPage?CSF=1386
- Cedar Summit Farm: 952-758-6886; http://www.cedarsummit.com/
- Scott County SWCD: Scott SWCD: 952-492-5425; www.scottswcd.org
- Le Sueur SWCD: 507-357-4879; http://www.lesueurswcd.org/
- MN DNR Adopt-a-River Program: 651-259-5630; http://www.dnr.state.mn.us/adoptriver/index.html
- MN 4-Wheel Drive Association: http://www.mn4wda.com/
- Metropolitan Mosquito Control District: 651-645-9149; http://www.mmcd.org/
- Alter Metal Recycling: 651-222-2751; http://www.altermetalrecycling.com/altermetalrecycling/yards/St_Paul_MN.jsp
- Ney Nature Center: 507-248-3474; http://neycenter.org/
- City of Henderson: 507-248-3234; http://www.hendersonmn.com/
- City of le Sueur: 507-665-6401; http://www.cityoflesueur.com/
- Sibley County Environmental Services: 507-237-4091; http://www.co.sibley.mn.us/default.aspx
- MN Valley Wildlife Refuge Trust: 612-801-1935; http://www.mnvalleytrust.org/
- City of Lafayette: 507-228-8241
- High Island Creek & Rush River CWP: 507-237-4050; http://mrbdc.mnsu.edu/major/lowminn/subshed/hi/index.html
- City of Gaylord: 507-237-2338; http://www.exploregaylord.org/
- Sibley SWCD: 507-237-5435; http://sibleyswcd.org/
- City of New Auburn: 320-864-5831
- Carver SWCD: 952-442-5101; www.co.carver.mn.us/departments/LWS/swcd.asp
- Pheasants Forever: 877-773-2070; http://www.pheasantsforever.org/
- Metropolitan Council: 651-602-1000; http://www.metrocouncil.org/

Middle Minnesota River Watershed

- City of St. Peter: 507-934-4840; http://www.saintpetermn.gov/
- St. Peter Treaty Site History Center: 507-934-2160; http://www.nchsmn.org/
- Gustavus Adolphus College: 507-933-8000; http://gustavus.edu/
- Le Sueur County Environmental Services: 507-357-2251; http://www.co.le-sueur.mn.us/EnvironmentalServices.html
- Brown-Nicollet-Cottonwood Water Quality Board: 507-934-4140; http://mrbdc.mnsu.edu/org/bnc/
- Brown Nicollet Environmental Health: 507-931-6800; http://www.co.nicollet.mn.us/department.aspx?Id=810207f2-64a6-4c1a-8a4d-1dccdfe0bd5d
- Mankato Area Environmentalists: 507-354-4494; http://www.hickorytech.net/~enviros/
- Center for Earth Spirituality and Rural Ministry: 507-389-4272; http://www.ssndmankato.org/whatwedo/ministries/earth.php
- City of Mankato: 507-387-8555; http://www.mankato-mn.gov/
- Blue Earth County Environmental Services: 507-304-4381; http://www.co.blue-earth.mn.us/dept/environmental.php
- Putting Green Inc: 507-354-7888; http://www.puttinggreen.org/
- Coalition for a Clean Minnesota River (CCMR): 507-359-2346; http://www.newulmweb.com/ccmr/
- City of New Ulm: 507-359-8264; http://www.ci.new-ulm.mn.us/index.asp?Type=B_BASIC&SEC={38AF3581-FF0D-426C-8665-7FA30A584706}
- Nicollet County Environmental Services: 507-931-6800; http://www.co.nicollet.mn.us/department.aspx?Id=2679d8ee-17c3-4ff6-97f2-240370fae34d
- Nicollet SWCD: 507-931-3792; http://www.nicolletswcd.org/

Le Sueur River Watershed

- Waseca SWCD: 507-835-4800; http://www.wasecaswcd.org/
- St. Anthony Falls Laboratory: 612-624-4363; http://www.safl.umn.edu/aboutus/aboutus.html
- National Center for Earth Dynamics: 612-624-4606; http://www.nced.umn.edu/content/about-nced
- Freeborn SWCD: 507-373-5607; www.freebornswcd.org
- Mankato Area Paddling & Outing Club: 507-388-2444; http://www.hickorytech.net/~mrbscr/?page0007.htm
- City of Wells: 507-553-6371; http://wells.govoffice.com/
- Blue Earth SWCD: 507-345-4744; www.blueearthswcd.org
- City of Mountain: 507-427-2999; http://www.mountainlakemn.com/
- Faribault SWCD: 507-526-2388; www.faribaultcountyswcd.com
- University of MN Extension Service (Mankato Office): 888-241-3214; http://www.extension.umn.edu/

- Winterhaven Vineyard and Nursery: 507-234-5469; http://www.winterhavengrapevines.com/

Blue Earth River Watershed

- Greater Blue Earth River Basin Alliance: 507-831-1153 ext. 3; http://www.gberba.org/
- Martin SWCD: 507-235-6680; http://www.martinswcd.net/
- City of Fairmont: 507-238-9461; http://www.fairmont.org/
- Rural Advantage: 507-238-5449; http://ruraladvantage.org/?page_id=4
- Conservation Marketplace MN: 507-345-4744; http://www.conservationmarketplaceofmn.org/
- Three Rivers Resource Conservation and Development: 507-345-7418 ext. 5; http://www.threeriversrcd.org/Contact%20Us.htm
- City of Mankato: 507-387-8555; http://www.mankato-mn.gov/contact/Page.aspx
- Simply Homemade: 507-236-1519; http://www.simplyhomemadefoods.com/5.html

Watonwan River Watershed

- City of Madelia: 507-642-3245; http://www.madeliamn.com/default.php
- Watonwan County Environmental Services: 507-375-1225; http://www.co.watonwan.mn.us/directory.aspx
- Watonwan SWCD: 507-375-3104 ext. 101; http://www.watonwanswcd.org/
- City of Mountain Lake: 507-427-2999; http://www.mountainlakemn.com/

Cottonwood River Watershed

- Cottonwood SWCD: 507-831-1153 ext. 3; http://www.cottonwoodswcd.org/
- Redwood-Cottonwood Rivers Control Area: 507-637-2134; http://www.rcrca.com/

Redwood River Watershed

- Area II MN River Basin Projects Inc: 507-537-6369; http://www.area2.org/
- MN DNR Water Trails Program: 651-296-6157; http://www.dnr.state.mn.us/watertrails/index.html
- Redwood SWCD: 507-637-2427 ext 3; http://www.redwoodswcd.org/
- Southwest Minnesota State University: 507-537-6171; http://www.smsu.edu/
- Lyon SWCD: 507-537-0396 ext. 3; http://www.lyonswcd.org/
- Schwan Food Company: 800-533-5290; http://www.theschwanfoodcompany.com/
- Lincoln SWCD: 507-694-1630 ext. 3; http://www.lincolnswcd.net/
- City of Lake Benton: 507-368-4641; http://www.lakebentonminnesota.com/
- Lincoln County Environmental Office: 507-694-1344; http://www.co.lincoln.mn.us/Departments/Environmental.htm
- Tatanka Bluffs: 507-637-2828; http://www.tatankabluffs.com/

Hawk Creek Watershed

- Hawk Creek Watershed Project: 320-523-3666; http://www.hawkcreekwatershed.org/
- Southern MN Beets Sugar Cooperative: 320-329-8305; http://www.smbsc.com/contact.php
- Renville SWCD: 320-523-1559; http://www.renvilleswcd.com/
- Kandiyohi SWCD: 320-235-3906; http://www.co.kandiyohi.mn.us/swcd/
- City of Granite Falls: 320-564-3011; http://www.granitefalls.com/city.html
- City of Minneota: 507-872-6144; http://minneotamn.com/index.php?option=com_content&view=article&id=9&Itemid=2
- Yellow Medicine River Watershed District: 507-872-6720; http://www.ymrwd.org/
- Moonstone Farm: 320-269-8971; http://www.prairiefare.com/moonstone/
- Land Stewardship Project (Montevideo Office): 320-269-2105; http://www.landstewardshipproject.org/

Chippewa River Watershed Project

- Chippewa River Watershed Project: 320-269-2139 ext 116; http://www.chippewariver.com/about_proj.aspx
- Swift SWCD: 320-842-7201; http://www.swiftswcd.org/
- Swift County Environmental Services: 320-843-2356; http://www.swiftcounty.com/index.asp?Type=B_BASIC&SEC=%7BD5E7B40E-3432-442B-876C-D22E97445A8B%7D
- Pope SWCD: 320-634-5327; http://www.popeswcd.org/
- West Central MN Regional Partnership: 320-760-3735; http://www.regionalpartnerships.umn.edu/westcentral
- Clean Up the River Environment: 320-269-2984; http://www.curemnriver.org/
- Chippewa SWCD: 320-269-2139 ext. 3; http://www.chippewaswcd.org/index.htm
- City of Benson: 320-843-4775; http://www.bensonmn.org/
- Prairie Horizons Farm: 320-239-4054; http://www.localfoods.umn.edu/prairiehorizons
- Douglas SWCD: 320-763-3191 ext. 3; http://www.douglasswcd.com/
- Pastures A' Plenty Farm: 320-367-2061; http://www.pasturesaplenty.com/
- Chippewa County Extension Service: 320-269-1652; http://www.extension.umn.edu/

- Chippewa County Land and Resource Management Office: 320-269-6231; http://www.co.chippewa.mn.us/land.htm

Lac qui Parle River Watershed

- Lac qui Parle – Yellow Bank CWP: 320-598-3117
- Lac qui Parle SWCD: 320-598-7321 ext. 3; http://www.lacquiparleswcd.org/
- Yellow Medicine SWCD: 320-669-4442 ext. 3; http://www.yellowmedicineswcd.org/
- Lac qui Parle County Environmental Office: 320-598-3132; http://www.lqpco.com/environment.php
- Yellow Medicine County: 320-564-2529; http://yellowmedicine.govoffice.com/index.asp?Type=B_BASIC&SEC=%7B14488D23-4054-4FCE-A973-DEC6492FFC70%7D
- Lincoln County Environmental Office: 507-694-1344; http://www.co.lincoln.mn.us/Departments/Environmental.htm
- Prairie Country Resource Conservation and Development: 320-231-0008 ext. 5; http://www.co.kandiyohi.mn.us/pcrcd/
- Lac qui Parle – Yellow Bank Watershed District: 320-598-3117; http://mnwatershed.govoffice.com/index.asp?Type=B_BASIC&SEC=%7B616BBA6D-F704-4EE8-AE81-D63091B78E0A%7D
- A-Frame Farms: 320-598-3010; http://www.localharvest.org/farms/M3439
- Earthrise Farm: 320-752-4700; http://earthrisefarmfoundation.org/
- City of Madison Chamber of Commerce: 320-598-7301; http://www.madisonmn.info/
- Lac qui Parle Wildlife Management Area; 320-734-4451; http://www.prairiewaters.com/places.php?id=177
- City of Dawson: 320-769-2154; http://www.dawsonmn.com/

Pomme de Terre River Watershed

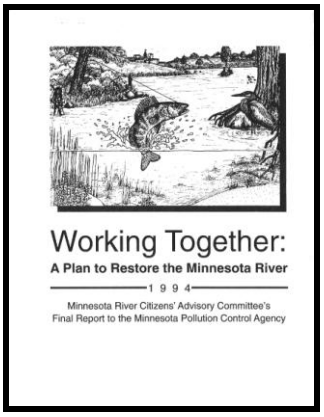
- Pomme de Terre River CWP: 320-589-4886 ext. 3; http://www.co.stevens.mn.us/SWCD/wq.shtml
- Stevens SWCD: 320-589-4886 ext. 3; http://www.co.stevens.mn.us/SWCD/index.shtml
- Pomme de Terre River Association: http://www.pdtriver.org/
- Morris Senior High School: 320-589-4400; http://www.morris.k12.mn.us/
- Pope SWCD: 320-634-5327; http://www.popeswcd.org/aboutus.htm
- Stevens County Environmental Services: 320-208-6558; http://www.co.stevens.mn.us/docs/departments/environm/default.html
- University of Minnesota Morris: 888-866-3382; http://www.morris.umn.edu/

Upper Minnesota River Watershed

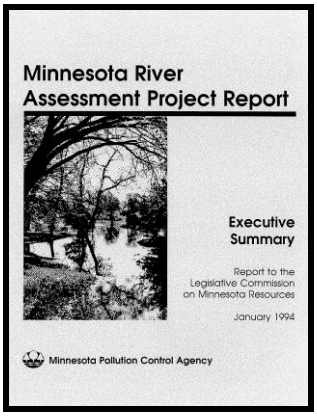
- Upper Minnesota River Watershed District: 320-839-3411; http://mnwatershed.govoffice.com/index.asp?Type=B_BASIC&SEC=%7B90365544-D993-4FA4-AA49-645DC482C220%7D
- East Dakota Water Development District: 605-688-6741; http://www.eastdakota.org/
- Big Stone SWCD: 320-839-6149 ext. 3; http://www.bigstoneswcd.org/
- City of Ortonville: 320-839-3428; http://www.ortonville.net/
- Big Stone National Wildlife Refuge: 320-273-2191; http://www.fws.gov/refuges/profiles/index.cfm?id=32640
- Prairie Wind Farm: 320-568-2110

Minnesota River Basin Reports
Below you will find an overview of the five reports cited under the Minnesota River Recommendations section on pages 141 through 144.

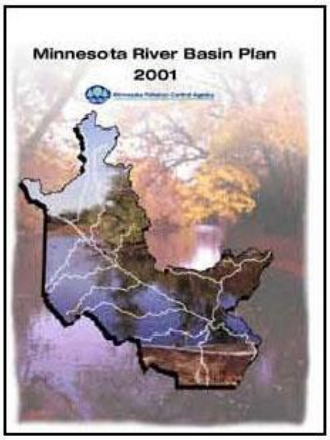
Minnesota River Citizens' Advisory Committee
A group of 30 individuals representing farmers, nonprofit organizations, government agencies, agriculture groups and others came together for two and half years to study water quality issues in the Minnesota River Basin and develop recommendations for water quality efforts for the basin. These recommendations were examined at the beginning of the report along with a new look at how they have either succeeded or failed.



Minnesota River Assessment Project Report
Federal, state and local government agencies cooperated on the four-year study to evaluate pollution sources and how it affects the Minnesota River by examining water chemistry, biological communities and land use. Funded by the Legislative Commission on the Minnesota Resources and other sources, more than 30 federal, state and local agencies participated in the study. Two major goals were followed: (1). Assess water quality and set water quality improvement objectives for individual tributaries and sites along the main stem of the river; and (2). Develop assessment techniques that are transferable to other large basin studies in the state.

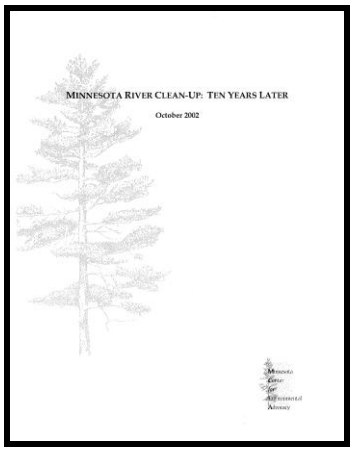


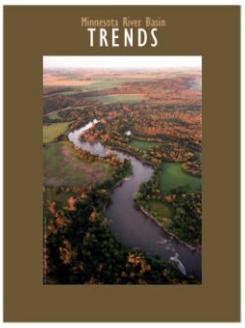
Minnesota River Basin Plan
Issued in December of 2001 by the Minnesota Pollution Control Agency (MPCA), this plan was intended to be another step in the process to improve water quality after Governor Arne Carlson issued his proclamation of "making the Minnesota River fishable and swimmable in ten years." The Minnesota River Basin Plan sets goals and strategies to improve the river based on scientific research and citizen recommendations. "*To restore, protect and maintain water quality, bio-diversity and the natural beauty of the Minnesota River*" is the overall goal of this plan.



The Minnesota River Basin Plan outlined six objectives that covered dissolved oxygen, nutrients, sediment, toxics, bacteria and biology along with action strategies. These strategies include: Recognize Threats to Minnesota's Environment; Prevent, Limit and Clean Up Pollution; Improve Government Services and Collaboration; and Provide Responsible Services to Citizens and Stakeholders. MPCA stressed that state government would look toward local government and watershed teams for leadership while continuing to provide assistance.

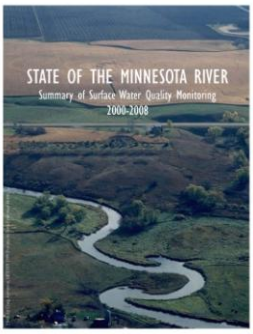
Minnesota River Clean-Up: Ten Years Later
The Minnesota Center for Environmental Advocacy (MCEA) put together a report on the effort to improve water quality in the Minnesota River Basin ten years after Governor Arne Carlson's famous proclamation of making the river swimmable and fishable. Founded in 1974, MCEA is a nonprofit organization dedicated to the protection of Minnesota's environment and health of its people. MCEA looked at water quality problems from 1992, the goals and recommendations for cleaning up the river, what had been accomplished, the amount of money spent, and water quality results. The report's findings covered major pollutant sources and actions to address them, how the Minnesota River looked ten years later and a set of conclusions and recommendations to continue the effort to improve water quality in the basin.





The Minnesota River Trends Report provides a broad overview of trends related to the state of the Minnesota River. This easy-to-read overview summarizes some of the major demographic, land use, water quality, biological and recreational trends in the Minnesota River over the past 10 to 100 years depending on data availability. In a few cases where an analysis of change over time was not possible, the report includes information on current conditions.

http://mrbdc.mnsu.edu/mnbasin/trends/index.html



This report presents selected results from water quality monitoring at four mainstem Minnesota River locations and fourteen outlets of major tributary streams (streams draining watersheds greater than 100,000 acres). The information represents results from more than 4,0000 water quality samples collected from 2000-08. This report highlights findings regarding excessive sediment, nutrient enrichment, and environmental health concerns in the Minnesota River Basin.

http://mrbdc.mnsu.edu/reports/basin/statemr08.html

Other Significant Minnesota River Basin documents

- Minnesota River Assessment Project Report, January 1994
- Working Together: A Plan to Restore the Minnesota River, December 1994 (Minnesota River Citizens' Advisory Committee)
- Minnesota River Basin Plan, December 2001
- Minnesota River Clean-Up: Ten Years Later, October 2002
- Progress on a Long Voyage: Decades of Effort Show Improvement in the Minnesota River Water Quality, January 2007
- Minnesota River Summit Summary, February 2007
- Identifying Sediment Sources in the Minnesota River Basin, June 2009
- Minnesota River Statistical Trend Analysis, November 2009

MINNESOTA STATE UNIVERSITY
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