2023 ANNUAL DRINKING WATER REPORT

Wisconsin Public Water Systems

Photo Credit: iStock/Yana Tatevosian

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Drinking Water and Groundwater Program

WISCONSIN DEPT. OF NATURAL RESOURCES

DNR.WI.GOV

PUB-DG-045 2024
June 2024

Obtaining Copies Of Wisconsin's Report

The *2023 Annual Drinking Water Report* is available to the public. Use the contact information below to obtain copies. The report is also available on DNR's website, dnr.wi.gov.

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Abbreviations

ALE	action level exceedance (lead and copper)
ARPA	American Rescue Plan Act
BIL	Bipartisan Infrastructure Law
CCR	Consumer Confidence Report
DNR	Wisconsin Department of Natural Resources
EPA	US Environmental Protection Agency
IOC	inorganic contaminant
LSL	lead service line
MC	municipal community water system
MCL	maximum contaminant level
mg/L	milligrams per liter
MPTC	Moraine Park Technical College
MR	monitoring & reporting
ng/L	nanograms per liter
NN	non-transient non-community water system
NON	Notice of Noncompliance
NOV	Notice of Violation
OC	other-than-municipal community water system
PFAS	perfluoroalkyl and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonic acid
PN	public notice
RCAP	Rural Community Assistance Program
SDWA	Safe Drinking Water Act
SDWLP	Safe Drinking Water Loan Program
SOC	synthetic organic contaminant
TN	transient non-community water system
TT	treatment technique
VOC	volatile organic contaminant
WHP	wellhead protection
WRWA	Wisconsin Rural Water Association

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2023 IN REVIEW

The DNR works to ensure that everyone in the state has access to safe and sustainable water supplies and the state's water resources are protected.

Strong state and federal regulations combined with the collaborative efforts and hard work of many people—including the 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 manage its drinking water resources successfully.

Report At A Glance

The DNR's *2023 Annual Drinking Water Report* summarizes compliance with the drinking water requirements for the year 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 2023, more than 99% of Wisconsin's public water systems provided water that met all health-based contaminant standards.
- The DNR awarded more than $60 million in financial assistance through the Safe Drinking Water Loan Program during 2023, helping 31 communities around Wisconsin make needed infrastructure improvements to their drinking water systems.
- The DNR awarded almost $5 million through the Private Lead Service Line Replacement Program, allowing 17 communities around the state to replace lead service lines last year.
- The DNR's partners provided compliance assistance, training and technical assistance to public water system owners and operators throughout the state during 2023.

The DNR works to protect the state's water resources and ensure that everyone in Wisconsin has access to safe and sustainable water supplies.

THE BASICS

Requirements for public water systems come from the Safe Drinking Water Act (SDWA), which was first passed in 1974 and established national limits for contaminants in drinking water to protect public health. These limits, known as Maximum Contaminant Levels (MCLs), are health-based standards specific to each contaminant.

The SDWA also specifies how often public water systems must test their water for contaminants and report the results to the state, the EPA and the public. Testing or "monitoring" requirements depend on a water system's size, the population served and the vulnerability of the water source to contamination. In general, water systems serving residential consumers and larger populations have more extensive monitoring and reporting requirements. Finally, the SDWA requires public water systems to notify their consumers—using clear and understandable language—when contaminants are detected or violations occur.

SDWA 50th Anniversary

Photo Credit: iStock/kunst-mp

The Safe Drinking Water Act (SDWA) will celebrate its 50th anniversary in 2024. This landmark law is designed to safeguard public health by setting national drinking water quality standards.

- The Safe Drinking Water Act was signed into law by President Gerald Ford on December 16, 1974.
- In the beginning, 22 contaminants were regulated under the SDWA.
- Today, public health is protected by federal drinking water standards for more than 90 contaminants.
- Amendments to the SDWA have expanded beyond the basic public health protections by eliminating lead pipes, creating a revolving loan fund to help communities make infrastructure improvements and increasing communication between water systems and their consumers.
- In 1993, Wisconsin experienced a disease outbreak in Milwaukee, caused by a microscopic parasite called *Cryptosporidium*, that affected more than 400,000 people and resulted in 104 recorded deaths. New upgrades to surface water treatment that were instituted after the outbreak became new treatment requirements under the SDWA.

Before the SDWA, more than 40% of our nation's drinking water systems failed to meet the most basic health standards. Today, more than 90% of the U.S. population is served by community water systems that meet all health-based standards. These accomplishments are possible because of forward-thinking legislation and water professionals working in partnership.

Did You Know?

The vast majority of Wisconsin's public water systems rely on groundwater pumped from wells. However, 58 systems use Wisconsin lakes to provide drinking water to their consumers. These surface water systems serve some of the state's largest communities, including Milwaukee and Green Bay. So, while more than 99% of the state's public water systems use groundwater sources, surface water systems serve almost one-third of the state's population.

Water Sources for Public Water Systems

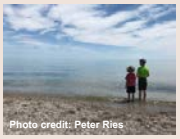


Photo credit: Peter Ries

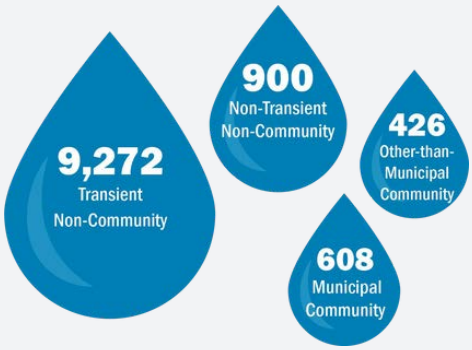
58 Surface Water


Photo credit: DNR

11,148 Groundwater

Wisconsin's Public Water Systems

Wisconsin had 11,206 public water systems in 2023, the largest number of any state.



Community water systems serve water to people where they live. Wisconsin has 1,034 community water systems that serve 70% of the state's residential population. The remaining Wisconsin residents receive their water from private domestic wells.

Municipal Community (MC)	Other-Than-Municipal (OC)
Owned by cities, villages, towns or sanitary districts. This group also includes care and correctional facilities owned by counties or municipalities.	Serve residents from privately-owned wells. The state's OC water systems include mobile home parks, apartment buildings, condominium complexes and long-term care facilities.

Non-community water systems serve water to people where they work, attend school or gather for food or activities. The wells supplying these systems are privately owned.

Non-Transient Non-Community (NN)	Transient Non-Community (TN)
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.	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.

MONITORING AND TESTING FOR CONTAMINANTS IN DRINKING WATER

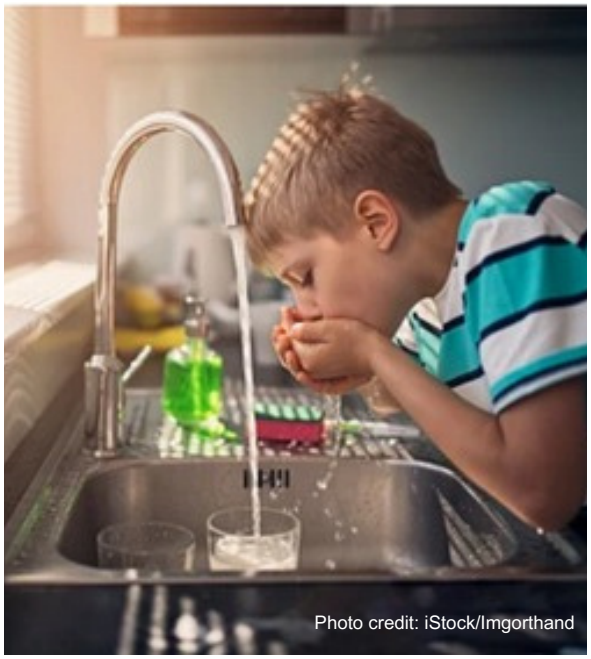


Photo credit: iStock/Imgorthand

Protecting drinking water supplies depends on monitoring. All public water systems are required to test their water for contaminants and report the results to the DNR and consumers. Monitoring determines whether a system's water quality meets all Maximum Contaminant Level (MCL) limits.

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. Chronic contaminants cause long-term health risks. Appendix A lists all the contaminants regulated in Wisconsin and their health-based standards or MCLs.

Some public water systems may treat their water to meet MCL limits. Most treatments reduce or inactivate contaminants in the water. One common treatment is disinfection, which inactivates microbial contaminants so they cannot make us sick. Disinfecting drinking water has revolutionized our lives by virtually eliminating diseases that used to cause many deaths, like typhoid fever.


Photo credit: DNR

Action Levels For Certain Contaminants

The SDWA establishes "action levels" for two contaminants: lead and copper. Exceeding an action level does not cause a violation, but does require a water system to conduct additional monitoring and take steps to control levels of the contaminant in the drinking water supply. The action levels for lead and copper are listed in Table A-2 of Appendix A.

Secondary Standards

The SDWA sets aesthetic or "secondary" standards for additional contaminants. These substances may cause an unpleasant smell, taste, appearance, stained sinks or discolored clothes when they exceed certain levels. Iron, manganese and sulfate are included in this group. Public water systems may be required to perform additional monitoring or take corrective action if they exceed secondary standards. Table A-6 in Appendix A lists the secondary standards.

COMPLIANCE WITH DRINKING WATER REQUIREMENTS

Complying with drinking water requirements involves many things. Violations can occur when contaminant levels exceed permissible limits, deadlines are not met, water samples are not collected on time, tasks are not completed on time or public notices are not delivered. Table 1 is a quick reference for the basic types of drinking water violations.

Table 1. What Do Drinking Water Violations Mean?

Maximum contaminant level (MCL) violations	MCL violations occur when contaminants are detected at levels above what is permissible for protecting public health (i.e., the MCL standard).
Monitoring and reporting (MR) violations	MR violations occur when water samples are not collected on time or analyzed using approved methods or when consumers are not notified of lead and copper results from samples collected in their homes.
Treatment technique (TT) violations	TT violations occur when water systems do not employ the required processes or treatments to reduce exposure to contaminants. They include failure to correct “significant deficiencies” or “sanitary defects” and failure to follow approved start-up procedures for seasonal operation.
Notification violations	Notification violations occur when water systems do not provide required public notices, deliver Consumer Confidence Reports, or notify DNR when significant deficiencies are corrected.

The majority of Wisconsin’s public water systems (88.5%) met their regulatory requirements during 2023. Most violations that did occur were for failing to meet monitoring, reporting and notification requirements. This section of the report summarizes compliance data for last year.

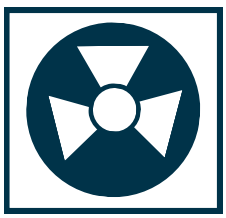
Maximum Contaminant Level (MCL) Violations

During 2023, more than 99% of Wisconsin’s public water systems provided water that met all the health-based MCL standards for regulated contaminants. Only 70 systems (out of 11,206 statewide) experienced MCL exceedances. Table B-1 in Appendix B summarizes the MCL violations during 2023.

The contaminants encountered most frequently in Wisconsin were bacteria, nitrate, arsenic and radionuclides.

Exceeding a maximum contaminant level does not necessarily mean that consumers experienced adverse health effects from drinking the water, but it does require a water system to notify consumers and take action to correct the problem.

The DNR works with public water systems that have MCL violations and action level exceedances to help them correct problems and return to compliance as soon as possible. Corrective actions can include disinfection, reconstructing an existing well, drilling a new well to obtain an alternate water source or installing a treatment system.



- ***Radionuclides***

Health risks from radium and uranium come from long-term exposure. Exposure over a lifetime could result in an elevated risk for cancer and kidney toxicity. Radionuclides occur naturally in rock formations in Wisconsin and are detected as contaminants of some drinking water supplies here. Radionuclide standards apply to community (MC and OC) water systems serving residential consumers. Of the 1,034 community water systems statewide, 11 (or 1.06%) had violations for exceeding radionuclide MCLs during 2023.

• *Microbial Contaminants*

Escherichia coli (or *E. coli*) is an acute contaminant because a single exposure can make people ill. Exposure can cause diarrhea, nausea, cramps and headaches but may have more serious effects on vulnerable populations, including infants, young children and people with compromised immune systems. *E. coli* bacteria indicate that drinking water is contaminated by human or animal waste.

When these bacteria are detected in a drinking water sample, systems are required to take action to "find" sources of contamination and "fix" the issues. Follow-up work at affected systems has included identifying the sources of contamination, correcting defects and, in some cases, switching to a new water source.

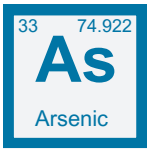
All of Wisconsin's public water systems are required to monitor for coliform bacteria. During 2023, Wisconsin had 24 public water systems (only 0.21%) with MCL violations for *E. coli*. (Table A-1 in Appendix A has more details about the MCL.)

• *Arsenic*

Arsenic's health effects come from long-term exposure and include increased risk of skin cancer; arsenic has also been linked to cancers of the lungs, bladder, liver, kidney and colon. 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.

Arsenic occurs naturally in some rock formations in Wisconsin and also is found in drinking water supplies here. Arsenic has no taste or odor, so testing is the only way to detect it in drinking water.

During 2023, there were 8 water systems (0.41% of the systems regulated for this contaminant) with violations for exceeding the arsenic standard (0.01 milligrams per liter or mg/L).



• *Nitrate And Nitrite*

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," deprives infants' blood of oxygen and can be fatal in extreme cases. In addition, there is evidence of a link between nitrate exposure during early pregnancy and certain birth defects. Consuming water with high nitrate levels has been linked to chronic diseases in adults also, including increased cancer risk, because nitrate gets converted within the human body to compounds that are known carcinogens.

Nitrate is the most widespread inorganic contaminant of drinking water here in Wisconsin. Because it is water-soluble, nitrate can move easily into the groundwater. Sources of nitrate and nitrite include agricultural fertilizers and animal wastes, according to the Wisconsin Groundwater Coordinating Council. Nitrate contamination is an ongoing challenge for water systems in Wisconsin.

All of Wisconsin's public water systems are required to monitor for nitrate and nitrite. During 2023, violations for exceeding the nitrate MCL occurred at 20 public water systems (0.18% of all systems).

223 TN water systems were operating with nitrate levels above the MCL during 2023.

Transient non-community systems may be allowed to operate with water that has nitrate above the MCL of 10 mg/L but below 20 mg/L, providing certain conditions are met. Wisconsin had 223 transient non-community water systems using this "continuing operation" provision during part or all of 2023.

West Koshkonong Lutheran Church Chooses Reverse Osmosis

The West Koshkonong Lutheran Church is a transient non-community water system in rural Stoughton established back in 1844. Since its origin, the church has had multiple wells; the latest drilled in 1998. The church has had nitrate levels that fluctuated between 10 and 20 mg/L for almost 20 years, but the level increased to 20.8 mg/L in late 2023.

The church council and property committee discussed options with the DNR, well drillers and water treatment system contractors and researched neighboring rural wells, but the most desirable approach, drilling a new well, was not a good fit for their congregation. Neighboring uphill wells also had high nitrate levels. Nancy Borth, church council president, explained that they had limited space available on church grounds and had to work around septic systems, a parking lot and even graves. The church decided its best option was to install a water treatment system. The church worked with Hellenbrand Water Center to develop a water treatment plan and received American Rescue Plan Act (ARPA) funding to add water treatment to their existing well.

Borth noted that, “The biggest challenge we had was to get all our property committee members on the same page, researching the best solution and dealing with change. Keeping up with communications (emails, phone calls, necessary paper work, etc.) was difficult for some.” Reverse osmosis was an expensive option, but the grant covered $16,000, leaving the church a balance of $24,000. This treatment is successful — the nitrate level after installation dropped below 1.0 mg/L. Borth praised the outcome. “These extremely low levels validate that we made the right decision. We no longer have to haul water for every event we host. No more back breaking just to make coffee. No more posted nitrate warning placards scaring members and visitors.”


Photo credit: Greg Parnow

Tackling Nitrate At Big River Escape Cabins

Big River Escape Riverside Cabins is a small, family-owned resort located along the Mississippi River that experienced chronic problems with high nitrate for more than a decade. This transient non-community (TN) water system was required to post notices alerting consumers that water with high nitrate is unsafe to drink, especially for infants and people who are or may become pregnant. Nitrate warning placards were posted at every water outlet in every cabin in the resort, as well as the fish cleaning sink and the resort’s website.

Greg Parnow, the resort owner since 2020, said that it was unsettling to have a well with high nitrate and bad for business. Parnow explains, “If someone was looking online to book a reservation and saw that a destination in Wisconsin included a drinking water warning and the one in Minnesota did not, the customer would book the Minnesota resort.” Many of Parnow’s customers are multi-generational families with members who could be at risk. Repeat customers prepared themselves by bringing bottled water.

Parnow heard about the DNR’s Well Compensation and Well Abandonment Grant Programs, funded through the American Rescue Plan Act (ARPA), and was eager to pursue that opportunity. For his TN water system in Buffalo City, the best option was to drill a deeper well, replacing an existing shallow well constructed in 1998. Parnow heard that the grant program involved a lot of paperwork, but he said applying was not difficult and certainly was worth the effort.

The biggest challenge turned out to be finding an available well driller. Busy schedules pushed back the drilling timeline to summer 2023. Tim Lysaker & Sons Well Drilling successfully drilled the new, deeper well at 105 feet. The nitrate level in the new well is below 2.5 mg/L, well under the maximum contaminant level of 10 mg/L.

Overall, Parnow is very pleased with the ARPA grant program that helped him tackle nitrate. Parnow says, “Why wouldn’t someone partake in this grant program to help everyone obtain safe drinking water? It’s the right thing to do.” His customers are pleased too and, so far, bookings are up this year.

•*Lead And Copper*

There is no safe level of lead exposure. Lead adversely impacts the health of people of all ages and genders and the health impacts are irreversible. Most significantly, lead impacts brain development of developing fetuses and small children. Copper is an essential nutrient, but long-term exposure to high levels can cause kidney and liver damage.

Lead and copper can leach into water as it flows through pipes and fixtures containing these elements (through the process of corrosion). Lead pipe, brass, chrome plated brass, copper plumbing and lead-based solder are all potential sources.

When an action level for lead or copper is exceeded, systems must provide special information to their consumers about health effects and steps people can take to reduce exposure. Systems also conduct additional monitoring to identify how water chemistry may contribute to lead and copper levels.

During 2023, 16 public water systems exceeded the lead action level, and four exceeded the action level for copper (Table 2).

Table 2. Action level exceedances during 2023

contaminant	number of water systems			
	MC	OC	NN	Total
Copper	2	1	1	4
Lead	10	0	6	16

Wisconsin Chosen As Lead Service Line Accelerator

Lead that gets into drinking water from pipes and faucets threatens the health of residents across Wisconsin, especially children. There is no safe level of lead exposure. In November 2023, Wisconsin was one of just four states selected by the U.S. Environmental Protection Agency to participate in a new water technical assistance (WaterTA) initiative called Lead Service Line Replacement Accelerators.

Ten Wisconsin communities are participating:
Beloit, Frederic, Kenosha, Manitowoc, Oshkosh, Racine, Superior, Wausau, West Allis and Wisconsin Rapids.

The EPA's technical assistance provider is working collaboratively to eliminate existing barriers and accelerate progress towards lead service line removal and replacement. Lead Service Line Accelerators communities receive support through the development of community engagement plans, lead service line inventories, lead service line replacement plans and State Revolving Funds application assistance.

Most exciting was that the EPA came to Wisconsin to announce the accelerators program and its participating states. The event was hosted by Kenosha Water Utility and Radhika Fox, the EPA's Assistant Administrator for Water, was joined by leaders from the accelerator communities and DNR Deputy Secretary, Steven Little. All the leaders participated in a round table discussion on challenges and opportunities for lead service line replacement.

Photo credit: EPA

Photo credit: DNR

Monitoring And Reporting Violations

To measure contaminant levels, public water systems are required to monitor and test their water during specific time periods. During 2023, there were 1,374 MR violations at 833 of the state's public water systems (7.4%). Most often, these violations resulted from failure to collect required samples on time and failure to notify consumers of lead and copper results. Table B-2 in Appendix B summarizes the MR violations that occurred during the year.

Treatment Technique Violations

Treatment techniques are actions that public water systems must follow to control or reduce levels of contaminants like lead and copper. When water systems don't complete required actions or fail to follow required procedures, treatment technique (TT) violations occur. TT violations signal the potential for health risks, since consumers cannot be certain whether their drinking water was treated or protected to reduce exposure to contaminants.

Among Wisconsin's 11,206 public water systems, 93 systems had treatment technique violations during 2023, meaning that 99.2% of the state's systems met these health-based requirements. Most TT violations resulted from not meeting deadlines for correcting defects or deficiencies identified during inspections. Table B-3 in Appendix B summarizes the treatment technique violations during 2023.

Notification And Reporting Violations

Communicating with consumers and the DNR is an important part of water system operation. Water systems are required to notify consumers when violations, emergencies or situations pose human health risks. Table B-4 in Appendix B summarizes all the notification violations that occurred during 2023.

- **Public notice violations -** Public notice violations happen when water systems fail to notify consumers about violations or other risks to human health. Public notice violations occurred at 560 of Wisconsin's public water systems last year (5% of all systems).

- **Consumer Confidence Report violations -** A Consumer Confidence Report (CCR) provides information to a system's residential consumers, including the sources of a system's water, levels of contaminants detected in the water and violations incurred by the water system during the previous year. CCR violations occur whenever water systems fail to deliver this annual report. Of Wisconsin's 1,034 community water systems, only 43 (or 4.2%) got violations last year for not delivering CCRs on time.

- **Notification violations -** Correcting significant deficiencies at public water systems protects public health. Water systems are required to notify the DNR when these corrective actions are completed. During 2023, only 5 water systems (or 0.04%) incurred violations for failing to provide notifications.

Overall Compliance With Drinking Water Requirements

Most of Wisconsin's public water systems met all their regulatory requirements in 2023 (88.5% overall). Compliance rates for the four types of public water systems are shown in Appendix B, Table B-5.

Photo credit: DNR

DNR EFFORTS TO PROTECT WISCONSIN'S DRINKING WATER

The DNR strives to achieve its mission to ensure the safety and availability of Wisconsin's drinking water supplies and protect the health of the state's water resources. To meet its responsibilities for implementing the SDWA, the DNR works in multiple ways to help Wisconsin's public water systems provide safe drinking water.

The first graduates of the Drinking Water and Groundwater Program's leadership training celebrate with Spritz, the program's mascot, during their recognition ceremony in December. Photo credit: DNR

Drinking water program funding & staff

Received $27 million in funding in 2023

Employed 90 full-time and 20 limited-term public water staff

Photo credit: DNR

Bipartisan Infrastructure Law

The federal Bipartisan Infrastructure Law (BIL), passed in late 2021, is a once-in-a-lifetime investment in the nation's drinking water infrastructure. The BIL allocates more than $35 billion toward safe drinking water nationwide over five years. For 2023, Wisconsin's share of the funding is more than $155 million:

- almost $36 million for the Safe Drinking Water Loan Program and implementation of the SDWA
- $81 million for lead service line replacement
- almost $13 million to address emerging contaminants, including PFAS
- $25 million available under the Emerging Contaminants in Small or Disadvantaged Communities Grant for OC and NN systems

Did You Know?

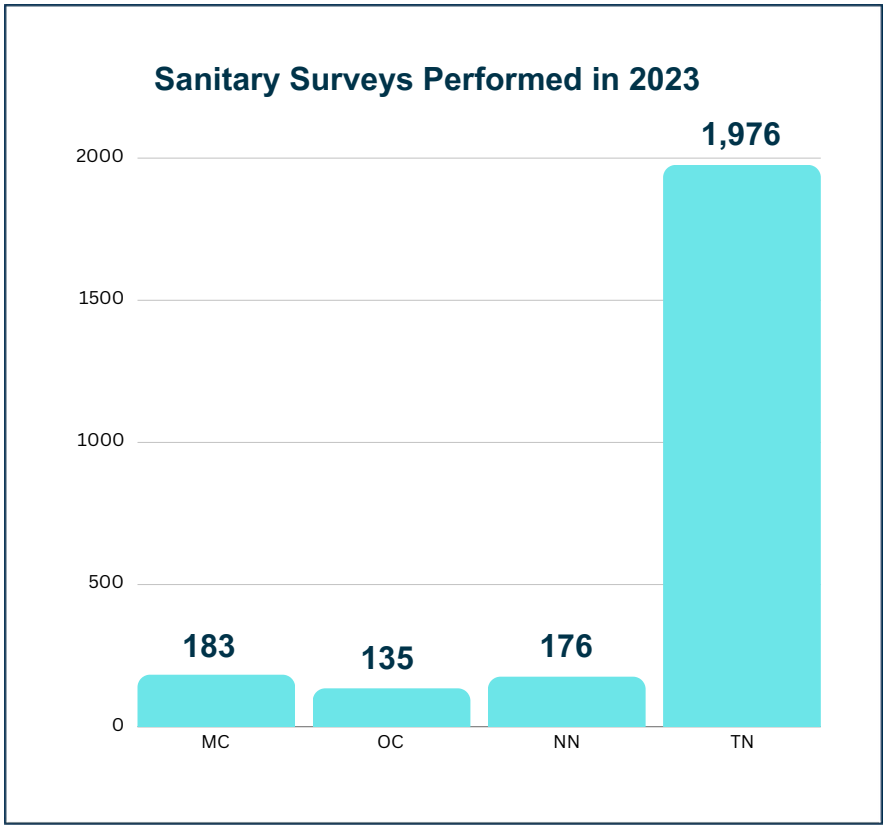
Extra funding from the BIL is only available for three more years. Now is the time for communities to get started on project applications and take advantage of this historic opportunity!

Inspections & Assessments

Inspections measure compliance with requirements and prevent future problems by locating and identifying defects before violations or health risks occur. Compliance inspections, called “sanitary surveys,” are comprehensive reviews of the water sources, pumps, 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 2,470 sanitary surveys throughout Wisconsin (see chart below).

The DNR also performs on-demand site assessments when coliform bacteria are detected at public water systems. The assessment aims to identify potential pathways for microbial contamination and the corrective actions needed to remedy any sanitary defects. During 2023, the DNR and its contracted partners performed 340 of these assessments.



Monitoring Assistance

Compliance with monitoring requirements is essential to protecting drinking water quality in Wisconsin.

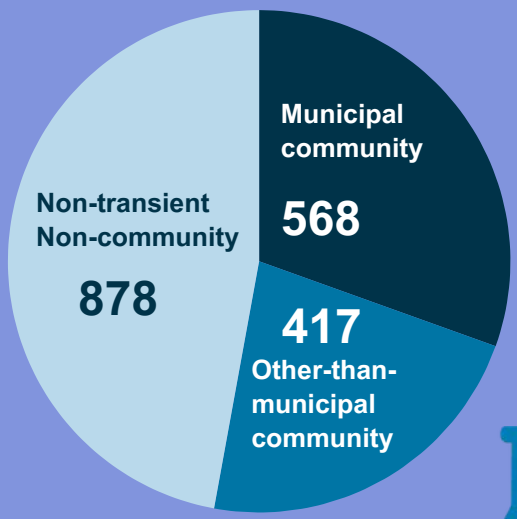
- Water systems collect and analyze samples throughout the year to measure their drinking water quality.

- The DNR provides monitoring assistance to all public water systems to meet both state and federal drinking water requirements.

Initial PFAS Monitoring Completed

Last year marked an important milestone. After the DNR established drinking water standards (MCLs) for two PFAS chemicals, more than 1,800 public water systems statewide completed their initial monitoring and obtained results and information about PFAS chemicals in their water supplies. PFAS contaminants were detected in samples from 30% of the water systems required to monitor.

Water Systems Submitting PFAS Samples



Community and non-transient non-community water systems may be eligible for monitoring waivers, or reduced monitoring frequencies, based on assessments of potential contaminant sources. Assessments are reviewed every three years, and evaluations are used to establish the proper monitoring frequency for regulated contaminants. This assessment process enables systems to reduce monitoring costs by approximately $3 million annually statewide.

Assisting Private Well Owners

Some DNR staff specialize in assisting individual well owners, since almost one-third of the state's population obtains their drinking water from private wells. Staff inspect new non-community wells during construction and pump installation whenever possible. Inspecting wells under construction can identify issues and allow corrections before a well is placed into service. Inspections also ensure compliance with regulatory standards and protect the drinking water resource.

In 2022, Governor Evers, along with the DNR, made $10 million available for the Well Compensation and Well Abandonment Grant Programs specifically to assist private well owners. The grants support replacing, reconstructing, abandoning or installing treatment for contaminated private wells. Applications opened in October 2022. The response was so strong that, by late 2023, applications were on track to use all available funds.

The program has helped 67 small public water systems deal with exceedances of MCLs. Most applicants received grants to help with nitrate contamination.

Enforcing DrinkingWater Regulations

Photo credit: iStock/Vitalii Barida

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

Most violations are resolved quickly because systems take action immediately after learning about them. Whenever possible, the DNR's more formal enforcement relies on voluntary agreements to take corrective action and establish a timeline for returning to compliance.

Table 3 summarizes DNR's enforcement activity during 2023. Last year, the DNR sent 1,695 Notice of Noncompliance letters but only 42 Notices of Violation. This illustrates that most water systems acted promptly after being notified of violations, eliminating any need for additional enforcement.

Table 3. Drinking Water Enforcement During 2023

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 and actions needed for returning to compliance.	1,695
Notice of Violation (NOV) sent	NOV notifies water system owner about a violation and schedules a meeting with DNR staff for more detailed discussion.	42
Enforcement conference held	Enforcement conferences are held to discuss the enforcement process, possible corrective actions and a timeline for returning to compliance.	35
Consent order signed or administrative order issued	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. Some administrative orders can include forfeitures (penalties).	29
Enforcement case referred to WI Department of Justice	Referral occurs when further enforcement is needed because return to compliance was not achieved.	2
Judgment by WI Department of Justice or court	Judgment is a formal agreement, filed in court, describing the actions required for a water system to return to compliance. Judgments are issued in cases that have been referred to WI DOJ for enforcement.	1

Protecting Water Sources


Photo credit: Matt Phelps

Preventing contamination is one of the best ways to safeguard drinking water supplies. 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. During 2023, the DNR approved 12 new wellhead protection plans covering 35 individual wells.

The DNR uses partnerships and collaboration to provide strategic and technical assistance to communities to enhance their wellhead protection efforts. Using DNR funding, the Wisconsin Rural Water Association (WRWA) assists communities with developing their plans.

Some of the DNR’s source water protection efforts include:

- Establishing well construction standards, well filling and sealing standards and requirements that prevent cross-aquifer contamination.
- Reviewing and permitting new high capacity wells, including siting and impacts to water quantity and quality.
- Providing hydrogeologic analyses to assist private well owners with siting and well construction.


Photo credit: DNR


Photo credit: DNR

Maintaining Strong Partnerships

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

The DNR Funded $21 million in partner contracting

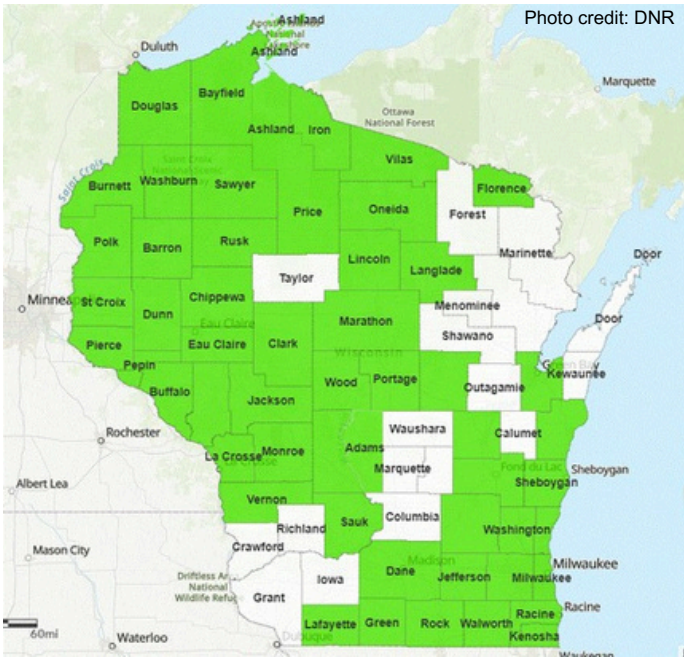


Photo credit: DNR

Compliance Support

DNR's partnerships with county health departments are crucial to helping transient non-community water systems across the state. Wisconsin has 9,272 of these small systems—which include small businesses, churches, restaurants, campgrounds and parks—more than any other state.

The DNR contracts with county health departments to inspect TN systems. During 2023, county sanitarians conducted 5,147 annual site visits, 1,524 sanitary surveys and 206 assessments (triggered when bacterial contaminants are detected).

County staff also perform the water quality monitoring at TN systems. The program is successful, evidenced by much higher rates of compliance with monitoring requirements in contracted counties.

Technical Assistance

Wisconsin Rural Water Association (WRWA) helps small public water systems by providing specialized, on-site technical assistance and delivering reminders about monitoring requirements and upcoming deadlines. WRWA helps with a wide variety of topics, including contaminant tracing and investigation, water loss, sampling and monitoring, reporting, completing and submitting compliance documents and winter operations. The assistance can cover anything from troubleshooting problems to training new operators. This program is funded through a contract with the DNR, so technical assistance is provided at no cost to the water systems.

During 2023, WRWA delivered more than 5,600 monitoring reminders and performed 700 site visits at other-than-municipal community and non-transient non-community water systems around the state. This technical assistance helps to improve compliance and reduce violations at OC and NN systems. Better compliance saves time for both DNR staff and water system operators.

Another technical assistance partner, the Wisconsin Rural Community Assistance Program (RCAP), assists small communities throughout the state with asset management, funding and other needs. RCAP works with the DNR to prioritize small water systems that need assistance and to identify priority training topics.

Training

Moraine Park Technical College (MPTC) and WRWA both provide training for water system operators through contracts with the DNR. The training courses cover both exam preparation to help future operators pass the certification exams and continuing education for current operators. Both organizations are essential to building and developing a robust and knowledgeable drinking water workforce for our state.

Financial Assistance

Wisconsin receives federal funding to implement the SDWA. The DNR uses most of the funding to provide low-interest loans and principal forgiveness awards for infrastructure improvements at eligible municipal water systems. Wisconsin communities are using loan program funds for a variety of projects to protect public health and achieve or maintain compliance with drinking water regulations.

Safe Drinking Water Loan Program

The DNR awarded more than $60.6 million in Safe Drinking Water Loan Program funding during 2023.

Since the program began in 1998, 603 projects in Wisconsin have received more than $1 billion in funding.

Did You Know?

Wisconsin's loan program passed the billion-dollar mark in 2023!

Last year's funding consisted of $45.5 million in low interest loans and $15.1 million in principal forgiveness. Depending on prevailing interest rates, communities may receive up to a 77% reduction on interest rates compared with a market rate loan.

- The village of Bruce received $1,009,043 to construct a water treatment plant for Wells 1 and 3 to address high levels of manganese.
- The village of Altoona received $3,207,319 to construct a new well (Well 8) to eliminate the existing water quantity deficiency.
- The village of Winneconne received $5,753,318 to construct a water treatment plant at Well 2 and address high levels of radium in Wells 1 and 2.
- The city of Rhinelander received $2,292,634 to replace aging water mains.
- The village of Arena received $3,147,567 to construct a new well (Well 2) and provide a second source of water for the village.

Appendix C lists the 31 projects that were awarded loan program funding during 2023.

Private Lead Service Line Replacement Program

Wisconsin has pioneered innovative approaches to funding lead service line (LSL) replacement in communities around the state. Replacing lead service lines —both publicly- and privately-owned parts—is one of the most effective ways to prevent exposure to lead in drinking water. Wisconsin's Private Lead Service Line Replacement Program awarded all funding as principal forgiveness, allowing communities to replace their privately-owned LSLs without incurring any debt.

Photo credit: DNR

A total of 17 communities received $4.9 million in principal forgiveness funding during 2023 for private LSL replacements. More than 1,100 lead service lines are being replaced through these projects. Appendix D lists the communities that received funding last year.

CONCLUSION

Wisconsin's water supply infrastructure—like the rest of the nation's—is aging. Communities and their citizens 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.

According to the EPA's 2021 Drinking Water Infrastructure Needs Survey and Assessment, Wisconsin will need approximately $11.8 billion to meet the state's drinking water infrastructure needs between 2021 and 2040.

The DNR is committed to protecting public health and the state's drinking water every day and into the future. Although the future holds numerous challenges, many partners working together—including public water system owners and operators, water industry professionals, training and technical assistance providers and other agencies —strive to meet the goal of providing a safe and adequate supply of drinking water to everyone in Wisconsin.

Photo credit: DNR

Photo credit: DNR

APPENDIX A. Maximum Permissible Levels Of Contaminants In Drinking Water

The tables in this appendix show the Maximum Contaminant Levels (MCLs) for the various types 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 the 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
Beta particle activity	4 millirems per liter dose equivalent

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 (31 contaminants in group)

contaminant	MCL (mg/L)	contaminant	MCL (mg/L)	contaminant	MCL (mg/L)
2,4-D	0.07	Dinoseb	0.007	Lindane	0.0002
2,4,5-TP	0.05	Dioxin	3×10^{-8}	Methoxychlor	0.04
Alachlor	0.002	Diquat	0.02	Oxamyl	0.2
Atrazine	0.003	Endothall	0.1	Pentachlorophenol	0.001
Benzo[a]pyrene	0.0002	Endrin	0.002	PFOS and PFOA	0.000070
Carbofuran	0.04	Ethylene Dibromide	0.00005	Polychlorinated biphenyls (PCBs)	0.0005
Chlordane	0.002	Glyphosate	0.7	Picloram	0.001
Dalapon	0.2	Heptachlor	0.0004	Simazine	0.004
Di(2-ethylhexyl)adipate	0.4	Heptachlor epoxide	0.0002	Toxaphene	0.003
Di(2-ethylhexyl)phthalate	0.006	Hexachlorobenzene	0.001		
Dibromochloropropane	0.0002	Hexachlorocyclopentadiene	0.05		

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.

chemical	standard (mg/L)	chemical	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 2023

The following tables summarize violations at Wisconsin's public water systems during 2023. The tables show violations of contaminant standards, monitoring and reporting requirements, treatment technique requirements, and notification requirements.

Table B-1. Maximum contaminant level violations during 2023

contaminant	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
MICROBIAL CONTAMINANTS	**24**	**0**	**1**	**1**	**22**	**35**
Total coliform bacteria					1	1
E. coli bacteria			1	1	21	34
INORGANIC CONTAMINANTS	**30**	**9**	**2**	**9**	**10**	**91**
arsenic		1	2	5	n/a	41
fluoride		2			n/a	2
nickel				1	n/a	7
nitrate		6		4	10†	41
RADIONUCLIDES	**11**	**9**	**2**	**n/a**	**n/a**	**359**
combined radium-226 and radium-228		8	2			187
beta particle activity			1			1
gross alpha particle activity		4	1			171
SYNTHETIC ORGANIC CONTAMINANTS	**4**	**0**	**1**	**3**	**n/a**	**7**
di(2-ethylhexyl) phthalate			1	3		
VOLATILE ORGANIC CONTAMINANTS	**2**	**1**	**1**	**0**	**n/a**	**14**
benzene		1				6
tetrachloroethylene			1			8
DISINFECTION BYPRODUCTS	**1**	**1**	**0**	**0**	**n/a**	**5**
haloacetic acids		**1**				1
total trihalomethanes		1				4
Overall totals	**70**	**19**	**7**	**14**	**30**	**511**

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

† An additional 223 TN systems operated with nitrate levels above the MCL of 10 mg/L but below 20 mg/L during 2023.

Table B-2. Monitoring and reporting violations during 2023

contaminant	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
MICROBIAL CONTAMINANTS	**532**	**16**	**40**	**40**	**436**	**735**
Ground Water Rule		6	8	7	47	74
Total Coliform Rule					7	7
Revised Total Coliform Rule monitoring		10	34	32	399	647
Revised Total Coliform Rule reporting				1	5	7
INORGANIC CONTAMINANTS (18 contaminants in group)	**382**	**82**	**36**	**116**	**148**	**495**
arsenic		8		8	n/a	20
lead and copper		74	27	104	n/a	277 (529 individual contaminants)
nitrate and nitrite		13	11	11	148	200 (219 individual contaminants)
other inorganic contaminants (13 contaminants)		10	1	2	n/a	15 (166 individual contaminants)
RADIONUCLIDES	**18**	**13**	**5**	n/a	n/a	**27** (83 individual contaminants)
SYNTHETIC ORGANIC CONTAMINANTS (31 contaminants in group)	**21**	**15**	**2**	**4**	n/a	**28** (446 individual contaminants)
VOLATILE ORGANIC CONTAMINANTS (21 contaminants in group)	**16**	**8**	**3**	**5**	n/a	**17** (377 individual contaminants)
DISINFECTANTS & DISINFECTION BYPRODUCTS	**54**	**43**	**5**	**6**	n/a	**72**
residual disinfectants		10	3	1		20
disinfection byproducts		35	3	5		52 (95 individual contaminants)
Overall totals	**833**	**132**	**71**	**150**	**480**	**1,374**

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

Table B-3. Treatment technique violations during 2023

contaminant	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
MICROBIAL CONTAMINANTS	**54**	**15**	**15**	**0**	**24**	**70**
Ground Water Rule		11	12		6	41
Revised Total Coliform Rule		4	3		18	29
CHEMICALS—LEAD AND COPPER RULE	**30**	**15**	**2**	**13**	n/a	**33**
DISINFECTANTS & DISINFECTION BYPRODUCTS	**13**	**11**	**1**	**1**	n/a	**13**
Overall totals	**93**	**38**	**17**	**14**	**24**	**116**

*Some water systems may have violations in multiple categories.

Table B-4. Notification violations during 2023

requirement	number of water systems with violations					number of violations
	total systems*	MC	OC	NN	TN	
Consumer Confidence Report	43	19	24	n/a	n/a	46
Ground Water Rule	5	1	1	1	2	8
Public Notice	560	47	41	45	427	954
Overall totals	**596**	**63**	**59**	**46**	**428**	**1,008**

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

Table B-5. Overall compliance with drinking water requirements during 2023

water system type	number of water systems	systems with violations	systems with full compliance	percent of systems complying
Municipal community	608	184	424	69.7%
Other-than-municipal community	426	117	309	72.5%
Non-transient non-community	900	191	709	78.8%
Transient community	9,272	795	8,477	91.4%
Overall totals	**11,206**	**1,287**	**9,919**	**88.5%**

APPENDIX C. Communities Receiving Safe Drinking Water Loan Program Funding For Drinking Water Projects During 2023

The Safe Drinking Water Loan Program funded projects in 31 communities during 2023, for a total of $60.6 million. Funding can be awarded as loans, principal forgiveness, or a combination to help communities throughout the state make needed infrastructure improvements.

community	principal forgiveness funding	loan funding	total funding	project description
Abbotsford (city)	$518,265	$345,510	$863,775	Replace water main along Cedar St, water tower rehab
Altoona (city)	$481,098	$2,726,221	$3,207,319	Construct well #8, wellhouse, emergency power and connect water main
Antigo (city)	$1,500,000	$1,227,273	$2,727,273	Replace 0.15M gallon water tower, SCADA
Arena (village)	$1,259,027	$1,888,540	$3,147,567	Construct well/house #2, distribution, sewer, backup power, land, SCADA
Beaver Dam (city)	$357,435	$2,025,480	$2,382,915	Water main replacement on Third St
Blue Mounds (village)	$335,111	$1,005,333	$1,340,444	Replace booster station
Bruce (village)	$655,878	$353,165	$1,009,043	Construct water treatment plant for wells #1 and 3
Cobb (village)	$142,715	$265,041	$407,756	Replace water mains along Clifton St and School St
Crandon (city)	$788,546	$525,696	$1,314,242	Replace water mains along E Glen St, S Park St and Polk St
Cross Plains (village)		$1,064,138	$1,064,138	Replace water main on Brewery Rd
Denmark (village)	$408,695	$2,315,932	$2,724,627	Connect to Central Brown Co Water Authority for water supply
Dodgeville (city)	$245,406	$2,208,649	$2,454,055	Rehabilitate/upgrade well #6
Fennimore (city)	$235,702	$942,806	$1,178,508	Replace water mains on Grant, 13th, Madison, 5th, and Cleveland streets
Haugen (village)	$282,728	$282,727	$565,455	Rehabilitate elevated storage tank
Jefferson (city)		$2,198,379	$2,198,379	Improve well #3
Kaukauna (city)		$2,069,533	$2,069,533	Replace water mains on 6th, 7th, 8th, Whitney, Sullivan, Hendricks and Island streets
Ladysmith (city)	$240,992	$248,898	$489,890	Replace water mains along W 5th St N
Lena (village)	$153,360	$466,940	$620,300	Replace water mains on W Maple and N 3rd streets
Madison (city)		$4,675,000	$4,675,000	Water main improvements 2023
Mayville (city)	$904,631	$2,713,890	$3,618,521	Replace existing water treatment system/SCADA
Merrimac (village)	$183,805	$428,876	$612,681	Rehabilitate well #1
Milwaukee (city)	$1,500,000	$3,700,550	$5,200,550	Replace water mains in multiple locations
Mineral Point (city)	$919,258	$2,757,773	$3,677,031	Replace water mains on High, Church, Chestnut, Jail Alley, Commerce and Nichol streets
Muscoda (village)	$561,359	$374,240	$935,599	Abandon/replace elevated water tower

community	principal forgiveness funding	loan funding	total funding	project description
Park Falls (city)	$223,180	$120,173	$343,353	Replace 4500 ft water main on Case, Sherry, Avery, Paddock and Linden streets
Rhinelander (city)	$917,054	$1,375,580	$2,292,634	Replace water mains along Oneida, King, Conro and Anderson streets
Thorp (city)	$358,757	$538,135	$896,892	Replace water main on School St and Church St
Two Rivers (city)	$131,675	$526,696	$658,371	Replace water main and lead service lines on Roosevelt, Wilson, 17th, 26th, 35th and Jackson streets
Wauzeka (village)	$655,062	$436,708	$1,091,770	Replace water mains on Main from Dousman to Timber streets
Westby (city)	$270,097	$810,290	$1,080,387	Replace water mains on Sunset, Greenbriar, Meadowlark, Blackhawk and Ulland streets
Winneconne (village)	$862,998	$4,890,320	$5,753,318	Treatment at well 2, upgrade pumping facilities
Total 2023 projects	**$15,092,834**	**$45,508,492**	**$60,601,326**	

APPENDIX D. Communities Receiving Private Lead Service Line Replacement Program Funding During 2023

The Private Lead Service Line Replacement Program funded projects in 17 communities during 2023. All funding in this program is awarded as principal forgiveness, allowing communities to replace the private portions of lead service lines without incurring any debt. According to estimates, more than 1,100 lead service lines are being replaced with funding awarded in 2023.

community	principal forgiveness funding	estimated number of lead service lines
Baraboo (city)	$222,500	40
Berlin (city)	$744,492	169
Boscobel (city)	$36,500	5
Edgerton (city)	$645,730	162
Evansville (city)	$58,000	27
Hilbert (village)	$54,350	9
Iron Ridge (village)	$30,725	3
Kenosha (city)	$270,000	45
Milwaukee (city)	$498,808	250
Neenah (city)	$1,200,000	214
New Glarus (village)	$165,500	22
Port Washington (city)	$205,000	33
South Milwaukee (city)	$75,000	15
Sturgeon Bay (city)	$250,000	50
Waupaca (city)	$64,640	7
Wausau (city)	$270,000	60
Whitefish Bay (village)	$111,961	30
total 2023 projects	**$4,903,206**	**1,141**