Wisconsin Public Water Systems
2018 Annual Drinking Water Report

Wisconsin Department of Natural Resources
Bureau of Drinking Water and Groundwater
dnr.wi.gov

PUB-DG-045 2019
July 2019

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Obtaining Copies of Wisconsin's *2018 Annual Drinking Water Report*

As required by the federal Safe Drinking Water Act, the *2018 Annual Drinking Water Report* is available to the public. To obtain copies of this report, contact the Bureau of Drinking Water and Groundwater DG/5, Wisconsin Department of Natural Resources, PO Box 7921, Madison WI 53707, 608-266-1054. The report is also available on DNR's web site, dnr.wi.gov, search "drinking water."

Wisconsin Department of Natural Resources

Preston D. Cole, Secretary

Environmental Management Division
Darsi Foss, Division Administrator

Bureau of Drinking Water and Groundwater
Steven B. Elmore, Director

Public Water Supply Section
Adam DeWeese, Chief

Public Water Engineering Section
Cathrine Wunderlich, Chief

Wisconsin Department of Natural Resources
Bureau of Drinking Water and Groundwater DG/5
PO Box 7921, Madison WI 53707-7921
608-266-1054
dnr.wi.gov/topic/DrinkingWater/

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EXECUTIVE SUMMARY

The Wisconsin Department of Natural Resources (DNR) is charged with protecting the quality and quantity of Wisconsin's water resources and is responsible for implementing and enforcing the Safe Drinking Water Act to safeguard the quality of Wisconsin's drinking water.

Strong state and federal regulations combined with the collaborative efforts and hard work of many people—including DNR, the US Environmental Protection Agency (EPA), individual owners and operators of public water systems, county health officials, professional associations, water quality organizations and water consumers—have allowed Wisconsin to successfully manage its drinking water resources.

Our *2018 Annual Drinking Water Report* summarizes compliance with the drinking water requirements during 2018 and highlights efforts that help public water systems provide a safe and adequate supply of drinking water in the state. Some of these include:

- During 2018, more than 99 percent of Wisconsin's public water systems provided water that met all of the health-based Maximum Contaminant Level standards. Monitoring for contaminants is a critical piece of the strategy to protect drinking water quality.
- Wisconsin's largest water systems embarked on new efforts during 2018 to protect consumers from lead and copper in drinking water. These efforts include more comprehensive monitoring of water quality and studies of optimal corrosion control treatment to prevent releases of lead and copper into drinking water supplies.
- DNR and its partners performed more than 2,500 sanitary survey inspections during 2018, to assess compliance with construction, operation and maintenance requirements.
- DNR's partners provided technical assistance and training for public water system owners and operators throughout the state during 2018. This assistance encompassed responses to contaminant detections, training courses and on-site assessments, all aimed at helping operators and systems comply with water quality requirements.
- DNR awarded more than $57 million in financial assistance through the Safe Drinking Water Loan Program during 2018. The funding is helping 56 communities around Wisconsin make needed infrastructure improvements and replace lead service lines at their drinking water systems.

DNR is committed to protecting the state's drinking water to ensure that it is safe today and for the future.

INTRODUCTION

The Wisconsin Department of Natural Resources (DNR) works to protect the quality and quantity of the state's water resources.

With strong state and federal regulations and collaborative efforts between DNR, the US Environmental Protection Agency (EPA), public water systems, county health officials, professional associations, individual operators, other water quality organizations and water consumers, Wisconsin has been able to manage its drinking water resources.

The federal Safe Drinking Water Act (SDWA) requires states to publish an annual report summarizing violations of the drinking water standards. This *2018 Annual Drinking Water Report* summarizes how Wisconsin's public water supply systems complied with the drinking water requirements between January 1 and December 31, 2018. This annual report also highlights state and local initiatives that help to meet the goal of providing a safe and adequate supply of drinking water to the citizens and visitors of Wisconsin.

WISCONSIN'S DRINKING WATER PROGRAM: THE BASICS

Requirements for public water systems come from the federal SDWA, which was originally passed in 1972 and amended several times since. In the SDWA, EPA sets national limits for contaminants in drinking water to protect public health. These limits, known as Maximum Contaminant Levels (MCLs), are health-based standards that are specific to each contaminant.

The SDWA details how often public water systems must test their water for contaminants and report the results to the state, EPA and the public. Testing or "monitoring" requirements vary depending on a water system's size, the type of population served, and the vulnerability of the water source to contamination. In general, water systems serving residential consumers and larger populations have more stringent monitoring and reporting requirements.

Finally, the SDWA requires public water systems to notify their consumers when they have not met these requirements. Consumer notification must include a clear and understandable explanation of the

violation that occurred, its potential adverse health effects, steps that the water system is taking to correct the problem and the availability of alternative water supplies during the violation.

States can obtain approval from EPA to administer their own public water supply programs. This primary enforcement authority, called "primacy," means that EPA has determined that the state has adopted drinking water regulations that meet SDWA requirements and can enforce those requirements. In Wisconsin, the DNR is the primacy agency for the state's drinking water program.

WISCONSIN'S PUBLIC WATER SYSTEMS

Wisconsin has 11,589 public water systems, the largest number of any state. Public water systems are defined as those that provide water for human consumption to at least 15 service connections or regularly serve at least 25 people for 60 days or longer per year. Wisconsin has four types of public water systems:

- Community water systems serve water to people where they live. Wisconsin has 1,053 community water systems that serve 73 percent of the state's population (Figure 1). The remainder of the state's residents get their water from private domestic wells.
    - **Municipal community (MC) water systems** are owned by cities, villages, towns or sanitary districts. This group also includes care and correctional facilities that are owned by counties or municipalities. Wisconsin has 610 municipal systems. Milwaukee Waterworks is the state's largest, serving almost 650,000 people. Wisconsin's smallest municipal water systems, by contrast, serve fewer than 50 people each.
    - **Other-than-municipal community (OC) water systems** serve residents living in areas supplied by privately-owned wells. The state's OC water systems include mobile home parks, apartment buildings, condominium complexes and long term care facilities.

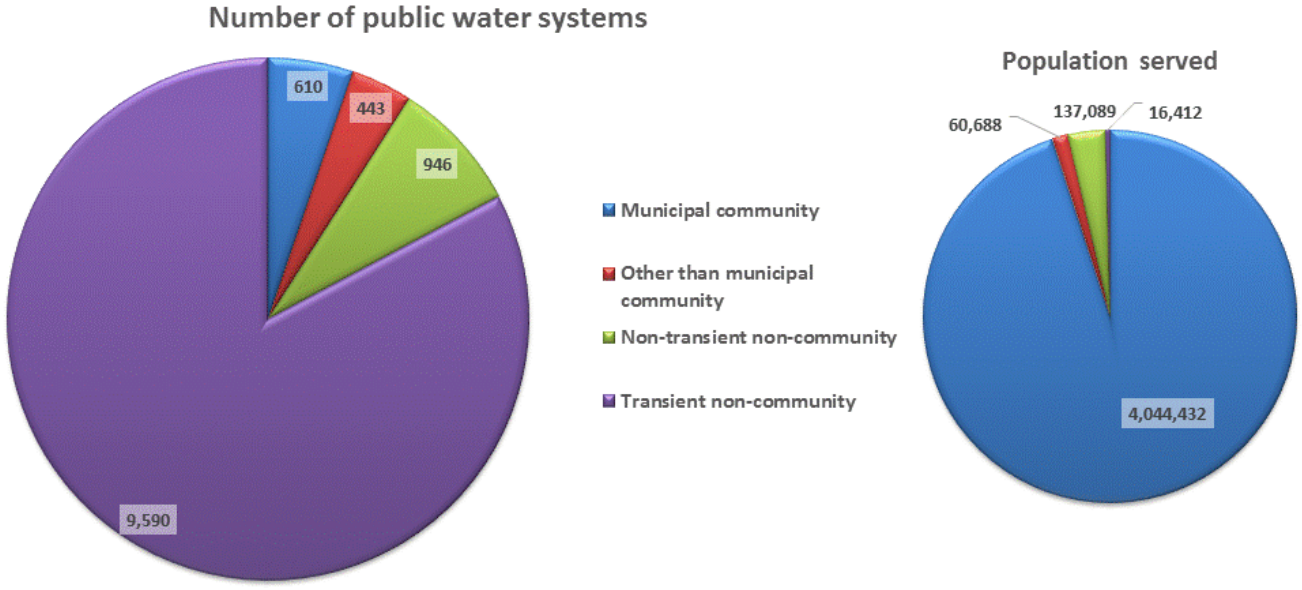


Figure 1. Wisconsin has more than 11,500 public water systems. Most are very small transient non-community systems, but the state's municipal water systems serve the largest population.

- Non-community water systems serve water to people where they work, attend school or gather for food or entertainment. The wells supplying these systems are privately owned. Wisconsin has 10,536 non-community systems (see Figure 1).
    - **Non-transient non-community (NN) water systems** regularly serve at least 25 of the same people for six months or more per year. They include schools, day care centers, office buildings, industrial facilities, dairies and many other businesses.
    - **Transient non-community (TN) water systems** serve at least 25 people (though not necessarily the same people) for 60 days or longer per year. They include campgrounds, parks, motels, restaurants, taverns and churches. There are more than 9,500 transient non-community water systems in Wisconsin.

The vast majority of Wisconsin's public water systems rely on groundwater pumped from wells. However, 56 systems use surface water from Wisconsin lakes to provide drinking water to their customers. These surface water systems serve some of the state's largest communities, including Milwaukee and Green Bay. So, while more than 99 percent of the state's public water systems use groundwater sources, surface water systems serve almost one third of the state's population (Figure 2).

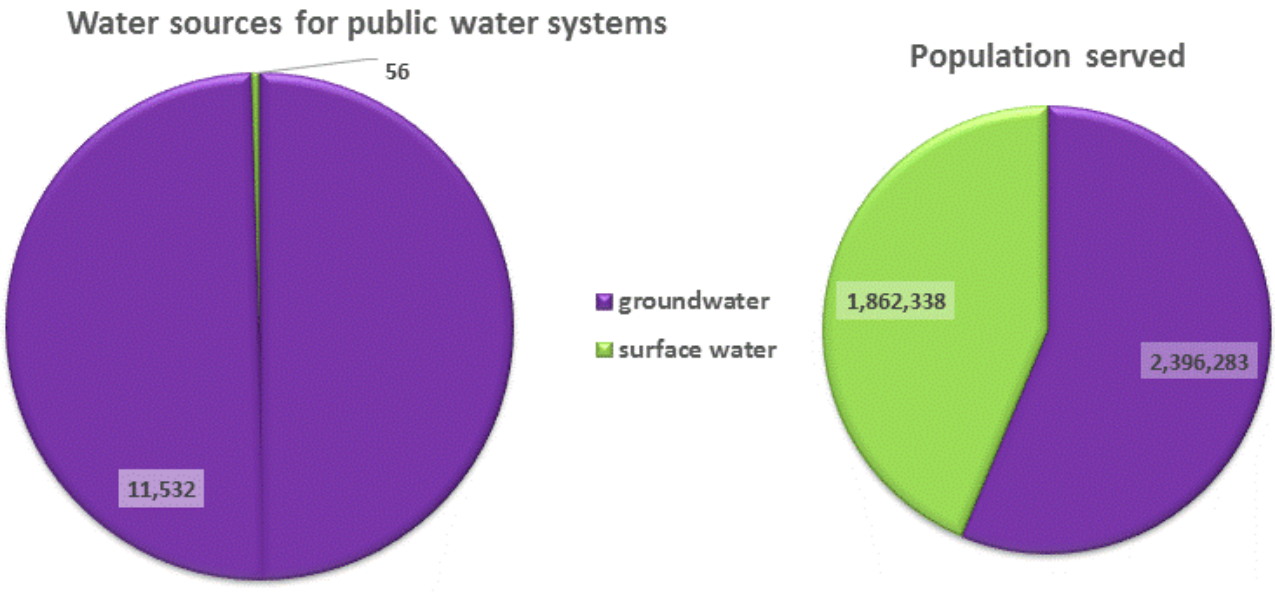


Figure 2. Most of Wisconsin's public water systems use groundwater pumped from wells. The 56 systems that use surface water from lakes include most of the state's largest public water systems.

MONITORING AND TESTING FOR CONTAMINANTS IN DRINKING WATER

Monitoring is critically important for protecting our drinking water and for identifying changes in water quality. All public water systems are required to monitor and test their water for contaminants. Monitoring involves collecting water samples, analyzing them for potential contaminants and reporting the results to DNR and consumers.

The frequency of monitoring and the number of contaminants measured depend on the type of water system and population served. The largest systems collect hundreds of water samples each month, while the smallest systems may collect only two samples per year.

Contaminants can have either acute or chronic health effects. Acute contaminants pose an immediate risk to human health—people can become ill within hours or days of exposure. Maximum permissible levels in drinking water are risk-based, set to prevent occurrences of acute or fatal illness. Chronic contaminants cause long-term health risks. Their maximum permissible levels are typically set so that only 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. Chronic contaminants are monitored less frequently, and the state's smallest systems, TNs, are not required to test for these contaminants.

Types of regulated contaminants

Regulated contaminants fall into several groups based on their microbial or chemical characteristics:

- Acute contaminants
    - *Escherichia coli* (or *E. coli*) bacteria
    - Nitrate and nitrite

- Chronic contaminants
    - Inorganic chemicals (IOCs)—this group includes arsenic, chromium, copper, lead and other chemicals
    - Synthetic organic chemicals (SOCs)—this group includes herbicides and pesticides
    - Volatile organic chemicals (VOCs)—this group includes benzene, toluene, xylene and other chemicals
    - Radionuclides—this group includes radioactive chemicals like radium and uranium
    - Disinfectants and disinfection byproducts—this group includes chlorine and byproducts like haloacetic acid and trihalomethanes

Most of these chemical groups contain multiple contaminants. For example, the synthetic organic contaminants group contains 30 regulated chemicals (although there are many more synthetic organic substances used in commerce). Municipal water systems, which have the most comprehensive monitoring requirements, test drinking water for more than 90 regulated contaminants to protect public health. Appendix A lists all the regulated contaminants and their health-based standards, or MCLs.

Aesthetic or secondary standards

The SDWA also sets aesthetic or "secondary" standards for additional contaminants. These substances may cause an unpleasant smell, taste, appearance, stain sinks or discolor clothes when they exceed certain levels. This group of chemicals includes iron, manganese and sulfate, among others. Public water systems may be required to take corrective actions if they exceed secondary standards for these contaminants. Appendix A lists the secondary standards.

Action levels for certain contaminants

The SDWA establishes "action levels" rather than MCL standards for two contaminants: lead and copper. Exceeding an action level does not result in a violation, but it does require a water system to conduct additional monitoring and follow certain procedures to control levels of the contaminant in the drinking water supply. The action levels for lead and copper are listed in Appendix A.

Treatment for contaminants

Public water systems may treat their water to meet regulatory MCL limits. Most treatments reduce or inactivate contaminants that may be present in the water. One common type of treatment is disinfection, which inactivates microbial contaminants so they cannot make us sick. Disinfection of drinking water has revolutionized our lives. Diseases that used to cause many deaths, like typhoid fever, have been almost eliminated thanks to disinfection. Other treatments—like filtration, oxidation and ion

exchange—remove or reduce contaminants present in the water. Corrosion control treatment involves adding compounds to adjust the chemistry of water and prevent certain contaminants from leaching (being dissolved or extracted) into the water, like lead from lead pipes.

Drinking Water News on Tap

Monitoring Wisconsin's Drinking Water: Emerging, Unregulated Contaminants

Protecting Wisconsin's drinking water sources is a continuous goal for DNR, the state's public water systems, and the EPA. EPA evaluates new contaminants based on their potential occurrence in drinking water and potential adverse health effects. This ongoing process for evaluating emerging contaminants is built into the Safe Drinking Water Act. Every five years, EPA identifies a group of unregulated contaminants (that is, contaminants for which there are currently no MCL standards) known as the Contaminant Candidate List (CCL).

Some of the public water systems in Wisconsin and across the country are required to monitor for contaminants selected from the CCL under the Unregulated Contaminant Monitoring Rule (UCMR). Water systems are currently monitoring under the fourth cycle of the rule (UCMR 4). The UCMR 4 monitoring is focused on 30 unregulated contaminants that include metals, pesticides, alcohols, semivolatile organic compounds (SVOCs), and cyanotoxins (toxins produced by blue-green algae during harmful algal blooms).

The UCMR 4 monitoring is designed to help EPA determine whether any contaminants on the list should be regulated as 'primary' drinking water contaminants under the SDWA. If EPA determines that a MCL standard is needed, it goes on to develop the proposed regulations.

One contaminant being monitored under UCMR 4 is manganese. Manganese is a naturally-occurring inorganic contaminant (a metal) which can be found in both groundwater and surface water. Human activities can also contribute to manganese in water (pollution sources, for instance). Because of the geology in the state, elevated manganese levels have been found in some of Wisconsin's public water systems.

Our bodies need some manganese to be healthy, but too much can be harmful. Manganese is currently listed as a secondary inorganic contaminant under the SDWA. While secondary contaminants do not have MCLs, EPA has established a Health Advisory Level of 300 mg/L for manganese because of potential adverse effects on infants.

Monitoring for manganese and the other unregulated contaminants listed under UCMR 4 began in 2018 and will conclude in 2020. EPA will then evaluate the results and determine whether to initiate the process of developing a national primary drinking water regulation for any contaminants in the UCMR 4 group.

Community water systems that are in the UCMR 4 monitoring program are required to report any detections of those contaminants in their annual Consumer Confidence Report (CCR). The CCR summarizes a system's water quality and compliance record. CCRs must be distributed to all consumers at the water system by July 1 each year.

COMPLIANCE WITH DRINKING WATER REQUIREMENTS

Compliance with drinking water requirements is measured in a variety of ways. DNR and EPA track whether water samples are collected in a timely manner and tested for the correct contaminants, and whether contaminant concentrations exceed permissible limits. They also track whether public water systems issue public notices or notifications in a timely manner, post or distribute notices as required, and whether systems correct deficiencies by appropriate deadlines. Violations can occur when deadlines are not met, water samples are not collected, or public notices are not issued. They also occur when samples exceed permissible limits for contaminants.

The majority of Wisconsin's public water systems met all their regulatory requirements during 2018. This section of our report summarizes compliance data and the violations that did occur.

Maximum Contaminant Level violations

Some of the most serious violations at public water systems result from contaminants in the drinking water. A MCL violation occurs when a contaminant is detected at a higher concentration than is permissible for protecting public health (i.e., the MCL standard). Although a MCL violation does not necessarily mean that any consumers experienced adverse health effects from drinking the water, it does require a water system to take action to notify consumers and correct the problem.

During 2018, 99.1 percent of Wisconsin's public water systems provided water that met all the health-based MCL standards for regulated contaminants. Among the 101 systems that experienced MCL exceedances, the contaminants encountered most frequently were bacteria, nitrate, arsenic and radionuclides. Table B-1 in Appendix B summarizes the MCL violations that occurred during 2018.

- ***Microbial contaminants***

  Microbes, especially coliform bacteria, are common contaminants of drinking water supplies in Wisconsin (and other places). Coliform bacteria are widely distributed in soil, plants and water; their presence in drinking water indicates that a pathway for contamination may exist. *Escherichia coli* (or *E. coli*) is a species of bacteria that, when present in drinking water, indicates contamination from human or animal wastes. *E. coli* is considered an acute contaminant because people can become ill after a single exposure to the viruses that may be present when *E. coli* is detected. Exposure can cause short-term health effects like diarrhea, nausea, cramps and headaches but may have more serious effects on vulnerable populations, including infants, young children and people with immune system problems.

  All public water systems in Wisconsin are required to monitor for the presence of coliform bacteria. When these bacteria are detected in a sample of drinking water (called a total coliform-positive result), additional actions are required that focus on "finding" sources of microbial contamination and "fixing" the issues allowing contaminants to enter the water system.

  First, follow-up samples are collected to confirm the presence of coliform bacteria and specifically identify whether *E. coli* are detected. When bacterial contamination is confirmed, trained inspectors from DNR and counties throughout the state respond by performing on-site assessments. These inspections follow a "find and fix" approach to ensure that bacteria do not persist in the drinking water at these facilities. More than 360 assessments were completed during 2018. These free inspections provide a valuable service to public water system owners and their customers.

  Often, inspectors discover simple corrections that will eliminate pathways for contamination and help water systems get back on track. Problems like cracked electrical conduits at a wellhead, or unnoticed cross connections to non-potable water sources, often can be corrected quickly and inexpensively. Shock-chlorinating wells that have biofilms growing in them is another common corrective strategy.

  The MCL for microbial contaminants is exceeded when the presence of *E. coli* is confirmed in the water supply (see Table A-1 in Appendix A for a description of the MCL). During 2018, there were 37 public water systems in Wisconsin (only 0.32 percent) with MCL violations for *E. coli* detections. Follow-up work at these systems has included identifying the sources of contamination, correcting defects and, in some cases, switching to a new water source.

- ***Nitrate and nitrite***

  Nitrate is the most widespread inorganic chemical that occurs as a contaminant of drinking water here in Wisconsin. Because it is water-soluble and leaches readily through soil, nitrate can move easily into the groundwater. Sources of nitrate and nitrite include agriculture and animal wastes, according to the Wisconsin Groundwater Coordinating Council. Nitrate and nitrite are acute contaminants because they can cause serious illness in infants younger than six months old. The condition, called methemoglobinemia or "blue baby syndrome," causes infants' blood to be deprived of oxygen, and it can be fatal in extreme cases. Consuming water with high nitrate levels has also been linked to chronic diseases, and there is some evidence of an association between exposure during early pregnancy and certain birth defects. In adults, the health concerns include increased cancer risk, because nitrate is converted within the human body to compounds that are known carcinogens.

  All of Wisconsin's 11,589 public water systems are required to monitor for nitrate in drinking water. During 2018, 36 public water systems had violations for exceeding the nitrate MCL, and one system exceeded the nitrite MCL. The number of systems with nitrate and nitrite exceedances decreased slightly compared with the previous year.

  Federal and state regulations offer some flexibility for very small water systems that exceed the nitrate MCL. This provision allows transient non-community systems to continue operating with water that has nitrate above the MCL of 10 milligrams per liter (mg/L) but below 20 mg/L, providing they meet certain conditions. They must notify the public about the nitrate contamination, ensure that the water will not be consumed by infants or women of childbearing age, and provide an alternate source of water.

Table 1. Summary of non-community water systems operating with nitrate levels exceeding the MCL during 2018

water system status	number of systems
continuing operation started before 2018	291
continuing operation started during 2018	31
continuing operation ended during 2018	43
total number of systems on continuing operation	279

Wisconsin currently has almost 300 transient non-community water systems on "continuing operation" (Table 1). Some have remained in that status for more than 20 years. During 2018, 31 more TN systems exceeded the nitrate MCL and were allowed to use the continuing operation option (a slight decrease from the previous year). During the same period, 43 systems went off continuing operation. The overall number has remained near 300 for years, though, indicating that nitrate contamination continues to be a significant challenge for water systems in Wisconsin.

- ***Arsenic***

  Arsenic is a naturally occurring element found in some rock formations in Wisconsin, which is why it is a common inorganic chemical detected as a contaminant of drinking water supplies here. Arsenic has no taste or odor, so the only way to detect it in drinking water is by testing. It is classified as a chronic contaminant, meaning that health risks come from long-term exposure. Health effects include increased risk of skin cancer; there is some evidence of links to cancers of the lungs, bladder, liver, kidney and colon also. Exposure to arsenic can cause skin damage, circulatory system

problems, and nervous system effects (like tremors). Arsenic exposure during pregnancy and early childhood may also affect learning, IQ scores and risk of certain cancers later in life.

All community and non-transient non-community water systems are required to monitor for the presence of arsenic (1,999 of Wisconsin's water systems). During 2018, there were 12 systems with violations for exceeding the arsenic MCL (0.01 mg/L). These water systems are located in various areas, but most are in southeastern Wisconsin.

- ***Radionuclides***

  Radium and uranium are elements that occur naturally in rock formations in Wisconsin, and they are detected as contaminants of some drinking water supplies here. Health risks come from long-term exposure. For example, exposure over a lifetime could result in an elevated risk for cancer and kidney toxicity. All community water systems are required to monitor for radionuclides. Of the 1,053 community water systems in Wisconsin, 12 (or 1.1 percent) had violations for exceeding the MCL standards for radium and/or alpha particle emitters during 2018. Most of these systems are located in the southern and northeastern parts of the state.

- ***Lead and copper***

  Lead and copper typically do not occur naturally in source water. Instead, they can leach into the water as it flows through piping and fixtures that contain these compounds, caused by the process of corrosion. Water system dynamics such as water use, water temperature and physical and hydraulic disturbances can also contribute to lead and copper in drinking water. Lead pipe, brass, chrome plated brass, copper plumbing and lead-based solder are all potential sources. Lead can have serious health effects because it interferes with the red blood cells that carry oxygen in our bodies. It primarily affects brain development in infants and children but can have health effects for adults also. Copper is an essential nutrient, but long term exposure to high levels can cause kidney and liver damage.

  All community and non-transient non-community water systems are required to monitor for lead and copper. When an action level is exceeded, systems are required to conduct additional water sampling, to determine how overall water quality may be contributing to lead and copper levels. In addition, these systems must provide special information to their consumers about health effects and the steps people can take to reduce exposure. Finally, systems with action level exceedances may also need to treat their water to reduce lead and copper exposure. During 2018, there were 22 public water systems that exceeded the lead action level and 14 that exceeded the action level for copper.

Table 2. Water systems with action level exceedances during 2018

contaminant	number of water systems			
	MC	OC	NN	total
copper	0	3	11	14
lead	5	9	8	22

DNR works with public water systems that have violations for contaminant MCL exceedances to help them correct problems and return to compliance as soon as possible. Corrective actions can include steps like disinfection, reconstructing an existing well, drilling a new well to obtain an alternate water source or installing a treatment system. Microbial contaminants, nitrate, arsenic and radionuclides are all continuing priorities for DNR because of the common occurrence of these contaminants in Wisconsin.

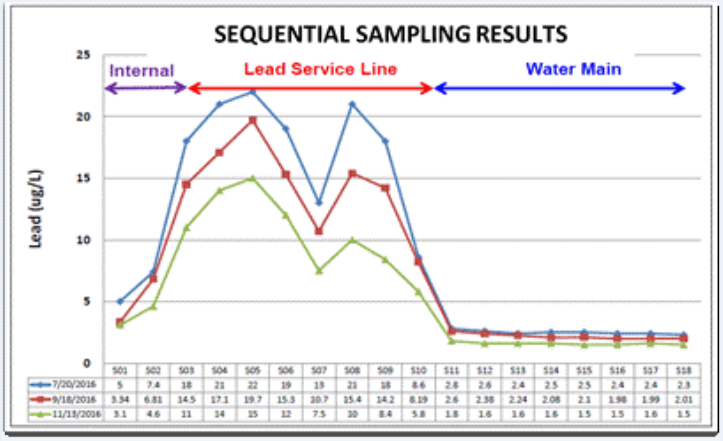
Drinking Water News on Tap

Wisconsin's Largest Water Systems Begin New Efforts to Protect Consumers from Lead and Copper

To protect consumers from lead and copper in their water, the Safe Drinking Water Act requires large public water systems serving populations of 50,000 or greater to maintain optimal corrosion control treatment. Wisconsin has 12 of these large municipal systems. Small water systems that exceed the lead or copper action level also are required to maintain optimal corrosion control treatment.

Effective corrosion control treatment is designed to minimize lead and copper concentrations in drinking water at consumers' taps to the greatest extent possible. Beginning in 2017, DNR launched an initiative in partnership with the "12 large" systems, to re-evaluate their existing corrosion control treatment.

Sequential sampling offers one valuable method for assessing the effectiveness of corrosion control treatment. It involves collecting a series of water samples over time and creating a profile of the plumbing between the water main and the consumer's tap. This reveals variation in lead and copper concentrations and the locations of contaminant sources (see the graph here).



Sequential sampling results from three iterations of treatment; the third demonstrates improvement (green line). In this example, the highest lead concentrations came from water in the service line (rather than indoor plumbing in the building).

Several of the "12 large" water systems performed sequential sampling during 2018 to investigate their existing corrosion control treatment. Optimizing corrosion control treatment can effectively reduce lead and copper concentrations (see graph).

Some of the "12 large" water systems have committed to further efforts by setting up "pipe loop" studies. Pipe loops are made from sections of lead and copper service lines that once delivered water to consumers in the system. These harvested pipes serve as examples of historic conditions in the water system and similar piping that may still be in service. Experimenting with pipe loops allows operators to determine the most effective corrosion control treatment and predict how changes in water quality might affect lead and copper releases, without exposing consumers to any risk.

Pipe loop study underway. Harvested sections of pipe are near the top of the rack, lead toward the rear and copper in the middle.

Once systems have optimized corrosion control treatment, they will monitor water chemistry to identify water quality changes over time and assess whether operations minimize lead and copper corrosion to the greatest extent possible. This collaborative effort between DNR and the "12 large" municipal systems is one important example of how Wisconsin's drinking water professionals are working together and searching for ways to improve their ability to provide safe drinking water.

Monitoring and reporting violations

Public water systems are required to monitor to verify that contaminants in the water do not exceed the MCL thresholds. If water samples are not collected by appropriate deadlines, or are not analyzed using approved methods, monitoring and reporting (M/R) violations can occur. M/R violations also occur if water systems fail to notify consumers of lead and copper results from samples collected at their homes.

Monitoring and reporting violations occur much more frequently than MCL violations. During 2018, there were 1,027 M/R violations, which occurred at 614 of the state's 11,589 public water systems (5.2 percent). Most often, these violations resulted from failure to collect required samples, samples collected late, and failure to notify consumers of the results of lead and copper samples collected from their homes. Table B-2 in Appendix B summarizes the M/R violations that occurred during 2018.

Treatment technique violations

Some parts of the SDWA establish "treatment technique" requirements instead of MCL standards as the method for controlling unacceptable levels of contaminants in water. Treatment techniques are procedures or actions that public water systems must follow to reduce levels of, or ensure control of, some contaminants. Treatment technique requirements have been established for controlling viruses, some bacteria, lead and copper.

Treatment technique (TT) violations can occur if water systems fail to employ the required processes or treatments to reduce exposure to contaminants, fail to follow approved start-up procedures for seasonal operation or fail to correct "significant deficiencies" and "sanitary defects." Significant deficiencies and sanitary defects are defects in design, treatment, operation or maintenance of a public water system that allow contaminants to enter the system, provide a pathway for entry of microbial contaminants or cause health risks for consumers of the water. Existence of these defects may indicate a failure or imminent failure of a barrier that is already in place. TT violations signal the potential for health risks, since

consumers cannot be certain whether their drinking water was adequately treated or protected to reduce exposure to contaminants.

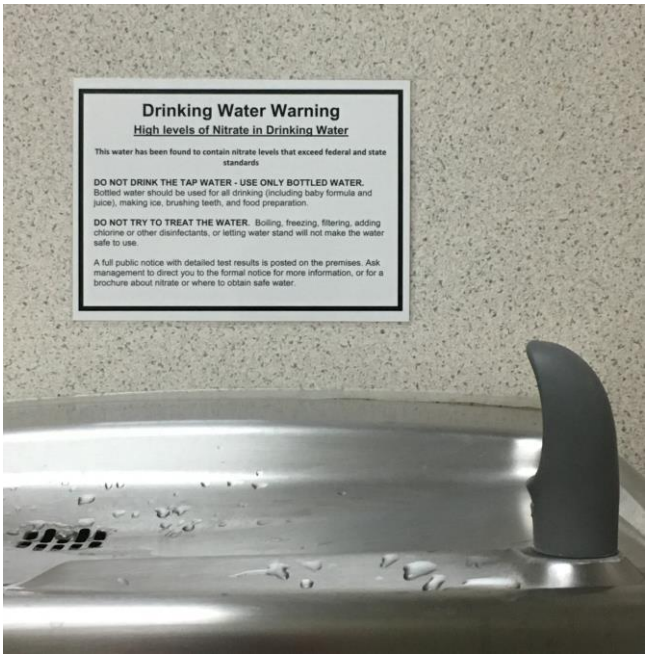
Among Wisconsin's 11,589 public water systems, 82 systems (0.71 percent) had treatment technique violations during 2018. Most of those violations resulted from failing to meet deadlines for correcting defects or problems identified during inspections or for completing tasks following action level exceedances for lead or copper. Table B-3 in Appendix B summarizes the treatment technique violations that occurred during 2018.

Notification and reporting violations

Informing consumers about their drinking water is a key component of water system operation, and the SDWA contains numerous requirements for systems to notify consumers about water quality, violations that occur, operational problems and emergency situations. Violations can occur if systems fail to notify their consumers as required. Table B-4 in Appendix B summarizes all the notification violations that occurred during 2018.

- ***Public notice violations***

  To protect public health, water systems are required to notify consumers whenever violations of the primary drinking water regulations occur, or if a situation poses a risk to human health. Exceeding a contaminant MCL, failing to monitor drinking water supplies and failing to properly treat the water are all violations that require public notification.



  Public notices must inform consumers about the nature of any violations, potential health effects, corrective actions that the water system is undertaking and any preventive measures that consumers should take. If a water system fails to notify consumers as required, public notice (PN) violations can occur.

  Among all the violations summarized in this report, public notice violations were most numerous. These violations occurred at 1,008 of Wisconsin's public water systems (8.7 percent of the total number) during 2018, which is a slight improvement over the previous year. More than 80 percent of the public notice violations occurring last year were related to monitoring for microbial contaminants and nitrate (missed or late samples).

- ***Consumer Confidence Report violations***

  All community water systems (those serving residential customers) are required to prepare and deliver a water quality report each year. The Consumer Confidence Report (CCR, often called a water quality report) provides information about the source of a system's water, levels of any

contaminants detected in the water, and a summary of violations incurred by the water system during the previous year. CCR violations occur whenever water systems fail to distribute this annual report to their customers. Of Wisconsin's 1,053 community water systems, only 36 (3.4 percent) got violations in 2018 for failing to distribute a CCR or for issuing the report late.

- ***Notification violations***

  Identifying significant deficiencies and sanitary defects at public water systems is an important method to protect public health. These are noted during inspections and assessments. Water systems are required to correct significant deficiencies and sanitary defects by specified deadlines and then notify DNR when the corrective actions have been completed. These requirements apply to all of Wisconsin's public water systems, and failure to properly notify DNR can cause a violation. During 2018, only four water systems incurred violations for failing to provide these notifications.

DNR EFFORTS TO PROTECT WISCONSIN'S DRINKING WATER

To meet its responsibilities for implementing the SDWA, DNR works in multiple ways to help Wisconsin's public water systems provide safe drinking water.

Program funding & staffing

Wisconsin's public water supply program receives funding from several sources, including the federal and state governments (Figure 3). Of a total $10.8 million in funding during 2018, the majority was used to pay for 80 full-time DNR staff along with contracts for help from outside organizations, county health departments and colleges. Despite having the largest number of public water systems nationwide, Wisconsin has fewer staff working to implement the SDWA than many other states do.

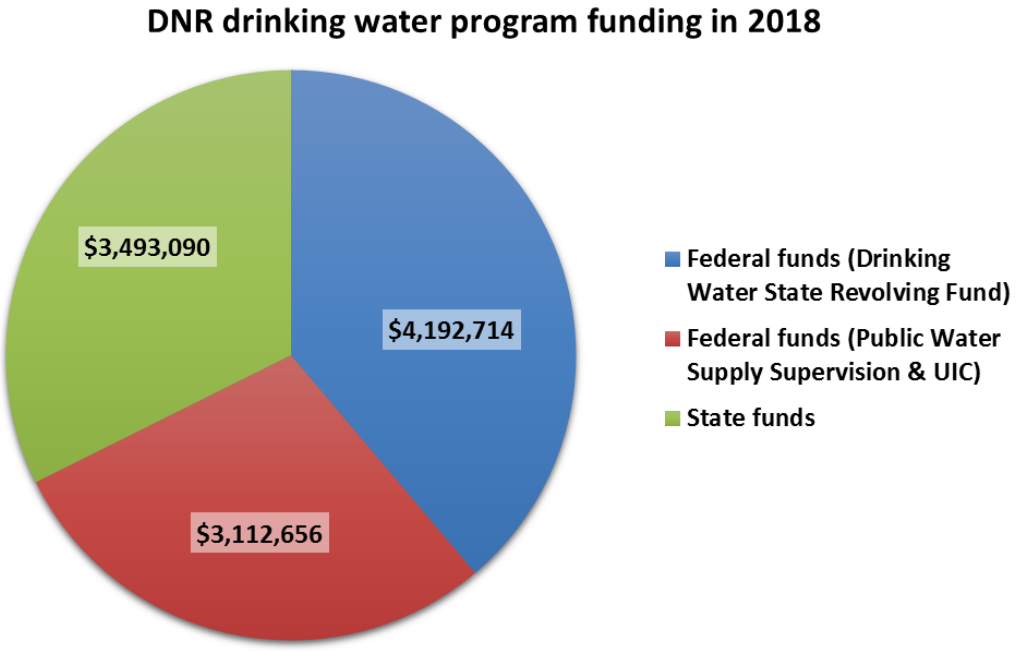


Figure 3. Funding for DNR's public water supply program comes from both federal and state sources. During 2018, the program had 80 full-time staff.

Inspections & assessments

Inspecting public water systems is one of DNR's central responsibilities, and it is a critically important tool. Inspections allow DNR to measure compliance with requirements and track changes over time. They also help to prevent future problems, because defects can be identified before health-based violations occur. These compliance inspections, called "sanitary surveys," are comprehensive reviews of the water sources, pumps and piping, treatment facilities and operation and maintenance practices at public water systems.

Sanitary surveys are performed regularly, every three years at community water systems and every five years at non-community systems. Last year, the DNR and its contracted partners conducted 2,531 sanitary surveys throughout Wisconsin (Figure 4).

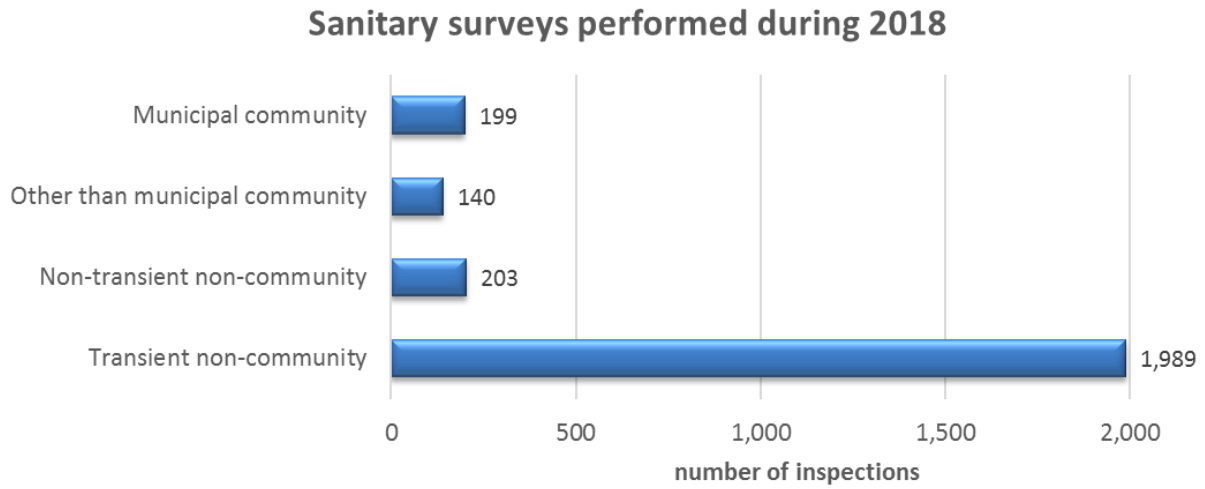


Figure 4. During 2018, the DNR and its contracted partners completed 2,531 sanitary survey inspections throughout Wisconsin.

In addition to regularly-scheduled sanitary surveys, DNR also performs inspections called "assessments" at some water systems. When the presence of coliform bacteria is confirmed at a public water system, DNR responds by conducting an on-site assessment of the facility. The goal of these assessments is to identify potential pathways for microbial contamination and the corrective actions needed to remedy any sanitary defects. During 2018, the DNR and its contracted partners performed 363 of these assessments.

In Wisconsin, some transient non-community systems can qualify for less frequent monitoring of microbial contaminants if they receive an annual site visit each year and correct all sanitary defects identified. During an annual site visit, the inspector checks the basic elements of the water system—for example, wells, pumps, water storage—and looks for any changes or problems. If any sanitary defects are identified, the system owner is informed about corrective actions needed. DNR and its contracted partners performed 6,928 annual site visits during 2018 to help water systems meet their requirements and qualify for reduced monitoring schedules.

Enforcement activity

Whenever water systems are not meeting the drinking water requirements, DNR works to resolve issues quickly to protect public health. The DNR follows a stepped enforcement process to ensure compliance with regulatory requirements. "Stepped enforcement" includes a series of actions designed to resolve violations at the lowest level—of formality and severity—that is appropriate.

Most violations are resolved quickly and early in the process. First, the DNR sends a written Notice of Noncompliance (NON) to public water systems when problems are identified. Often, corrective action can be taken immediately to return the system to compliance.

If a system does not take action after initially receiving a NON, the enforcement process proceeds through additional steps. These include a Notice of Violation and in-person enforcement conference, which can result in written compliance agreements, administrative orders, and penalty orders. The process emphasizes voluntary agreements about the actions needed and appropriate timeline for returning to compliance. If the DNR is unable to resolve violations by working with a water system, a case may be referred to the Wisconsin Department of Justice for further enforcement.

When contaminants are detected in drinking water and MCL standards are exceeded, the enforcement process is expedited so problems can be addressed quickly. Water systems with MCL violations receive Notices of Violation to begin the process of evaluating potential corrective actions and returning to compliance as soon as possible.

Table 3 summarizes DNR's enforcement activity during 2018. Last year, DNR sent 1,649 Notice of Noncompliance letters but only 61 Notice of Violation letters, illustrating that most water systems took action promptly to resolve violations after being notified of problems.

Table 3. Drinking water program enforcement activity during 2018		
Enforcement action	**purpose**	**number**
Notice of Noncompliance (NON) sent	NON informs public water system owner about failure to collect samples, report results, or distribute required information or notices.	1,649
Notice of Violation (NOV) sent	NOV notifies water system owner about a violation and schedules a meeting with DNR staff for more detailed discussion.	61
Enforcement conference held	Enforcement conferences are held to discuss the enforcement process, possible corrective actions and a timeline for returning to compliance.	30
Compliance agreement signed	Compliance agreement is a voluntary agreement between water system owner and DNR describing corrective actions and the timeline for correcting violations. Compliance agreements are typically used when return to compliance can be accomplished within a short time frame.	10
Consent order or administrative order signed	Consent (or administrative) order describes corrective actions and establishes a timeline and deadline for returning to compliance. Orders are usually used when returning to compliance will take longer than six months.	19

Monitoring assistance

Public water systems collect and analyze water samples throughout the year to measure the quality of drinking water served to their customers. The process of maintaining safe drinking water requires public water systems to follow a schedule of monitoring activities. The DNR assists water systems by distributing monitoring schedules to individual community and non-transient non-community water system owners and operators. Monitoring schedules are distributed twice per year, in August of the preceding compliance year (preliminary schedules) and in January of the compliance year (final schedules). The preliminary schedule helps water system owners with budgeting and planning for the upcoming compliance year. The final schedule provides logistic information for use in water quality monitoring activities during the current operating year.

Most wells serving community and non-transient non-community public water systems are evaluated every three years for vulnerability to potential contaminant sources. During these evaluations, DNR assesses source water quality and determines the proper monitoring frequency for contaminants regulated under the SDWA. As part of the vulnerability evaluation, DNR reviews numerous criteria including: previous water quality results, groundwater proximity to potential contaminant sources, local geology and well construction. The vulnerability assessment process provides some systems with the ability to reduce monitoring costs by approximately $3 million annually statewide.

Protection of water sources

Wellhead protection is a preventive program designed to protect public water supply sources and reduce infrastructure costs, treatment costs and public health risk. The program represents a “first line of defense” approach to protecting our drinking water. It helps to prevent contaminants from entering public water supplies by managing the land use that contributes water to wells. Wisconsin’s wellhead protection program incorporates both regulatory and voluntary approaches, and DNR encourages development and implementation of wellhead protection plans for all public water systems as a

proactive step to protect wells from potential contamination. During 2018, 21 new wellhead protection plans were reviewed and approved by DNR.

Financial assistance

Wisconsin receives federal funding to implement the SDWA, and the DNR uses most of that funding to provide low-interest loans and principal forgiveness awards for infrastructure improvements at eligible municipal water systems. Working together, DNR's community financial assistance program and public water program awarded more than $57 million in funding from the Safe Drinking Water Loan Program during 2018. The loan program funds projects that help Wisconsin communities meet the goal of providing safe drinking water for consumers at affordable prices. Since the Safe Drinking Water Loan Program began in 1998, 477 projects in Wisconsin have received more than $689 million in loans and principal forgiveness.

Last year's funding was comprised of $40.1 million in low interest loans and $17.2 million in principal forgiveness. Depending on market interest rates, communities can save 20 to 30 percent from a lower interest rate loan compared with a market rate loan.

The majority of the principal forgiveness funding last year ($12.8 million) was awarded for 28 projects through the Private Lead Service Line Replacement Program. This two-year program was Wisconsin's innovative approach to funding replacement of both the public *and* private portions of lead service lines.

These are some examples of how Wisconsin communities are using loan program funds from 2018 for infrastructure improvements:

- The village of Ellsworth received $408,852 to consolidate the Ray Huppert Utility (the water system called Dar-Ray Addition) with the village by constructing water main replacements and abandoning an old well and wellhouse.

- The village of Lake Delton received $1,963,499 to construct a new well, wellhouse and backup generator.
- The city of Milwaukee received $12,706,234 to replace water mains throughout the city.
- The village of Spring Valley received $1,082,682 for constructing a new well and wellhouse and abandoning a backup well.
- Three Lakes Sanitary District No.1 received $411,530 to replace water mains along County Road A.
- The city of South Milwaukee received $7,030,090 to construct two new clearwells and a high lift pump station.
- The city of Redgranite received $893,921 to rehabilitate the existing storage facility and upgrade electrical components at Well #1.

Appendix C lists all the communities that were awarded funding during 2018.

Partnerships

In Wisconsin, working toward the goal of safe drinking water is a cooperative effort between public water systems, professional associations, individual operators, DNR, local agencies, EPA, water consumers and many others. As part of this effort, the DNR contracts with numerous organizations to help provide technical assistance, training and compliance support to the state's water system owners and operators, including:

- County health departments perform inspections, assessments and water sampling at thousands of restaurants, parks, churches, and other transient non-community systems around the state. It is a huge effort, and during 2018, these locally-based sanitarians performed almost 1,500 sanitary surveys and more than 5,700 assessments and annual site visits at transient non-community water systems throughout the state.
- Wisconsin Rural Water Association (WRWA) helps small public water systems by giving them regular reminders about monitoring requirements and upcoming deadlines and by providing specialized, on-site technical assistance. This assistance helps to train new operators and troubleshoot any problems that occur. During 2018, WRWA delivered 5,702 monitoring reminders and performed 566 on-site visits at other-than-municipal community and non-transient non-community water systems all around the state.
- Moraine Park Technical College and Wisconsin Rural Water Association provide training for water system operators to obtain their required continuing education. Both organizations also help to build the future drinking water workforce by helping new water system operators prepare to take their certification exams.

CHALLENGES AHEAD

Wisconsin's water supply infrastructure, like the rest of the nation's, is aging, and citizens and communities face steep costs to maintain and upgrade the wells, pumps, pipes, and treatment facilities needed to bring drinking water to our homes and businesses every day.

Every four years, EPA conducts its Drinking Water Infrastructure Needs Survey and Assessment to quantify the nationwide need. The most recent information comes from EPA's 2015 survey. Nationally, an estimated $472.6 billion are needed to meet the nation's drinking water infrastructure needs between 2015 and 2034.

The price tag for Wisconsin was estimated to be over $8.5 billion. Here's how that bill breaks down:

- $5.3 billion— Distribution and transmission needs—includes replacing water mains, eliminating stagnant areas and dead end mains, installing and rehabilitating pumping stations to maintain adequate water pressure, installing and replacing water meters, and installing backflow prevention to protect against contamination.
- $1.6 billion— Treatment needs—constructing and rehabilitating treatment processes like disinfection, contaminant removal, filtration, and removal of objectionable secondary contaminants, along with the 'advanced' processes employed by systems using surface water sources.
- $2.39 billion— Needs of Wisconsin's largest community water systems, serving populations greater than 100,000.
- $3.9 billion— Needs of the state's community water systems serving 3,300 to 100,000 people.
- $1.7 billion— Needs of Wisconsin's smallest community water systems, serving fewer than 3,300 people.
- $612 million— Needs of the not-for-profit, non-community water systems in the state.

EPA recently began work on the 2020 Drinking Water Infrastructure Needs Survey and Assessment, which will include some new features.

- EPA plans to focus extra effort on assessing the needs of two groups of small water systems, which are very relevant for Wisconsin:
    - Community water systems serving populations less than 3,300 people—more than 80 percent of Wisconsin's community water systems serve these very small populations.
    - Non-profit non-community water systems—including schools, churches and other non-profit facilities. Wisconsin has the largest number of non-profit non-community water systems in the nation.
- During the next needs survey, states will also estimate the costs associated with replacing privately-owned portions of lead service lines (in addition to the parts that are publicly owned).

Physical infrastructure is not the only need, though. Drinking water programs nationwide are struggling to do more with less. Funding levels for public water programs have remained flat for more than a decade. Over the same time, though, DNR and other state agencies have taken on more work to meet their responsibilities for implementing the SDWA and to plan for managing new issues like emerging contaminants. Nationally, there is a 40 percent gap between current funding and staffing levels and what states need to comprehensively address all the challenges facing public water systems.

Although future needs are challenging, many partners—including public water system owners and operators, water industry professionals, training and technical assistance providers and other agencies—all play critical roles and work hard every day. DNR is committed to protecting the state's drinking water and public health today and into the future.

APPENDIX A. Maximum permissible levels of contaminants in drinking water

The tables in this appendix show the Maximum Contaminant Levels (MCLs) for the various groups of regulated drinking water contaminants.

Table A-1. MCLs for microbial contaminants

contaminant	MCL
Escherichia coli bacteria	MCL exceedance can occur in several ways: • *E. coli*-positive repeat sample following a total coliform-positive routine sample. • Total coliform-positive repeat sample following an *E. coli*-positive routine sample. • Failure to collect all required repeat samples following an *E. coli*-positive routine sample. • Failure to test for *E. coli* after a total coliform-positive repeat sample.

Table A-2. MCLs for inorganic contaminants

contaminant	MCL (mg/L)	contaminant	MCL (mg/L)	contaminant	MCL (mg/L)
Antimony	0.006	Chromium	0.1	Nickel	0.1
Arsenic	0.01	Copper	1.3 is Action Level*	Nitrate	10
Asbestos (fiber length >10 microns)	7 million fibers/L	Cyanide	0.2	Nitrite	1
Barium	2	Fluoride	4	Total Nitrate & Nitrite	10
Beryllium	0.004	Lead	0.015 is Action Level*	Selenium	0.05
Cadmium	0.005	Mercury	0.002	Thallium	0.002

* Exceeding an action level is not a violation; it requires water systems to take additional steps and employ techniques to control corrosiveness of water.

Table A-3. MCLs for radionuclides

contaminant	MCL
Gross alpha particle activity	15 picocuries per liter
Radium-226 and Radium-228	5 picocuries per liter
Uranium	30 micrograms per liter

Table A-4. MCLs for disinfectants and disinfection byproducts

DISINFECTION BYPRODUCTS		RESIDUAL DISINFECTANTS	
contaminant	**MCL (mg/L)**	**disinfectant**	**MRDL * (mg/L)**
Bromate	0.01	Chloramines (as Cl_2)	4
Chlorite	1	Chlorine (as Cl_2)	4
Haloacetic Acids	0.06	Chlorine dioxide (as ClO_2)	0.8
Total Trihalomethanes	0.08	* MRDL = maximum residual disinfectant level	

Table A-5. MCLs for organic contaminants

SYNTHETIC ORGANIC CONTAMINANTS (30 contaminants in group)

contaminant	MCL (mg/L)	contaminant	MCL (mg/L)	contaminant	MCL (mg/L)
2,4-D	0.07	Dibromochloropropane	0.0002	Hexachlorobenzene	0.001
2,4,5-TP	0.05	Dinoseb	0.007	Hexachlorocyclopentadiene	0.05
Alachlor	0.002	Dioxin	3×10^{-8}	Lindane	0.0002
Atrazine	0.003	Diquat	0.02	Methoxychlor	0.04
Benzo(a)pyrene	0.0002	Endothall	0.1	Oxamy	0.2
Carbofuran	0.04	Endrin	0.002	PCBs	0.0005
Chlordane	0.002	Ethylene Dibromide	0.00005	Pentachlorophenol	0.001
Dalapon	0.2	Glyphosate	0.7	Picloram	0.001
Di(2-ethylhexyl)adipate	0.4	Heptachlor	0.0004	Simazine	0.004
Di(2-ethylhexyl)phthalate	0.006	Heptachlor epoxide	0.0002	Toxaphene	0.003

VOLATILE ORGANIC CONTAMINANTS (21 contaminants in group)

contaminant	MCL (mg/L)	contaminant	MCL (mg/L)	contaminant	MCL (mg/L)
Benzene	0.005	1,2-Dichloroethylene,trans	0.1	Toluene	1
Carbon Tetrachloride	0.005	Dichloromethane	0.005	1,2,4 Trichlorobenzene	0.07
o-Dichlorobenzene	0.6	1,2-Dichloropropane	0.005	1,1,1-Trichloroethane	0.2
p-Dichlorobenzene	0.075	Ethylbenzene	0.7	1,1,2 Trichloroethane	0.005
1,2-Dichloroethane	0.005	Chlorobenzene	0.1	Trichloroethylene	0.005
1,1-Dichloroethlyene	0.007	Styrene	0.1	Vinyl Chloride	0.0002
1,2-Dichloroethylene,cis	0.07	Tetrachloroethylene	0.005	Xylenes (Total)	10

Table A-6. Secondary drinking water standards
Water containing inorganic chemicals in quantities above these limits is not hazardous to health but may be objectionable.

parameter	standard (mg/L)	parameter	standard (mg/L)
Aluminum	0.05 to 0.2	Iron	0.3
Chloride	250	Manganese	0.05
Color	15 units	Odor	3 (threshold number)
Copper	1	Silver	0.1
Corrosivity	Noncorrosive	Sulfate	250
Fluoride	2	Total Dissolved Solids (TDS)	500
Foaming agents	0.5	Zinc	5
Hydrogen Sulfide	Not detectable		

APPENDIX B. Summary of violations of drinking water requirements during 2018

The following tables summarize violations during 2018 at Wisconsin's public water systems. The tables contain reports of violations of MCL standards, monitoring and reporting requirements, treatment technique requirements, and notification requirements.

Table B-1. Maximum Contaminant Level violations during 2018

contaminant	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
MICROBIAL CONTAMINANTS	**37**	**1**	**1**	**1**	**34**	**54**
Total coliform bacteria					4	4
E. coli bacteria		1	1	1	30	50
INORGANIC CONTAMINANTS	**48†**	**3**	**5**	**22**	**18**	**91**
arsenic		1	1	10	n/a	54
nitrate		2	4	12	17†	36
nitrite					1	1
RADIONUCLIDES	**12**	**11**	**1**	**n/a**	**n/a**	**297**
combined radium 226+228		10	1			169
gross alpha particle activity		4	1			128
DISINFECTION BYPRODUCTS	**4**	**4**	**0**	**0**	**n/a**	**7**
total trihalomethanes		4				7
Overall totals	**101**	**19**	**7**	**23**	**51**	**449**

* Some water systems may have multiple violations within a contaminant group.

† An additional 279 TN systems are on continuing operation with nitrate levels above the MCL of 10 mg/L but below 20 mg/L.

Table B-2. Monitoring and reporting violations during 2018

contaminant	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
MICROBIAL CONTAMINANTS	**382**	**4**	**24**	**43**	**311**	**507**
Ground Water Rule			6	3	56	73
Total Coliform Rule					2	2
Revised Total Coliform Rule monitoring		4	18	40	250	427
Revised Total Coliform Rule reporting					3	5
INORGANIC CONTAMINANTS	**307**	**91**	**62**	**46**	**108**	**394**
arsenic		4	8	2	n/a	15
lead and copper		79	36	38	n/a	222
nitrate and nitrite		5	11	6	108	146 (161 individual contaminants)
other inorganic contaminants (13 contaminants in group)		3	7		n/a	11 (219 individual contaminants)
RADIONUCLIDES	**10**	**7**	**3**	n/a	n/a	**12** (40 individual contaminants)
DISINFECTANTS & DISINFECTION BYPRODUCTS	**37**	**27**	**5**	**5**	n/a	**72**
residual disinfectants		4	1	1		7
disinfection byproducts		23	4	4		65
SYNTHETIC ORGANIC CONTAMINANTS (30 contaminants in group)	**9**	**5**	**4**	**0**	n/a	**10** (161 individual contaminants)
VOLATILE ORGANIC CONTAMINANTS (21 contaminants in group)	**26**	**5**	**11**	**10**	n/a	**32** (692 individual contaminants)
Overall totals	**614**	**111**	**69**	**88**	**346**	**1,027**

*Some water systems may have multiple violations within a contaminant group.

Table B-3. Treatment technique violations during 2018

contaminant	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
MICROBIAL CONTAMINANTS	**47**	**13**	**7**	**1**	**26**	**60**
Ground Water Rule	22	12	4	1	5	33
Revised Total Coliform Rule	25	1	3		21	27
INORGANIC CONTAMINANTS	**25**	**12**	**6**	**7**	n/a	**29**
Lead and Copper Rule		12	6	7		29
DISINFECTANTS & DISINFECTION BYPRODUCTS	**10**	**8**	**2**		n/a	**10**
Overall totals	**82**	**32**	**14**	**8**	**26**	**99**

*Some water systems may have multiple violations within a contaminant group.

Table B-4. Notification violations during 2018

requirement	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
Consumer Confidence Report	36	6	30	n/a	n/a	38
Ground Water Rule	4	3	0	0	1	4
Public Notification	1,008	74	59	104	771	2,068
Overall totals	**1,041**	**81**	**85**	**104**	**771**	**2,110**

*Some water systems may have multiple violations within this group.

APPENDIX C. Communities receiving Safe Drinking Water Loan Program funding for drinking water projects during 2018

community	principal forgiveness funding	loan funding	total funding	project description
Arcadia (city)	$500,000	$3,274,122	$3,774,122	Construct well 7 and pumphouse; fill and seal well 3
Belleville (village)		$1,490,842	$1,490,842	Construct well 3 and wellhouse, connecting main and access road; SCADA improvements
Chaseburg (village)	$306,689	$715,607	$1,022,296	Construct 140,000 gal water storage facility with connecting main and improvements to well 1
Cross Plains (village)		$1,788,706	$1,788,706	Water main replacements on County Road P and Baer St
Dane (village)		$740,353	$740,353	Loop water main and railroad crossing from 1st St to Traex Plaza; replace water main on High St
Dorchester (village)		$221,475	$221,475	Replace undersized water mains on South 2nd St and West 1st Ave
Ellsworth (village)	$122,656	$286,196	$408,852	Transfer Ray Huppert Utility to village, including: fill and seal well 1 and wellhouse, replace undersized water mains, SCADA upgrades, and two connections to Ellsworth's distribution system
Fall Creek (village)	$322,282	$751,989	$1,074,271	Construct wells 3 and 4, pumphouse 3 and connecting water main; fill and seal well 2 and pumphouse; SCADA upgrade; access road
Grantsburg (village)	$217,384	$144,923	$362,307	Replace water mains and lead service lines along Wisconsin Ave
Greenwood (city)		$1,271,256	$1,271,256	Replace water mains on East Begley St and West Begley St
Hancock (village)	$282,413	$188,274	$470,687	Replace aging water mains; construct water main loop; relocate water main to a public right-of-way
Horicon (city)		$743,420	$743,420	Replace aging cast iron water mains on South Wind Trail
Junction City (village)	$407,517	$352,118	$759,635	Modifications to water storage reservoir and pumphouses 3 and 4, including: new chemical feed equipment, back-up generator and SCADA improvements; replace water meters throughout village; connecting main from well 7 to reservoir; water main looping

community	principal forgiveness funding	loan funding	total funding	project description
Lake Delton (village)	$500,000	$1,463,499	$1,963,499	Construct well 7 and wellhouse, including back-up generator and SCADA improvements
Lone Rock (village)	$340,065	$415,635	$755,700	Replace undersized water mains and construct water main loop
Mayville (city)		$877,098	$877,098	Replace water mains on State Highway 28/67 from Horicon St to Main St and Main St to Ruedebusch St
Milwaukee (city)		$12,706,234	$12,706,234	Replace water mains citywide
Necedah (village)		$309,029	$309,029	Replace water mains; add looping
New Berlin (city)		$871,920	$871,920	Construct water main loop
Ontario (village)	$373,383	$148,922	$522,305	Construct well 2 and wellhouse, including connecting water main, access road and SCADA improvements
Redgranite (village)	$469,359	$424,562	$893,921	Replace and upgrade electrical components at wellhouse 1; rehabilitate existing water storage facility
Reeseville (village)	$279,780	$211,525	$491,305	Replace water main on North Ave and water main looping from Harrison St to Jackson St
South Milwaukee (city)		$7,030,090	$7,030,090	Construct two clearwells and a new high service pump station
Spring Valley (village)	$324,805	$757,877	$1,082,682	Construct well 4 and wellhouse, including connecting main; fill and seal back-up well
Three Lakes Sanitary District		$411,530	$411,530	Replace water mains along County Road A
Tomah (city)		$888,178	$888,178	Rehabilitate and repaint 1,000,000 gallon ground storage reservoir
Two Rivers (city)		$896,664	$896,664	Replace water mains and services in several locations; install new water main to eliminate dead end
Waukesha (city)		$684,275	$684,275	Install 24-inch, 16-inch, 12-inch, and 8-inch water mains in preparation for new Lake Michigan water source
Total 2018 funding	**$4,446,333**	**$40,066,319**	**$44,512,652**	

APPENDIX D. Communities and water systems awarded funds through the Private Lead Service Line Replacement Funding Program during 2018

community	principal forgiveness funding	total funding
Antigo (city)	$300,000	$300,000
Ashland (city)	$300,000	$300,000
Baraboo (city)	$250,000	$250,000
Clintonville (city)	$200,000	$200,000
Eagle River (city)	$200,000	$200,000
Eau Claire (city)	$300,000	$300,000
Fond du Lac (city)	$200,000	$200,000
Jefferson (city)	$150,000	$150,000
Manitowoc (city)	$300,000	$300,000
Markesan (city)	$185,000	$185,000
Marshfield (city)	$200,000	$200,000
Menasha (city)	$200,000	$200,000
Milwaukee (city)	$4,001,226	$4,001,226
Mosinee (city)	$150,000	$150,000
North Fond du Lac (village)	$100,000	$100,000
Oshkosh (city)	$300,000	$300,000
Platteville (city)	$200,000	$200,000
Racine (city)	$1,381,863	$1,381,863
Schofield (city)	$150,000	$150,000
Sheboygan (city)	$300,000	$300,000
St. Francis (city)	$150,000	$150,000
Thorp (city)	$200,000	$200,000
Two Rivers (city)	$500,000	$500,000
Viroqua (city)	$200,000	$200,000
Waupaca (city)	$200,000	$200,000
Wausau (city)	$300,000	$300,000
West Allis (city)	$1,358,421	$1,358,421
West Milwaukee (village)	$500,000	$500,000
Total 2018 funding	**$12,776,510**	**$12,776,510**