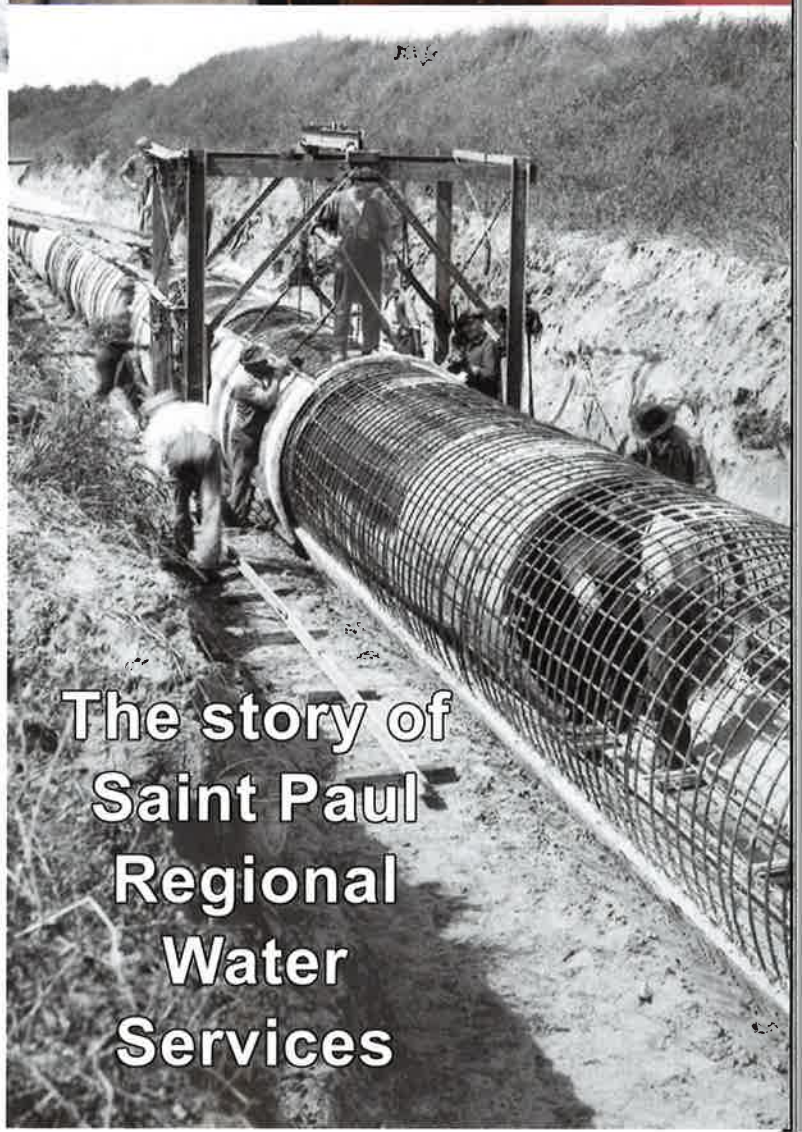
Beyond the faucet



Beyond the Faucet

This publication is designed with you in mind. It is written for anyone who is interested in Saint Paul Regional Water Services.

An interesting story lies beyond the faucet. It is the story of a grand river, beautiful lakes, ample water reservoirs, a large network of conduits and pumps, treatment facilities for disinfection and purification, and an efficient organization made up of women and men who are dedicated to serving their communities.

The people of Saint Paul and surrounding communities have good reason to be proud of their water system – proud of the high quality of its product and of the efficient and businesslike operation of the water utility. The provision of water for public consumption involves a public trust; the health of the public must be protected through the delivery of safe drinking water from a reliable source.

How this is accomplished is the story told in Beyond the Faucet. The story is told here so that the people served by Saint Paul Regional Water Services can better know and understand the water utility that serves them 24 hours a day.

2014
Seventh Edition (revised)
Steve Schneider
General Manager

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SAINT PAUL REGIONAL WATER SERVICES

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The founding of the Saint Paul water system

When the city of Saint Paul was incorporated in 1854, it was a boom-town of miners, loggers, and new businesses.

Charles Gilfillan
Founder, The St. Paul Water Company, predecessor to today's utility.

Below: Building wooden water mains in Centerville. 1896.

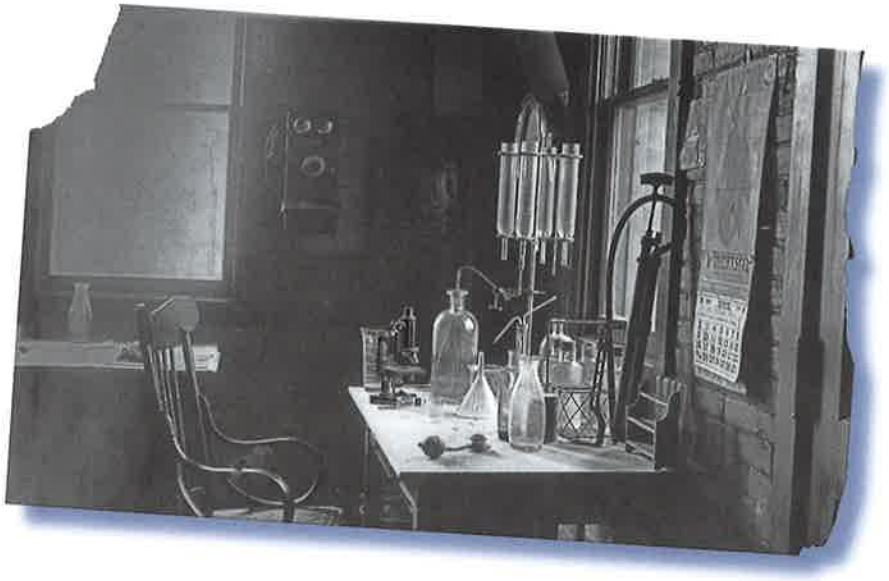
Residents relied chiefly on water supplied from private wells or from door-to-door sellers, who sold water by the barrel. To improve the city's water supply and fire protection ability, the Legislative Assembly of the Territory of Minnesota issued an Act on March 1, 1856, which franchised a municipal water system and incorporated the St. Paul Water Company as a private enterprise. The charter was extended three times in subsequent years, but no progress was made in actually developing a water supply system until 1865, when the original Act was revived and a new set of seven incorporators were named.

Charles Gilfillan, one of the incorporators, was the key figure in establishing a water works for Saint Paul. Depending largely on bond sales and on Gilfillan's cash contributions, a pump and intake were installed at Phalen Creek, as were over eight miles of main. John Caulfield, who was with the utility from 1870 to 1914 said that "it was entirely owing to [Gilfillan's] energy that the money was raised and the work prosecuted." The water was first turned on by the St. Paul Water Company in the fall of 1869.

From Lake Phalen, the water was conveyed, without prior treatment, to the main business section of the city. Gravity moved the water through a 16-inch, cement-covered, sheet iron pipe and a 24-inch earthenware pipe. Water pressure was generally poor, and distribution was limited to low areas close to the north side of the Mississippi River.

By the 1880s, the city was growing rapidly, stimulating discussions on the city owning the water works. Gilfillan agreed to sell the works. But, wanting to ensure that the municipal water works be "operated on business principles," he had two stipulations: first, that the city agree to operate the company under a law that he would draft, and second, that the purchase be approved by popular vote.

With authorization from the Minnesota Legislature, the city purchased the St. Paul Water Company in 1882 for the



sum of $510,000. A Board of Water Commissioners was created to administer its operations. Records show that, by the time of the sale in 1882, Gilfillan had overseen the installation of 188 fire hydrants, 1,817 water services, and more than 23 miles of water main.

Work to expand the system and strengthen its infrastructure moved forward under the city's ownership. By 1884, a 72-inch brick conduit was added to deliver water by gravity flow from Vadnais Lake directly to the distribution system. Shortly thereafter, connections were made to Sucker and Pleasant Lakes.

In 1889, the source of supply was extended to Baldwin Lake by open channel. In 1894, an extension to Otter Lake was created by conduit, and arrangements were made to receive the overflow from Bald Eagle Lake by open channel. A pumping station was constructed in 1896 at Centerville Lake to pump water from this source into the lake system.

Attempts to improve the water quality began in 1914, when an algae growth in the lakes caused unpleasant tastes and odors. Copper sulphate was used to remove the algae. In 1917, large revolving screens were installed at McCarrons Station, and soon the use of chlorine for disinfection began. In 1920, construction began on a water treatment plant to provide clarification,

Left: Professor John Allison from the University of Minnesota Forestry program. He led the re-planting of trees from 1914 onward to replenish deforested areas within the watershed.

Above: McCarron's original lab.

Below: Crews building the 60-inch conduit from the Mississippi River to Charley Lake in 1924-1925.

Above: Laying mains in the 1920s.

Below: The Highland Park Water Tower while under construction in 1927-28.

filtration, and disinfection. The plant started operating in 1923.

Water from the Mississippi River was first used in 1925 to augment the supply. A 60-inch conduit brought the water from the intake station in Fridley to Charley Lake and from there it flowed to the Vadnais Lake system. In 1926, a 90-inch concrete conduit from Vadnais Lake to the treatment plant was completed. A larger, reconstructed plant began operation in 1941; it included a lime processing facility to provide water softening in addition to purification.

The period from the end of World War II to the present has been one of constant improvements in the sources of supply, treatment, facilities, pumping, distribution, and storage of water. Improvements have included a new computerized control system, which allows for instant response to a crisis; installation of larger pipes and steel conduits; increased pumping capacity; improved purification and softening methods; increased storage capacity; and modernized machinery and equipment.

More recent improvements include a Granular Activated Carbon and biologically active filtering system that address the main causes of taste and odor issues. Since that implementation, taste and odor complaints have dropped significantly.

All 94,000 water meters have been replaced, with most using radio read technology to improve efficiencies in collecting the billing information from each home and business. Meter readers no longer need to enter private property while data is securely transmitted to a moving vehicle on the street.

Several new wells are now online, bringing the total number of deep wells in our system to 10. Together they can provide more than 45 million gallons of drinking water a day, the average daily water use within the system. They currently augment the water provided by the Mississippi River and the chain of lakes that make up our water supply system.

Oxygenation systems installed in both Vadnais and Pleasant lakes provide more oxygen and suppress algae growth in the lakes, thus helping to reduce the amount of taste and odor components in our lake water supply.

As communities grow, the number of people we serve continues to grow. Today, we serve nearly 415,000 customers residing in a 123-square-mile area. Our water storage capacity is 91 million gallons, with our customers using an average of 45 million gallons a day. About 1,100 miles of mains distribute water to 94,000 retail services and 10,000 fire hydrants. The sturdy foundations laid by the utility's early architects made it possible for future generations to proceed almost seamlessly with needed expansions of the system to meet the ever-increasing demands for water services.

Administration

The utility is under the control of the Board of Water Commissioners, which consists of members of the Saint Paul City Council and public representatives from Saint Paul and the suburbs served by the utility.

Above: The McCarrons Center administration building.
Left: Pat Mulroy, president of the Association of Metropolitan Water Agencies presents Steve Schneider, general manager, with the Platinum Award for Utility Excellence.

State law established the Board and provides that the rates charged be adequate to cover all the costs of operation and maintenance, and to retire all bonds. The utility is entirely self-supporting with revenue obtained through the sale of water and payment for services provided to other entities. No taxes are used to support the utility. The utility also owns property and facilities totaling approximately $271 million in value as of December 31, 2013. It does business in the amount of $53 million a year and employs about 252 full time equivalent employees to carry out that business.

Administration of the day-to-day operations of the utility is conducted under the direction of a general manager, who is responsible to the Board. An assistant general manager assists the general manager in overseeing utility-wide support services.

The utility is comprised of four major divisions: business, production, distribution, and engineering, each of which operates under the direction of a division manager.

To ensure the highest quality water, the utility continuously upgrades its operations and facilities to the most efficient and up-to-date methods and equipment available. SPRWS employees are expected to be conscientious, dedicated public servants, ready to render helpful and courteous service to all customers.

Bottom: Board of Water Commissioners in 2013. Greg Kleindl, James Bykowski, Kathy Lantry, President Matt Anfang, Vice President Amy Brendmoen, Will Rossbach, Chris Tolbert.

Business Division

The SPRWS business division includes the customer service, financial services, and information services sections.

Customer Service

The customer service section consists of three units—revenue management, the call center, and public information.

Revenue management bills more than 94,000 of the utility's customer accounts either quarterly or monthly. Approximately 31,000 bills are prepared and sent every month.

The **call center** has frequent personal contact with the utility's customers. A large portion of that contact is over the telephone, with customer service representatives handling an average of 6,763 calls per month. Customers also use an interactive Voice Response Unit, which handles another 7,143 calls a month.

Customers call for a myriad of reasons:

- to report that they are moving
- to check on the status of their accounts
- to get information on water and sewer rates
- to find out how to check for plumbing leaks
- to ask about drinking water quality, and so on.

The customer service office is open to the public during normal business hours, and many of the utility's customers choose to stop by and conduct their business in person.

Public information staff produce several publications, including:

- *Customer Service Connections*, a newsletter distributed with the customers' bills
- the utility's annual reports

- the annual water quality report; and a variety of other informational brochures and publications.

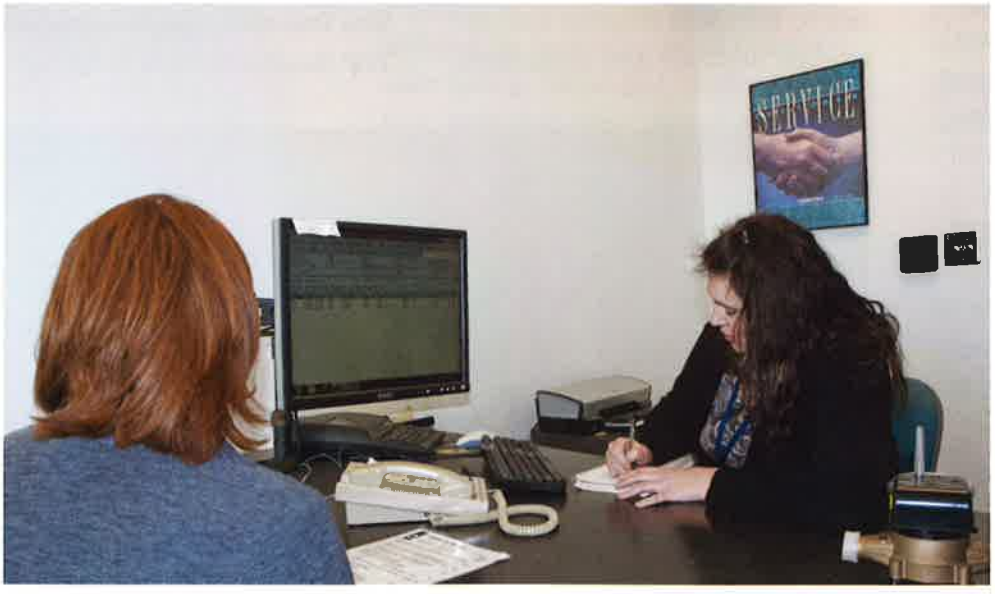
Each year, the office coordinates open houses at the Highland Water Tower.

The unit also maintains the SPRWS website (www.stpaul.gov/water).

Financial Services

The financial services section has five functions. The **payroll unit** pays the salaries of the utility's employees and handles all personnel-related paperwork.

Accounts payable annually pays more than $17 million to about 1,275 vendors, while payments received by the utility are processed by the **cashiers unit.**



Top: Visitors to the Highland water tower.

Left: A customer service rep assists a customer.

The **cost accounting unit** prepares cost analyses for installations of mains, hydrants, water services, supply system pumps, reservoirs, conduits, and repairs to the system. The **general accounting unit** manages the overall accounting system and coordinates the preparation of the utility's annual budget.

Information Services

The utility's information services section supports all enterprise-wide database applications. These include billing and customer service, and a computerized maintenance management system that ties together all of our assets, labor and material costs, as well as our historical records, into one program used throughout the utility. IS also supports many desktop applications and administers Internet management software, the dispatching system, the utility's e-mail and Intranet, and all network servers hardware and software.

Meters

Regulations requiring water meters became effective on April 1, 1875. Since then, virtually all water provided by the utility has been metered. SPRWS owns all meters, except for those used on fire supplies, which are owned by the user.

The utility reads and bills for all 1-inch and smaller meters on a quarterly basis. Meters that measure 1.5 inches and larger – normally installed in commercial property and larger multiple dwellings – are read and billed monthly.

Meter repair shop personnel install, repair, and maintain meters for all customers who obtain their water on a retail basis. About 4,500 meters are tested and repaired each year.

Between 2010-2013, all 94,000 water meters were replaced with radio-read meters. The new meters have a life expectancy of two decades.

The radio-read system allows staff to drive slowly past a house or business and pick up the coded water reading. Once back at the office, the information is downloaded and used to create water bills for actual usage.

Above: A new radio-read water meter in local homes and businesses.

Below: Accountants go over numbers in a financial report.

The new radio read meters nearly eliminated estimated readings caused by inaccessible meter reading equipment on the customers' home. The meters are more efficient to read. The improvements have allowed for a reduction in staff required to read and bill the water meters each month.

Production Division

The SPRWS production division manages the utility's water supply and treatment processes, as well as water quality matters.

Sources of Water Supply

The sources of water supply for Saint Paul Regional Water Services consist of the Mississippi River, the chain of lakes north of Saint Paul, and 10 deep wells located at the south end of the chain.

From the river, water is directed to an Impounding Reservoir Lake System. The water intake facilities at the Mississippi River are located in the city of Fridley, about two miles downstream from the Coon Rapids dam.

The Mississippi River pumping station has a total capacity of 90 million gallons per day. Depending on the weather, this pumping station supplies from 65 to 90 percent of the total raw water that supplies our customers. The water is pumped through two parallel conduits, each 60 inches in diameter and about 8 miles long, to Charley Lake of the Impounding Reservoir Lake System.

Lying about 6 miles north of Saint Paul, this lake system consists of a number of natural lakes, including Charley, Pleasant, Sucker, and Vadnais. The lakes are connected by conduits and canals and have a watershed area of approximately 28 square miles, a water surface of about 1,600 acres, a total volume of about 8 billion gallons and, when the lakes are at optimum elevations, an available supply of 3.6 billion gallons of water.

Above: Well I, one of 10 deep wells that act as additions to our main water supply from the Mississippi River. The 10 wells can supply the entire 45 million gallons a day used by the water utility on average should it be needed.

SPRWS also maintains groundwater wells. Each well is about 450 feet deep and measures 24 inches in diameter. They have a combined capacity of at least 45 million gallons a day. In the winter, water from these wells occasionally is used to mix with the water supply to raise the overall temperature

of the water; this is to reduce the number of main breaks resulting from cold weather. In warm weather, well water is added to bring down the temperature of the surface water and to assist with nitrification issues in the system.

Water from the river and lakes eventually reach Vadnais Lake. Two 90-inch conduits connect Vadnais Lake to the water treatment plant 4.4 miles to the south. Along the way, water from the wells can be added.

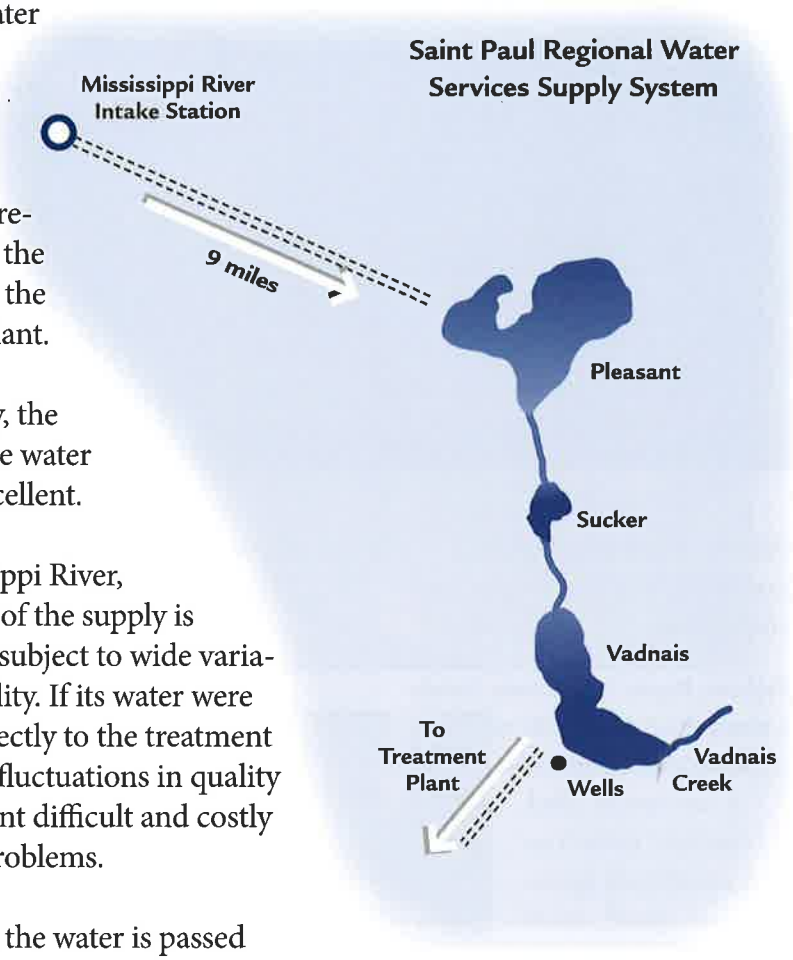
Together, the conduits are capable of conveying water by gravity at a rate of 200 million gallons a day. Valves are used to regulate the amount of water actually entering the treatment plant. The use of gravity saves a great deal of electrical energy every day. One of the advantages of our water supply system is that it relies heavily on gravity to do much of its work.

Once the water is pumped out of the Mississippi, no further pumping is required until the water leaves the treatment plant.

Additionally, the quality of the water supply is excellent.

The Mississippi River, where most of the supply is obtained, is subject to wide variations in quality. If its water were pumped directly to the treatment plant, these fluctuations in quality would present difficult and costly treatment problems.

However, as the water is passed through the lake system, it is subjected to natural processes and diluted with lake water, producing a raw water source of exceptionally good quality.



The intake chamber and boat house on Vadnais Lake.

It is fortunate that abundant water resources are available and that people with foresight developed a supply system that was capable of meeting the quantity and quality needs of Saint Paul and its surrounding communities for many years in to the future.

Water Treatment

Since the utility's water treatment plant was built in 1920–1922, it has been enlarged and modernized at frequent intervals to provide up-to-date treatment techniques that ensure high quality drinking water. The phases involved in the treatment process are described below.

Above: A painter cleans the surface of the McCarrons treatment plant.

Below: Basin No. 4 near Sandy Lake gets cleaned out of accumulated spent lime.

Raw Water

The raw water is first treated in the supply lakes through oxygenation and the addition of ferric chloride to reduce algae growth. From the lakes, the water is conveyed by two 90-inch conduits to the treatment plant, where it is metered for rate of flow. This measurement, combined with the chemical, bacteriological, and physical characteristics, is used to determine the best way to treat the water.

Mixing Basins

Raw water entering the plant has an average content of natural mineral hardness compounds of 170 milligrams per liter (or, about 10 grains per gallon).

As the water enters two rapid mixers, chemicals are added: lime to soften the water, and aluminum sulfate as a primary coagulant. Chemical reactions begin to change certain hardness compounds from soluble to insoluble precipitates called floc. Floc absorbs and entangles bacteria and other suspended matter. As the floc settles, the hardness is reduced, resulting in a finished water hardness of approximately 64 to 85 milligrams per liter (or, 4 to 5 grains per gallon).

Flocculators

From the mixing chambers, the water passes through three basins called flocculators. Large, motor-driven paddles rotate slowly, causing the floc to come into contact with all suspended matter. The long, narrow basins ensure that the softening and coagulation agents have sufficient time to complete the chemical reaction and prevent the floc from settling. Ferric chloride is added as a flocculant aid.

Clarifiers

Water from the flocculators enters into one of five clarifiers. These large basins are designed to reduce the velocity of the water, allowing the floc to settle rapidly to the bottom and the water to go on for further treatment. The settled floc is called spent lime and is scraped into a pit.

Eventually, the spent lime flows to the dewatering plant.

Recarbonation Chamber
As the water flows over the top of the clarifiers, it enters the recarbonation chamber. Carbon dioxide gas is added to lower the pH and reduce the caustic alkalinity caused by softening. At the front of this basin, fluoride is added for dental health.

Secondary Settling Basins
Water flows through the secondary settling basins very slowly to further clarify the water before it is ready for filtration.

Filters
Twenty-four filter units are available with a combined capacity of filtering 144 million gallons of water a day. The filters consist of 36 inches of granular activated carbon (GAC) and 4 inches of sand.

These filters are biologically active, using nature's own good bacteria to help further break down organisms in the water and help the filters remove them.

During filtration, the settled water is conveyed by flumes to the top of the filter, where it passes down through the GAC and sand. The filtered water is collected in the underdrain system and piped to the finished water reservoir.

The GAC filtering process in conjunction with the biologically active filters has greatly reduced the seasonal taste and odor issues that surface with algae blooms.

Above: New boilers in the boiler room. **Left:** Pump No. 5 at Fridley Station along the Mississippi River. Pump No. 5 was recently replaced after more than 50 years of service.

Final Treatment
Chlorine, a powerful oxidant and disinfectant, which kills bacteria and other disease organisms that may be present, is added. In addition, we add ammonia. The ammonia reacts with the chlorine to form chloramines, a more stable compound that provides disinfection in the distribution system.

Sodium hydroxide is added as an adjustment for optimal corrosion control treatment.

Dewatering and Wash water Recovery Plant
Filter presses capture nearly 100 percent of the spent lime solids. This treatment residual is classified as an agricultural liming material. It is transported from the plant and used for soil treatment in a wide geographic area.

Top: A water quality specialist shows a water sample during a tour of the treatment plant.

Right: The low service water reservoir at McCarrons Center.

Below: Staff from the water quality lab take samples of the spent lime from holding basin No. 4, where wash water from the plant is discharged for holding and settling.

Laboratory Control

The water from the Mississippi River and the lake system, as well as the raw water entering the plant, are continuously subjected to bacteriological, biological, physical, and chemical analyses by professional laboratory staff. These analyses help determine the treatment required for softening and disinfection. They also help determine if the utility's lake management strategies are effectively controlling algae, and they disclose any factors that may lead to deterioration of water quality so that preventative measures may be taken.

Before the finished water leaves the plant, on-line analyzers ensure compliance with the federal Surface Water Treatment Rule. The water in the distribution system is routinely examined for chlorine residual and bacteriological content in accordance with standards set by the U.S. Environmental Protection Agency (EPA) and the Minnesota Department of Health.

In addition to these analyses, SPRWS has convened a Taste and Odor Panel once a week since 1994. The panel of utility employees uses samples of both raw water and distributed water for detection of unwanted tastes and smells. The origins of the samples are not known to the panel members. The process can give the utility's laboratory advance warning of any problems in the water system.

Water Distribution System

Water pumped from the treatment plant enters a distribution system consisting of more than 1,100 miles of water mains in the city of Saint Paul and the suburbs served by the utility. Most mains vary in size from 3 inches to 42 inches in diameter.

The utility's total, finished water storage capacity is 91 million gallons; this is approximately twice the average daily demand for water.

Service Areas

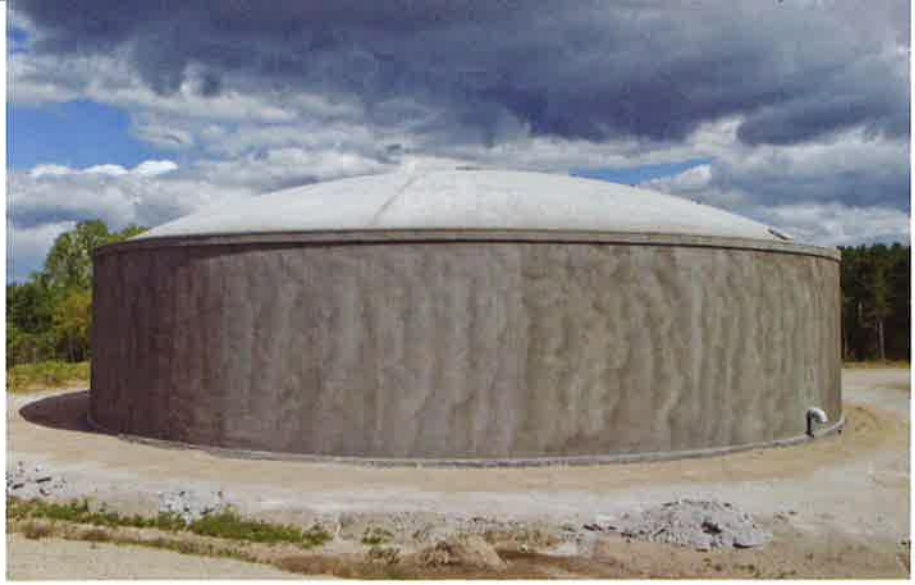
Excluding the districts served by booster stations, the distribution system in the city of Saint Paul is divided into two main service areas – the low-service area and the high-service area.

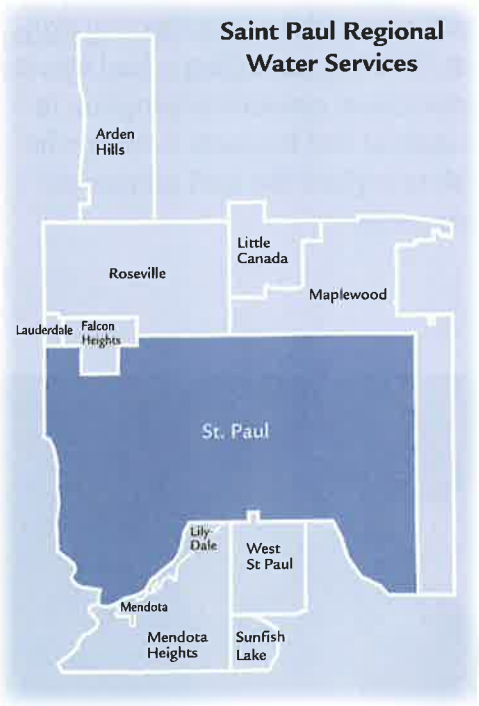
The low-service area embraces the entire downtown business section; the low-lying regions across the Mississippi River; and the low-lying areas adjacent to West Seventh Street, running southwesterly from downtown to just west of Interstate 35. Storage for the low-service area is provided in a 16 million-gallon reservoir located at the utility's water treatment plant in Maplewood.

Pumps from McCarrons deliver water directly to the high-service areas, which is also served by four large reservoirs. Highland Park has 18 million- and 10 million-gallon reservoirs; Hillcrest has a 10 million-gallon reservoir; and Dale Street has a 10 million-gallon reservoir. The Dale Street reservoir also serves Roseville and later, Arden Hills.

Booster Stations

The city of Saint Paul is often referred to as the city of seven hills. This topography requires that a substantial amount of water in the distribution system be re-pumped to provide sufficient pressure in the high-lying areas. SPRWS operates 10 booster stations to provide water storage and maintain sufficient pressure in these areas.





Top: The new 10 million-gallon reservoir at Roseville, which replaces the 30 million-gallon reservoir.

Far Left: This map outlines the SPRWS service areas.

Near Left: Crews replace a 30-inch water main.

Above: Cement workers lay concrete to replace a sidewalk that was removed during water main replacement along Snelling Avenue in Saint Paul.

Below: Installing a main under the highway at 110 in Mendota.

Distribution Division

The distribution division provides maintenance, repair, and replacement of the underground piping infrastructure. This includes material warehousing and vehicle and equipment maintenance.

Dispatch Office

All of the utility's fieldwork is coordinated by the dispatch office, including main construction and repair, installation of new water services, and service shut-off and turn-on functions. This office also handles emergency calls from customers and police and fire services. Emergency crews are on duty 24 hours a day, always ready to respond.

Fire Protection

To ensure that adequate quantities of water are available in all parts of the SPRWS service area at all times, the utility's system of mains, reservoirs, and pumps is designed to meet fire demands in addition to normal requirements. To accommodate easy access to a fire hydrant during a fire emergency, the water system is designed for hydrants at 600-foot intervals in residential areas and at much closer intervals in industrial areas. Every hydrant is inspected at least once a year for accessibility, flowage, and leakage and, if needed, repaired or replaced. The utility currently maintains nearly 10,000 hydrants in its system.

Water Services

SPRWS maintains more than 94,000 water services and distributes water to approximately 415,000 people.

The first service was installed in 1869, with the original services consisting of lead pipe. Galvanized piping was used later, and copper has been used since 1925. Ductile iron piping is used for fire supply and services more than 2 inches in diameter.

SPRWS has replaced many of the original lead services with copper. Some are replaced as part of main repair projects, while other replacements are coordinated with Saint Paul's Public Works projects, including, for example, the sewer separation and the street paving projects. SPRWS also offers a lead service replacement assessment program to residential and business owners who wish to replace the lead service on their property.

Engineering Division

The engineering division, which operates through four units, performs a variety of professional, technical, and inspection services for the utility and its customers.

Project engineering provides engineering services for water treatment and pumping improvements, large water mains, water tower maintenance, and related projects, including water conservation. The **maps and records unit** maintains and updates the utility's engineering drawings and records.

Agreements and inspection staff assist utility customers in obtaining new water services and making improvements to existing ones. They also manage the lead service replacement assessment program and inspect suburban and private water main installations. The **plumbing inspection unit** issues permits and inspects water service construction work.

Main removal as part of the Light Rail Project in 2010 downtown St. Paul.

Saint Paul Regional Water Services
Water Facts and Figures

AREA SUPPLIED (in square miles)	
Saint Paul	56.2
Suburbs	66.6
WATER USE (in million gallons)	
Average daily	45
Maximum daily (in 1975)	126
Average annual	16,425
GROSS DAILY PUMPING CAPACITY (in million gallons)	
McCarrons Pumping Station	144
Mississippi River Pumping Station	90
Centerville Pumping Station	40
10 Booster Stations	97
WATER TREATMENT PLANT (in million gallons)	
Daily plant capacity	130
STORAGE CAPACITY (in million gallons)	
Total treated, finished water	91
DISTRIBUTION (retail)	
Miles of main in system (3"–42")	1,119
Number of fire hydrants	9,470
Number of valves	24,350
Number of metered accounts	94,807
Number of people served (includes wholesale customers)	416,879

Services to Suburban Communities

Saint Paul Regional Water Services provides water services to several of Saint Paul's neighboring communities.

Above: Water isn't only for drinking, as this firefighter demonstrates.

Depending on the level of services they receive, these suburbs can take advantage of a number of benefits offered by the utility:

- a considerable capacity for service through the system's extensive network of mains and pumping facilities
- a wide array of services including, for example, water main inspection, testing, and repair; regular water quality testing; water and sewer billing services; and computerized financial services
- a range of options for services, which may be provided on a retail or wholesale basis
- a staff of experienced, trained, and competent employees to deliver the services

Little Canada, Roseville, and indirectly, Arden Hills, which purchases its water from Roseville, all receive wholesale services from SPRWS. With wholesale services, the utility delivers the water to the borders of the suburb, and then the suburb distributes the water and provides all other services – such as billing and maintenance of the distribution system – to its customers.

Falcon Heights, Lauderdale, Maplewood, Mendota Heights, and West St. Paul have retail services. This means that the utility provides the water, maintenance of the infrastructure (e.g., mains, pumping stations), and water billing services. The utility also provides water directly to a small number of residents in Lilydale, Mendota, Newport, Roseville, South St. Paul, and Sunfish Lake. Nearly 23 percent of the utility's retail accounts are suburban accounts.

The Board of Water Commissioners and the suburbs of Maplewood, Falcon Heights, Lauderdale, and West St. Paul created permanent partnerships under which the Board owns the water facilities in addition to providing all the services on a retail basis.

These arrangements continue to be of long-term mutual benefit to all parties. The partnerships have increased the permanent customer base and the sources of revenue for SPRWS, allowing the utility to expand its operations without adding more staff, thereby increasing efficiency. For these suburban residents, water rates are the same as Saint Paul residents.

Personnel from these suburbs no longer need to spend time on water-related operations.

Watershed Conservation

Left: Two swans at sunset at Vadnais Lake. (Dick Rohland photo)

Above: A crane watches over the SPRWS watershed.

Inset: Two Canada goose goslings make their way through the grass at the water utility.

The landscape of the Vadnais Lake watershed, consisting of 15,407 acres, has changed substantially since this source was first utilized. What once was a sparsely populated area of marsh, prairie, and woodland is now a relatively typical suburban area. During the 1970s and 1980s, the development of the watershed area was in full swing, and the reservoir lakes became overly stressed with excess phosphorus and nitrogen. These substances function as nutrients in the lake ecosystem, causing excessive growth of algae – the chief cause of taste and odor problems.

In the mid-1980s, in partnership with neighboring municipalities, the utility began a reservoir and watershed-monitoring program. The focus of the program was to assess, monitor, and control the amounts of nutrients flowing through the watershed to the reservoir lakes from the various communities. The utility spearheaded the campaign with a staff of scientists and engineers and a significant infusion of capital. The effort was designed to find the best methods for maintaining excellent source water quality.

As a result, the amount of water from the Rice Creek system decreased, as it had unfavorable characteristics.

The utility began using an application of the mineral salt ferric chloride to limit the availability of soluble phosphorus.

The use of aeration in Vadnais and Pleasant lakes began. In 2011 and 2013, those aeration tanks were replaced with an oxygenation system in Vadnais and Pleasant, respectively.

Wetlands along Lambert Creek, a source of nutrients into Vadnais Lake, were restored to help decrease the volume of water and nutrients flowing into Vadnais.

Above: Pleasant Lake having oxygenation pipes installed.

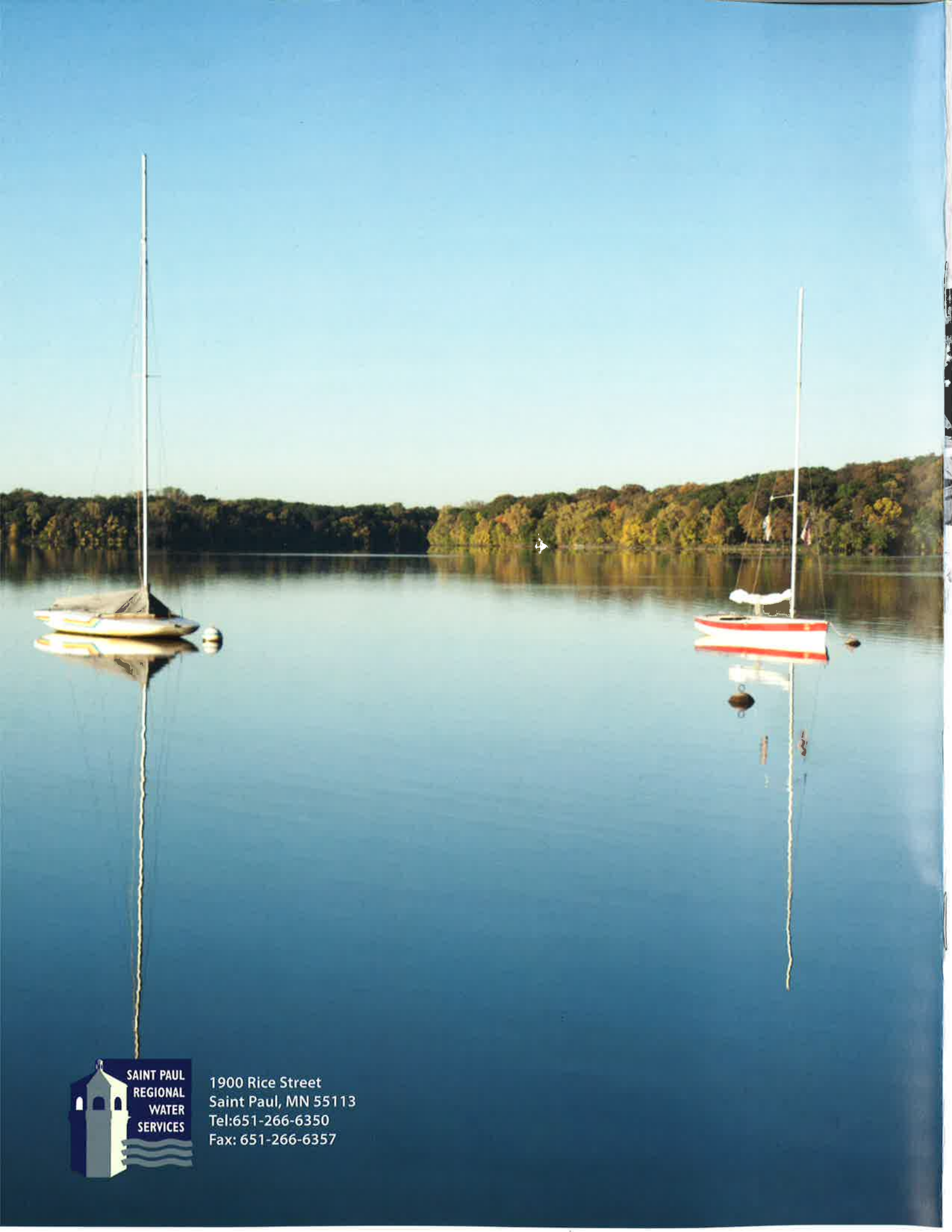
These strategies have been implemented and have proven successful. Water quality in the reservoir system has improved, and complaints from consumers have decreased. Moreover, wildlife also benefits from the stable, moist environment created by the restoration.

Saint Paul Regional Water Services and the neighboring communities are committed to continued success with the reservoir and watershed protection programs. New developments in the watershed now are required to conduct a wetland evaluation if wetland is affected.

New developments also are required to include functional ponding sites to minimize the impact of water runoff on the watershed.

Above: The oxygen tank at Pleasant Lake.


BOARD OF WATER COMMISSIONERS
ST. PAUL, MINN.



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