2015 Annual Drinking Water Report Wisconsin's Public Water Systems

Bureau of Drinking Water and Groundwater
Wisconsin Department of Natural Resources

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Executive Summary

Wisconsin's drinking water remained safe and affordable in 2015 due to strong efforts and partnerships among local water suppliers, the state, professional associations, consultants and others working to ensure safe drinking water issues. On average, Wisconsin residents pay $5.50 for 1,000 gallons of tap water—mere fractions of a penny per gallon according to the state Public Service Commission.

- Despite economic challenges, public water systems continued their strong performance, with over 96 percent—11,036 of 11,470 systems—meeting all health-based standards. These systems had no water samples exceeding health-based standards for regulated contaminants. That is a slight improvement over what Wisconsin's public water systems achieved in 2014.

- Bacterial contamination again ranked as the most common health-based violation, followed by violations for nitrates and radioactivity. A violation of a health-based standard does not mean that people who drank the water experienced adverse health effects; it means users were exposed to a contaminant at a level deemed by U.S. Environmental Protection Agency to pose an unreasonable risk to health, or that the system failed to treat its water to the extent necessary.

- Monitoring and reporting violations represent the area where public water system performance needs the most improvement, which is a continuing challenge. In 2015, Wisconsin Department of Natural Resources (DNR) worked to address 518 M/R violations, compared with 777 in 2014. The decrease resulted mainly because public water systems did a better job providing notice of test results to customers who took a sample for lead. DNR continues working with public water systems through assistance from staff, contractors, and county public health departments to ensure that water samples are collected in the required time frames and public notices are issued correctly.

- Fewer formal enforcement actions were needed in 2015 than in 2014. This improvement is due to DNR's work in previous years establishing long-term agreements with public water systems for correcting violations and improved efforts to address violations in a timely manner.

- Twenty-two communities received more than $35 million in assistance for drinking water system infrastructure improvements, of which $32.9 million was low interest loans. These low interest loans can provide a cost savings of up to 30 percent to communities, enabling them to address challenges more quickly and economically.

INTRODUCTION

The Wisconsin Department of Natural Resources (DNR) works to protect the state's water resources to ensure safe drinking water is available to anyone who lives, works and plays in Wisconsin.

Abundant fresh water, strong state and federal regulations and cooperative efforts between public water systems, trade associations, individual operators, county health officials, United States Environmental Protection Agency (EPA), DNR and other organizations have contributed to the success in managing drinking water resources in Wisconsin.

The 2015 Annual Drinking Water Report for Wisconsin's Public Water Systems summarizes performance of the state's public water systems between January 1, 2015 and December 31, 2015. Additionally, it highlights compliance with drinking water standards and state and local efforts to assure a safe, adequate supply of drinking water.

Safe Drinking Water Act

Under the Safe Drinking Water Act (SDWA), passed by Congress in 1972 and amended several times since, the EPA sets national limits for several groups of bacteriological and chemical contaminants in drinking water. These limits, health-based standards known as Maximum Contaminant Levels (MCLs), are specific for each contaminant.

Federal law details how frequently a public water system must test for contaminants and report results to the state, EPA, and the public. These testing or "monitoring" requirements vary according to system type, population served, vulnerability of the water source to contamination, and results of previous monitoring. EPA also requires public water systems serving more than 10,000 people, to monitor for additional unregulated contaminants of concern to help the agency gauge the prevalence and the need to set new health-based standards.

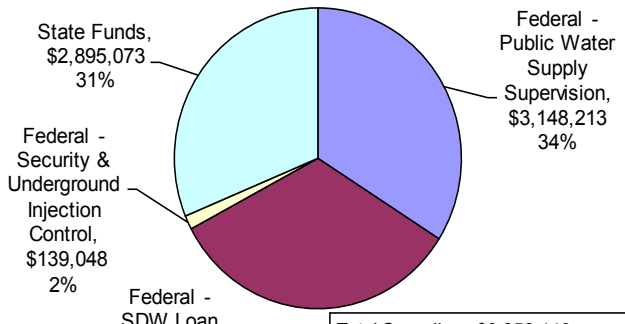
State primacy for the Safe Drinking Water Act

EPA may grant states regulatory authority to implement the SDWA program for public water systems. Wisconsin has such authority or "primacy" implemented by the DNR's Drinking Water and Groundwater (DG) program. DNR maintains an inventory, reviews monitoring results and conducts inspections to make sure public water systems meet requirements. DNR also provides technical help to public water system owners and operators, reviews construction plans for public water systems, and coordinates formal enforcement to address violations when necessary. DNR's Bureau of Community Financial Assistance provides low-interest loans to help communities improve or expand their public water systems.

Public Water Supply program funding

In 2015, DG had the equivalent of 74 full-time staff working with the states 11,470 public water systems. The public water supply program receives funding from several sources including federal and state governments (Graph 1). Of the total $9.8M received, the majority goes to funding program staff and twenty percent of the budget went to contracts with organizations, colleges, county health departments and consultants for

Graph 1: Public Water Supply Program
State Fiscal Year 2014 - 2015
Estimated Spending by Funding Source



training and technical help.

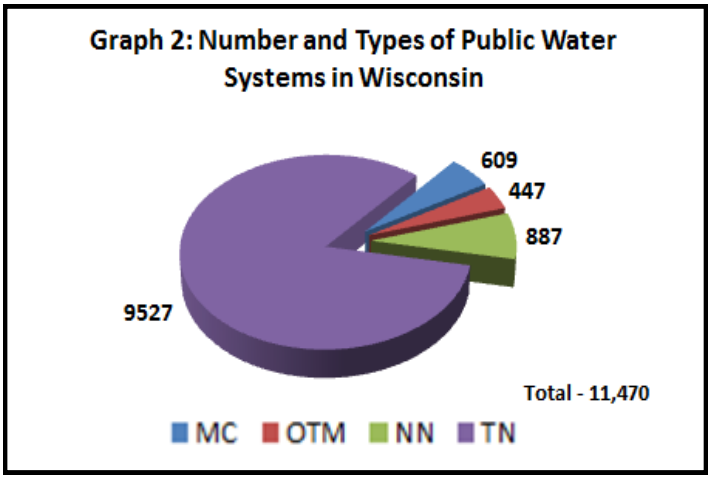
Four types of public water systems

EPA and DNR define public water systems as those providing water for human consumption to at least 15 service connections or regularly serving an average of at least 25 people a day for at least 60 days per year.

Types of public water systems:

- ***Municipal Community (MC) systems*** are owned by cities, villages and sanitary districts and regularly serve at least 25 year-round residents.
- ***Other Than Municipal Community (OTM) systems*** are privately owned and regularly serve at least 25 year-round residents. These include mobile home parks, apartment buildings and condominium complexes.
- ***Non-transient Non-community (NN) systems*** regularly serve at least 25 of the same people six months of the year. These include schools, day care centers and factories.
- ***Transient Non-community (TN) systems*** serve at least 25 people at least 60 days of the year. These include motels, restaurants, parks, taverns, churches and campgrounds.

Graph 2 shows the breakdown of Wisconsin's 11,470 public water systems. By far, the state's 9,527 TN systems make up the largest category. However, the state's 609 municipal systems serve the most people, more than 60 percent of the population.



Source and cost of water

Based on municipal water user rates reported to the Public Service Commission, on average Wisconsin residents pay approximately $5.50 for 1,000 gallons of tap water—mere fractions of a penny per gallon.

The vast majority of Wisconsin's public water systems rely on groundwater as their water source. However, there are 58 systems that rely on surface water, via lakes, to provide their drinking water. These surface water systems serve some of the state's largest communities, including Milwaukee and Green Bay. Such surface water systems serve 1.9 million people, while groundwater systems serve about 3.1 million. The DNR tracks the amount of water used by Wisconsin's municipal water systems, which totaled almost 178 billion gallons in 2015 (Table 1).

Table 1: Water Use by Source

Water pumped annually	Surface water	Groundwater
Gallons	82,793,173,044	95,148,910,360
Total	177,942,083,404	

PUBLIC WATER SYSTEM TESTING

The SDWA mandates that public water systems collect water samples, test them for potential contaminants and report the results to their customers and the primacy agency. The number and frequency of samples collected for testing is dependent on the water system type, population served, and whether the water source is a groundwater aquifer, lake or river.

Potential contaminants are categorized as having either an acute or chronic health risk. Acute contaminants, such as bacteria or nitrates, pose an immediate risk to human health—people can become ill within hours or days of exposure. Contaminants that pose a long-term health risk are called chronic contaminants. Their maximum permissible levels are risk-based and are typically set so that no more than one in 1,000,000 people would face an increased risk of developing cancer by drinking two liters of water a day for 70 years.

All public water systems monitor for acute contaminants. The largest public water systems collect hundreds of water samples for acute contaminant testing every month, while the smallest systems test once a year. Chronic contaminants are monitored less frequently and the smallest systems, TNs, are not required to test.

Regulated contaminants fall into several groups based on their characteristics. The categories of regulated contaminants are:

- Total coliform bacteria
- Nitrate
- Inorganic chemicals (IOCs);
- Volatile organic chemicals (VOCs);
- Synthetic organic chemicals (SOCs);
- Radionuclides
- Lead
- Copper
- Disinfection by-products
- Groundwater Rule

Each category may include multiple contaminants. For instance, “synthetic organic chemicals” include 30 different substances. Municipal systems, which test for the most contaminants, test for over 90 regulated contaminants to protect public health.

Appendix A, page 16, contains a list of regulated contaminants and their health-based standard, or MCL.

EPA also sets aesthetic or “secondary” standards for certain contaminants. These substances may cause an unpleasant smell, taste, or appearance, or stain sinks or discolor clothes when they exceed certain levels. Public water systems may be required to take corrective actions if they exceed secondary standards for contaminants such as manganese, iron, copper, and sulfate.

Every five years the EPA identifies a list of unregulated contaminants for potential regulation under the SDWA. Contaminants such as chromium, vanadium and enteroviruses were evaluated under the EPA’s most recent Unregulated Contaminant Monitoring Rule (UCMR3) to determine their prevalence in drinking water. Sampling for these contaminants, which was conducted at randomly selected community and non-community water supply systems in Wisconsin and across the United States, began in 2013 and was completed in 2015. EPA will evaluate the analytical results of contaminants monitored under UCMR3 and determine whether any will be considered for regulation.

2015 COMPLIANCE RATES STRONG

The vast majority of Wisconsin's public water systems met all SDWA requirements: they collected water samples, tested them for the appropriate contaminants, reported the results, and did not exceed health-based standards. They also used appropriate treatment techniques and delivered Consumer Confidence Reports to their customers. Table 2 outlines how well public water systems complied with SDWA requirements in 2015, and Appendix B contains additional detail on violations that occurred during the year.

Table 2: Water systems' compliance with SDWA Requirements--percent systems in compliance

Water System Type	Type of Requirement		
	MCL (water samples met all health standards)	Monitoring/ Reporting	Treatment Technique
Municipal	94.6%	86.7%	98%
OTM (condos, mobile home parks, etc. with own water supply)	92.6%	76.1%	99%
Nontransient Noncommunity (NN) (schools, day care centers, etc. with own water supply)	94.3%	89.0%	100%
Transient Noncommunity (TN) (restaurants, taverns, churches, with own water supply)	96.7%	97.6%	100%

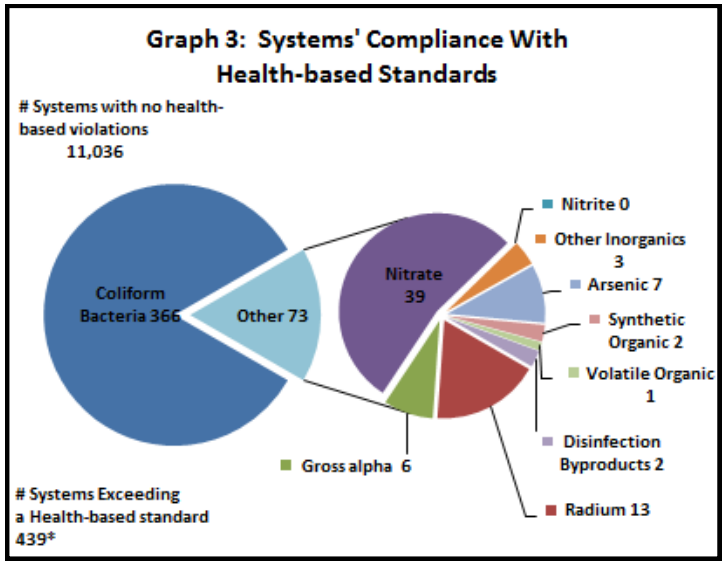
The 2015 compliance rates are notable because SDWA requirements for most systems have increased as EPA has implemented new regulations over the years. Of the compliance categories, meeting the monitoring and reporting (M/R) requirements continues to be the area needing the most improvement.

Health-based violation summary

The most serious violations of the SDWA occur when contaminants are detected in water samples and exceed the MCL thresholds. A MCL violation does not mean that people who drank the water experienced adverse health effects. It means that a contaminant in drinking water was detected at a higher concentration than what EPA has determined is allowable to protect human health.

During 2015, over 96 percent of the state's public water systems—or 11,036 of 11,470—served water to their customers without exceeding any of the MCL standards for regulated contaminants.

The remaining 4 percent, or 439 public water systems, collected water samples that exceeded the MCL for at least one contaminant. Graph 3 below is a breakdown of systems with MCL exceedances. Of these, the state's smallest systems—TN systems—accounted for about 73 percent of the health-based violations. This group includes motels, restaurants, parks, taverns, churches, and campgrounds. Appendix C contains details of specific contaminants detected in water samples during 2015.



**Several systems exceeded the MCL for both Radium and Gross Alpha, and are included in each category.*

♦ *Bacterial violations top list again*

In 2015, as in the past, the most MCL violations resulted because bacteria were detected in drinking water. Public water systems collected a total of 78,188 samples for bacteriological analysis, and 3.2 percent, or 366 of the 11,470 public water systems, reported results that exceeded the MCL (Table 3). Most of the violations (299) occurred at TNs, the smallest public water systems. It should be noted this is an improvement over the number of violations in 2014.

Table 3: Systems Exceeding Bacteria Standards

System Type	# Systems Exceeding the Bacteria Standard (MCL)	% System Type Exceeding the Bacteria Standard (MCL)
Municipally owned (cities, villages, sanitary districts)	12	2.0%
Other-than-Municipal (mobile home parks, condo associations, etc.)	25	5.6%
Non-transient non-community (NN) (schools, day cares, factories)	30	3.4%
Transient non-community (TN) (motels, taverns, restaurants, etc.)	299	3.1%
TOTAL	366	3.2%

Systems test for both total coliform and *Escherichia coli* (*E. coli*) bacteria. Total coliform bacteria are microscopic organisms that can be found in human and animal waste, in soil, on plants, and in runoff. Total coliform bacteria in water indicate that other bacteria, viruses, and parasites that can cause illness may also be present.

E. coli are a large and diverse group of bacteria found in the environment, foods and intestines of people and animals. People may become ill after just one exposure to water containing *E. coli*. Public water systems must notify customers immediately when *E. coli* is present and can usually address the presence of these microorganisms quickly.

♦ *Nitrate MCLs*

Community and NN water systems reported 39 nitrate MCL violations in 2015, a drop from 57 nitrate MCL violations reported the previous year. The contaminant poses an acute health risk to infants six months and younger and women who are or may become pregnant, and a longer term health threat to the general population. In addition to the 39 nitrate MCL violations at community and NN water systems, 39 TN water systems also exceeded the nitrate MCL. The TN water systems are currently allowed to operate as long as they post a continuous notice that nitrate levels exceed the MCL. They must also provide an alternate water source when requested.

♦ *Radioactivity MCLs*

In 2015, 14 community water systems served water that exceeded the combined radium standard and/or the gross alpha standard for at least part of the year, making this the third most prevalent MCL violation.

While radium is a naturally occurring contaminant present in groundwater aquifers, people exposed over their lifetime to drinking water with elevated radioactivity levels run a greater risk of developing disease.

Contaminant trends over time

Over the past seven years, 2.6-3.7 percent of Wisconsin's public water systems have incurred violations of the bacteria standards. This is a top health-related priority for DNR and public water systems, since bacteriological contamination represents an acute health risk.

Research and monitoring results suggest the need for greater focus on nitrates and viruses. In 2014, the Wisconsin Department of Health Services notified DNR that adverse health effects may result from long-term exposure (a

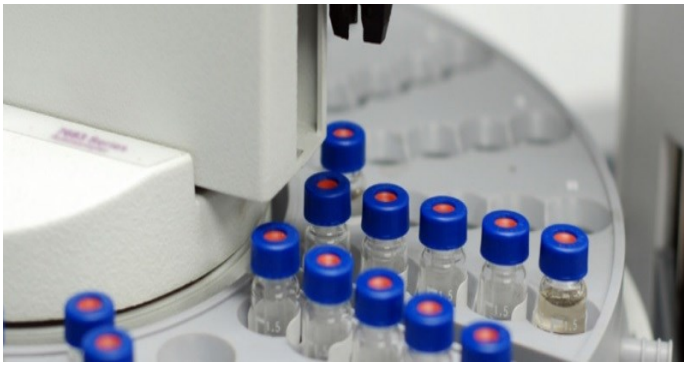
year or more) to drinking water with nitrate levels exceeding the MCL. Working with public water systems to maintain nitrate levels below the MCL will continue to be a priority.

DNR has worked with public water systems exceeding the radium and arsenic MCLs for several years. Many public water systems have taken action to return to compliance, including installing treatment systems, reconstructing wells, or finding alternative water sources. Radium and arsenic compliance will be a continued priority for DNR due to the common occurrence of these contaminants in Wisconsin.

Monitoring and reporting violations

EPA specifies the water testing methods that public water systems must use and sets schedules for monitoring frequency and reporting results. A public water system that does not follow the schedule or use appropriate methods incurs a M/R violation.

States must report M/R violations when samples are not taken or results are not reported during a compliance period.
The Surface Water Treatment Rule (SWTR) sets monitoring requirements for public water

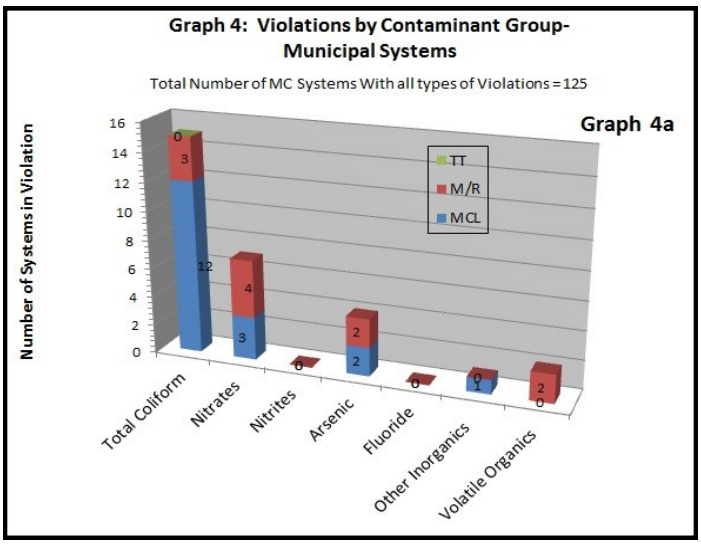


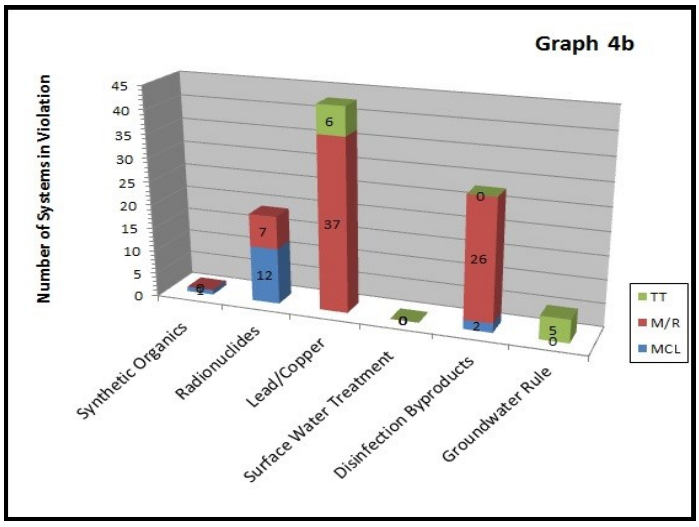
Monitoring public water systems for contaminants is the foundation for safe drinking water. States must report significant monitoring violations, which occur when no samples are taken or results are not reported.

systems using lakes or rivers, or groundwater directly influenced by surface water, as a source. A major M/R violation of the SWTR occurs if a public water system fails to collect at least 90 percent of the required samples for turbidity and disinfectant residuals. No SWTR violations were reported in 2015.

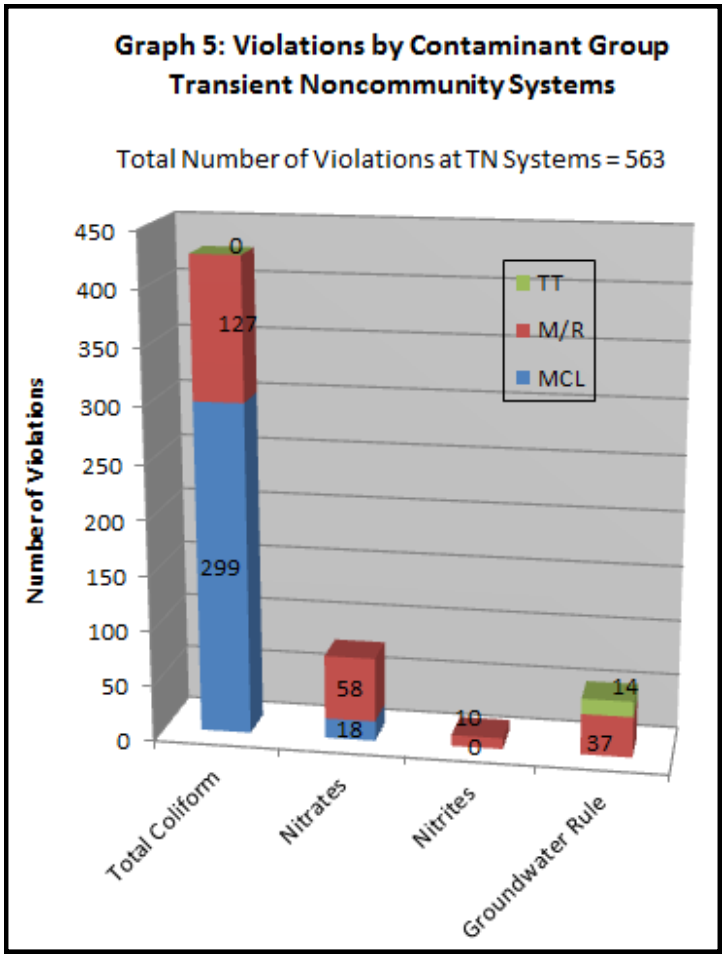
Failure of a system to notify customers of their lead and copper compliance monitoring results is also a M/R violation. In 2015, approximately one percent of public water systems (132 systems) incurred these violations. Municipal water systems incurred 35 of these M/R violations for not notifying customers of lead results.

During 2015, municipal water system compliance for all M/R requirements (Graph 4a & 4b) was about 87 percent (see Appendix B for details).





The compliance rate for TN systems shows improvement over previous years. For example, only 1.3 percent of TN systems incurred M/R violations for failing to monitor for bacteria, and fewer than one percent failed to collect nitrate samples in 2015 (Graph 5). DNR will continue to provide technical assistance to small public water systems to improve their compliance with M/R requirements.



Treatment technique violations

Treatment technique (TT) violations occur when a public water system fails to use a mandated process to reduce people's exposure to a contaminant, or when it fails to correct significant deficiencies in the water system construction.

TT violations represent a potential for increased health risk since customers can't be sure whether their water was treated or protected to adequately reduce exposure to a contaminant. Wisconsin's public water systems reported 31 TT violations in 2015.

Public notice violations

If a public water system exceeds a contaminant MCL, fails to properly treat its water, or does not monitor according to the prescribed schedule, it must notify its customers and correct the problem. Public notification is required by federal and state regulations, and is key to informing and protecting the public.

Public water system operators must inform their customers of the nature of the violation, corrective actions that are being taken, potential health effects, and any preventative measures consumers should take, including using bottled water or boiling their water. The public can be notified by radio or television, newspapers, door-to-door notification or inserts in water bills. Public water systems that exceed a bacteriological MCL must notify the public within 24 hours.

In 2015, there were 123 systems (1.1%) that incurred a violation for failure to post a public notice. The most common public notice requirement was the result of the water system's failure to monitor for chronic chemicals, the lowest risk level of the three tiers of public notice violations. In addition, EPA has agreed to work with DNR to formally close out public notice violations at 1546 public water systems that occurred between 2004 and 2013. These public notice violations occurred because the system failed to notify their customers of a violation related to system operation or monitoring. There were no known public health concerns resulting from these violations. In all cases the underlying reason for the violation has been addressed because the system has returned to compliance, or entered into a formal agreement to take corrective action.

Consumer Confidence Report violations

All community water systems are required to provide customers with a Consumer Confidence Report (CCR) by July 1 of each year. The report outlines results of all water quality monitoring and any violations of SDWA requirements during the previous calendar year.

In 2015, 95 percent (99 of 1,056 systems) of Wisconsin's community water systems submitted CCRs by July 1. The remaining 57 systems that did not report on time received a violation and were still required to submit a CCR to their customers.

What's in My Water?

Every year Wisconsin's community water systems (those that serve residential customers) must provide each customer with a Consumer Confidence Report. This report details contaminants detected in the water, health effects, and treatment methods. If you didn't receive a report, contact your water system or generate your own.

http://dnr.wi.gov/topic/DrinkingWater/CCR.html or search "CCR" on the DNR web page

Enforcement actions in 2015

When systems don't meet SDWA requirements, DNR works towards resolving the issue quickly to protect public health. Most of these situations are resolved through a process in which DNR sends a public water system a written Notice of Noncompliance (NON). In the event corrective action is not taken by the system in response to an NON, the DNR follows a stepped enforcement process with each step being more severe. The final step consists of a written order. Types of orders used for enforcement purposes include consent orders, administrative orders and administrative penalty orders. If a violation is not resolved, DNR may refer a case to the Department of Justice (DOJ) for further enforcement.

Table 4 shows the history of violations, and the number of respective actions taken over the past five years. A decrease in the number of written orders indicates that timely, consistent follow up for violations is effective in returning systems to compliance as soon as possible. See Appendix B for additional detail on the 2015 violations.

Table 4: Violation Actions

Year	Systems with Violations	Total Written NONs	Written Orders
2011	1,118	2,437	163
2012	940	2,171	74
2013	1,262	2,469	47
2014	1,325	2,690	21
2015	983	2,432	15

In 2015, there were 518 M/R violations for all contaminant categories, compared to the 777 M/R violations in 2014. This improvement occurred because there was a significant decrease in violations for failure to notify customers of their lead and copper monitoring results. This is believed to be the result of an ongoing partnership with technical assistance contractors and county employees assisting in implementing the SDWA. DNR will continue these partnerships to reduce the number of M/R violations.

Enforcement action summary is as follows:

- DNR sent 2,432 NON letters, which informed public water systems about a failure to report sample results or other information required by the SDWA, or that test results exceeded a drinking water standard.
- DNR sent 44 Notice of Violation (NOV) letters, requiring public water system owners to meet with DNR drinking water and enforcement staff to discuss corrective actions and a timetable for returning the system to compliance.
- DNR held 33 enforcement conferences to develop written documents that establish actions and time lines necessary for public water systems to return to compliance.

- DNR developed 15 written orders that established actions and timelines necessary for a public water system to return to compliance.

- DNR did not refer any cases to the Department of Justice for further enforcement in 2015.

DNR HELPS PROVIDE SAFE WATER

DNR is committed to supporting public water systems in providing safe drinking water. A variety of indirect activities help public water systems meet requirements of the SDWA.

♦ ***Technical assistance***

The DNR works with contractors to provide a technical assistance program for the state's NN and OTM public water systems (1,334 systems). Technical assistance providers support these systems via telephone, email and in person. In 2016, 5,678 quarterly reminders to the systems about monitoring and reporting requirements and upcoming deadlines were delivered.

Since the reminders began in 2013, the number of M/R violations incurred by these systems dropped nearly 50 percent from 364 in 2014 to 205 violations in 2015.

Additionally, technical assistance providers make in-person site visits that are intended to 1) help system owners and operators investigate and resolve problems, 2) identify operational issues or 3) train new personnel. The total for 2015 was 508 site visits.

♦ ***On-site assessments***

In 2015, DNR conducted 2,675 inspections of the water source, facilities, equipment, operation and maintenance at public water systems. Inspections are important prevention tools; they can help identify problems before a health-based violation occurs.

♦ ***Monitoring assessments***

Every three years DNR evaluates well construction and potential contamination sources at community and NN systems. DNR may reduce monitoring frequency when an assessment shows the public water system meets particular criteria. This may significantly reduce monitoring costs, potentially saving Wisconsin public water systems in excess of $3 million per year.

♦ ***Annual monitoring schedules***

To promote timely monitoring and reporting, DNR sends annual monitoring schedules to public water system operators detailing all sampling that must be completed throughout the year.

♦ ***Protecting drinking water sources***

Wellhead protection plans prevent groundwater pollution by minimizing potential sources of contamination near municipal source water supplies. These plans are required for newly constructed wells. DNR also encourages using this tool to protect existing wells. At the end of 2015 there were 395 municipal systems had developed wellhead protection plans for one or more of their wells.

♦ ***Financial assistance***

In 2015, DNR awarded $32.9 million in low interest loans and $2.8 million in principal forgiveness (i.e. grants) to municipal public water systems for projects that help provide safe drinking water for consumers. Depending on market interest rates, the savings to communities from a lower interest rate loan can equal 20 to 30 percent compared to a market rate loan. Since the Safe Drinking Water Loan Program began in 1998, 280 projects have received over $555 million in loans and grants.

Examples of how communities used funds to provide safe drinking water in 2015:

- The City of Mosinee received approximately $2.5M for chemical and mechanical rehabilitation of Wells No. 3, 4 and 5, and for treatment plant upgrades to address disinfection by-products and lead.

- The City of Sheboygan received approximately $3.6M for construction of an ultraviolet light (UV) disinfection facility, and for clearwell improvements at the treatment plant. This will provide an additional barrier for protection against microbials (UV disinfection) and to meet design standards (clearwells).

- The Village of Tennyson received approximately $160,000 to replace water mains on Bunker Hill Street.

- The Village of Wrightstown received approximately $7.2M for construction of a transmission main to connect to the Village of Ashwaubenon water system. This will help Wrightstown address water quality and quantity issues with their current wells.

- The Village of Fredonia received approximately $965,000 to replace water mains on Fredonia Avenue.

» Find a full listing in Appendix D on page 22

Partnering for safe drinking water

Safe drinking water is a result of cooperative efforts between public water systems, federal, state, and local agencies, trade associations, individual operators, DNR and others.

In 2015, about $1.83 million, or 20 percent of the public water program's total $9.3 million budget, went to contracts with trade associations, county health officials and consultants to help provide educational training and technical assistance to water system owners and operators.

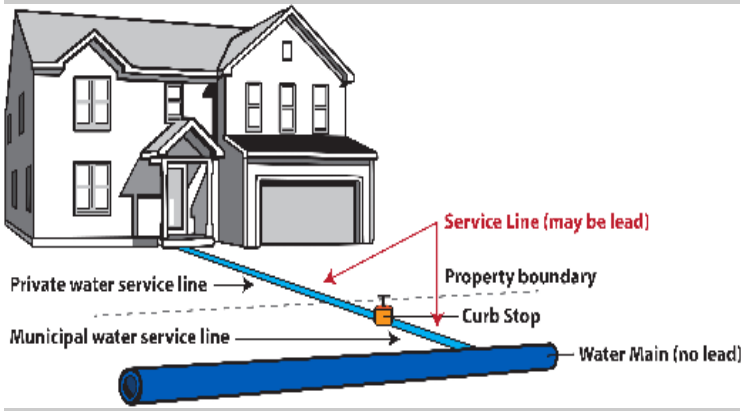
These contract programs assisted:

- County health officials to collect the water samples required of churches, restaurants, parks, and other transient non-community systems.
- Wisconsin Rural Water Association to help small public water systems by providing on-site technical assistance, monitoring reminders, training programs, and continuing education for certified operators.
- Moraine Park Technical College to provide a Water Quality Technology degree program that offers training for new operators and continuing education opportunities for certified operators.

Drinking Water News on Tap
Lead in Drinking Water

Lead is a common metal that can be found in lead-based paint, air, soil, household dust, and food. Lead can enter drinking water if the water contacts lead service lines, lead pipes, or other lead components in the water distribution system. The U.S. Environmental Protection Agency (EPA) estimates that drinking water accounts for 20 percent or more of a person's total exposure to lead. Infants who consume mostly mixed formula can receive 40 percent to 60 percent of their exposure to lead from drinking water.

Results of lead testing of the water supplies in Washington, D.C, Chicago and Flint, MI, suggest that lead service lines are a major source of lead in drinking water. Sampling results also demonstrated that consumers are likely to be exposed to elevated lead levels if a community water supplier removes a utility-owned portion of a lead service line, but does not replace a home owner portion of the line.



These factors will play a major role in EPAs upcoming revisions to the Lead and Copper Rule. As identified by the National Drinking Water Advisory Council (NDWAC) recommendations, other issues that should be addressed include a more assertive public education program, stronger corrosion control treatment measures, full lead service line replacement, and funding for customers' portions of lead service lines.

The City of Madison, Wisconsin, represents a success story involving full lead service line replacement. In cooperation with the Department of Natural Resources (DNR) and EPA, Madison put in place a program to replace both the city-owned and customer's portion of about 10,000 lead service lines. The effort to replace all of Madison's lead service line began in 2001, took about 10 years to complete, and cost roughly $15.5M. In the end, Madison was able to reduce lead levels in water delivered to its customers, while avoiding adding phosphate into drinking water that is ultimately discharged to surrounding lakes and streams.

While this serves as a model for the rest of the country, there is still significant work to be done in Wisconsin. The Public Service Commission estimates that the state has at least 176,000 lead service lines connecting older homes to water mains that deliver municipal water to customers. Replacing full lead service lines is critical for effectively reducing exposure to lead. Sampling suggests that sites with disturbed lead service lines, such as during partial lead service line replacement, had elevated lead levels. These elevated lead levels may continue for years following partial lead service line replacement. Since homeowners must cover the cost for replacing their portion of a lead service, they often opt not to have it replaced. This contributes to an increased risk of lead in drinking water.

To assist homeowners, DNR is making money available to water utilities to subsidize or pay for replacement of the homeowners' portion of the lead service lines. DNR will target low- to moderate– income areas with $11.8 million in grants to replace these lead pipes. The current proposal is that small communities with 50,000 people or less could receive up to $300,000; medium-sized communities could receive up to $500,000 and large communities (Milwaukee) could receive up to $1,000,000. The program is scheduled to begin July 1, 2016.

Reducing your risk to lead in drinking water

While you cannot see, taste, or smell lead in drinking water, there are some actions you can take to reduce your exposure to lead:

- Check whether your home has a lead service line connecting to the water main.
  - ⇒ Work with community and water utility officials if your home has a lead service line. It's important to replace these lines in their entirety.
- Check whether you have water fixtures or plumbing materials that may contain lead.
  - ⇒ Consider replacing with non-lead materials where possible.
- Flush the water before drinking.
  - ⇒ If you have lead water fixtures, lead plumbing materials or a lead service line, flush any time the water has been motionless for four hours or more.
  - ⇒ If you have a lead service line, flush your water until the line is cleared.
  - ⇒ If you have lead fixtures but no lead service line, flush the tap for approximately one minute.
- Clean faucet aerators regularly.
- Use cold water for cooking and preparing baby formula.
  - ⇒ Do not cook with or drink water from the hot water tap; lead dissolves more easily in hot water.
- Do not boil water to remove lead.
  - ⇒ Boiling water can increase the concentration.
- Consider a water filter.
  - ⇒ Select a filter that is approved to reduce lead.
  - ⇒ Contact NSF International at 800 NSF 8010, or www.nsf.org for information on performance standards for water filters.

Challenges for the future

Wisconsin's water supply infrastructure, like the nation's, is aging, and citizens and communities face a big bill to upgrade the pipes, pumps and treatment systems necessary to bring safe water to our homes every day.

In 2011, EPA conducted the most recent Drinking Water Infrastructure Needs Survey and Assessment. Nationally, an estimated $384 billion is needed to meet infrastructure needs between 2011 and 2031. The price tag for Wisconsin was estimated to be over $7.1 billion. Here's how that bill breaks down:

Public Water System	Needs
Large-size system (>100,000 people served)	$1.7B
Medium-size system (3,300-100,000)	$3.4B
Small-size system (<3,300 people served)	$1.5B
Not-for-profit non-community	$550M

Over 60 percent ($4.4 billion) of these costs are needed for distribution and transmission infrastructure, while the 20-year treatment facility improvement needs will cost $1.4 billion.

Wisconsin Department of Natural Resources
Cathy Stepp, Secretary

Environmental Management Division
Pat Stevens, Administrator

Bureau of Drinking Water and Groundwater
Stephen M. Ales, Acting Director

Public Water Supply Section
Steven Elmore, Chief

Public Water Engineering Section
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Copies of this report may be obtained by contacting the Bureau of Drinking Water and Groundwater, Wisconsin Department of Natural Resources, P.O. Box 7921, Madison, WI 53707, (608) 267-4230.

Appendix A
Maximum Permissible Contaminant Levels for Drinking Water

MCL = Maximum Contaminant Level - Violation occurs when contaminant level exceeds the maximum concentration allowed in drinking water

MRDL = Maximum Residual Disinfectant Level

INORGANIC CONTAMINANTS	**MCL** (milligrams per liter or mg/L)	**VOLATILE ORGANIC CONTAMINANTS**	**MCL** (mg/L)	**SYNTHETIC ORGANIC CONTAMINANTS**	**MCL** (mg/L)
Antimony	0.006	Benzene	0.005	2,4-D	0.07
Arsenic	0.010	Carbon Tetrachloride	0.005	2,4,5-TP	0.05
Asbestos (fiber length >10 microns)	7 million fibers per liter	o-Dichlorobenzene	0.6	Alachlor	0.002
Barium	2	p-Dichlorobenzene	0.075	Atrazine	0.003
Beryllium	0.004	1,2-Dichloroethane	0.005	Benzo(a)pyrene	0.0002
Cadmium	0.005	1,1-Dichloroethlyene	0.007	Carbofuran	0.04
Chromium	0.1	1,2-Dichloroethylene,cis	0.07	Chlordane	0.002
Cyanide	0.2	1,2-Dichloroethylene,trans	0.1	Dalapon	0.2
Fluoride	4.0	Dichloromethane	0.005	Di(2-ethylhexyl)adipate	0.4
Mercury	0.002	1,2-Dichloropropane	0.005	Di(2-ethylhexyl)phthallate	0.006
Nickel	0.1	Ethylbenzene	0.7	Dibromochloropropane	0.0002
Nitrate	10	Chlorobenzene	0.1	Dinoseb	0.007
Nitrite	1	Styrene	0.1	Dioxin	$3x1^{-8}$
Total Nitrate & Nitrite	10	Tetrachloroethylene	0.005	Diquat	0.02
Selenium	0.05	Toluene	1	Endothall	0.1
Thallium	0.002	1,2,4 Trichlorobenzene	0.07	Endrin	0.002
		1,1,1-Trichloroethane	0.2	Ethylene Dibromide	0.00005
Lead & Copper	**Action Level**	1,1,2 Trichloroethane	0.005	Glyphosate	0.7
Lead	0.015	Trichloroethylene	0.005	Heptachlor	0.0004
Copper	1.3	Vinyl Chloride	0.0002	Heptachlor epoxide	0.0002
		Xylenes (Total)	10	Hexachlorobenzene	0.001
Radionuclides	**MCL** Picocuries per liter (pCi/L)			Hexachlorocyclopentadiene	0.05
Gross Alpha	15			Lindane	0.0002
Radium 226+228 (combined radium)	5	**Disinfection Byproducts**		Methoxychlor	0.04
Uranium	30 micrograms/l (ug/l)	Total Trihalomethanes	0.080	Oxamy	0.2
		Haloacetic Acids	0.060	PCBs	0.0005
		Bromate	0.010	Pentachlorophenol	0.001
		Chlorite	1.0	Picloram	0.001
				Simazine	0.004
				Toxaphene	0.003
		Residual Disinfectants	**MRDL (mg/L)**		
		Chlorine	4.0 as Cl_2		
		Chloramines	4.0 as Cl_2		
		Chlorine dioxide	0.8 (as ClO_2)		

Appendix B

Number of Systems in Violation by System Type

Reporting period Jan. 1, 2015 to Dec. 31, 2015

MCL = Maximum Contaminant Level - Violation occurs when contaminant level exceeds the maximum concentration allowed in drinking water.

M/R = Monitoring and Reporting - Violation occurs when a system fails to collect water samples and/or fails to report results.

TT= Treatment Technique - Violation occurs when a system fails to take measures to ensure control of a contaminant when there is no reliable method to measure a contaminant at particularly low concentrations.

Contaminant Category	Number of systems with Violations												
	Municipal			Other-than-municipal			Non-transient-Noncommunity			Transient-Noncommunity			Totals
	MCL	M/R	TT	MCL	M/R	TT	MCL	M/R	TT	MCL	M/R	TT	
Total Coliform	12	3	0	25	29	0	30	32	0	299	127	0	557
Nitrates	3	4		6	6		12	7		18	58		114
Nitrites	0	0		0	1		0	0		0	10		11
Arsenic	2	2		0	3		5	0					12
Fluoride	0	0		0	1		0	0					1
Other Inorganics	1	0		0	1		2	0					4
Volatile Organics	0	2		0	4		1	2					9
Synthetic Organics	1	0		0	1		1	0					3
Radionuclides	12	7		2	5								26
Lead/Copper		37	6		50	1		53	3				150
Surface Water Treatment	0	0	0	0	0	0							0
Disinfection Byproducts	2	26	0	0	2		0	0	0				30
Groundwater Rule		0	5		4	2		4	0		37	14	66
	33	81	11	33	107	3	51	98	3	317	232	14	983

Appendix C

Drinking Water Violations by Contaminant Group

Reporting period Jan. 1, 2015 to Dec. 31, 2015

VOLATILE ORGANIC CONTAMINANTS	MCL (mg/L)	Max. Contaminant Level (MCL)		Treatment Technique		Monitoring/Reporting (M/R)	
		# Violations	Systems In Violation	# Violations	Systems In Violation	# Violations	Systems In Violation
Benzene	0.005	0	0	0	0	8	8
Carbon Tetrachloride	0.005	0	0	0	0	8	8
o-Dichlorobenzene	0.6	0	0	0	0	8	8
p-Dichlorobenzene	0.075	0	0	0	0	8	8
1,2-Dichloroethane	0.005	0	0	0	0	8	8
1,1-Dichloroethlyene	0.007	0	0	0	0	8	8
1,2-Dichloroethylene,cis	0.07	0	0	0	0	8	8
1,2-Dichloroethylene,trans	0.1	0	0	0	0	8	8
Dichloromethane	0.005	1	1	0	0	8	8
1,2-Dichloropropane	0.005	0	0	0	0	8	8
Ethylbenzene	0.7	0	0	0	0	8	8
Chlorobenzene	0.1	0	0	0	0	8	8
Styrene	0.1	0	0	0	0	8	8
Tetrachloroethylene	0.005	0	0	0	0	8	8
Toluene	1	0	0	0	0	8	8
1,2,4 Trichlorobenzene	0.07	0	0	0	0	8	8
1,1,1-Trichloroethane	0.2	0	0	0	0	8	8
1,1,2 Trichloroethane	0.005	0	0	0	0	8	8
Trichloroethylene	0.005	0	0	0	0	8	8
Vinyl Chloride	0.0002	0	0	0	0	8	8
Xylenes (Total)	10	0	0	0	0	8	8
Disinfection By products (DBP)	80	0	0	0	0	8	8
TOTALS		**1**	**1**	**0**	**0***	**176**	**8***

* The same water systems each had at least 1 violation for each contaminant within the VOC category. When calculating the total number of systems in violation, systems with violations of multiple contaminants in the same group are only counted once.

Appendix C (continued)

Drinking Water Violations by Contaminant Group

Reporting period Jan. 1, 2015 to Dec. 31, 2015

SYNTHETIC ORGANIC CONTAMINANTS	MCL (mg/L)	Max. Contaminant Level (MCL)		Treatment Technique		Monitoring/Reporting (M/R)	
		# Violations	Systems In Violation	# Violations	Systems In Violation	#Violations	Systems In Violation
1,2 Dibromo-3-Chloropropane (DBPC)	0.0002	0	0	0	0	1	1
2,3,7,8-TCDD (Dioxin)	$3x10^{-8}$	0	0	0	0	1	1
2,4-D	0.07	0	0	0	0	1	1
2,4,5-TP	0.05	0	0	0	0	1	1
Alachlor	0.002	0	0	0	0	1	1
Atrazine	0.003	0	0	0	0	1	1
Benzo(a)pyrene	0.0002	0	0	0	0	1	1
Carbofuran	0.04	0	0	0	0	1	1
Chlordane	0.002	0	0	0	0	1	1
Dalapon	0.2	0	0	0	0	1	1
Di(2-ethylhexyl)adipate	0.4	0	0	0	0	1	1
Di(2-ethylhexyl)phthallate	0.006	1	1	0	0	1	1
Dinoseb	0.007	0	0	0	0	1	1
Diquat	0.02	0	0	0	0	1	1
Endothall	0.1	0	0	0	0	1	1
Endrin	0.002	0	0	0	0	1	1
Ethylene Dibromide	0.00005	1	1	0	0	1	1
Glyphosate	0.7	0	0	0	0	1	1
Heptachlor	0.0004	0	0	0	0	1	1
Heptachlor epoxide	0.0002	0	0	0	0	1	1
Hexachlorobenzene	0.001	0	0	0	0	1	1
Hexachlorocyclopentadiene	0.05	0	0	0	0	1	1
Lindane	0.0002	0	0	0	0	1	1
Methoxychlor	0.04	0	0	0	0	1	1
Oxamyl	0.2	0	0	0	0	1	1
PCBs	0.0005	0	0	0	0	1	1
Pentachlorophenol	0.001	0	0	0	0	1	1
Picloram	0.001	0	0	0	0	1	1
Simazine	0.004	0	0	0	0	1	1
Toxaphene	0.003	0	0	0	0	1	1
TOTALS		**2**	**2**	**0**	***0**	**30**	***1**

*The same systems had violations of all the contaminants within the "Synthetic Organic Chemicals" category with the exception of two chemicals. When calculating the total number of systems in violation, systems are only counted once for violations of multiple contaminants within the same contaminant group.

Appendix C (continued)

Drinking Water Violations by Contaminant Group

Reporting period Jan. 1, 2015 to Dec. 31, 2015

INORGANIC CONTAMINANTS	MCL (mg/L)	MCLs		Treatment Technique		Monitoring/Reporting	
		Violations	Systems in Violation	Violations	Systems in Violation	Violations	Systems In Violation
Antimony	0.006	2	2	0	0	1	1
Arsenic	0.05	9	7	0	0	5	5
Asbestos (fiber length > 10 microns	7 million. fibers per liter	0	0	0	0	0	0
Barium	2	0	0	0	0	1	1
Beryllium	0.004	0	0	0	0	1	1
Cadmium	0.005	0	0	0	0	1	1
Chromium	0.1	0	0	0	0	1	1
Cyanide	0.2	0	0	0	0	1	1
Fluoride	4	0	0	0	0	1	1
Mercury	0.002	0	0	0	0	1	1
Nickel	0.1	1	1	0	0	1	1
Nitrate	10	39	39	0	0	76	75
Nitrite	1	0	0	0	0	11	11
Selenium	0.05	0	0	0	0	1	1
Sodium		0	0	0	0	2	2
Thallium	0.002	0	0	0	0	1	1
SECONDARY CONTAMINANTS	Standard (mg/l)					**Significant Monitoring/Reporting**	
(Not health-related standards)						**Violations**	**Systems In Violation**
Alkalinity	**					8	8
Aluminum	0.05 to 0.2					8	8
Chloride	**					8	8
Hardness	**					8	8
Iron	0.3					8	8
Manganese	0.05					8	8
Magnesium	**					8	8
pH	**					8	8
Total Dissolved Solids	500					8	8
Silver	0.1					8	8
Zinc	5					8	8
TOTALS		**51**	**49**	**0**	***0**	**193**	***94**

*To calculate the total number of systems in violation, systems are only counted once for violations of multiple contaminants within the same contaminant group.

** There are no drinking water standards for these compounds, but results are used together to determine corrosivity and other water quality characteristics.

Appendix C (continued)

Drinking Water Violations by Contaminant Group

Reporting period Jan. 1, 2015 to Dec. 31, 2015

Contaminant Group	MCL (mg/L) Or Action Level	Maximum Contaminant Levels (MCLs)		Treatment Technique		Monitoring/ Reporting (M/R)	
		# Violations	Systems in Violation	# Violations	Systems In Violation	# Violations	Systems In Violation
Lead	0.015	N/A	N/A	10	10	8	8
Copper	1.3	N/A	N/A	10	10	8	8
Water Quality Parameters						8	8
Lead Customer Notice						132	132
TOTALS				**10**	**10**	**156**	**148**
Radionuclides	Picocuries per liter			0	0		
Gross Alpha	15	6	6	0	0	11	11
Radium 226+228 (combined radium)	5	13	13	0	0	11	11
Combined Urani-	30 mg/l	0	0	0	0	1	1
TOTALS		**19**	***19**	**0**	**0**	**23**	**12***
Total Coliform Rule Totals	No Detect	575	366	0	0	230	191

*To calculate the total number of systems in violation, systems are only counted once for violations of multiple contaminants within the same contaminant group.

Appendix D

Communities Receiving Low-Interest Loans for Drinking Water Projects

Municipality	County	FAA Amount	Project Description
Brillion, City of	Calumet	$1,689,997	Construct Well #5 and transmission main
Lake Hallie, Village of	Chippewa	$2,516,139	Construct new storage tank and connecting main; up-grade SCADA
Mosinee, City of	Marathon	$2,497,999	Chemical and mechanical rehabilitation of Wells #3, 4 & 5
Sheboygan, City of	Sheboygan	$3,622,030	Install ultraviolet light (UV) disinfection system; construct UV building with electric equipment; construct clear well improvements
Racine, City of	Racine	$1,931,200	Modifications to high lift station
Thorp, City of	Clark	$867,061	Construct Well #15, wellhouse and SCADA; replace water main along Washington Street and STH 73
Siren, Village of	Burnett	$825,191	Replace undersized water mains and loop dead ends
Colby, City of	Marathon	$1,135,678	Abandon existing well(s); construct new well, wellhouse and SCADA
Tennyson, Village of	Grant	$159,914	Replace watermains on Bunker Hill Street
Albany, Village of	Green	$379,770	SCADA upgrades, chemical feed system upgrades at Wells #1 and #2
Orfordville, Village of	Rock	$969,220	Replace steel water mains
Whitehall, City of	Trempealeau	$1,788,158	Construct Well #3 with SCADA; raw water main and water main relay from tower to USH53
Fredonia, Village of	Ozaukee	$965,235	Replace water main on Fredonia Avenue
Fall Creek, Village of	Eau Claire	$375,994	Construct new Well #1 pumphouse, install chemical feed storage
Bayfield, City of	Bayfield	$995,530	Replace undersized water mains on STH 13

Appendix D (continued)

Communities Receiving Low-Interest Loans for Drinking Water Projects

Municipality	County	FAA Amount	Project Description
Allouez, Village of	Brown	$2,127,307	Replace undersized watermains and construct looping mains
Wrightstown, Village of	Brown	$7,244,797	Install 62,000 feet of 16" water main to connect to Ashwaubenon for water supply
Biron, Village of	Wood	$2,091,776	Replace water mains and construct looping mains
Cross Plains, Village of	Dane	$1,491,359	Replace water mains on Main Street, USH 14 and East Street
Cottage Grove, Village of	Dane	$730,296	Re-coat/rehabilitate water storage facility
Mayville, City of	Dodge	$589,317	Replace water mains in South Clark Street area
Mineral Point, City of	Iowa	$699,173	Replace water mains on Chestnut and Decatur Streets
	Total	$35,693,141	