Wisconsin Public Water Systems
2019 Annual Drinking Water Report

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

PUB-DG-045 2020
July 2020

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Obtaining Copies of Wisconsin's *2019 Annual Drinking Water Report*

As required by the federal Safe Drinking Water Act, the *2019 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."

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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 *2019 Annual Drinking Water Report* summarizes compliance with the drinking water requirements during 2019 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 2019, 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 part of the strategy to protect drinking water quality.
- Wisconsin embarked on an administrative rule process to protect consumers from exposure to per- and polyfluorinated chemicals (PFAS) in drinking water.
- DNR and its partners performed more than 2,600 sanitary survey inspections during 2019, to assess compliance with construction, operation and maintenance requirements.
- Wisconsin's municipal water systems continued their efforts to protect consumers from lead and copper in drinking water. Smaller systems are conducting detailed water quality monitoring to assess the effect of water chemistry on releases of lead and copper into drinking water.
- County health departments, in partnership with DNR, provided monitoring and compliance assistance to small water systems in 53 counties around the state.
- DNR's partners provided training and technical assistance to public water system owners and operators throughout the state during 2019. This helped water systems respond to contaminant detections and operational problems and meet their monitoring deadlines. Training allowed operators to prepare for certification exams and meet their continuing education requirements.
- DNR awarded more than $60 million in financial assistance through the Safe Drinking Water Loan Program during 2019. The funding is helping 29 communities around Wisconsin make needed infrastructure improvements 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 state's water resources and ensure the safety and availability of the state's drinking water supplies.

Wisconsin manages its drinking water resources by relying on effective state and federal regulations combined with strong collaborative partnerships 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.

The federal Safe Drinking Water Act (SDWA) requires states to publish an annual report showing violations of the drinking water standards. This *2019 Annual Drinking Water Report* summarizes how Wisconsin's public water supply systems complied with the drinking water requirements between January 1 and December 31, 2019. This 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.

In January, Governor Tony Evers declared that 2019 would be the Year of Clean Drinking Water. This focused attention on the importance of safe drinking water and initiated efforts statewide to address concerns about the quality and safety of drinking water in Wisconsin.

The Year of Clean Drinking Water focused attention on three types of contamination in particular:

- nitrate in groundwater
- lead in drinking water
- emerging contaminants, especially PFAS

Many efforts began during 2019 to address these issues, and you will find more information about some of them later in this report. DNR's report about the Year of Clean Drinking Water is also available on the web site for more information.

WISCONSIN'S DRINKING WATER PROGRAM: THE BASICS

Requirements for public water systems come from the federal SDWA, which was originally passed in 1972 and then 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 specifies 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.

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

WISCONSIN'S PUBLIC WATER SYSTEMS

Wisconsin has 11,525 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 1,055 community water systems that serve 70 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 611 municipal systems. Milwaukee Waterworks is the state's largest, serving almost 600,000 people. Wisconsin's smallest municipal water systems, by contrast, serve fewer than 50 people each.
    - **Other-than-municipal community (OC) water systems** serve residents 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.

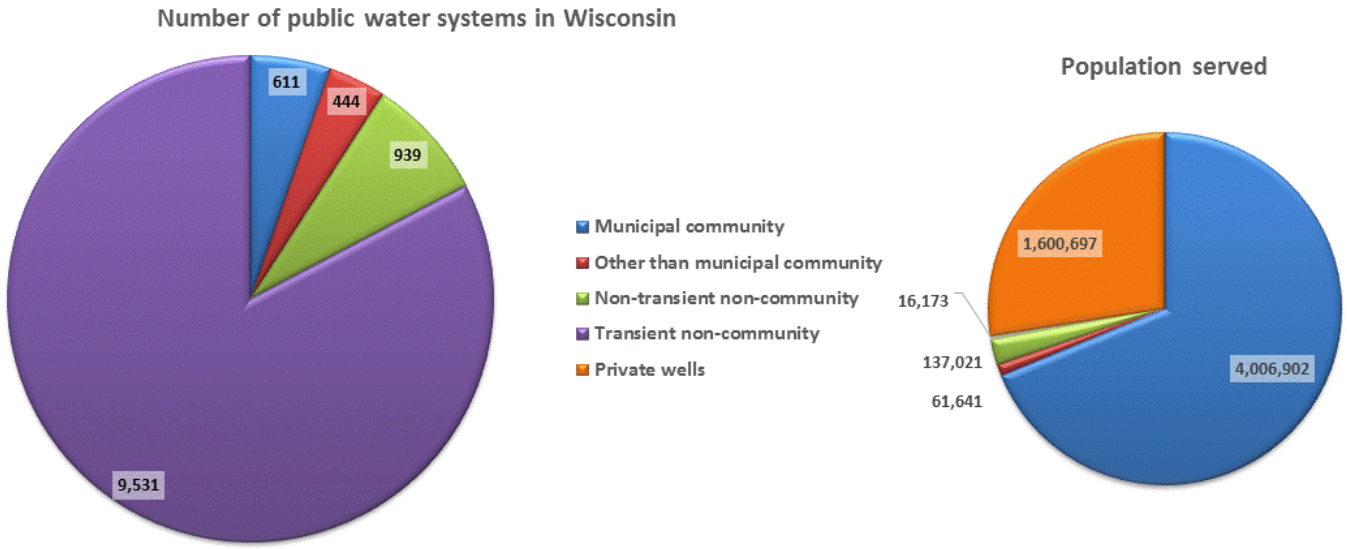


Figure 1. Wisconsin has more than 11,500 public water systems. Most are very small transient non-community systems, but the state's municipal water systems serve the largest population.

- 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 10,470 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. Wisconsin has more than 9,500 transient non-community water systems.

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).

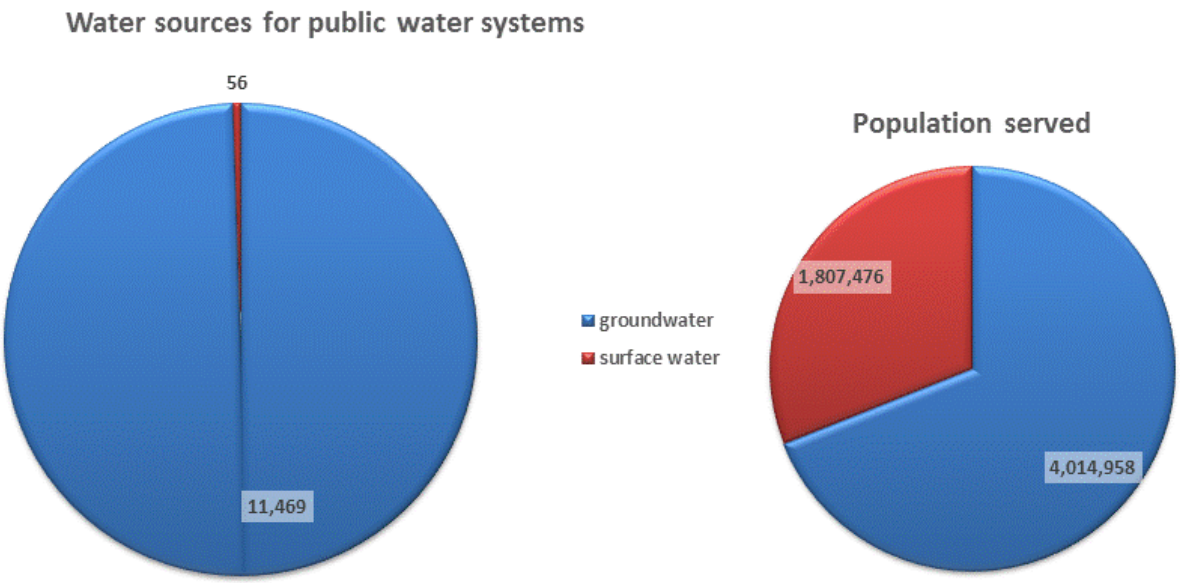


Figure 2. Most of Wisconsin's public water systems use groundwater pumped from wells. The 56 systems that use surface water from lakes include most of the state's largest public water systems.

MONITORING AND TESTING FOR CONTAMINANTS IN DRINKING WATER

Monitoring is critically important for protecting our drinking water and 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 days or even hours 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. The state's smallest systems, TNs, are not required to test for chronic 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, copper, lead, mercury 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.

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

DNR begins work to protect consumers from PFAS chemicals in drinking water

Non-stick cookware, stain-resistant carpet, fabric and fast food packaging — all these things have been common in households during the past five decades. But as helpful as they have been, they are among many items now known to contain synthetic chemicals that are harmful to human health and the environment.

According to the EPA, perfluoroalkyl and polyfluoroalkyl substances, two of the chemicals referred to as PFAS, have been manufactured and used in a variety of industries around the globe for decades. PFOA (perfluorooctanoic acid) and PFOS (perfluorooctanesulfonic acid) are the most extensively-produced of these chemicals. Both are very persistent in the environment and the human body, meaning they do not break down and can accumulate over time. There is evidence that exposure to certain PFAS can have adverse effects on human health.

In 2016, the EPA established cumulative lifetime health advisories for two types of PFAS. In 2019, Wisconsin began the process of establishing regulatory limits for PFAS in our state's drinking water to protect human health and the environment.

Why are PFAS harmful?
Adverse health effects have been associated with PFOS and PFOA. They include reproductive and developmental issues, liver and kidney problems, hormone disruption and immunological effects. Both chemicals have caused tumors in animals, and the EPA and other international organizations have classified them as potentially carcinogenic to humans.

How are PFAS chemicals used, and where are they found?
PFAS have unique physical and chemical properties that impart oil, water, stain and soil repellency; chemical and thermal stability; and friction reduction to a range of products. PFAS chemistry was discovered in the late 1930s and, since the 1950s, PFAS have been used in various industries and many common consumer products.

PFAS can be found in food, food packaging, commercial household products, firefighting foams, industrial workplaces and living organisms. In Wisconsin, PFAS have been detected in surface water and groundwater—including drinking water supply wells—in several parts of the state.

"We aren't sure how widespread it is yet," said Adam DeWeese, chief of the Wisconsin DNR's Public Water Supply Section. PFAS chemicals have been detected in a few water systems and not in others. More testing is needed.

What will a regulation do?
During 2019, DNR began the process of revising the state's Safe Drinking Water rule to add PFAS chemicals to the Synthetic Organic Contaminants regulated and establish a MCL standard for them. After the standard takes effect, community and non-transient non-community public water systems in Wisconsin will be required to monitor for the presence of PFAS in drinking water supplies. Systems with PFAS levels above the MCL may also have to take action to reduce levels in their water supply.

The proposed drinking water standard will apply to MC, OC and NN public water systems, and all the consumers of water supplied by these systems will benefit. DNR has been working with public water systems to implement the proposed rule effectively and to identify financial assistance opportunities for systems that may need help.

What happens next?
In 2019, EPA released its PFAS Action Plan, and one of the primary actions is evaluating the need for a MCL determination as part of the federal Safe Drinking Water Act. DeWeese said EPA has decided to go forward with seeing it into law. "But we don't know for certain when they will do that," he said.

Like many other states, Wisconsin isn't waiting. The Department of Health Services reviewed scientific information and, based on its findings, DNR will propose a drinking water standard for PFOS and PFOA of 20 parts per trillion (individually or combined). The rulemaking process is lengthy but the initial stages began in 2019.

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 sample results exceed permissible limits for contaminants.

The majority of Wisconsin's public water systems met all their regulatory requirements during 2019. This section of the 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 2019, more than 99 percent of Wisconsin's public water systems provided water that met all

the health-based MCL standards for regulated contaminants. Only 101 systems 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 2019.

- ***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 a possible pathway for contamination. *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 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 to "find" sources of microbial contamination and "fix" the issues allowing contaminants to enter the water system.

First, follow-up samples are collected to confirm the presence of coliform bacteria and specifically verify 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 the "find and fix" approach to ensure that bacteria do not persist in the drinking water at these facilities. More than 425 assessments were completed during 2019. 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 a water supply (see Table A-1 in Appendix A for a description of the MCL). During 2019, there were 31 public water systems in Wisconsin (only 0.27 percent) with MCL violations for *E. coli*. 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 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 11,525 public water systems are required to monitor for nitrate and nitrite in drinking water. During 2019, violations for exceeding the nitrate MCL occurred at 35 public water systems, and one system exceeded the nitrite MCL. This is similar to the number of systems with exceedances during the previous year. These water systems are located throughout the state.

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 certain conditions are met. Water systems 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 2019

water system status	number of systems
continuing operation started before 2019	256
continuing operation started during 2019	32
continuing operation ended during 2019	51
total number of systems on continuing operation	237

Wisconsin currently has almost 240 transient non-community water systems on "continuing operation" (Table 1). Some have remained in that status for 25 years. During 2019, another 32 TN systems exceeded the nitrate MCL and were allowed to use the continuing operation option (similar to the previous year). During the year, 51 systems went off continuing operation. Although the overall number of systems decreased, it has remained above 200 for years, 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 regularly 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 (1,994 of Wisconsin's water systems). During 2019, there were 15 systems with violations for exceeding the arsenic MCL (0.01 mg/L). These water systems are located in various areas, but most are in southern Wisconsin.

- ***Radionuclides***

  Radium and uranium are elements that occur naturally in rock formations in Wisconsin and that 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 (serving residential consumers) are required to monitor for radionuclides. Of the 1,055 community water systems in Wisconsin, 14 (or 1.3 percent) had violations for exceeding the MCL standards for radium, uranium and/or alpha particle emitters during 2019. 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 also

Table 2. Water systems with action level exceedances during 2019

contaminant	number of water systems			
	MC	OC	NN	total
copper	2	2	25	29
lead	6	7	31	44

need to recommend and implement corrosion control to reduce concentrations of lead and copper in their drinking water. During 2019, there were 44 public water systems that exceeded the lead action level and 29 that exceeded the action level for copper. This represents an increase from the previous year.

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 Municipal Water Systems Expand Efforts to Protect Consumers from Lead and Copper

To protect consumers from exposure to lead and copper, MC, OC and NN public water systems monitor for these contaminants. Some systems also add corrosion inhibitor to their water to minimize release of lead and copper from pipes and plumbing materials. "Optimal" corrosion control treatment means minimizing the amount of lead and copper that corrodes into drinking water at consumers' taps to the greatest extent possible.

The Safe Drinking Water Act requires Wisconsin's municipal water systems to maintain optimal corrosion control treatment. All large MC systems are required to complete corrosion studies and install optimal corrosion control based on study results. Smaller systems may be required to conduct corrosion control studies to determine optimal corrosion control treatment.

For several years, DNR has been working with the state's largest systems to re-evaluate their corrosion control treatments by conducting a corrosion control study, review water chemistry and optimize those treatments. During 2019, these efforts expanded to address water quality at some of the state's smaller municipal systems too.

Smaller municipal systems that have lead service lines but do not add corrosion inhibitor are undertaking an effort to conduct additional monitoring of their water chemistry. Approximately 40 systems around the state will participate. Preparation began in 2019, and the sampling activities will occur during 2020.

EPA has been updating the Lead and Copper Rule, and it published draft proposed revisions during 2019. Although the rulemaking process has not finished yet, DNR has already started helping water systems prepare for possible new requirements. These initiatives are getting underway during 2020. Efforts include helping municipal systems understand how to conduct accurate inventories of their service line materials and reviewing municipal monitoring plans to ensure that sites used for collecting lead and copper samples represent locations representative of worst-case scenario lead and copper exposure.

These continuing collaborative efforts are important examples of Wisconsin's drinking water professionals working together 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 2019, there were 1,036 M/R violations, which occurred at 631 of the state's 11,525 public water systems (5.5 percent). Most often, these violations resulted from failure to collect required samples, samples collected late, and failure to notify consumers of lead and copper results. Table B-2 in Appendix B summarizes the M/R violations that occurred during 2019.

Treatment technique violations

Some parts of the SDWA establish "treatment technique" requirements instead of MCL standards for controlling 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.

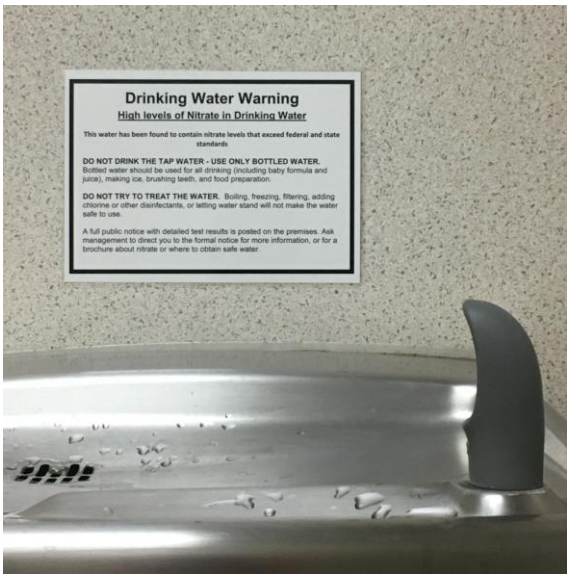
Among Wisconsin's 11,525 public water systems, 84 systems had treatment technique violations during 2019, so 99.3 percent of the state's systems met these health-based requirements. Most of the treatment technique violations resulted from failing to meet deadlines for correcting defects or problems identified 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 2019.

Notification and reporting violations

Informing consumers about their drinking water is an important aspect 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 2019.

- ***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 822 of Wisconsin's public water systems (7.1 percent of all systems) during 2019, which is an improvement over the previous year. More than 80 percent of all 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. This is called the Consumer Confidence Report (or CCR) and it 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 1,055 community water systems, only 32 (3.0 percent) got violations in 2019 for failing to distribute a CCR or for reporting late.

- ***Notification violations***

  Identifying significant deficiencies at public water systems is an important method for protecting public health. These are noted during inspections. Water systems are required to correct significant deficiencies 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 2019, only 18 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 $10.6 million in funding during 2019, 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.

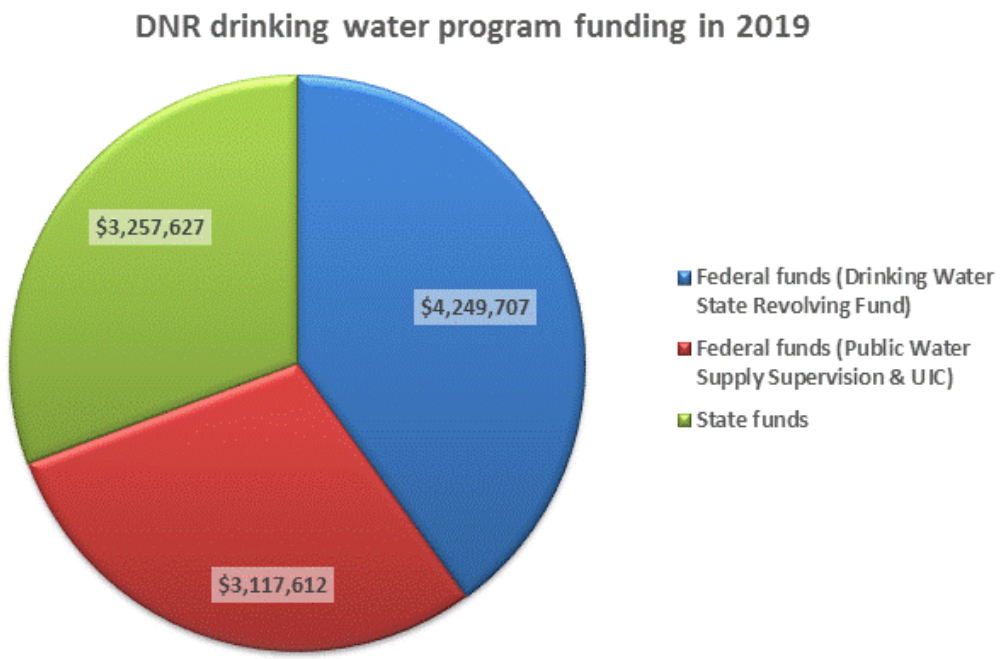


Figure 3. Funding for DNR's public water supply program comes from both federal and state sources. During 2019, the program had 80 full-time staff.

Inspections & assessments

Inspecting public water systems is one of DNR's central responsibilities and 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 2,634 sanitary surveys throughout Wisconsin (Figure 4).

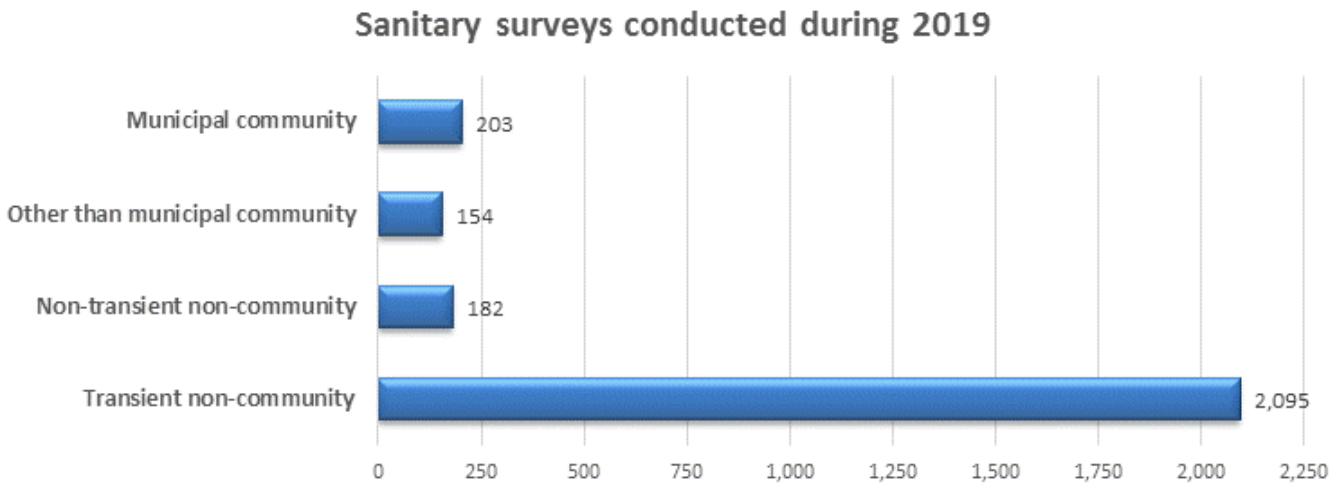


Figure 4. DNR and its partners completed 2,634 sanitary surveys in 2019.

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

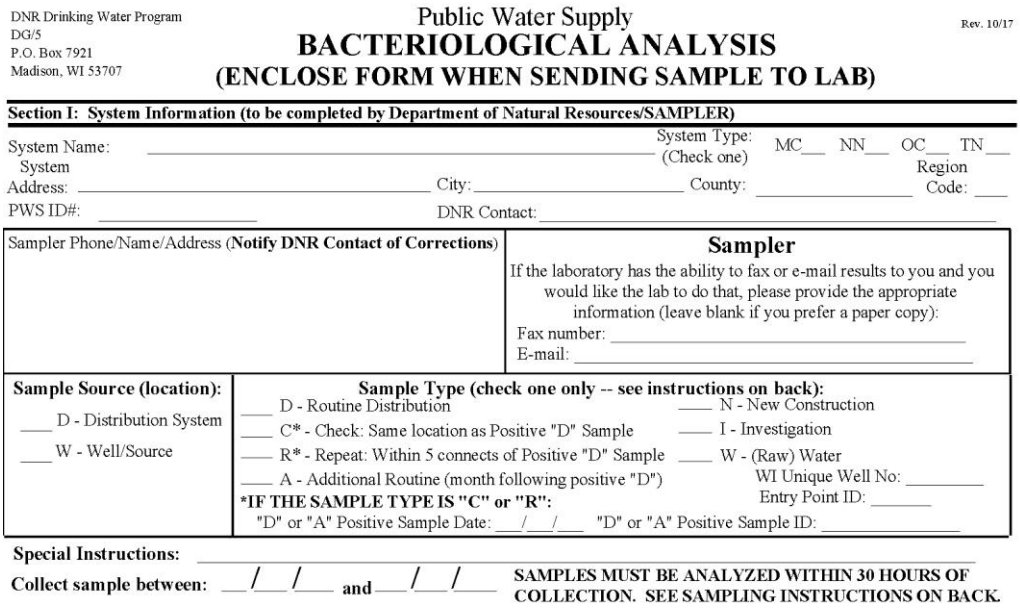
needed to remedy any sanitary defects. During 2019, the DNR and its contracted partners performed 427 of these assessments.

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 6,872 annual site visits during 2019 to help water systems meet their requirements and qualify for reduced monitoring schedules.

Monitoring assistance

Compliance with monitoring requirements is essential to protecting drinking water quality for Wisconsin citizens and visitors. Water systems collect and analyze samples throughout the year to measure the quality of drinking water, and the DNR provides monitoring assistance to all operating systems in the state.

Monitoring assistance includes providing monitoring schedules and laboratory submission forms to water systems. DNR sends monitoring schedules twice yearly to community and non-transient non-community water systems to help ensure that sampling requirements are met. Preliminary schedules are sent four months prior to the start of a compliance year (which is helpful for planning purposes), and final schedules are delivered at the start of each year.



DNR Drinking Water Program
DG/5
P.O. Box 7921
Madison, WI 53707

Public Water Supply
BACTERIOLOGICAL ANALYSIS
(ENCLOSE FORM WHEN SENDING SAMPLE TO LAB)

Rev. 10/17

Section I: System Information (to be completed by Department of Natural Resources/SAMPLER)

System Name: _____ System Type: (Check one) MC___ NN___ OC___ TN___
System Address: _____ City: _____ County: _____ Region Code: ___
PWS ID#: _____ DNR Contact: _____

Sampler Phone/Name/Address (**Notify DNR Contact of Corrections**)

Sampler
If the laboratory has the ability to fax or e-mail results to you and you would like the lab to do that, please provide the appropriate information (leave blank if you prefer a paper copy):
Fax number: _____
E-mail: _____

Sample Source (location):
___ D - Distribution System
___ W - Well/Source

Sample Type (check one only -- see instructions on back):
___ D - Routine Distribution
___ C* - Check: Same location as Positive "D" Sample
___ R* - Repeat: Within 5 connects of Positive "D" Sample
___ A - Additional Routine (month following positive "D")
___ N - New Construction
___ I - Investigation
___ W - (Raw) Water
WI Unique Well No: _____
Entry Point ID: _____
***IF THE SAMPLE TYPE IS "C" or "R":**
"D" or "A" Positive Sample Date: ___/___/___ "D" or "A" Positive Sample ID: _____

Special Instructions: _____
Collect sample between: ___/___/___ **and** ___/___/___ **SAMPLES MUST BE ANALYZED WITHIN 30 HOURS OF COLLECTION. SEE SAMPLING INSTRUCTIONS ON BACK.**

Public water systems also receive all of their laboratory submission forms from the DNR. This ensures that they have the documentation necessary to complete their monitoring requirements. The forms contain information to notify laboratories about the contaminant(s) being monitored, the monitoring period, sample site location, sample instructions, sample collector and DNR representative.

DNR distributes updated monitoring site plans to all community and non-transient non-community systems annually. This helps to ensure that systems have current information about their approved monitoring site locations. Monitoring at approved locations is necessary for properly and consistently assessing drinking water quality.

DNR also distributes supplemental information annually to water systems that monitor for lead and copper. The information includes laboratory submission forms, instructions for sample collection, explanations of compliance determinations, forms for notifying consumers of sample results and certification forms for submitting information to DNR. This helps ensure that water systems collect samples properly, understand compliance determinations and inform residents of analytical results when samples are collected from their homes.

Community and non-transient non-community water systems are eligible for monitoring waivers, or reduced monitoring frequencies, based on an assessment of potential contaminant sources and well vulnerability. During the vulnerability evaluation, DNR reviews previous water quality results, groundwater proximity to potential contaminant sources, local geology and well construction.

Waivers are reviewed on a three-year cycle, and each year the DNR distributes monitoring assessment information to the systems eligible for waivers. The evaluations are used for determining the proper monitoring frequency for all regulated contaminants. This monitoring assessment process enables systems 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. It represents a "first line of defense" approach to protecting our drinking water. Wellhead protection 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 2019, 16 new wellhead protection plans were reviewed and approved by DNR.

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 help water systems return to 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. Usually, the DNR sends a written Notice of Noncompliance (NON) to public water systems when problems are identified. Often, action can be taken immediately to return to compliance.

When health-based violations occur—either because contaminants exceed the MCL standards or because deficiencies and defects are not corrected as required—the enforcement process is expedited so problems can be addressed. Water systems with MCL and TT violations receive Notices of Violation to begin the process of evaluating potential corrective actions and returning to compliance as soon as possible.

If health-based violations need to be resolved, or 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 may be followed by written compliance agreements, consent orders, and penalty orders. The enforcement process emphasizes voluntary agreements about the corrective 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.

Table 3 summarizes DNR's enforcement activity during 2019. Last year, DNR sent 1,645 Notice of Noncompliance letters but only 60 Notice of Violation letters, illustrating that most water systems resolved violations promptly after being notified of problems.

Table 3. Drinking water program enforcement activity during 2019

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.	1,645
Notice of Violation (NOV) sent	NOV notifies water system owner about a violation and schedules a meeting with DNR staff for more detailed discussion.	60
Enforcement conference held	Enforcement conferences are held to discuss the enforcement process, possible corrective actions and a timeline for returning to compliance.	36
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.	4
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.	13

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 almost $61 million in funding from the Safe Drinking Water Loan Program during 2019. 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, 506 projects in Wisconsin have received more than $743 million in loans and principal forgiveness.

Last year's funding was comprised of $55.5 million in low interest loans and $5.5 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.

Wisconsin communities are using loan program funds for a variety of infrastructure improvements.

- The village of Bruce received $649,487 to replace Wellhouse #1 and a connecting main.
- The village of Bear Creek received $815,994 to construct a new well, wellhouse and connecting main and help provide firm pumping capacity.
- The city of Milwaukee received $16,210,551 to replace water mains throughout the city.
- The village of Lomira received $2,196,150 for constructing a booster station to create a new high pressure zone and provide service to an additional residential area with water quality issues.
- The village of Alma Center received $1,018,808 to construct a new wellhouse and connecting main to help provide firm pumping capacity.
- The city of Richland Center received $2,536,797 to construct a new ground reservoir and transmission main.

Appendix C lists all the communities that were awarded funding during 2019.

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.

- County health departments are part of a contract program to perform inspections, assessments and water quality sampling at thousands of restaurants, parks, churches, and other transient non-community systems around the state. County agents conduct routine monitoring and all triggered sampling for 73 percent of the state's TN systems. In 2019, transient non-community system owners in 53 counties received some form of assistance from county sanitarians. These locally-based sanitarians performed more than 1,500 sanitary surveys, almost 5,500 annual site visits and 250 assessments at TN 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 problems that occur. WRWA provides technical assistance on a wide variety of topics, including new and seasonal water system startup, water loss, reporting and completing compliance documents, monitoring site assessments, sampling and monitoring, contaminant tracing and investigation, and winter operations. During 2019, WRWA delivered 5,816 monitoring reminders and performed 669 on-site visits at other-than-municipal community and non-transient non-community water systems all around the state. DNR has a long-running partnership with WRWA, and both organizations regularly share feedback on how to improve their assistance to the state's small public water systems.
- Moraine Park Technical College and Wisconsin Rural Water Association provide training for water system operators to obtain their required continuing education. The DNR contracts with MPTC to provide training that allows small water system operators to earn their required continuing education credits for certification renewal. The DNR contracts with WRWA to provide hopeful operators with exam preparation training and help them pass the exam that is required to become certified by the state. The DNR also maintains a longstanding contract with MPTC to provide both continuing education and exam preparation for municipal waterworks operators. Both organizations are essential to helping build and develop a robust and knowledgeable drinking water workforce for our state.

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—Collective needs of Wisconsin's largest community water systems, serving populations greater than 100,000 (4 water systems statewide).
- $3.9 billion—Needs of the state's community water systems serving 3,300 to 100,000 people (174 of Wisconsin's 1,055 community water systems serve populations in this range).
- $1.7 billion—Needs of Wisconsin's smallest community water systems, serving fewer than 3,300 people (877, or 83 percent, of Wisconsin's community water systems serve small populations).
- $612 million—Needs of the not-for-profit, non-community water systems in the state.

EPA is working on the next Drinking Water Infrastructure Needs Survey and Assessment. It was delayed by a year, and information is being collected during 2020. The next survey is being expanded to address several new issues.

- 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—most of Wisconsin's community water systems serve 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.
- States will be asked to estimate the costs associated with replacing privately-owned portions of lead service lines (in addition to the parts that are publicly owned).
- For the first time, EPA will add a questionnaire about workforce issues. The operator workforce is aging, and the needs survey will gather information to address concerns about upcoming retirements and how to provide enough operators in coming years to replace this aging workforce.

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 2019

The following tables summarize violations during 2019 at all of Wisconsin's public water systems. The tables include violations of MCL standards, monitoring and reporting requirements, treatment technique requirements, and notification requirements.

Table B-1. Maximum Contaminant Level violations during 2019

contaminant	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
MICROBIAL CONTAMINANTS	**32**	**1**	**1**	**3**	**27**	**39**
Total coliform bacteria					1	1
E. coli bacteria		1	1	3	26	38
INORGANIC CONTAMINANTS	**52**	**4**	**3**	**22**	**23**	**102**
antimony				1	n/a	3
arsenic		1	1	13	n/a	61
nitrate		3	2	8	22†	37
nitrite					1	1
RADIONUCLIDES	**14**	**13**	**1**	**n/a**	**n/a**	**299**
combined radium 226+228		12				175
gross alpha particle activity		4				122
uranium			1			2
DISINFECTION BYPRODUCTS	**3**	**3**	**0**	**0**	**n/a**	**7**
total trihalomethanes		3				7
VOLATILE ORGANIC CONTAMINANTS	**2**	**0**	**0**	**2**	**n/a**	**2**
1,2-dichloroethane				1		1
trichloroethylene				1		1
Overall totals	**101**	**20**	**5**	**27**	**49**	**449**

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

† An additional 237 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 2019

contaminant	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
MICROBIAL CONTAMINANTS	**475**	**7**	**48**	**54**	**366**	**564**
Ground Water Rule			4	4	59	70
Total Coliform Rule					1	1
Revised Total Coliform Rule monitoring		7	44	50	287	473
Revised Total Coliform Rule reporting					19	20
INORGANIC CONTAMINANTS	**256**	**48**	**54**	**58**	**96**	**364**
arsenic		1	5	9	n/a	18
lead and copper		40	46	45	n/a	190
nitrate and nitrite		8	12	9	96	144 (158 individual contaminants)
other inorganic contaminants (13 contaminants in group)			4	5	n/a	12 (238 individual contaminants)
RADIONUCLIDES	**16**	**12**	**4**	n/a	n/a	**18** (57 individual contaminants)
DISINFECTANTS & DISINFECTION BYPRODUCTS	**33**	**27**	**2**	**4**	n/a	**69**
residual disinfectants		1				1
disinfection byproducts		26	2	4		68
SYNTHETIC ORGANIC CONTAMINANTS (30 contaminants in group)	**3**	**0**	**2**	**1**	n/a	**4** (70 individual contaminants)
VOLATILE ORGANIC CONTAMINANTS (21 contaminants in group)	**17**	**4**	**2**	**11**	n/a	**17** (397 individual contaminants)
Overall totals	**631**	**87**	**93**	**100**	**351**	**1,036**

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

Table B-3. Treatment technique violations during 2019

contaminant	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
MICROBIAL CONTAMINANTS	**55**	**14**	**7**	**0**	**34**	**81**
Ground Water Rule	25	14	5	0	6	43
Revised Total Coliform Rule	31	0	2	0	29	38
INORGANIC CONTAMINANTS	**25**	**6**	**5**	**14**	n/a	**27**
Lead and Copper Rule		6	5	14		
DISINFECTANTS & DISINFECTION BYPRODUCTS	**4**	**3**	**1**		n/a	**4**
Overall totals	**84**	**23**	**12**	**14**	**34**	**112**

*Some water systems may have violations in multiple categories.

Table B-4. Notification and other violations during 2019

requirement	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
Consumer Confidence Report	32	13	19	n/a	n/a	34
Ground Water Rule	18	5	0	1	12	23
Public Notice	822	61	54	82	625	1,520
Overall totals	**858**	**73**	**69**	**83**	**633**	**1,577**

*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 2019

community	principal forgiveness funding	loan funding	total funding	project description
Alma Center (village)	$500,000	$518,808	$1,018,808	Construct pumphouse at well 2 and connecting main
Augusta (city)	$500,000	$1,576,859	$2,076,859	Replace water mains and services on Lincoln St; GIS, SCADA
Barron (city)	$453,573	$1,058,336	$1,511,909	Construct elevated storage tank and SCADA
Bear Creek (village)	$367,198	$448,796	$815,994	Construct well 3
Bloomington (village)	$442,288	$540,573	$982,861	Water main replacements on Fourth St, Front St, Union St and Canal St
Bruce (village)	$389,693	$259,794	$649,487	Demolition and replacement of wellhouse 1 and new connecting main
Chetek (city)	$262,478	$320,806	$583,284	Water main replacement and addition of hydrants on Banks & Pine streets; additional crossing under Chetek River on CTH SS
Cobb (village)		$543,815	$543,815	Construct well 4, including pumphouse, chemical addition and connecting main
Colby (city)	$175,225	$214,162	$389,387	Transmission of water from wells 9 and 12 to water treatment plant for blending; process control and SCADA upgrades
Edgerton (city)		$234,605	$234,605	Rehabilitate water tower
Highland (village)	$23,374	$416,638	$440,012	Water main replacements on Prospect St, Isabell Ct and in two village easements
Ladysmith (city)		$1,313,529	$1,313,529	Water main replacements on Fritz, Worden and Summit avenues
Lomira (village)	$500,000	$1,696,150	$2,196,150	Construct booster station to create new high pressure zone and provide service to additional area within village limits
Lyndon Station (village)	$500,000	$355,710	$855,710	Construct well 3; abandon well 1
Mayville (city)		$92,206	$92,206	Water main replacements on State Highway 28/67
Milwaukee (city)		$16,210,551	$16,210,551	water main replacements
New Berlin (city)		$1,206,314	$1,206,314	Replace aging water mains in Greenridge neighborhood
Omro (city)	$433,739	$1,012,057	$1,445,796	Construct well 3 and connecting water main
Omro (city)		$1,118,358	$1,118,358	Replace water mains on Decatur St, Iowa St, Pine St, Webster Ave and Poygan Rd
Plover (village)		$3,130,291	$3,130,291	Upgrade water treatment plant including replacement of anion exchange nitrate removal system; rehabilitate well 2

community	principal forgiveness funding	loan funding	total funding	project description
Rhinelander (city)		$5,677,375	$5,677,375	Replacement of aging water mains
Richland Center (city)		$2,536,797	$2,536,797	Construct new 500,000 gallon ground storage reservoir, incuding SCADA and transmission main
Rock Springs (village)		$329,322	$329,322	Water main replacements on Montgomery, Hill, Smythe and Bender streets
Somerset (village)		$1,141,266	$1,141,266	Construct well 5, wellhouse and connecting main; abandon well 4
Thorp (city)	$248,838	$304,135	$552,973	Construct addition to water treatment plant to house new pressure filters for removal of iron and manganese
Tomahawk (city)	$451,956	$877,790	$1,329,746	Upgrade wellhouses 4 and 5, including addition of new emergency generator
Two Rivers (city)	$236,727	$552,363	$789,090	Replacement of water mains and public portions of services, including lead service lines
Waukesha (city)		$8,863,261	$8,863,261	Water main replacements at various locations and construction of underground RR crossing
Waukesha (city)		$2,903,659	$2,903,659	Replace water main along Main St from Lombardi Ave to Manhattan Dr
Total 2019 funding	**$5,485,089**	**$55,454,326**	**$60,939,415**	