Safe Drinking Water in Minnesota

A Summary of Drinking Water Protection Activities in Minnesota for 2010

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For more information, contact:
Minnesota Department of Health
Division of Environmental Health
Drinking Water Protection Section
625 North Robert Street—P.O. Box 64975
St. Paul, Minnesota 55164-0975
http://www.health.state.mn.us
651-201-4700

This report is available on the World Wide Web at

http://www.health.state.mn.us/divs/eh/water/com/dwar/report10.html

Reports from previous years (through 1995) are also available at this site

Minnesota Department of Health

Drinking Water Protection Section Web Page:

http://www.health.state.mn.us/water/com/dwar/index.html

Introduction

Ensuring the safety of our drinking water is one of the most fundamental, and most critical, responsibilities of modern public health. In fact, safe drinking water has been a key ingredient in some of the greatest public health achievements of the last half-century, including the dramatic reduction in disease and increased longevity that we now tend to take for granted. Along with other basic public health measures like immunization, drinking water protection has played a crucial role in building a safer and healthier society.

We need to remain vigilant if we are to protect those past gains. The Minnesota Department of Health (MDH) is strongly committed to safeguarding the quality of our drinking water, and as part of that commitment, we routinely monitor all of our state's public water supply systems for a broad range of chemical, radiological, and biological contaminants.

MDH believes that educating the public about water quality issues is an important element of drinking water protection. Since 1995, we have been releasing annual summary reports, like this one, to help us achieve that goal. Like previous reports in the series, this year's report covers test results and actions taken during the preceding calendar year.

The main body of the report provides information about Minnesota's community water supply systems—that is, systems that provide people with drinking water in their places of residence.

The section on Emerging Issues contains information on the Clean Water Fund, the state water plan and water sustainability framework, and rules that are being revised.

We hope this information will 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. We believe that the picture is a positive one, but there is always room for improvement and we hope this report will maintain Minnesotans' confidence the work being done by MDH to protect the safety and the quality of their drinking water.

Executive Summary

The Minnesota Department of Health is responsible for enforcing the federal Safe Drinking Water Act and safeguarding the quality of drinking water in our state. This includes the responsibility of regulating approximately 7,100 public water supply systems statewide. This figure includes 961 community systems, which provide drinking water to people in their places of residence. The community systems include 727 municipal systems, serving towns or cities.

The Major Elements of Drinking Water Protection

Minnesota's drinking water protection strategy includes three major elements:

- ***Prevention*** measures are used to protect the quality of drinking water at the source by controlling potential sources of pollution, regulating land use, reviewing plans and providing advice on construction of water treatment and distribution facilities, and inspecting these facilities on a regular basis.

- ***Treatment*** measures, including routine disinfection, are used to make the water palatable and safe to drink.

- ***Monitoring*** of water supplies for potentially harmful contaminants, on a routine basis, is the critical element of the state's enforcement responsibilities under the Safe Drinking Water Act.

The Monitoring Process

Minnesota's community water supply systems are monitored for the following types of contaminants:

- **Pesticides and Industrial Contaminants.** Each community water system may be tested regularly for more than 100 pesticides and industrial contaminants, including both synthetic organic chemicals (SOCs) and volatile organic chemicals (VOCs). The list of chemicals to be tested, and the testing schedule, may vary from one system to another. Testing requirements depend on factors such as whether a particular chemical is likely to be present in the local environment and how vulnerable the system is to contamination. If a system exceeds the applicable federal or state drinking water standard for a particular chemical, it must notify the people who use the water and take appropriate steps to correct the problem.

- **Bacteriological Contamination.** Larger community water systems are tested monthly, and smaller systems are tested quarterly, for contamination by coliform bacteria. The coliform test is used as a general indicator of water quality in the system, in terms of potential microbial contamination.

  Total coliform bacteria are common in the environment (such as in soil) and are generally not harmful. Fecal coliform and *Escherichia coli (E. coli)* bacteria are an indicator of human or animal fecal matter.

If fecal coliform or *E. coli* is detected along with total coliform in drinking water, there is strong evidence that sewage is present; therefore, a greater potential for harmful organisms exists. In these cases, immediate corrective actions must be taken. The actions include a notice to residents to boil their water before using it for cooking and drinking. The water system will be disinfected, flushed, and retested to ensure that any contamination problems are eliminated.

If only total coliform is detected (without the presence of fecal coliform or *E. coli*), the source is most likely contamination from the environment, introduced during construction or while repairs to plumbing or a water main were underway. 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 will not be issued.

- **Nitrate.** Each system must be tested annually for nitrate. Nitrate is a man-made contaminant and also occurs naturally in the environment, but elevated nitrate levels in drinking water are usually associated with the use of fertilizer, or the breakdown of human and animal waste. It is a health concern primarily for infants under the age of six months. If the federal standard for nitrate is exceeded, an advisory is issued regarding consumption of the water by infants. The advisory remains in effect until steps can be taken to correct the problem.

- **Inorganic Chemicals and Radioactive Elements.** Each system is typically tested once every nine years—although, in some cases, it could be as often as once a year—for 13 additional inorganic chemicals. Systems are normally tested every three years for a number of radioactive elements. Both inorganic chemicals and radioactive elements may be naturally present in the water. If the water exceeds health standards for either type of contaminant, people who use the water are informed, and steps are 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 disease. The most common method of disinfection is the addition of chlorine to drinking water supplies. However, 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. 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 U. S. Environmental Protection Agency (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.** Community water supply systems have participated in efforts to reduce lead and copper contamination in drinking water. Lead and copper are not typically present in the water when it leaves the treatment plant. Lead and copper differ from other contaminants in that they are rarely present in source waters. Rather, they enter the water through contact with plumbing components, usually in individual homes. If more than 10 percent of the homes in a community exceed the federal "action level" for lead or copper, based on the results of community-wide monitoring, the water system must do additional testing and take steps to reduce levels. Systems that exceed the action level for lead must also perform an ongoing program of public education.

Note: Any time a drinking water standard is violated, the affected water system must take corrective actions that include notifying its residents of the violation. In addition to this notification, all community water systems issue an annual **Water Quality Report** (sometimes referred to as a **Consumer Confidence Report**) that lists the source of the system's drinking water as well as a list of all regulated contaminants that were detected, even in trace amounts well below the legal standard, during the previous calendar year.

A Current Profile of

Minnesota's Drinking Water Protection Program

Since 1974, the U.S. 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 now 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 7,128 public water supply systems. Of those systems, 961 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, 23 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 961 community water systems, 727 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, colleges, hospitals, and correctional facilities.

The remainder of the state's public water supply systems is 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.

Note: *The monitoring requirements and test results described in this report apply primarily to community water supply systems.*

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—depends 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*** on page 9). 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 to acceptable levels.

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.

As noted in the Executive Summary, 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 which can also enter the water from sources like fertilizer run-off, decaying plant and animal wastes, or 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 know 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 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 U. S. 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. If the system uses groundwater, proper well construction can serve to increase or decrease the risk of contamination. In some systems, natural geologic barriers may serve to protect the source water from contamination. Systems with a past history of contamination problems may be at higher risk.

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 2010

This is a summary of results of monitoring performed in 2010. 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.

Pesticides and Industrial Contaminants

During 2010, MDH conducted 17,361 tests for pesticides and industrial contaminants in community water systems.

One municipal system, Bloomington (population 85,238, Hennepin County), exceeded the standard for methylene chloride. The system was back in compliance within a few days, and the city notified its residents of the situation.

Bacteriological Contamination

Fifteen community systems, including 10 municipal systems, tested positive for bacteriological contamination in 2010.

The 10 municipal systems that had confirmed bacteriological contamination in 2010 were Avoca (population 117, Murray County), Ceylon (pop. 343, Martin County), Correll (pop. 34, Big Stone County), Johnson (pop. 28, Big Stone County), Kasota (pop. 688, Le Sueur County), Lake City (pop. 5,303, Wabasha County), Lake Elmo (pop. 8,389, Washington County), Pine River (pop. 916, Cass County), Vernon Center (pop. 332, Blue Earth County), and Wilmont (pop. 311, Nobles County).

Standard procedures were followed in all of these cases. Systems were disinfected, flushed, and retested to ensure that any contamination problems had been eliminated. All of the residents served by the affected systems were informed of the situation.

Nitrate/Nitrite

Three community systems, including one municipal system, exceeded the standard for nitrate in 2010. The municipal system was Park Rapids (population 3,494, Hubbard County), which had a well that exceeded the allowable limit for nitrate. The city worked with the Minnesota Department of Health and developed a compliance agreement to take the affected well out of service and use it only for emergency purposes after notifying residents. Park Rapids also informed its residents of the situation as soon as the violation was identified.

Arsenic

Approximately 40 community water systems had arsenic levels above 10 parts per billion (ppb) when the maximum contaminant level was modified in January of 2006. By the end of 2010, 15 community water systems, including 10 municipal systems, still exceeded that level. The affected municipal systems are Big Falls (population 258, Koochiching County), Buffalo Lake (pop. 751, Renville County), Climax (pop. 215, Polk County), Dilworth (pop. 3,500, Clay County), Hackensack (pop. 308, Cass County), Herman (pop. 416, Grant County), Lowry (pop. 257, Pope County), Oak Grove (pop. 8,504, Anoka County), Stewart (pop. 533, McLeod County), and Wendell (pop. 177, Grant County).

Arsenic occurs naturally in the environment and, as a component of underground rock and soil, can work its way into groundwater, and is found in many areas of Minnesota. For many years, the standard for arsenic was 50 ppb. A revision to the Arsenic Rule, which was finalized in January 2001, lowered the limit to 10 ppb. The new standard took effect in 2006.

These systems in exceedance are working with MDH to come into compliance and are also communicating regularly with their residents about the situation.

Radioactive Elements

Radiation occurs naturally in the ground, and some radioactive elements may work their way into drinking water.

Radium 226 & 228/Gross Alpha Emitters

Nine community water systems, including 8 municipal systems, exceeded the standard for radium 226 & 228 by the end of 2010. The affected municipal systems are Amboy (population 541, Blue Earth County), Claremont (pop. 608, Dodge County), East Bethel (pop. 88, Anoka County), Hinckley (pop. 3,301, Pine County), Lewiston (pop. 1,507, Winona County), Medford (pop. 1,107, Steele County), New Germany (pop. 360, Carver County), and Rushford Village (pop. 260, Fillmore County). 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.

Other Inorganic Chemicals

No community water systems exceeded the standard for inorganic chemicals in 2010.

Disinfection By-products

No community water systems exceeded the standard for disinfection by-products in 2010.

Lead and Copper

Community water supplies in Minnesota began their lead and copper monitoring programs in 1992 and 1993 as a result of the U. S. EPA Lead and Copper Rule in 1991. The monitoring is done by taking first-draw water samples from a given number of consumer taps within the water distribution system. The number of samples taken in based on populations served and past monitoring results. If more than 10 percent of the samples taken exceed the federal action level for lead (15 parts per billion-ppb) or copper (1.3 parts per million-ppm), the entire system is considered to be "in exceedance." Communities that are found to be in exceedance are required to perform additional monitoring, implement corrosion control measures, and begin a public education program within 60 days of the reported exceedance.

Since the initiation of the lead and copper monitoring program in 1992, more than 250 community water systems in Minnesota have exceeded the lead and/or copper action levels. Over 150 of these systems have integrated corrosion control measures into their water treatment process. The majority of the systems that have taken proactive treatment measures have been deemed by MDH to have optimized their corrosion control treatment. Continued monitoring results have shown that corrosion control treatment is very effective in lowering lead and/or copper levels in Minnesota's community water supplies. Among the various treatment approaches, the most widely adopted was the use of phosphate-based corrosion control inhibitors, which accounts for about 90 percent of the treatment processes installed for lead/copper corrosion control in Minnesota. By maintaining a consistent treatment and adequate levels of corrosion inhibitor residuals in the water distribution system, both lead and copper levels can be effectively reduced.

In 2010, five community water supplies exceeded the lead action level and 17 community water supplies exceeded the copper action level. The occurrence of lead action level exceedances was considerably lower than the occurrence of copper action level exceedances because proven corrosion control treatments have shown to be more effective in reducing lead levels. In general, corrosion control treatment brought reduction in copper levels by 50 to 70 percent, and about 80 percent of the systems achieved compliance after treatment installation and optimization. Of the 24 systems not meeting the copper action level, seven have a 90^{th} percentile copper value greater than 2.0 parts per million. The Minnesota Department of Health continues to work with these systems to bring them into compliance through the effort of corrosion control treatment and treatment optimization.

Copper is an essential element for living organisms, including humans, and—in small amounts—necessary in our diet to ensure good health. However, too much copper can cause adverse health effects, including vomiting, diarrhea, stomach cramps, and nausea. It has also been associated with liver damage and kidney disease.

The human body has a natural mechanism for maintaining the proper copper levels throughout the body. However, children under one year old have not yet developed this mechanism and, as a result, are more vulnerable to the toxic effects of copper. People with Wilson's disease also have a problem with maintaining the proper balance and need to exercise particular care in limiting exposure to copper.

The most common and effective corrosion control measure currently accepted for use in community water supplies is the inclusion of phosphate-based compounds into the water treatment process. Increasing phosphate usage in the water treatment process to lower copper and lead levels may not be feasible due to environmental concerns associated with increased phosphorus levels being released into the environment. Because there are concerns with potential environmental impacts from increased phosphorous and discharge limits set by the Minnesota Pollution Control Agency, some systems are unable to add phosphate at doses necessary to achieve levels needed to regain compliance for both lead and copper. With the need to balance public-health protection and environmental protection, and recognizing that it is unlikely for copper to cause adverse health effects at levels below 2.0 parts per million, the Minnesota Department of Health does not envision copper levels in the remaining systems to be further reduced through increasing phosphate usage. However, the goal to lower the copper levels as much as is technically feasible will be continued.

Emerging Issues

State Water Plan and Water Sustainability Framework

The Minnesota Environmental Quality Board (EQB) has adopted the *2010 Minnesota Water Plan*, a comprehensive long-range water resources plan for the state that presents a vision for achieving sustainable water management and ensuring healthy ecosystems.

“In 2008, the citizens of Minnesota voted to dedicate special tax revenue to protect and restore the state’s land, water, habitat, trails, and cultural resources,” reads the executive summary of the *Water Plan.* “These valued resources define our identity as Minnesotans, and with this special revenue comes a responsibility to set priorities wisely and in a manner that can most effectively make a difference.” (The executive summary refers to the Clean Water, Land, and Legacy Amendment to the state constitution, which increased the sales tax by three-eighths of one percent and allocated the additional revenue to protect water quality, preserve arts and culture, and support state parks and trails.)

The state water plan, prepared every 10 years, identifies steps Minnesota must take to meet its long-term needs. The report details seven principles and nine strategies for sustainable water management. It calls for new efforts to understand state groundwater systems and the role they play in nourishing surface waters and identifies additional steps to protect Minnesota’s lakes and streams. With the support and engagement of local land and water interests, the plan calls for setting priorities, adapting management practices, increasing protection efforts, promoting wise water use, and restoring local management capacity.

The plan was prepared in cooperation with EQB member agencies and with public advice. It is the latest in a long history of bringing together agencies and others with an interest in achieving sustainable water management. The *2010 Minnesota Water Plan* is on the EQB’s website at http://www.eqb.state.mn.us/documents/2010_Minnesota_Water_Plan.pdf.

Related to the state water plan is the *Minnesota Water Sustainability Framework*, the first long-term framework for statewide water sustainability in the country. Released by the University of Minnesota Water Resources Center, the framework was commissioned by the Minnesota Legislature in 2009. It is intended to serve as a legislative roadmap for future investments in water resources, including the approximately $86 million a year dedicated to the protection of water as a result of the Clean Water, Land, and Legacy Amendment.

The report addresses a number or water-related issues, including drinking water quality, storm water management, agricultural and industrial water use, surface and groundwater interactions, ecological needs, invasive species, and the state’s water infrastructure. The recommendations include a study of Minnesota’s ground-water resources to determine how much is available and if supplies are being adequately replenished, the promotion of “green” chemistry through incentives for industry and consumer education to prevent future water contamination, a plan for integrated of water and land sustainability at the watershed level, and restructuring of municipal water pricing to reflect the actual costs, including ecological costs, of water use.

The framework is described (along with a link to the entire report) at http://wrc.umn.edu/watersustainabilityframework.

Drinking Water Quality Standards Review and Revisions

Fluoride

The U.S. Department of Health & Human Services (HHS) has proposed new guidance which recommends a single national optimal fluoride level of 0.7 parts per million (ppm) for community public water supplies. This would replace an optimal fluoride range of 0.7 to 1.2 ppm, a range used by the state of Minnesota when it developed its fluoridation laws.

To promote public health through the prevention of tooth decay, Minnesota requires municipal water supplies to maintain an average distribution system fluoride concentration of 1.2 ppm while remaining between 0.9 ppm and 1.5 ppm. That requirement remains in effect. The newly proposed HHS optimal level of 0.7 ppm was subject to a 30-day public comment period with a final recommendation expected before the end of the year. Once the HHS recommendations are finalized, MDH will investigate changes in policies and/or laws that will continue to promote and protect the dental health of all Minnesotans.

The U. S. Environmental Protection Agency (EPA) also announced that it intends to reevaluate the existing fluoride maximum contaminant level (MCL) of 4 parts per million. A secondary (non-enforceable guideline) standard for fluoride is 2 ppm to protect against moderate dental fluorosis. Some areas of Minnesota have naturally occurring fluoride in the ground. All systems are in compliance with the MCL although a small number have levels of fluoride above 2 ppm in their water.

Percholate and Other Volatile Organic Chemicals

The U. S. EPA will begin regulating perchlorate, a chemical used in the manufacture of rocket fuel, fireworks, flares and explosives, and may be present in bleach and in some fertilizers. Perchlorate may affect the thyroid. EPA will evaluate the science on perchlorate health effects and occurrence in public water systems as well as the feasibility of treatment technologies to remove perchlorate from water. The process for proposing a formal rule includes input from key stakeholders and a public comment period.

The EPA is also moving toward establishing a drinking water standard to address a group of up to 16 volatile organic chemicals that may pose a risk to human health. VOCs include solvents discharged from industrial operations. The VOC standard will be developed in line with EPA's new strategy to address contaminants as groups rather than individually to provide public health protection more quickly and also allow water utilities to more effectively and efficiently plan for improvements.

Chromium-6 (Hexavalent Chromium)

A standard for total chromium of 1 ppm has existed since 1991 although it does not distinguish between chromium-3 (trivalent chromium) and chromium-6 (hexavalent chromium). Chromium-3 is an essential nutritional element in humans and has relatively low toxicity, unlike chromium-6, which is more toxic and may lead to adverse health effects. Sources of chromium-6 are discharges from steel and pulp mills and erosion of natural deposits of chromium-3.

EPA is providing guidance to public water systems to enhance chromium monitoring through additional sampling and analysis specifically for chromium-6 and is assessing the health effects of chromium-6. This is part of a process to identify and address potential health threats from long-term exposure and could lead to a separate standard for chromium-6.

Clean Water Fund

On November 4, 2008, Minnesota voters approved the Clean Water, Land, and Legacy Amendment to the state constitution, increasing the sales tax by three-eighths of one percent and allocating the additional revenue to protect state waters, preserve arts and culture, and support state parks and trails.

Approximately 33 percent of the tax proceeds will be dedicated to a Clean Water Fund to protect, enhance, and restore water quality in lakes, rivers, streams, and groundwater, with at least five percent of the fund targeted for protecting drinking water. The use of these funds is determined by the Minnesota Legislature, and administered by programs within the Department of Natural Resources, the Minnesota Pollution Control Agency, the Minnesota Department of Health, and other agencies.

Minnesota Department of Health activities will focus on protecting public health by evaluating and communicating scientific information about the potential for health risks from exposures to possible environmental health hazards in drinking water and by ensuring a safe and adequate supply of drinking water for all Minnesotans through source water protection.

During the 2010-2011 biennium, the Minnesota Department of Health will receive approximately $3,765,000 from the Clean Water Fund. These resources provide support for MDH to:

- engage an additional 90 communities into the wellhead protection program and assist them with plan development and implementation, in line with MDH's goal to have all communities involved in wellhead protection planning by 2020,
- award more than 100 source water planning and implementation grants to public water suppliers, totaling nearly $950,000,
- contract for a special project to evaluate geological, chemical, and well construction conditions corresponding with arsenic levels in three counties,
- establish health-based guidelines for 10 contaminants of emerging concern in drinking water contaminants,
- assess where and how these contaminants are used in Minnesota and the potential for human exposure, and
- contract special research studies relating to alternative risk assessment methodologies, relative source contribution, and a needs assessment for public education and outreach for contaminants of emerging concern.

Many Minnesota communities already have been benefiting from money from the Clean Water Fund, including:

Big Falls

Big Falls, in Koochiching County in northern Minnesota, has dealt with issues with arsenic, especially since the maximum contaminant level for arsenic was lowered from 50 to 10 parts per billion in 2006. One of the city's well had high levels of arsenic, and Big Falls struggled to meet the stricter standard. Finally, the city drilled a new well and took the well with high arsenic out of service. However, this well was close to the new well and an existing well; it needed to be sealed so that it wouldn't become a conduit for contamination to enter the groundwater.

Big Falls is a small city and found the cost of sealing the well to be a hardship. Clean Water Fund funds covered the $1,350 cost of sealing the well, leaving the city responsible only for obtaining estimates, contracting with a licensed well driller, and providing documentation to the Minnesota Department of Health.

The funds available helped Big Falls to protect its groundwater and to continue to provide its 264 residents with safe drinking water.

Pelican Rapids

Abandoned wells can threaten aquifers as conduits for contamination. The city of Pelican Rapids, in Otter Tail County in central Minnesota, had a pair of wells located in areas where contamination was known to be present.

The Minnesota Department of Health (MDH) identified these wells as potential threats to the city's drinking water supplies. After Pelican Rapids developed a wellhead protection plan that included the sealing of these two wells, MDH, using funding from the Clean Water Fund, awarded the city $8,940 to seal them.

By sealing the abandoned wells, the city is protecting its groundwater, helping it to keep providing its 2,374 residents with safe drinking water.

Clarissa

A grant from the Clean Water Fund has helped the city of Clarissa ensure that it will still have the ability to provide safe drinking water to its 609 residents even during an extended power outage or other emergency.

Clarissa, located in Todd County in central Minnesota, had no way to provide power to their water plant in case of an extended power outage or other emergency. Minnesota Rural Water Association (MRWA), a partner of the Minnesota Department of Health's Drinking Water Protection Section, addressed this issue while working with the city on its Wellhead Protection Plan (WHP). MRWA staff recommended the installation of a transfer switch and the rewiring of the city generator. The Health Department approved the WHP and, ultimately, the implementation grant, using funding from the Clean Water Fund.

The grant helped to fund the rewiring as well as the installation of a 400-amp transfer switch. As a result of this, the city will be able to continue uninterrupted service of its water supply to residents, even if the area experiences a power failure for an extended period.

Cold Spring

In response to elevated nitrate levels in its water, the city of Cold Spring, Minnesota, has been working with local landowners and others to reduce nitrogen fertilizer applications. In addition to area farmers, the central Minnesota city has partnered with the Minnesota Department of Health, the Minnesota Department of Agriculture, Minnesota Rural Water Association, Stearns County, and the Natural Resource Conservation District and has benefited from grants from the Clean Water Legacy fund.

After studying the issue, the group prioritized fields where recharge to public water supply wells was likely occurring. The group then worked with area farmers and landowners to reduce the nitrate levels. Cold Spring purchased nitrogen-inhibitor products from the local co-op, which applied the products to farmers' fields to more efficiently use the nitrogen fertilizer that was being applied to the fields. As a result, farmers reduced their levels of fertilizer from 8 to 16 percent of their current application rates in comparison to University of Minnesota recommendations for coarse textured soils. The use of nitrogen inhibitors, combined with the additional reduction in applied fertilizer, resulted in a decrease of 4,100 pounds of nitrogen applied on 277 acres.

Beyond reducing the nitrogen fertilizer being applied, the partnership has increase the trust and cooperation between the city and local farmers and landowners, a relationship that had been strained in the past. The cooperation has extended to all city residents with education regarding turf management issues to alleviate nitrate loading that may be occurring near public wells.

In addition to the nitrate inhibitors, Cold Spring has installed four monitoring wells and is working with the Minnesota Department of Health to measure the effectiveness of the program and develop information about the source of contaminated groundwater now supplying the city's wells. The monitoring wells will also show groundwater flow conditions within the drinking water supply management area, which will help reduce uncertainty in future efforts to amend the city's wellhead protection plans.

The partnership, aided by Clean Water Legacy funds, has improved vital relationships while making safer the water that Cold Spring is supplying to its 3,850 residents.

Henning

Henning is in Otter Tail County in central Minnesota. The city provides drinking water to its 812 residents as well as to the 313 people in nearby Ottertail. While Henning has been able to provide an uninterrupted supply of water to these two cities, it was concerned about what could happen during an emergency in which it could be left without power.

When Henning was working on its Wellhead Protection Plan, Minnesota Rural Water Association, a partner of the Minnesota Department of Health's Drinking Water Protection Section, recommended that they install a transfer switch. The Health Department approved the city's wellhead plan along with an implementation grant made available through the Clean Water Fund of $9,860.

This grant made it possible for Henning to install a three-phase, 600-amp transfer switch at their water plant, allowing the city to continue to be able to provide safe water even when electricity is not available.

Conclusion

Monitoring test results for 2010 tend to reinforce the conclusions of previous years. Although we need to remain vigilant, Minnesotans can continue to have confidence in their drinking water.

MDH remains committed to protecting the high quality of our drinking water. The safety of our drinking water should never be taken for granted—but Minnesotans can be assured that their local water supply system is making every effort to ensure that their water is safe. And they can also be assured that the Minnesota Department of Health—and the broader public health community—are working to ensure that their confidence is well placed.

Appendix

Summary of Safe Drinking Water Monitoring Results for Minnesota

Includes Results for Both Community and Non-Community
Public Water Supply Systems in Minnesota for 2009

The following is a summary of drinking water monitoring test results for all public water supply systems in Minnesota for calendar year 2010. 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 7,128 such systems in Minnesota, including:

- *961 community systems, which provide water to consumers in their places of residence, including 727 municipal systems.*
- *6,167 noncommunity systems, which provide drinking water in settings like factories, schools, restaurants, and highway rest stops.*

A report that lists all violations of the Safe Drinking Water Act in Minnesota for calendar year 2010 is available from the Drinking Water Protection Section, Minnesota Department of Health, Box 64975, St. Paul, MN 55164-0975. This is also available on at:

http://www.health.state.mn.us/divs/eh/water/cinfo/dwar/summary2010.pdf
http://www.health.state.mn.us/divs/eh/water/cinfo/dwar/pwsid2010.pdf
http://www.health.state.mn.us/divs/eh/water/cinfo/dwar/contaminant2010.pdf

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.