

## **Appendix 7H**

### **Water Quality Initiative Newsletters**

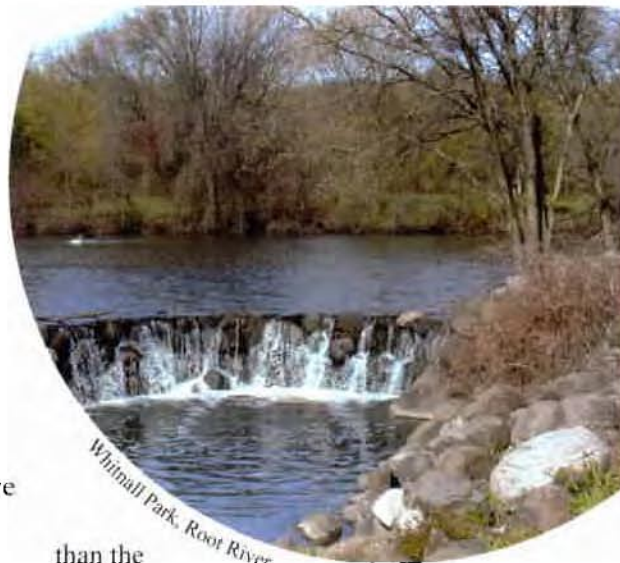
**Water Quality Initiative Newsletter  
Volume 1**

## Water Quality Initiative

The Milwaukee Metropolitan Sewerage District (MMSD) is starting a long-range planning process to look at how we can best meet the region's water quality needs. We've done a lot of work on our collection and treatment systems in the past, and we want to make sure we continue to spend your tax dollars appropriately on projects that will further improve water quality for generations to come.

To develop this plan, we're using the Watershed Approach, which is now recommended by the US Environmental Protection Agency (EPA) as the best way to do water resources planning. The Watershed Approach uses nature's boundaries to plan instead of city limits. It recommends decisions based on science and requires strong partnerships with people, interest groups, and agencies.

The Watershed Approach will help us look at things like separating sewers, operating the deep tunnel, and reducing overflows even further



Whitnall Park, Root River

than the 95 percent reduction we've seen over the past 9 years. It will also help us look at other sources of pollution, so that money can be spent on solutions that can really work!

Here is the mission statement for the Water Quality Initiative:

*The MMSD 2020 Facility Plan will identify which policies, operational improvements, facilities, and programs are required to achieve the water resource goals inspired by our public.*

## Watershed Approach

Within the last decade, the U.S. EPA has encouraged agencies like MMSD to use a "watershed" approach to planning to better address water resource issues. This comprehensive approach identifies and considers all kinds of pollution within a watershed.

Other agencies nationwide have



used this approach and achieved great results. Working together with diverse groups throughout Milwaukee, the watershed approach gives people in the community a voice in decisions that affect their everyday lives.

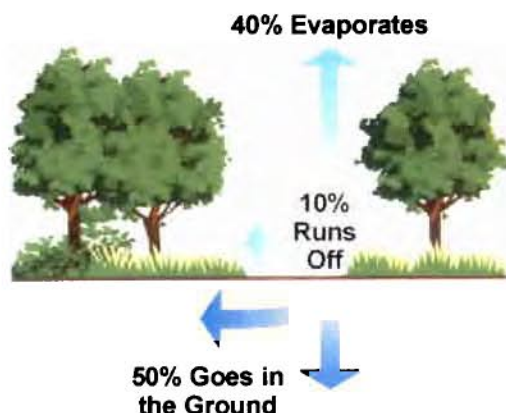
Instead of focusing resources on one particular water quality problem, the watershed approach looks at the big picture.

Decisions are based on all the water resources, all the water uses, and all the systems throughout the watershed, including surface water, groundwater, and wetlands. The outcome will be better information for decision-makers and better information for you. A successful watershed approach includes the support, participation and leadership of people like YOU.



# Where Does Rain Go?

## Natural Meadows and Forests



You may not give it much thought, but the rainwater that falls on your property can affect your downstream neighbors. The amount of rainfall that soaks into the ground, evaporates into the air, and runs off into lower lying areas depends greatly on the level of urban development.

Depending on soil conditions, as much as 50 percent of rainfall can be absorbed directly into the ground in areas like meadows and forests with no urban development. Only 10 percent of this water is left as runoff.

In highly urbanized areas only 15 percent of the water is absorbed into the ground. A good 55 percent of the water runs across the land, picking up pollutants.

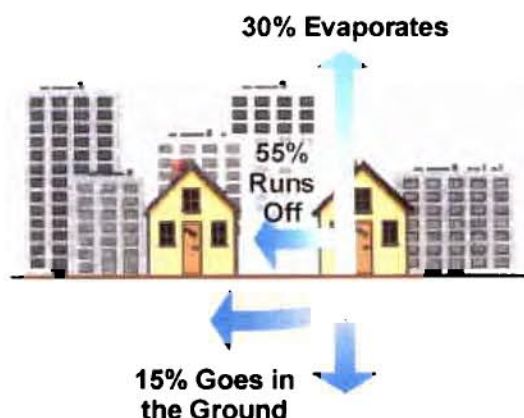
Why is there so much runoff in urban areas?  
Buildings, parking lots, and

streets do not absorb water. These *impervious* areas prevent rainwater from seeping into the ground as it would in undeveloped areas.

Rainwater in urban areas, instead, flows toward storm or combined sewer inlets (that's why roads slope down from their centers toward the curbs). Depending on where you live, water that gets into the sewer system either goes to a wastewater treatment plant or directly to a river or lake.

You can help decrease the volume of stormwater runoff that contributes to sewer overflows and water pollution by participating in one of our many programs. Please see our Web page at [www.mmsd.com](http://www.mmsd.com) for more information.

## 75% - 100% Paved Surfaces



## What Does Water Mean To You?

What was the first thing you did when you got up this morning? Take a shower? Put on a pot of coffee? Sit and read the newspaper? The shower and the coffee are obvious uses of water, but even the newspaper required water at some point in its production. Do you like to go fly fishing or canoeing? Or are you a beachcomber who likes to take a dip in Lake Michigan on occasion? If you really think about your daily habits and favorite hobbies, you can understand how important water is to all of us. We all need to do what we can to protect this most precious resource.

The goal of MMSD's Water Quality Initiative is to protect this resource through a watershed planning approach. This approach looks at the whole watershed—its land uses, its wetlands, its point and pollution sources—to find cost-effective solutions to improving water quality. This includes decreasing the opportunities for water to become polluted in the first place—something called "source control." There are simple things we can all do to help keep our water clean, like using less fertilizer on our lawns, properly disposing of household hazardous wastes and collecting pet waste.

There are ways we can and should be involved in improving water quality. Water quality affects our daily lives and we all need to be involved.



# What is a Watershed?

Defined by nature's boundaries instead of political boundaries, a watershed is an area of land that captures water and drains it to a river or lake. If a drop of water falls outside of the boundary, it will become part of another watershed. As rain and melting snow flow downhill, they carry sediments and other materials into our waterways. Since we all live in a watershed, what we do on the land impacts the quality and quantity of our water.

## Which Watershed Do You Live In?

The **Milwaukee River Watershed** is the largest watershed in the Milwaukee River Basin. At 685 square miles, this watershed includes Milwaukee, Glendale, Brown Deer, River Hills, and Mequon north into Fond du Lac and Sheboygan Counties. If you live near Lake Michigan (shoreline areas of Bayside, Whitefish Bay, Shorewood, Fox Point, Cudahy, Milwaukee, St. Francis, and South Milwaukee), you are living in the direct **Lake Michigan Drainage** area (25 square miles are within the MMSD service area, and more to the north and south).

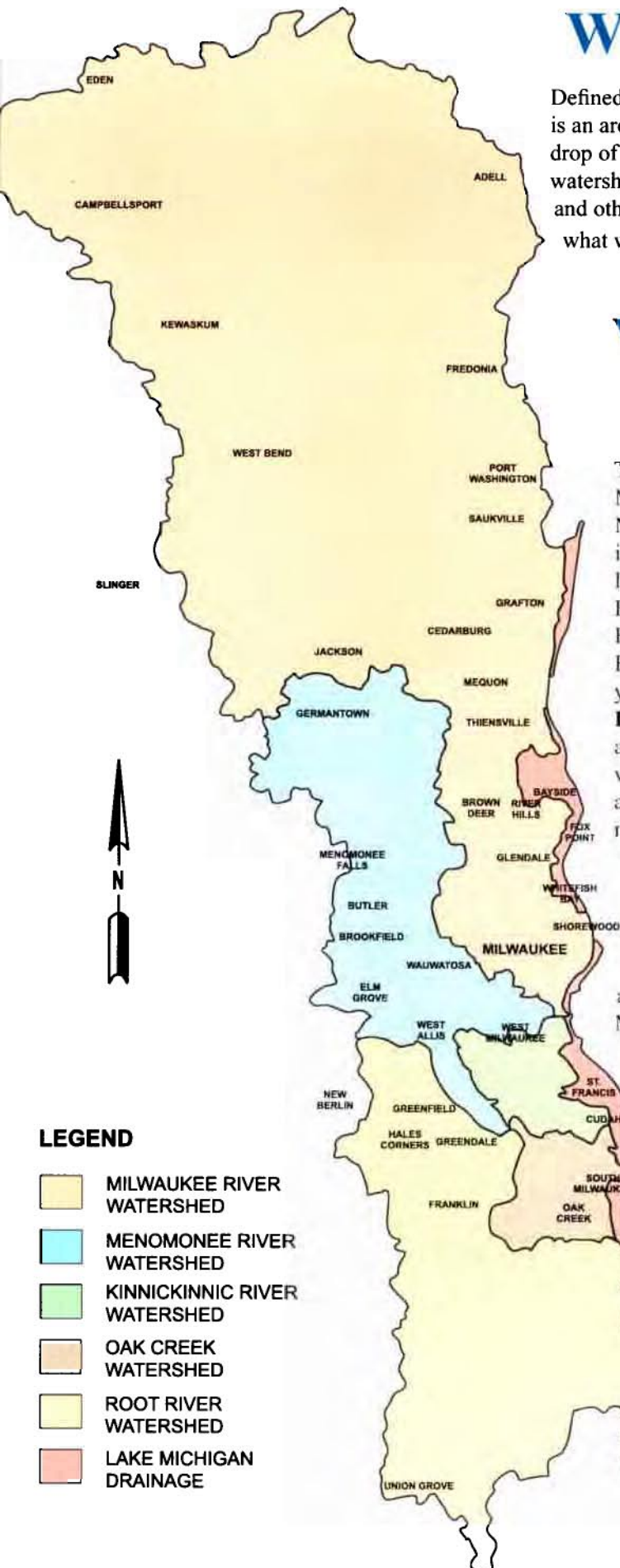
The 135-square-mile **Menomonee River Watershed** encompasses all or parts of Milwaukee, West Allis, West Milwaukee, Wauwatosa, Brookfield, and Germantown. Because watersheds do not follow municipal boundaries, parts of West Allis, West Milwaukee, and Cudahy also sit within the 25-square-mile **Kinnickinnic River Watershed**, and most of Oak Creek and South Milwaukee lie within the 27-square-mile **Oak Creek Watershed**.

The **Root River Watershed** is 197 square miles. This watershed extends from southern West Allis, through Greenfield, Hales Corners, Greendale, and Franklin and continues south through the eastern half of Racine County and into Kenosha County.



### LEGEND

-  MILWAUKEE RIVER WATERSHED
-  MENOMONEE RIVER WATERSHED
-  KINNICKINNIC RIVER WATERSHED
-  OAK CREEK WATERSHED
-  ROOT RIVER WATERSHED
-  LAKE MICHIGAN DRAINAGE





## Web Sites

There are many interesting Web sites where you can learn more about water quality, watersheds and other important environmental issues. Here are some sites to help you get started.

### **Milwaukee Metropolitan Sewerage District**

[www.mmsd.com](http://www.mmsd.com)

### **US Environmental Protection Agency**

[www.epa.gov/owow/watershed/why.html](http://www.epa.gov/owow/watershed/why.html)

### **Wisconsin Department of Natural Resources**

[www.dnr.state.wi.us/org/water/wm](http://www.dnr.state.wi.us/org/water/wm)

### **River Alliance of Wisconsin**

[www.wisconsinrivers.org](http://www.wisconsinrivers.org)

### **Milwaukee River Basin Partnership**

<http://clean-water.uwex.edu/Milwaukee/index.html>

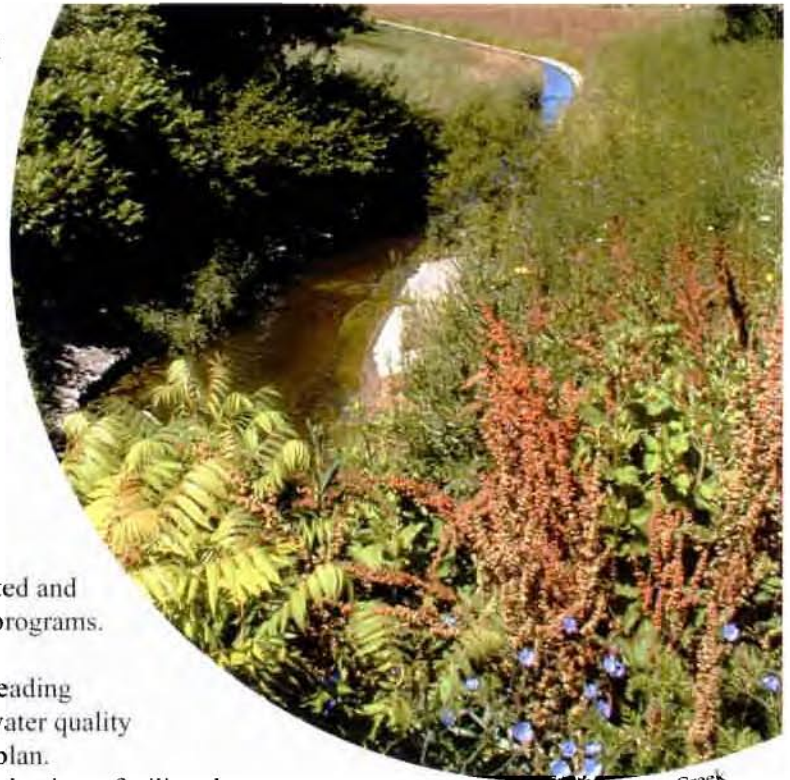
### **Milwaukee Audobon Society**

<http://www.amrivers.org/groups/MilwaukeeAudubonSociety53209.htm>

## Agency Integration

The Wisconsin Department of Natural Resources (DNR), the Southeastern Wisconsin Regional Planning Commission (SEWRPC) and the Milwaukee Metropolitan Sewerage District (MMSD) all are concerned with water resource issues. Together, we are evaluating the issues and conducting two separate, but coordinated and cooperative planning programs.

- SEWRPC is leading the regional water quality management plan.
- MMSD is conducting a facility plan.
- DNR will review and approve the final plans for both planning programs.



Southbranch Creek

## Water Quality Initiative Schedule

MMSD's 2020 facility planning process will continue over the next five years. MMSD is currently forming committees, and will soon be seeking your input to identify goals and objectives. Here is the 2020 Facility Planning Study schedule:

**2003/04**

Stakeholder identification of goals and objectives

**2004/05**

Stakeholder evaluation of preliminary alternatives

**2006**

Development of Implementation Plan

**2007**

Final Plan approvals

## How Can You Be Involved in the Water Quality Initiative?

There are many ways you can be involved. You can look on our website ([www.mmsd.com](http://www.mmsd.com)). You can also get on our e-mail distribution list to receive our environmental updates and quarterly newsletters by sending a quick message to [WQI@mmsd.com](mailto:WQI@mmsd.com). Also look for annual open house-type events. If you have questions, call us at (414) 225-2070.

Any interest group you're a member of may choose to elect or appoint someone to sit on our Citizens Advisory Committee—one of several committees designed to address planning

issues. That person can report back to your group on our progress while also providing your input. If you're looking for more in-depth information, you can have someone from the Water Quality Initiative come and speak directly to your group by calling the phone number to the left. You can also look on our website for other committee happenings.

Please contact us if you'd like to know more, or if you have other ideas about how we can best involve our public! We want to hear what you think, and what you think about the future of the region's water quality.



**Water Quality Initiative Newsletter  
Volume 2**



## Drafting a Blueprint for the Future

*Planning expands to truly encompass the watersheds*

Last year, MMSD began a long-range planning effort to address water resource issues in the Greater Milwaukee Watersheds. The blueprint for the future, or *Water Quality Initiative*, is now part of a larger effort that includes MMSD and the Southeastern Wisconsin Regional Planning Commission (SEWRPC), working together with the Wisconsin Department of Natural Resources (WDNR). The public—both special committees and the general public—are playing an important role in identifying problems and finding solutions to water resource issues.

### Taking the First Steps

Rather than focusing limited resources on single water resource problems, the *Water Quality Initiative* uses a watershed approach to look at connections between water resources issues. Since the *Water Quality Initiative* began, the agencies involved have laid the groundwork for an unprecedented level of collaboration in water resource planning. Early this year MMSD and



SEWRPC reached key agreements to further benefit watershed-based planning. Recognizing the overlapping and common goals between the District's long-range facilities plan and SEWRPC's area-wide water quality management plan (WQMP) update, the two agencies agreed to integrate and coordinate planning efforts.

In strong support of this integration and coordination, MMSD Commissioners authorized a resolution supporting three important elements of MMSD's facilities plan and SEWRPC's WQMP: support for a broader analysis of watershed areas *beyond* the District's jurisdictional boundaries; support for SEWRPC's need to update the WQMP (originally approved in 1979), and support for an increased role in the important public dialog that will help guide the planning process.

### Coordinating Committees for Public Input

As a result of the agreement and strong Commission support, MMSD and SEWRPC will integrate a number of their working committees—made up of the general public as well as scientists, engineers and planners—to comprehensively involve them in the *Water Quality Initiative*.

### Looking into the Future

The next step in the process involves analyzing an enormous amount of data on water quality in southeastern Wisconsin. The *Water Quality Initiative* is an ambitious undertaking for the public agencies involved, and its success is critical for the future of the region. Ensuring sustainable, safe water resources and minimizing pollution in the region's watersheds are of paramount importance to the health, safety and economic vitality of the area. The long-range planning effort of the *Water Quality Initiative* will outline how we can all work together for the future health of our watersheds.

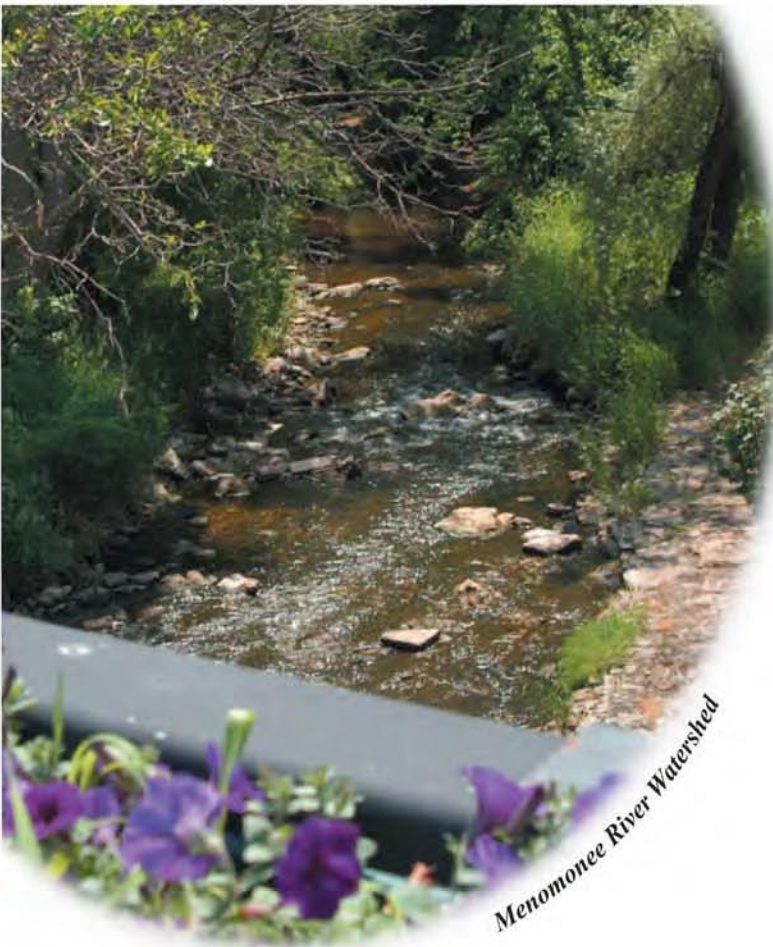
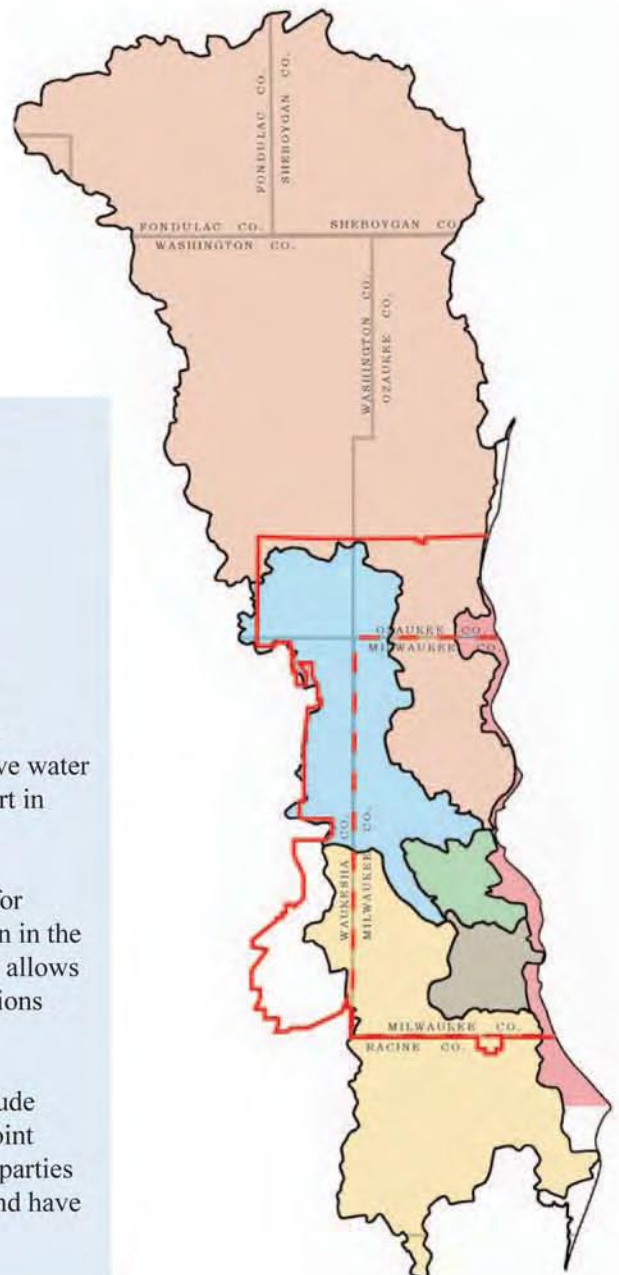




# Greater Milwaukee Watersheds Map

## LEGEND

- MMSD PLANNING AREA BOUNDARY
- MILWAUKEE COUNTY BOUNDARY
- MILWAUKEE RIVER WATERSHED
- MENOMONEE RIVER WATERSHED
- KINNICKINNIC RIVER WATERSHED
- OAK CREEK WATERSHED
- ROOT RIVER WATERSHED
- LAKE MICHIGAN DRAINAGE



## New Direction for Water Quality Planning

*Marsha Burzynski, Program and Planning Analyst,  
Wisconsin Department of Natural Resources*

The Department of Natural Resources has entered into a Memorandum of Understanding with the Milwaukee Metropolitan Sewerage District and the Southeastern Wisconsin Regional Planning Commission for a comprehensive water quality planning effort on a watershed basis. This will be the first such effort in Wisconsin and may serve as a model for other watersheds.

The department has been moving in the direction of a watershed approach for some time. We adopted a watershed approach during a major reorganization in the mid-1990s, and now have water-related staffs grouped by watersheds. This allows the department to bring various programs together to make integrated decisions concerning the watershed.

The department is excited about broadening the watershed approach to include the various components of planning activities that will be included in this joint effort. The effort provides opportunities to bring together all the interested parties to arrive at decisions that comply with minimum regulatory requirements and have strong local support.



# Groundwater - Surface Water Connection

by Robert P. Biebel, Chief Environmental Planner, Southeastern Wisconsin Regional Planning Commission

As water resources planning is proceeding using the watershed approach as described in the previous issue of the Water Resource Initiative, it is important to recognize the role which groundwater plays in sustaining streams, lakes, springs, wetlands, and aquatic communities.

## Why is Groundwater important?

To answer this question, we must first understand the basics of where groundwater comes from and where it is stored in Southeastern Wisconsin. In discussions about groundwater in Southeastern Wisconsin, often the terminology will turn to the *shallow aquifer* vs. the *deep aquifer*.

The term “shallow aquifer” throughout southeastern Wisconsin refers to the glacially deposited sands and gravels. In the eastern two-thirds of the Region, it includes the dolomite bedrock immediately beneath. The “unconsolidated” glacial materials (not solidified like rock) and dolomite (Lannon stone) generally yield water adequately. They are “shallow” in the sense of being closest to the ground surface, but actually extend hundreds of feet down in numerous locations. This shallow aquifer is directly connected to the streams, lakes, and wetland surface water system.

In natural systems there is a balance between groundwater and surface water systems. Groundwater maintains base flow of streams and all of the flow in springs and, in many cases, is an important factor for water levels in lakes and wetlands. However, human activities, such as pumping of wells and urbanization, can affect groundwater levels by drawdown and reducing recharge opportunities. These

changes on balance can affect the biological systems associated with the surface water systems.

## Basic Definitions

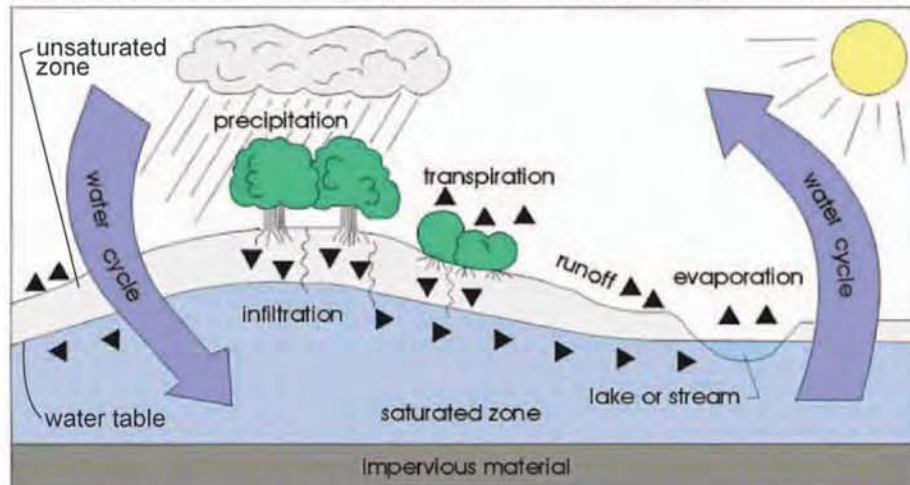
**Aquifer** – A saturated, permeable geologic formation that will yield significant quantities of water

**Drawdown** – The lowering of groundwater level caused by pumping a well

**Groundwater Recharge** – The replenishment of an aquifer by either artificial or natural means (in southeast Wisconsin, this is equivalent to 3 to 7 inches of rainfall)

**Water Table** – The upper surface of the standard zone (appears as the level at which water stands in a well penetrating the unconfined aquifer)

## A LOCALIZED VIEW OF THE WATER CYCLE AND ITS COMPONENTS



Source: University of Wisconsin-Extension and SEWRPC.

## Tools of the Trade

As the water resources planning is carried out for the watersheds of the greater Milwaukee-area, an important groundwater element will be included. Fortunately, today there are now important tools available to help better understand the groundwater system and its surface water relationships. One such tool is a Regional Groundwater Computer Model of Southeastern Wisconsin, recently developed under a cooperative effort of the U.S. Geological Survey, the Wisconsin Geological and Natural History Survey, the Wisconsin Department of Natural Resources, and the water utilities using groundwater in Southeastern Wisconsin, the Southeastern Wisconsin Regional Planning Commission. Using this model and other tools, alternative future conditions can be developed and evaluated. Among others, strategies which are expected to be considered include:

- Identify and develop protection recommendations for important groundwater recharge areas.
- Promote the use of stormwater management measures designed to maintain the natural balance between groundwater and surface water when and where practical.
- Promote management of groundwater uses and supplies to minimize groundwater table drawdown by measures, such as water conservation and pumping system optimization.

This integrated planning approach considering the balance between groundwater and surface water will be an important element in protecting the Region's water quality.



## Upcoming Activities

### Committee Meetings

Several committees were formed to involve stakeholders in MMSD's long-range planning. It is anticipated that the committees will evolve as the District integrates its process with SEWRPC to complete its own regional water quality management plan update. The committees will continue meeting throughout the process.

### Municipal Meetings

Staff from SEWRPC and MMSD meet with municipal officials in each of the Greater Milwaukee Watersheds to discuss existing and future land use. These meetings are an important element of establishing baseline conditions.

### Watershed Maps

In order to help people further understand water resource issues, MMSD is creating maps which may be used to help establish a sense of place. In addition, MMSD is creating educational materials to explain key indicators of water quality for each of the watersheds.

### Watershed Planning Conference

Plans are underway for a day-long conference in February 2004. MMSD and SEWRPC are planning an informative forum to discuss watershed planning, the 2020 Facilities Plan, and other important water resource issues.

## Water Quality Initiative Schedule

The Water Quality Initiative will culminate with development of the District's 2020 Facilities Plan and final plan approval in 2007. The following is a general schedule for the 2020 facilities planning process:

- |                |                                                    |
|----------------|----------------------------------------------------|
| <b>2003/04</b> | Stakeholder identification of goals and objectives |
| <b>2004/05</b> | Stakeholder evaluation of preliminary alternatives |
| <b>2006</b>    | Development of Implementation Plan                 |
| <b>2007</b>    | Final Plan approvals                               |

# Watersheds: What You Do Affects Your Neighbor

You can help us improve water quality in the Greater Milwaukee Watersheds by taking just a few simple steps at and around your house. Just thinking about water quality and watersheds is the first step!

Did you know that oil dripping from cars in your neighborhood or cigarette butts thrown out the window by drivers on your street may eventually end up in the water you swim and boat in? Seemingly small things like this are collectively called "nonpoint source pollution." In fact, federal and state environmental regulatory agencies report that this type of pollution is our greatest threat to water quality. Each and every one of us, through our actions, can reduce nonpoint source pollution. If you'd like to learn more about nonpoint source pollution, go here: ([www.mmsd.com/environment/pollrunoff.asp](http://www.mmsd.com/environment/pollrunoff.asp)). If you'd like to learn about some of the things you can do now, go here: ([www.mmsd.com/environment/enviro.asp](http://www.mmsd.com/environment/enviro.asp)).

To help people in the Greater Milwaukee Watersheds understand how pollution affects



stream health (and ultimately the health of Lake Michigan), we are developing two reports. The first is really a set of maps designed to show key features in each watershed. The second is a set of status reports for each watershed. The status reports will identify and explain key indicators of water quality for the Greater Milwaukee Watersheds. When complete, both types of reports will be available on our Web site at [www.mmsd.com/wqi/homepage.htm](http://www.mmsd.com/wqi/homepage.htm).

As the Milwaukee Metropolitan Sewerage District (MMSD) works with other agencies and the public on the Water Quality Initiative, the focus remains on watersheds – your watersheds.

## Get Involved in the Water Quality Initiative

Are you interested in water resource issues in the Greater Milwaukee Watersheds? If so, you can channel that interest and become involved in ways, both large and small.

If you're a member of an interest group, consider choosing someone to sit in on our Citizens Advisory Council or having a *Water Quality Initiative* representative speak at one of your regularly scheduled meetings. Even if you simply get a library book, use Internet resources, or read this newsletter, you're participating in your own way!



For those interested in participating, you can be added to our e-mail distribution list to receive environmental updates and newsletters by sending a message to [WQI@mmsd.com](mailto:WQI@mmsd.com). You can visit our Web site: [www.mmsd.com/wqi/homepage.htm](http://www.mmsd.com/wqi/homepage.htm) to learn about the

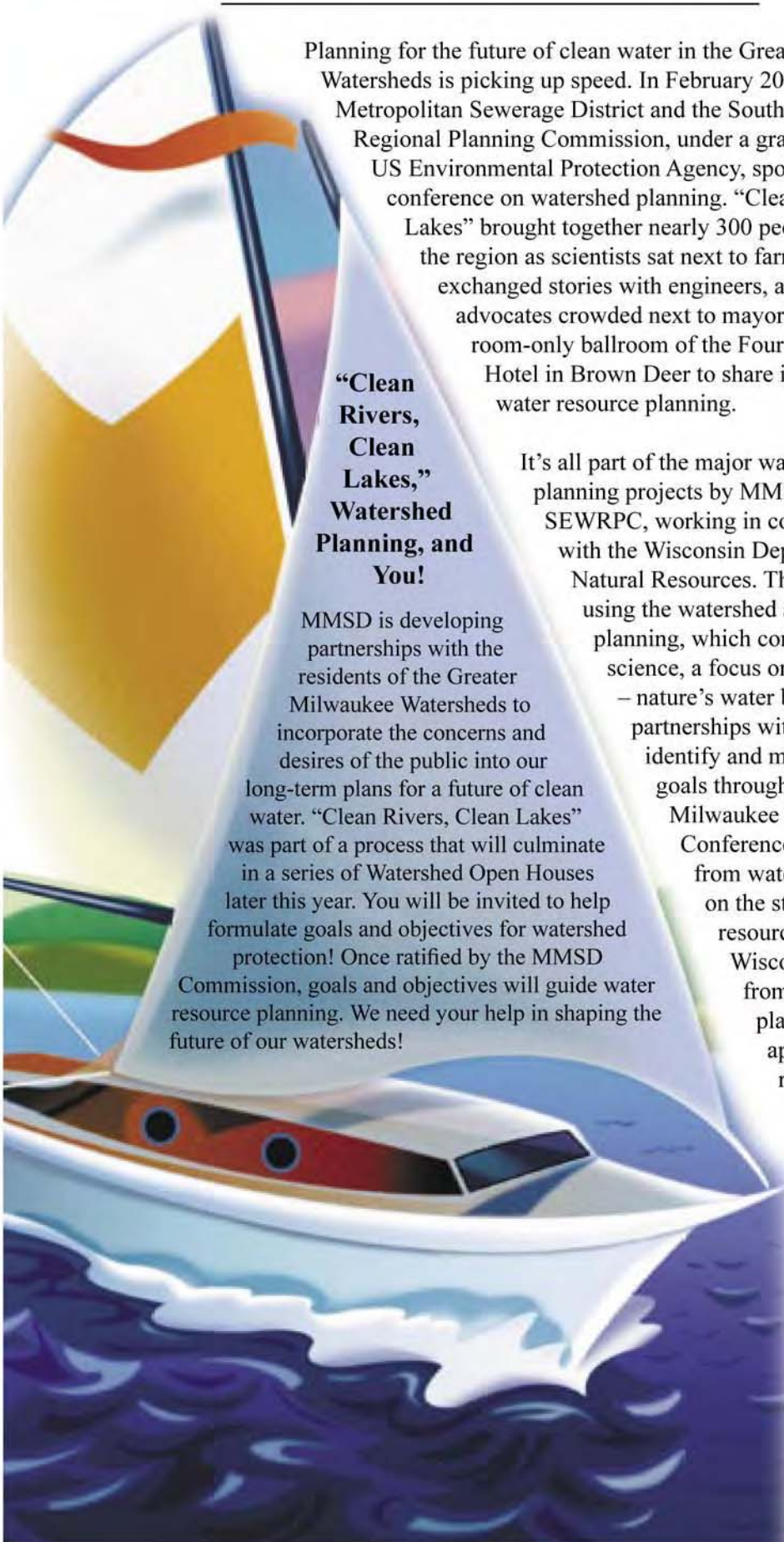
Greater Milwaukee Watersheds and stay up-to-date on *Water Quality Initiative* issues. In addition, you can attend a co-sponsored watershed planning conference in late winter and annual open house-type events being planned for next year—more on those to come in the future!

Feel free to contact us to learn more, or if you have ideas about how we can best involve the public. For more information, call (414) 225-2070 or send a message to [WQI@mmsd.com](mailto:WQI@mmsd.com).

**Water Quality Initiative Newsletter  
Volume 3**



## Clean Rivers, Clean Lakes Kindles Water Quality Initiative



Planning for the future of clean water in the Greater Milwaukee Watersheds is picking up speed. In February 2004, the Milwaukee Metropolitan Sewerage District and the Southeastern Wisconsin Regional Planning Commission, under a grant from the US Environmental Protection Agency, sponsored a major conference on watershed planning. "Clean Rivers, Clean Lakes" brought together nearly 300 people from around the region as scientists sat next to farmers, journalists exchanged stories with engineers, and parks advocates crowded next to mayors in the standing-room-only ballroom of the Four Points Sheraton Hotel in Brown Deer to share information on water resource planning.

### **"Clean Rivers, Clean Lakes," Watershed Planning, and You!**

MMSD is developing partnerships with the residents of the Greater Milwaukee Watersheds to incorporate the concerns and desires of the public into our long-term plans for a future of clean water. "Clean Rivers, Clean Lakes" was part of a process that will culminate in a series of Watershed Open Houses later this year. You will be invited to help formulate goals and objectives for watershed protection! Once ratified by the MMSD Commission, goals and objectives will guide water resource planning. We need your help in shaping the future of our watersheds!

It's all part of the major water quality planning projects by MMSD and SEWRPC, working in collaboration with the Wisconsin Department of Natural Resources. The agencies are using the watershed approach to planning, which combines good science, a focus on watersheds – nature's water boundaries – and partnerships with the public to identify and meet water resource goals throughout the Greater Milwaukee Watersheds.

Conference attendees heard from water scientists on the state of water resources in southeastern Wisconsin. They heard from politicians and planners about approaching water resource issues using the natural boundaries of water systems rather than city limits. And they listened to people who are actively creating partnerships to ensure a future of cleaner water.



# Highlights from “Clean Rivers, Clean Lakes”

## *What's Past is Prologue:*

### *The History of Water in Milwaukee*

Historian John Gurda put today's water quality planning efforts into perspective with an overview of the ways Milwaukeeans have used their water resources over the last two centuries. Like the Native Americans who already lived here, early European settlers were attracted to Milwaukee because of its pristine rivers and deep Lake



Michigan harbor.

Water ran the growing region's mills, water shipped the wheat that came through its port, and water was the main ingredient of its most famous product: beer. There were costs to growth, however, and Milwaukee's rivers became choked with

sewage while inland deforestation led to flooding. The city flushed the rivers with clean water, and then in 1925 began treating sewage, beginning an early commitment to improving water quality for residents and businesses. That commitment is paying off today, Gurda noted, with our rivers the focus of new residential development and Lake Michigan the region's recreation hub.



*John Gurda*

## *The State of Our Watersheds*

Judy Beck is the Lake Michigan Team Manager for the US Environmental Protection Agency, and an expert in the many threats to healthy water faced by the Great Lakes. She was frank in assessing the lake's overall health. “If I were from a different federal agency,” she said, “I would be seriously considering an orange alert.” Although we are working to clean up the lake, a legacy of abuse haunts our harbors and waterways. Polluted sediments lead to fish-eating advisories, beaches are closed due to contaminants in the water, and exotic species – zebra mussels, for example – disrupt the food chain. According to Beck,

Lake Michigan's best chance for the future lies in surrounding states adopting the watershed approach to planning for clean water.

The lake's drainage divides are different from political lines, and the resource must be viewed as a whole – a source of



*Commercial fishing in Lake Michigan has declined dramatically in just a few years because of pollution.*

drinking water, transportation and recreation, food, and the lifeblood of industry.



*Judy Beck*



← Zebra mussel

Beach closure →





### Using Science to Make Water Planning Decisions

Sandra McLellan and Madeline Gotkowitz focused attention on new scientific methods that help planners understand our watershed resources. Dr. McLellan is an expert in aquatic biology; she's been studying the vexing problem of e. coli bacteria in Milwaukee's watersheds, bacteria that can indicate threats of dangerous contamination. Through years of research, she has found that e. coli show up in consistent patterns after large storms, when contaminated runoff enters our waterways. This information will allow water quality planners to begin considering ways to reduce this important water contaminant.



*E. coli bacteria threatens water quality. Discovering the source of e. coli bacteria in waterways will lead to innovative methods for combating pollution.*

Madeline Gotkowitz studies groundwater, the deep aquifers that feed municipal and household wells. Increased water use in the western part of the Milwaukee area is having dramatic effects on drinking water quantity, with subterranean water levels declining more than 350 feet over the last century. According to Gotkowitz, only by taking a regional, watershed approach to resource planning can we hope to preserve the health and integrity of our water systems in the face of increasing demand.



*Madeline Gotkowitz*

### Small Solutions, Big Results

A water pollution specialist at the Wisconsin Department of Natural Resources, Roger Bannerman outlined the ways that government agencies, developers and individuals are working together to find creative solutions to water pollution.



*Roger Bannerman*

One of the biggest challenges facing Wisconsin's watersheds is polluted runoff. Increased development leads to increased runoff during rainstorms, runoff that picks up pollutants and sediment as it travels to the nearest creek, river, or lake. The results can be disastrous for streams and even drinking water supplies. Bannerman

showed that things like rain gardens, grassy swales and detention ponds that hold rainwater for short periods of time and then slowly release it into the watershed can reduce water pollution dramatically. When incorporated into yards, streets and parking lots, these methods also create oases of natural beauty in urban settings. Using these techniques can even reduce costs for developers, businesses and homeowners, as water that is controlled naturally requires less expensive sewer infrastructure.



*Rain gardens can be built into parking lots to control pollution and add beauty.*

### Farmer, Citizen, Environmentalist

Dan Stoffel takes citizenship – and stewardship – seriously. A farmer and supervisor for Washington County, Stoffel led an effort to formulate a watershed protection plan for Quaas Creek, which drains eight square miles in the heart of Washington County. Like watersheds in other rapidly urbanizing areas, Quaas Creek's health was seriously threatened by encroaching development. Stoffel chaired a committee of five cooperating local governments to determine methods to manage growth while protecting



the watershed for future generations. The resulting plan will prevent more than 850,000 pounds of pollutants from entering the creek every year by maintaining natural buffers and limiting runoff through development design standards. In an inspiring postscript, Stoffel related how he has applied many of the same principles

to the management of his own farm, restoring waterways and changing the grazing areas for his dairy herd to reduce erosion and the fouling of streams. The results: clean water for the future and an enhanced farming operation now.



## Upcoming Activities

MMSD's Water Quality Initiative and SEWRPC's update to its Regional Water Quality Management Plan are comprehensive long-range planning efforts to address water issues at a regional level, working in partnership with the people of the Greater Milwaukee Watersheds to identify and meet water resource goals in a manner responsive to the demands of the public and sensitive to environmental needs. Here are some ways you can get involved:

### **Citizens Advisory Council**

The Citizens Advisory Council is fully formed, and is one of the ways public input will guide watershed planning. The CAC has begun to draft goals and objectives for the Greater Milwaukee Watersheds, and those goals will soon be honed by other committees and the public.

### **Open Houses and Small Group Meetings**

Plans are underway for public meetings late in 2004. Open houses will present the public with opportunities to review information about their watersheds, learn about the planning process, and comment on progress. Groups interested in having MMSD send a speaker to their meeting should contact MMSD at 414-225-2070 or email [WQI@mmsd.com](mailto:WQI@mmsd.com).

### **Municipal Involvement**

MMSD and SEWRPC have invited local elected officials and technical staff to join the Watershed Officials Forum and Technical Advisory Team. The committees will continue to work on technical and policy issues for both MMSD's Water Quality Initiative and SEWRPC's update to the Regional Water Quality Management Plan.

### **Learn More**

Visit our Web site ([www.mmsd.com/wqi](http://www.mmsd.com/wqi))

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| <b>2007</b>    | Final Plan approvals                                |

# Mapping the State of Our Watersheds

Participants at "Clean Rivers, Clean Lakes" learned that the best way to ensure a clean water future is to use the watershed approach for planning: focus on nature's boundaries, use good science, and bring citizens and businesses together with public agencies to meet water resource goals. To help people understand what's at stake, MMSD is preparing a series of maps and reports on the "state of our watersheds." The first of these maps and reports, on the Menomonee River watershed, is available now, with most of the remainder to be available in late spring 2004. The maps of the watersheds highlight key features such as wetlands, parks and places where water flows through concrete channels; the status reports on the health of

water systems discuss indicators such as dissolved oxygen, habitat quality and pollutants to paint a big picture of watershed health and challenges for the future. The maps and reports are available by calling 414-225-2070 or by visiting [www.mmsd.com/wqi](http://www.mmsd.com/wqi).



## Little Things Add Up



Every time you use water – for drinking, washing, cooking, or for recreation – you affect your watershed. Every time you drive a car or salt a snowy walkway, you affect your neighbors' access to clean water. At "Clean Rivers, Clean Lakes," MMSD Executive Director Kevin Shafer reminded the audience that everyday actions can add up to better water quality. Some examples: by installing a rain barrel to collect water, you can water your garden for free and prevent polluted runoff from entering waterways. By delaying a load of laundry until the day after a big storm, you can take pressure off the sewer system. By reducing the amount of fertilizer you put on your lawn, you can help aquatic life thrive in nearby streams. It all adds up to healthier watersheds for you and your neighbors.



**Water Quality Initiative Newsletter  
Volume 4**



## Region's Citizens Envision a Future of Clean Water

The Water Quality Initiative's Citizens Advisory Council – made up of dozens of residents from the Greater Milwaukee Watersheds – has been working hard to outline a vision of clean water for the region. This vision will be refined into goals and objectives by scientists, engineers, government representatives and the public. Specific goals and objectives for each watershed are currently being developed with public input to guide the Water Quality Initiative planning process. We are all working together to address our water pollution problems! Turn to the back cover to find out how you can get involved.

## Green Roofs



MMSD Green Roof

*This is the first article in a series to highlight technologies and projects that benefit water quality.*

Where is the hottest place to be in the summer? Perhaps a rooftop! Commercial building roofs are usually large areas that get rid of rain as fast as possible by paving, coating, and smoothing the flat surfaces. Roofs can sometimes be like pavement, without the benefit of shade from nearby trees.

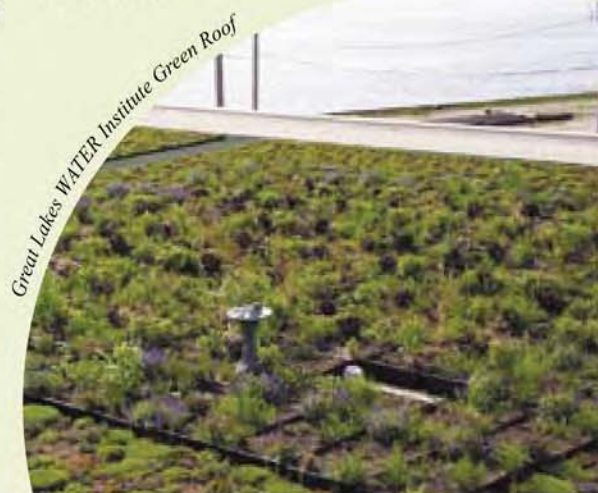
There is relief! Green roofs are no longer a purely European fixture and are fast becoming recognized for their water quality benefits in the states. In the summer of 2003, MMSD selected a green roof system for its headquarters building in downtown Milwaukee — the University of Wisconsin, Great Lakes WATER Institute quickly followed, adding its own green roof. "Green roof technology, water gardens, etc. have the real potential to transform the urban environment into a much more ecologically friendly and pleasant place to live," says Val Klump, Senior Scientist at the Great Lakes WATER Institute. "The city of the future will look significantly different than it does today, and given the stresses placed on water resources, not just here, but globally, this type of green engineering will be critical in developing sustainable systems." You can watch the time lapse video of the green roof installation on the WATER Institute website, <http://www.uwm.edu/Dept/GLWI/ecoli/Greenroof/webcam.html>.

Though many European cities have been using the technology for years, it was in the 1990's that green roofs started to catch on in the United States. And they are much needed, according to the US EPA; buildings are responsible for 65% of U.S. electricity consumption! One of the most prominent green roofs is the 10.4-acre planting on Ford Motor Company's Dearborn

Michigan Truck Plant. Gap Incorporated's San Bruno, California office building roof is home to native grasses. In addition, the Pentagon, as part of its renovation and commitment to sustainable design, is adding a green roof to protect the roof from extreme temperatures and reduce the building's overall heating and cooling costs.

Not only do they help with building costs, but green roofs also filter stormwater. The process of absorption by the roof plants reduces the amount of stormwater runoff and improves the quality of water that eventually enters our streams and rivers. In urban areas, up to 75% of rainwater can become runoff. This runoff carries many contaminants and pollutants. Natural absorption and recycling of rainwater provide relief.

So do green roofs help? The GreenGrid™ System used on the MMSD and WATER Institute roofs should absorb up to 99% of a 1-inch rainfall and reduce heating and cooling costs by up to 25 and 50%, respectively, for the floor directly below. This is good news for the environment!



Great Lakes WATER Institute Green Roof



# State of the Greater Milwaukee Watersheds: Highlights and Challenges

The health of our watersheds affects every one of us. And, an unhealthy watershed can be disastrous! The Greater Milwaukee Watersheds do many things: fuel economic development, provide recreation, and drinking water, help our gardens grow, and protect us from floods.

Scientists judge the health of a watershed with “indicators,” or measures of habitat, nutrients from fertilizer or minerals, dissolved oxygen needed to maintain life, and the presence of fecal bacteria. These pages highlight notable successes and significant challenges for the future of clean water in Southeastern Wisconsin. For more detailed reports on the state of our watersheds, visit [www.mmsd.com/wqi](http://www.mmsd.com/wqi) or call 414-272-5100.

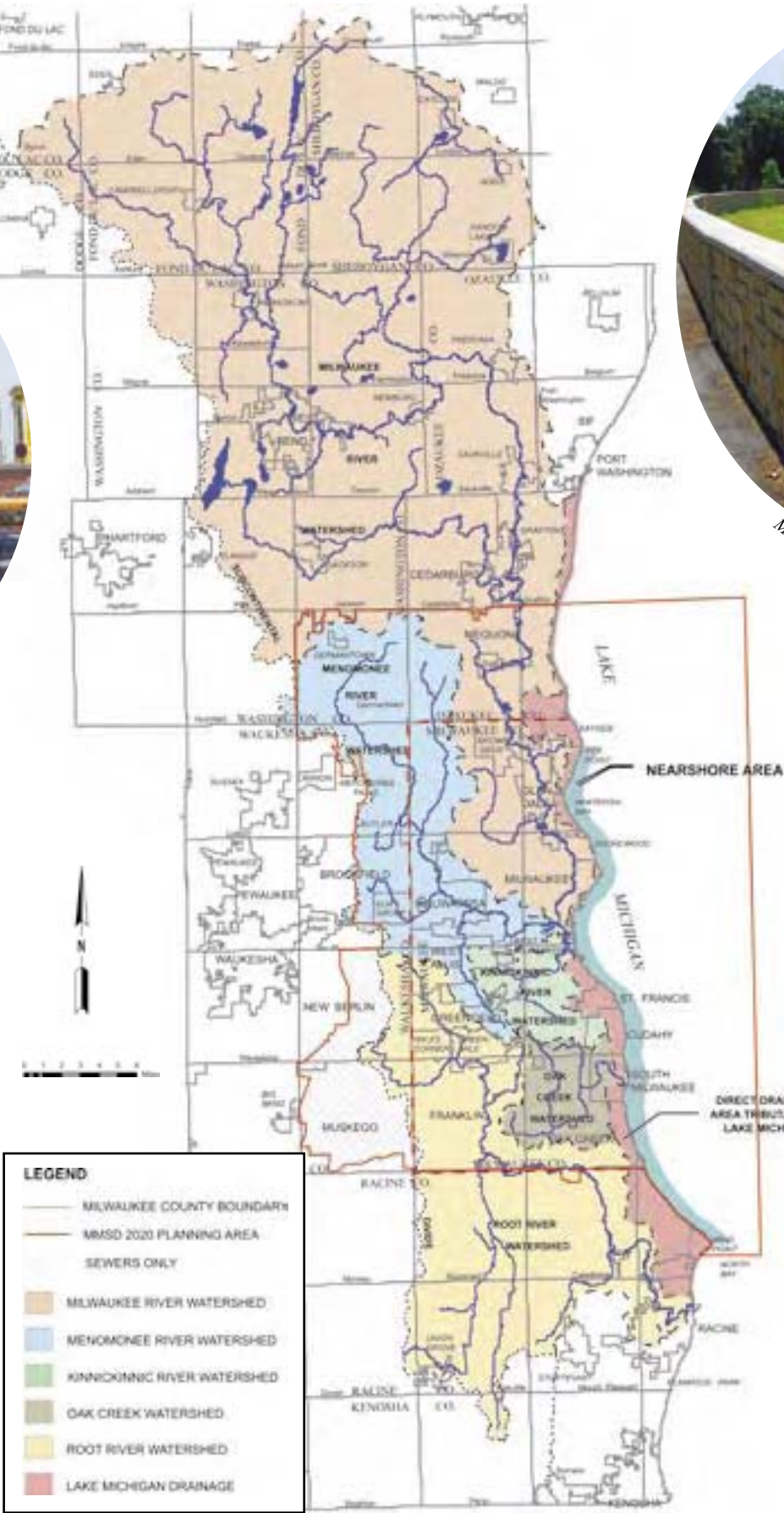
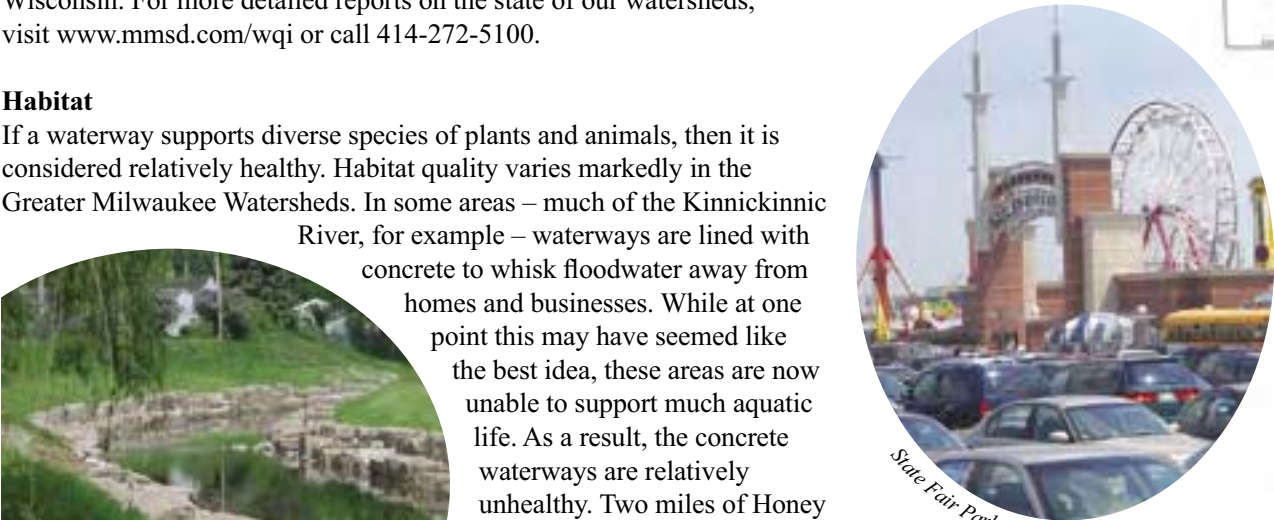
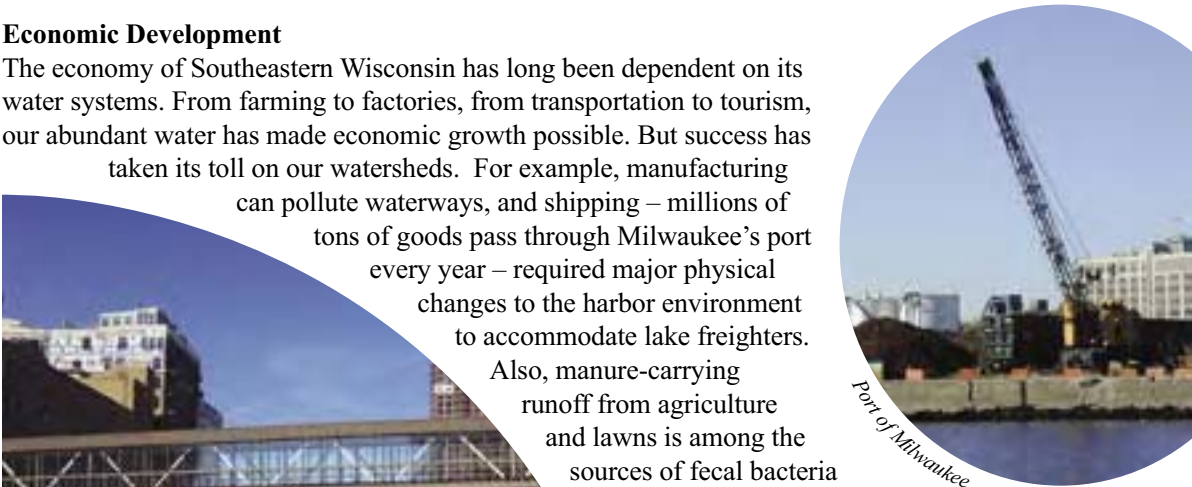
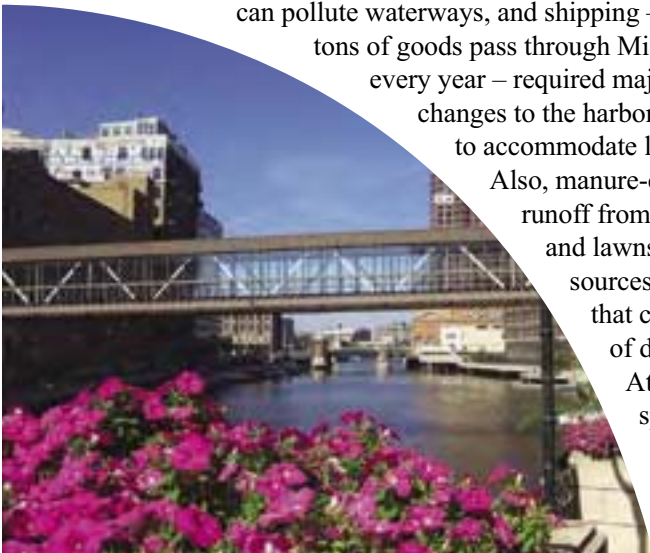
### Habitat

If a waterway supports diverse species of plants and animals, then it is considered relatively healthy. Habitat quality varies markedly in the Greater Milwaukee Watersheds. In some areas – much of the Kinnickinnic River, for example – waterways are lined with concrete to whisk floodwater away from homes and businesses. While at one point this may have seemed like the best idea, these areas are now unable to support much aquatic life. As a result, the concrete waterways are relatively unhealthy. Two miles of Honey Creek is paved over, located under Wisconsin State Fair Park! Concrete is not forever, though: more than two miles of concrete channel were removed along Lincoln Creek and the habitat was restored. The result has been a dramatic increase in life in the creek and on its banks, as well as natural flood management.



### Economic Development

The economy of Southeastern Wisconsin has long been dependent on its water systems. From farming to factories, from transportation to tourism, our abundant water has made economic growth possible. But success has taken its toll on our watersheds. For example, manufacturing can pollute waterways, and shipping – millions of tons of goods pass through Milwaukee’s port every year – required major physical changes to the harbor environment to accommodate lake freighters. Also, manure-carrying runoff from agriculture and lawns is among the sources of fecal bacteria that can indicate the presence of disease-causing organisms in our waterways. At the same time, improved water quality is spurring development and awareness. For example, West Bend, Cedarburg, Wauwatosa, and Milwaukee have built riverwalks to encourage housing and commercial development along the waterways.



### Flooding and Infrastructure

Flood management, pollution control, and stormwater management are among the priorities of the Water Quality Initiative. Throughout the Greater Milwaukee Watersheds, many approaches were taken to keep homes from flooding, roadways above water, and to prevent the storm sewer system from being overwhelmed during rainstorms. For example, Oak Creek used to flood Ryan Road with up to 10 feet of water during storms, causing significant problems for travel. A storm pump station and detention basin, constructed in the early 2000s, now keep the road dry. A floodwall protects the residents of the Valley Park neighborhood, near Miller Park, from flooding year round. In addition, under the Conservation Plan, MMSD acquires undeveloped land to maintain natural stormwater management functions.



### Recreation

Recreation is among the key uses of our watersheds, and their value is affected by their overall health. For example:

- Visits to the beach are sometimes marred by the odor of a decaying algae called Cladophora, a problem that may be exacerbated by phosphorus and nitrogen in the water.
- The quality of fishing depends on habitat to support species and the amount of dissolved oxygen in the water.

Since the North Avenue Dam was removed from the Milwaukee River in 1997, more than 30 species of fish lure anglers to the river.

- Many parks and trails follow the region’s waterways. The Seven Bridges Trail, for example, one of the region’s prettiest walks, winds through the Grant Park’s ravines to the point where Oak Creek meets Lake Michigan.



Milwaukee Riverwalk

Lake Michigan: Cladophora (algae)



## Upcoming Activities

MMSD's Water Quality Initiative and SEWRPC's update to its Regional Water Quality Management Plan are comprehensive long-range planning efforts to address water issues at a regional level, working in partnership with the people of the Greater Milwaukee Watersheds to identify and meet water resource goals in a manner responsive to the demands of the public and sensitive to environmental needs. Hundreds of citizens, elected officials, government officials and community group members have been working hard on various aspects of these two studies.

### *Citizens Advisory Council*

The Citizens Advisory Council includes over 85 members and has brainstormed a vision for the Greater Milwaukee Watershed. The CAC, along with other study participants, is working with agency staff on draft goals and objectives for the Greater Milwaukee Watersheds. The council is one of the ways public input is helping guide watershed planning.

### *Municipal Involvement*

The Watershed Officials Forum and technical committees have also been working on goals and objectives, as well as technical and policy issues for both MMSD's Water Quality Initiative and SEWRPC's update to the Regional Water Quality Management Plan.

### *Small Group Meetings*

MMSD staff has been making presentations to community groups, students, and local committees so people may learn first-hand about the Water Quality Initiative. If you are interested in having MMSD send a speaker to your next meeting, contact MMSD at 414-225-2070 or email [WQI@mmsd.com](mailto:WQI@mmsd.com).

### *Learn More*

Visit our Web site ([www.mmsd.com/wqi](http://www.mmsd.com/wqi)).

## Water Quality Initiative Schedule

The Water Quality Initiative will culminate with development of the District's 2020 Facilities Plan and final plan approval in 2007. The following is a general schedule for the 2020 facilities planning process:

- |                |                                                     |
|----------------|-----------------------------------------------------|
| <b>2003/04</b> | Stakeholder identification of goals and objectives. |
| <b>2004/05</b> | Stakeholder evaluation of preliminary alternatives  |
| <b>2006</b>    | Development of Implementation Plan                  |
| <b>2007</b>    | Final Plan approvals                                |

# Water Quality Initiative Public Information Meetings

MMSD's Water Quality Initiative and SEWRPC's update to its Regional Water Quality Management Plan are comprehensive long-range planning efforts that address water issues at a regional level, working in partnership with the people of the Greater Milwaukee Watersheds to identify and meet water resource goals. The studies are responding to the demands of the public while being sensitive to environmental needs. Hundreds of citizens, elected officials, government officials and community group members are working hard on various aspects of these two studies.

Plans are underway for Water Quality Initiative public information meetings this



fall. The meetings will present information about the watersheds and the planning process, and provide opportunities for community members to comment on what they see. Technical staff will be available to discuss study issues and engage in one-on-one discussions. Specific information for each watershed will be provided at these meetings to enable participants to more fully understand diverse water quality issues. This will be a unique opportunity for the public to provide input and to make specific comments related to the preliminary goals and objectives drafted by study participants. Watch for an announcement of dates and locations for public information meetings, coming soon.

## Citizens Envision a Future of Cleaner Water

The Water Quality Initiative, a long-range planning effort of the Milwaukee Metropolitan Sewerage District (MMSD), will identify the facilities, policies, programs and operational improvements necessary to meet water resource goals inspired by the public. The Initiative is based on three principles of good planning:

- Plan using watersheds, which are nature's boundaries
- Use the best water science to make informed decisions
- Form strong partnerships with the public, interest groups, and agencies.

How is the public involved? The Water Quality Initiative's Citizens Advisory Council (CAC) – made up of more than 85 residents from all walks of life – has worked for months to outline a vision for cleaner water for the region. The group

met in two large brainstorming sessions to develop these goals and objectives for the future of water resources in the Greater Milwaukee Watersheds. To solicit discussion, participants were asked to consider this question: What do we, as a region, need to do so that current and future generations have improved rivers, streams, and lakes in the Greater Milwaukee Watersheds?

In answering, CAC members wrote down hundreds of suggestions which were then sorted into categories and ultimately incorporated into vision statements. Several categories emerged:

- Leadership and education
- Enhanced government functions
- Improvements to water resources
- Comprehensive planning and design



**Water Quality Initiative Newsletter  
Volume 5**

## Water Quality Initiative Moves Forward with Publicly Inspired Goals and Objectives

### Public Information Meetings Display Goals and Objectives

During the past year, MMSD worked with the citizens and leadership of the Greater Milwaukee Watersheds to sculpt a vision for the future of clean water in the region. The Citizens Advisory Council (CAC) initiated the process by discussing one question: "What do we, as a region, need to do so that current and future generations have improved rivers, streams and lakes in the Greater Milwaukee Watersheds?" As the 85 members of the CAC responded to the question, MMSD staff recorded every suggestion and comment. Similar ideas were grouped together, and from those groups a set of preliminary goals and objectives were developed that reflect the CAC's desires for regional water quality. This preliminary set of goals and objectives were then discussed with other committees of the Water Quality Initiative. These committees are comprised of technical experts, elected



officials, municipal directors and engineers and government officials. After all comments were received and incorporated, a draft set of goals and objectives emerged (see page 2 for details). These goals and objectives will be used over the next 3 years to guide the MMSD's planning process. As the process evolves and alternatives are developed, these goals and objectives could

*...continued on back page*

### The Water Quality Initiative: A Collaboration of Ideas for Regional Goals

To a scientist, water quality may be measured by the amount of dissolved oxygen in a stream on a calm spring day. To a fisherman, water quality may be measured by the day's catch. To a child on a hot summer day, water quality may be measured by the availability of Lake Michigan's cool, refreshing waters. MMSD, in efforts to improve water quality in the Greater Milwaukee Watersheds, has taken these definitions into account and

more.

By integrating the watershed approach into its 2020 facilities planning process, MMSD has broadened the opportunities for setting water quality goals and objectives through the use of extensive public involvement. Collaboratively, the MMSD, other government agencies, citizens and leadership of the Greater Milwaukee Watersheds are working toward creating a comprehensive vision of improved water quality for the region.



Public information meetings, citizen, technical and policy committees and publications just like this one provide opportunities for the region's leadership and citizens to collaboratively guide the planning process. As technical planning advances, MMSD will continue to educate the public and provide opportunities for input during various aspects of the process.

Have a question, comment or idea? Visit the Water Quality Initiative Web site at [www.mmsd.com/wqi](http://www.mmsd.com/wqi).



## Upcoming Events

**February 23, 2005** - 2nd Annual Watershed Planning Conference - Four Points Sheraton - Milwaukee Airport. SAVE the DATE... more info coming in January.

### Future Topics

As the Water Quality Initiative progresses in 2005, future topics of discussion for WQI committees will be:

- Measures of goals
- Tools used for screening different technologies
- Scenario and alternative development
- Roles of authority and responsibility

This list is not exhaustive but as technical planning progresses through the process, so will the public involvement aspect of the WQI.

### Citizens Advisory Council

The Citizens Advisory Council includes over 85 members and has brainstormed a vision for the Greater Milwaukee Watersheds. The CAC, along with other study participants, is working with staff on draft goals and objectives for the Greater Milwaukee Watersheds. The CAC is one of the ways public input is helping guide watershed planning.

### Municipal Involvement

The Watershed Officials Forum and technical committees have also been working on goals and objectives, as well as technical and policy issues for both MMSD's Water Quality Initiative and SEWRPC's update to the Regional Water Quality Management Plan.

### Speaker's Bureau

MMSD staff has been making presentations to community groups, students, and local committees so people may learn first-hand about the Water Quality Initiative. If you are interested in having MMSD send a speaker to your next meeting, contact MMSD at 414-225-2070 or email [WQI@mmsd.com](mailto:WQI@mmsd.com).

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- 2004** Stakeholder identification of goals and objectives.
- 2005** Stakeholder evaluation of preliminary alternatives
- 2006** Development of Implementation Plan
- 2007** Final Plan approvals

## Milwaukee Idea Home

*This is the second article in a series to highlight technologies and projects that benefit water quality.*

Are you interested in learning more about Best Management Practices (BMPs) to control stormwater on your property and around your house?

If so, you may want to drive or walk over to the Milwaukee Idea Home at 726 West Bruce Street.

This home, designed by the UWM School of Architecture and Urban Planning, was made possible through the efforts of several public, private and nonprofit partners from the metro area. It was completed in 2004 and is a prototype for new technologies that could change the way residential housing is designed.

There are a number of different stormwater BMPs incorporated into the landscaping. Stormwater management on private property helps reduce the amount of runoff and improves the quality of water that eventually reaches our streams and rivers. In urban areas, up to 75% of rainwater can become runoff, which carries with it pollution.

This house was designed using four different stormwater BMPs, including rain barrels, rain gardens, porous pavement and gutterless roof drainage.

Rain gardens on the northwest and southeast corners of the lot are designed to capture runoff and contain it until the water can seep naturally into the ground. A rain garden reduces the volume of stormwater released to public streets and right of ways.



The stormwater runoff from the garage roof is directed, by a gutter and downspout, into a barrel. The water is saved in the barrel and can be used at a later time for watering the garden during dry periods.

Porous pavement was used in the construction of the walkway and driveway of the house. Porous pavement is designed to allow water to seep through the pavement and be naturally absorbed into the ground.

The house has no rain gutters to direct roof drainage. Stormwater runoff from the roof is designed to flow in sheets off the roof and directly to the ground below which is lined with gravel or decorative stone. This clear water seeps into the ground naturally and reduces the volume of the runoff directed to the public streets and right of ways.

For more facts about stormwater BMPs, their use and method of construction, visit MMSD at [www.mmsd.com/wqi/publications.cfm](http://www.mmsd.com/wqi/publications.cfm).

For more information about the Milwaukee Idea Home, visit <http://www.uwm.edu/News/Features/03.07/MIH.html>.

*continued from the cover ...* be modified to reflect the continuous public input that MMSD is soliciting.

In September, MMSD took the draft goals and objectives on the road during a series of public information meetings. The meetings were held throughout the MMSD's planning area to educate the public about the Water Quality Initiative, inform the public about the condition of the water resources and to gain valuable input from the attendees about their vision for improving water quality for the future.

People who attended the public information meetings spoke with scientists,

engineers and planners about water quality. A series of displays outlined current conditions – the state of wildlife habitat, pollution levels, recent water quality successes and special challenges – for each of the metropolitan Milwaukee's six watersheds. Finally, attendees reviewed and contributed to the draft goals and objectives for improved water quality, addressing issues from safety and recreation to pollution control and regional cooperation.

Much of the information presented at the Public Information Meetings is available on the Water Quality Initiative website ([www.mmsd.com/wqi](http://www.mmsd.com/wqi)).



# Publicly Inspired Goals and Objectives (Draft 10/7/2004)

## MMSD's Water Quality Initiative

### Goal 1 – Improved Water Resources

#### Objective Category: Habitat protection and restoration

- Restore, protect, and enhance natural areas.
- Increase species diversity and protect endangered and threatened species habitat.
- Protect riparian lands along the waterways to help provide habitat, reduce erosion, stabilize bank erosion, decrease stormwater runoff, and increase property values.
- Manage invasive species, both plant and animal.

#### Objective Category: Public recreation and access

- Provide more and protect safe, public access and recreational opportunities along waterways.
- Make beaches safer and more aesthetic for patrons.
- Cost effectively improve all segments of the waterways to ultimately support healthy, diverse fisheries.

#### Objective Category: Pollution reduction and control

- Improve waterways to support fishing, swimming, and drinking.
- Identify and correct overflows and urban/ag source pollution problems.
- Remove contaminated sediment in rivers.

- Develop ecologically sound, sustainable development strategies to reduce pollution.
- Investigate impacts of thermal pollution on water quality. Plan according to information received.

#### Objective Category: Natural systems

- Promote and improve infiltration and natural hydrology.

#### Objective Category: Safety

- Focus on water quality impacts to health, safety and welfare of people.
- Promote protection of property against natural forces.

#### Objective Category: Commercial Navigation

- Manage excessive aquatic plant growth.
- Reduce negative effects of bilge water.

#### Objective Category: Aesthetics

- Minimize presence of floatables.
- Reduce or eliminate odors caused by pollution or natural sources.

### Goal 2 – Regional Leadership, Education and Collaboration

#### Objective Category: Stakeholder education and public understanding

- Educate the public, decision makers, students, and media on issues and responsibilities pertaining to water resources.
- Conduct an informative, positive, and factual education campaign regarding water quality issues.
- Demonstrate the positive economic benefits of high quality water resources.
- Identify and educate the public, decision makers, students and media on costs of providing different levels of service for water quality.
- Promote water resource protection education among stakeholders at all levels.

#### Objective Category: Collaborative relationships

- Encourage existing and future partnerships to improve water quality.
- Promote collaboration among stakeholders at all levels.
- Create programs and policies focusing on regional/systems-wide water quality issues.
- Develop a facilities plan and regional water quality management plan to ensure a comprehensive regional approach to all water systems management.

#### Objective Category: Advocacy

- Promote advocacy on water quality issues.
- Promote active stewardship of conservation lands.
- Promote stewardship of the environment and personal responsibility.

### Goal 3 – Strong Governmental Role in Environmental Protection

#### Objective Category: Policy regulations and enforcement

- Enforce existing government regulations consistently.
- Promote policies and regulations that improve and protect water quality.

#### Objective Category: Government planning and monitoring

- Establish and improve coordinated planning, monitoring systems, and implementation throughout all levels of government.

### Goal 4 – Effective Planning and Design

#### Objective Category: Infrastructure

- Examine regional drainage infrastructure and make improvements where appropriate.
- Reduce flooding where determined feasible.
- Determine sufficiency of current treatment capacity and make improvements if warranted.

- Support effective and consistent measurement and monitoring systems of water quality systems.
- Determine sources of water quality problems and deal with them appropriately.

#### Objective Category: Planning

- Match the science, technology, and economics of water quality improvements with expectations.
- Conduct on-going planning and comprehensive evaluations of water quality in the waterways.
- Prioritize water quality issues in comprehensive and land use planning.

#### Objective Category: Funding and implementation

- Balance clean water needs with financial resources.
- Determine full costs of alternatives.
- Implement cost-effective and economically feasible options.
- Identify and consider new funding mechanisms and maximize external funding sources.
- Develop an implementation process for regional water quality management plan.
- Develop approvable plan.

#### Objective Category: Research

- Support and promote on-going scientifically sound research of water quality.

#### Objective Category: Environmental Justice

- Evaluate all impacts of alternatives on discrete populations.

The goals and objectives shown herein are the result of public collaboration on the Milwaukee Metropolitan Sewerage District's *Water Quality Initiative*, or 2020 Facilities Plan. The collaboration to date has involved over 100 citizens from throughout southeastern Wisconsin, representing environmental and civic leadership groups, neighborhood organizations, religious organizations, businesses and recreation groups; they are all united in their commitment to improve water quality! MMSD has also relied on input from municipal public works and engineering directors, chief elected officials, and a variety of elected and appointed professionals from around the region. After input at public information meetings and technical refinements by scientists, engineers and elected officials, the publicly inspired goals and objectives listed above will be approved by MMSD's Commission to guide water resource projects and improvements for the next 20 years.




**Water Quality Initiative Newsletter  
Volume 6**

## Clean Rivers, Clean Lakes II

### Watershed Planning Conference

**B**uilding partnerships is a key activity of the Water Quality Initiative, the Milwaukee Metropolitan Sewerage District's (MMSD) long-range planning process to improve our water resources in Southeastern Wisconsin. In February, "Clean Rivers, Clean Lakes II," the second annual water resource conference sponsored by MMSD and the Southeastern Wisconsin Regional Planning Commission (SEWRPC), brought together more than 400 citizens, scientists, planners, engineers, elected officials, environmentalists, and others

to learn about state-of-the-art practices and research for improving our water resources.

The conference focused on three themes: the relationship between wet weather and water quality, civic engagement, and personal and community responsibility. The articles in this newsletter present some highlights from the conference; more details and synopses of the presentations are available at the Water Quality Initiative website: [www.mmsd.com/wqi/presentations.cfm](http://www.mmsd.com/wqi/presentations.cfm). 



## When It Rains, It Pours

**M**any of the speakers at "Clean Rivers, Clean Lakes II" focused on the effects of wet weather on our water resources.

The enormous rainstorms of last May reminded the citizens of the Greater Milwaukee Watersheds that rainfall can substantially impact our lakes and streams with pollution, bacteria, and sediment, as well as create flooding and basement backups and lead to sanitary sewer overflows. In fact, according to the U.S. Environmental Protection Agency (EPA), polluted runoff may be the most important issue facing our waterways.

Of all the contaminants that enter our waterways during a rainstorm,

Gordon Stevenson, from the Wisconsin Department of Natural Resources (DNR), Bureau of Watershed Management, characterized sediment as "public enemy No. 1, at least by sheer volume."

Dale Robertson and David Saad, scientists from the U.S. Geological Survey who have been studying erosion in rivers, concur. They noted that the mass of eroded soil and other particulate matter that flows into streams and lakes can have significant impacts, degrading biological habitat – through clouding the water, for example, which lowers oxygen availability – and silting up harbors.



*continued on page 2...*



# When It Rains, It Pours *continued...*

What can be done? Stevenson noted that Wisconsin has been a leader in reducing polluted runoff since it began its watershed planning efforts in 1978. As our scientific understanding of stormwater improves, so have our policy and engineering responses. The DNR's new stormwater regulations (and an attendant grant program) set even stricter standards for abating pollution from rainstorm runoff from municipal stormsewer systems, construction sites, and agricultural operations. The improvements in our water resources from these regulations will act as a catalyst for other activities to make our water cleaner.

## Cooperation and engagement are the keys

"Inflow & Infiltration" is another important issue for stormwater management. As Tim Bate (Engineering Planning Manager for the Milwaukee Metropolitan Sewerage District) explained at the conference, infiltration is rainwater that enters the sanitary sewer system from the ground through cracks in sewer pipes and broken connections. Inflow is stormwater that enters the sanitary sewer system through



Gordon Stevenson, DNR



Tim Bate, MMSD



Rocky Marcoux, City of Milwaukee DCD

illegally connected downspouts and sump pumps, through broken or outdated manhole covers, and basement or roof drains. Inflow & Infiltration is a big problem for stormwater management because sanitary sewer systems cannot always accommodate all the extra water that enters them during wet weather. The many thousands of small sources of Inflow & Infiltration really add up: Bate showed that a single downspout from a home illegally connected to the sewer system can dump 19 gallons of water into the sewer system every minute during a rainstorm! If this water were left to run across the lawn, some of it would be absorbed rather than putting pressure on the sanitary sewer system's capacity. Too much water can lead to overflows into Lake Michigan or back-ups into people's basements.

Reducing Inflow & Infiltration might be a cost-effective way of improving our water resources in the Greater Milwaukee Watersheds, but doing so will take cooperation among citizens, local governments, and MMSD. In fact, speakers at "Clean Rivers, Clean Lakes" stressed that cooperation and engagement are the keys to ensuring a future of cleaner water. 💧

## What About the Bacteria?

In the summertime, Milwaukee beaches are sometimes closed when water testing reveals counts of fecal coliform and/or E. coli bacteria exceed levels set by the USEPA and the State of Wisconsin. Where does the bacteria come from? And how long does it last? These are questions that Dr. Sandra McClellan is addressing in her work which includes the Bacteria Source, Transport and Fate Study. This study seeks to determine the source of bacterial contamination in Lake Michigan and the Milwaukee harbor, how the bacteria are transported to and within the Lake and Harbor, and how long the bacteria survive in Lake Michigan. Sources of pollution have been studied not only in the Milwaukee area but also in Racine, Manitowoc, and Door County.

Using sophisticated computer modeling, mapping and genetic identification techniques, Dr. McClellan and her colleagues at the UWM Great Lakes WATER Institute have drawn

*...continued on back page*



Sandra McClellan



# Helping Out

From the area's biggest corporations to schools to your neighbors, everyone can do their part to improve water quality in Southeastern Wisconsin, and many people are. With green roofs and rain gardens, lateral repair programs, and conservation subdivisions, individuals, local governments, and other organizations around the Greater Milwaukee Watersheds are developing projects that will help create a future of cleaner water for the region.

Many of these projects were shared at the Water Quality Conference. The range of rain gardens alone was impressive. Willie Gonwa described how Miller Brewing Company tore up the asphalt on a parking lot at the company's facility on W. State Street in Milwaukee and built a rain garden. Now, an area that was used for palette storage – and which drained runoff directly into the combined sewer system – now stores rainwater, letting the earth slowly soak it up.

Across town, students at Tonawanda Elementary School in Elm Grove worked with Friends of Milwaukee's Rivers to build a rain garden at their

school. Friends of Milwaukee's Rivers brought the entire community together to plan and build the garden, which captures water from a playground before it enters a nearby creek. Together with the National Park Service, Tom's of Maine, and the Elmbrook Foundation they were able to plant over 2,000 native plants.

Now we're talking  
about the  
environment rather  
than crime

In Walnut Way, a neighborhood on Milwaukee's north side that is among the most impoverished in the city, a community group is building rain gardens on vacant lots as a means of both solving the area's water runoff problems and to build community. As Sharon Adams told conference goers: "Imagine – city lots with okra and collard greens growing on them. We've engaged the community in water management. At a recent community meeting, we found ourselves talking about the environment rather than crime or other nuisances." 💧



Willie Gonwa, Triad Engineering



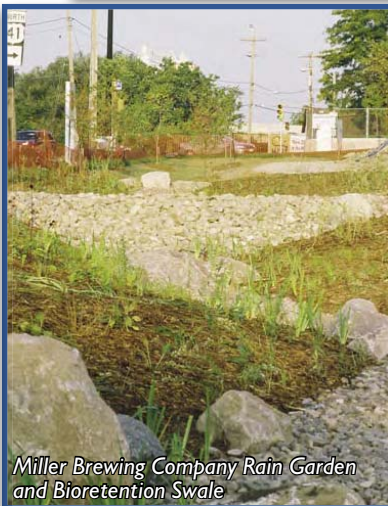
Michele Trawicki, Instructional Resource Teacher, Tonawanda School, Elm Grove, WI



Sharon Adams, Walnut Way Conservation Corp



Miller Brewing Company Tearing Up the Asphalt on a Parking Lot



Miller Brewing Company Rain Garden and Bioretention Swale



Tonawanda School Rain Garden



Tonawanda School Rain Garden



## Upcoming Events

**April 15, 2005:** MMSD Headquarters is opening their doors to the public on Gallery Night. Come explore the taboo topic of the Deep Tunnel through the photographs of Robert Kuehn. The artist and district officials will be on hand to answer questions. Also, find out how you can use a piece of art to help protect Lake Michigan. For more information about MMSD go to [www.mmsd.com](http://www.mmsd.com) and for more info on Gallery Night visit [www.historichirdward.org/events/April05GNParticipants.php](http://www.historichirdward.org/events/April05GNParticipants.php) (MMSD is #48).

### **Citizens Advisory Council**

The Citizens Advisory Council is one of the ways public input is helping to guide watershed planning. Along with other study participants, we have created a draft set of goals and objectives that can be viewed at [www.mmsd.com/wqi/public\\_involvement.cfm](http://www.mmsd.com/wqi/public_involvement.cfm).

Currently, MMSD's technical consultant for the Water Quality Initiative is evaluating dozens of "technologies" – from separating combined sewers to downspout disconnection and everything in between. Using data from the "gap analysis," these technologies will be combined into packages of alternatives. People like you will be given ample opportunity to review the alternatives as they are developed early next year.

### **MMSD's Launches New Program: "Adopt-a-River"**

Adopt-a-River invites people from the community to take ownership of nearby rivers and pledge to help keep them free of trash and other pollutants. This program is targeting three rivers: Lincoln Creek, Honey Creek and Underwood Creek. MMSD will help your group by providing trash bags, work gloves and disposal service for the full trash bags. If you are interested in participating please contact Cora Lee-Palmer at 414-421-2191 or visit our website:  
[www.mmsd.com/projects/adoptariver.cfm](http://www.mmsd.com/projects/adoptariver.cfm)

## Water Quality Initiative Schedule

The Water Quality Initiative will culminate with development of the District's 2020 Facilities Plan and final plan approval in 2007. The following is a general schedule for the 2020 facilities planning process:

- |                |                                                     |
|----------------|-----------------------------------------------------|
| <b>2004</b>    | Stakeholder identification of goals and objectives. |
| <b>2005/06</b> | Stakeholder evaluation of preliminary alternatives  |
| <b>2006</b>    | Development of Implementation Plan                  |
| <b>2007</b>    | Final Plan approvals                                |

# "The Impossible Will Take a Little While"

Keynote speaker Paul Loeb addressed one of the themes of "Clean Rivers, Clean Lakes II:" the necessity of individual civic engagement to create a future of cleaner water. Loeb, who studied the psychology of social involvement for three decades, is the author of "Soul of a Citizen: Living with Conviction in a Cynical Time" and, most recently, "The Impossible Will Take a Little While: A Citizen's Guide to Hope in a Time of Fear."

Loeb stressed the value to society of the so-called citizen "troublemakers." People, by getting involved in the business of technicians and experts, can help those experts do their jobs better. The health of our watersheds, he claimed, is one of those issues that must be addressed together, because everyone feels ownership of Lake Michigan and the systems are so big that they cannot be tackled piecemeal. Citizens must take charge to set local priorities – overcoming the fear that they are not experts and can't grasp all the details – while the experts must realize that we all share the same goals and a common vision of the

future.

Through the Water Quality Initiative, MMSD is actively building partnerships with citizens and environmental groups throughout the Greater Milwaukee Watersheds. If you're inspired to get involved and work for improved water resources, call MMSD at 414-225-2070 or visit [www.mmsd.com/wqi](http://www.mmsd.com/wqi). 💧



Paul Loeb

## What About the Bacteria? *continued...*

a number of conclusions about fecal bacteria contamination in the region, conclusions that in some cases contradict perceptions about bacteria in the Lake. For example, sewage overflows do contribute to the total bacteria load found in the Lake immediately following a severe storm, but beach closings are driven more by local stormwater runoff from the area immediately adjacent to the lakeshore. Furthermore, extreme levels of E. coli bacteria contamination in Milwaukee's rivers during a rainstorm point to polluted runoff as the source of contamination, runoff that picks up fecal matter from birds and animals as it flows into our storm sewers, emptying into the waterways and eventually into the harbor downtown.

Dr. McClellan's team has measured concentrations of E. coli in regular stormwater runoff of more than 250,000 bacteria per 100 milliliters of water, and the USEPA says that anything more than 235 bacteria per 100 milliliters is enough to close a beach. She has also determined that bacteria cannot live very long in the cold lake water, nor do they travel very far in the Lake Michigan currents. Her team's research found that 90% of the bacteria entering Lake Michigan, from any source, die off within six to eight hours. After a major storm, no bacteria were found further than one to two miles from shore. 💧



**Water Quality Initiative Newsletter  
Volume 7**



# MMSD Studies Water Quality

**T**he Water Quality Initiative, the Milwaukee Metropolitan Sewerage District's long-term planning process to improve water resources in the Greater Milwaukee Watersheds, is based on three key components:

- Nature's boundaries (watersheds)
- Public involvement and creating partnerships
- Sound science

There is still much to learn about the sources of pollution in the Greater Milwaukee Watersheds. MMSD is working with scientists from the University of Wisconsin-Milwaukee (UWM) and the Great Lakes WATER (Wisconsin Aquatic Technology and Environmental Research) Institute to address three major questions:

- Are sewage overflows the major source for

bacteria in Lake Michigan that can lead to summertime beach closings?

- What kind of contaminants are in the water that run into our waterways during rainstorms and what are their sources?
- Why have Lake Michigan's beaches seen an increase in algae washing up onto the shore in the last five years?

You can read details about the preliminary results of these studies in the pages that follow. By ensuring that the best scientific information about water quality and pollution is available, MMSD, working with the public it serves, will be able to make effective decisions about what is needed to improve the Greater Milwaukee Watersheds in the coming years. 💧

## Bacteria: Where Does It Come From? How Long Does It Stay?



*South Shore Beach, Milwaukee, WI*

**I**n the summertime, Milwaukee beaches are closed when water testing reveals bacteria counts that exceed levels set by the U.S. Environmental Protection Agency and the State of Wisconsin. Led by Dr. Sandra McLellan, the Bacteria Source, Transport and Fate Study seeks to determine the source of bacterial contamination in Lake Michigan and the Milwaukee harbor, how the bacteria are

transported to and within the Lake and Harbor, and how long the bacteria survive in Lake Michigan.

Using sophisticated computer modeling, mapping and genetic identification techniques, Dr. McLellan and her colleagues at the UWM Great Lakes WATER Institute (GLWI) have drawn a number of conclusions about bacteria

*...continued on page 2*



# Bacteria: Where Does It Come From? How Long Does It Stay *continued...*

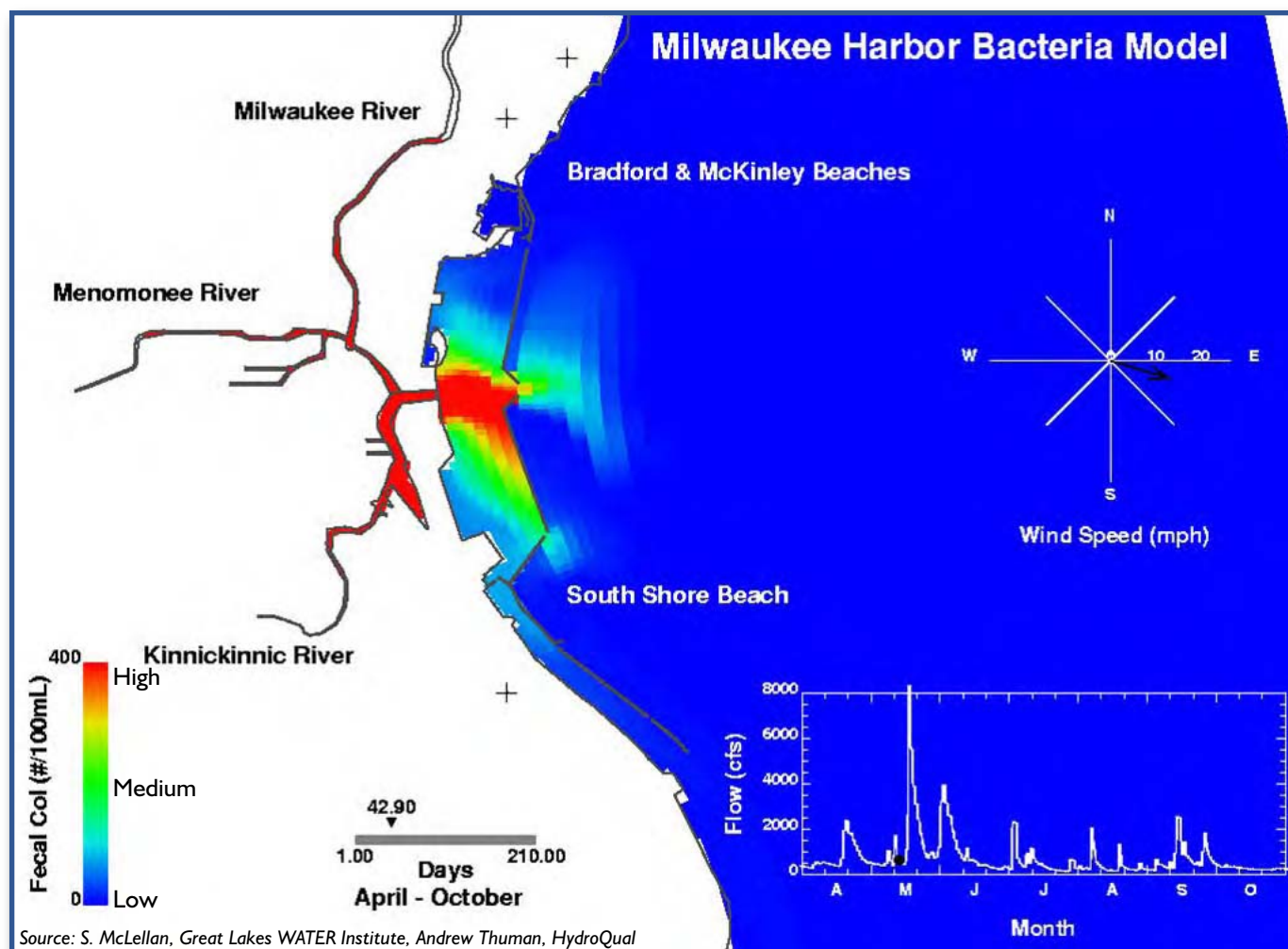
contamination in the region, conclusions that in some cases contradict perceptions about bacteria in the Lake commonly reported in the news.

For example, although occasional sewage overflows do contribute to the total bacteria load found in the Lake immediately following a severe storm, beach closings can be driven more by local stormwater runoff in the area immediately adjacent to the lakeshore. Furthermore, extremely high levels of bacteria contamination in Milwaukee's rivers during rainstorms point to polluted stormwater runoff as the major source of contamination. Stormwater runoff, as it flows into storm sewers, picks up any number of pollutants as it continues along into waterways and eventually into the harbor downtown. Pollutants in stormwater runoff can include trash, oils, sediment, roadway salt, pet and bird fecal matter, fertilizers, leaves and grass clippings; basically anything that is on the surface and in the path of the free-flowing stormwater

runoff. Dr. McLellan's team has measured concentrations of bacteria in regular stormwater runoff of more than 250,000 fecal coliform bacteria per 100 milliliters of water. WDNR regulations state that anything greater than 1000 bacteria per 100 milliliters of water is enough to close a beach!

Dr. McLellan has also determined, however, that the bacteria cannot live very long in the cold lake water, nor do they travel very far in the Lake Michigan currents. McLellan found through repeated sampling that 90% of the bacteria entering Lake Michigan die off within six to eight hours. Even after a major storm, no bacteria will be present further than one to two miles from shore as can be seen on the map below. This finding means it is very unlikely that overflows in Milwaukee had any effect on beach closings in Chicago, as was reported following last spring's large rain storms. For more information about Dr. McLellan's research go to:

[www.glwi.uwm.edu/ecoli](http://www.glwi.uwm.edu/ecoli) . 💧





# Stormwater Monitoring and Data Analysis

Contaminated stormwater runoff is among the most serious threats facing our waterways. Every time it rains, storm sewers and ditches collect the runoff and channel it directly to creeks, streams, rivers, and Lake Michigan. That runoff brings with it all the pollutants it collects along the way. Some common pollutants are litter, oil from cars, fertilizer and pesticides, grass clippings and leaf debris, roadway dust, rocks and heavy metal compounds like zinc, lead and mercury.


The problem of contaminated stormwater runoff is especially difficult to resolve because these pollutants exist everywhere within the watersheds and there are many sources. The Milwaukee River Watershed alone covers more than 690 square miles of southeastern Wisconsin and has a population of 485,000!

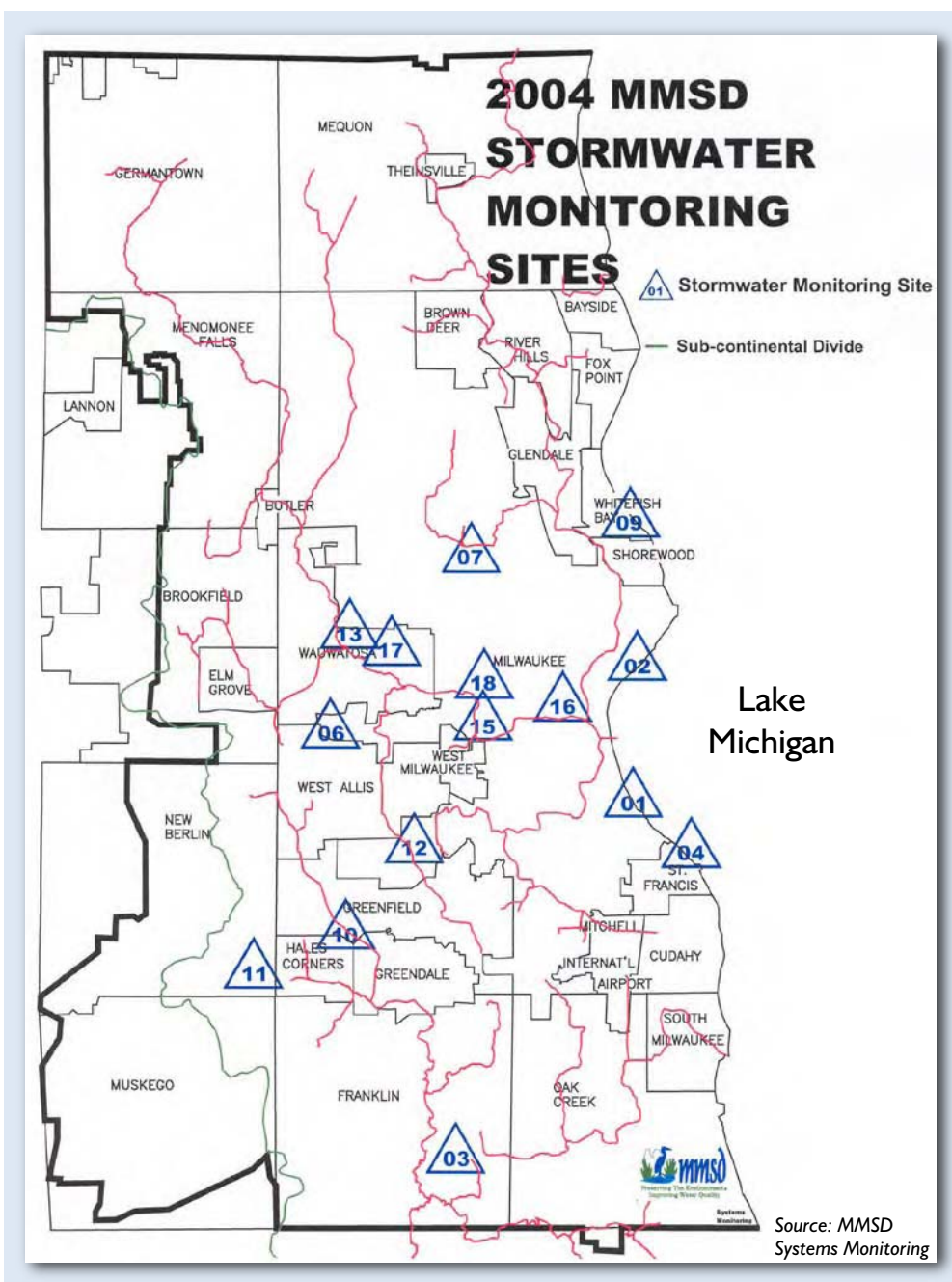
Dr. Erik Christensen and his team from the University of Wisconsin-Milwaukee's School of Engineering is undertaking a study within the Greater Milwaukee Watersheds (GMW) to characterize levels of pollution in stormwater runoff from different land use types. Within the GMW land use types include residential, recreational, agricultural, industrial, commercial, and transportation. Each land use type is characterized by the amount of pervious land, where water can be absorbed into the ground, and impervious land, where water runs off and there is no absorption into the ground. Dr. Christensen is analyzing four years-worth of runoff data collected by MMSD personnel at 15 outfalls (the places where storm sewers empty into a river or lake) around the metropolitan area. Approximate locations of the monitoring sites are on the adjacent map.

The special samplers set up at these 15 outfalls are designed to collect stormwater runoff immediately after rain starts and again after some predetermined duration. All samples collected by MMSD are analyzed for 32 pollutants of concern.

Preliminary results from the study show that the stormwater runoff from residential areas tends to have higher than average concentrations of pollutants that deplete oxygen from the water resource, along with higher concentrations of phosphorus and bacteria. This is a concern because fish

and other aquatic organisms need plenty oxygen to stay alive. Water that drains off of highways, roads and parking lots tends to be higher in Total Suspended Solids (dirt/dust/sediment), salts and heavy metals. These types of pollutants also have a negative impact on the water resources.

As Dr. Christensen and his team expand their research in the coming year, they will be able to produce “runoff profiles” of the Greater Milwaukee Watersheds. These profiles will provide important information and allow MMSD, its partners, and the public to focus on solving the most serious problems affecting a water resource in a cost-effective manner. 



## Upcoming Events

**June 23-24, 2005:** Northwest Lakes Conference, Cable, WI. Find information about the conference online at [www.wisconsinlakes.org](http://www.wisconsinlakes.org).

### Citizens Advisory Council

The Citizens Advisory Council is one of the ways public input is helping to guide watershed planning. Along with other study participants, we have created a draft set of goals and objectives that can be viewed at [www.mmsd.com/wqi/public\\_involvement.cfm](http://www.mmsd.com/wqi/public_involvement.cfm).

### Watershed Modeling Update:

Modeling on the 5 watersheds within the Greater Milwaukee Watersheds is underway. MMSD's technical consultant for the Water Quality Initiative has finished the model calibration and validation for the Menomonee River and Oak Creek Watersheds. The Kinnickinnic River, Milwaukee River, and Root River Watersheds are still in process and when the models for all five watersheds are complete, integration with the estuary model will be done.

Long-term data from many different sources must be integrated when creating a model. MMSD and its consultants assembled data from the U.S. Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), Southeastern WI Regional Planning Commission (SEWRPC), WI Department of Natural Resources (DNR), the 28 municipalities within the planning area and MMSD's Corridor Study. The end result of this work will be an integrated model of the Greater Milwaukee Watersheds that will show conditions within the watersheds. It will also improve watershed planning by developing a process for the exchange of information among different agencies within the watershed and give planners a tool for predicting impacts on a water resource when any changes are made within a watershed.

## Water Quality Initiative Schedule

The Water Quality Initiative will culminate with development of the District's 2020 Facilities Plan and final plan approval in 2007. The following is a general schedule for the 2020 facilities planning process:

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| <b>2006/07</b> | Plan selection & development of implementation plan |
| <b>2007</b>    | Final plan approval                                 |
| <b>2008+</b>   | Plan implementation                                 |

# Options to Control Cladophora Growth in Lake Michigan

It has been difficult for some to ignore the foul-smelling algae that have washed up on the region's beaches in ever-increasing amounts over the last several summers. The green algae, *Cladophora*, is the subject of a study co-funded by MMSD and led by Dr. Harvey Bootsma of the Great Lakes WATER Institute (GLWI).



Seagulls and *Cladophora* on Bradford Beach

Forty years ago, Lake Michigan's beaches were covered by the plant, a visible indication of declining water quality. Studies in the 1970s determined, but not conclusively, that *Cladophora* growth is related to high levels of nutrients like phosphorus and nitrogen in the water. In 1969, the state of Wisconsin initiated the ban of phosphate washing detergents. This helped decrease the amount of phosphorus in wastewater that flowed through to sewage treatment plants and streams, rivers and lakes. Reduction of phosphorus in detergents led to reduced nutrient levels and algae levels.

Despite the reductions in phosphorus, *Cladophora* growth has resurged over the last five years, approaching its former nuisance levels. Dr. Bootsma's study, which began in 2004 and runs through the beginning of 2007, will seek to determine whether nutrient levels are increasing and whether those increases

are tied to polluted stormwater runoff, sewage overflow, or the filtering activity of zebra mussels. There are strong indications that the introduction of the non-native zebra mussel to the Great Lakes has changed ecological conditions enough, particularly

water clarity, to allow *Cladophora* to flourish. Zebra mussels are thought to concentrate nutrients (nitrogen and phosphorus) in shallow water near the lakeshore.

Dr. Bootsma and his team are mapping the geographic distribution of *Cladophora* in the Milwaukee harbor and in the areas of the lake adjacent to the county to study localized variations in the algae.

Dr. Bootsma's study is intended to identify the sources of nutrients that are enabling algae growth, so that measures may be taken – through MMSD's Water Quality Initiative – to limit their negative effects on water quality in the Greater Milwaukee Watersheds. By studying the relative effects of watershed-wide influences that may play a part in the excessive growth of *Cladophora*, financial resources and management options can be directed in the most effective manner to make our beaches and lake water cleaner and swimming more attractive to the general public. 💧

## What Can You Do?

Preliminary results from these local water quality studies further confirm the Wisconsin Department of Natural Resources' claim that polluted rainfall runoff is the leading cause of water quality problems in the state, contributing to the degradation of our lakes, streams and rivers. Because this non-point source pollution originates from the actions of many people going about their daily lives, little changes in behavior can make a big difference. Here are some simple tips that will help you be part of the solution to controlling polluted runoff:

- Get to know your watershed and find out where water flows when it leaves your property.

- Pick up after your pet.
- Use fertilizers correctly and use natural organic fertilizers.
- Use pesticides correctly and sparingly.
- Take your car to the car wash since they treat the wash water, or wash your car on your lawn where the water flows into the grass.
- Landscape your property to reduce the amount of impervious surfaces and replace grass with natural plantings to increase absorption and slow water runoff.

MMSD has more information about the things you can do to reduce non-point source pollution. Log on to our website at [www.mmsd.com](http://www.mmsd.com) and explore. 💧



**Water Quality Initiative Newsletter  
Volume 8**

# Technologies to Improve Water Resources

The Water Quality Initiative is in an exciting phase... identifying technologies that will help improve the water resources in the area and address publicly inspired water resource goals. Past newsletters have highlighted scientific research related to the sources of pollutants in our area waterways; this issue focuses on the emerging solutions.

The Water Quality Initiative, the Milwaukee Metropolitan Sewerage District's long-term planning process to improve regional water quality, is based on three principles:

- Using nature's boundaries (watersheds),
- Involving the public in setting goals and objectives and creating partnerships to improve the water resources, and
- Relying on the best science available to make decisions.

For the last two years, the Water Quality Initiative has been gathering data about the current health of the Greater Milwaukee Watersheds and researching the multitude of "technologies" available to mitigate or solve the problems identified. The planning team talked to people from the region to establish water resource goals and objectives for the future that will guide the team through the alternatives phase of the project. This newsletter focuses on technologies, the

building blocks of alternatives ("packages" or combinations of technologies) that will be evaluated for effectiveness and cost next year. Technologies are far-ranging and include a wide variety of options that, when used individually or in combination, will address water resource issues in the Greater Milwaukee Watersheds.

Some of the questions being asked in this phase of the Water Quality Initiative include:

- What can be done to reduce the pollution in lakes, streams, and rivers?
- What initiatives are being undertaken throughout the region, and how can they best be coordinated?
- How will we know how effective our efforts are?
- How will we determine the best package of solutions to apply to the Greater Milwaukee Watersheds?

With many different sources of pollution and many different solutions, the Water Quality Initiative seeks to bring together all the organizations and agencies responsible for water quality and the technologies to improve it. Together we can work to find the best combination to improve the health of our water resources. 💧





# What are Technologies and How will

**T**echnologies (for purposes of this study) are facilities, tools, initiatives, or actions that could be built or undertaken to improve water resources.

Technologies are the building blocks of alternatives. Constructing alternatives is the next step in the planning process and will be addressed in the December newsletter.

The Water Quality Initiative reviewed the hundreds of suggestions made by the public, municipalities, and others and did an exhaustive literature review to find all the technologies that could help improve water quality. The work resulted in a list of over 320 applicable technologies for the Greater Milwaukee Watersheds.

Examples of technologies include anything from individual rain gardens on private property, to expanding the sewer system, to providing more storage or creating a volunteer program to clean up area waterways.

Five criteria were used to evaluate each technology:

- Has the technology been proven or not; has it been used successfully in other places?
- Implementability; will the technology be compatible with existing structures, fit on existing land, impact other facilities during construction?
- Environmental impacts; overall, are the effects positive or negative?

## Technologies to Address Point Source Pollution

**T**he cooling tower discharge from a power plant, the effluent from MMSD's two treatment plants, and the discharge from any manufacturing/industrial facility along the river or in your neighborhood are examples of "point source" discharges. Point source pollution comes from one, "identifiable" source, making it easy to locate, reduce, or eliminate the pollutants before being discharged into a sewer or body of water.

As regulatory standards change from technology-based to water quality-based, traditional treatment technology upgrades may no longer be efficient or cost effective. Adding more or different technologies to the end of an existing

treatment system may not necessarily solve the water resource problem identified.

MMSD engineers have identified sources of wastewater that enter the treatment plants by way of the conveyance systems. These sources include anything from domestic waste to large quantities of runoff from storms. Technologies being evaluated in the 2020 Facilities Plan – to reduce pollutants or increase treatment capacity during a rainfall event at the treatment plants – include: chemical enhanced primary treatment, chemical or biological phosphorus removal, and final effluent filtration.

Technologies also being considered to help reduce, eliminate or slow down the amount of stormwater that enters the sewers include: stormwater trees, street storage, programs and policies, sewer separation, and sewer rehabilitation in separate sewer areas.

As we continue through the 2020 Facilities Planning process, we will identify different combinations of technologies, and evaluate their effects on our water resources (and for those that are effective, consider costs). With this information we will move forward in the process to build alternatives that will improve water resources and meet the publicly inspired goals and objectives for the region. 💧



*High Rate Treatment Pilot Study, South Shore Wastewater Treatment Plant*



*Northwest Side Relief Sewer Tunnel*

# We Determine Which Ones to Use?

- Financial aspects; are there significant capital costs, significant operation and maintenance costs or are there disparate user sector impacts that will result? and
- Miscellaneous impacts; including public perception, intergovernmental cooperation agreements, regulatory restrictions or significant safety and risk management issues.

The screening of technologies was completed by the team with input during the process from all advisory committees.

Over 50 technologies will be analyzed and developed further. Their effectiveness will be quantified using “production theory.” Production theory uses mathematics to describe how inputs get

turned into outputs, via technologies. For instance, x quantities of rain gardens (inputs) result in y benefits (outputs). Production functions can be expressed as mathematical formulae or as graphs. The production data that results from these analyses help us to compare the effort, effectiveness, and cost of the different technologies. Think of it as a way to make apples to apples comparisons between very different things. This will ultimately help MMSD, the Water Quality Initiative’s team and advisory committees to evaluate and group the technologies based on their benefit to the water resource system and their cost.

The lists of technologies can be viewed at [www.mmsd.com/wqi/draft\\_documents.csm](http://www.mmsd.com/wqi/draft_documents.csm) 

## Technologies to Address Nonpoint Source Pollution

“Nonpoint” source pollution refers to the runoff that carries pollutants from many, unrelated sources into our streams, rivers, lakes, and groundwater. These sources are usually associated with land use activities rather than pipe discharges. Nonpoint source pollutants include: sediment, pesticides, and nutrients running off fields and urban lawns; oil, grease, heavy metals, and other toxic materials carried from streets, highways, rooftops, and parking lots; animal waste; and soil washed from construction sites. Stormwater runoff is the most common carrier for nonpoint source pollution.

The effects of nonpoint source pollution can be seen in fish habitat destruction, fish kills, reduction in drinking water quality, siltation of harbors and streams, and the decline in the ability of lakes to support recreational uses.

Wisconsin has been a leader in reducing polluted stormwater runoff since it began addressing nonpoint source pollution in 1978. Some technologies used to minimize the effects of nonpoint source pollution include acquiring and protecting “critical areas” in our watersheds. A program of “pocket wetlands” helps to naturally contain and filter polluted runoff.



*River Sediment Plume into Harbor*


While conservation crop rotation reduces erosion and improves soil fertility, education programs have helped urban residents safely dispose of wastes that were historically thought safe to dump onto streets or directly into a catch basin.

Demonstration projects directed at using the latest technology for stormwater Best Management Practices (BMP) have been partially funded by MMSD since 2003. Around the region, these projects include rain barrels, rain gardens, pervious parking lots, porous pavement, stormwater parks, constructed wetlands, street storage, downspout disconnection, and cisterns. Information collected from these projects will help determine how effective these technologies are, and at what cost – providing valuable data to determine the best combinations of technologies for the final recommended plan.



*Rain Barrel*

Programs and policies such as expanded public education, outreach and involvement in watershed planning are also being considered as technologies to help reduce nonpoint source pollution. Finally, MMSD is evaluating new rules and regulations that affect nonpoint source pollution, such as construction site erosion control and post-construction stormwater management.

To find out more about some of these technologies, visit the Water Quality Initiative web page at: [www.mmsd.com/wqi](http://www.mmsd.com/wqi) . Fact sheets are available for reading and downloading and sharing with your community or environmental group. 



## Upcoming Events

**Water Quality Initiative Analyzes Performance of Technologies** The Water Quality Initiative is entering another exciting phase of the project. We've listened to our public as they have described their vision of a future of cleaner water in the Greater Milwaukee Watersheds, and now MMSD is evaluating dozens of "technologies" – from separating combined sewers to downspout disconnection – that will be combined into packages of alternatives to affect a range of improvements to sewer facilities, policies, operations, and programs. The citizens of the Greater Milwaukee Watersheds will be given opportunity to review these alternatives as they are developed.

### **SEWRPC Regional Water Quality Management Plan Update**

The Southeastern Wisconsin Regional Planning Commission is working as a partner with MMSD's Water Quality Initiative by concurrently updating its Regional Water Quality Management Plan for the seven counties of southeastern Wisconsin. Draft chapters from that update are available for reading and downloading at <http://www.sewrpc.org/waterqualityplan/chapters.asp>

**Draft Chapters of the 2020 Facilities Plan Available Soon** MMSD's 2020 Facilities Plan – also called our Water Quality Initiative – has been ongoing for more than two years. Drafts of the first chapters of the plan will soon be available for public review and comment.

### **Baseline Water Quality Studies Complete**

In order to know if we're reaching our water quality goals, we have to know where we've been. MMSD has completed a series of water quality reports highlighting existing conditions in each of the Greater Milwaukee Watersheds – Menomonee River, Milwaukee River, Oak Creek, Root River, Kinnickinnic River, and the Lake Michigan Direct Drainage.

## Water Quality Initiative Schedule

The Water Quality Initiative will culminate with development of the District's 2020 Facilities Plan and final plan approval in 2007. The following is a general schedule for the 2020 facilities planning process:

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| <b>2008+</b>   | Plan implementation                                 |

# Reduce Combined Sewer Overflows & Basement Backups

That's what the citizens of the Village of Shorewood chose to do. A pilot project, to see how stormwater best management practices (BMPs) can help reduce Combined Sewer Overflows and basement backups and perhaps avoid expensive sewer installations, began earlier this summer in the Village.

This project is a partnership between the Village of Shorewood and Milwaukee Metropolitan Sewerage District (MMSD) as part of the 2020 Facilities Plan. The goal is to disconnect downspouts and install rain barrels and gardens that will retain 50% of the roof surface runoff in the targeted area of the Village of Shorewood. Two demonstration rain gardens have been constructed on land between the Shorewood Village Hall and Library and on the grounds at Atwater Elementary School.

This project is a great step forward for stormwater education and is a hallmark for intergovernmental cooperation. In order for the Village to take on this pilot project, the Village Board passed a resolution to allow disconnection of downspouts. They asked for a few things on behalf of the residents: that there would be no additional costs to the homeowners, that the disconnections and installations be completed by professionals, not homeowners, and that rain barrels and rain gardens are designed and installed with project funds.

Disconnecting downspouts from the sewer system, installing rain barrels and rain gardens are the three main stormwater BMPs used in the Shorewood project. These practices focus on reducing the amount of stormwater

runoff that gets into the combined sewers by redirecting the water into rain gardens and barrels or directly into storm sewers already available in the streets.

### **What are stormwater best management practices (BMPs)?**

They are a way to manage rain where it falls. For example, during a heavy storm, each downspout on a home can deliver up to 12 gallons a minute to the combined sewer system. By simply disconnecting a downspout, excess water can be delayed from entering the sewer system.

Project team members and Village of Shorewood staff visited each and every residence to assess what practices would work best. They documented the number and locations

of downspouts and photographed each site. Residents also received a packet of information, with a letter from the Village President, handouts and materials, a sign-up form, and were encouraged to attend a Public Meeting.

To date, 390 residents have expressed an interest in participating in the program. The community is enthusiastic and is making a difference in the way we look at combined sewer overflows. All the information collected from this project will help determine whether these practices are applicable in other parts of the region and what more can be done to reduce combined sewer overflows. After all, every drop counts.

*This is the third article in a series to highlight technologies and projects that benefit water quality.* 💧



Rain Garden

**Water Quality Initiative Newsletter  
Volume 9**



# the WATER RESOURCE

Water Quality  
INITIATIVE

## Schedule

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- 2007 Final plan approval
- 2008+ Plan implementation

## New Information about the Sources of Pollution Aids Water Quality Initiative

**I**n order to plan for the future of clean water in the Greater Milwaukee

Watersheds and meet publicly-inspired goals and objectives, we need to know the current condition of our waterways. The Milwaukee Metropolitan Sewerage District (MMSD) has been working closely with the Southeastern Wisconsin Regional Planning Commission (SEWRPC) to determine the sources of pollution in the Greater Milwaukee Watersheds. Part of this ongoing study seeks to identify the amounts and causes of point source pollution (sewer overflows and industrial discharges) and non-point source pollution (polluted rain runoff), or "loadings." By studying this, we can determine how best to develop a plan to address the region's goals and objectives.

The results of the Menomonee and Kinnickinnic River Watershed SEWRPC studies regarding existing pollution loads have been released.

They estimate the amount and types of pollutants in the region's surface water by source. Among the major findings, since the inline storage system ("Deep Tunnel") went into operation in 1994, total annual "loadings" of

most types of pollution have been dramatically reduced in the areas of the waterways that benefited from the construction of the inline storage tunnel. This is because the inline storage system (ISS) greatly reduces overflows from



Milwaukee River

separate and combined sewers during storms. For example, in 1975, the Kinnickinnic River Watershed received more than 14 trillion fecal coliform cells per year; in 2000, there were fewer than 5 trillion cells, a 67% decline, based on SEWRPC data.

Sewer overflows remain a concern in both watersheds studied so far. For example, 15% of the fecal coliform in the Menomonee River Watershed still comes from point sources,

primarily sewer overflows from municipalities in the watershed. Still, the bulk of most pollutants entering our waterways – biochemical oxygen demand, phosphorus, and fecal coliform – come from non-point sources.

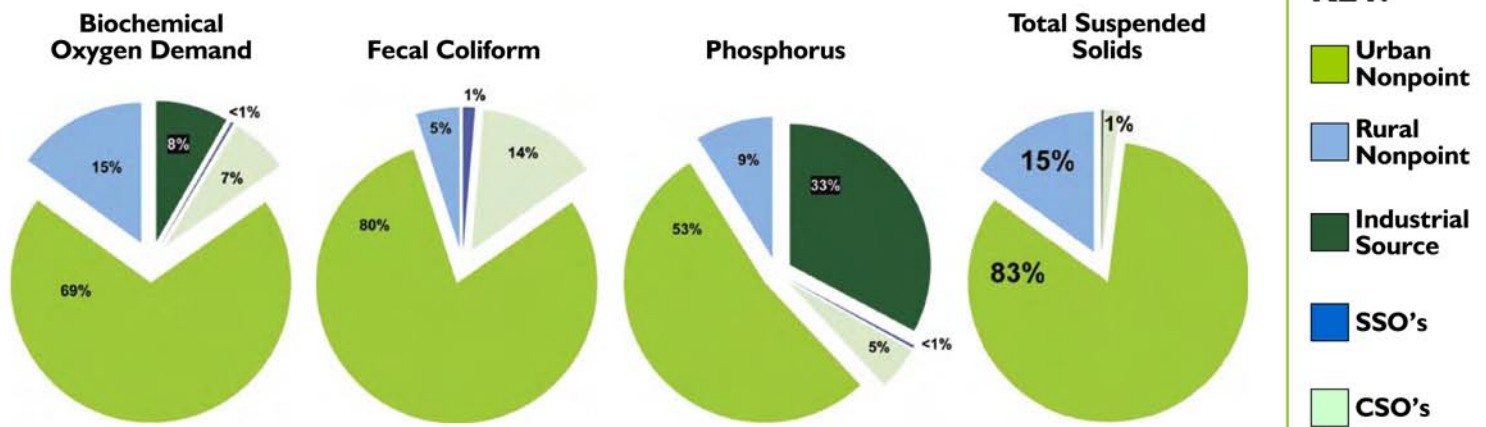
This data analysis will allow a better understanding of the magnitude and sources

of the pollution in our waterways to help MMSD, its partners, and the public make informed decisions about the best ways to improve water quality in the Greater Milwaukee Watersheds. See data pie charts on pages 2 and 3. 💧

The MMSD/SEWRPC study measures the annual "loadings" of these four types of pollutants:

- Nutrients (phosphorus and nitrogen) - they can cause algae growth;
- Suspended Matter (total suspended solids) - these include silt and other material or particles that cloud the water and settle in the streams;
- Bacteria (fecal coliform or E. coli bacteria) - this can cause beach closings; and
- Oxygen-demanding substances (biochemical oxygen demand) - this reduces the amount of oxygen available for fish and plants.




**KEY:**


Source: 2020 Facilities Planning Team

## Alternative Visions for Cleaner Water

Improving water quality in the Greater Milwaukee Watersheds requires addressing both point source pollution (sewer overflows and industrial discharges) and non-point source pollution (polluted runoff). Engineers, scientists, and the Water Quality Initiative's Citizens Advisory Council have been evaluating hundreds of potential ways to meet the public's goals for our waterways. These methods, or technologies which are sometimes referred to as "FPOPs," include Facilities (or infrastructure improvements), Policies, Operational improvements and Programs. They have been collected and grouped together into sets of "alternatives," or combinations of technologies. Each alternative takes a different approach to improving the water resource.

Three major alternatives (groups of methods for meeting project goals) were developed including a baseline "no additional action" alternative, a set focused on meeting overflow regulations, and a set designed to meet water quality regulations.

### Alternative A: "Baseline"

The Baseline Alternative focuses on completing all the projects that MMSD, the municipalities, the Wisconsin Department of Natural Resources (DNR), and other authorities are already committed to do. These projects include expanding the ISS system, and implementing the DNR's non-point pollution control regulations (for example, urban detention basins and enhanced street sweeping programs to remove debris and sources of pollution before they are washed into rivers and lakes, etc).

Although this alternative does not include any new initiatives beyond what is already planned, it still is working to prevent overflows; MMSD is currently committed to \$900 million of

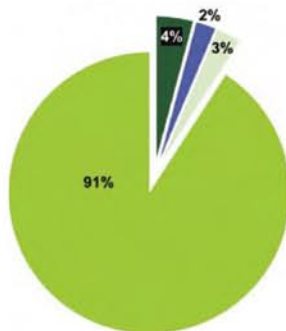
ALTERNATIVE	DRIVER	DESCRIPTION	ENDPOINT(S)
<b>A (Baseline)</b> Future 2020 Situation	Completion of all committed MMSD and other projects, and implementation of committed programs.	FPOPs determined by all committed projects and non-point pollution regulations as impacted by projected 2020 population and land use.	Completion of all committed FPOPs.
<b>B1</b> Meet all discharge and non-point regulations	Compliance with all regulations governing discharge of municipal overflows and non point pollution into watersheds.	Develop FPOPs to comply with existing SSO, CSO and non-point pollution regulations.	Projected frequency of allowable overflows (SSO and CSO), and meet percent reduction requirements for non-point pollution using applicable measures.
<b>B1 (MMSD)</b> MMSD functions only	Compliance with all regulations governing discharge of overflows.	Develop FPOPs to comply with existing SSO, CSO regulations.	Number of CSO and SSO meet regulations.
<b>B2</b> Minimize Overflows (utilizing FPOPs from B1)	Maximum use of MMSD facilities to reduce overflows and meet all non-point regulations.	Operate all existing and committed MMSD facilities to reduce overflows to the maximum extent, and develop FPOPs to comply with non-point regulations.	Projected frequency of overflows (SSO and CSO), and meet percent reduction requirements for non-point pollution using applicable measures.
<b>C1</b> Water Quality Criteria	Compliance with receiving water quality criteria.	Develop FPOPs to comply with all applicable receiving water quality criteria.	Projected water quality based upon implementation of FPOPs.
<b>C2</b> Water Quality Criteria with habitat, aesthetic and community measures.	Compliance with receiving water quality criteria with improvement of water quality emphasizing non-traditional "green" FPOPs that also provide aesthetic, habitat and community value.	Develop FPOPs that result in water quality improvement and objectives for open space, aesthetics, and environmental conditions consistent with community needs and vision.	Projected water quality based upon implementation of FPOPs.



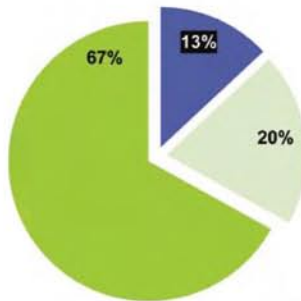
## KEY:



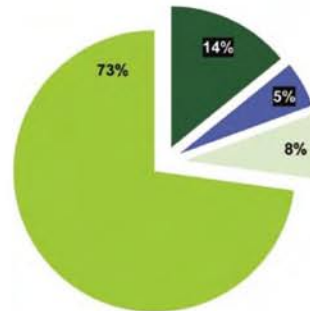
**Biochemical Oxygen Demand**



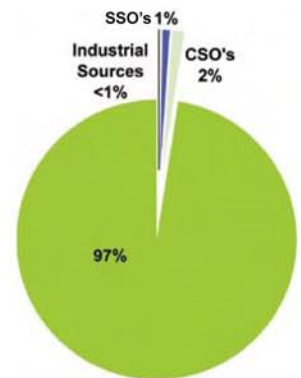
**Fecal Coliform**



**Phosphorus**



**Total Suspended Solids**



Source: 2020 Facilities Planning Team

improvements alone. Analysis of the Baseline Alternative will show us what the state of the region's water resources will be in 2020 if no further action is taken beyond current commitments.

### The Common Package

This set of actions includes improvements to MMSD's sewer and treatment systems, implementing watershed-wide education programs, advocacy, efforts to reduce basement back-ups and sewer overflows during storms, and basic measures to reduce the polluting effects of urban stormwater runoff. The common package is included in all the alternatives.

### Alternative B: Meeting Regulatory Standards

This alternative seeks only to meet all state standards on overflows and non-point source pollution. In these alternatives, methods have been selected to most effectively meet regulations. The B alternative comes in several forms—focusing on reducing sewer overflows (MMSD's responsibility for its collection system); cooperating with other partners, such as municipalities, to meet non-point source pollution regulations; and by maximizing operational improvements to meet overflow regulations and complying with runoff regulations.

The technologies proposed in the "B" Alternative may include implementing



Flooding

rain barrel and rain storage programs, adding flow restrictors to street sewers to slow the rate at which rainwater enters the sewerage system, construction of additional "deep tunnel" storage, creating detention basins, and helping establish low-impact farming practices.

### Alternative C: Improving Water Quality Through the Watershed Approach

Alternatives C1 and C2 are the results of using the Watershed Approach; they focus on most closely meeting the publicly-inspired goals and objectives in the region's lakes and streams. The "C" alternatives meet the current water quality criteria, all state and federal regulations, and address the goals set by the citizens of the Greater Milwaukee Watersheds for the future of water resources.

*Alternative C1* uses the best technologies and practices available to improve water resources throughout watersheds. It would implement a full range of technologies, concentrating on the impact of the technology on water quality such as implementing stormwater BMPs, necessary additional sewage storage and treatment systems, and conservation buffers or detention basins to reduce the amount of non-point pollution entering our waterways.

*Alternative C2* goes even further, looking to improve habitat for plants and wildlife and the aesthetics of our waterways. Along with FPOPs that reduce the amount of water pollution, this alternative would include improving access to water for recreation, increasing the amount of open space in our watersheds, and restoring prairies and wetlands. The goals and objectives of the Greater Milwaukee Watersheds have expressed support for all these objectives. 💧



Rain Barrel



Rain Garden



## Upcoming Events

### *Water Quality Initiative Analyzes Performance of Technologies*

The Water Quality Initiative is entering another exciting phase of the project. We've listened to our public as they have described their vision of a future of cleaner water in the Greater Milwaukee Watersheds, and now MMSD is evaluating dozens of "technologies" – from separating combined sewers to downspout disconnection – that are combined into packages of alternatives to affect a range of improvements to sewer facilities, policies, operational improvements, and programs. The citizens of the Greater Milwaukee Watersheds will be given opportunity to review these alternatives as they are developed.

### *SEWRPC Regional Water Quality Management Plan Update*

The Southeastern Wisconsin Regional Planning Commission is working as a partner with MMSD's Water Quality Initiative by concurrently updating its Regional Water Quality Management Plan for the seven counties of southeastern Wisconsin. Draft chapters from that update are available for reading and downloading at <http://www.sewrpc.org/waterqualityplan/chapters.asp>.

### *Draft Chapters of the 2020 Facilities Plan Available Soon*

MMSD's 2020 Facilities Plan – also called our Water Quality Initiative – has been ongoing for more than two years. Drafts of the first chapters of the plan are available for public review and comment as they become available.

### *Baseline Water Quality Studies Complete*

In order to know if we're reaching our water quality goals, we have to know where we've been. MMSD has completed a series of water quality reports highlighting existing conditions in each of the Greater Milwaukee Watersheds – Menomonee River, Milwaukee River, Oak Creek, Root River, Kinnickinnic River, and the Lake Michigan Direct Drainage.

# What's Next?

## Evaluating the Future of the Greater Milwaukee Watersheds

The Water Quality Initiative, the Milwaukee Metropolitan Sewerage District's long-term planning process to improve water resources in the Greater Milwaukee Watersheds, is based on three key components: using nature's boundaries (watersheds), public involvement, and creating partnerships, and sound science. So far, the process has generated many documents that you can review on MMSD's website:

- **Goals and objectives for future water quality in the Greater Milwaukee Watersheds:**

These are the goals and objectives created by hundreds of citizens, environmental groups, technical experts, scientists, and elected officials. See [www.mmsd.com/wqi/public\\_involvement.cfm](http://www.mmsd.com/wqi/public_involvement.cfm).

- **Current state of water quality in the region:**

This report looks at the state of the Greater Milwaukee Watersheds so we can monitor our efforts to improve water

quality and to direct future actions. See "watershed booklets" at [www.mmsd.com/wqi/publications.cfm](http://www.mmsd.com/wqi/publications.cfm).

- **Complete list of technologies to improve water quality:**

Technologies are tools and actions to improve water quality; they range from building more sewage treatment plants to installing rain gardens. See [www.mmsd.com/wqi/draft\\_documents.cfm](http://www.mmsd.com/wqi/draft_documents.cfm).  
  
The next step in the Water Quality Initiative is to evaluate the alternatives in terms of how they meet goals and objectives, and if they're cost-effective. This process, which includes measuring the benefits of the technologies, will take place over the next year. In the end, an alternative will be selected – based on technical evaluation and public input – that will best help the region attain the water quality goals inspired by the public. 💧



Runners, Milwaukee Water Tower