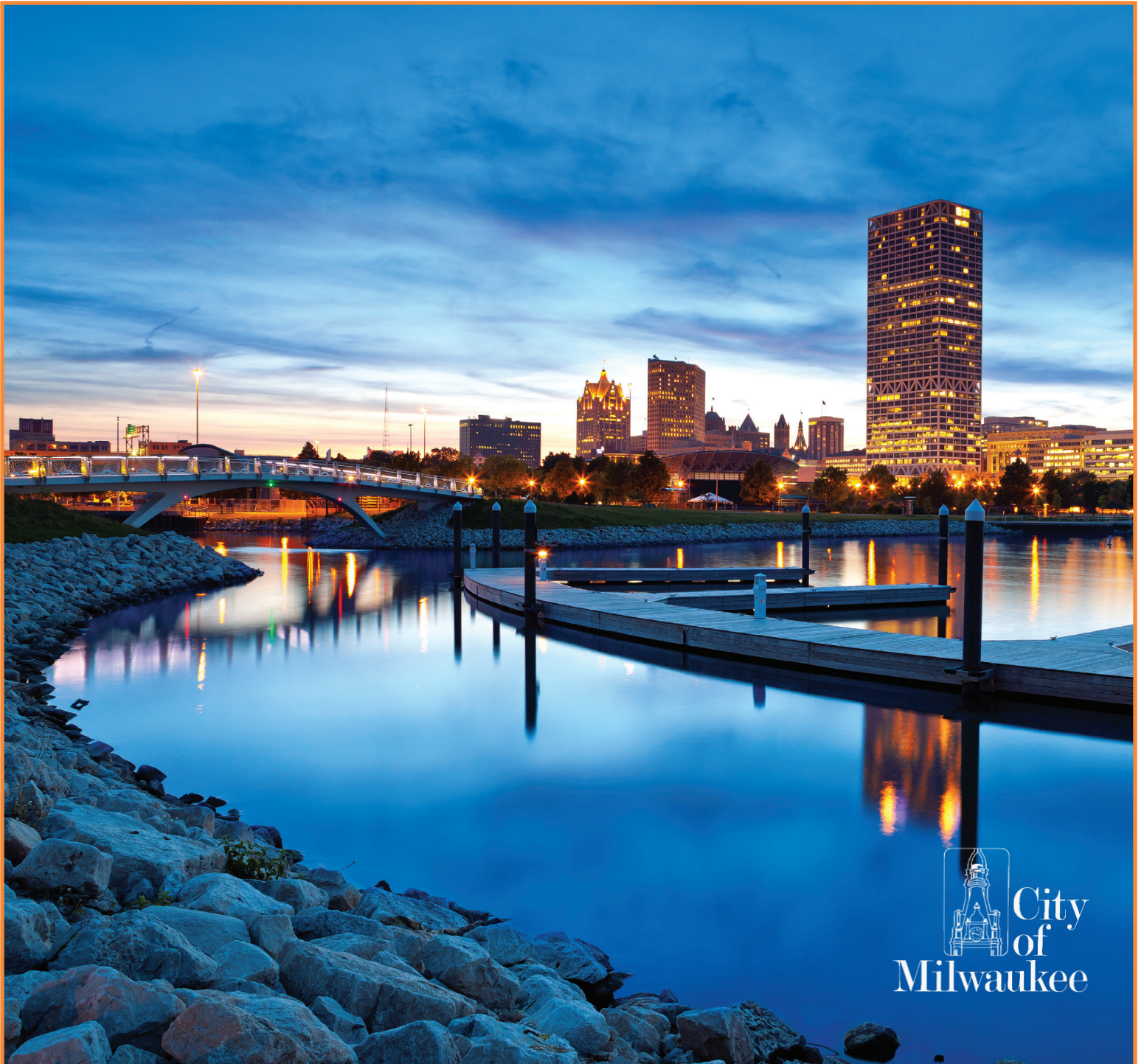


GREAT LAKES & ST. LAWRENCE CITIES INITIATIVE

2014 SUSTAINABLE MUNICIPAL WATER MANAGEMENT PUBLIC EVALUATION REPORT

Milwaukee, WI



ACKNOWLEDGMENTS

The *2014 Sustainable Municipal Water Management Public Evaluation Report* was developed by the City of Milwaukee's Office of Environmental Sustainability with support from Milwaukee Water Works and Milwaukee Metropolitan Sewerage District. The *Report* was developed for the Great Lakes and St. Lawrence Cities Initiative.

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ABBREVIATIONS

CiTTS	Cities Transforming Towards Sustainability
GI BMP	Green Infrastructure Best Management Practice
GIBI	Green Infrastructure Baseline Inventory
GLSLCI	Great Lakes and St. Lawrence Cities Initiative
MMSD	Milwaukee Metropolitan Sewerage District
MWW	Milwaukee Water Works
RGIP	<i>Regional Green Infrastructure Plan</i> (developed by MMSD)
SEWRPC	Southeastern Wisconsin Regional Planning Commission
SMWM	Sustainable Municipal Water Management
SPER	Sustainable Municipal Water Management Public Evaluation Report
TMDL	Total Maximum Daily Load
WDNR	Wisconsin Department of Natural Resources

BACKGROUND

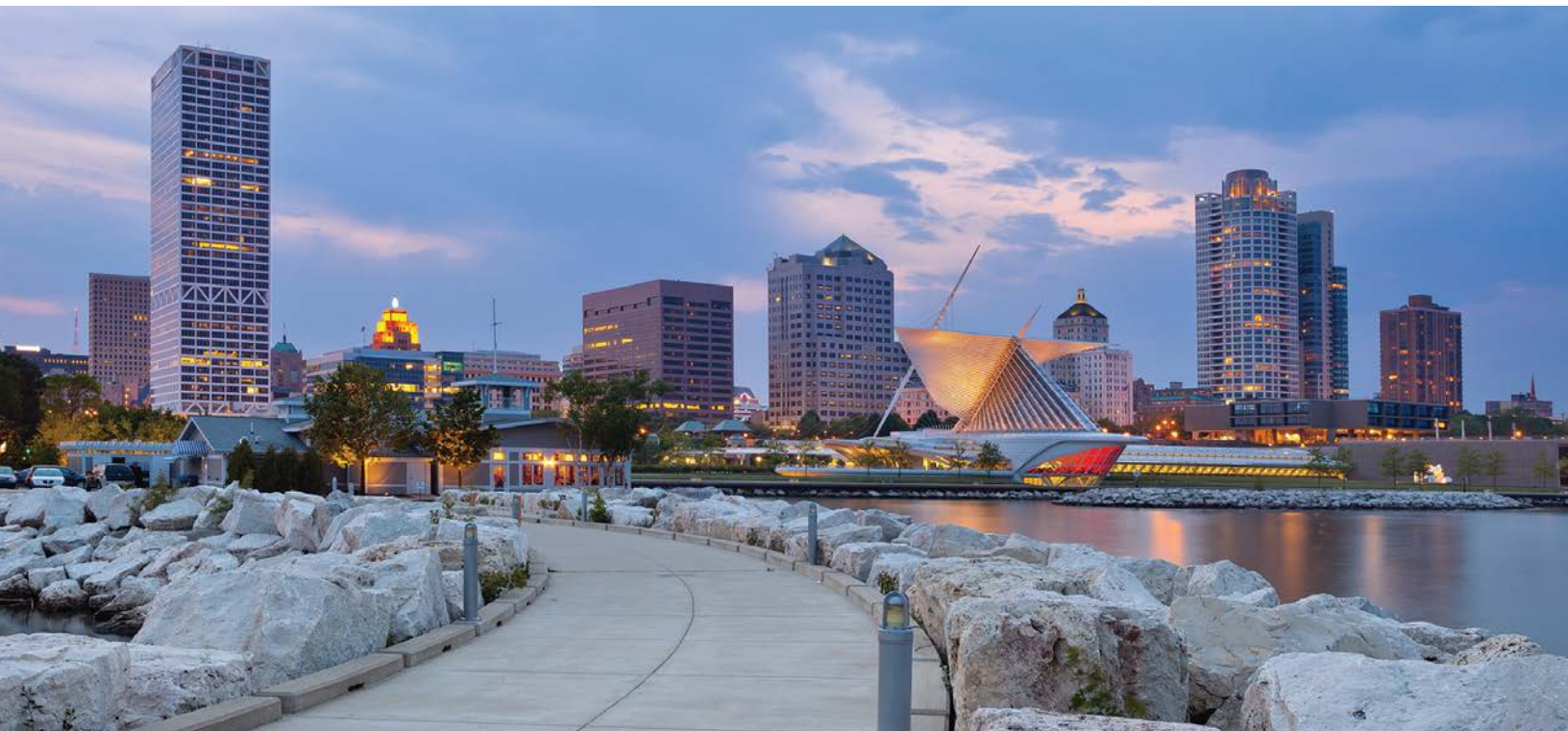
The Great Lakes and St. Lawrence Cities Initiative (GLSLCI) is a binational coalition of mayors and other local officials that works actively with federal, state, and provincial governments to advance the protection and restoration of the Great Lakes and St. Lawrence River. Milwaukee became a member of GLSLCI in 2006. Milwaukee Mayor Tom Barrett recently served as Chairman of the Board of Directors and still serves as an active Board member. During Mayor Barrett's tenure as Chairman, GLSLCI membership surpassed 100 cities.

Milwaukee participates in several GLSLCI initiatives, including the Green Cities Transforming Towards Sustainability Program (CiTTS). In recognition of their efforts, the City of Milwaukee and the Milwaukee Metropolitan Sewerage District received the Green CiTTS Leadership Award in 2011 for their ongoing commitment to addressing stormwater impacts through green infrastructure. Green CiTTS showcases the actions of Great Lakes and St. Lawrence cities in moving the entire region towards a sustainable future. Through the Green CiTTS program, GLSLCI provides support for member cities to switch to more sustainable practices across a broad range of municipal operations and responsibilities, including the protection of water resources and coastal areas.

The objectives of the Green CiTTS program are:

- Protect Water Resources and Coastal Areas
- Promote Low-Carbon Energy Generation and Consumption
- Adopt Green Land Use and Building Design
- Encourage Green Economic Development

Out of these objectives grew the Sustainable Municipal Water Management (SMWM) declaration, which reflects a broader approach to protecting water resources. The SMWM Framework consists of six principles and 21 milestones to work towards. Indicators to measure progress have also been developed. Additionally, the *Sustainable Municipal Water Management: Measuring Progress and Reporting Publicly* was created as a guide to encourage members to measure and publicly report their progress towards implementation of sustainable municipal water trends and milestones. Milwaukee's 2014 *Sustainable Municipal Water Management Public Evaluation Report (SPER)* is the result of this effort.



MILWAUKEE'S POLICIES

Milwaukee's municipal entities, non-profits and other stakeholder groups have developed numerous policies pertaining to the sustainable management of the region's abundant water resources, including municipal water management, which are directly applicable to principles and milestones set forth by GLSLCI. In addition, the City of Milwaukee collaborates with regional partners to implement sustainable policies on a watershed-wide scale and has officially adopted the city's first sustainability plan – *ReFresh Milwaukee*.

In 2013, Mayor Barrett released *ReFresh Milwaukee*, which is a strategic vision and roadmap for a more sustainable community. It sets goals and targets over a 10 year time frame. Water is a central component of the plan, as is economic and ecological redevelopment of Milwaukee's Inner Harbor. The City of Milwaukee's *ReFresh Milwaukee* plan, among other things, sets water-related goals and targets for individuals and organizations to achieve while emphasizing high priority strategies to attain the overall sustainability vision.



ReFresh Milwaukee Water Goals and Targets

Goal 1: *Reduce stormwater runoff and clear water from entering sewer system.*

Targets:

- Establish baseline measures of impervious surface and green infrastructure on a citywide basis by June 2014.
- Create a City green infrastructure policy plan by December 2014.
- Develop a regional climate change resiliency plan that uses the best available atmospheric science, via City collaboration with partners, by 2015.
- Increase the volume of stormwater runoff captured through green infrastructure by 10 percent annually.

Goal 2: *Achieve swimmable and fishable waters in Milwaukee watersheds and the near shore of Lake Michigan.*

Targets:

- Develop Total Maximum Daily Load (TMDL) studies and recommendations, with City assistance, for the Kinnickinnic, Menomonee and Milwaukee River watersheds and the Milwaukee Harbor estuary.
- Preserve and expand all riparian corridors on all waterways and in the estuary as redevelopment occurs, balancing both the built and natural environments.

Goal 3: *Establish Milwaukee as America's Water-Centric City.*

Target:

- Use water-centric strategies on both public and private projects across residential, business, and commercial applications to substantially increase water conservation and citywide energy savings.

Goal 4: *Prevent new aquatic invasive species from entering Lake Michigan and Milwaukee area waterways.*

Target:

- Adopt a plan of action by 2018, in coordination with Great Lakes cities, states, federal and international governments, to prevent new aquatic invasive species from entering Lake Michigan and local waterways.

High Priority Water Strategies:

- Develop a City green infrastructure policy plan.
- Collaborate with Milwaukee County parks and land trusts to maximize green space for stormwater management.
- Replace and maintain city sewers, and work with private property owners to maintain private laterals.
- Complete a Milwaukee TMDL Implementation Plan.
- Identify City facilities to conduct permanent pharmaceutical collection.
- Promote water efficiency and smart water use practices among Milwaukee residents, businesses, and commercial users.
- Recognize and improve the recreational and aesthetic potential of water resources, including Lake Michigan and area rivers.
- Engage in active measures to protect Lake Michigan.

The City of Milwaukee owns and operates the municipal drinking water utility – Milwaukee Water Works (MWW). MWW is a national leader in providing high-quality drinking water and monitoring water quality. Established in 1871, Milwaukee Water Works is proud to be the largest and oldest continuously operating water utility in Wisconsin. It provides water to over 860,000 people in 16 communities in Milwaukee, Ozaukee, and Waukesha Counties – all in and/or straddling the Great Lakes basin. MWW utilizes sustainable practices such as supply-side conservation, water accountability, energy conservation, operational efficiency, and consumer advocacy to reduce waste and encourage responsible water use. These practices ensure the long-term availability of safe and affordable drinking water, while taking into consideration agricultural, recreational, and industrial demand for water and the competing priorities of environmental health, economic prosperity, and social welfare.

The Milwaukee Metropolitan Sewerage District (MMSD) is a regional government agency that provides water reclamation and flood management services for about 1.1 million people in 28 communities in the Greater Milwaukee Area. MMSD serves 411 square miles that cover all, or segments of, six watersheds. MMSD has taxing authority and its main job is to help protect Lake Michigan. MMSD developed its *2035 Vision* with the mission of attaining zero overflows, zero basement backups, and improved stormwater management. The *Vision* establishes guiding principles for integrating efficiency, innovation, and sustainability in the Milwaukee region. The two main elements of *2035 Vision* include:

- Integrated Watershed Management
- Climate Change Mitigation/Adaptation with an emphasis on Energy Efficiency

Through implementation of the principles and objectives designated in the *2035 Vision*, MMSD aims to be a model in its management of climate change impacts on wet weather and its focus on energy efficient and sustainable operations. MMSD also completed its *Strategic Plan 2013-2015*, which identifies goals and strategic objectives to address internal strengths and weaknesses, as well as external opportunities and threats. This plan will enable MMSD to effectively and efficiently reach the *2035 Vision* and goals, while adhering to the District's mission of cost-effectively protecting the quality of the region's water resources.

Finally, there are many non-profits and environmental groups in the Milwaukee region contributing to sustainable water resource management. One entity is especially relevant for SMWM reporting: the Southeastern Wisconsin Watersheds Trust, Inc. (Sweet Water). Sweet Water is a collaborative effort to achieve healthy and sustainable water resources throughout the Greater Milwaukee Watersheds.

Sweet Water's Goals:

- Make measurable progress toward improving the water resources in the region.
- Identify/support land use practices and designs that enhance/improve water resources and promote and restore ecological benefits.
- Forge and strengthen relationships to leverage funding and recommend policies to assist in the implementation of projects to produce lasting water resource benefits and cost savings throughout the Greater Milwaukee Watersheds and nearshore Lake Michigan.

The Greater Milwaukee Watersheds are defined as the watersheds of the Kinnickinnic River, Menomonee River, Milwaukee River, Root River, and Oak Creek; Lake Michigan direct drainage; the Milwaukee Harbor estuary; and nearshore Lake Michigan. These are the watersheds that were included in the Southeast Wisconsin Regional Planning Commission (SEWRPC)'s *Regional Water Quality Management Plan*.



MILWAUKEE'S REPORT

Milwaukee, alone and in collaboration with regional partners, has developed and implemented a number of initiatives aimed toward increasing the sustainability of its municipal water resources and management. The overlapping objectives of the regional water-related initiatives are reducing water waste, preventing pollution of water resources, developing innovative methods to reduce energy consumption during treatment processes, decreasing the risk for basement backups and localized flooding due to stormwater, and integrating sustainable water policy into regional planning and development.

As a result, Milwaukee has been instrumental in helping to develop the principles and milestones for the Sustainable Municipal Water Management (SMWM) framework. Milwaukee is committed to devising and administering sustainable water management objectives set forth by Green CiTTS and the SMWM initiative.






















The six sustainable municipal water management principles are subdivided into 21 milestones (see the Assessment Scorecard on page 8). GLSLCI recommends one or more indicators for measuring a municipality's progress for each milestone. The GLSLCI also recognizes, however, that the suggested indicators must be suited to the local context. Municipalities may adapt the Assessment Scorecard according to their needs and apply the indicators per their unique situations.









Included in Milwaukee's report are:

- The Assessment Scorecard, which lists SMWM milestones and trends.
- Synopsis of Milwaukee's water management plans.
- Further explanations as warranted for milestones adopted by Milwaukee.
- Corresponding web links.

MILWAUKEE'S 2014 ASSESSMENT SCORECARD

PRINCIPLES	MILESTONES	PERFORMANCE
1. WATER CONSERVATION AND EFFICIENCY	1.1 Promote Water Conservation	
	1.2 Set the Price Right	
	1.3 Minimize Water Loss	
	1.4 Increase Water Reuse and Recycling	
2. SHARED WATER STEWARDSHIP	2.1 Raise Public Awareness and Engage the Public	
	2.2 Report Publicly on Sustainable Municipal Water Performance	
3. SHORELINE AND WATERWAYS RESTORATION	3.1 Protect and Restore Shorelines / Riparian Corridors and Control Erosion	
	3.2 Increase Public Access to Shorelines, Riverbanks, and Waterfronts	
	3.3 Protect Habitats and Biodiversity	
4. WATER POLLUTION PREVENTION	4.1 Prevent Pollutants from Entering the Stormwater or Sewage Collection System	
	4.2 Remove Pollutants from Wastewater Treatment Plant Effluent	
	4.3 Reduce Stormwater from Entering Waterways	
	4.4 Monitor and Control Sources of Pollution	
	4.5 Improve Beach Quality	
5. WATER PROTECTION PLANNING	5.1 Adopt Council-Endorsed Commitment to Sustainable Water Management	
	5.2 Integrate Water Policies into Land Use Plan	
	5.3 Collaborate on a Watershed-Scale	
	5.4 Adopt Green Infrastructure	
6. WATER PREPAREDNESS FOR CLIMATE CHANGE	6.1 Conduct a Vulnerability Assessment	
	6.2 Address Vulnerability	
	6.3 Mitigate Contribution to Climate Change Related to Water Operations	

GUIDE TO PERFORMANCE INDICATORS		
Trend Indicators	Significant or Continued Progress	
	Slight or Little Progress	
	No Progress	
Status Indicators	Milestone Achieved	
	Milestone in Process	
	Milestone Not Adopted/Planned	

PRINCIPLE 1: WATER CONSERVATION AND EFFICIENCY

The Milwaukee Water Works (MWW) is a national leader in providing high-quality drinking water and monitoring water quality. Lake Michigan’s abundant supply ensures that Milwaukee’s demand can be met, while the treatment processes utilized produce safe water that exceeds U.S. Environmental Protection Agency quality and safety regulations. Continued investment in aging infrastructure and replacement of outdated water meters helps minimize water loss in the distribution system and encourages wise use by customers.

“Use Water Wisely” is an MWW program run in collaboration with the environmental group Clean Wisconsin as a means to assist customers in reducing water waste while controlling costs through the identification and repair of leaks. Customers with unusually high water use who participated in the program in 2013 identified and repaired leaks in 33% of situations; 91% of customers who received information about the program reported it was useful.

To date, the American Water Works Association has recognized MWW’s efforts with three awards for water efficiency:

- 2008 – Gimmicks and Gadgets Award for a tank rinsing device which dilutes residual in sodium hypochlorite storage tanks prior to inspection and saves 500,000 gallons of treated water annually.
- 2008 – Utility Achievement Award for reducing wasted water.
- 2011 – Utility Special Achievement Award for the Use Water Wisely consumer outreach program.

MILESTONE 1.1 PROMOTE WATER CONSERVATION

Indicator: Change in the Total Volume of Water Produced Annually/Consumed by Households Daily

Status: **Significant Progress**

Metric: 7.1% decrease from 2012-2013 (2.35 million gallons)

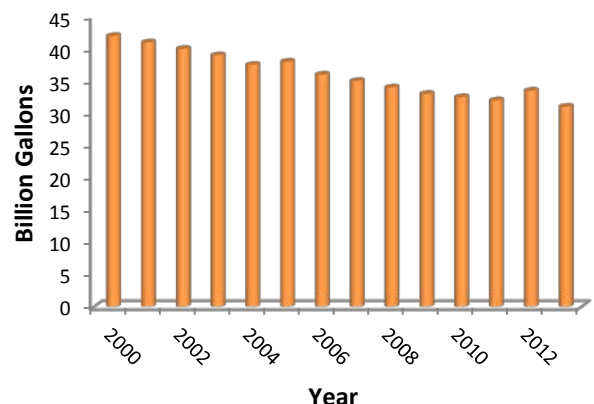
COMMITMENT

- Continue to achieve lowered water usage through the use of conservation efforts and more efficient supply-side procedures.

HIGHLIGHTS

- Between 2000 and 2013, Milwaukee’s annual drinking water usage declined over 21%; by 2015, this is expected to exceed 25% (see Figure 1). Additionally, Milwaukee’s average daily per capita residential water demand in 2013 was 46 gallons versus an average of 100 gallons for the United States as a whole.
- In 2013, water usage decreased by 7.1% as compared to 2011, a non-drought year, 2013 usage declined by 5.2% (1.69 million gallons).
- Over one billion gallons of water were saved during the 2006-2013 period on the supply side resulting from implementation of more efficient practices.

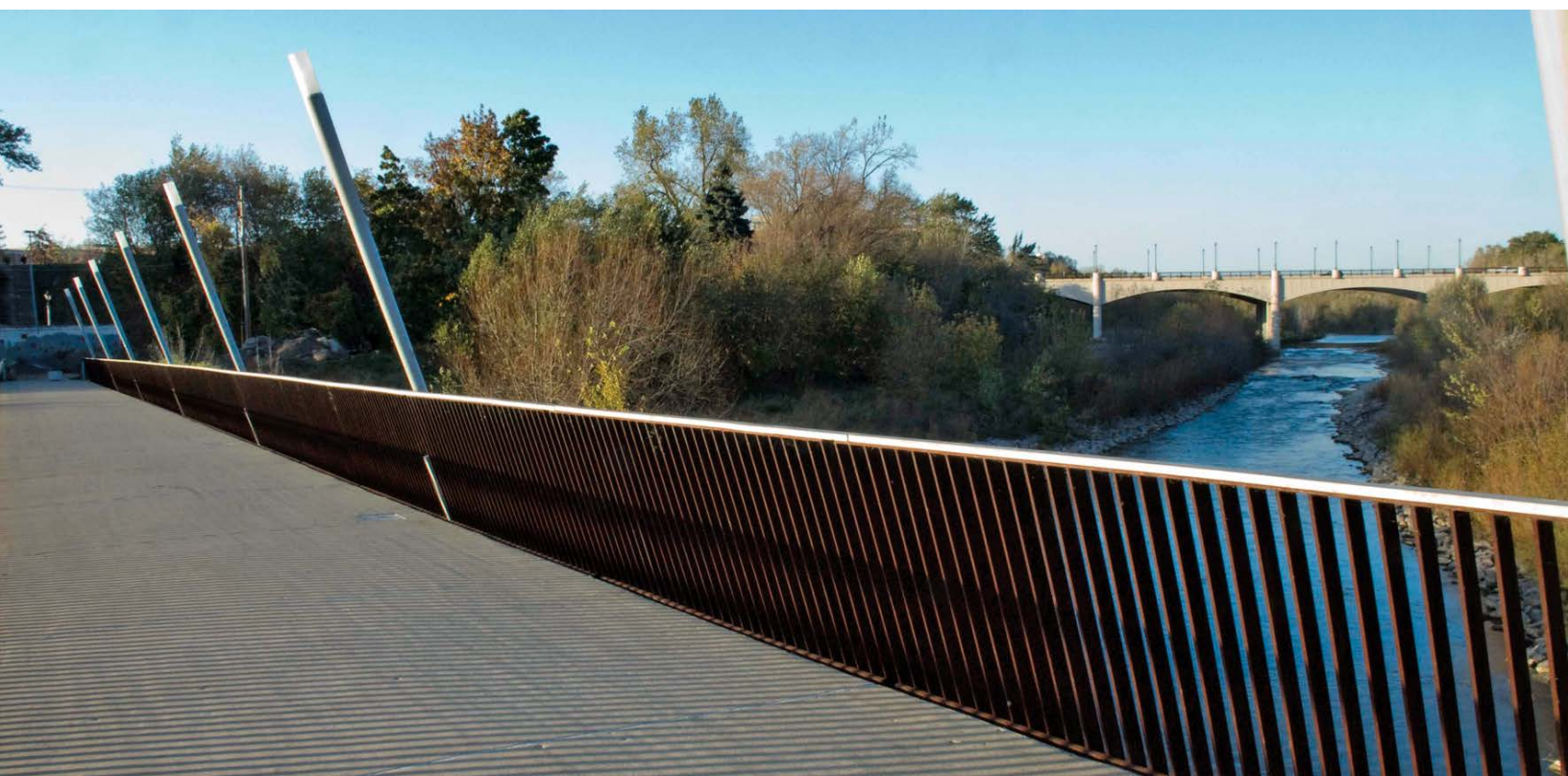
Figure 1: Milwaukee Water Works Annual Metered Water Sales



- As part of the utility’s ongoing efforts to educate the public and encourage conservation, customers of Milwaukee Water Works have several opportunities to receive information regarding the Use Water Wisely program:
 - Over 24,000 residents who contact Customer Service annually are offered information packages about the program.
 - An average of 100 packages are distributed monthly by Meter Services meter readers and technicians when they investigate high water use cases.
 - The City of Milwaukee Department of Neighborhood Services Permit Center distributes brochures to property owners and plumbers when they apply for plumbing permits; plumbers also hand out brochures during inspections.
 - Additional information is made available during public events, such as City Landlord Training, home ownership workshops, and neighborhood association meetings.

OUTLOOK

- Replacement of end-of-life water meters and continued customer education on reducing water waste through leak identification and repair will diminish demand-side losses.
- The sustained emphasis on operational efficiency and innovation promotes significant water savings which are unattainable through conservation alone. Examples of Milwaukee’s best management practices include:
 - Basing hydrant and water main flushing on water quality parameters, rather than specific lengths of time, by using handheld turbidimeters to analyze the water.
 - Modification of filters at the two water treatment plants extended filter run length and reduced the volume of water used to backwash filters, resulting in annual savings of 165 million gallons of treated water.
 - Installation of hydrant-locking devices and public education campaign reduced wasted water from illegal hydrant openings from 447 million gallons (745 hydrants) in 2006, to 54 million gallons (91 hydrants) in 2013.
- MWW is committed to reducing costs, increasing operational efficiencies, and implementing sustainable practices, such as reducing energy use and installing green infrastructure, as water use and revenues continue to fall.



MILESTONE 1.2 SET THE RIGHT PRICE

Indicator: Total Costs/Total Water Rate Revenues
Status: **Continued Progress**
Metric: 0.92 in 2013

COMMITMENT

- Wisconsin municipal utilities are required to perform full accounting cost and recovery.
- MWW water rates and accounting methods are determined by the Public Service Commission of Wisconsin.

HIGHLIGHT

- MWW's total costs divided by total water revenue metric was 0.92 in 2013, indicating that MWW is a financially stable entity.

OUTLOOK

- MWW will continue to utilize full cost accounting and recovery as required per the Public Service Commission of Wisconsin.

MILESTONE 1.3 MINIMIZE WATER LOSS

Indicator: Non-revenue Water/Water Produced (%)
Status: **Continued Progress**
Metric: 14% in 2013

COMMITMENT

- MWW is committed to reducing the amount of water lost in the distribution system.

HIGHLIGHT

- Real and apparent losses of water in the distribution system are calculated at 14% for 2013.

OUTLOOK

- Investment in replacing and repairing aging infrastructure will decrease the risk for water losses in the system.
- MWW is committed to continuing efforts to reduce water waste on the supply side, which will aid in reducing nonessential municipal water usage.
- In the upcoming rate adjustment request to the Public Service Commission of Wisconsin, MWW will be setting the rate of return higher in order to ensure more funds are available for infrastructure improvements, notably to increase water main replacement.

MILESTONE 1.4 INCREASE WATER REUSE AND RECYCLING

Indicator: Activities Resulting in Water Reuse and/or Recycling
Status: **Little Progress**

COMMITMENT

- The City is intent on working collaboratively with developers to allow businesses to design and implement grey water recycling projects.

HIGHLIGHTS

- Rain barrels and solar pumps to transport water from subsurface basins located beneath permeable pavers are being utilized to reuse water in urban agriculture and community gardens created by the City of Milwaukee's HOME GR/OWN initiative.
- Developers for the Reed Street Yards and the Global Water Technology Park have installed "purple piping" for grey water recapture.

OUTLOOK

- The State of Wisconsin building code currently inhibits widespread implementation of water reuse systems. The City and its partners continue to explore ways to ensure that water reuse and recycling systems are legal in the state.
- Milwaukee will investigate and explore options for further addressing this milestone in the future.



PRINCIPLE 2: SHARED WATER STEWARDSHIP

Public awareness of water issues is crucial to fostering a sense of shared responsibility with regard to water resources. A greater understanding of the challenges utilities face, both in producing a safe, reliable drinking water supply and cleaning wastewater, can lead to improved habits among consumers. Because the assistance and cooperation of the general public is paramount to achieving sustainable water management, Milwaukee has developed an innovative method to perform outreach by collaborating with local entities and consolidating water education and outreach. These programs are administered by the Southeastern Wisconsin Watersheds Trust (Sweet Water) and highlight the importance of acting responsibly to preserve the safety, integrity, and beauty of local waters.

MILESTONE 2.1 RAISE PUBLIC AWARENESS AND ENGAGE THE PUBLIC

Indicator: Activities to Raise Public Awareness
Status: **Continued Progress**

The City of Milwaukee and MMSD are supporters of Sweet Water and its public awareness campaigns. Sweet Water is an umbrella group of government and non-governmental organizations that work collaboratively to achieve healthy and sustainable water resources throughout the Greater Milwaukee Watersheds. Together with MMSD, Sweet Water wrote restoration plans for the Menomonee River and Kinnickinnic River watersheds, with a third for the Root River in progress. The recommendations included in these plans help guide government- and grant-funded water restoration work.

Entities like MMSD utilize Sweet Water's campaign to count towards their information/education stormwater discharge state permit requirements. Municipalities in Southeast Wisconsin provide Sweet Water with funding to run a consolidated outreach program.

COMMITMENT

- Sweet Water leads regional efforts to educate diverse audiences about the critical need to protect and restore Lake Michigan and area rivers.

HIGHLIGHTS

- Respect Our Waters is the regional campaign to raise awareness and motivate residents to act in responsible ways that contribute to the protection of area waters. A puppet mascot, Sparkles the Water Spaniel, is designed to appeal to children. Educational and outreach themes include:
 - Thinking and acting as entire watersheds.
 - Seeking collaboration and building partnerships.
 - Employing innovative and cost-effective solutions to address issues and challenges to lakes and rivers.
- Sweet Water organizes and hosts an annual *Clean Rivers, Clean Lakes* conference, thus providing a venue to present opportunities, areas of concern, restoration and water quality initiatives, and introduce innovative projects.

OUTLOOK

- Municipalities and MMSD intend to continue funding Sweet Water into the foreseeable future to ensure education and outreach for the region's residents on water resource protection and best practices for handling stormwater runoff.

MILESTONE 2.2 REPORT PUBLICLY ON SUSTAINABLE MUNICIPAL WATER PERFORMANCE

Indicator: Production of Regular Public Report Tracking Key Municipal Water Performance

Status: **Significant Progress**

COMMITMENT

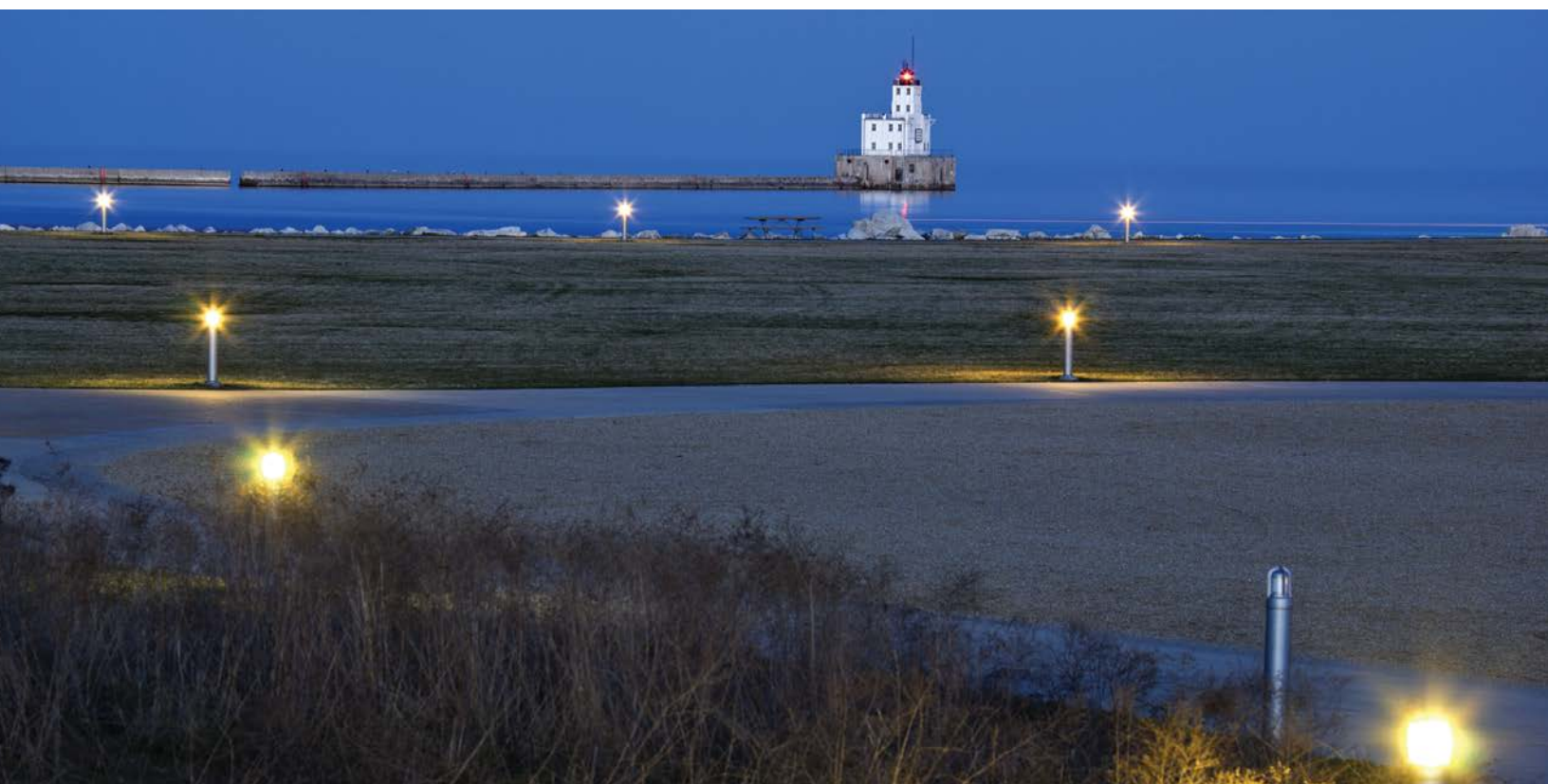
- Milwaukee is composing one of the inaugural SPERs for the GLSLCI Green CiTTS Sustainable Municipal Water Management initiative to be published in June, 2014.
- Milwaukee is currently creating a Green Infrastructure Baseline Inventory (GIBI) to meet *ReFresh Milwaukee* sustainability plan goals that will be published at the end of June, 2014.
- *ReFresh Milwaukee's* implementing legislation requires annual public reporting; the first public report is due by 2015.

HIGHLIGHTS

- The City's SMWM SPER will allow governments, water-focused organizations, stakeholders, and the public to have a comprehensive depiction of what Milwaukee has accomplished regarding sustainable water management practices and its roadmap for the future.
- The in-development GIBI will provide the foundation for planning and designing GI BMPs in areas of the city most at risk for localized flooding and basement backups. The GIBI will also identify impervious surface areas in the city which would be ideal candidates for GI BMPs.
- *ReFresh Milwaukee's* annual report will highlight progress on water sustainability in four broad goal areas with eight related targets.

OUTLOOK

- The City's SMWM SPER will be updated annually to allow ongoing public disclosure of sustainable water management accomplishments, goals, and best practices.
- *ReFresh Milwaukee* requires annual reporting and periodic review of stated goals and targets.



PRINCIPLE 3: SHORELINE AND WATERWAYS RESTORATION

Milwaukee is fortunate to have access to abundant freshwater resources. Portions of six major watersheds are located within city limits: the Menomonee River, Kinnickinnic River, Milwaukee River, Root River, Oak Creek, and Lake Michigan direct-drainage. These watersheds are ecologically important and diverse, although pollution and encroachment due to development have taken a toll on the health of the watersheds, their biological diversity, and habitat availability. Protecting riverbanks and shorelines is vital to ecosystem survival and to maintaining biodiversity along the city's waterways.

MILESTONE 3.1 PROTECT AND RESTORE SHORELINES/RIPARIAN CORRIDORS AND CONTROL EROSION

Indicator: Length of Shoreline or Riparian Corridor that is Protected or Repaired
Status: **Continued Progress**
Metric: 10 new miles from 1999 through 2014

COMMITMENT

- The Southeastern Wisconsin Regional Planning Commission (SEWRPC) developed legacy comprehensive watershed plans for the Milwaukee, Menomonee, and Kinnickinnic Rivers that were adopted in 1972, 1977, and 1979, respectively. Although dated, some recommendations are still relevant and being implemented today. A supplementary comprehensive harbor estuary plan for these three rivers was developed in 1987.
- MMSD aims to continue restoration of natural riparian corridors through the implementation of its integrative watershed management approach. MMSD has also collaborated with Sweet Water on watershed restoration plans for the Menomonee and Kinnickinnic Rivers, with one for the Root River currently in development.
- *ReFresh Milwaukee* requires the acreage of natural areas (including riparian areas, wetlands, stream buffers, environmental corridors, and green stormwater facilities) that are restored or placed under protection to increase by 10 percent annually.

HIGHLIGHTS

- MMSD has restored 10 miles of riparian corridor tributary to Lake Michigan; restoration includes removing concrete channels, removing drop structures, and providing natural riparian beds/banks.
- MMSD has also instituted the Greenseams® program in collaboration with the Wisconsin Department of Natural Resources (WDNR), through which undeveloped, privately-owned land along rivers and streams is acquired from willing sellers, either through direct purchase or easements, with the goal of reducing the risks of sewer overflows and basement backups by decreasing regional flooding and water pollution.
 - Since Greenseams® began in 2001, more than 2,600 acres of land have been protected.
 - Lands are permanently protected through conservation easements in target areas along waterways and regions estimated to have high growth potential.

OUTLOOK

- MMSD intends to acquire an additional 10,000 acres of land through Greenseams®, thus maintaining the commitment to further reduce flooding and pollution risk in Milwaukee's most vulnerable areas.
- Riparian restoration plans are in place and moving forward for the Menomonee, Kinnickinnic, and Root Rivers via numerous organizations.

MILESTONE 3.2 INCREASE PUBLIC ACCESS TO SHORELINES, RIVERBANKS, AND WATERFRONTS

Indicator: Length/Area of Shoreline and/or Riverbank with Public Access

Status: **Continued Progress**

COMMITMENT

- All navigable bodies of water in Wisconsin are considered “publicly accessible” under the public trust doctrine enshrined by the State of Wisconsin Constitution.

HIGHLIGHTS

- In the City of Milwaukee, 95% of the Lake Michigan shoreline, more than 9.6 miles, is open to the public.
- There are many public access points, parks, and trails along Lake Michigan and the rivers in Milwaukee, including, but not limited to, the Oak Leaf Trail and the Urban Water Trail.

OUTLOOK

- Milwaukee is committed to maintaining and protecting the high levels of public access to shorelines and riverbanks.

MILESTONE 3.3 PROTECT HABITATS AND BIODIVERSITY

Indicator: Area of Protected “Site of Ecological Interest”

Status: **Little Progress**

COMMITMENT

- SEWRPC and the WDNR, together with local governments, work to create watershed protection plans, which provide recommendations and strategies for communities to apply in protecting sensitive habitats.

HIGHLIGHT

- MMSD has included a biodiversity plan for the region, including the city of Milwaukee, as part of its 2050 Facilities Plan.

OUTLOOK

- Milwaukee will investigate and explore options for further addressing this milestone in the future.

PRINCIPLE 4: WATER POLLUTION PREVENTION

Milwaukee’s vigilance in reducing pollutant introduction into sewers, streams, rivers, and lakes is essential for the continued health of area residents and the environment. Several strategies for preventing pollution from entering area waterways are employed:

- Controlling the pollutant loads in wastewater treatment effluent and ensuring that it meets discharge permit requirements.
- Expanding storage capacity via green infrastructure and MMSD’s Deep Tunnel to decrease the occurrences of combined sewer overflows.
- Reducing the disposal of hazardous household waste and pharmaceuticals into waterways by administering community collection programs.
- Educating the public about the importance of preventing pollutants, such as pet waste, from getting into storm sewers, either directly through disposal or indirectly via runoff.
- Utilizing water quality sampling and monitoring programs which can detect improper waste disposal and cross-connection issues.

MILESTONE 4.1 PREVENT POLLUTANTS FROM ENTERING STORMWATER OR SEWAGE COLLECTION SYSTEM

Indicator: Pollution Prevention Measures in Place
Status: **Continued Progress**

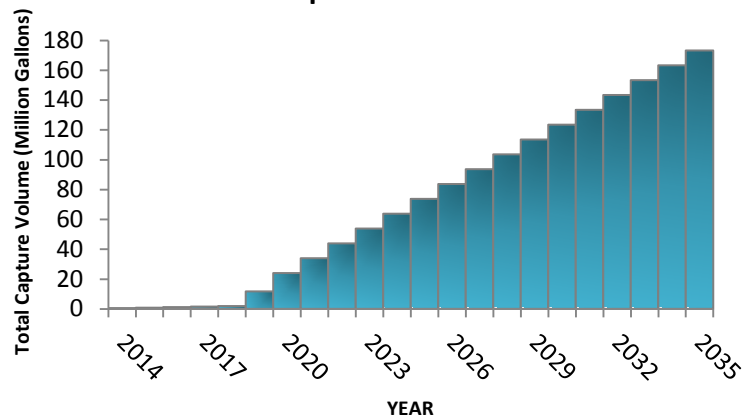
COMMITMENT

- Milwaukee has implemented pollution prevention measures to meet state total suspended solids runoff reduction requirements outlined in the compliance schedule of the regulations (NR 151 and 216).
- MMSD is currently completing a TMDL study and anticipates developing an implementation plan, in collaboration with Milwaukee, in 2015.
- The City is developing a green infrastructure plan (GIBI) to prioritize GI BMP implementation in areas with flooding and basement backup issues. The goals are to decrease stormwater runoff pollution, and reduce the risks of basement backups, localized flooding, and combined sewer overflows due to excess runoff in sanitary sewers.

HIGHLIGHTS

- MMSD created the “Every Drop Counts” education program to inform its customers about reducing overflows and protecting water resources from runoff pollution by adopting sustainable habits:
 - Disposing of hazardous waste properly (Household Hazardous Waste Program).
 - Preventing pharmaceuticals from entering the waste stream by utilizing the Medicine Collection Program.

Figure 2: Annual Green Infrastructure Capture Goals



- Planting rain gardens to filter pollutants and encourage natural infiltration.
- Installing rain barrels for stormwater capture and reuse.
- Decreasing fecal contamination in stormwater runoff by picking up pet waste.
- MMSD operates household hazardous waste collections at several points throughout the year, and pharmaceutical drug collections in collaboration with area police departments.
- Milwaukee has instituted the *Green Streets Stormwater Management Plan* through the Department of Public Works, which aims to reduce stormwater runoff and increase the quality of runoff flow through the implementation of street-side green infrastructure strategies. The Plan integrates stormwater planning and road reconstruction projects.

OUTLOOK

- Milwaukee is committed to capturing the first half-inch of rain falling within the municipality by 2035, as stated in MMSD’s *Regional Green Infrastructure Plan*. Total annual capture goals are shown in Figure 2 on page 17.
- Milwaukee will collaborate with MMSD and the WDNR to create and institute a TMDL plan for the city’s waterways.

MILESTONE 4.2 REMOVE POLLUTANTS FROM WASTEWATER TREATMENT PLANT EFFLUENT

Indicator: Improvement of the Quality of Treated Wastewater Effluent, Including Contaminants of Emerging Concern

Status: **Slight Progress**

COMMITMENT

- MMSD is proactively experimenting with methods to remove emerging contaminants from wastewater by collaborating with the University of Wisconsin - Milwaukee School of Freshwater Sciences on research related to pharmaceuticals and personal care products in water.

HIGHLIGHTS

- MMSD meets all discharge permit requirements for the effluent it treats.
- MMSD emphasizes reducing the quantities of recalcitrant pollutants and contaminants entering the water reclamation facilities through the use of programs such as:
 - Industrial Waste Pretreatment
 - Household Hazardous Waste collection
 - Medicine collection

OUTLOOK

- To encourage greater participation in the medicine collection, MMSD and the City of Milwaukee are looking to expand the pharmaceutical collections and create permanent, continuous drop-off locations.

MILESTONE 4.3 REDUCE STORMWATER ENTERING WATERWAYS

Indicator: Reduce Quantity of Stormwater and/or Non-Treated Sewage from Entering Receiving Waters
Status: **Continued Progress**

COMMITMENT

- The City of Milwaukee developed the *ReFresh Milwaukee* sustainability plan that outlines its goals to reduce stormwater runoff from entering the sewer system. The targets include:
 - Completing baseline measures of impervious surface and green infrastructure established on a citywide basis by June 2014.
 - Developing a green infrastructure plan for the City by December 2014.
 - Creating a regional climate change resiliency plan that incorporates the best available atmospheric science, in collaboration with partners, by December 2015.
 - Increasing the volume of stormwater captured by green infrastructure annually by 10%.
- MMSD built the Deep Tunnel: a 28.5 mile-long system of tunnels 300 feet below ground level which has the capacity to store 521 million gallons of excess stormwater and non-treated wastewater during storm events.
- MMSD also has created an incentivized partnership program for green infrastructure projects in the service area by providing funding reimbursements in collaboration with partners.

HIGHLIGHTS

- Since the completion of MMSD's Deep Tunnel, the number of average annual combined sewer overflows has decreased from 50-60 overflows to 2.5 overflows, saving 98.5 billion gallons of pollution from entering Lake Michigan.
- With the storage capacity of the Deep Tunnel, MMSD is able to process and treat 98.5% of the water that entered its regional sewer system.

OUTLOOK

- The City of Milwaukee is looking to drastically increase the amount of green infrastructure available to capture stormwater runoff, as outlined in the *ReFresh Milwaukee* plan. The green infrastructure implementation should decrease pressures on the sewage system, especially in areas served by the combined sewer, and result in reduced risks for combined sewer overflows and runoff to enter the receiving waters.



MILESTONE 4.4 MONITOR AND CONTROL SOURCES OF POLLUTION

Indicator: Adoption and Monitoring of Water Quality Parameters

Status: **Continued Progress**

COMMITMENT

- MWW is recognized for its comprehensive water monitoring program, which goes above and beyond requirements set forth by the U.S. Environmental Protection Agency's Safe Drinking Water Act regulations. This monitoring also extends to Lake Michigan source water.
 - MWW combines electronic continuous monitoring of treatment process control indicators with grab samples to validate them and provide historical validation.
 - MWW continuously analyzes Lake Michigan source water and the distribution system of 1,956 miles of water mains that transport over 100 million gallons of treated water daily.
- Milwaukee's drinking water quality meets or exceeds federal and state standards and regulations.
- MMSD analyzes for quality control in treated wastewater effluent discharge. It also employs specialized teams that collect, monitor, and track evidence for improving water quality in the region. Their responsibilities consist of:
 - Monitoring and enforcing point source pollution programs, which include Industrial Waste Pretreatment, Mercury Reduction, and Household Hazardous Waste
 - Reviewing, organizing, monitoring, and analyzing data generated from monitoring and sampling of the conveyance systems, groundwater, and stormwater programs.
 - Sampling, monitoring, analyzing, and reporting on the water quality and emerging pollutants of concern in local watersheds.
- The *ReFresh Milwaukee* sustainability plan outlines the goal to create a city-wide TMDL implementation plan that addresses all Milwaukee watersheds.
- Each year, Milwaukee Riverkeeper® releases a report card on the quality of local waterways.

HIGHLIGHTS

- In 2013, MWW tested for the presence of over 500 contaminants in the source water, entry point, and distribution system, of which 91 are regulated at the entry point by the U.S. EPA.
 - Source water is tested for 6-12 parameters required by the Safe Drinking Water Act (EPA); these include *Cryptosporidium*, bacteria, Total Organic Compounds, and alkalinity. Virus monitoring is performed voluntarily.
 - MWW water quality monitoring and screening activities include organisms and contaminants that are not yet regulated but may be considered of emerging concern to public health, including endocrine disrupting compounds and pharmaceuticals and personal care products.
- MMSD operates an extensive water quality monitoring program. Monitoring crews take samples in Lake Michigan, area waterways, and sewers. They also support the U.S. Geological Survey's river gage network in the region.
- Milwaukee Riverkeeper® conducts water quality monitoring and has a bacteria detection program in place in conjunction with University of Wisconsin-Milwaukee School of Freshwater Sciences.

OUTLOOK

- The City, in collaboration with MMSD, Sweet Water, SEWRPC, municipalities, non-government organizations, and WDNR, will develop a TMDL implementation plan by 2015, with the goal to achieve pollutant load reductions by 2035.
- MMSD and the other active local organizations are committed to continue monitoring water quality to ensure forward progress in restoring watershed health and minimizing impacts due to pollution.

MILESTONE 4.5 IMPROVE BEACH QUALITY

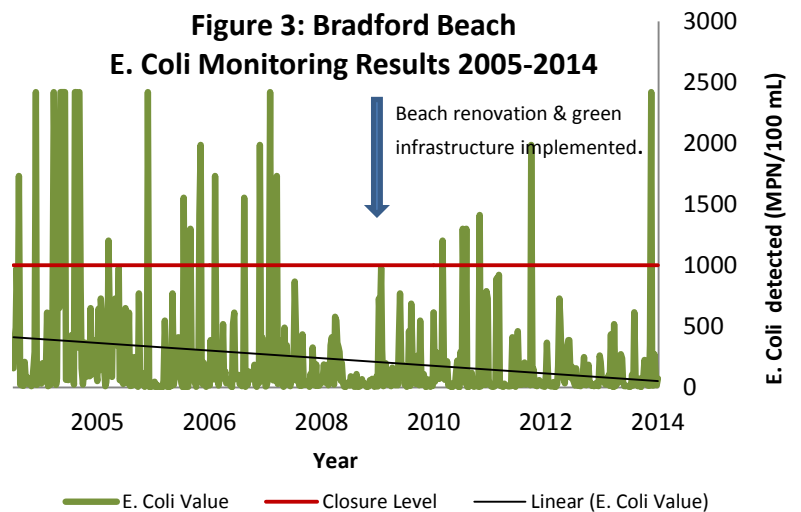
Indicator: Increase the Number of Days Beaches Are Open for Swimming
Status: **Little Progress**

COMMITMENT

- The WDNR tracks beach water quality information and posts it daily during the summer swimming season; this information is also be found on the Wisconsin Beach Health website.
- Following an extensive restoration in 2008 to reduce closures due to elevated *Escherichia coli* bacteria levels, Milwaukee's Bradford Beach has attained the *Blue Wave* certification from the Clean Beaches Coalition. *Blue Wave* is a national environmental certification designed to maintain healthy, robust, and vibrant beaches. Figure 3 highlights the reduction in beach closures due to elevated *E. coli* levels prior to and after the renovations.

HIGHLIGHTS

- Development plans are underway to redesign Milwaukee's South Shore Beach in an effort to improve water quality and lead to increased time the beach is available for swimming.
- The City of Milwaukee and MMSD are in the process of designing and implementing green infrastructure strategies to decrease runoff and pollution due to stormwater that can result in beach advisories or closures.



OUTLOOK

- Milwaukee and MMSD plan to implement GI BMPs to reduce stormwater runoff that can overwhelm the sewage system and lead to combined sewer overflows, as well as improve the quality of runoff when it enters the receiving waters.
- The creation and implementation of TMDLs for fecal coliform and phosphorus may also positively impact the city's beach water quality by decreasing the quantities present in river discharge entering Lake Michigan.



PRINCIPLE 5: WATER PROTECTION PLANNING

Water resources are a crucial asset for Milwaukee and have played an integral role in the city's development. In the past, Milwaukee's economy was based on water-intensive industries, such as brewing, food processing, tanning, shipping, and farming; these fueled the city's growth. Related companies also developed alongside these industries to manage, measure, treat, and transport the necessary water. Even as manufacturing has declined, the water technology, consultancy and management companies have continued to grow and thrive. The Water Council is a prime example of the new wave of Milwaukee area water-related business growth.

Sustainable urban development and land-use planning are essential to the overall economic health of the city. As Milwaukee positions itself to become America's Water-Centric City, it must continue to invest and innovate with key strategies to substantially increase water and energy conservation, which can be accomplished only with unwavering commitment to sustainable, regional, water-focused planning and protection of all water resources.

MILESTONE 5.1 ADOPT COUNCIL-ENDORSED COMMITMENT TO SUSTAINABLE WATER MANAGEMENT

Indicator: Adopt Vision for Sustainable Municipal Water Management by Municipal Council
Status: **Milestone Achieved**

- The City of Milwaukee created the *ReFresh Milwaukee* plan, which emphasizes sustainable municipal water management. Green infrastructure projects aim to capture an additional 10% of stormwater annually in order to reach the goal of 173 million gallons captured by 2035 (per MMSD's RGIP), equal to the initial half-inch of rainfall during storm events.

MILESTONE 5.2 INTEGRATE WATER POLICIES INTO LAND USE PLAN

Indicator: Integration of Sustainable Water Management Objectives into Municipality's Land Use Plan
Status: **Milestone Achieved**

- Various water-related management objectives reflecting *ReFresh Milwaukee* goals are integrated into the citywide Policy Plan which is part of the City's Comprehensive Area Plan.
- There are individual neighborhood "area plans" that comprise the Comprehensive Area Plan and are tailored for specific needs and priorities of a given neighborhood area. For instance, in the Southeast Area Plan, there are a number of municipal objectives which help drive the catalytic projects along the Kinnickinnic River.

MILESTONE 5.3 COLLABORATE ON A WATERSHED-SCALE

Indicator: Adoption of Watershed-Scale Approach within Sustainable Municipal Water Management Strategy

Status: **Milestone Achieved**

- SEWRPC has developed the *2035 Regional Land Use Plan* for Southeastern Wisconsin. This plan addresses planning and development with regard to concepts related to the abatement and containment of urban sprawl, the protection and preservation of natural resources, and the protection and preservation of prime agricultural lands.
- MMSD and Sweet Water collaborated to develop Watershed Plans for the Menomonee and Kinnickinnic Rivers, with a plan for the Root River currently underway.

MILESTONE 5.4 ADOPT GREEN INFRASTRUCTURE

Indicator: Policy Adopted by Municipality to Encourage the Use of Green Infrastructure

Status: **Milestone Achieved**

- The City adopted its Green Streets Stormwater Management program in 2013 and is currently working towards creating a comprehensive green infrastructure implementation plan as per *ReFresh Milwaukee*.
- Milwaukee is also a participant in the RE.invest initiative, a collaboration of eight partner cities designed to help develop more flexible, sustainable, and integrated networks, and use public resources more efficiently to leverage private investment in building stronger communities. The City is partnering with RE.invest to:
 - Implement green infrastructure to improve water quality and make the city more resilient to the risks of climate change.
 - Leverage public-private partnerships to advance community stormwater goals.
- H2OCapture connects residents and businesses with green infrastructure tools and resources while also cataloging regional green infrastructure best management practices and their capacity to capture stormwater.



PRINCIPLE 6: WATER PREPAREDNESS FOR CLIMATE CHANGE

Milwaukee’s ability to adapt its water management program for climate change is crucial for continued future preparedness. Potential risks to infrastructure and population must be identified, and measures to adapt to and reduce changing stormwater flows need to be developed. The City must also forge contingency plans and implementation methods for emergency response. Because of the vital role Milwaukee plays in the areas of urban planning, economic development, transportation, infrastructure, and environmental stewardship, it has a responsibility to seek out vulnerabilities and mitigate effects of climate change.

MILESTONE 6.1 CONDUCT A VULNERABILITY ASSESSMENT

Indicator: Complete Assessment of Municipal Vulnerability Associated with Climate Change
Status: **Milestone in Process**

- MWW has undertaken an informal survey of factors that may impact their operations as a result of climate change and plans to review these findings in the context of the U.S. Environmental Protection Agency’s “Climate Ready Water Utilities” program.
- MMSD is finalizing a vulnerability analysis on its conveyance, storage, and reclamation facilities. This analysis will include a modeling exercise and will serve as input to the next round of facilities planning. MMSD is working with others to downscale global climate models in order to consider the impact of climate change on combined sewer overflows. Additionally, MMSD and the City of Milwaukee are embracing “no-regrets” strategies, such as the Greenseams® program for major property acquisition and various green infrastructure programs.

MILESTONE 6.2 ADDRESS VULNERABILITY

Indicator: Approve and Begin Implementation of Climate Change Adaptation Plan Associated with Water Resources and Operations
Status: **Milestone in Process**

- The City of Milwaukee developed the *ReFresh Milwaukee* sustainability plan that includes and addresses adaptation and resilience with respect to water resources. Implementation of the plan recommendations is just beginning.
- MMSD identified steps that can be taken to adapt policies and procedures and reduce the risk of adverse effects with regard to climate change in its 2012 Sustainability Plan, *SeWeR Sustainability Report*.

MILESTONE 6.3 MITIGATE CONTRIBUTION TO CLIMATE CHANGE RELATED TO WATER OPERATIONS

Indicator: Increase the Energy Savings in the Operation of Water and Wastewater Systems

Status: **Significant Progress**

COMMITMENT

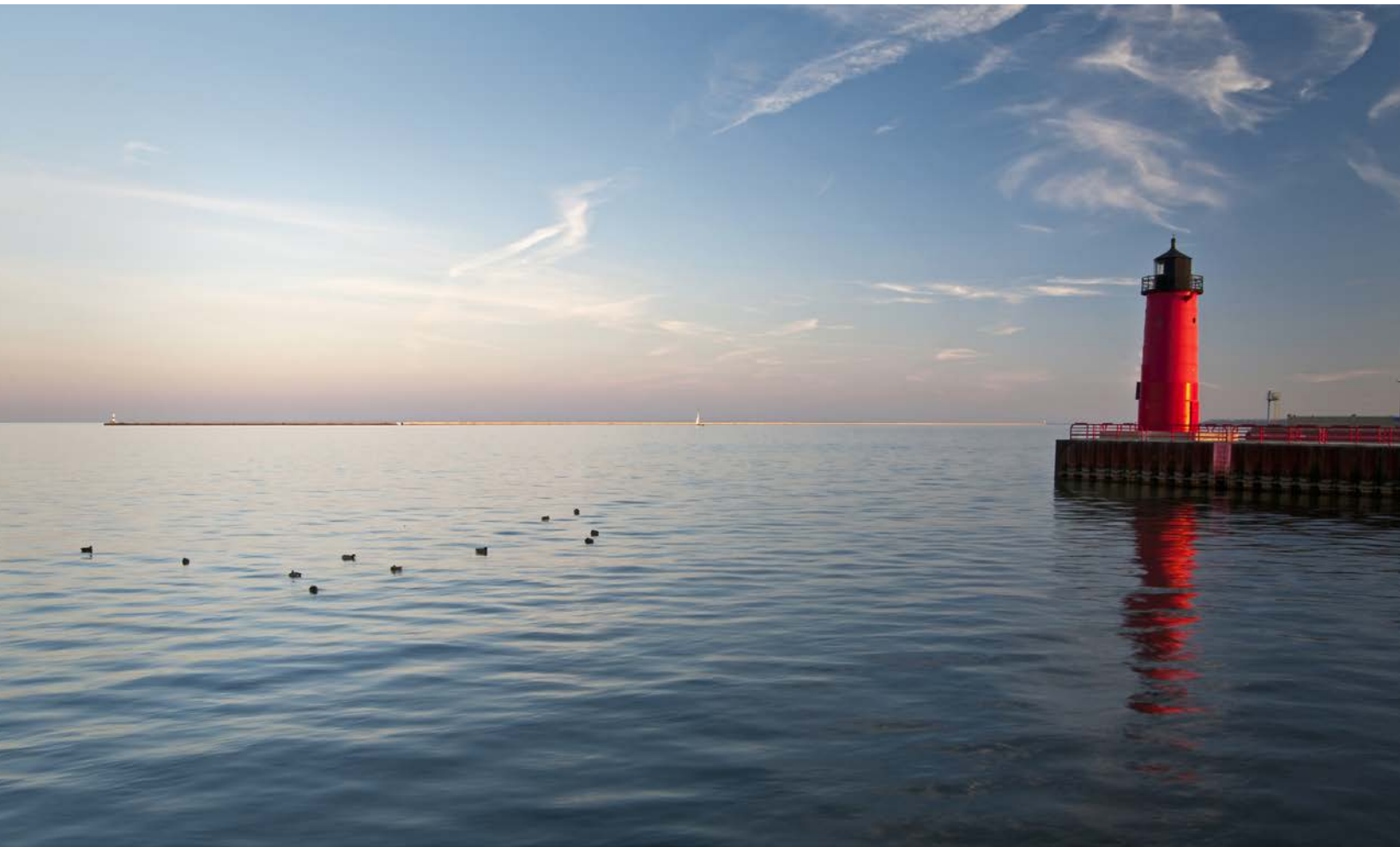
- The City of Milwaukee and MMSD are in the process of implementing processes to save energy in both drinking water and wastewater treatment.

HIGHLIGHTS

- MWW is reducing energy usage by focusing on increased efficiency in infrastructure and processes.
- MMSD has initiated two major projects for wastewater system energy savings:
 - Anaerobic digestion enhancement, which currently meets 2/3 of the energy needs at the South Shore Water Reclamation Facility.
 - Three new turbines at the Jones Island Water Reclamation Facility generate electricity from landfill gas that is piped 19 miles from the Emerald Park Landfill in Muskego, WI. The new system replaced two inefficient natural gas turbines.

OUTLOOK

- MMSD is exploring the feasibility of utilizing sewer heat recovery technologies to assist in achieving their goal of using 100% renewable energy, with 80% internal renewable sources, to power both Jones Island and South Shore facilities by 2035.
- MWW recently completed a solar site assessment on two of its facilities to determine economic feasibility of solar energy in meeting their extensive energy demands.



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REFRESH MILWAUKEE

ReFresh Milwaukee provides a vision for community sustainability over the next 10 years and seeks to make Milwaukee a center for sustainability innovation and thought leadership. *ReFresh Milwaukee* was published in July 2013 and is Milwaukee's first sustainability plan.

The goals and targets within the Plan provide a strategic framework, or roadmap, for encouraging individual responsibility, City leadership, and purposeful action that will ultimately lead to collective benefits for our city. The Plan provides fresh ideas for America's Fresh Coast Capital!

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www.milwaukee.gov/sustainability



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www.glslcities.org