Water Quality INITIATIVE

The Water Resource

www.mmsd.com/wqi

Issue 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

Technologies (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

The 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.

High Rate Treatment Pilot Study, South Shore Wastewater Treatment Plant

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.

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*

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.

Rain Barrel

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.

River Sediment Plume into Harbor

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* . 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:

2002/03	Plan organization & methods development
2003/04	Identification of goals & objectives
2004/05	Data collection & forecasting conditions
2005/06	Development & evaluation of alternatives
2006/07	Plan selection & development of implementation plan
2007	Final plan approval
2008+	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