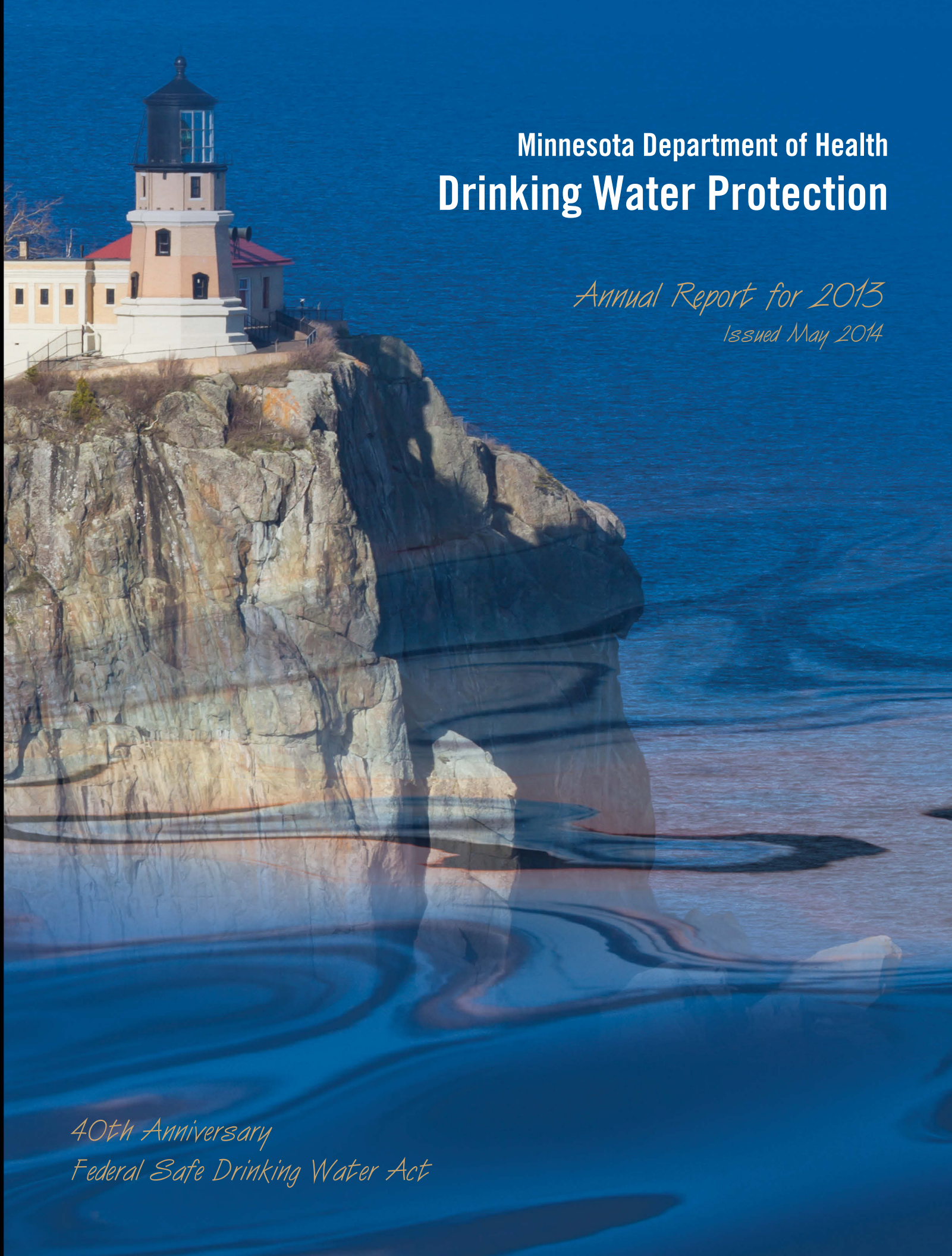

Minnesota Department of Health

Drinking Water Protection

Annual Report for 2013

Issued May 2014

40th Anniversary
Federal Safe Drinking Water Act

1974-2014

The 40th anniversary of the passage of the federal Safe Drinking Water Act (SDWA) commemorates the first time a national set of regulations and standards was established to include all public-water suppliers in the United States.

Walter Mondale, who represented Minnesota in the U.S. Senate when the Act was passed and later became vice president of the United States, served with Wisconsin senator (and Earth Day founder) Gaylord Nelson during a period of great advances for environmental initiatives. "Our argument was that effective environmental protection required federal action," Mondale wrote in his autobiography, "Air and water don't stop at state boundaries."

On Tuesday, December 16, 1974, Gerald Ford signed the bill, but the event wasn't mentioned in some of the nation's largest newspapers, such as the *New York Times* and *Washington Post*, nor in the major magazines, *Time* and *Newsweek*.

However, the Safe Drinking Water Act made a splash in Minnesota because of its impact on the state's third-largest city, Duluth, which had just given the go-ahead for a new filtration plant to remove asbestos particles from the water. With the passing and signing of the law, the Environmental Defense Fund petitioned the U.S. Environmental Protection Agency (EPA) to use its emergency powers in connection with a number of cities, including Duluth.

"Ford signs drinking-water law; Duluth may benefit," was the headline in the *Minneapolis Tribune* on Wednesday, December 18, 1974. The *Duluth News-Tribune* announced the "federal Safe Waters Act" in a front-page story headlined, "Emergency funding urged on water filters."

40th Anniversary

Former Minnesota governor Al Quie and former vice president Walter Mondale were members of the U.S. House of Representatives and Senate, respectively, when the Safe Drinking Water Act was signed in 1974. Quie and Mondale are part of a video that commemorates the 40th anniversary of SDWA, which is available at http://youtu.be/inLZwGZSvSc, http://www.health.state.mn.us/water, *or* scan QR code on the back cover with your smartphone.

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The Safe Drinking Water Act

The Safe Drinking Water Act directed the EPA, which had been created only four years earlier, to develop health-based standards for a number of contaminants—both naturally occurring and those that result from human and animal activity—that may be found in drinking water supplies. The Act affects all water systems that serve water to the public (in general, to more than 25 people on a regular basis) in the United States in addition to all U.S. territories and commonwealths as well as tribal reservations. It does not apply to private wells or bottled water.

While the EPA oversees the Safe Drinking Water Act, most states have taken over the administration and enforcement aspects of it. Minnesota did this in 1977 and has since been responsible for testing water and inspecting all public water suppliers in the state.

Although the Act initially focused mostly on water treatment, over the years it has been amended to encompass other means, including source water protection, water-operator training, below-market-rate loans for capital improvements needed by water treatment systems to remain in compliance with SDWA, and communication.

Before SDWA

The need for and benefits of drinking water have been known for a long time. Around 400 B.C., Hippocrates, the father of medicine, said, "Water contributes much to health."

Treatment of drinking water goes back even before that. Ancient Egyptians placed their water in big jars to allow large particles, such as soil, to settle to the bottom. Others strained their water through cloth to remove particles. These are actually crude forms of types of treatment that are done today. Water systems today have sedimentation basins instead of large jars, but the result is the same: large particles settle out and are removed. And filtration is used to remove smaller particles, even though media such as sand and anthracite are used instead of cloth.

A difference between then and now is that the primary purpose of treatment done thousands and even just hundreds of years ago was to improve the taste and appearance of water—not to remove contaminants that could cause people to get sick.

It wasn't until more recently, in the last 150 years or so, that it became apparent that treatment of drinking water was needed not just to improve its aesthetic qualities but also to protect public health. Finally, people were realizing that the quality of drinking water cannot be accurately judged by the senses—by looking at it, smelling it, or tasting it.

Water that looks and tastes fine may not be safe to drink. And vice versa.

Medical advances in the 19th century brought a greater understanding of the need for safe water.

Soon after the turn of the 20th century, municipal water suppliers began disinfecting water with chlorine. The results were dramatic. Disinfection, which rids the water of microbiological organisms, resulted in the virtual elimination of waterborne diseases such as cholera, typhoid, dysentery, and hepatitis A.

Disinfection was not just a major advance in the treatment of drinking water; it was a huge step forward in public health in general. It has been said that the treatment and disinfection of drinking water have saved more lives than all the hospitals in the history of the world.

In 1997 *Life* magazine declared, "The filtration of drinking water plus the use of chlorine is probably the most significant public health advance of the millennium."

Drinking Water in Minnesota

In 1872 Minnesota became the fourth state (after Massachusetts, Virginia, and California) to establish a board of health. Now the Minnesota Department of Health, the state board was established as a result of typhoid fever. "This is the disease which, being so common, should attract the most attention in the state," wrote board president D. W. Hand on typhoid fever in the State Board of Health annual report in January of 1874.

"Almost from the very first both rural and urban residents became ill as the result of impure water. By the time the State Board of Health was created, typhoid fever, a water-borne disease, annually was taking a large toll of lives," wrote Philip D. Jordan in *The People's Health: A History of Public Health in Minnesota to 1948*.

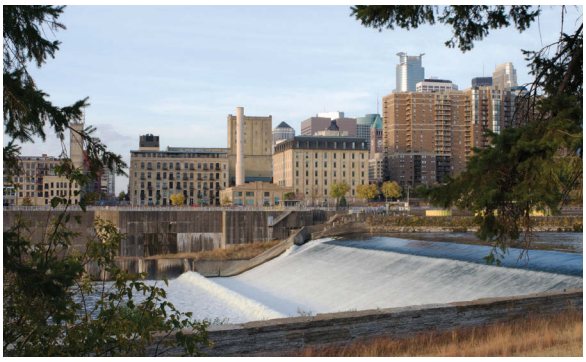
However, Jordan pointed out that in the 1870s the cause of typhoid fever was not thought to be from contaminated water. "The prevailing opinion, in Minnesota and elsewhere, was that typhoid fever was of miasmatic origin," referring to a theory that diseases such as cholera and typhoid were the result of noxious fumes or vapors emanating from the decomposition of animal and vegetable substances.

While miasma was commonly thought to be the source of many ailments, pioneers such as John Snow and Louis Pasteur were advancing other theories by this time. Snow, a London physician, had identified the source of a cholera outbreak as a contaminated well in the 1850s. In the 1860s the work of Pasteur, a French microbiologist, led to the germ theory that some diseases were caused by microorganisms.

As Jordan noted in *The People's Health*, "The germ theory took hold slowly," both in Minnesota and elsewhere. But Jordan also pointed out that "as early as 1876 the state board [of health] listed water supplies as one of its major projects, and in that year a warning was issued for citizens to clean roofs and water pipes to prevent pollution before water reached cisterns."

In tandem with the formation of the state board of health was the continuing growth of the Twin Cities metropolitan area. Minneapolis Water Works was initially established for firefighting as residents used wells and cisterns for their water. As needs increased, Minneapolis began distributing water to its residents.

St. Paul, the second-largest city in the state, was also on board with water treatment. Starting with a private water company, the city took over the enterprise in 1882.



"The very idea of great urban centers depends on a large urban water supply," John Anfinson of the Mississippi River and Recreation Area has said.

Nevertheless, deaths from typhoid, pneumonia, and tuberculosis continued to rise in concert with the area's growing population. When Minneapolis, and many other cities around the state, began disinfecting the water with chlorine early in the 20th century, the disease trend not only slowed—it virtually halted.

In the years leading up to the federal Safe Drinking Water Act, Minnesota was active in many ways in promoting safe drinking water.

1917 The State Board of Health adopted rules requiring submission and approval of plans for public water supplies.

1918 The State Board of Health adopted rules prohibiting cross connections between potable and non-potable water supplies.

1933 The first state plumbing code, requiring licensed plumbers in cities with populations of greater than 5,000, was established.

1930s The first training sessions for water operators were held in Minnesota.

1937 The State Board of Health adopted a water supply standard for the design for all types and sizes of water supplies.

1947 The Minnesota Department of Health began annual investigations of more than 500 public water supplies in the state.

1962 The federal government published a series of public health standards, which were mandatory for interstate carriers of water and recommended for public water systems.

1970s Minnesota required operators of public water systems to be certified and continued to provide training to operators. It also established a program for private wells and a construction code for water wells.

The Safe Drinking Water Act and Its Legacy

Since the passage of the federal Safe Drinking Water Act in 1974, Minnesota expanded its own program. In 1977 it became the 12th state to achieve primacy, which involved taking over the administrative and enforcement functions from the EPA and adopting regulations at least as stringent as those in the Act.

SDWA was also expanded through several amendments, the most significant coming in 1986 and 1996. The ongoing impact of the Safe Drinking Water Act has been important in following the multi-pronged approach of prevention, treatment, and monitoring in maintaining an adequate supply of safe drinking water.

Prevention

Preventing contamination of public water supply wells and surface-water sources is an important part of drinking water protection. According to the U.S. Environmental Protection Agency, it costs about 10 to 30 times more to clean up contaminated drinking water wells than it does to prevent the contamination. Therefore, source water protection makes sense from two perspectives: public health and economic.

In 1986 the Safe Drinking Water Act was amended to require states to develop wellhead protection programs. Later expanded to include surface-water sources, the programs:

- determine protection areas for each well or surface-water intake that supplies public drinking water.
- identify potential sources of contamination within these areas.
- evaluate how susceptible the well or intake is to contamination from the sources identified.
- use the information to protect drinking water through local land-use ordinances, zoning, conservation easements, and land purchases.
- release the results to the public to help residents, businesses, and land owners understand the potential threats and determine ways to safeguard the water supplies.

The Source Water Protection Unit (SWP) at the Minnesota Department of Health works with communities, land owners, and the public to keep rivers, lakes, and streams as well as underground aquifers (the source of most drinking water in the state) as clean as possible. These efforts include assessing the vulnerability to contamination of the aquifers being used and managing potential contaminant sources and land uses.

Education and training of people involved in the treatment and distribution of drinking water is another component of prevention.

MDH assesses the vulnerability of water supply systems to contamination, taking into account a number of factors. If the system uses groundwater, proper well construction can serve to decrease the risk of contamination. In some systems, natural geologic barriers may serve to protect the source water from contamination.

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 under-ground aquifers tapped by water wells. That process can remove certain kinds of surface contaminants, including bacteria and parasites such as *Cryptosporidium*. Aquifers in many areas of Minnesota are free of microbial contamination; as a result, some groundwater systems do not routinely include disinfection as part of their normal water treatment procedures.

As of March 2014, MDH has phased in 447 of the state's community water suppliers that use groundwater into the wellhead protection program. Of these, 324 are implementing their wellhead protection plans (88 are also amending their plans), and 123 are developing wellhead protection plans for the first time.

Success story

Little Falls Continues Implementation of Wellhead Protection Plan

Little Falls, a central Minnesota city of 8,400, is midway through the implementation phase of its 10-year wellhead protection plan, developed with the Minnesota Department of Health (MDH) and set to expire in 2017. The city had fallen behind with implementation efforts but has made great progress thanks to a grant, a significant find, and dedicated employees.

As part of implementing its wellhead protection plan, Little Falls has to seal unused and abandoned wells. "Unused, unsealed wells can provide an open channel between the surface and an aquifer—or between a shallow aquifer and a deeper aquifer," said MDH hydrologist Geoff Nash. "An unused well can act as a drain, allowing surface water runoff, contaminated water, or improperly disposed waste to reach an uncontaminated aquifer."

Little Falls applied for and received an $8,300 implementation grant from MDH with money available from the fund established by the 2008 Clean Water, Land, and Legacy amendment to the state constitution.

Some of the 12 abandoned wells were accessible via manholes, others were under buildings, and some were under streets. Before tearing up pavement and concrete, the city wanted additional evidence of the locations of these wells.

With a portion of the grant money, Little Falls hired 3Dgeophysics, Inc., of Chaska, Minnesota, to use a proton magnetometer with GPS. The magnetometer identified anomalies, produced by metal, in the earth's magnetic field, a means of finding and confirming the location of the wells. Of the four wells targeted for sealing in 2013, 3Dgeophysics found three. As for the other, it's likely it was removed sometime in the past, possibly during a utility installation. Little Falls has applied for a well-sealing permit to MDH, which will evaluate the situation and determine the status of that well.

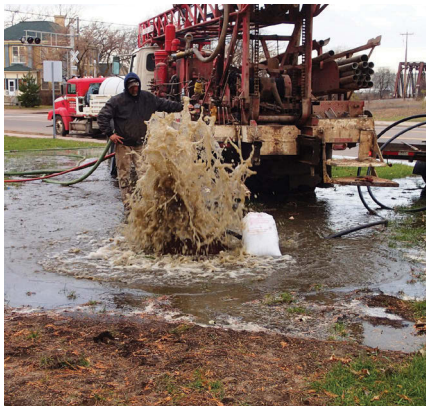
Former wells 7, 10, and 12 were found. Well 7 was just outside of City Hall (which occupies a building that served as the water treatment plant from the time it was built in the 1930s until 1973). The well casing was only a few inches beneath the ground. Though filled with debris and gravel, the locating of the well was an "easy job," according to Nash.

Well 10 was under the basement of City Hall and also posed few challenges.

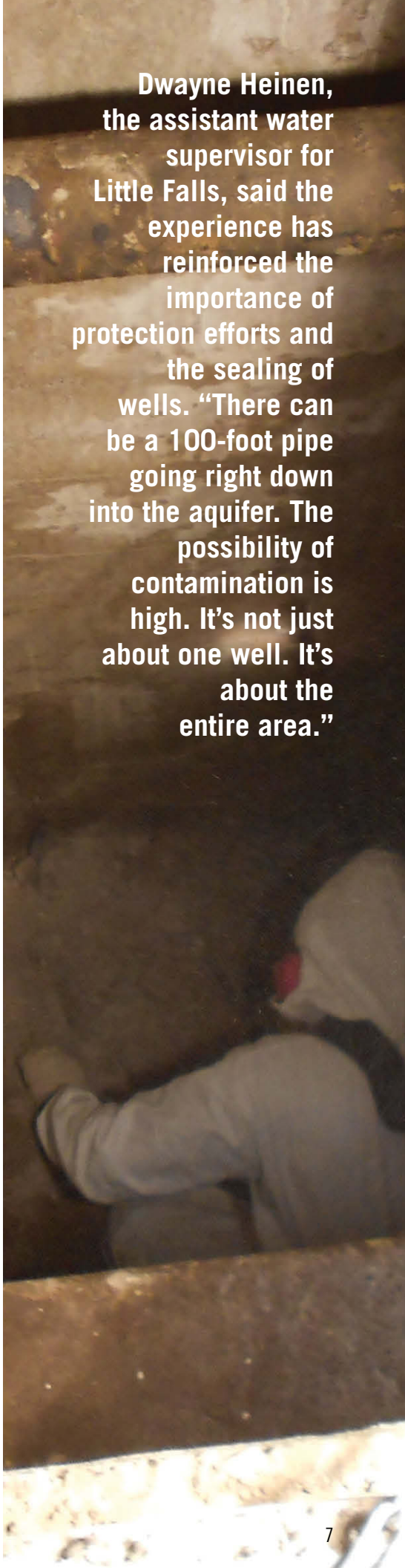
Well 12 was a tougher find. Curtis Wunderlich of the MDH Well Management Section, using a magnetometer, found a Class V well (a shallow injection well into which water and other liquids are pumped). Wunderlich suspected that the sediment, including a chunk of concrete, at the base of the Class V well was covering a well casing. Nash added, "We suspected that the chunk of concrete was part of a past well-sealing effort. Troweling or dumping concrete into the upper few feet of a well was a method of 'abandoning' wells before regulations."

Wunderlich lowered a magnetometer on a rope into the Class V well structure and found a magnetic signature for well 12 beneath it. "Curtis is like a bloodhound when it comes to locating wells," said Dwayne Heinen, the assistant water supervisor for Little Falls. "He just doesn't give up."

The next day a city worker moved the concrete to reveal a six-inch diameter pipe, from 1926, that was well 12. At that point, city crews put a sleeve over the casing to make for easier access for the drillers. Wells 7 and 12 were later cleaned of obstructions and sealed in accordance with the Minnesota Well Code by Northland Drilling of Randall, Minnesota.



Little Falls will be applying for additional grants to continue its program of sealing the rest of the wells. Nash notes that the city's efforts are protecting the aquifers beneath it and ultimately its drinking water and public health.



Dwayne Heinen, the assistant water supervisor for Little Falls, said the experience has reinforced the importance of protection efforts and the sealing of wells. "There can be a 100-foot pipe going right down into the aquifer. The possibility of contamination is high. It's not just about one well. It's about the entire area."

Treatment

Public water systems, often municipalities, are responsible for treating water to make sure it is safe to drink. Disinfection keeps the water free of microbiological organisms that can cause and spread disease, and filtration is often used to remove contaminants. Many municipalities also perform treatment to remove naturally occurring elements that are in the ground, such as iron and manganese, that can affect aesthetic qualities like color, taste, and odor, even if these contaminants don't have the potential to harm people's health.

A 1986 amendment to the Safe Drinking Water Act added additional chemicals to the list of regulated contaminants and required systems that use rivers, lakes, and other surface-water sources to filter the water as part of the treatment process. In 1996 SDWA was amended again to direct the Environmental Protection Agency to consider contaminants based on their potential to adversely affect human health and to be likely to occur in public water systems as well as the opportunity for a meaningful health-risk reduction.

Monitoring

Engineers and public health sanitarians from the Minnesota Department of Health regularly sample treated water distributed by water systems to ensure the water complies with the drinking water standards in the Safe Drinking Water Act. The process includes sampling for microbiological contaminants and nitrate, which can create immediate health hazards, and monitoring for chemical and radiological contaminants, which can increase the likelihood of adverse health effects if elevated levels are present and the water is consumed over a long period of time.

Monitoring requirements for individual public water supply systems depend partly on how vulnerable the system is to contamination. Any time a drinking water standard is violated, the water system must take corrective actions that include notifying its residents.

A 1996 amendment to the Safe Drinking Water Act added to the communication water utilities must have with their customers. All community water systems now issue an annual water quality report (officially known as a Consumer Confidence Report). This report contains information on the source of the system's water and a list of all regulated contaminants that were detected, even in trace amounts well below the legal standard, during the previous calendar year.

MDH engineers and public health sanitarians continue to work with and assist water systems with technical assistance and advice. They sample water and inspect treatment and distribution facilities. If necessary, MDH staff issue violations and require compliance with all rules and regulations intended to ensure that the water being distributed is safe to drink.

Drinking Water Revolving Fund

To assist public water systems with capital improvement needs and to remain in compliance with the federal Safe Drinking Water Act, the Minnesota Department of Health provides below-market-rate loans through its Drinking Water Revolving Fund (DWRF).

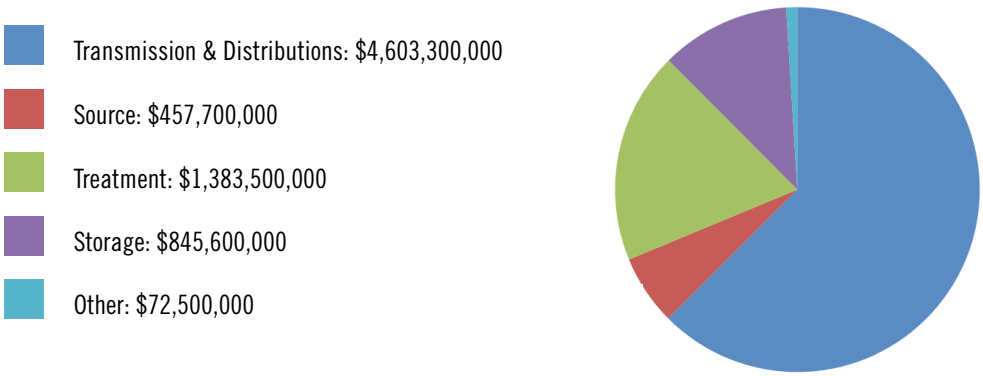
In 2013, the DWRF funded 12 projects totaling $9.2 million. Seventeen additional projects totaling $19.3 million were certified in 2013 for funding in the next fiscal year. For 2014, 89 projects are listed on the Intended Use Plan for a total cost of $102.2 million. Since the program's inception in 1998, a total of $688.4 million in projects were funded through 2013.

Infrastructure Needs Survey

The 1996 Safe Drinking Water Act Amendments mandated that EPA conduct an assessment of the nation's drinking-water infrastructure needs every four years and use the findings to allocate funds for the states' Drinking Water State Revolving Fund (DWSRF) programs. The assessment results for 2011 are reported in the 2011 Drinking Water Infrastructure Needs Survey and Assessment, which can be found at http://tinyurl.com/jwta7vw. The DWSRF, referred to in Minnesota as the Drinking Water Revolving Fund, was established to help public water systems obtain financing for improvements necessary to protect public health and maintain compliance with drinking-water regulations. The results of the survey determined a 20-year drinking-water infrastructure need for Minnesota of almost $7.4 billion. The pie chart below shows a cost breakdown of the needs by project type (transmission and distribution, source, treatment, storage, and other).

20 Year Drinking Water Infrastructure Needs for Minnesota by Project Type
Total Need - $7.4 billion

(Based on 2011 Drinking Water Infrastructure Needs Survey Assessment)



Construction Inspections

Since 1998, construction inspections have been completed for all Drinking Water Revolving Fund (DWRF) projects, with the exception of watermains. In 2012, MDH created a new position with the purpose of conducting inspections on non-DWRF funded projects. Based on the size of the project, both interim and final inspection may be conducted. A breakdown of the number of construction inspections conducted in 2013 can be seen below.

Construction inspections conducted in 2013

	Interim	Final
DWRF	10	7
Non-DWRF	1	16
TOTAL	11	23

Plan Review

Ensuring proper construction for new and renovated drinking water infrastructure is another way of preventing problems before they happen. The Minnesota Department of Health reviews plans and specifications for drinking water infrastructure projects. This protects public health, avoiding possible cross connections and improper treatment of water, helping consulting engineers and the water systems they advise to comply with construction standards and ultimately the Safe Drinking Water Act. It can also save companies and communities hundreds of thousands of dollars each year by having corrections made in the design phase rather than having to make costly modifications during the construction phase. In general, approximately 20 to 25 percent of all plan submittals have issues that are resolved during the planning and design process.

The totals for approved plans have risen steadily in the past few years, indicating growth following a recession.

A total of 480 plans were approved in 2010, 432 in 2011, 587 in 2012, and 639 in 2013, broken down as follows:

89 General water infrastructure, including water treatment plants

27 Storage facilities

491 Watermains

32 Wells

Watermain approvals, a partial indicator of housing starts, increased from 360 in 2010 to 491 in 2013.

Clean Water Legacy Funding

Minnesota's multi-agency efforts in drinking water protection continue to be enhanced by additional dollars from the Clean Water Fund. The Fund receives about 85 million dollars each year (a third of the three-eighths of a percent sales tax increase) through the Clean Water, Land, and Legacy Amendment approved by citizens in 2008. While the broad intent of the fund is to protect, enhance and restore Minnesota's waters, five percent is targeted for activities that protect drinking water.

MDH's continuing Clean Water Fund initiatives include:

- Enhanced source water protection planning and implementation through technical assistance and grants.
- Proactive guidance and education about contaminants of emerging concern County Well Index upgrade.
- Cost-share grants for public and private well sealing.

In 2013, the Legislature funded three new initiatives:

- Studying of viruses in public water supplies
- Studying of contaminants in private wells in select parts of the state
- Monitoring of the water quality of Lake Superior beaches

MDH participates in Clean Water Fund interagency teams that each focus on specific areas of Minnesota's water resource management. MDH holds a non-voting seat on the Clean Water Council, which consists of stakeholders, legislators, and agency representatives, and serves in an advisory role for the governor.

In February 2014, the second edition of the Clean Water Performance Report was released. The 24 measures in the report provide a snapshot of how Clean Water Fund dollars are being spent and the progress that's been made. These measures are part of a larger set that will be used to consistently track and report clean water outcomes over the life of the Clean Water, Land, and Legacy amendment.

New additions to the set of measures were largely in the area of groundwater and drinking water, watersheds monitored by local partners, source water protection grants, county geologic atlases, long-term monitoring network wells, unused groundwater wells sealed, and groundwater levels. This reflects a growing understanding and integration of groundwater and drinking water into broader water resource management activities in Minnesota. The appropriation for drinking water protection is continuing to increase each biennium and exceeds the required five percent of funding.

Source Water Protection Grants

The Source Water Protection grant program, made possible with funding from the Clean Water Fund, is a new grant program that offers financial support to public water suppliers. Three types of Source Water Protection grants cover all categories of public water suppliers:

1. **Source Water Protection plan implementation grants** apply to community or nontransient noncommunity water suppliers that have a current MDH-approved wellhead protection plan or MDH-endorsed intake protection plan. The grants help suppliers implement their source water protection plans.

2. **Source Water Protection competitive grants** apply to community water suppliers regardless of whether they have a wellhead protection plan in place to support management of a potential contamination source that presents a high risk to a source of drinking water.

3. **Source Water Protection grants for noncommunity transient systems** apply to transient noncommunity water suppliers to support wellhead protection measures that address a potential contamination source that presents a high risk to a source of drinking water.

Grants awarded as of December 31, 2013

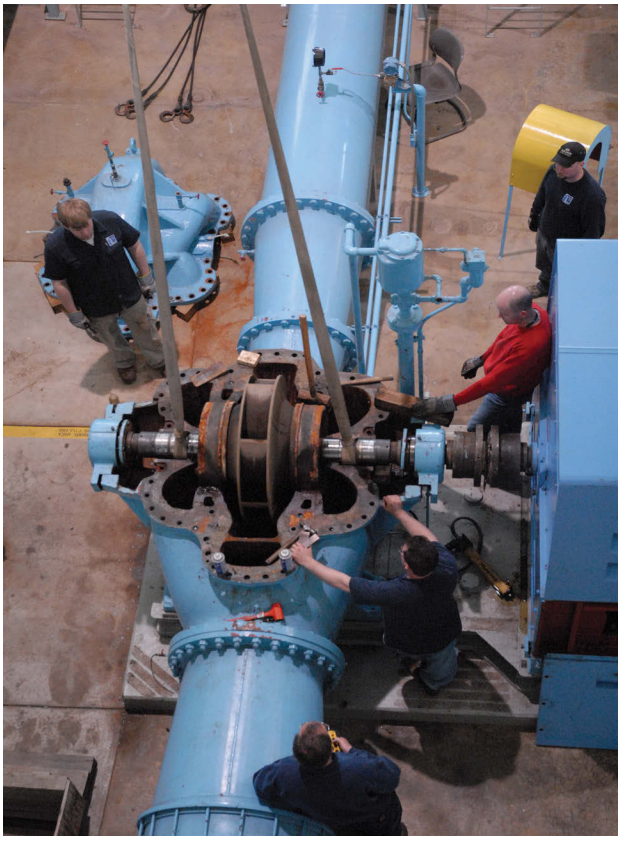
Fiscal Year	Grant Category	# of Grants	Amount	Cost Share
2010	Plan implementation	11	$ 92,449.14	not required
2011	Competitive	25	$183,146.15	$319,806.04
	Plan implementation	66	$426,441.60	not required
	Transient	26	$105,574.71	$135,929.16
2012	Competitive	15	$ 88,860.93	$166,925.38
	Plan implementation	27	$155,518.07	not required
	Transient	29	$180,315.91	$243,955.19
2013	Competitive	12	$ 76,865.31	$153,228.15
	Plan implementation	39	$260,523.29	not required
	Transient	14	$ 81,367.95	$102,201.29
2014	Competitive	6	$ 33,235.69	$ 41,066.69
	Plan implementation	19	$150,954,50	not required
	Transient	5	$ 32,210.16	$ 35,515.16
	TOTAL	294	$1,867,463.41	$1,198,627.06

Training and Education

The people who perform the critical jobs of treating and distributing water to the public are required to meet strict regulations in their ability to do the work. Water operators in Minnesota must be licensed by the Minnesota Department of Health and attend ongoing training, provided by the Health Department in conjunction with other organizations, such as the Minnesota Section of American Water Works Association (AWWA) and the Minnesota Rural Water Association (MRWA).

In 2013, MDH co-sponsored nine training workshops, ranging from one to three days and reaching more than 1,000 operators around the state, in a partnership with Minnesota AWWA. In addition, MDH presented and participated in training conducted by the Minnesota Rural Water Association, including MRWA's annual technical conference, which nearly 1,500 operators attended.

In 2013, 463 water operators took certification exams with 86 percent of them passing on their first attempt. The department also issued 378 certificates and renewed 871 certificates.



Community Training

Actions people take in their daily lives make a difference. Protecting sources and understanding what it takes to create and maintain an adequate supply of safe drinking water result in significant collective achievements.

Toward those ends, MDH participates in children's water festivals and, with Minnesota AWWA, established an annual institute for teachers. Succeeding generations will grow up knowing more about the importance of water and their roles in making sure it remains safe.

The Minnesota Department of Health and Minnesota AWWA have conducted *WaterWorks! A Drinking Water Institute for Educators,* since 2001. Middle-school and high-school teachers learn about drinking water, along with ways to develop the subject into inquiry-based curriculum, at these Institutes. They also have the opportunity to write curriculum to take back to their classrooms. Teachers return for a follow-up session in the fall to present their action plans and subject them to a peer-review process. Those who complete the workshop receive college credits for their participation.

More than 270 teachers have attended the Drinking Water Institute since it began in 2001. The 2013 Drinking Water Institute was held at the Cascade Meadow Wetlands and Environmental Center in Rochester. The 2014 Institute will be held in August in St. Paul.

Distribution Challenges
The 2013 Watermain Break

After water is treated, it is distributed to commercial and residential users. The infrastructure for getting water to customers is massive and needs to be maintained.

Minneapolis Water Works has been the subject of international attention and acclaim with its ultra filtration treatment plant, which opened in 2005. The plant was called "one of the most advanced water treatment systems in the world that marked a sea change in the treatment of drinking water"

according to Robert D. Morris in his book, *The Blue Death: Disease, Disaster, and The Water We Drink.*

Staying out of the spotlight but doing work that is just as critical is the distribution arm of the utility. Its 1,000 miles of pipe, a lifeline to supply the city with its most precious resource, is hidden beneath the surface, leaving residents, when they hear the word "infrastructure," to think of roads and bridges, important components to a community but no more vital as what they don't see.

In early 2013, the city faced one of its biggest challenges. Winter is a season for watermain breaks. But the break in downtown Minneapolis the afternoon of Thursday, January 3, 2013 was distinctive for two reasons: though it happened in winter, it wasn't the result of the stress of cold weather; in addition, the break occurred in a 36-inch pipe, bringing an unprecedented gusher with effects felt through a large portion of the city.

Minneapolis distribution foreman Mark Ebert said it was the largest mainbreak he has seen during his 33 years with the city.

The break occurred at a construction site at Second Street North and Hennepin Avenue when a private contractor ruptured the water pipe. The city lost more than 14 million gallons of water, much of which flooded streets down to the river and submerged a number of vehicles in the garage of the nearby post office. The cost of the lost water itself was $65,000.

Minneapolis Water Works crews followed procedures for isolating the area, but because of the size of the main, it took more than two hours to close the valves. Valves farther from the site had to be closed first to reduce the flow in the area of the break. By late afternoon, the affected area was confined to three blocks between Second Street and Washington Avenue and between Hennepin Avenue and Third Avenue North.

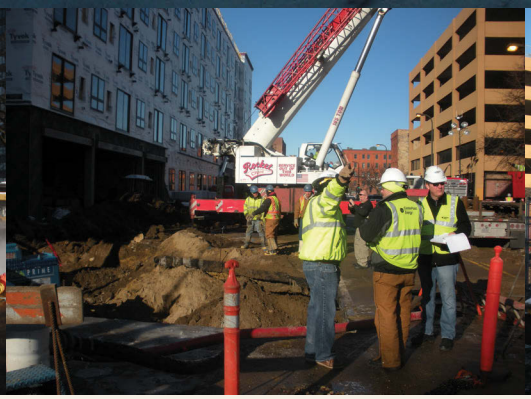
As distribution crews closed valves, others checked water pressure in the surrounding area, concerned that a drop below 20 pounds per square inch (psi) could cause back-siphonage issues. Although pressure dropped in buildings near the break site, the city confirmed that pressure had stayed above 20 psi in the nearby Federal Reserve Bank and Hennepin County Central Library.

Waterworks officials consulted with the Minnesota Department of Health, and the city issued updates on its web site and on Facebook while also communicating with local media. Workers delivered notices to buildings in the affected area with orders not to use the water.

By the weekend the city restored water to the three-block area with temporary lines from fire hydrants while crews continued to fix the broken pipe. Distribution crews bolted a pair of sleeves over a longer section of new pipe to replace the damaged portion.

The city flushed and disinfected the lines in the affected area and worked with MDH engineers Ike Bradlich and Lucas Martin to take bacteriological samples and to check the water for possible contamination from volatile organic chemicals. The samples came back clean. Within a week of the break, Minneapolis had restored all water service to the area and confirmed that the water was safe to drink.

Minneapolis Water Works crews work to isolate area and close water valves after a watermain break near Hennepin and Second Street in downtown Minneapolis.



Monitoring Test Results
for calendar year 2013

This is a summary of results of monitoring performed in 2013. In the case of a violation, a water system takes corrective actions. These actions include public notification to inform affected residents of the situation and if there are any special precautions they should take. In all cases noted here, residents were advised directly by the water system at the time the violation occurred.

All community water systems have also noted any violations in the water quality reports they distribute to their residents. Information on a complete summary of monitoring results in 2013 is in the appendix.

Pesticides and Industrial Contaminants
During 2013, MDH conducted 17,843 tests for pesticides and industrial contaminants in community water systems. No systems violated drinking water standards for these contaminants.

Bacteriological Contamination
Thirteen community systems, including 5 municipal systems, tested positive for bacteriological contamination in 2013. (Most community water systems are municipal systems, such as Minneapolis Water Works or the city of Bemidji. Other community water systems include manufactured home parks, housing developments, nursing homes, and prisons.)

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.

The number of systems that tested positive for bacteriological contamination is in line with numbers from previous years.

Nitrate/Nitrite
No community systems exceeded the standard for nitrate in 2013.

Arsenic
Seven community water systems, including 5 municipal systems, exceeded the standard for arsenic by the end of 2013.

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 had either started or completed infrastructure changes or is studying alternatives to meet the maximum contaminant level (MCL).

For many years the MCL for arsenic in water was 50 parts per billion (ppb). In 2006 the maximum contaminant level was dropped to 10 ppb. Systems that were in compliance with the previous MCL but had levels that would not comply with the revised standard began making plans and considering options for reducing their levels of arsenic. Approximately 40 systems were in this category. By management of the water supply and/or adding treatment, many have come into compliance with the stricter MCL. The others are continuing to work on the situation and have been communicating with their residents.

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

Radium 226 & 228
Seven municipal water systems, exceeded the standard for radium 226 & 228 by the end of 2013.

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 had 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 2013.

Disinfection By-products

One community water system exceeded a standard for disinfection by-products in 2013. The system notified residents of the situation. The system returned to compliance during October 2013.

Lead and Copper

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

Since the initiation of the lead and copper monitoring program in 1992, more than 260 community water systems in Minnesota have exceeded the lead and/or copper action levels. Most systems have returned to compliance after implementing corrective actions; however, approximately 5 to 10 systems each year end up with a lead or copper exceedance due to treatment process changes causing the treated water to become more corrosive or due to water-quality change or instability that require the corrosion control treatment to be reevaluated or re-optimized.

In 2013, 3 community systems exceeded the lead action level, and 18 community systems exceeded the copper action level. These systems are exploring options for getting back into compliance and conducting a public education program. The Minnesota Department of Health has worked with these systems and has been doing its own education campaign since the early 1990s with information about lead and copper and simple precautions people can follow to reduce their exposure.

Enforcement Tools

Minnesota Department of Health engineers evaluate compliance status and, when necessary, work with public water supply systems to develop actions and timelines to return to compliance. However, MDH will take enforcement actions when necessary by using a variety of methods to ensure compliance. The tools include a Notice of Violation, issued to a regulated party that has committed a violation of a statute or rule; a Compliance Agreement, a negotiated agreement between the party and MDH; a 10-Day Letter, requiring a response about potentially serious or repeated violations; and an Administrative Penalty Order, which is used to gain compliance. These methods can be used when a public water system violates a drinking water standard or when it violates reporting requirements.

In 2013, MDH entered into 22 compliance agreements and issued 11 10-day letters and 1 administrative penalty order to community public water systems. (For comparison, in 2012, MDH entered into 16 compliance agreements and issued 15 10-day letters and 2 administrative penalty orders to community public water systems.)

Service Connection Fee

In 1992 the Minnesota Legislature established a service connection fee, which directs each municipal water system to collect an annual fee (now $6.36) for each connection. These funds are sent to the Minnesota Department of Health to cover the costs of testing the nearly 7,000 public water systems in the state as well as to conduct inspections, develop protection plans, and provide technical assistance to these systems, which helps ensure that safe water is being provided to people in Minnesota.

A charge of $1.59 will appear on a quarterly bill; the charge on a monthly bill will be 53 cents. It could also appear as one lump charge for the entire year on one of the bills.

SERVICE CHARGE	5.00
WATER CONSUMPTION - TIER 1	39.76
STATE TESTING FEE	1.59
SEWER	47.88
STORM DRAINAGE - RES	11.33
STREET LIGHTS	5.19
RECYCLING CREDIT	1.80CR

Impacts of the Safe Drinking Water Act

The Safe Drinking Water Act brought uniform standards to all public water systems in the nation, including U.S. commonwealths and territories. For Minnesotans, this means they can be assured of safe drinking water when traveling out of the state to anywhere else in the country.

The Safe Drinking Water Act continues to be examined and revised to reflect changes in technology and knowledge, such as the recognition of the relationship between land and water resources and the need to protect supplies at their source. Contaminants of emerging concern, such as traces of pharmaceutical and personal-care products that work their way into rivers and lakes, are studied and evaluated for potential health risks. The list of regulated contaminants grows, and the limits set for each contaminant are reviewed on a regular basis and sometimes revised, as needed. Communication between utilities and their customers, awareness of the importance of drinking water and the need to maintain facilities and distribution systems, and the investments required by water systems to continue to ensure safe drinking water are all part of the ever-evolving Safe Drinking Water Act.

Looking Ahead

Collaboration

The Minnesota Department of Health oversees the provisions of the federal Safe Drinking Water Act and works in concert with other agencies and organizations. Collaboration between groups in the public and private sector is significant. The insights and experience among those working on public-health and environmental issues create a big-picture look at the challenges and solutions needed.

The connection between the federal Clean Water Act, passed in 1972, and the Safe Drinking Water Act is evident in the gains made to protect water in the environment and ultimately the water that is used for drinking. The Clean Water Act focuses on improving the quality of waterways and addresses specific sorts of pollution (often called point-source pollution). The Safe Drinking Water Act has in many ways enhanced the provisions of the Clean Water Act, addressing treatment and monitoring of water to ensure its safety. The Source Water Protection measures that have evolved through SDWA have expanded efforts by also dealing with non-point sources of contamination.

The Clean Water Act and Safe Drinking Water Act have a common purpose. Although the approaches are sometimes different, the goals of both are to remove contaminants to protect the health of both the environment and of people.

Cooperation

Protection of drinking water also relies on the cooperation of many private-land owners. How farm fields in the vicinity of water wells are used have an effect on water quality as do industries near these wells. To a certain extent, land use can be regulated by rules and laws, but cooperation by land owners and an understanding of their impact on water sources is critical. In addition to land-use ordinances, such collaboration involves planning as well as education and information, the sharing of goals for water-quality protection, and cost-share grants for surface and groundwater protection and restoration.

Infrastructrure

The need to maintain, rehabilitate, and replace vital components of drinking-water infrastructure, such as wells, treatment plants, and pipes, will always be a challenge. The economic vitality of communities of all sizes is dependent on a continuing supply of safe drinking water. Individuals and businesses have a vested interest in safe water.

Contaminants of Emerging Concern

New contaminants are being found in Minnesota waters for a variety of reasons, including better analytical methods for finding substances at lower levels as well as the fact that additional substances are being looked for, new substances are being used, and old substances are being used in new ways. The Drinking Water Contaminants of Emerging Concern (CEC) program at the Minnesota Department of Health is investigating and communicating the health and exposure potential of these contaminants in drinking water.

MDH currently develops human health-based guidance for contaminants that have already been found in groundwater in Minnesota. Under the CEC program, MDH takes a proactive approach to the protection of drinking water by considering contaminants that have been found in groundwater, surface water, or soil or have not been found (or looked for) in Minnesota at all. Additionally, this program provides information on how people are exposed to these contaminants. These differences separate the work of this program from MDH's other guidance work and supplements existing work.

The CEC program supports the Clean Water Legacy Fund mission to protect drinking water sources and the MDH mission to protect, maintain, and improve the health of all Minnesotans.

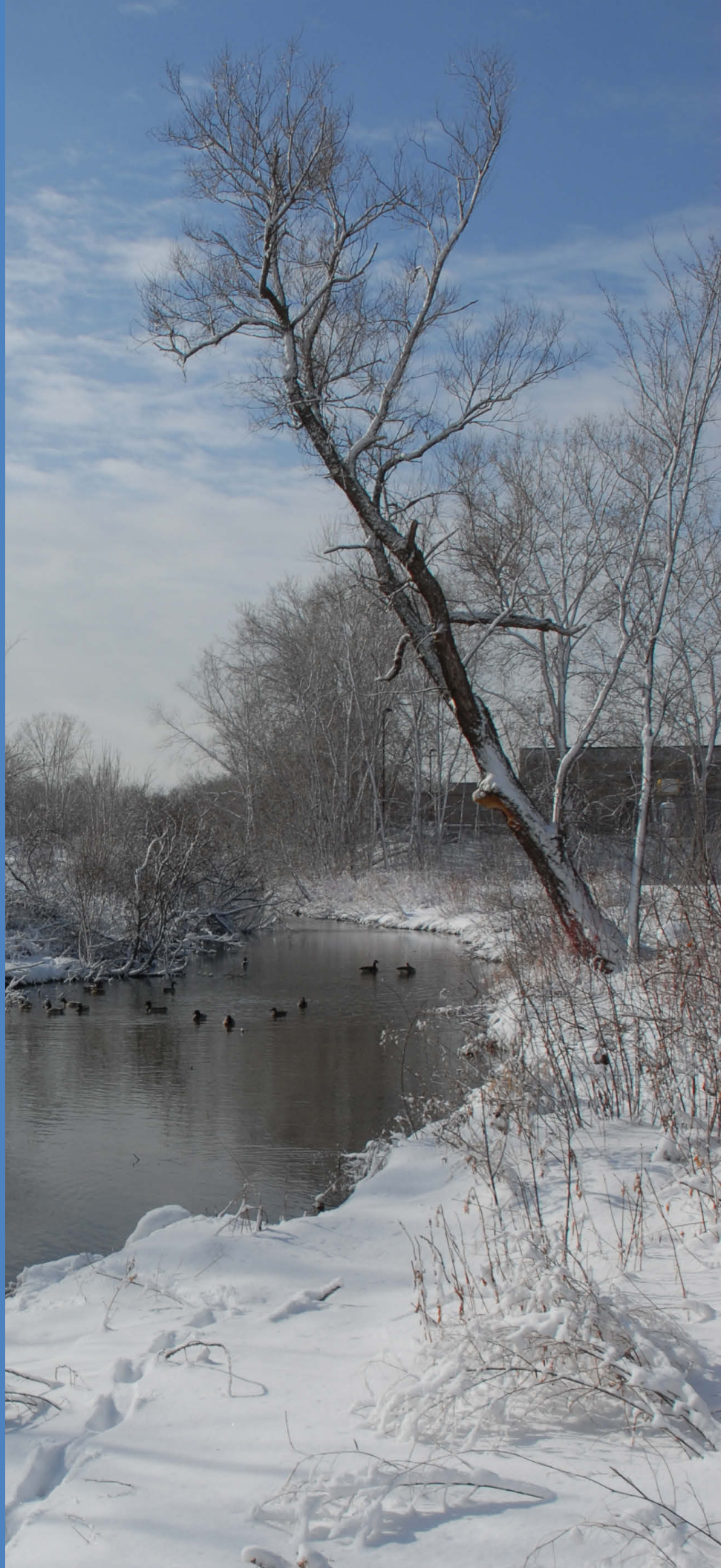
Conclusion

Monitoring test results for 2013 are consistent with 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.

Personal decisions regarding everything from the products we use and how land is managed for industry and agricultural will have a telling effect on the future of our environment and ultimately our drinking water.

Professionals in the water industry work every day to protect and maintain our water, but this is a role that extends to every person who uses water—in other words, everyone.





Summary of Safe Drinking Water Monitoring Results for Minnesota

The summary includes results for both community and noncommunity public water systems in Minnesota in 2013. Public water supply systems include all systems that serve 25 or more people on a regular basis, or that have 15 or more service connections. There are 6,897 such systems in Minnesota, including:

- 958 community systems, which provide water to consumers in their places of residence, including 730 municipal systems.
- 5,939 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 2013 is available from the Drinking Water Protection Section, Minnesota Department of Health, Box 64975, St. Paul, MN 55164-0975. This is also available at:

http://www.health.state.mn.us/divs/eh/water/com/dwar/summary2013.pdf
http://www.health.state.mn.us/divs/eh/water/com/dwar/pwsid2013.pdf
http://www.health.state.mn.us/divs/eh/water/com/dwar/contaminant2013.pdf

Individual community water systems produce an annual report listing contaminants that were detected, even in trace amounts, during the previous calendar year. The individual water system may be contacted for a copy of this report.

SCAN HERE

Use your smartphone to get the Drinking Water Annual Report and SDWA commemorative video at your fingertips.

ANNUAL REPORT

SDWA VIDEO

We want to formally acknowledge the many citizens, professionals, organizations, and agencies that work to protect and restore our water resources and provide safe drinking water to Minnesota citizens. Some areas in Minnesota have aquifers so pristine that at this time they require no treatment to provide safe drinking water. However, our ground and surface waters can be contaminated both by natural processes and by our human activities, and demand for water keeps increasing across Minnesota. It is because of the work of these people as individuals and as members of businesses, organizations, and government agencies that anywhere in Minnesota, citizens can feel confident that the drinking water provided by public water supplies meets all federal drinking water standards.

Our thanks to:

Minnesota Rural Water Association
American Water Works Association and its Minnesota Section
Local government staff including counties, townships, and municipalities
Nonmunicipal public water system staff and operators
Landowners
Business and industry owners
Food, beverage, and lodging facilities owners and staff
Manufactured housing development operators
Schools and churches
Treatment and correctional facilities
Board of Water and Soil Resources
Minnesota Pollution Control Agency
Minnesota Department of Natural Resources
Minnesota Department of Agriculture
Metropolitan Council
Environmental Quality Board
Clean Water Fund
Public Facilities Authority
Elkay
H2O for Life
U.S. and Minnesota Geological Survey
Minnesota Ground Water Association
Minnesota Water Well Association
Suburban Utility Superintendents Association
Water Resource Programs at Vermilion Community College, St. Cloud Technical and Community College, and the University of Minnesota
Association of State Drinking Water Administrators
U.S. Environmental Protection Agency

Safe Drinking Water Is Everyone's Job.

Drinking Water Protection

MINNESOTA MDH DEPARTMENT OF HEALTH

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