Michigan's Water Infrastructure Investment Needs

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Prepared for

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Contents

Executive Summary

The infrastructure that provides clean water is one of the most fundamental underpinnings of urban society. Yet, the systems that provide safe drinking water and treat and manage wastewater and stormwater largely operate out of sight and out of mind, only garnering the public's attention in times of crisis. For example, (1) the statewide power outages in 2003 that shut down major public water systems, (2) the 2014 forced shutdown of the city of Toledo's Great Lakes water system due to toxic algal blooms, (3) the recent crisis related to lead contamination when the city of Flint switched to using the Flint River as its drinking water source, (4) the 2014 flooding that forced shutdowns of five freeways and many other roads in southeast Michigan after a severe rainfall occurred, and (5) numerous contamination issues over the last several decades related to municipal and private drinking water supplies, have all highlighted how dependent the state's metropolitan areas are on water for drinking, cooking, manufacturing, waste transport, and fire suppression. An essential role of government, therefore, is to ensure that communities have reliable drinking water infrastructure systems that pump and convey water in significant quantities and with sufficient pressure to meet critical needs, and to maintain adequate infrastructure to safely transport and appropriately treat stormwater and wastewater. Failure to adequately plan for and sufficiently fund critical water infrastructure in Michigan can lead to major crises affecting tens of thousands, if not millions, of the state's residents.

Currently, about 75 percent of Michigan residents get their drinking water from 1,390 community water systems, and approximately 70 percent are served by 1,080 wastewater treatment systems (MDEQ 10/31/15). Most of these systems were built between 50 and 100 years ago, while some in the state's oldest cities date back to the 1800s. Many of these systems are fast approaching, or have already exceeded, their expected lifespan. Communities throughout Michigan, therefore, face the challenge of maintaining and updating old infrastructure that was designed and built to meet former, less strict requirements, but now must meet emerging, more stringent state and federal drinking water, wastewater, and stormwater standards.

To better understand the status of the state's water infrastructure, the Michigan Infrastructure & Transportation Association hired Public Sector Consultants (PSC) to (1) assess the level of water infrastructure investment needed to bring systems and facilities up to current standards, and (2) determine whether current investments by communities across the state are sufficient to meet the challenge. The analysis focuses only on capital investment needs for water infrastructure; it does not include an assessment of operations and maintenance (O&M) expenses or debt services. If these expenses were included, the total costs—or necessary annual investment—would be significantly higher. Additionally, delaying needed capital improvements will likely increase emergency repair costs and further erode O&M monies needed to keep functional system components from deteriorating at faster rates.

METHODS

To conduct the analysis, PSC drew on many data sources that provide information on municipal spending and borrowing, state administered loan programs, and estimates of water infrastructure investment needs. To enable better comparisons, all figures were adjusted for inflation and are reported in 2015 dollars. A summary of our approach follows.

- To answer the question of how much is spent on drinking water and sewer infrastructure, we drew from the *U.S. Census Bureau Annual Surveys of State and Local Finances*, which provide revenue and expenditure data for states and municipalities. The reports include line items for capital outlays, or investments, in drinking water and sewerage infrastructure.
- To assess water infrastructure investment needs, we reviewed information collected by the U.S. Environmental Protection Agency (EPA). Every four years the EPA conducts two surveys that estimate (1) drinking water investment needs, and (2) wastewater and stormwater investment needs. While the surveys have similar goals, they use different methodologies, and thus have different strengths and weaknesses. Industry watchers regard both surveys as providing conservative estimates.

- To account for the conservative nature of the EPA estimates, PSC evaluated different methods other organizations have used to quantify differences between the survey results and communities' true long-term investment needs.
- For drinking water investment needs, we developed a range of estimates. The low end uses the results of the survey and adjusts them only for inflation. The high end of the range uses an adjustment factor developed by the EPA in 2002 that accounts for underreporting.
- Wastewater and stormwater investment needs were only adjusted for inflation because the methods available for better estimating the full investment need all draw on outdated approaches that are no longer practical given the veracity of the most recent survey.
- PSC then compared the estimates of water infrastructure investment needs with how much Michigan communities are currently spending to determine whether sufficient investments are being made.

MICHIGAN'S DRINKING WATER INVESTMENT GAP

Between 2004 and 2013, average annual investments in drinking water infrastructure were $447 million. This compares to an estimated investment need of between $731 million and $1.01 billion on an average annual basis until 2030. According to these estimates, Michigan is underinvesting in its drinking water infrastructure by anywhere from $284 to $563 million each year.

These estimates represent the additional spending needed to continue to provide clean drinking water to Michigan residents and businesses and to meet the requirements of the Safe Drinking Water Act. These estimates draw on data that were developed before the Flint drinking water crisis and do not reflect the additional investment that will be needed to reestablish a safe drinking water supply in that area.

MICHIGAN'S SEWER INVESTMENT GAP

Compared to drinking water estimates, stormwater and wastewater figures are much murkier. Unfortunately, there is not a comprehensive estimate that accurately reflects the total long term costs to ensure that Michigan communities are adequately managing wastewater and stormwater. EPA survey results suggest that Michigan's estimated investment need is approximately $2.14 billion. However, because of significant under-reporting in the survey this estimate does not adequately reflect anticipated long-term costs. Furthermore, because the survey is skewed toward shorter-term needs it is not practical to generate estimates of investment need on an annual basis.

Census data show that between 2004 and 2013, communities in Michigan spent an average of $691 million each year on wastewater and stormwater infrastructure. While this investment is significant, it is unlikely that it fully addresses Michigan's long-term needs, particularly for stormwater management. Of the investments made, many have followed consent orders to reduce or eliminate combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), and wastewater treatment plant bypasses. As a result of these investments, the estimated need within this subcategory declined by 70 percent between 2004 and 2008. Unfortunately, due to the underreporting of large-scale projects in the 2012 EPA needs survey, it is impractical to estimate the percent change over this period.

Furthermore, the state's recent initiatives to collect additional information on sewer infrastructure through the Stormwater, Asset Management, and Wastewater (SAW) Program will provide a wealth of information regarding the condition of existing systems and help communities identify their long-term needs. Preliminary results from those initiatives suggest that Michigan communities are in need of significant investment in wastewater and stormwater infrastructure. Once more information becomes available, the state and communities can better evaluate how much additional funding may be necessary to ensure that wastewater and stormwater infrastructure are adequately funded.

The infrastructure that provides clean water is one of the most fundamental underpinnings of urban society. Yet, the systems that provide safe drinking water and treat and manage wastewater and stormwater largely operate out of sight and out of mind, only garnering the public's attention in times of crisis. For example, (1) the statewide power outages in 2003 that shut down major public water systems, (2) the 2014 forced shutdown of the city of Toledo's Great Lakes water system due to toxic algal blooms, (3) the recent crisis related to lead contamination when the city of Flint switched to using the Flint River as its drinking water source, (4) the 2014 flooding that forced shutdowns of five freeways and many other roads in southeast Michigan after a severe rainfall occurred, and (5) numerous contamination issues over the last several decades related to municipal and private drinking water supplies, have all highlighted how dependent the state's metropolitan areas are on water for drinking, cooking, manufacturing, waste transport, and fire suppression. An essential role of government, therefore, is to ensure that communities have reliable drinking water infrastructure systems that pump and convey water in significant quantities and with sufficient pressure to meet critical needs, and to maintain an adequate infrastructure to safely transport and appropriately treat stormwater and wastewater. Failure to adequately plan for and sufficiently fund critical water infrastructure in Michigan can lead to major crises affecting tens of thousands, if not millions, of the state's residents.

Currently, about 75 percent of Michigan residents get their drinking water from 1,390 community water systems, and approximately 70 percent are served by 1,080 wastewater treatment systems (MDEQ 10/31/15). Most of these systems were built between 50 and 100 years ago, while some in the state's oldest cities date back to the 1800s. Many of these systems are fast approaching, or have already exceeded, their expected lifespan. Communities throughout Michigan, therefore, face the challenge of maintaining and updating old infrastructure that was designed and built to meet former, less strict requirements, but now must meet emerging, more stringent state and federal drinking water, wastewater, and stormwater standards.

To better understand the status of the state's water infrastructure, the Michigan Infrastructure & Transportation Association hired Public Sector Consultants (PSC) to (1) assess the level of water infrastructure investment needed to bring systems and facilities up to current standards, and (2) determine whether current investment by communities across the state is sufficient to meet the challenge. The analysis focuses only on capital investment needs for water infrastructure; it does not include an assessment of operations and maintenance (O&M) expenses or debt services. If these expenses were included, the total costs—or necessary annual investment—would be significantly higher. Additionally, delaying needed capital improvements will likely increase emergency repair costs and further erode O&M monies needed to keep functional system components from deteriorating at faster rates.

FINANCING WATER INFRASTRUCTURE

Beginning in the late 1960s, state and federal governments provided generous grants to local agencies to construct sanitary sewers and treatment plants. At the time, little thought was given to the dollars needed to upgrade and replace them as they approached the end of their useful life. So, while local capital investments in, and operating costs for, sanitary waste systems have increased steadily since 1970, the share of the costs picked up by state and federal governments has continued to diminish since the early 1980s. Since 1988, state and federal assistance for capital improvements to wastewater systems, with some exceptions, has been limited to subsidized loans from state revolving funds (SRF).

Due to the transition away from federal grants as a primary source of funding and the substantial capital investments required to update water infrastructure, communities now generally look to the lending market to finance their investments. Since this transition occurred, 90 percent of water infrastructure investments were financed through loans or bonds (EPA 2002). These loans have been supported through federal appropriations to capitalize state revolving loan funds for both drinking water and wastewater management. These funds require a 20 percent match, which Michigan provides through voter-approved bonds. The state's revolving loan funds provide low-cost, long-term loans to communities to help them cover the initial

costs associated with replacing and updating water infrastructure. Since they were created, Michigan's Clean Water and Drinking Water Revolving Loan Funds have provided over $6.59 billion (in 2015 dollars) to supply residents with clean drinking water and manage the state's wastewater (MDEQ 2015a)[1].

ESTIMATING WATER INFRASTRUCTURE SPENDING IN MICHIGAN

To estimate current spending, PSC started by looking at data from the U.S. Census Bureau. Each year, the bureau collects information from local and state governments on revenue and expenditures through its *Annual Survey of State and Local Finances*, including capital outlays for drinking water and sewerage infrastructure. Because a significant number of drinking water systems are privately owned, the estimates were adjusted to reflect private investment. The results of this analysis suggest that between 2004 and 2013, Michigan communities made an average annual investment of approximately $1.14 billion in water infrastructure[2].

To confirm this spending estimate, PSC obtained data collected by the Municipal Advisory Council of Michigan (MAC), which maintains records of outstanding bond debt held by Michigan communities. The MAC provided data for all open loans held by Michigan communities related to water and sewer infrastructure. Between 2009 and 2013, Michigan communities borrowed over $4.56 billion for water and sewer infrastructure, or an average of about $913 million each year[3]. (The MAC data do not identify whether the loans were for drinking water, stormwater, or sanitary wastewater projects.) Considering that the majority of large-scale water infrastructure projects are financed, the Census data and the MAC data should provide similar results. The minor differences between the Census data ($1.14 billion) and the MAC data ($913 million) may be attributed to multiple factors, including investments made by privately owned drinking water systems, investments made without financing, state and federal grants, delays between the year in which a community borrowed funds and when payments on projects actually began, and the use of different periods (fiscal versus calendar year) when conducting the analyses.

ESTIMATING WATER INFRASTRUCTURE INVESTMENT NEEDS

The U.S. Environmental Protection Agency (EPA) conducts two surveys every four years that estimate (1) drinking water investment needs, and (2) wastewater and stormwater investment needs. The results of these surveys are used by the federal government to determine the share of federal appropriations that goes to each state's revolving loan funds to help finance water infrastructure investments. While the surveys have similar goals, they use different methodologies, and thus have different strengths and weaknesses.

The drinking water survey uses a statistical approach, collecting information from a representative sample of community drinking water systems, which is, in turn, modeled to estimate infrastructure investment needs at the state and national level. The wastewater and stormwater survey does not use a statistical approach and seeks to collect information from all communities on a voluntary basis.

Industry watchers regard both surveys as providing conservative estimates because they only seek to quantify infrastructure investments that would be eligible to receive financing through state revolving loan programs; other water infrastructure investments that extend beyond the purview of those programs are excluded. Additionally, the surveys provide conservative estimates because they have rigorous documentation requirements—such as a comprehensive description of the problem, specific pollution control measures that will be used, and detailed cost information determined either by engineers or through supplier estimates—that are not always met. Finally, estimates are regarded as being conservative simply because many communities use a shorter planning horizon than the EPA.

Over the years, many attempts have been made to quantify differences between the results of the surveys and communities' true long-term investment needs. Such attempts have been made by the American Water Works Association (AWWA), the Congressional Budget Office (CBO), the EPA, and the Water Infrastructure Network (WIN). To estimate water infrastructure investment needs at the national level, each organization has applied a different methodology. The AWWA and WIN reports yielded results that are on the higher end of the projected investment continuum, whereas the CBO and EPA reports developed a range

of anticipated need using various sets of assumptions that would result in high- and low-case scenarios (Congressional Research Service 2010). Although the CBO and the EPA used different methodologies to determine investment needs, their studies yielded remarkably similar results. The CBO concluded that both their own and the EPA methodology produced reliable estimates for the purpose of developing a reasonable projection of long-term needs (Congressional Research Service 2010). Unfortunately, these studies have not provided state-specific results.

PSC evaluated each of these reports to determine whether they could be replicated or applied to estimates of Michigan's water infrastructure investment needs. The thorough documentation in EPA's 2002 method of adjusting the survey results made it possible to adapt and apply it to Michigan's drinking water estimates. However, due to differences in how the surveys are conducted and changes that have occurred since the adjustment method was developed in 2002, they no longer reflect conditions in Michigan for wastewater and stormwater investment needs. As a result, the only adjustments made in this analysis to the wastewater and stormwater estimates are for inflation. Throughout this report all figures are reported in 2015 dollars.

Estimating Drinking Water Infrastructure Needs

Every four years, the U.S. Environmental Protection Agency (EPA) conducts the *Drinking Water Infrastructure Needs Survey* (DWINS) to estimate the capital investments needed to meet Safe Drinking Water Act requirements. Through the survey, the EPA collects information from a subset of public drinking water systems in each state regarding their long-term investment needs. These results are then modeled to estimate drinking water investment needs on a state-by-state basis over a 20-year period within the following categories:

- Distribution and transmission
- Treatment
- Storage
- Source
- Other needs

The survey has been conducted five times since 1994, the most recent of which was conducted in 2011. The results of the survey are used to determine the proportion of federal appropriations allocated to each state for Drinking Water Revolving Loan Funds. While the DWINS is considered to be a comprehensive assessment of needs at the state and national level, it is generally thought to yield conservative estimates because needs are under-reported due to the rigorous documentation required to be included in the survey and because many communities use a shorter planning horizon than the 20-year survey period (EPA 2002).

In a 2002 analysis, the EPA developed a methodology to adjust its estimate for drinking water investment needs using results from the 1999 DWINS. The adjustment was based on data and information collected through site visits to 200 drinking water systems across the country. Drawing on this information, the EPA developed an adjusted estimate to better reflect long-term needs. Following this review, the next iteration of the DWINS saw estimated needs increase by more than 60 percent. This increase was attributed to growing security-related needs, the costs to comply with more stringent regulations, and a more comprehensive assessment of system needs that are used to model state and national needs (Congressional Research Service 2010). Considering the significant change in DWINS estimates, applying the 2002 adjustment factors to the surveys that followed may put estimated need at the higher end of the spectrum. However, the unadjusted survey is still considered by industry watchers to yield conservative results.

To account for these factors when estimating Michigan's drinking water investment needs, PSC used the DWINS estimate adjusted only for inflation as the low end of the range and applied the additional adjustment factors developed by EPA in 2002 as the high end of the range[iv]. This analysis suggests that Michigan would need to invest between $14.61 and $20.27 billion in drinking water infrastructure between 2011 and 2030, or between $731 million and $1.01 billion each year during this period. Exhibit 1 shows the results of the five DWINS investment estimates and the adjusted estimates.

EXHIBIT 1. Estimated Drinking Water Infrastructure Investment Needs in Michigan

Survey Period	DWINS Estimate (low) 2015 dollars, millions	Adjusted Estimate (high) 2015 dollars, millions
Adjustment Factor	Inflation only	~1.387
2011–2030	$14,612.62	$20,267.87
2007–2026	$13,590.76	$18,850.54
2003–2022	$14,627.28	$20,288.20
1999–2018	$9,695.47	$13,447.73
1994–2014	$6,927.26	$9,608.19

Source: PSC calculated these figures using data from EPA Drinking Water Infrastructure Needs Surveys; the Clean Water and Drinking Water Infrastructure Gap Analysis report (EPA 2002); and the Bureau of Labor Statistics Consumer Price Index Inflation Calculator. All estimates have been adjusted to 2015 dollars.

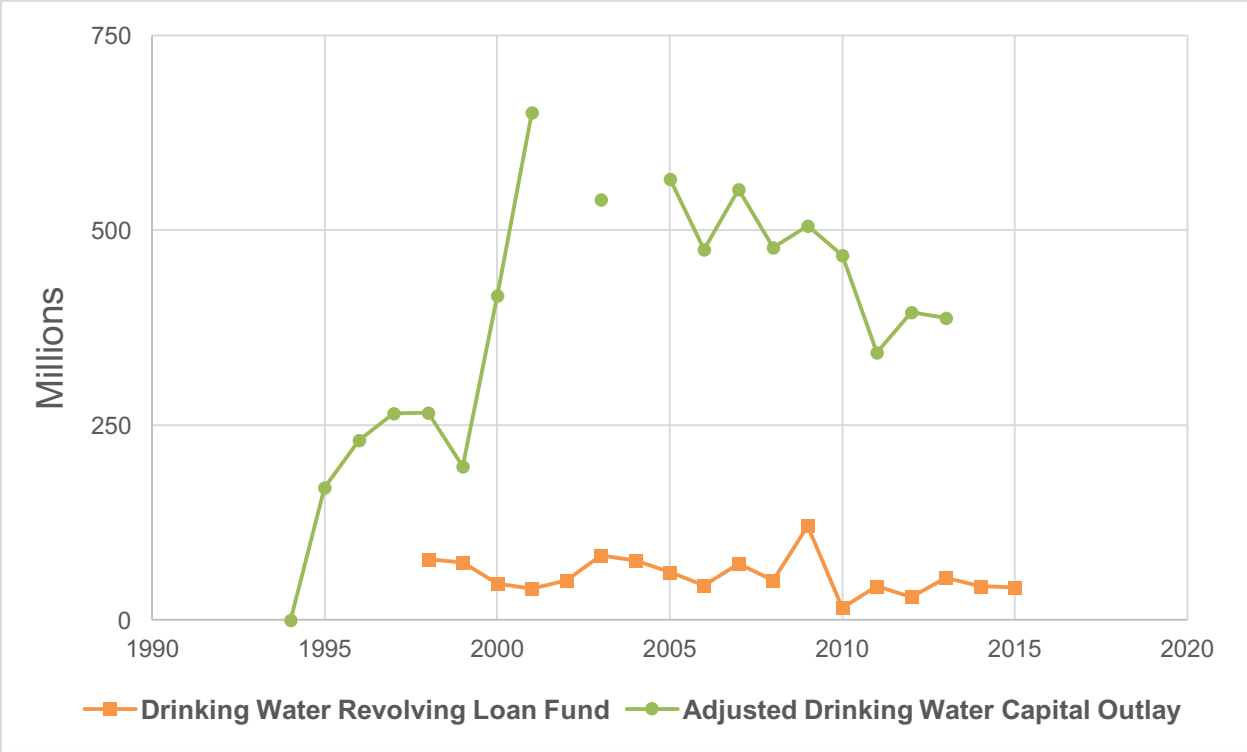
FINANCING DRINKING WATER INVESTMENTS

The results of the DWINS are used to determine the amount of federal appropriations allocated to each state's Drinking Water Revolving Fund (DWRF). These funds are a significant source of financing for drinking water infrastructure projects. Since it was created, the Michigan DWRF has issued more than 275 loans totaling over $857 million (MDEQ 2015a). When adjusted for inflation, the total loan value is $1.02 billion in 2015 dollars.

The U.S. Census Bureau *Annual Surveys of State and Local Finances* data series provides information on capital outlays made by the government for drinking water infrastructure; however, many drinking water systems in Michigan are privately owned. In 2002, the EPA estimated that one-third of households were served by privately owned systems (EPA 2002). To account for these systems, Public Sector Consultants (PSC) increased the capital outlay figures by one-third. Adjusting capital outlay data for inflation and to reflect private investment suggests that between 2004 and 2013, Michigan communities made an average annual investment of $447 million in drinking water infrastructure.

Exhibit 2 shows Michigan's DWRF loans and the adjusted capital outlays for drinking water infrastructure over time. Comparing the drinking water capital outlay and the DWRF loan data suggests that significantly more money is invested in drinking water infrastructure than is financed through the revolving loan fund.

EXHIBIT 2. Drinking Water Capital Outlays and Revolving Loans in Michigan

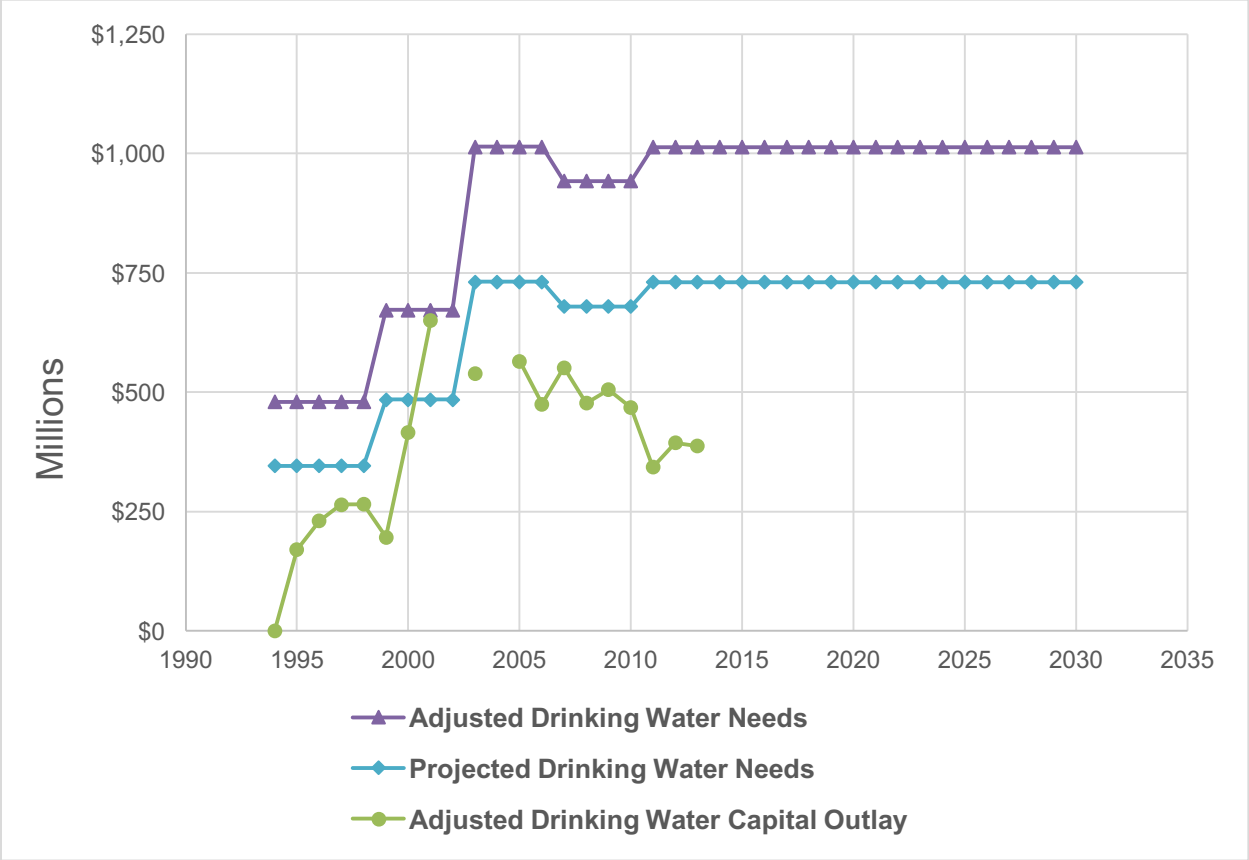


Source: PSC calculated these figures using data from the U.S. Census Bureau, State and Local Finances (as complied by the Urban Institute); the Michigan Department of Environmental Quality, State Revolving Loan Fund; and the Bureau of Labor Statistics Consumer Price Index Inflation Calculator. All estimates have been adjusted to 2015 dollars. Census data are not available for 2001 and 2003.

ARE MICHIGAN COMMUNITIES SPENDING ENOUGH?

Between 2004 and 2013, average annual investments in drinking water infrastructure were $447 million. This compares to an estimated investment need of between $731 million and $1.01 billion on an average annual basis. According to these estimates, Michigan is underinvesting in its drinking water infrastructure by anywhere from $284 to $563 million each year. These estimates represent the additional spending needed to continue to provide clean drinking water to Michigan residents and businesses and to meet the requirements of the Safe Drinking Water Act. These estimates draw on data that were developed before the Flint drinking water crisis and do not reflect the additional investment that will be needed to reestablish a safe drinking water supply in that area.

EXHIBIT 3. Drinking Water Investment Needs and Capital Outlays



Source: PSC calculated these figures using data from the 1994, 1999, 2003, 2007, and 2011 EPA Drinking Water Infrastructure Needs Survey; the Clean Water and Drinking Water Infrastructure Gap Analysis report (EPA 2002); the U.S. Census Bureau, State and Local Finances (as compiled by the Urban Institute); and the Bureau of Labor Statistics Consumer Price Index Inflation Calculator. All estimates have been adjusted to 2015 dollars. Census data are not available for 2001 and 2003.

Estimating Wastewater and Stormwater Infrastructure Needs

Every four years, the U.S. Environmental Protection Agency (EPA) conducts the *Clean Watersheds Needs Survey* (CWNS) to estimate the infrastructure investment needed to meet Clean Water Act water quality requirements. To complete the estimate, the EPA coordinates with states and local governments to collect information on capital investment needs for up to 20 years. The results of the survey are used to determine the percentage of federal appropriations allocated to state-administered Clean Water State Revolving Funds. In Michigan, the fund is most commonly referred to as the State Revolving Fund or the SRF.

The EPA works with states and local jurisdictions to collect information about investment needs for publicly owned systems in the following categories:

- Wastewater treatment (including secondary and advanced treatment)
- Pipe replacement
- Installation of new pipes
- Combined sewer overflow correction
- Stormwater management

The most recent CWNS was conducted in 2012 and the results were released in January 2016. While its purpose is similar to the drinking water survey, the CWNS uses a different methodology. Rather than developing a statistical sampling method in which a subset of communities report their long-term investment needs, all communities are encouraged to submit information on a voluntary basis. As a result, there is wide variation in the participation rates of individual communities. The majority of communities for which information is available are frequently those that expect to seek financing through the SRF, while communities that may look to the open bond market to finance investments are less likely to participate. This approach fits the goals of the program to determine how much money is needed to finance projects through state revolving funds, but it does not accurately portray all wastewater and stormwater investment needs. Furthermore, the CWNS is considered to provide conservative results for the following reasons (EPA 2002 and 2016):

- To be included in the survey, infrastructure needs must be rigorously documented, a requirement that not all communities meet for all projects.
- Reported needs are documented through capital improvement plans, which reflect investments that communities *can* make within the confines of municipal budgets. As a result, reported needs reflect what communities can currently afford and do not fully address the scope of investments that *should* be made.
- While investment needs are collected for up to 20 years, most communities use a shorter planning horizon. As a result, the majority of reported needs are those that communities expect to complete within approximately five years.
- The survey focuses on compliance with the Clean Water Act to control water pollution and does not fully capture the range of investments made by communities for other purposes, such as flood control.

The 2012 CWNS estimates that Michigan will need to spend $2.14 billion. Exhibit 4 shows the results of the six most recent investment needs estimates.

EXHIBIT 4. Estimated Stormwater and Wastewater Investment Needs in Michigan

Survey Year	CWNS Estimate (2015 dollars, millions)
2012	$2,144.15
2008	$4,105.68
2004	$7,576.70
2000	$5,654.30
1996	$7,799.56
1992	$6,264.92

Source: PSC calculated these figures using data from the EPA Clean Watersheds Needs Surveys; and the Bureau of Labor Statistics Consumer Price Index Inflation Calculator. All estimates have been adjusted to 2015 dollars.

Unlike the drinking water estimates that are modeled over a 20-year period, the CWNS is skewed toward shorter-term needs. However, because the estimate includes many short-term needs and some long-term needs, it is not practical to generate an annual estimated investment need from the CWNS estimate or to compare such a figure to annual spending to determine whether communities are making appropriate investments in wastewater and stormwater infrastructure; the results simply do not include enough information to determine investment timelines. While attempts have been made to adjust these estimates, the most recent survey results reflect significant under-reporting from Michigan. For example, the Michigan Department of Environmental Quality (MDEQ) Revolving Loan program, which collaborates with the EPA to generate estimates, noted that Michigan was not able to meet EPA's requirements to include over $1 billion in additional needs for Lansing and Detroit alone due to the timing of the survey period (MDEQ 01/14/16). Due to such significant under-reporting, the adjustment factors that were developed using previous versions of the survey no longer provide meaningful results.

Furthermore, the CWNS estimate provides information on *community* wastewater treatment system needs but does not reflect additional investments needed for *onsite* wastewater treatment systems (septic systems). Approximately 30 percent of Michigan's homes and businesses are serviced by onsite wastewater treatment systems rather than municipal treatment systems (MOGL 2015). These 1.3 million onsite systems can provide effective treatment when they are properly installed and maintained. However, there is a growing body of evidence that suggests that some of these systems are contributing sewage to the environment. For example, a study lead by Michigan State University found that 100 percent of 64 waterbodies sampled in the Lower Peninsula tested positive for human sewage and demonstrated that sewage levels increased as the density of septic systems increased (Verhougstraete et al 2014). This suggests that a significant portion of onsite systems are not functioning properly and, as a result, are contributing sewage and bacteria to Michigan's waterways. This is one of many factors prompting the MDEQ to develop a new statewide Bacterial Total Maximum Daily Load. This standard would set limits on how much bacteria could be introduced into a waterway and meet the water quality standards set through the Clean Water Act.

To address these concerns, some property owners may need to install new onsite wastewater treatment systems. In other instances, communities may find it more cost effective to take a community-wide approach and install new community wastewater collection and treatment systems. While investments needs for onsite systems are not included in the EPA CWNS estimate, the information was collected separately for other purposes. Michigan documented over $1 billion in onsite wastewater treatment system investment needs over a 20-year period (MDEQ 01/14/16).

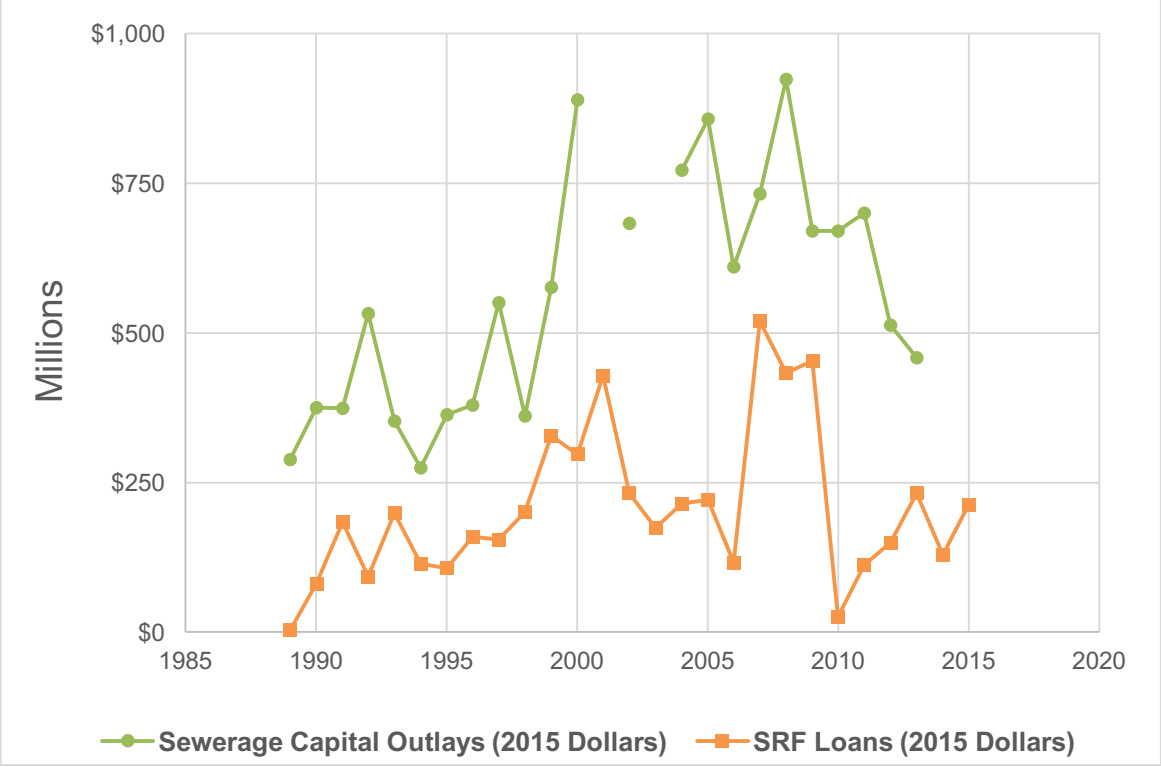
FINANCING MICHIGAN'S STORM AND WASTEWATER INFRASTRUCTURE

The results of the CWNS are used to determine federal appropriations to capitalize Michigan's SRF, which is a primary financing source for wastewater infrastructure investments in the state. Since it was created, the Michigan SRF has issued over 550 loans totaling more than $4.46 billion (MDEQ 2015a). When adjusted for inflation, the total loan value is over $5.57 billion in 2015 dollars.

Since its inception, the SRF has been a significant resource to help communities finance wastewater treatment projects. However, the program focuses on projects that address water quality (e.g. pollution control) rather than water quantity (e.g. stormwater management and flood control). The funding through the SRF represents only a portion of the water management needs that communities face. Additionally, because market interest rates for municipal bonds have been near historical lows, many communities financed infrastructure investments through the open bond market.

The U.S. Census Bureau collects information from local and state governments on revenue and expenditures through its *Annual Survey of State and Local Finances*. The Census data parses municipal spending for sewerage capital outlays and operations and maintenance (O&M) expenses. These figures include loans and grants received from the state and other sources. Adjusting the spending data for inflation suggests that between 2004 and 2013, Michigan communities made an average annual investment of $691 million in wastewater and stormwater infrastructure. Exhibit 5 shows annual SRF loan amounts and capital outlays for wastewater and stormwater projects.

EXHIBIT 5. Clean Water Capital Outlays and Revolving Loans in Michigan



Source: PSC calculated these figures using data from the U.S. Census Bureau, State and Local Finances (as compiled by the Urban Institute); the Michigan Department of Environmental Quality, State Revolving Loan Fund; and the Bureau of Labor Statistics Consumer Price Index Inflation Calculator. All estimates have been adjusted to 2015 dollars. Census data are not available for 2001 and 2003.

Exhibit 5 demonstrates that communities consistently spend significantly more on stormwater and wastewater infrastructure than is financed through the SRF. Unfortunately, the Census spending data do not differentiate between capital outlays for pollution prevention to control combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), and wastewater treatment plant bypasses, and other stormwater management investments. However, the majority of the investments have likely focused on pollution prevention activities that meet Clean Water Act requirements, whereas less funding has been dedicated to stormwater management.

THE MICHIGAN STORMWATER, ASSET MANAGEMENT, AND WASTEWATER PROGRAM

To establish an additional funding source for stormwater management, and to assist communities with better identifying long-term stormwater and wastewater infrastructure investment needs, the MDEQ launched the Stormwater, Asset Management, and Wastewater (SAW) Program in 2013. The SAW program provides grants to develop:

- Stormwater and wastewater asset management plans
- Stormwater management plans
- Sewage collection and treatment plans

The SAW Program also provides low interest loans to support construction projects identified through such planning documents. The state has allocated $450 million to the program, which will be disbursed over multiple years. In its first year of existence, the SAW program received 673 applications totaling $541 million in requests. The state awarded $97 million in FY 2014 and again in FY 2015 to support these projects (MDEQ 2015b). The first series of planning projects are scheduled to be completed by the end of 2016. They should provide a much better assessment of the current condition of wastewater and stormwater infrastructure and help communities develop long-term asset management plans that will enable communities to maximize their resources and make appropriate investments in wastewater and stormwater management. Aggregating these results to a statewide level would, in turn, provide a more accurate picture of the state's long-term investment needs.

OTHER FUNDING SOURCES

In addition to the SRF and the SAW program, many other smaller sources of funding are available to support stormwater and wastewater infrastructure investments in Michigan. For example, the United States Department of Agriculture (USDA) Rural Development is a place where communities—at least rural ones—can obtain financing for water infrastructure. Between 2009 and 2014, this agency provided approximately $447 million in loans and $166 million in direct funds to Michigan communities through its Water and Waste program (USDA 2014).

Another significant source of funding was the Rouge River National Wet Weather Demonstration Project—a federally supported initiative designed to demonstrate alternative approaches to stormwater and wastewater management in urban watersheds highly affected by wet weather. From 1992 to 2014, this initiative provided over $150 million in federal grants to support combined sewer overflow (CSO) and sanitary sewer overflow (SSO) corrective actions in southeast Michigan (Wayne County 11/24/2015).

ARE MICHIGAN COMMUNITIES SPENDING ENOUGH?

Compared to drinking water estimates, stormwater and wastewater figures are much murkier. Unfortunately, there is not a comprehensive estimate that accurately reflects the total long term costs to ensure that Michigan communities are adequately managing wastewater and stormwater. EPA survey results suggest that Michigan's estimated investment need is approximately $2.14 billion. However,

because of significant under-reporting in the survey this estimate does not adequately reflect anticipated long-term costs. Furthermore, because the survey is skewed toward shorter-term needs but still allows for some longer-term needs, it is not practical to generate estimates of investment need on an annual basis.

Census data show that between 2004 and 2013, communities in Michigan spent an average of $691 million each year on wastewater and stormwater infrastructure. While this investment is significant, it is unlikely that it fully addresses Michigan's long-term needs, particularly for stormwater management. Of the investments made, many have followed consent orders to reduce or eliminate CSOs, SSOs, and wastewater treatment plant bypasses. As a result of these investments, the estimated need within this subcategory declined by 70 percent between 2004 and 2008. Unfortunately, due to the underreporting of large-scale projects in the 2012 EPA needs survey, it is impractical to estimate the percent change over this period.

The SAW Program will provide a wealth of information regarding the condition of existing systems and help communities identify their long-term needs. Preliminary results from this work suggest that Michigan communities are in need of significant investment in stormwater. Once more information becomes available, the state and communities can better evaluate how much additional funding may be necessary to ensure that wastewater and stormwater infrastructure are adequately funded.

Conclusion

At the request of the Michigan Infrastructure & Transportation Association, Public Sector Consultants (PSC) assessed Michigan's water infrastructure investment needs, current and historical financing levels, and the amount of investment currently being made by communities across the state. As a part of that work, PSC developed a methodology to estimate Michigan's drinking water infrastructure investment needs that draws from the *Drinking Water Infrastructure Needs Survey*, and a U.S. Environmental Protection Agency (EPA) analysis of deficiencies in the survey results. While this approach to adapting national estimates to state needs may be somewhat simplified, PSC believes it better reflects the full range of investment needs that Michigan communities face. For stormwater and wastewater investments, a similar adjustment was not practical given available data. Estimated needs for stormwater and wastewater collected through the *Clean Watershed Needs Survey* significantly under-report Michigan's long-term investment needs for stormwater and wastewater infrastructure.

Perhaps more important than attempting to establish a precise projection of statewide investment needs is recognizing that enhanced planning is necessary at the local and state level to better quantify needs and ensure that investments are being made to continue to provide safe, reliable water supplies to residents, and to manage stormwater and wastewater appropriately.

MICHIGAN'S DRINKING WATER INVESTMENT GAP

Between 2004 and 2013, average annual investments in drinking water infrastructure were $447 million. This compares to an estimated investment need of between $731 million and $1.01 billion on an average annual basis until 2030. According to these estimates, Michigan is underinvesting in its drinking water infrastructure by anywhere from $284 to $563 million each year.

These estimates represent the additional spending needed to continue to provide clean drinking water to Michigan residents and businesses and to meet the requirements of the Safe Drinking Water Act. Furthermore, these estimates draw on data that were developed before the Flint drinking water crisis and do not reflect the additional investment that will be needed to reestablish a safe drinking water supply in that area.

MICHIGAN'S SEWER INVESTMENT GAP

Compared to drinking water estimates, stormwater and wastewater figures are much murkier. Unfortunately, there is not a comprehensive estimate that accurately reflects the total long-term costs of ensuring that Michigan communities are adequately managing wastewater and stormwater. EPA survey results suggest that Michigan's estimated need is approximately $2.14 billion. However, due to the survey method, it is not practical to generate an annual figure. Census data show that, between 2004 and 2013, communities in Michigan spent an average of $691 million on wastewater and stormwater infrastructure each year. While this investment is significant, it is unlikely that it addresses Michigan's long-term needs, particularly for stormwater management.

The state's recent initiatives to collect additional information on sewer infrastructure through the Stormwater, Assest Management, and Wastewater (SAW) Program will provide a wealth of information regarding the condition of existing systems and help communities identify their long-term needs. Preliminary results from those initiatives suggest that Michigan communities are in need of significant investment in wastewater and stormwater infrastructure. Once more information becomes available, the state and communities can better evaluate how much additional funding may be necessary to ensure that wastewater and stormwater infrastructure are adequately funded.

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Endnotes

[1] The Michigan Department of Environmental Quality provided the total loan amounts for Michigan's Clean Water and Drinking Water Revolving Loan Funds. PSC adjusted the figures for inflation to 2015 dollars.
[2] 2013 is the most recent year for which the State and Local Finances data set was available from the U.S. Census Bureau.
[3] The data provided by the MAC identifies active loans and includes only limited information on loans that were repaid between 2009 and 2015. Considering this, PSC used a five-year, rather than a ten-year, average because some bonds have termination periods that would not have been captured in the analysis if looking at a ten-year period that aligned with the census capital outlay data.
[iv] To apply the EPA's adjustment factors to Michigan's estimated investment need, PSC determined the adjustment factor by dividing the adjusted estimate by the unadjusted estimate. This approach yielded an adjustment factor of approximately 1.387.