

Subgoal 2

Can we drink the water?

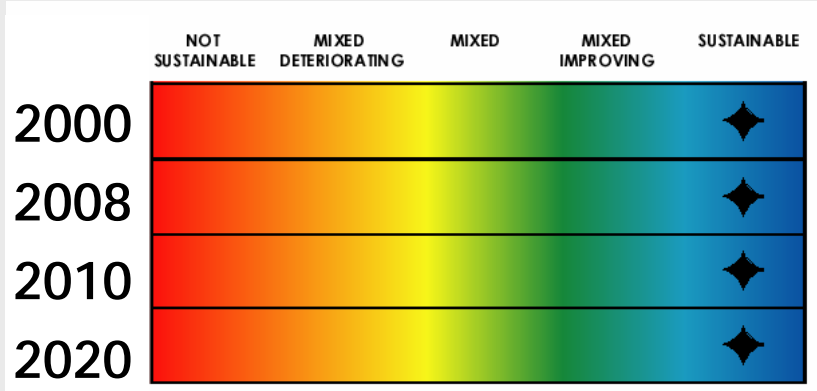
What is our target for sustainability?

A treated water supply that meets all Federal drinking water quality standards.

Why is this important?

The Safe Drinking Water Act provides federal standards and regulations for water supplies. Lake Michigan water quality is overwhelmingly good. Although there have been past local problems that did cause illness, current concerns are the need to monitor for emerging contaminants and depletion of ground water that serves as both a drinking water source and also replenishes Lake Michigan.

Lake Michigan Target Dates for Sustainability



What is the current status?

Drinking water quality for municipal systems using Lake Michigan water resources is of good quality. Supplied water is also generally of high quality.

What are the major challenges?

- Climate Change: Energy consumption by water treatment facilities is significant and water quality impacted due to intense storms, runoff, and temperatures promoting pathogen growth as well as emerging water quality concerns
- Aging water treatment infrastructure, operations, and maintenance plans
- Improving public education on protection and conservation of water sources
- Slow pace of implementing of source water protection plans
- Managing impacts of urban and agricultural nonpoint source runoff
- Monitoring for existing and emerging contaminants
- Educating the public on the hydrological cycle and the need for stewardship of both drinking water quantity and quality

What are the next steps?

- Work with new WaterSense label and Energy Star program to promote benchmarking energy performance of water utilities
- Continue Watershed Academy to ensure land use and planning take account of source water issues protection needs
- Seek funding to develop a source water protection GIS system including recharge areas
- Enhance local public water supply security awareness
- Identify resources for public water suppliers to ensure that by 2011 80% of the community water systems will be substantially implementing source water protection plans
- Identify opportunities to work with the Great Lakes and St. Lawrence Cities Initiative conservation framework of 15% reduction from 2000 to 2015



What are some tools for addressing the challenges?

- IL-IN Sea Grant Unwanted Medicine Disposal Community Tool Kit
- Water Security Resources
- USEPA Pollution Prevention Technical Assistance
- Drinking Water Academy
- Water Efficiency Resources

What are the State of the Lakes Ecosystem (SOLEC) indicators used to help assess the status of the subgoal?

[Indicator # 117 - Atmospheric Deposition of Toxic Chemicals](#)

Great Lakes: Status: Mixed, Trend: Improving (for PCBs, banned organochlorine pesticides, dioxins and furans) / Unchanging or slightly improving (for PAHs and mercury)

[Indicator # 118 - Toxic Chemical Concentrations in Offshore Waters](#)

Lake Michigan: Status: Fair, Trend: Undetermined

[Indicator # 4175 - Drinking Water Quality](#)

Great Lakes: Status: Good, Trend: Unchanging

For more information on status of indicators, see <http://www.epa.gov/solec/sogl2007/>

The original 1998 Lake Michigan Lakewide Management Plan goal referred to water quality. Recent concerns about quantity are discussed in Chapter 6. Both quantity and quality factor into “sustainability.”

Background

Drinking Water Contaminants

The waters of Lake Michigan and surrounding areas are a primary source of drinking water for 10 million people who live in the basin. The Lake Michigan states currently are delegated to run their own drinking water programs. Since LaMP 2000 the issue of ground water depletion has been growing in importance with implications for drinking water sources and habitat (see Chapter 6 for more information on ground water).

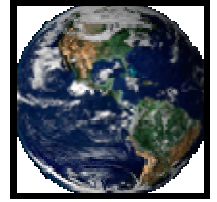
In addition, there is a growing concern over pharmaceuticals in source water. The first national reconnaissance was completed by USGS in 2000. The study found a wide range of contaminants, but at low levels. Many compounds, however, do not have established guidelines thereby demonstrating the need for both monitoring and research.

Various contaminants can adversely impact drinking water, including microorganisms (e.g., bacteria, viruses, and protozoa such as cryptosporidium), chemical contaminants (including naturally occurring compounds and anthropogenic or synthetic chemicals), and radiological contaminants (including naturally occurring inorganic and radioactive materials and metals). Some contaminants in raw (untreated) water supplies, such as aluminum, arsenic, copper, and lead, can be both naturally occurring and the result of human activities. Other contaminants, such as household chemicals, industrial products, urban storm water runoff, fertilizers, human and animal waste, nitrate (from fertilizers and sewage), and pesticides, may also end up in raw water supplies (EPA, 1999a; Health Canada, 1998).

Certain contaminants pose a concern when present in drinking water because of possible health consequences associated with these substances. These contaminants may be in raw water as a result of industrial and agricultural activities or treated wastewater discharges (Minnesota Pollution Control Agency, 1997). Some may also be present in treated water as a result of chemicals used in the drinking water treatment process (Health Canada, 1998). The impact of contaminants is diluted in a large water body like Lake Michigan but could be more serious in a groundwater source.

Great Lakes 2008 Earth Day Challenge

For Earth Day 2008, US EPA challenges residents and communities around the Great Lakes to collect and recycle electronic waste and to properly dispose of unwanted medicines.



e-Waste

Electronic waste includes all those old or broken TVs, cell phones, computer components and similar gadgets that are part of our lives. E-waste contains possibly hazardous materials that can harm human health and the Great Lakes environment if disposed of improperly. In 2005 we discarded an estimated 2 million tons of TVs, computers and other electronic gear. Proper disposal and recycling are necessary to avoid unwanted pollution. When we reuse or recycle e-waste properly, we recover materials for re-use, save energy and reduce the environmental costs of raw material extraction and processing.

Medicines

Traces of medicines have been found in streams and the Great Lakes where we get our drinking water and have also been detected near wastewater treatment outflows. Some of these medicines can lead to reproductive and developmental problems in fish and other animals. We often treat leftover medicine as a common household waste. More than half of people surveyed throw their unused medicines in the trash while a third flush them down the drain. In both cases, the medicines have the potential to be released into our rivers and lakes.

The Challenge

U.S. EPA issued an Earth Day Challenge to residents, businesses and community organizations throughout the Great Lakes basin to plan or participate in collection events of e-waste or unwanted medicines during Earth Week April 19 –



27. Across the Great Lakes region, communities are stepping up, signing on to the challenge and adding their collection and take-back events to the efforts of thousands.

This is a chance to see how much we can accomplish together. The Challenge is to collect a million pounds of e-waste for proper management and a million pills of unwanted medicines for responsible disposal during Earth Week.

More information is available at <http://www.epa.gov/greatlakes/earthday2008/links.html>

In general, drinking water provided by public water suppliers is likely to remain of good quality because of the multiple pollutant barrier approach being implemented across the basin. Not only are treatment systems and operating practices continually improving, but increased monitoring is also providing more information about source water supplies and the need for source water protection. In the past two years, greater emphasis has been placed on protecting raw sources of drinking water. Both the source water assessments that were completed for public water supplies and recent data collected from 22 sites around the Great Lakes are providing more information about raw water supplies.

The Importance of Groundwater

The Lake Michigan basin has had the luxury of sufficient water of good quality. The basin has seen a significant population expansion. However, many communities reliant on groundwater are facing both quality and quantity problems. Further, climate change is likely to add pressure to a system that is already stressed.

Seventy-nine percent of the Lake Michigan annual recharge comes either directly or indirectly from ground water. As such, being stewards of Lake Michigan requires being stewards of the ground water as well.

Drinking Water Monitoring and Reporting

Continuing efforts must be made to inform health professionals and the public of the results of analyses of drinking water. USEPA requires that public water supplies be monitored for bacteriological, inorganic, organic, and radiological contaminants. The analyses of drinking water include tests for the physical and chemical characteristics of the water as well as for contaminants from natural sources or human activities. In addition, the USEPA Office of Groundwater and Drinking Water (OGWDW) web site at www.epa.gov/OGWDW/ provides detailed information on the nation's drinking water, including drinking water and health information, drinking water standards, and local drinking water information. Community water suppliers deliver high-quality drinking water to millions of people every day, and a network of government agencies is in place to ensure the safety of public drinking water supplies.

Water Infrastructure Security

Under both the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA), USEPA works closely with partner organizations -- other government agencies and water utilities and associations (both drinking water and wastewater) -- to ensure clean and safe water. Industry and government are also working cooperatively to improve drinking water and wastewater security. Building on and supporting long-established relationships with its partners, USEPA helps the water sector to: (1) understand and utilize the best scientific information and technologies for water security; (2) support assessment of utility vulnerabilities to possible attack; (3) take action to improve security; and (4) respond effectively and efficiently in the event that an incident occurs. This commitment is outlined in USEPA's Strategic Plan for Homeland Security.

A number of actions are underway to support development of tools, training, and technical assistance for small and medium drinking water and wastewater utilities, and actions are being taken to promote information sharing and research on water security (See the Lake Michigan Toolbox on preceding page).

The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 has drinking water utilities facing new responsibilities. While their mission has always been to deliver a dependable and safe supply of water to their customers, the challenges inherent in achieving that mission have expanded to include security and counter-terrorism. In the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, Congress recognizes the need for drinking water systems to undertake a more comprehensive view of water safety and security.

Drinking Water Security in the Lake Michigan Basin

All Community Water Systems in the Lake Michigan Basin have submitted their Vulnerability Assessments as required by the "Public Health Security and Bioterrorism Preparedness and Response Act of 2002". The current focus of drinking water security efforts is to integrate drinking water security into the everyday culture at all levels – local, state, and federal. The National Drinking Water Advisory Council (NDWAC)

Partnership Investigates Pharmaceuticals and Personal Care Products (PPCP)

Increasing evidence indicates widespread occurrence of PPCP compounds in surface water, sediments, and municipal effluent, but data on the accumulation of PPCP compounds in fish tissue are scarce. US EPA Office of Science and Technology within EPA's Office of Water responded to this agency priority and addressed this data gap through the initiation of a pilot study. The purpose of the study is to investigate the occurrence of PPCP chemicals in fish tissue called the National Pilot Study of Pharmaceuticals and Personal Care Products in Fish Tissue. It will determine the concentrations of 34 PPCPs in composited fish fillets and liver samples from five effluent dominated stream sites, plus one reference site where waters are not impact dominated by waste water treatment plant effluents. A supplemental study on the North Shore Channel of the Chicago River was added to the Pilot Study through collaboration with GLNPO. Both studies concluded in March 2007.

This comprehensive and exploratory study was created through a collaborative process involving all partners and organized by GLNPO. Because of the collaborative nature of the project, a large amount of work was completed for minimal funding. The collaboration on this project allowed EPA to gain much greater insight into the presence, trends, and ecological significance of PPCPs, hormones, and Alkylphenol. Ethoxylates (APEs) in an effluent-dominated stream. Without the collaboration, EPA would have only been able to estimate concentrations of a small set of PPCPs in fish tissue.

This strong partnership has allowed the project team to leverage resources, gain access to facilities and locations using the resources of all participating organizations, and provide technical support across among federal government, academia, state government, and the local wastewater treatment agency towards a common goal. This partnership is also showing its lasting strength through its use on similar projects in the region.

The supplemental study on the North Shore Channel is a collaborative partnership between GLNPO, Region 5, the Chicago Regional Laboratory (CRL), the Office of Water, the Office of Research and Development (ORD), United States Geological Survey (USGS), United States Department of Agriculture (USDA), Saint Cloud State University, Clarkson University, Baylor University, the Illinois Department of Natural Resources (ILDNR), and the Metropolitan Water Reclamation District of Greater Chicago (District). The four main objectives of the supplemental study support the Agency's strategic Goal 4 to protect healthy ecosystems with the subobjective to improve the health of the Great Lakes ecosystems in addition to addressing Goal 2, clean and safe water. The main objectives of the study are to: (1) determine if there is reproductive impairment to resident fish; (2) estimate whole fish and fillet concentrations of PPCPs, APEs, and hormones; (3) estimate effluent and stream concentrations of PPCPs, APEs, and hormones; and (4) document seasonal differences in concentrations of these compounds in effluent, stream, and fish.

The project's preliminary results indicate mild affects on aquatic life and a need for development of new sampling and analyses by monitoring agencies, additional research by academia, and strengthened relationships between participating partners.



The Lake Michigan Toolbox

Illinois-Indiana Sea Grant Unwanted Medicine Disposal Community Tool Kit

With funding from US EPA GLNPO, Illinois-Indiana Sea Grant created the toolkit Disposal of Unwanted Medicines: A Resource for Action in Your Community <http://www.iisgcp.org/unwantedmeds/>. This collection of resources is intended for waste management officials and others who are interested in addressing the problem of unwanted medicines in the environment. A panel of expert reviewers, including solid waste managers, pharmaceutical and personal care product researchers, pharmacists, doctors, and communication specialists, reviewed this resource kit and their comments and suggestions were incorporated into the final version.

Illinois-Indiana Sea Grant focuses on collection events for the public as a partial solution to the problem on unwanted medicines on the environment. To assist event organizers, the kit provides a set of case studies and sample educational materials along with the Northeast Recycling Council's step-by-step advice for running a collection. Background information on the science behind the issue and a bibliography of news stories and articles from scientific journals are also featured. Illinois-Indiana Sea Grant continues to post updated materials to the toolkit website in an effort to provide users with the most current content available on this issue.



The Lake Michigan Toolbox Water Security Resources

Water Security Resources

These resources are available at: cfpub.epa.gov/safewater/watersecurity/waterresources.cfm

- Information on training courses, meetings, and workshops / webcasts for utilities, federal and state governments, and utility security officials.
- Tools and technical assistance to assist utilities in developing and updating vulnerability assessments and emergency response plans.
- Information about recently awarded grants and potential financial assistance programs.
- Information from trade/industry organizations, clearinghouses and information centers, state homeland security web sites, state drinking water protection web sites, and USEPA programs.

Drinking Water Security Education Materials

The USEPA has recently developed a collection of useful education and resource materials on drinking water security. The information includes resources on emergency preparedness, drinking water security, and law enforcement. These materials can be found at: cfpub.epa.gov/safewater/watersecurity/index.cfm.

A compendium of laboratories identifying their capabilities to analyze for contaminants of concern can be found at: www.epa.gov/compendium

The Water Contaminant Information Tool (WCIT) to assist in identifying unknown contaminants in water can be found at: www.epa.gov/wcit.

User registration for these sites is required.

convened a Water Security Work Group (WSWG) that was tasked with identifying the key features of an "active and effective" security program. The NDWAC-WSWG was composed of representatives from water systems, water professional organizations, state drinking water officials, and USEPA. The WSWG identified 14 "key" features of an active and effective security program for water systems. USEPA subsequently met with the Association of State Drinking Water Administrators (ASDWA) Water Security Committee and it was agreed that the 14 "key" features should be integrated into the state and federal drinking programs. USEPA will continue to work with its partners to identify and facilitate integration of water security activities at all levels and is working to identify ways of measuring success in these areas (see the Water Resources Toolbox).

Inadvertent Water Contamination

Contamination of drinking water sources can result inadvertently during the production, use, and disposal of the numerous chemicals used in industry, agriculture, medical treatment, and in the household. Knowledge of the environmental occurrence or

toxicological behavior of contaminants has resulted in increased concern over potential adverse environmental and human health effects. For many contaminants, public health experts have incomplete understandings of their toxicological significance (particularly effects of long-term exposures at low-levels). The need to understand the processes controlling contaminant transport and fate in the environment and the lack of knowledge of the significance of long-term exposures has increased the need to study environmental occurrence down to trace levels. Furthermore, the possibility that environmental contaminants may interact synergistically or antagonistically has increased the need to define the complex mixtures of chemicals that are found in our waters (toxics.usgs.gov/regional/emc.html).

Water Quality Tracking

In 2002, USEPA released the Great Lakes Strategy. A key action from this effort was stated: "Beginning in 2002, USEPA, in cooperation with local utilities, will track water quality at the intake points of selected drinking water treatment plants around the Lakes.

Findings will be reported to the public through the biennial State of the Lakes Ecosystem Conference (SOLEC) "State of the Lakes report". More information is available at: www.epa.gov/glnpo/gls/gls04.html.

As of April 2003, USEPA examined data provided by 114 public water systems in the Great Lakes basin and by the U.S. Safe Drinking Water Information System. Specifically, USEPA has evaluated various contaminants, including the following:

- Atrazine, an agricultural pesticide
- Nitrate and nitrite, which are naturally occurring nutrients found at high levels in fertilizers
- Total coliform bacteria, E. coli, protozoa, giardia, and cryptosporidium, which may contaminate water supplies after sewage spills

USEPA has also examined the turbidity, taste, odor, and organic carbon content of drinking water supplies to assess any other potential health issues. Of the public water systems evaluated between 1999 and 2001, none exceeded drinking water standards for atrazine, and only one exceeded drinking water standards for nitrate and nitrite after treatment. However, atrazine, nitrate, and nitrite are detected at elevated levels in the Great Lakes, which indicates that advanced treatment technologies prevent the entry of significant concentrations of these contaminants into drinking water supplies. For total coliform and E. coli, only one violation of drinking water standards occurred between 1999 and 2001 in the Great Lakes basin. Finally, public water systems rarely have problems with turbidity, taste, odor, or organic carbon content.

Drinking Water State Revolving Fund

The Nation's water systems must make significant investments to install, upgrade, or replace infrastructure to continue to ensure the provision of safe drinking water to their 240 million customers. Installation of new treatment facilities can improve the quality of drinking water and better protect public health. Improvements are also needed to help those water systems experiencing a threat of contamination due to aging infrastructure systems.

The Safe Drinking Water Act, as amended in 1996, established the Drinking Water State Revolving Fund (DWSRF) to make funds available to drinking water

How the Lake Michigan States are Dealing With Medicine Disposal

There have been numerous new initiatives to deal with the problem of medicine disposal in the Great Lakes. Currently, many people dispose of old medicines by flushing them down the toilet. Existing wastewater treatment strategies cannot effectively treat for these medicines and they end up in water bodies including Lake Michigan.

Illinois EPA has proactively addressed the medicine disposal issue by volunteering to cover incineration costs for collections of household medicines in the state. In response to this, county solid waste managers are accepting medicines at household hazardous waste (HHW) drop-off events. Some HHW sites are single-day collections, while others are ongoing monthly or weekly programs. Other models have been piloted in Chicago, including a single-day multi-site drop-off with the sheriff's department, the police, and retail stores participating.

An ecumenical faith-based environmental group in the Upper Peninsula of Michigan organized collections for various special household wastes-most recently for unwanted medicines on Earth Day 2007.

In Wisconsin, numerous counties and municipalities have run medicine collection events for households, and there is an effort by a state workgroup to create a sustainable mail-back program. By describing and comparing the various disposal methods and funding sources WDNR hopes to provide insight into which methods have been most successful and which will be sustainable in the long term.



The Lake Michigan Toolbox Drinking Water Academy

Established by the USEPA Office of Ground Water and Drinking Water, the Drinking Water Academy (DWA) is a long-term training initiative whose primary goal is to expand USEPA, State, and Tribal capabilities to implement the 1996 Amendments to the Safe Drinking Water Act (SDWA). In addition to providing classroom and Web-based training, the DWA acts as a resource for training materials pertaining to SDWA implementation. More information is available at: www.epa.gov/safewater/dwa.html.

Source Water Assessment and Protection Program Status

The Safe Drinking Water Act Amendments of 1996 established the Source Water Assessment and Protection Program (SWAP) to help States locate and identify existing and potential threats to the quality of public drinking water for the purpose of fostering local efforts to benefit and protect the resource. States are responsible for assessing the condition of source water for all public water systems within their borders. Each assessment must include a delineation of the source water area for each public water system, an inventory of potential contaminant sources, a determination of the system's susceptibility to contamination from those sources, and must be made available to the public. Assessments are intended to be a useful tool in helping water system develop plans and implement measures to protect their water source.

Wisconsin, Illinois, Indiana, and Michigan have completed all assessments. The focus of this program has now shifted to using the assessments to encourage States and local water utilities to develop source water protection plans and implement protection measures. USEPA and the States will be working to establish partnerships with volunteer and nonprofit organizations and integrate source water protection with other regulatory programs in order to achieve results.

More information on this program is available at the following internet address: cfpub.epa.gov/safewater/sourcewater/



The Lake Michigan Toolbox

Sourcewater Protection Tools and Technical Assistance

A variety of tools are available to aid community planners, public water supply operators, and members of local source water protection teams in developing source water assessments. The tools include general information on water quality and surface and ground water hydrology, as well as specific information on watersheds, aquifers, and federally owned public water supplies.

More information is available at: cfpub.epa.gov/safewater/sourcewater/ and cfpub.epa.gov/safewater/sourcewater/sourcewater.cfm?action=Tools.



Source USEPA



Source LISFPA



Source USEPA

systems to finance infrastructure improvements. The program also emphasizes providing funds to small and disadvantaged communities and to programs that encourage pollution prevention as a tool for ensuring safe drinking water. The funds are passed from USEPA to each state. For more information see: www.epa.gov/safewater/dwsrf.html.

Drinking Water Quality Reports

Information on local water quality is available from several sources, including state public health departments and local water suppliers. To inform the public of the results of analyses of drinking water and to demonstrate a commitment to protecting human health, each community public water supplier is required to generate an annual Consumer Confidence Report that is made available to all residents receiving water from the water system. A Consumer Confidence Report provides information about the source of water used, its susceptibility to contaminants, the levels of contaminants detected in the water, the likely sources of contaminants, and potential health effects of any contaminant detected at a concentration above its maximum contaminant level (MCL). Consumer Confidence Reports can be reviewed to get an indication of the overall quality of treated surface water and groundwater and the condition of the drinking water provided. In addition, the states are distributing information on the status of the source waters used by public water suppliers and the level of susceptibility of those source waters to contamination.



The Lake Michigan Toolbox Water Efficiency *Climate Change Adaptation and Mitigation*

WaterSense

In June 2006, U.S. EPA helped launch the WaterSense label to spread the ethic of water efficiency and promote the tools like the successful energy Star trade marked program for energy-efficient devices. The program features information about water conservation as well as about specific products that meet the WaterSense standards.



The average American could save 30,000 gallons of water annually by adopting water-efficient methods and products that would also translate into money savings on water and sewer rates which are estimated to rise. The current built water systems are aging and EPA estimates the nation's systems need an investment of up to \$1.2 trillion over the next 20 years. More information is available at <http://www.epa.gov/waterinfrastructure/waterefficiency.html>

Alliance For Water Efficiency

A new group is working with stakeholders to help promote the WaterSense standard to the public while also working with the commercial sector. The Alliance for Water Efficiency is a stakeholder-based 501(c)3 non-profit organization dedicated to the efficient and sustainable use of water.



Located in Chicago, the Alliance serves as a North American advocate for water efficient products and programs, provides information and assistance on water conservation efforts. Charter members include Kohler Company and Home Depot. More information is available at www.allianceforwaterefficiency.org.



Great Lakes Forever Coastal Drink Coasters.
Source: www.biodiversityproject.org