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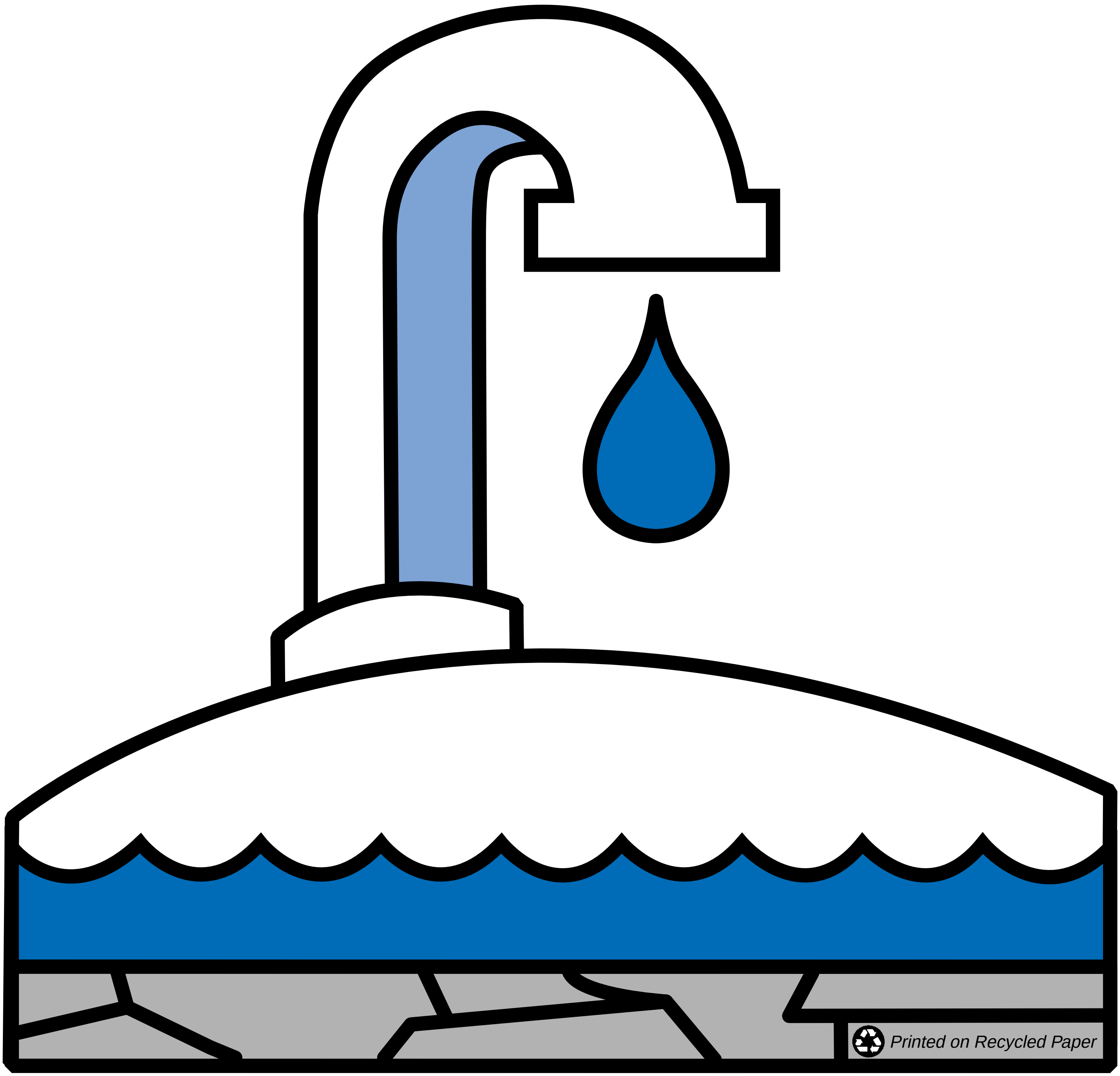
Water on Tap:

A Consumer's Guide to the Nation's Drinking Water



Foreword

Dear Friends of Drinking Water:

We are pleased that EPA has prepared the following report. This report provides information about the quality of U.S. drinking water safety, and addresses a variety of concerns that apply to many regions and situations.

The report stresses the need for all of us to take more individual and community-level responsibility for drinking water quality. We urge you to contact local utility officials with questions; read reports sent to you about the local water supply; and most importantly, become a good water steward yourself.

Everyone needs to help prevent contaminants from entering source waters in the first place. Protection of the watershed goes hand-in-hand with ensuring the appropriate treatment is provided by your utility. Begin with the information that EPA has prepared in this report, but don't stop there. Continue to learn more, and as you do, you'll also care more and do more for the drinking water that nourishes us all.

The National Drinking Water Advisory Council

Water on Tap: A Consumer's Guide to the Nation's Drinking Water

The United States enjoys one of the best supplies of drinking water in the world. Nevertheless, many of us who once gave little or no thought to the water that comes from our taps are increasingly asking the question: "Is my water safe to drink?" While tap water that meets federal and state standards generally is safe to drink, threats to drinking water quality and quantity are increasing. From short-term disease outbreaks linked to contaminated drinking water to restrictions on water use during droughts, we can no longer take our drinking water for granted.

People are asking many questions. How safe is my drinking water? Where does my drinking water come from, and how does it get to my home? My water may be safe now, but what about in the future? What can I do to help protect my drinking water?

This booklet provides answers to these and other frequently asked questions. It also describes changes in the Safe Drinking Water Act (SDWA) that will make new information available to consumers in the near future. The U.S. Environmental Protection Agency (EPA) wants to help consumers understand this new information and to encourage these informed consumers to become engaged citizens. The SDWA offers opportunities for citizens to participate in maintaining high quality drinking water. It is our shared responsibility, involving federal, state, and local government; water suppliers; **and the public** to help maintain the quality and quantity of our drinking water.

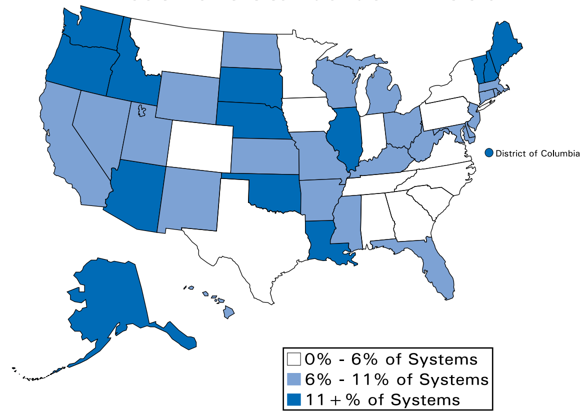
This booklet also directs you to more detailed sources of information to help you become an active participant in ensuring the quality of your drinking water. You can check with the resources in the Appendix, or call the EPA's Safe Drinking Water Hotline at (800) 426-4791 for information on how to get involved with drinking water protection.

The Bull Run Watershed provides drinking water for Portland, Oregon.

City of Portland, Oregon Bureau of Water Works

How Safe Is My Drinking Water?

Community Water Systems Violating Maximum Contaminant Levels or Treatment Standards in 1996



Most community water suppliers deliver high quality drinking water to millions of Americans every day. Of the more than 55,000 Community Water Systems in the United States, only 4,769 or 8.6 percent reported a violation of one or more drinking water health standards in 1996. (See pages 3 and 4 for more information about what constitutes a violation.)

Nationwide, drinking water systems have spent hundreds of billions of dollars to build drinking water treatment and distribution systems, and they spend an additional $22 billion per year to operate and maintain them. Additional monies became available in 1997 to upgrade drinking water systems and implement local source water protection activities. (See page 12 for more details.)

In addition, there is a network of government agencies whose job is to ensure that public water supplies are safe. Nonetheless, problems with local drinking water can, and do, occur.

Why Does EPA Allow Any Contaminants in Drinking Water?

All sources of drinking water contain some naturally occurring contaminants. Because water is the universal solvent, many materials are easily dissolved upon contact. At low levels, these contaminants generally are not harmful in our drinking water. Removing all contaminants would be extremely expensive and in nearly all cases would not provide greater protection of health. A few of the naturally occurring substances may actually improve the taste of drinking water and may have nutritional values at low levels.

What Problems Can Occur?

As development in our modern society increases, there are growing numbers of threats that could contaminate drinking water. Suburban sprawl has encroached upon once-pristine watersheds, bringing with it all of the by-products of our modern life style. Actual events of serious drinking water contamination occur infrequently, and typically not at levels posing near-term health concern. Nonetheless, with the threats of such events increasing, we cannot take drinking water safety for granted. Greater vigilance by you, your water supplier, and your government is vital to ensure that such events do not occur in your water supply.

Microbiological and chemical contaminants can enter water supplies. These materials can be the result of human activity or can be found in nature. For instance, chemicals can migrate from disposal sites and contaminate sources of drinking water. Animal wastes and pesticides may be carried to lakes and streams by rainfall runoff or snow melt. Human wastes may be discharged to receiving waters that ultimately flow to water bodies used for drinking water. Coliform bacteria from human and animal wastes may be found in drinking water if the water is not properly treated or disinfected. These bacteria are used as indicators that other harmful organisms may be in the water.

The potential for health problems from drinking water is illustrated by localized outbreaks of waterborne disease. Many of these outbreaks have been linked to contamination by bacteria or viruses, probably from human or animal waste. In 1993 and 1994, for example, there were 30 reported disease outbreaks associated with drinking water, 23 associated with public drinking water supplies and 7 with private wells.

Certain pathogens, such as *Cryptosporidium*, may pass through water treatment filtration and disinfection processes in sufficient numbers to cause health problems. *Cryptosporidium* is a protozoa that causes the gastrointestinal disease cryptosporidiosis. The most serious, and sometimes deadly, consequences of cryptosporidiosis tend to be focused among sensitive members of the population, such as individuals with immune system deficiencies.

A 1993 outbreak of cryptosporidiosis in Milwaukee, Wisconsin, is the largest outbreak of waterborne disease in the United States. Lake Michigan is the source of Milwaukee's water, which is treated by filtration and disinfection. Due to an unusual combination of circumstances during a period of heavy rainfall and runoff the treatment plant was ineffective, resulting in an increase in the turbidity of the treated water. Increased turbidity can be, and was in this case, an indicator of higher levels of *Cryptosporidium*. Over 400,000 persons were affected by the disease, more than 4,000 were hospitalized, and over 50 deaths (some counts are as high as 100) have been attributed to the disease. The original source of contamination is uncertain.

Nitrate in drinking water at levels above the national standard poses an immediate threat to young children. Excessive levels can result in a condition known as "blue baby syndrome." If untreated, the condition could be fatal.

Boiling water contaminated with nitrate increases the nitrate concentration and the potential risk. Persons worried about nitrate should talk with their doctor about alternatives to using boiled water in baby formula.

Naturally occurring contaminants also are being found in drinking water. For example, the radioactive gas radon-222 occurs in certain types of rock and can get into ground water. People can be exposed to radon in water by drinking it, while showering, or when washing dishes. The primary source of exposure to radon in the home is radon seeping out of the soil and into the basement air.

Where Can I Get More Information About My Water?

Information on water quality in your area is available from several sources, including your local public health department and your water supplier. You can determine whom to contact by checking your water bill or by calling your local town hall.

State agencies also can provide extensive information on your water supply and its quality. Each state has a department responsible for drinking water quality.

EPA maintains general water resources information at its headquarters and in its 10 regional offices. Other groups, such as environmental organizations, also may be able to provide information. Appendix C lists organizations that can answer your questions and provide additional information.

How Does EPA Set Drinking Water Standards?

EPA has issued drinking water standards, or Maximum Contaminant Levels (MCLs) for more than 80 contaminants. (See Appendix A.) The standards limit the amount of each substance allowed to be present in drinking water.

A process called risk assessment is used to set drinking water quality standards. When assessing the cancer and non-cancer risks from exposure to a chemical in drinking water, the first step is to measure how much of the chemical could be in the water. Next, scientists estimate how much of the chemical the average person is likely to drink. This amount is called the exposure. In developing drinking water standards, EPA assumes that the average adult drinks 2 liters of water each day throughout a 70-year life span.

Risks are estimated separately for cancer and non-cancer effects. For cancer effects, a risk assessment estimates a measure of the chances that someone may get cancer because they have been exposed to a drinking water contaminant. EPA generally sets MCLs at levels that will limit an individual's risk of cancer from that contaminant to between 1 in 10,000 and 1 in 1,000,000 over a lifetime. For non-cancer effects, the risk assessment estimates an exposure level below which no adverse effects are expected to occur.

MCLs are set based on known or anticipated adverse human health effects, the ability of various technologies to remove the contaminant, their effectiveness, and cost of treatment. All MCLs are set at levels that protect public health. The limit for many substances is based on lifetime exposure so, for most potential contaminants, short-term exceedances pose a limited health risk. The exceptions are the standards for coliform bacteria and nitrate, for which exceedances can pose an immediate threat to health.

To comply with MCLs, public water systems may use any state-approved treatment. When it is not economically or technologically feasible to set an MCL for a contaminant—for example, when the contaminant cannot be easily measured—EPA may require use of a particular treatment technique instead. The technique specifies the design for part of the drinking water treatment process.

How Many Public Water Systems Have Exceeded The MCLs And Treatment Requirements?

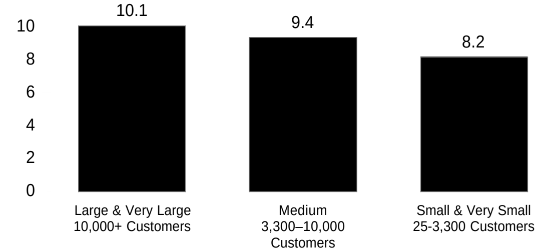
Currently, the nation's approximately 55,000 Community Water Systems (CWSs) must test for more than 80 contaminants. In 1996, 4,151 systems, or 7 percent, reported one or more MCL violations, and 681 systems (less than 2 percent) reported violations of treatment technique standards.

Who Makes Sure That My Drinking Water Supply Is Safe?

Local governments, public water systems, the states, and EPA work together towards the goal of ensuring that all public water supplies are safe. For households on private wells, state and local health departments usually have some standards for the drinking water, but it is generally up to the homeowner to maintain the quality of the drinking water.

Local governments have a direct interest in protecting the quality of their drinking water source, be it ground water or surface water. They may be responsible for overseeing land uses that can affect the quality of untreated source water. Public water systems have a responsibility to maintain sound treatment works and water distribution networks. They are responsible for ensuring that the water

Percentage of CWSs Violating MCLs or Treatment Techniques, by System Size in 1996



Source: Safe Drinking Water Information System

they supply does not contain contaminants at levels higher than the law allows.

Prior to 1974 each state ran its own drinking water program and set the standards that had to be met at the local level. As a result, drinking water protection standards differed from state to state. Since 1974, when Congress passed the original Safe Drinking Water Act, EPA has set uniform nationwide minimum standards for drinking water. State public health and environmental agencies have the primary responsibility for ensuring that these federal drinking water quality standards, or more stringent ones required by the state, are met by each public water supplier.

When a state water agency or water supplier announces that the standard for a particular contaminant has been exceeded, that may or may not by itself be a cause for alarm, but it can be a cause for action. It is a safety precaution required by the law to alert the public to deficiencies in drinking water quality.

Boil Water Notices

When microorganisms such as those that indicate fecal contamination are found in drinking water, water suppliers may be required to issue "boil water notices." Boiling water kills the organisms that can cause disease. Therefore, the notices serve as a precaution for the public.

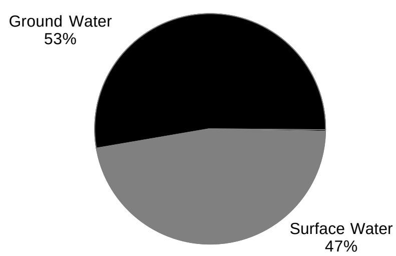
Boil water notices are being issued more frequently in recent years. In fact, in 1993 notices were issued by water suppliers in New York City and the District of Columbia, which together serve more than 7.1 million people. At least 725 other communities have also issued notices affecting almost 3 million people in the past few years.

Where Does My Drinking Water Come From?

Drinking water comes from surface water and ground water. Large-scale water supply systems tend to rely on surface water resources, and smaller water systems tend to use ground water. Including the approximately 23 million Americans who use ground water as a private drinking water source, slightly more than half of the population receives its drinking water from ground water sources.

Surface water includes rivers, lakes, and reservoirs. Ground water is pumped from wells that are drilled into aquifers. Aquifers are geologic formations that contain water. The quantity of water in an aquifer and the water produced by a well depend on the nature of the rock, sand, or soil in the aquifer where the well withdraws water. Drinking water wells may be shallow (50 feet or less) or deep (more than 1,000 feet). Your water utility or your public works department can tell you the source of your public drinking water supply.

Percentage of Population Using Ground Water and Surface Water



Source: USGS 1986 National Water Summary

What is a Public Water System?

The SDWA defines a public water system as one that serves piped water to at least 25 persons or 15 service connections for at least 60 days per year. Such systems may be owned by homeowner associations, investor-owned water companies, local governments, and others. Water that does not come from a public water supply, and which serves one or only a few homes, is called a private supply.

Community water systems are public systems that serve people year-round in their homes. EPA also regulates other kinds of public water systems—such as those at schools, factories, campgrounds, or restaurants—that have their own water supply. The data shown in this report cover only community water systems because they are the source of most drinking water.

How Does Water Get To My Faucet?

In a typical community water supply system, water is transported under pressure through a distribution network of buried pipes. Smaller pipes, called house service lines, are attached to the main water lines to bring water from the distribution network to your house. In many community water supply systems, water pressure is provided by pumping water up into storage tanks that store water at higher elevations than the houses they serve. The force of gravity then "pushes" the water into your home when you open your tap. Houses on a private supply usually get their water from a private well. A pump brings the water out of the ground and into a small tank within the home, where the water is stored under pressure.

How Do Public Water Suppliers Treat My Water To Make It Safe?

Water suppliers use a variety of treatment processes to remove contaminants from drinking water. These individual processes may be arranged in a "treatment train" to remove undesirable contaminants from the water. The most commonly used processes include filtration, flocculation and sedimentation, and disinfection. Some treatment trains also include ion exchange and adsorption. A typical water treatment plant would have only the combination of processes needed to treat the contaminants in the source water used by the facility. **If you want to**

know what types of treatment are used for your water supply, contact your local water supplier or public works department.

Flocculation/Sedimentation

Flocculation refers to water treatment processes that combine small particles into larger particles, which settle out of the water as sediment. Alum and iron salts or synthetic organic polymers (alone, or in combination with metal salts) are generally used to promote coagulation. Settling or sedimentation is simply a gravity process that removes flocculated particles from the water.

Filtration

Many water treatment facilities use filtration to remove remaining particles from the water supply. Those particles include clays and silts, natural organic matter, precipitants from other treatment processes in the facility, iron and manganese, and microorganisms. Filtration clarifies water and enhances the effectiveness of disinfection.

Ion Exchange

Ion exchange processes are used to remove inorganic constituents if they cannot be removed adequately by filtration or sedimentation. Ion exchange can be used to treat hard water. It can also be used to remove arsenic, chromium, excess fluoride, nitrates, radium, and uranium.

Adsorption

Organic contaminants, color, and taste- and odor-causing compounds can stick to the surface of granular or powdered activated carbon (GAC or PAC). GAC is generally more effective than PAC in removing these contaminants. Adsorption is not commonly used in public water supplies.

Disinfection (chlorination, ozonation)

Water is often disinfected before it enters the distribution system to ensure that dangerous microbes are killed. Chlorine, chloramines, or chlorine dioxide most often are used because they are very effective disinfectants, and residual concentrations can be maintained to guard against biological contamination in the water distribution system. Ozone is a powerful disinfectant, but it is not effective in controlling biological contaminants in the distribution pipes.

EPA is in the process of developing regulations limiting the amount of disinfection by-products (DBPs). DBPs are contaminants that form when disinfectants react with organic matter that is in treated drinking water. Long-term exposure to some DBPs may increase the risk of cancer or other adverse health effects.

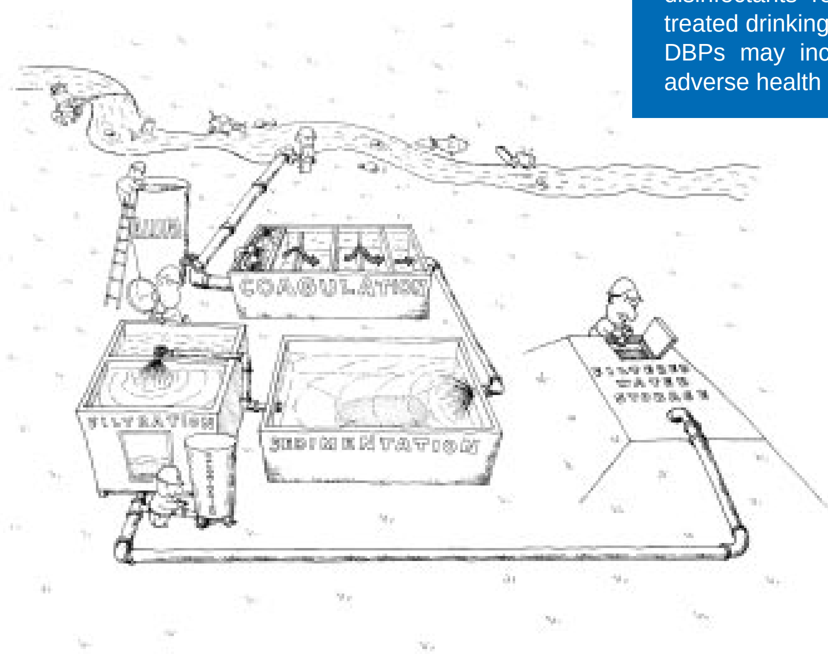


Illustration adapted with permission from a publication of the East Bay Municipal Utility District, Oakland, California

How Much Does It Cost To Treat And Deliver My Drinking Water?

On a per gallon basis, water is cheap. On average, water costs are slightly more than $2 per 1,000 gallons, although the costs tend to be lower for large water systems. Treatment accounts for about 15 percent of that cost. Other costs are for equipment (such as the treatment plant and distribution system) and labor for operation and maintenance of the system.

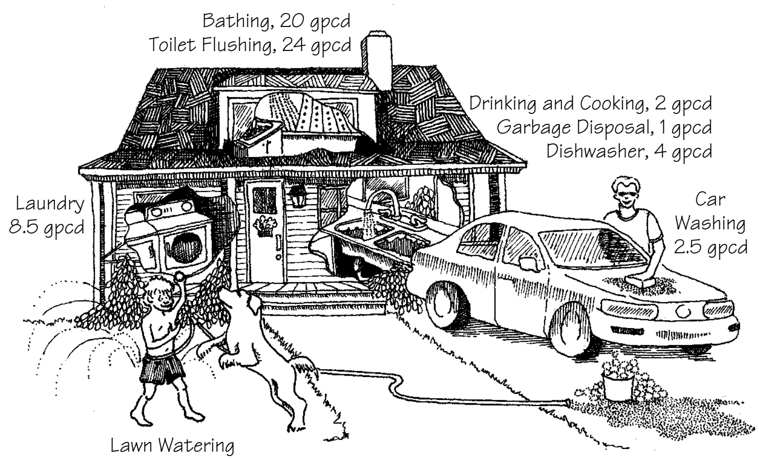
How Much Drinking Water Do We Use In Our Homes?

On average, our society uses almost 100 gallons of drinking water per person per day. Traditionally, water use rates are described in units of gallons per capita per day (gpcd), gallons used by one person in one day. Of the “drinking water” supplied by public water systems, only a small portion is actually used for drinking. As residential water consumers, we use most water for other purposes, such as toilet flushing, bathing, cooking, cleaning, and lawn watering.

The amount of water we use in our homes varies during the day:

- Lowest rate of use - 11:30 p.m. to 5:00 a.m.
- Sharp rise/high use - 5:00 a.m. to noon. (Peak hourly use from 7:00 a.m. to 8:00 a.m.)
- Moderate use - noon to 5:00 p.m. (Lull around 3:00 p.m.)
- Increasing evening use - 5:00 to 11:00 p.m. (Second minor peak, 6:00 to 8:00 p.m.)

Common Household Uses of Drinking Water*
(Gallons per Capita per Day)



Source: Van Der Leeden, F., F.L. Troise, and D.K. Todd. The Water Encyclopedia. Lewis Publishers, Inc. Second Edition, 1990.

I’ve Heard That Households In The U.S. Use A Lot Of Water Compared To Other Countries. Is That True?

Yes. The United States uses more water than other countries, even those that are equally well developed. In the United States, significant amounts of water are used for lawn and garden sprinkling, automobile washing, and kitchen and laundry appliances, such as garbage disposals, clothes washers, and automatic dish washers.

Water Use in Different Countries

Country	Annual Water Use per Capita (Gallons)	Percentage of Total Water Use by Category	
		Residential	Industry/ Agriculture*
United States	525,000	10	90
Canada	310,000	13	87
Belgium	221,000	6	94
India	132,000	3	97
China	122,000	6	94
Poland	112,000	14	86
Nicaragua	72,000	18	82
Malta	16,000	100	0

*Includes water used for electrical power and for cooling.

Source: Van Der Leeden, F., F.L. Troise, and D.K. Todd. The Water Encyclopedia. Lewis Publishers, Inc. Second Edition, 1990.

We use tap water for various purposes. A typical family of four on a public water supply uses about 350 gallons per day at home. In contrast, a typical household that gets its water from a private well or cistern uses about 200 gallons for a family of four. In our communities an additional 35 gallons of water per person are used for public activities such as fire fighting, street washing, and park maintenance.

Commercial and industrial businesses may also place heavy demands on public water supplies in developed countries. In most water supply systems, the predominant number of user connections are residences, but the few connections to nonresidential customers may account for a significant portion of the system-wide water use.

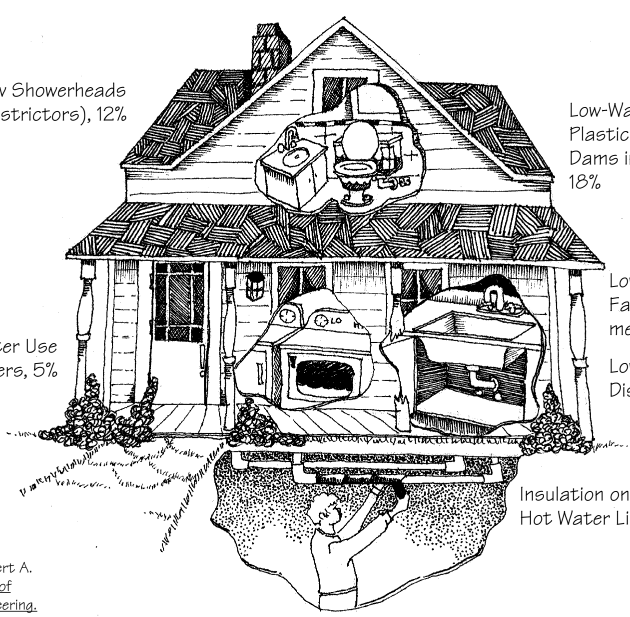
How Do Water Utilities Ensure Adequate Drinking Water Supplies?

Water utilities forecast water source availability, growth in population, and water demand to ensure adequate future water supplies during normal conditions and periods of drought. When water shortages are predicted or experienced, water utilities have many options for conserving water. Temporary cutbacks or permanent operating adjustments can help conserve water. Permanent conservation measures may include:

- Subsidizing use of water-efficient faucets, toilets, and showerheads
- Public education and voluntary use reduction
- Billing practices that impose higher rates for higher amounts of water use
- Building codes that require water-efficient fixtures or appliances
- Leak detection surveys and meter testing, repair, and replacement
- Reduction in use and increase in recycling of industrial water

Ways To Save Water At Home*

(*Water Savings as Percent of Total Interior Water Use)



Source: Corbitt, Robert A. Standard Handbook of Environmental Engineering. McGraw-Hill, Inc. 1989.

Temporary cutbacks may include:

- Reduction of system-wide operating pressure
- Water use bans, restrictions, and rationing

How Can I Reduce The Amount Of Drinking Water I Use?

There are many ways to conserve water that result in significant reductions. For example, residential water consumption can be reduced by using water-efficient fixtures (faucets, toilets, and showerheads) and appliances, and through better managed lawn watering. The graphic at the lower left shows the relative effectiveness of residential techniques used to reduce water use. Possible water savings are indicated as a percentage of total interior water use for conservation methods such as low-water use toilets, water-efficient faucets, and low-water use appliances.

Can Business Also Reduce Water Use?

Water can be conserved in the industrial and commercial sectors through recycling and waste reduction. Industry has implemented conservation measures to comply with state and federal water pollution controls. Evaluation of industrial plant data may show that a particular process or manufacturing step uses the most water or causes the greatest contamination. Such areas can be targeted for water conservation, thus saving on plant-wide water use. Also, water that is contaminated by one process may be usable in other plant processes that do not require high-quality water.

How Will I Know If My Drinking Water Remains Safe In The Future?

I've Heard That A New Law Was Passed By Congress. What Will That Do For My Drinking Water?

President Clinton signed the Safe Drinking Water Act (SDWA) Amendments of 1996 on August 6, 1996. The 1996 SDWA amendments require that consumers receive more information about the quality of their drinking water supplies and what is being done to protect them. The amendments also provide new opportunities for public involvement and provide an increased emphasis on protecting the sources of local drinking water.

What Information Can I Expect To Receive?

Water suppliers must promptly tell you if your water has become contaminated by something that can cause immediate illness. The 1996 SDWA Amendments specified new time frames for notification of violations. Water systems now have 24 hours to inform their customers of violations of EPA standards "that have the potential to have serious adverse effects on human health as a result of short-term exposure." If such a violation occurs, the system will announce it through the media and provide information about:

- The potential adverse effects on human health,
- The steps that the system is taking to correct the violation, and
- The need to use alternative water supplies (such as boiled water or bottled water) until the problem is corrected.

Systems will inform customers about violations of less immediate concern in the first water bill sent out after the violation, in an annual report, or by mail within a year.

Beginning in 1998, your state will compile information from individual systems so that you can evaluate the overall quality of drinking water in your state. EPA must compile and summarize the state reports into an annual report on the condition of the nation's drinking water.

The SDWA amendments also require EPA to publish regulations that will require systems to prepare consumer confidence reports. These con-

The SDWA Amendments stress efforts to protect source water.

sumer confidence reports at a minimum will provide:

- Information about where your drinking water comes from,
- Results of monitoring that the system performed during the year, and
- Information on health concerns associated with violations that occurred during the year.

Beginning in 1999, systems will have to prepare and distribute the reports annually. Systems serving fewer than 10,000 persons will, at the Governor's option, be able to make the reports available to the public in ways other than mailing them.

How Often Is My Water Supply Tested?

EPA has established pollutant-specific minimum testing schedules for public water systems. To find out how frequently your drinking water is tested, contact your water system or state agency in charge of drinking water.

The table on this page shows the major groups of contaminants and the minimum frequency that public water systems must test for them. If a problem is detected, there are immediate retesting requirements that go into effect and strict instructions for how the system informs the public about the problem. Until the system can reliably demonstrate that it is free of problems, the retesting is continued.

In 1996, one out of five CWSs did not conduct testing or report the results for all of the monitoring required to verify drinking water safety. Although failure to monitor does not necessarily suggest safety problems, conducting the required monitoring and

Sample Monitoring Schedule

Contaminant	Minimum Monitoring Frequency
Acute Contaminants	
Bacteria	Monthly or quarterly, depending on system size and type
Protozoa and Viruses	Continuous monitoring for turbidity, monthly for total coliforms, as indicators
Nitrate	Annually
Chronic Contaminants	
Volatile Organics (e.g., benzene)	Ground water systems, annually for 2 consecutive years; surface water systems, annually
Synthetic Organics (e.g., pesticides)	Larger systems, twice in 3 years; smaller systems, once in 3 years
Inorganics/Metals	Ground water systems, once every 3 years; surface water systems, annually
Lead and Copper	Annually
Radionuclides	Once every 4 years

General requirements may differ slightly based on the size or type of drinking water system.

Federal drinking water standards protect the public.

reporting is critical to ensure that problems will be detected. Consumers can help make certain monitoring and reporting requirements are met by first contacting their state drinking water agency to determine if their water supplier is meeting all requirements. If the water supplier is not meeting the requirements, consumers can work with local and state officials and their water supplier to ensure that the required monitoring gets done.

Can Water Systems Be Excused From Monitoring For Some Contaminants?

In some cases, yes. Over time, public water systems should better understand the likely threats to their water supplies by reviewing test results and keeping a watchful eye on threats to their drinking water sources. If a system does not have water quality problems, it can apply to the state for permission to test less frequently for certain contaminants. If, after scientific analysis, state regulators believe it is unlikely that human or natural activities will affect the system's water quality in the future, they may grant the request to avoid unnecessary testing.

A waiver from the monitoring requirements in no way reduces the water supplier's responsibility to provide high-quality water; on the contrary, it is a privilege awarded only to the suppliers who can ensure the reliable delivery of safe water to their customers. Testing continues, but at a reduced frequency. At the first indication of any problem — or *likelihood* of a problem — the system must notify the state and the state may instruct the system to return to a more rigorous monitoring schedule.

Does This New Safe Drinking Water Act Do Anything Else To Keep My Drinking Water Safe In The Future?

The 1996 SDWA includes many new provisions that will help states and water systems improve the quality of drinking water by preventing problems *before* they occur. Under the new source water protection provisions, for example, each state must develop a program to identify potential contamination threats and determine the susceptibility of drinking water sources such as wells or reservoirs to activities that may harm the source water. The source water assessments will provide the information necessary for states and localities to protect source water from contamination. Substantial federal funding is provided to states for assessments and for source water protection programs if states choose to operate such a program.

The new law also will help prevent problems by ensuring that water systems are operated by qualified professionals. Each state must carry out an "operator certification program," including training and certification for individuals responsible for operating the drinking water plant. Most states required operator certification before it was mandated by federal law. Many very small water systems that cannot afford a full-time operator use "circuit riders" who travel from system to system providing technical assistance and making sure that the plant is operating correctly. States must establish programs to ensure that the water systems have sufficient technical, managerial, and financial capacity to reliably deliver safe drinking water.

Other Sources of Funding Assistance Are Available

The 1996 SDWA Amendments will provide up to $9.6 billion over the next 6 years for improving drinking water infrastructure. Other sources of funding also are available to water systems through the U.S. Department of Agriculture's Rural Utility Service (RUS).

RUS administers a water and wastewater loan and grant program as part of the Water 2000 initiative, which is aimed at providing clean, safe, and affordable drinking water to all rural homes by the year 2000. Under the RUS programs, rural areas and small cities and towns can receive loans or grants to restore a deteriorating water supply, upgrade a water or wastewater facility, or develop new systems. In Fiscal Year 1997, Congress appropriated approximately $740 million for direct and guaranteed loans and approximately $500 million for grants under the RUS programs.

Funding to improve water treatment and distribution systems may also be available from the Department of Housing and Urban Development's Community Development Block Grant Program, the Economic Development Administration, Appalachian Regional Commission, and the Indian Health Service. Additional information about these programs is available from the contacts listed at the end of this document.

How Can I Help To Protect My Drinking Water Supply?

Drinking water protection is a shared responsibility, involving water suppliers, local and state governments, business, and individuals. We all have an important role to play, and as private citizens we have many opportunities. Environmental protection activities such as watershed protection projects are taking place across the United States. Clean and healthy watersheds are vital to safe drinking water.

Other opportunities to be involved in drinking water protection are discussed in the rest of this section.

What Programs Are Underway To Protect Water Supplies?

Wellhead protection is a process for protecting individual communities' underground sources of drinking water. These programs focus on areas thousands of square feet to a few square miles immediately surrounding a community water supply well. State and local governments began developing wellhead protection programs in the late 1980s, and more than 10,000 programs have been started throughout the United States.

Sole source aquifer protection programs also protect ground water supplies, but usually over a much larger area than that covered by wellhead protection programs. They focus on government-funded projects that may affect the aquifer.

EPA is encouraging states and communities to undertake source water protection programs, which apply the principles of wellhead protection to surface water as well as ground water supplies of drinking water.

Source water protection should be a critical part of all community water programs. In the past, water suppliers used most of their resources to treat water from rivers, lakes, and underground sources of drinking water before supplying it to our homes as drinking water. Now, we understand that if we place greater emphasis on *protecting* our sources of drinking water, the need for treatment can be reduced.

The general components of a source water protection program include:

- **Delineation:** Identifying the area of land that water passes through to reach the drinking water intake.
- **Contaminant source inventory:** Mapping the locations of potential sources of drinking water contamination.
- **Source water protection area management:** Using regulatory controls, such as zoning or health ordinances, or nonregulatory controls, such as technical assistance to businesses and public education, to keep contaminants out of drinking water supplies.
- **Contingency planning:** Plan special actions in case a sudden event (for instance, a flood or spill) occurs that threatens the drinking water supply.

The Partnership for Safe Water is a voluntary self-assessment and peer-review process to help water utilities ensure high drinking water quality. Public water supply systems that use surface water and that have filtration treatment are eligible to participate. Contact the American Water Works Association (see Appendix C) or your water supplier to find out if they are part of the Partnership.

How Can I Get Involved To Protect Water Supplies?

Many communities are in the process of implementing source water protection programs. Your local water supplier can tell you whether your community has a source water protection program.

Source water protection works by involving all members of the community. Citizens can voice their support for controlling how land is used near drinking water intakes.

Citizens can also educate their neighbors about the danger that household chemicals pose to drinking water supplies. Many communities sponsor household hazardous waste disposal days to promote proper handling of waste paints and thinners, pesticides, used oil, and other hazardous materials. Your state or local environmental agency should have information about such programs in your community.

What Legal Options Do I Have To Improve My Drinking Water Quality?

The 1996 amendments to the Safe Drinking Water Act provide many opportunities for public involvement. The new law gives states flexibility and funding to tailor the new program efforts to improve source water protection and water system capacity to meet each state's unique needs and conditions. The amendments emphasize public participation and consumer right-to-know to ensure that states' choices respond to their constituents' needs and conditions. States must involve or consult with the public about key decisions on their source water assessment programs, on how states will work with water systems to improve their operations, on which specific drinking water improvement projects they will fund, and on how much money they plan to use for their source water protection and capacity programs. Contact your state drinking water program for further information on specific opportunities to participate.

In addition to commenting on proposed drinking water regulations, citizens may file lawsuits in federal court under the federal Safe Drinking Water Act and many state drinking water laws in response to violations of drinking water standards by water suppliers. At least 60 days before filing such a suit, the citizen must provide notice to EPA, the state in which the violation allegedly occurred, and the alleged violator. The purpose of the notice is to encourage the violator to take voluntary action to fix the violation before the courts get involved. An individual believed to have been harmed by a contaminated drinking water supply may also have rights and remedies under state law.

Federal and state agencies also may take legal action to enforce drinking water laws. These legal actions typically involve public hearings or other opportunities for citizen comment. The actions can result in fines or penalties, or in the rare case of criminal violations, jail time for a water supplier, or injunctions to prevent further harmful actions by a water supplier. Citizens can assist with government enforcement by providing information to states and the federal government on potential violations of drinking water laws, or by participating in enforcement proceedings.

Successful Source Water Protection

Elkhart, Indiana began developing a source water protection program in the late 1980s, after being forced to close one of its drinking water wellfields when dangerous chemical solvents were found in the drinking water supply.

Officials in Elkhart realized that they needed an efficient way to inventory and map all of the potential sources of contamination that could reach their new drinking water supply. They discovered that retired senior volunteers are an excellent resource for conducting the inventories.

By working with the Service Corps of Retired Executives and the American Association of Retired Persons, Elkhart recruited 20 senior volunteers, from a list of over 400 potential volunteers, to conduct the inventories. Working with city staff, the senior volunteers visited homes and businesses throughout Elkhart and mapped 280 potential contaminant sources for management. Management controls include zoning/land use control and technical assistance. So far, Elkhart has been successful in keeping its drinking water sources clean.

What Can I Do If There Is A Problem With My Drinking Water?

Local incidents, such as spills and treatment problems, can lead to short-term needs for alternative water supplies or in-home water treatment. In isolated cases, individuals have needed to rely on alternative supplies for the long term because of their individual health needs or problems with obtaining new drinking water supplies.

Local water suppliers are required to notify you if there is a problem with your drinking water. In addition, if you suspect a problem, you can hire a laboratory to analyze your drinking water.

Are Alternative Water Supplies Available? What About Bottled Water?

Yes, alternative sources of water are available. Bottled water is sold in supermarkets and convenience stores. Some companies lease or sell water dispensers or bubblers and regularly deliver large bottles of water to homes and businesses. Bottled water is very expensive compared to water from a public water system. Bottled water quality varies among brands, because of variations in the source water used, costs, and company practices.

The U.S. Food and Drug Administration (FDA) regulates bottled water used for drinking. FDA imposes quality standards that are equivalent to EPA's drinking water standards. Source water and product water must be periodically sampled and analyzed for compliance with quality standards for microbiological contaminants, radionuclides, organics and inorganics. FDA has adopted regulations to ensure fair labeling practices. These include standard definitions for sources such as mineral water, artesian water, ground water, and distilled water. Requirements are also established for the nutritional content of bottled water, as part of normal food labeling regulations. As an additional safeguard, FDA recommends that bottled water be handled like other food products and refrigerated after opening.

A shopper purchases bottled water during Milwaukee, Wisconsin's 1993 Cryptosporidiosis outbreak.

AP/World Wide Photos

Can I Do Anything In My House To Improve The Safety Of My Drinking Water?

You can choose to install a home water treatment device to add a factor of safety, or to address concerns about the taste of your water. Point-of-use (POU) systems treat water at a single tap. Point-of-entry (POE) systems treat water used throughout a house. POU systems can be installed in various places in the home, including on the counter top, at the faucet itself, or under the sink. POE systems are installed where the water line enters the house.

POU and POE devices are based on various contaminant removal technologies. Filtration, ion exchange, reverse osmosis, and distillation are some of the treatment methods used. All types of units are generally available from retailers, or by mail order. Prices can range well into the hundreds of dollars. Depending on the method and location of installation, plumbing changes can also add to costs.

Home filtration units use activated carbon filters, which adsorb organic contaminants and constituents that cause taste and odor problems. Depending on their design, some units can remove chlorination by-products, some cleaning solvents, and pesticides. To maintain the effectiveness of these units, the carbon canisters must be replaced periodically. Activated carbon filters are not efficient in removing metals such as lead and copper.

Because ion exchange units can be used to remove minerals from your water, particularly calcium and magnesium, they are sold for water softening. Some ion exchange softening units remove radium and barium from water. Ion exchange systems that employ activated alumina are used to remove fluoride and arsenate from water. These units must be regenerated periodically with salt.

Reverse osmosis treatment units generally remove a more diverse list of contaminants than other systems. They can remove nitrates, sodium, other dissolved inorganics, and organic compounds.

Distillation units boil water and condense the resulting steam to create distilled water. Depending on their design, some of these units may allow vaporized organic contaminants to condense back into the product water, thus minimizing the removal of organics.

You may choose to boil your water to remove microbial contaminants. Keep in mind that boiling reduces the volume of water by about 20 percent, thus concentrating other contaminants not affected by the temperature of boiling water, such as nitrates and pesticides.

Maintaining Treatment Devices

All POU and POE treatment units need maintenance to operate effectively. If they are not maintained properly, contaminants may accumulate in the units and actually make your water worse. In addition, some vendors may make claims about their effectiveness that have no merit. Units should be tested for conformance with standards of the National Sanitation Foundation (NSF) or the Water Quality Association. EPA does not test or certify these treatment units.

Where Can I Learn About the Effectiveness Of These Devices?

Your local library has articles, such as those found in consumer magazines, on the effectiveness and cost of these devices.

Copies of a booklet *Drinking Water: Inadequate Regulation of Home Treatment Units Leaves Consumers at Risk* (December 1991) are available from the U.S. General Accounting Office, P.O. Box 6015, Gaithersburg, MD 20884-6015 (phone: (202) 512-6000).

Organizations you can contact for more information on home treatment units are:

The National Sanitation Foundation
3475 Plymouth Road
P.O. Box 1468
Ann Arbor, MI 48106
(800) 673-8010
web: http://www.nsf.org

The Water Quality Association
Consumer Affairs Department
P.O. Box 606
Lisle, IL 60532
(800) 749-0234
web: http://www.wqa.org

What Do I Need to Know to Protect My Private Drinking Water Supply?

Approximately 23 million U.S. citizens rely on their own private drinking water supplies. Most of these supplies are drawn from ground water through wells, but some households also use water from streams or cisterns. These households must take special precautions to ensure the protection and maintenance of their drinking water supplies.

A laboratory technician prepares a drinking water sample for analysis

Jim Walasek

How Can I Test The Quality Of My Private Drinking Water Supply?

Private water supplies should be tested annually for nitrate and coliform bacteria to detect contamination problems early. They should be tested more frequently and for more potential contaminants, such as radon or pesticides, if a problem is suspected.

Many laboratories are available to test water quality. Lists of laboratories certified by your state or the U.S. EPA may be available from your local or state public health department. Some local health departments also test private water for free. Phone numbers for your local, county, or state health department are available under the government listings in your phone book.

If you use a private laboratory to conduct the testing, nitrate and bacteria samples will typically cost between $10 and $20 to complete. Testing for other contaminants will be more expensive. For example, testing for pesticides or organic chemicals may cost from several hundred to several thousand dollars.

The laboratory usually supplies sample bottles. Depending on the type of test to be completed, the bottles may contain preservatives or include special instructions for handling the samples. Private water can most easily be sampled at the drinking water tap by carefully filling the bottles to avoid spilling or getting other contaminants into the bottle. For nitrates and other basic water tests, the bottles can usually be mailed to the laboratory. Some tests, such as those for coliform bacteria, may require that the sample bottles be kept cool until they are delivered to the laboratory for analysis.

Most laboratories mail back the sample results within days or several weeks. The results typically indicate whether a particular contaminant was detected in the sample. If a contaminant is detected, the results will include the concentration of the contaminant and an indication of whether this concentration exceeds a drinking water quality standard. If a standard is exceeded in your sample, you should retest the water supply immediately and contact your public health department for assistance. Some problems can be handled quickly. For example, high bacteria concentrations can sometimes be controlled by disinfecting a well. Filters or other on-site treatment processes may also remove some contaminants. Other problems may require a new source of water, such as a new, deeper well. If serious problems persist, you may need to rely on bottled water until a new water source can be obtained.

How Can I Protect My Private Water Supply?

You can protect your water supply by carefully managing activities near the water source. For households using a domestic well, this includes keeping contaminants away from sinkholes and the well itself. Hazardous chemicals also should be kept out of septic systems.

Several sources of technical assistance are available to help you protect your water supply. The organization Farm*A*Syst/Home*A*Syst provides fact sheets and worksheets to help farmers and rural residents assess pollution risks and develop management plans geared toward their circumstances. For example, Farm*A*Syst helps farmers and ranchers identify pollution risks from nitrates, microbes, and toxic chemicals. Home*A*Syst reaches homeowners who face pollution risks from faulty septic systems, pesticide use, petroleum leaks, and hazardous waste disposal. More information about the programs is available from:

Farm*A*Syst/Home*A*Syst Program
B142 Steenbock Library
University of Wisconsin
Madison, WI 53706
608 262-0024
e-mail: farmasyst@macc.wisc.edu
web site: http://www.wisc.edu/farmasyst

Local health departments and agricultural extension agents can also provide general technical assistance. They can be found under the government listing in your phone book. The U.S. EPA Safe Drinking Water Hotline also provides access to publications and technical assistance over the phone at (800) 426-4791. The Hotline may also be able to direct you to other sources of state and local assistance.

A main potential source of contamination of private water supplies is septic systems or other on-site wastewater disposal systems. If these systems are not properly sited, designed, and maintained, they can leak contaminants into drinking water supplies. Information on septic system design and maintenance is available from local health departments, state agencies, and the National Small Flows Clearinghouse at (800) 624-8301. A septic system design manual and guidance on system maintenance are available from EPA.

Protecting Your Ground Water Supply

- Periodically inspect exposed parts of the well for problems such as:

  - cracked, corroded, or damaged well casing
  - broken or missing well cap
  - settling and cracking of surface seals.

- Slope the area around the well to drain surface runoff away from the well.

- Install a well cap or sanitary seal to prevent unauthorized use of, or entry into, the well.

- Disinfect drinking water wells at least once per year with bleach or hypochlorite granules, according to the manufacturer's directions.

- Have the well tested once a year for coliform bacteria, nitrates, and other constituents of concern.

- Keep accurate records of any well maintenance, such as disinfection or sediment removal, that may require the use of chemicals in the well.

- Hire a certified well driller for any new well construction, modification, or abandonment and closure.

- Avoid mixing or using pesticides, fertilizers, herbicides, degreasers, fuels, and other pollutants near the well.

- Do not dispose of wastes in dry wells or in abandoned wells.

- Do not cut off the well casing below the land surface.

- Pump and inspect septic systems as often as recommended by your local health department.

- Never dispose of hazardous materials in a septic system.

Appendix A: National Primary Drinking Water Standards

Contaminants	MCLG (mg/L)	MCL (mg/L)	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Fluoride	4.0	4.0	Skeletal and dental fluorosis	Natural deposits; fertilizer, aluminum industries; water additive
Volatile Organics				
Benzene	zero	0.005	Cancer	Some foods; gas, drugs, pesticide, paint, plastic industries
Carbon Tetrachloride	zero	0.005	Cancer	Solvents and their degradation products
p-Dichlorobenzene	0.075	0.075	Cancer	Room and water deodorants, and "mothballs"
1,2-Dichloroethane	zero	0.005	Cancer	Leaded gasoline, fumigants, paints
1,1-Dichloroethylene	0.007	0.007	Cancer	Plastics, dyes, perfumes, paints
Trichloroethylene	zero	0.005	Cancer	Textiles, adhesives and metal degreasers
1,1,1-Trichloroethane	0.2	0.2	Liver, Nervous system effects	Adhesives, aerosols, textiles, paints, inks, metal degreasers
Vinyl Chloride	zero	0.002	Cancer	May leach from PVC pipe; formed by solvent break down
Coliform and Surface Water Treatment				
Giardia Lamblia	zero	TT	Gastroenteric disease	Human and animal fecal waste
Legionella	N/A	TT	Legionnaire's disease	Indigenous to natural waters; can grow in water heating systems.
Standard Plate Count	N/A	TT	Indicates water quality, effectiveness of treatment	
Total Coliform *	zero	<5% +	Indicates gastroenteric pathogens	Human and animal fecal waste
Turbidity *	N/A	TT	Interferes with disinfection, filtration	Soil runoff
Viruses	zero	TT	Gastroenteric disease	Human and animal fecal waste
Inorganics				
Antimony	zero	0.006	Cancer	Fire retardants, ceramics, electronics, fireworks, solder
Asbestos (>10um)	7MFL	7MFL	Cancer	Natural deposits; asbestos cement in water systems
Barium *	2	2	Circulatory system effects	Natural deposits; pigments, epoxy sealants, spent coal.
Beryllium	0.004	0.004	Bone, lung damage	Electrical, aerospace, defense industries
Cadmium *	0.005	0.005	Kidney effects	Galvanized pipe corrosion; natural deposits; batteries, paints
Chromium * (total)	0.1	0.1	Liver, kidney, circulatory disorders	Natural deposits; mining, electroplating, pigments.
Cyanide	0.2	0.2	Thyroid, nervous system damage	Electroplating, steel, plastics, mining, fertilizer
Mercury * (inorganic)	0.002	0.002	Kidney, nervous system disorders	Crop runoff; natural deposits; batteries, electrical switches
Nitrate *	10	10	Methemoglobulinemia	Animal waste, fertilizer, natural deposits, septic tanks, sewage
Nitrite	1	1	Methemoglobulinemia	Same as nitrate; rapidly converted to nitrate
Selenium *	0.05	0.05	Liver damage	Natural deposits; mining, smelting, coal/oil combustion
Thallium	0.0005	0.002	Kidney, liver, brain, intestinal	Electronics, drugs, alloys, glass
Organics				
Acrylamide	zero	TT	Cancer, nervous system effects	Polymers used in sewage/wastewater treatment
Adipate, (di (2-ethylhexyl))	0.4	0.4	Decreased body weight	Synthetic rubber, food packaging, cosmetics
Alachlor	zero	0.002	Cancer	Runoff from herbicide on corn, soybeans, other crops
Atrazine	0.003	0.003	Mammary gland tumors	Runoff from use as herbicide on corn and non-cropland
Carbofuran	0.04	0.04	Nervous, reproductive system effects	Soil fumigant on corn and cotton; restricted in some areas
Chlordane *	zero	0.002	Cancer	Leaching from soil treatment for termites
Chlorobenzene	0.1	0.1	Nervous system and liver effects	Waste solvent from metal degreasing processes
Dalapon	0.2	0.2	Liver and kidney effects	Herbicide on orchards, beans, coffee, lawns, road/railways
Dibromochloropropane	zero	0.0002	Cancer	Soil fumigant on soybeans, cotton, pineapple, orchards
o-Dichlorobenzene	0.6	0.6	Liver, kidney, blood cell damage	Paints, engine cleaning compounds, dyes, chemical wastes
cis-1,2-Dichloroethylene	0.07	0.07	Liver, kidney, nervous, circulatory	Waste industrial extraction solvents

Notes: *Contaminants with interim standards which have been revised. TT=Special treatment techniques required
MFL=million fibers per liter. +=less than 5% positive samples

Contaminants	MCLG (mg/L)	MCL (mg/L)	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Organics (continued)				
trans-1,2-Dichloroethylene	0.1	0.1	Liver, kidney, nervous, circulatory	Waste industrial extraction solvents
Dichloromethane	zero	0.005	Cancer	Paint stripper, metal degreaser, propellant, extraction
1,2-Dichloropropane	zero	0.005	Liver, kidney effects; Cancer	Soil fumigant; waste industrial solvents
Dinoseb	0.007	0.007	Thyroid, reproductive organ damage	Runoff of herbicide from crop and non-crop applications
Dioxin	zero	0.00000003	Cancer	Chemical production by-product; impurity in herbicides
Diquat	0.02	0.02	Liver, kidney, eye effects	Runoff of herbicide on land & aquatic weeds
2,4-D *	0.07	0.07	Liver and kidney damage	Runoff from herbicide on wheat, corn, rangelands, lawns
Endothall	0.1	0.1	Liver, kidney, gastrointestinal	Herbicide on crops, land/aquatic weeds; rapidly degraded
Endrin	0.002	0.002	Liver, kidney, heart damage	Pesticide on insects, rodents, birds; restricted since 1980
Epichlorohydrin	zero	TT	Cancer	Water treatment chemicals; waste epoxy resins, coatings
Ethylbenzene	0.7	0.7	Liver, kidney, nervous system	Gasoline; insecticides; chemical manufacturing wastes
Ethylene dibromide	zero	0.00005	Cancer	Leaded gasoline additives; leaching of soil fumigant
Glyphosate	0.7	0.7	Liver, kidney damage	Herbicide on grasses, weeds, brush
Heptachlor	zero	0.0004	Cancer	Leaching of insecticide for termites, very few crops
Heptachlor epoxide	zero	0.0002	Cancer	Biodegradation of heptachlor
Hexachlorobenzene	zero	0.001	Cancer	Pesticide production waste by-product
Hexachlorocyclopentadiene	0.05	0.05	Kidney, stomach damage	Pesticide production intermediate
Lindane	0.0002	0.0002	Liver, kidney, nerve, immune, circul.	Insecticide on cattle, lumber, gardens; restricted 1983
Methoxychlor	0.04	0.04	Growth, liver, kidney, nerve effects	Insecticide for fruits, vegetables, alfalfa, livestock, pets
Oxamyl (Vydate)	0.2	0.2	Kidney damage	Insecticide on apples, potatoes, tomatoes
PAHs (benzo(a)pyrene)	zero	0.0002	Cancer	Coal tar coatings; burning organic matter: volcanoes, fossil fuels
PCBs	zero	0.0005	Cancer	Coolant oils from electrical transformers; plasticizers
Pentachlorophenol	zero	0.001	Liver and kidney effects, and cancer	Wood preservatives, herbicide, cooling tower wastes
Phthalate, (di (2-ethylhexyl))	zero	0.006	Cancer	PVC and other plastics
Picloram	0.5	0.5	Kidney, liver damage	Herbicide on broadleaf and woody plants
Simazine	0.004	0.004	Cancer	Herbicide on grass sod, some crops, aquatic algae
Styrene	0.1	0.1	Liver, nervous system damage	Plastics, rubber, resin, drug industries; leachate from city landfills
Tetrachloroethylene	zero	0.005	Cancer	Improper disposal of dry cleaning and other solvents
Toluene	1	1	Liver, kidney, nervous, circulatory	Gasoline additive; manufacturing and solvent operations
Toxaphene	zero	0.003	Cancer	Insecticide on cattle, cotton, soybeans; cancelled 1982
2,4,5-TP	0.05	0.05	Liver and kidney damage	Herbicide on crops, right-of-way, golf courses; cancelled 1983
1,2,4-Trichlorobenzene	0.07	0.07	Liver, kidney damage	Herbicide production; dye carrier
1,1,2-Trichloroethane	0.003	0.005	Kidney, liver, nervous system	Solvent in rubber other organic products; chemical production wastes
Xylenes (total)	10	10	Liver, kidney, nervous system	By-product of gasoline refining; paints, inks, detergents
Lead and Copper				
*Lead **	zero	TT+	Kidneys, nervous system damage	Natural/industrial deposits; plumbing, solder, brass alloy faucets
Copper	1.3	TT#	Gastrointestinal irritation	Natural/industrial deposits; wood preservatives, plumbing
Other Interim Standards				
Beta/ photon emitters	zero	4 mrem/yr	Cancer	Decay of radionuclides in natural and man-made deposits
Alpha emitters	zero	15 pCi/L	Cancer	Decay of radionuclides in natural deposits
Combined Radium 226 /228	zero	5 pCi/L	Bone cancer	Natural deposits
Arsenic*	0.05	0.05	Skin, nervous system toxicity	Natural deposits; Smelters, glass, electronics wastes; Orchards
Total Trihalomethanes	zero	0.10	Cancer	Drinking water chlorination by-products

Notes: *Contaminants with interim standards which have been revised. TT=Special treatment techniques required
+=Action Level 0.015mg/L #=Action Level 1.3mg/L pCi=picocuries

Appendix B
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Is Your Drinking Water Safe? EPA 810-F-94-002. May 1994.

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Office of Ground Water and Drinking Water Publications. EPA 810-B-96-001. June 1996.

Appendix C
Sources of Additional Information

American Water Works Association
Public Affairs Department
6666 West Quincy Avenue
Denver, CO 80235
Phone: (303) 347-6284
Web: http://www.awwa.org

Association of Metropolitan Water Agencies
1717 K Street, NW; Suite 1102
Washington, DC 20036
Phone: (202) 331-2820
Fax: (202) 785-1845

Association of State Drinking Water Administrators
1120 Connecticut Avenue, NW
Suite 1060
Washington, DC 20036
Phone: (202) 293-7655
Fax: (202) 293-7656

Environmental Working Group
1718 Connecticut Avenue, NW
Suite 600
Washington, DC 20009
Phone: (202) 667-6982
Fax: (202) 232-2592
Web: http://www.ewg.org

Friends of the Earth
1025 Vermont Avenue, NW
Suite 300
Washington, DC 20005
Phone: (202) 783-7400
Fax: (202) 783-0444

Groundwater Foundation
P.O. Box 22558
Lincoln, NE 68542
Phone: (800) 858-4844
Fax: (402) 434-2742
Web: http://groundwater.org

Know Your Watershed
1220 Potter Drive, Room 170
West Lafayette, IN 47906-1383
Phone: (317) 494-9555
Fax: (317) 494-5969

League of Women Voters Education Fund
1730 M Street, NW
Washington, DC 20036
Phone: (202) 429-1965
Fax: (202) 429-0854

National Association of Water Companies
1725 K Street, NW; Suite 1212
Washington, DC 20006
Phone: (202) 833-8383
Fax: (202) 331-7442

National Drinking Water Clearing-house
West Virginia University
P.O. Box 6064
Morgantown, WV 26506-6064
Phone: (800) 624-8301
E-mail: webmaster@estd.wvu.edu
Web: http://www.ndwc.wvu.edu

Natural Resources Defense Council
1200 New York Avenue, NW
Suite 400
Washington, DC 20005
Phone: (202) 289-6868
Web: http://www.igc.apc.org/nrdc/

National Rural Water Association
2915 South 13th Street
Duncan, OK 73533
Phone: (405) 252-0629
Web: http://www.cais.com/nrwainfo/

U.S. Department of Agriculture
Rural Utility Service
1400 Independence Avenue, SW
Washington, DC 20250
Phone: (202) 690-2670
Web: http://www.usda.gov/rus

U.S. Geological Survey
Hydrologic Information Unit
419 National Center
Reston, VA 22092
Phone: (703) 648-6818

U.S. EPA
401 M Street, SW
Washington, DC 20460
Water Resource Center
Phone: (202) 260-7786
SDWA Hotline: (800) 426-4791
Web: http://www.epa.gov/OGWDW

EPA Regional Offices

EPA Region 1
(CT, ME, MA, NH, RI, VT)
Phone: (617) 565-3478

EPA Region 2
(NJ, NY, PR, VI)
Phone: (212) 637-3725

EPA Region 3
(DE, DC, MD, PA, VA, WV)
Phone: (215) 566-5701

EPA Region 4
(AL, FL, GA, KY, MS, NC, SC, TN)
Phone: (404) 562-9424

EPA Region 5
(IL, IN, MI, MN, OH, WI)
Phone: (312) 353-4919

EPA Region 6
(AR, LA, NM, OK, TX)
Phone: (214) 665-7155

EPA Region 7
(IA, KS, MO, NE)
Phone: (913) 551-7030

EPA Region 8
(CO, MT, ND, SD, UT, WY)
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EPA Region 9
(AZ, CA, HI, NV, AS, GU)
Phone: (415) 744-1818

EPA Region 10
(AK, ID, OR, WA)
Phone: (206) 553-1230

Appendix D Glossary

Cryptosporidium

A protozoan associated with the disease cryptosporidiosis in humans. The disease can be transmitted through ingestion of drinking water, person-to-person contact, or other exposure routes. Cryptosporidiosis may cause acute diarrhea, abdominal pain, vomiting, and fever that last 1-2 weeks in healthy adults, but may be chronic or fatal in immuno-compromised people.

Exposure

Contact between a person and a chemical. Exposures are calculated as the amount of chemical available for absorption by a person.

Giardia lamblia

A protozoan, which can survive in water for 1 to 3 months, associated with the disease giardiasis. Ingestion of this protozoan in contaminated drinking water, exposure from person-to-person contact, and other exposure routes may cause giardiasis. The symptoms of this gastrointestinal disease may persist for weeks or months and include diarrhea, fatigue, and cramps.

Maximum Contaminant Level (MCL)

Maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

Nitrates

Inorganic compounds that can enter water supplies from fertilizer runoff and sanitary wastewater discharges. Nitrates in drinking water are associated with methemoglobinemia, or blue baby syndrome, which results from interferences in the blood's ability to carry oxygen.

Organics

Chemical molecules that contain carbon and other elements such as hydrogen. Organic contaminants of concern to drinking water include chlorohydrocarbons, pesticides, and others.

Per capita

Per person; generally used in expressions of water use, gallons per capita per day (gpcd).

Point-of-Use Water Treatment

Refers to devices used in the home or office on a specific tap to provide additional drinking water treatment.

Point-of-Entry Water Treatment

Refers to devices used in the home where water pipes enter to provide additional treatment of drinking water used throughout the home.

Radionuclides

Elements that undergo a process of natural decay. As radionuclides decay, they emit radiation in the form of alpha or beta particles and gamma photons. Radiation can cause adverse health effects, such as cancer, so limits are placed on radionuclide concentrations in drinking water.

Risk

The potential for harm to people exposed to chemicals. In order for there to be risk, there must be hazard and there must be exposure.

Treatment Technique

A specific treatment method required by EPA to be used to control the level of a contaminant in drinking water. In specific cases where EPA has determined it is not technically or economically feasible to establish an MCL, EPA can instead specify a treatment technique.

Total Coliform

Bacteria that are used as indicators of fecal contaminants in drinking water.

Toxicity

The property of a chemical to harm people who come into contact with it.

Volatile Organics

Chemicals that, as liquid, evaporate into the air.