



# Minnesota Annual Compliance Report for 2019

## Introduction

Each year, the Minnesota Department of Health (MDH) provides citizens and the U. S. Environmental Protection Agency (EPA) with a report on the status of public drinking water in Minnesota. This report provides both an assessment of how well public water supply systems are doing at meeting the standards set in the federal Safe Drinking Water Act and insights about current challenges faced by public water suppliers.

Ongoing attention, investment, and response to new and ongoing challenges to our water resources are needed to maintain the ability to rely on an adequate supply of safe water. Sustainable water resources are critical to personal and public health as well as our economy. Protecting water sources, treating the water, and testing the water after it is treated are part of the multi-barrier approach to assuring an adequate supply of water that is safe to drink.

Protecting and supplying safe water depends on many organizations and individuals. While the Minnesota Department of Health administers and enforces the provisions of the federal Safe Drinking Water Act on behalf of the EPA, we rely on our partners in areas ranging from government to industry to non-profit organizations to take an active role and contribute to this quest.

These partners include everyone, including individual citizens. Everyone plays a part in ensuring safe water. As always, our aim with this report is to provide Minnesotans with a clearer picture of what is done to protect the quality of their drinking water and the success of the efforts to do so.

## Executive Summary

The Minnesota Department of Health has been issuing a report on the state of water supply and quality since 1995.

The Minnesota Department of Health began as the Minnesota State Board of Health in 1872, largely as a result of waterborne and foodborne diseases. Typhoid fever, a waterborne disease, was taking a large toll of lives at this time.

Advances in protecting water were rapid; the results were dramatic. By the early 1900s, treatment and disinfection of drinking water resulted in the virtual elimination of waterborne diseases such as cholera, typhoid, dysentery, and hepatitis A.

A century later the importance of safe and sufficient water remains as strong as ever, and the challenges toward achieving this goal emerge in new and different manners.

The passage of the federal Safe Drinking Water Act in 1974 established a national program of regulations and standards that covers all public water systems in the United States. MDH administers and enforces the provisions of the act through a strategic series of safeguards from sources in rivers, lakes, and groundwater until the drinking water reaches the tap. The safeguards include three basic strategies of prevention, treatment and monitoring.

- Prevention focuses on controlling potential sources of pollution and managing land uses in the area where rain drains to become groundwater that supplies a well. Prevention activities also include plan review, advice on construction of water treatment and distribution facilities, and inspection of these facilities on a regular basis.
- Treatment measures, including disinfection, are used to make the water safe to drink.
- Monitoring of public water supplies for more than 100 potentially harmful contaminants on a routine basis is a critical element in the state's enforcement responsibilities that ensure safe drinking water.

The aim of this report is to provide the people of Minnesota with a clearer picture of what is being done to protect the quality of their drinking water and what our monitoring efforts have revealed about the success of those efforts.

## **A Current Profile of Minnesota's Drinking Water Protection Program**

Since 1974, the EPA has been responsible for regulating the nation's public water supply systems, under the provisions of the federal Safe Drinking Water Act. However, almost all states, including Minnesota, have assumed responsibility for enforcing the act within their own borders. Minnesota became one of the first states to achieve primacy, and to begin regulating public water supply systems at the state level, in 1976.

The definition of "public water supply system," for purposes of the Safe Drinking Water Act, is a broad one. To be considered "public," a water supply system must have its own water source and provide water to 25 or more people, or have 15 or more service connections.

Minnesota currently has 6,724 public water supply systems. Of those systems, 964 are community systems, which provide water to people in their homes or places of residence. Most of these community systems use groundwater from underground sources, tapped by wells, as their source of water. However, 24 of these systems, including the municipal systems that serve the state's largest cities, use surface water drawn from lakes or rivers.

Of the state's 964 community water systems, 729 are municipal systems, serving towns or cities. The rest of the community systems provide water to people in a variety of residential locations, including manufactured home parks, apartment buildings, housing subdivisions, hospitals, and correctional facilities.

The rest of the state's 5,760 public water supply systems are noncommunity systems. Some of these noncommunity systems provide water to an ever-changing "transient" population at places such as restaurants, resorts, and highway rest stops. Other noncommunity systems may provide water to relatively stable population groups in nonresidential locations such as schools, places of employment, and day-care facilities.

## The Major Elements of Drinking Water Protection

Three basic strategies are used to safeguard the quality of our drinking water:

- **Prevention.** Preventing contamination of the source water used by public water supply systems—lakes, rivers, and water wells—is an important component of drinking water protection. This aspect of drinking water protection includes measures such as regulating land use, regulating the construction of water treatment facilities, and controlling potential sources of pollution.
- **Treatment.** Most community water supply systems use some form of treatment so the water will be palatable and safe to drink. Many systems require routine disinfection as a safeguard against potential problems with bacteriological contamination. Groundwater systems are less likely to require disinfection, because wells that are properly constructed and are located in a non-vulnerable aquifer are less susceptible to surface contamination.
- **Monitoring.** Monitoring is the critical element of compliance activities under the Safe Drinking Water Act (SDWA). Under provisions of the act, public water supply systems are required to sample treated—or “finished”—water on a regular basis and submit the samples to the MDH lab for analysis. The samples are tested for a broad range of potential contaminants. If unacceptable levels of contaminants are found, the water supply owner or operator is legally responsible for informing the people who use the water and for taking steps to eliminate potential health hazards.

Under the provisions of the SDWA, the individual public water supply system is responsible for taking water samples and submitting them to certified laboratories for analysis. To lessen the burden on water supply operators, most of the required samples are collected by field staff from MDH. Minnesota’s public water supply operators have one of the best records in the nation regarding compliance with these sampling and testing requirements.

### Monitoring: What We Test For—and Why

Minnesota’s community water supplies are tested for a number of different types of contaminants. The reasons for testing—and how often the testing is done—depend on the type of contaminant and other factors. The type of contaminant also determines what actions will be taken if unacceptable levels are found in the water.

The major types of contaminants we test for include:

**Pesticides and Industrial Contaminants.** Minnesota’s community water supply systems are routinely tested for more than 100 different pesticides and industrial contaminants, including synthetic organic compounds (SOCs) and volatile organic compounds (VOCs). Systems may be tested anywhere from four times a year to once every six years, depending on the specific chemical and the vulnerability of the system to contamination (see *Assessing Vulnerability to Contamination* below). Some systems may not need to do any testing for a particular contaminant. A formal use waiver is sometimes granted, specifically exempting a water supply

system from testing for a particular contaminant, if that chemical or pesticide is not commonly used in the immediate area.

The EPA has developed legal standards known as maximum contaminant levels (MCLs) for 60 of the more common pesticides and industrial contaminants found in drinking water. Advisory standards have been developed for the other pesticides and industrial contaminants, and those are used in the same way as the MCLs in assessing test results.

Any time a community water system exceeds the MCL for one of these contaminants, the water supply operator, with the assistance of MDH, must notify the people who use the water. Appropriate steps are then taken to reduce the contamination.

In some cases, the MCL or advisory standard is calculated to prevent immediate or short-term health effects. More often, however, these standards are designed to reduce the long-term risk of developing cancer or other chronic health conditions. They are calculated very conservatively. If the concern is long-term health effects, the standards are calculated to keep the risk of illness at levels most people would regard as negligible—even if they drink the water every day, over an entire 70-year lifetime.

**Bacterial Contamination.** Community water supply systems serving more than 1,000 people are tested one or more times per month for coliform bacteria. Smaller systems are tested four times a year. The coliform test is used as a general indicator of water quality in the system, in terms of potential microbial contamination. If the coliform test is negative, it is an indication that the system is adequately protected against contamination from other types of disease-causing organisms. However, if coliform bacteria are found in the water, it is assumed that the system may be compromised, and steps are taken to protect the people who use the water.

Total coliform bacteria (without the detection of fecal coliform or *E. coli*) are generally not harmful. In these cases, the system will identify the source of the contamination, correct the problem, and thoroughly disinfect its system. The public will also be notified of the situation; however, unless unusual circumstances exist to cause particular concern about the safety of the water, a boil water notice would not be issued as would be if fecal coliform or *E. coli* were found.

**Nitrate/Nitrite.** Community water supply systems in Minnesota are tested once a year for nitrate, a chemical which may occur naturally in the environment but that can also enter the water from sources like fertilizer run-off, decaying plant and animal wastes, and sewage. Nitrate is a health concern primarily for infants under the age of six months. The infant's digestive system can convert the nitrate to nitrite, which can interfere with the ability of the infant's blood to carry oxygen. The result is a serious illness known as methemoglobinemia, or "blue baby syndrome." Methemoglobinemia can be fatal if nitrate levels in the water are high enough and the illness isn't treated properly.

The MCL for nitrate in drinking water is 10 parts per million (ppm). If a water supply system exceeds the standard, the people who use the water are notified and advised not to use the water for mixing infant formula or other uses that might result in consumption of the water by infants under six months of age. The advisory is kept in place until steps can be taken to reduce

nitrate levels in the water. Possible remedial measures include treating the water to remove the nitrate or drilling a new water well.

Older children and adults are generally not at risk from drinking nitrate-contaminated water. In fact, the average adult consumes about 20-25 milligrams of nitrate per day in food, primarily from vegetables. Because of changes that occur after six months of age, the digestive tract no longer converts nitrate into nitrite. However, some adults—including people with low stomach acidity and people with certain blood disorders—may still be at risk for nitrate-induced methemoglobinemia.

**Inorganic Chemicals.** Community water systems in Minnesota are tested for 13 other inorganic chemicals in addition to nitrate. If past results don't indicate the presence of inorganic chemicals, testing is usually done once every nine years; otherwise it may be done as often as once a year. The list includes antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, sulfate, and thallium. In some cases, these chemicals may be naturally present in the groundwater. If a water supply system were to exceed the MCL for one of these chemicals, the people who use the water would be notified, and appropriate steps would be taken to reduce levels of these chemicals in the water.

**Radioactive Elements.** Community water systems in Minnesota are also usually tested once every three years—or as often as once a year, in some cases—for a list of radioactive elements. These radioactive elements, or radiochemicals, are present in the water from natural sources. If a system were to exceed the federal MCL for one of these radioactive elements, the people who use the water would be notified and steps would be taken to correct the problem.

**Disinfection By-products.** Disinfection rids drinking water of microbiological organisms, such as bacteria, viruses, and protozoa, that can cause and spread diseases. The most common method of disinfection is the addition of chlorine to drinking water supplies. Not only is chlorine effective against waterborne bacteria and viruses in the source water, it also provides residual protection to inhibit microbial growth after the treated water enters the distribution system. This means it continues working to keep the water safe as it travels from the treatment plant to the consumer's tap.

However, even though chlorine has been a literal lifesaver with regard to drinking water, it also has the potential to form by-products that are known to produce harmful health effects. Chlorine can combine with organic materials in the raw water to create contaminants called trihalomethanes (THMs) and haloacetic acids (HAAs). Repeated exposure to elevated levels of THMs over a long period of time could increase a person's risk of cancer.

The formation of disinfection by-products is a greater concern for water systems that contain organics or use surface water, such as rivers, lakes, and streams, as their source. Surface water sources are more likely to contain the organic materials that combine with chlorine to form THMs and HAAs.

All community water systems that add a disinfectant to the water must regularly test their treated water to determine if THMs and HAAs are present. If the THMs or HAAs exceed the limits set by the EPA, the water system must take action to correct the problem. The corrective actions include notifying all residents served by the water system.

**Lead and Copper.** All community and non-transient public water systems have been tested for lead and copper. In community water systems, the water was tested in a number of homes within each system to determine if they exceeded the federal “action level” of 15 parts per billion (ppb) for lead or 1,300 ppb for copper. If a system exceeded the action level for lead or copper in more than 10 percent of the locations tested, it was required to take corrective action and do further testing. Current testing requirements are based partly on the results of that initial round of testing and of the success of subsequent efforts to reduce risk of lead contamination in systems that have previously exceeded the action level.

Lead in drinking water is not an environmental contamination problem in the conventional sense. Water is almost never contaminated with lead at the source or when it first enters the distribution system. However, water can absorb lead from plumbing components used in individual homes. Possible sources of lead contamination include lead pipe, lead plumbing solder, and brass fixtures. Lead exposure is a potentially serious health concern, especially for young children. However, the water must usually be in contact with lead plumbing components for an extended period of time, usually by standing in the system overnight, before it can absorb potentially hazardous levels of lead. Consumers can usually protect themselves simply by turning on the faucet and letting the water run for 30 seconds, or until it runs cold, before using it for drinking or cooking. Those in homes with lead service connections should run the water an additional 30 seconds after it turns cold.

While most people are subject to lead exposure from a number of possible sources—and drinking water typically accounts for a relatively small proportion of a person’s total lead exposure—it is also one of the easiest sources of lead exposure to control and eliminate. Some Minnesota water supply systems address the issue by treating their water before it reaches a person’s home, so it will be less likely to absorb lead from plumbing.

## Assessing Vulnerability to Contamination

Monitoring requirements for individual public water supply systems depend partly on how vulnerable the system is to contamination. MDH does vulnerability assessments of water supply systems, taking into account a number of factors. For groundwater systems, these include well construction, geologic setting, water quality, and well use. High vulnerability conditions leads to more aggressive sampling, monitoring, inspection, and other actions than low vulnerability conditions require.

In general, groundwater systems tend to be less vulnerable to certain types of contamination than surface water systems. Water tends to be naturally filtered as it moves downward through the earth, making its way from the surface to the underground aquifers tapped by water wells. That process can remove certain kinds of surface contaminants, including bacteria and parasites such as *Cryptosporidium*. For that reason, many groundwater systems do not routinely include disinfection as part of their normal water treatment procedures.

## Monitoring Test Results for Calendar Year 2019

This is a summary of results of monitoring performed in 2019. In the case of a violation, a water system takes corrective actions. These actions include public notification to inform affected residents of the situation and if there are any special precautions they should take. In all cases noted here, residents were advised directly by the water system at the time the violation occurred.

All community water systems have also noted any violations in the annual water quality reports (also called Consumer Confidence Reports) they distribute to their residents. Information on a complete summary of monitoring results in 2019 is in the appendix.

Minnesota has 964 community water suppliers, systems that serve water to people in their homes; 729 of these are municipal water systems.

Minnesota also approximately 5,760 noncommunity water suppliers, which serve water to people in places outside their homes. These can be schools and businesses that have their own water supply (that aren't on city water). They can also be resorts, restaurants, highway rest stops, and state parks.

Those that serve the same group of people every day, such as schools and businesses, are known as nontransient noncommunity systems. Those that serve a differing group of people are transient noncommunity water systems. Nontransient systems are monitored for the same group of contaminants as community water systems. Though larger in number of systems, transient noncommunity systems do not need to be monitored as extensively as nontransient systems; since they serve different people on a day-by-day basis, transient systems need to be sampled only for coliform bacteria and nitrate, contaminants that can cause immediate illness.

Information on all violations for community and noncommunity water systems is in the appendix below.

## Pesticides and Industrial Contaminants

During 2019, MDH conducted 19,710 tests for pesticides and industrial contaminants in community water systems. No systems violated drinking water standards for these contaminants.

MDH conducted approximately 9,525 tests for pesticides and industrial contaminants in the 488 nontransient noncommunity water systems in the state. No systems violated drinking water standards for these contaminants.



## Bacteriological Contamination

No community water systems exceeded the standard for bacteriological contamination in 2019.

All noncommunity water systems—transient and nontransient—are monitored for bacteriological contamination. There were nine violations among the 5,760 noncommunity systems, which worked with MDH staff to disinfect their systems and retest the water.

## Nitrate/Nitrite

Three community systems exceeded the standard for nitrate in 2019.

Eighteen noncommunity systems (transient and nontransient) exceeded the standard for nitrate in 2019. These systems notified the people who used the water, offering bottled water to those with infants, while working with MDH staff to remedy the problems.

## Arsenic

Eight community water systems, and four noncommunity water systems, exceeded the standard for arsenic by the end of 2019.

No restrictions were placed on water consumption although residents were notified of the situation. Residents were told that this was not an emergency situation and were advised to consult with their doctors if they have any special concerns. Each of these systems has begun the process to meet the maximum contaminant level. Examples of actions systems may take include researching, starting, or completing approved infrastructure or operational changes.

## Radioactive Elements

Radiation occurs naturally in the ground, and some radioactive elements may work their way into drinking water. Nine community water systems exceeded the standard for radium 226 & 228 and/or gross alpha emitters by the end of 2019; six community systems exceeded the standard for radium 226 & 228 and/or gross alpha emitters.

No restrictions were placed on water consumption although residents were notified of the situation. Residents were told that this was not an emergency situation and were advised to consult with their doctors if they have any special concerns. Each of these systems has either started or completed infrastructure changes or is studying alternatives to meet the maximum contaminant level.

Noncommunity water systems are not regulated for radioactive elements.

## Other Inorganic Chemicals

No community or noncommunity water systems exceeded the standard for inorganic chemicals in 2019.



## Disinfection By-products

One community water system and one noncommunity exceeded the standard for disinfection by-products in 2019.

## Lead and Copper

As a result of the Lead and Copper Rule, implemented by the EPA in 1991, community water systems began sampling for lead and copper in 1992. These contaminants differ from others in that they are rarely present in source water. Rather, lead and copper may appear in water by dissolving from parts of the distribution system, often household plumbing. Monitoring for lead and copper is done in individual homes and on a case-by-case basis. Samples are taken after the water has been idle, resulting in elevated levels. If more than 10 percent of the homes sampled in a community are above the action level (15 parts per billion for lead and 1,300 ppb for copper), the water system will be in exceedance and must take corrective actions and begin an ongoing public education program. The actions include corrosion control measures, such as adjusting water chemistry to make it less corrosive or less likely to absorb lead and/or copper from the plumbing.

In 2019, two community system exceeded the lead action level, and 20 community systems exceeded the copper action level; three noncommunity systems exceeded the lead action level, and 13 noncommunity systems exceeded the copper action level. These systems are exploring options for getting back into compliance and conducting a public education program. The Minnesota Department of Health continues to work with these systems and has been doing its own education campaign since the early 1990s with information about lead and copper and simple precautions, such as flushing faucets when the water hasn't been used for several hours, people can follow to reduce their exposure.

## Appendix

The summary includes results for both community and noncommunity public water systems in Minnesota in 2019. Public water supply systems include all systems that serve 25 or more people on a regular basis, or that have 15 or more service connections. There are 6,724 such systems in Minnesota, including:

- 964 community systems, which provide water to consumers in their places of residence, including 730 municipal systems.
- 5,760 noncommunity systems, which provide drinking water in settings like factories, schools, restaurants, and highway rest stops.

Information about violations of primary drinking water standards includes the following:

- Maximum contaminant level (MCL) violations
- Maximum residual disinfectant level (MRDL) violations
- Treatment technique requirement (TT) violations

- Significant monitoring and reporting requirements (M/R) violations
- Significant monitoring requirement (M) violations
- Significant reporting requirement (R) violations
- Variances and exemption violations
- Recordkeeping violations
- Significant public notification requirement violations
- Significant consumer confidence report (CCR) notification requirement violations

*A report that lists all violations of the Safe Drinking Water Act in Minnesota for calendar year 2019 is available from the Drinking Water Protection Section, Minnesota Department of Health, Box 64975, St. Paul, MN 55164-0975, 651-201-4700, [health.drinkingwater@state.mn.us](mailto:health.drinkingwater@state.mn.us).*

Individual water systems produce an annual report listing contaminants that were detected, even in trace amounts, during the previous calendar year. Please contact the individual water system if you would like a copy of this report.

Minnesota Department of Health  
Drinking Water Protection Section  
651-201-4700  
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*To obtain this information in a different format, call 651-201-4700.*