

DRINKING WATER QUALITY

PUBLIC HEALTH ISSUE

Ensuring safe and healthy drinking water is essential in promoting public health. Virtually all drinking water is obtained from surface waters or groundwater aquifers. These sources can be contaminated by various chemicals, microbes, and naturally occurring contaminants. If drinking water contains unsafe levels of contaminants, it can cause health effects, such as gastrointestinal illnesses, nervous system or reproductive effects, and chronic diseases such as cancer. The [Safe Drinking Water Act](#) (SDWA) amendments of 1986 and 1996 were designed to ensure safe drinking water for all Americans. States implement the program with technical and financial support from the U.S. Environmental Protection Agency (EPA). In New Hampshire, the Department of Environmental Services (NHDES) is the primary agent and lead agency for the SDWA. Populations at higher risk for adverse health effects from contaminated water include children, the elderly, pregnant women, and persons who are immunocompromised from infection with HIV, are undergoing chemotherapy, or have auto-immune illnesses.

In New Hampshire, about half of the population get their household drinking water from public water systems, which serve a population of 25 people or more and are regulated under the state and federal Safe Drinking Water Acts. The other half of the population gets water from unregulated residential wells. While overall New Hampshire's drinking water systems provide high-quality drinking water to communities, occasionally there are contaminations with natural and industrial contaminants. If there are concerns for water pollution, the Health Officer may assist in an investigation, testing, and enforcement of drinking water standards.

ROLE OF THE LOCAL HEALTH OFFICER

- **May** have an analysis of the water completed if a well, spring, or other water supply is suspected of being polluted. If the analysis results show the water is unfit for drinking purposes, the health officer, with the approval of NHDES, prohibit its use ([RSA 485:33](#)).
- **May** remove such material, substance, or fluid that is found to be polluting a drinking water source and may recover the expense of removal from the person who placed the same, or caused it to be placed, in or near the water ([RSA 485:18](#)).
- **Shall** receive notification from the NHDES when a boil water order is issued.
- **May** organize private drinking water sampling/testing events independently or in conjunction with NHDES.
- **May** issue a written cease and desist order against any violation of [RSA 485-C](#) Groundwater Protection Act (485-C16).
- **Shall** receive notification from the NHDES upon the discovery of groundwater contamination where regulated chemical or radiological contaminants exceeds ambient groundwater quality standards ([485-C:14-b](#))

ROLE OF OTHER AGENCIES

The NHDES Drinking Water and Groundwater Bureau (DWGB) works to protect public health by ensuring safe and reliable drinking water through collaboration, education, assistance and oversight of public water systems. The DWGB accomplishes this mission through a number of activities, including administration of the federal Safe Drinking Water Act and state statutes. Additionally, the NHDES provides guidance to [public water systems and residential well owners](#).

LAWS AND REGULATIONS

- [RSA 485: New Hampshire Safe Drinking Water Act](#): This chapter outlines a comprehensive drinking water protection program for the citizens of New Hampshire.
- [RSA 485-C Groundwater Protection Act](#): This chapter aims to “protect the natural quality of the groundwater resource of the state by assisting local groundwater protection efforts and by establishing procedures and standards for the classification and remediation of groundwater”. This chapter gives municipalities the opportunity to institute programs for groundwater protection within the scope of the chapter.

PUBLIC WATER SYSTEMS

The Federal Safe Drinking Water Act defines a Public Water System (PWS) as a system that provides piped water for human consumption to 15 or more service connections or to an average of at least 25 persons each day for at least 60 days per year. Human consumption refers to water used for food preparation, cooking, hand washing, bathrooms and bathing, as well as for drinking. New Hampshire has over 2,200 public water systems, with the vast majority of them serving fewer than 1,000 people. There are two types of public water systems: community and non-community.

Community Water Systems (CWS) serve year round residences. In addition to town and city water systems, community systems include condominiums, homeowner associations, apartment complexes, mobile home parks and nursing homes. Hence many CWSs are privately owned.

Non-Community Systems (NTNC) are public water systems that are not community water systems. Non-community systems are subdivided into non-transient and transient categories. Non-transient non-community systems serve the same non-resident persons for more than six months per year. Examples include schools, factories, office buildings, hospitals and shopping malls.

Transient non-community systems (TNC) serve different people each day. If a system serves 25 or more of the same individuals for less than 6 months, then it also is a TNC. TNCs are the largest category of public water systems in terms of the total number of systems in NH. TNCs include campgrounds, restaurants, coffee shops, country stores, motels and gas stations. A seasonal home cluster such as summer camps on a lake is also an example. If water is available to the homes for less than six months, then the system falls into the TNC category.

As the Health Officer, it is important to know that water from a PWS must be tested at varying intervals and frequencies for different contaminants. If you have a PWS in your municipality, the [NHDES One Stop Tool](#) will inform you of that location’s water testing requirements as well as sample results, outstanding violations, and other documents.

COMMON WATER CONTAMINANTS

The sections below outline the common water contaminants found in drinking water that can adversely affect people's health if found at unsafe levels. For each of these, EPA has established a [Maximum Contaminant Level \(MCL\)](#). The MCL is the highest level of a contaminant that is allowed in drinking water. **MCLs are enforceable standards to which all public water systems must conform.** MCLs are used as recommended health limits for private well owners.

Total Coliform Bacteria -The coliform group of bacteria (referred to as [total coliform bacteria](#)) is an ideal indicator for drinking water. These bacteria are generally not pathogenic, but they are usually present along with pathogens. The presence of coliform bacteria in a water sample indicates pathogens could be present as well. If a sample tests positive for total coliform, then further analysis is done to determine if the bacteria are *E. coli* coliform. If *E. coli* coliform are present, then fecal contamination of the water is more likely to have occurred recently. A higher risk of pathogens being present in the water is assumed when *E. coli* coliform bacteria are present, and the water should be boiled prior to consumption.

Inorganic Chemicals (IOC) - Inorganic contaminants (16 are regulated) are naturally occurring. They are mostly minerals that are constituents of the rocks and sediment with which the water has come into contact, including [arsenic](#). IOCs also can be introduced from industrial discharges and hazardous waste dumps, as well as from corrosion of plumbing.

Nitrate and Nitrite - [Nitrate and nitrite](#) are inorganic compounds that form when ammonia from manure, fertilizers and septic systems comes into contact with oxygen on and under the ground. Nitrite does not typically occur in water at significant levels and its presence would indicate likely wastewater contamination. If nitrate or nitrite are elevated, testing for bacteria is also important.

Organic Chemicals - There are 51 regulated [organic chemicals](#). Many are manufactured from oil and used in solvents, degreasers, plastics, gasoline, paints, and some pesticides. These are volatile organic chemicals (VOCs). Community and NTNC systems test annually for VOCs, unless a monitoring waiver has been obtained. TNC systems are not required to sample for VOCs.

Radionuclides - Most radioactive substances or [Radionuclides](#), occur naturally in ground water and in some surface water supplies (lakes, streams). Some man-made radioactive substances may also enter the environment from hazardous waste dumps and nuclear power plants. When dissolved in water, radionuclides are colorless, odorless and tasteless, and therefore cannot be detected by our senses. [Radon](#), a radioactive gas, is highly soluble in water.

Lead and Copper - [Lead and copper](#) enter drinking water as a result of the corrosion, or wearing away of materials containing lead or copper in the water distribution piping and household plumbing. These materials include lead-based solder used to join copper pipe through 1986, leaded brass and chrome-plated brass faucets available until 2014, and in some cases, lead gooseneck connectors and service lines used through the 1950s to connect your house to the water main.

Per- and Polyfluoroalkyl Substances (PFAS) - [PFAS](#) are a group of synthetic chemicals that have been used for decades to manufacture household and commercial products that resist heat, oil, stains, grease, and water. They have been found to have contaminated some public drinking water

systems and private wells in NH. In 2019, NHDES adopted administrative rules that establish health-based MCLs. These rules went into effect for Public Water Systems in 2020. These rules do not require testing by owners of private water wells but NHDES does recommend for health reasons that private wells test for this contaminant.

As the Health Officer, you may be asked to test water for one or all of the contaminants listed above. You may direct community members to have water tested by one of the many [private water testing companies in NH](#) or you may, under the guidance of the [NH Public Health Lab](#), take a water sample and bring it to the lab for analysis. Resources are available in [NHDES Be Well Informed Guide](#) to interpret water analysis results.

Water Remediation

If MCL violations of chemical components are identified, the NHDES has developed [this factsheet](#) to provide guidance on available solutions. If microbial activity is identified in drinking water sources, [this factsheet](#) provides instructions for the disinfection of the drinking water source. Additional guidance for water remediation can be found in the [NHDES publications page](#).

BOIL ORDERS

All public water systems are required to test the water regularly for microbiological pathogens. As a safeguard until corrections can be made, NHDES may issue a boil water advisory to the PWS. **As the health officer, you shall receive an email notification from the NHDES when a boil water order is issued.** The notice generally advises that all water that is used for consumption should be brought to a boil, then kept at a vigorous boil for at least one minute. Such advisories may be issued for the detection of fecal coliforms including E. coli, a lapse in distribution system integrity causing a drop in positive pressure, or the detection or suspicion of waterborne pathogens.

[Boil water advisories](#) can be lifted by NHDES when system corrections have been completed and water quality indicators are acceptable. In the case of fecal coliform presence, the boil water advisory typically remains in effect until a minimum of two consecutive sets of samples show the absence of coliform and any outstanding system defects have been corrected.

PRIVATE WATER SYSTEMS

Almost half of New Hampshire residents use private wells for their home water supply. This means that although they may be drinking from a PWS at work or school, their home water supply comes from a private well. In some cases, several residences share a single well, but if fewer than 15 service connections or 25 people are included, it is considered a private well.

The construction of new wells is regulated by NHDES, however, water testing is not required by state law. Private well owners are responsible for their own water quality - they are encouraged to test their water, and to treat their water if contaminants are discovered above the health limits. More information on [private well testing can be found here](#).

NHDES also provides the [Be Well Informed web tool](#) for private well owners. When a private well owner enters the results of their well test into Be Well Informed they will receive a report indicating which contaminants, if any are above health limits. The report also indicates potential health risks of those contaminants, and recommends treatment systems which will remove those contaminants.

There are many barriers preventing private well owners from testing and treating their water, including lack of knowledge, cost and time. Health officers are encouraged to work with their towns and NHDES to hold workshops and well testing drives for their private well owners. These events have been growing in NH towns in recent years, and have been effective at increasing private well testing in towns that have held events. In a typical town private well event, NHDES presents an educational workshop on the common private well contaminants, potential health effects, the importance of water testing, and the NHDES *Be Well Informed* webtool for understanding test results and treatment options. The town Health Officer or other town representative may then coordinate a water testing option with a water testing lab. Test kits can be handed out at the workshop, and the town representative can schedule a time/date where residents can return their water samples, and be driven to the lab by the health officer or a lab courier. Health officers are encouraged to reach out to NHDES about scheduling an event.

The Environmental Public Health Tracking Program within the Department of Health and Human Services worked with partners in the NHDES and PHL to create a [Private Well Water Quality Dashboard](#) available through the [NH DHHS Data Portal](#). The Dashboard allows the user to choose from 14 common contaminants and multiple water quality measures at the town level, such as the number of wells tested and the percent of wells exceeding the drinking water standard for specific contaminants. These water quality measures can be used to get a better understanding of private well water quality trends observed in tested wells in your town, with comparison values for the county and state.

See [NHDES Private Wells](#) for more details on private well testing and treatment.

ROADSIDE SPRINGS

Throughout New Hampshire, there are sites where visitors drive up to locations with water flowing from a pipe, and fill water bottles, presumably using this water for drinking. These water sources, informally known as ‘roadside springs’, could contain contaminants that pose immediate and long term health risks. Roadside springs are not regulated as public water systems and are likely not regularly tested for contaminants. The source of the water is often unclear, and could be from a spring or a poorly constructed dug well. Springs and dug wells carry water that’s close to or at the land surface, so the water doesn’t get filtered by the soil and rock. They are more susceptible to contaminants that come from the land surface, especially bacteria such as E. coli that can cause acute health risks.

NHDES recommends health officers actively discourage residents from drinking from roadside springs. If a roadside spring is on town property or a town road right of way, the town may consider removing any piping or infrastructure, gating the area, or placing signage discouraging use. If the water source is on private property, health officers could work with the landowner to encourage them to discontinue the public’s use of the water. Health officers may also select an educational approach to discouraging use of roadside springs.

EDUCATIONAL RESOURCES

[Public Water Systems Monitoring | NH Department of Environmental Services](#)

[Ground Water and Drinking Water | US EPA](#)

[Small PWS Help Center | NH Department of Environmental Services](#)

[Accredited Laboratory Search \(state.nh.us\)](#)

[NH PFAS Investigation \(state.nh.us\)](#)

[Lead FAQs | NH Department of Environmental Services](#)

[Private Well Water Quality Dashboard](#)

[NH EPHT Private Well Water Factsheet](#)

PROGRAM CONTACTS

NH DES Drinking Water and Groundwater Bureau

General Information:

(603) 271-2513

dwgbinfo@des.nh.gov

<https://www.des.nh.gov/water/drinking-water/public-water-systems>

<https://www.des.nh.gov/water/drinking-water/private-wells>

NH DHHS Public Health Water Analysis Lab

(603) 271-3445

<https://www.dhhs.nh.gov/programs-services/environmental-health-and-you/water-testing>

Partial list of drinking water contaminants and their regulatory limits for public water systems

Total coliform	Not necessarily a health risk. Presence could be indicative of coliform bacteria or other microbial contaminants entering the well water.
<i>E.coli</i> *	Present is unacceptable
pH	Recommended 6.5 - 8.5
Hardness	No MCL
Iron **	SMCL = 0.30 mg/L
Manganese	MCL = 0.3 mg/L
Sodium	no MCL ***
Chloride **	SMCL = 250 mg/L
Nitrate *	MCL = 10 mg/L
Nitrite *	MCL = 1 mg/L
Fluoride *	MCL = 4.0 mg/L
Copper	*AL = 1.3 mg/L **SMCL = 1.0 mg/L
Lead *	*AL = 0.015 mg/L
Arsenic *	MCL = 0.005 mg/L
Uranium *	MCL=30 ug/L
Radium *	MCL = 5 pCi/L
Radon *	no MCL For private wells with radon concentrations at or above 10,000 pCi/L, the treatment of water is recommended in conjunction with mitigation of indoor air radon. For private wells with radon concentrations between 2,000 and 10,000 pCi/L, the treatment of water may be advisable if air concentrations in the home exceed 4 pCi/L.
Perfluorohexane sulfonic acid (PFHxS)	18 nanograms/L or parts per trillion
Perfluorononanoic acid (PFNA)	11 nanograms/L or parts per trillion
Perfluorooctane sulfonic acid (PFOS)	15 nanograms/L or parts per trillion
Perfluorooctanoic acid (PFOA)	12 nanograms/L or parts per trillion

- MCL Maximum contaminant level (health-based) – enforceable for public water systems
- SMCL Secondary maximum contaminant level – not based on health risk, but based on aesthetic concern
- AL Action level (at which a public water system would be required to address the issue)
- mg/L milligrams per liter
- pCi picocuries per liter
- * Primary standards are health-based
- ** Secondary standards are not health based, but are aesthetic parameters (may cause taste or odor issues or staining)
- *** Recommended limit of 20 mg/L sodium for persons on a doctor-prescribed “no-salt” diet