What does your WATER UTILITY *do for you?*

MWUA
Maine Water Utilities Association
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BANGOR DAILY NEWS • BIDDEFORD JOURNAL • BRUNSWICK TIMES RECORD • KENNEBEC JOURNAL • LEWISTON SUN-JOURNAL
MAINE SUNDAY TELEGRAM • MORNING SENTINEL • PORTSMOUTH HERALD • FOSTER'S DAILY DEMOCRAT
MONDAY - TUESDAY, MAY 3-4, 2010

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What does your WATER UTILITY do for you?

A Message from MWUA President Kathy Moriarty

The Maine Water Utilities Association is pleased to present this 2010 informational supplement celebrating National Drinking Water Week. We were excited that so many people enjoyed our first supplement distributed last year.

Water utilities provide an essential service to our communities: a reliable supply of safe drinking water at the turn of the tap. The value of water and the infrastructure that supplies it cannot be overstated. For the most part, water utilities have been "silent servants," with the majority of our facilities out of sight — and therefore often out of mind. Water is plentiful and relatively inexpensive in Maine, and without the need for enforced conservation, the cost and mechanics of maintaining a steady supply rarely comes to mind — until a water main breaks or a hydrant is needed for fire fighting.

We hope this supplement brings into focus the value of water, which includes the professionals who deliver it right to your tap — all day, every day — and the planning, projects, and investments that support that delivery. Our mission supports:

Public health: Experts estimate three million people die each year from waterborne disease worldwide. In the United States, you can safely drink from a public tap. Water utilities monitor for more than 100 contaminants and must meet nearly 90 regulations.

Fire protection: A well-planned distribution system with appropriate hydrants and sufficient volume and pressure is critical in protecting communities.

Economic development: The availability, quality, and cost of public water and fire protection can influence a company's decision about locating or expanding a business.

One final thought from a recent industry publication: "Reinvesting in our water infrastructure today can help prevent a crisis tomorrow."

Yours for safe drinking water,

Kathy Moriarty

Kathy Moriarty, President
Maine Water Utilities Association

MWUA STORIES

SPLASHES OF HISTORY

WATER RESOURCES

Maine Water Utilities Association
www.mwua.org - (207) 832-2263 - Represents the Maine water works professional membership.

State of Maine Drinking Water Program
www.medwp.com - (207) 287-2070 - State agency responsible for enforcing federal and state drinking water rules.

American Water Works Association
www.awwa.org - International scientific and educational society dedicated to the improvement of drinking water quality and supply.

U.S. Environmental Protection Agency
www.epa.gov - (800) 426-4791 - Present and future federal regulations, water quality data, and source water information.

National Centers for Disease Control
www.cdc.gov - (800) 311-3435
Information on Disease Control and Prevention.

It's National Drinking Water Week!

May 2-8, 2010 is National Drinking Water Week —a time to recognize the importance of drinking water protection and conservation, as well as the value, importance, and fragility of our state's water resources water for people in their everyday lives. Maine residents and visitors are served daily by more than 1,900 public drinking water systems, ranging in size from a drinking fountain at a roadside rest area to a large metropolitan drinking water system. The Maine CDC Drinking Water Program within the Department of Health and Human Services works with drinking water utilities to make sure that the water delivered to consumers meets all federal and state standards and is clean and abundant.

In acknowledgement of Drinking Water Week, on May 4 Gov. John E. Baldacci will sign a proclamation to recognize May 2-8, 2010 as Drinking Water Week in Maine. Members of several water utilities, the Maine Municipal Bond Bank, Maine Rural Water Association, and the Maine CDC Drinking Water Program will be at the governor's office for the signing.

The Maine CDC Drinking Water Program has reported the tremendous benefits from the $19.5 million in drinking-water funding Maine received from the American Recovery and Reinvestment Act of 2009. That funding helped put people to work at a time of great need, and enabled public water systems throughout Maine to replace aging pipes, treatment systems, and tanks to improve drinking-water quality and public health for Maine citizens.

The Maine CDC Drinking Water Program is also sponsoring the National Theatre for Children to perform at various Maine schools served by community water systems during Drinking Water Week. The NTC performs skits that educate kindergarten through sixth-grade students about the importance of safe, secure drinking water. This year, the NTC will work with the Limestone Water District, Eagle Lake Water & Sewer District, Brownville Water District, Aqua Maine (Camden/Rockland Division), and the Morrill Village Water District to perform for schools in their service areas.

This supplement was produced and published for the MWUA by the

Bangor Daily News

Editor/Layout: David M. Fitzpatrick **Writing and Photos:** Members of the MWUA
Cover Design: Josh Alves **Sales:** Linda Hayes

If you'd like to participate in next year's MWUA supplement, contact Linda Hayes at (207) 990-8137 or lhayes@bangordailynews.com. If you'd like to reach a local, regional, or statewide audience (or beyond) with your organization's message, consider running your own targeted Special Section. For more information, contact Paul Herrick at (207) 990-8295 or pherrick@bangordailynews.com.

How do you know your drinking water is SAFE?

Andy Tolman, Assistant Director
MAINE CDC DRINKING WATER PROGRAM

Safe, secure, and adequate supplies of drinking water are necessary for good health and well-being. For about half of Mainers, public water systems provide this essential service to their homes. The other half relies on private wells for drinking water.

Public Water Systems

Public water systems work with the Maine Drinking Water Program to treat and routinely test the water they supply to ensure it meets federal standards and is safe to drink. Municipal water systems produce annual Consumer Confidence Reports to inform their customers about the quality and safety of their water. If a routine test finds bacteria in the water, customers are informed immediately, and a boil-water order may be issued. As soon as the problem is resolved, the order is lifted. Water operators licensed by the state, under the supervision of either a board of trustees or the municipality, manage municipal systems. All of these entities work together to provide safe and reliable drinking water to their customers.

Private Wells

If you have your own well, it was probably drilled by a Maine state-licensed well driller, who is trained and tested in the proper location and construction of water wells. Drillers typically take initial water samples from the well and have them tested to determine if it's safe to drink. After that, the homeowner is responsible for the well's operation and maintenance. The water for your home comes from rainfall, and how you and your neighbors use the land around your well can change your water quality. Some steps you can take to help ensure the quality of your well water:

- If you have a septic tank, pump it regularly and don't pour chemicals you don't want to drink down the drain.
- Use fertilizers and pesticides carefully, so they won't wash down into your water supply.
- Handle gasoline and used motor oil carefully, and dispose of it at a recycling center.
- Inspect your heating-oil tank and its piping to make sure it's not leaking or in danger of tipping over.
- Test your well every year for bacteria and nitrates that can quickly make you sick.
- Test your well every three to five years for arsenic, radon, uranium, lead, and fluoride. These are all natural elements that can have health effects.
- Encourage your neighbors to take care of their septic tanks, petroleum, and chemicals with as much care as you do.
- For more information about maintaining your well, visit the Maine Department of Health and Human Service and Maine Center for Disease Control and Prevention's Division of Environmental Health site at wellwater.maine.gov.

How is water treated?

Rick Knowlton
AQUA MAINE

Across Maine, public water systems withdraw over 30 billion gallons each year to supply customers with potable water. Over 20 billion gallons come from Maine's lakes, streams, and rivers — surface waters that must be treated before delivery. Ten billion gallons come from groundwater sources — either shallow wells in sand and gravel deposits or deep wells drilled into Maine's granite plate. How your water is treated generally depends on where it comes from.

Community water systems in Maine serve 66 percent of the population. Every one of these systems must deliver water that meets the same stringent quality standards regardless of their sources. Large public water systems typically use surface waters; community water systems from Kittery to Eastport to Presque Isle rely on surface sources. Surface waters commonly require the most treatment, as they are more susceptible to natural and manmade contamination.

Surface-water treatment typically includes filtration and disinfection. Filtration removes particulate and organic matter; techniques can vary and in Maine can include conventional, direct, slow sand, cartridge, or membrane filtration.

Conventional filtration has several steps, including flocculation, sedimentation, filtration, and disinfection. Flocculation refers to treatment processes that combine or coagulate small particles together, which settle out of the water as sediment. Alum or iron salts or synthetic organic polymers promote coagulation. After flocculation and sedimentation, the water passes through a sand, garnet, or anthracite filter to "polish" the water and capture remaining fine particles. The water is then disinfected to ensure inactivation of any viruses, bacteria, or other disease-causing organisms.

Direct filtration is similar, with the exception of the sedimentation step. With direct filtration, water flows directly to the filter after the coagulation step and all sediment is trapped on the filter.

Slow sand filtration operates without the coagulation step. Water is passed at very slow rates through a sand filter before disinfection. The slow sand filter develops a biologically active top layer that provides treatment of organic matter in addition to the sand media's physical barrier. This was the first method of municipal water filtration in the U.S., dating to 1872.

Cartridge filtration is a physical barrier comprised of various permeable fabrics that remove solids from water. Cartridge filters come in various shapes and sizes and were developed for small water systems as a convenient, cost-effective filtration method.

Membrane filtration is a thin layer of semi-permeable material that separates water as a function of chemical and physical characteristics when pressure is applied across the membrane. Microfiltration, ultrafiltration, nanofiltration, and reverse osmosis are membrane processes across a spectrum of filter performance that measures the effectiveness of the membrane based on the molecular size or the molecular weight cutoff of the membrane. Microfiltration can remove particles, microorganisms, and organic matter larger than 0.1 micron on one end of the scale, and reverse osmosis can be used to desalinate salt water on the other end. The first large-scale membrane-filtration plant in Maine is currently under construction.

After filtration, disinfection is used to destroy or inactivate disease-causing microorganisms. Maine water systems disinfect with chlorine, chloramines, ozone, and ultraviolet light. Each technique has specific effectiveness and cost benefits. Most Maine water systems disinfect to ensure adequate treatment at the treatment facility and throughout the distribution system that delivers water to homes or businesses. There are 10 public water systems in Maine that use surface water sources that treat with only disinfection because their water sources are clean and protected enough to not need filtration.

Treatment of groundwater sources differs because groundwater is less exposed to microbial or organic contaminants and more exposed to inorganic contaminants such as arsenic, nitrates, and nitrite. Groundwater is also exposed to radon and other naturally occurring radionuclides. Common in Maine groundwater, elevated levels of iron, manganese, and hardness that can cause significant aesthetic issues without corresponding health risks.

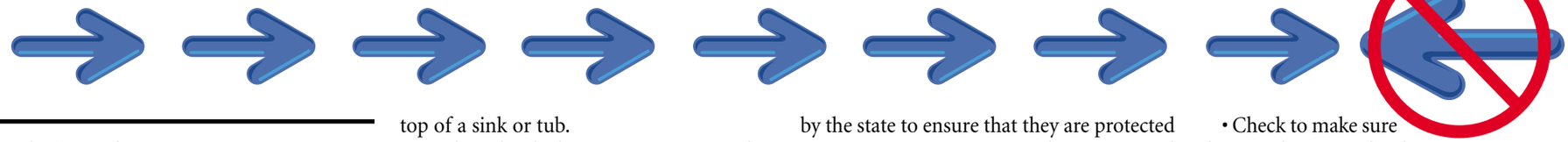
Treatment for removal of nitrate, nitrite, iron, and manganese generally requires oxidation and filtration but can also be accomplished with ion-exchange techniques. Ion exchange uses special media and chloride, sodium, or potassium ions that are exchanged from the surface of the media in favor of the contaminant ion that is highly attracted to the media surface as the water flows through the media bed. Ion exchange can be used to remove arsenic and radionuclides such as uranium and radium.

Some water systems are using adsorptive media such as activated alumina or ferric hydroxide to capture and reduce arsenic, iron, and manganese levels in groundwater sources. These systems do not require frequent regeneration of the media to be effective.

Radon commonly occurs in bedrock wells in Maine; aeration removes it from groundwater. Radon moves rapidly from water to air when water is aerated and becomes nondetectable when mixed in the atmosphere.

Public water systems in Maine use these techniques and more to ensure that the water delivered to your home or business meets or exceeds all state and federal drinking-water standards. For more information about the treatment techniques used by your water system, give them a call.

PROTECT YOUR HOME From CROSS CONNECTIONS and BACKFLOW



Erika Bonenfant
MAINE CDC DRINKING WATER PROGRAM

A cross connection is a physical connection between a source of clean, drinkable water and a source that is unsafe, potentially unsafe, or undesirable to drink. Cross connections make it possible for potentially hazardous, unsafe substances (or contaminants) to enter a drinking-water supply and cause people to get sick or even die.

Backflow. Water normally flows in one direction through your plumbing system and out your tap. It flows in reverse during backflow. When a cross connection exists, it is possible for an unwanted substance or contaminant to backflow into the drinking water supply. Suction backflow pulls contaminants into the drinking-water supply, like sucking liquid up a straw. Pressure backflow occurs when the unsafe or unwanted substance has greater pressure than the drinking water and therefore can force its way into the drinking water supply.

Examples of cross connections and potential backflow situations include:

• A hose submersed in a pool, bucket, or a car radiator. When pressure in the water system is lost (such as a main break, excess water demand, or well-pump failure) the hose can suck up the water from the pool or bucket it's in, drawing in with it any present chemicals or bacteria.

• The discharge line from a home water-softening system that is directly plumbed into the pipe to the septic system.

• Lawn and garden chemical sprayers attached to hoses.

• A hose attached to a utility sink, or attached to a faucet that extends below the top of a sink or tub.

• A hose hooked up to a pressure washer with soap.

Concerns. Backflow has the potential to make people sick, especially if a dangerous or poisonous material enters into the drinking water, such as chemicals used for cleaning or treating lawns. Backflow is also unexpected; many people think it can't or won't happen to them, but it is hard to predict when a loss of pressure in your water system can happen. And, if you have a cross connection, you could end up with backflow into your water supply.

Look for cross connections:

• Check any hoses and be diligent about not submersing a hose in a tank, pool, bucket, or other container.

• Check all sinks or tubs to make sure that the end of the faucet does not extend below the top of the sink or tub and does not have a hose attached to it.

• Check any waste lines from water softeners or water treatment systems and make sure that if the line goes into a septic or sewer line, it is not directly connected. There should be a gap between where the softener or treatment system waste line enters the septic or sewer line, called an air gap.

Who is responsible for preventing backflow? Everyone. Homeowners need to be aware of the potential hazards of cross connections and identify, eliminate, and prevent them around the house. It is also important for plumbers, plumbing inspectors, code-enforcement officers, water-utility personnel, and water-treatment installers to be aware of cross connections and to prevent them — or, if they do exist, to properly protect them to make sure that backflow doesn't occur. Public water systems are regulated by the state to ensure that they are protected against cross connections and are aware and attentive to protecting public health from cross connections.

How to prevent backflow

• Be aware of the hazards and prevent and eliminate cross connections.

• Install backflow-prevention devices. One inexpensive, easy-to-install, and effective device you can install on your hose spigot is a vacuum breaker, also called a "hose bibb vacuum breaker." These devices, available at hardware stores, screw directly onto your outside hose spigot and can prevent suction backflow. There are other backflow prevention devices that can be used to prevent backflow due to pressure and also to prevent backflow from high-hazard cross connections, such as some lawn irrigation systems or fire-sprinkler systems.

• Check to make sure that anything you hook up to your water supply has the appropriate backflow prevention device, such as your pressure washer or lawn and garden chemical applicator. If you don't know, ask a plumbing professional.

• If you have any plumbing work done, such as installing a water-softening system or dishwasher, you should check with the plumber to make sure they are providing appropriate backflow prevention.

For more information, contact:

• Your local water district or department (if you're supplied by public water)

• Your local plumbing inspector

• A state inspector from the Plumbers' Examining Board & Office of Licensing & Registration

• The Maine Center for Disease Control's Drinking Water Program

IT'S ULTRAVIOLET!

Stimulus funding allows Lewiston-Auburn to begin joint UV-light disinfection facility

By John Storer
AUBURN WATER DISTRICT

In February 2009, Congress passed the American Recovery and Reinvestment Act to encourage job growth in an attempt to stimulate the nation's economy. In Maine, the Drinking Water Program elected to disburse ARRA money through the Drinking Water State Revolving Loan Fund. The Auburn and Lewiston water utilities were successful in securing a $7.7 million ARRA funding package through the DWSRF, including $2.3 million in a grant and a zero-interest loan for Phase 1 of a new joint ultraviolet-light disinfection treatment facility.

To administer the ARRA funds statewide, the DWP identified infrastructure projects necessary for public water systems to continue providing safe drinking water to Mainers. Some targeted projects included drinking-water treatment systems improvements; replacement of old and vulnerable water mains (some of which are as old as 100 years); pump station, wells, and storage facilities improvements; and 20 percent of stimulus funding for energy-efficiency improvements

All told, the DWP successfully administered $38 million to qualifying public water systems as low-interest loans and grants and utilized all the available federal funding provided to the State. These funds help defray costs to the ratepayers for the necessary infrastructure improvements.

In anticipation of the stimulus bill, the Lewiston Water Division and Auburn Water District worked together to apply for funding of the UV facility. Installation of a secondary treatment technology is required to meet the Phase 2, Long Term Surface Water Treatment Rule of the Safe Drinking Water Act. This rule requires that each public surface-water supply provide two forms of disinfectants to meet statutory levels of inactivation for viruses and bacteria.

In 2004, the two water utilities began evaluating the impact of pending water-quality regulations. The objective was to determine the best approach to protect the health of the water users while providing the most responsible and cost-effective solution to meet these goals. The firm of Camp, Dresser and McKee of Cambridge, Mass. was retained to evaluate options for providing a secondary disinfection process. After evaluating over 64 alternatives, the utilities concluded that adding UV reactors to its treatment train would provide the best short- and long-term approach to meet the water-quality regulation.

To maximize potential for funding the facilities, the project components were prioritized and designed to be phased in. The three phases are UV process, pumping and control equipment; chemical facilities; and laboratory, administration areas, and operations and storage areas.

The cost to complete Phases 2 and 3 of the project are estimated to be approximately $3.94 million.

The joint UV facility is being constructed on the southern shore of Lake Auburn adjacent to the existing treatment facilities. The new UV building was designed to obtain Leadership in Energy and Environmental Design certification to meet the 20 percent Energy Efficiency requirement of ARRA funding. As designed, the project involves converting the Auburn high-lift pump station to a low-lift station to pump to the new UV facility. The design also made provisions for the future additional of filtration units, should additional treatment ever be required.

The utilities are pursuing additional funding to complete Phases 2 and 3.

The August 11, 2009 groundbreaking of the UV-light disinfection facility, a joint project of Lewiston and Auburn. Photo courtesy of Auburn Water District.

Kennebec Water District

The first water district in the nation

Jeff LaCasse
KENNEBEC WATER DISTRICT

In 1899, the Kennebec Water District was chartered as the first water district in the U.S. KWD is a public water utility serving Waterville, Fairfield, Winslow, Benton, and Vassalboro.

Maine was very active in the Civil War, sending 70,000 to fight. At the end of the war, approximately 10 percent of Maine's population was lost — some as war casualties, but others were dissatisfied with the conditions in Maine and sought opportunity elsewhere. Thousands went to the Mississippi Valley where the federal government was practically giving away farms. Maine lost much of its potential for a vibrant economic base. To offset this, many Maine communities began to exempt mills and factories from taxes and several went into debt — in some cases up to 50 percent of valuation — to finance the building of railroads. The communities' debt problems spurred the Maine legislature to put a 5 percent constitutional limit on how much debt a municipality could accumulate.

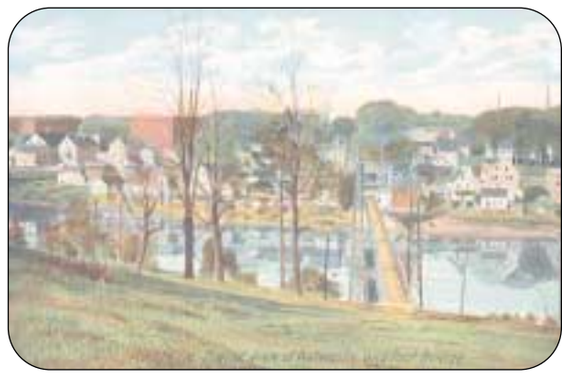
By the 1880s, many small private water systems served Maine communities, and several companies sold bottled spring water. Neither was very customer-friendly; the private systems had quality issues, and spring water was expensive. Centralized downtown business areas were developing in many municipalities, and several major downtown fires spurred the need to develop water systems to provide both adequate fire protection and reliable water for drinking and sanitation. Because such systems would serve the public good, it made sense for municipalities to own and operate them.

The debt limit that municipalities could incur posed a problem in doing this. Water systems, consisting of pipes, hydrants, pumps, and storage tanks, were costly to develop; without the ability to borrow large sums, there was no way the towns could finagle the necessary financing.

In Waterville, attorney Arthur D. Eaton, with assistance from partner Walter Wyman, an engineer (two visionaries who also combined to start Central Maine Power), was the force behind finding a solution to the municipal-funding dilemma. Eaton, while returning on foot from a trip to Oakland, looked over the valley containing Waterville, Fairfield, Winslow, and Benton, and had a "Eureka!" moment. His concept was to develop a water "district" that spanned several communities, was predicated on providing only one public service (water supply), and was funded independently from individual municipalities to avoid the debt restrictions. His proposal received legislative approval and the Kennebec Water District was chartered to begin existence in 1899. Many local leaders had opposed the concept as they didn't want the cost burdens of the project, but eventually the towns of Waterville and the Fairfield Village Corporation approved participation in the district.

There remained some practical problems. First, Eaton actually had to get legislation passed to allow districts to borrow from out-of-state banks, primarily Massachusetts banks, as Maine banks did not have the assets available for such large financial endeavors. Second, the newly chartered Kennebec Water District had to complete the process of taking over the existing works of the Maine Water Company, which had started a private system in Waterville using Messalonskee Stream as its source. The litigation lasted several years; KWD won, paying $503,475.37 for the assets of Maine Water Company in October 1903. The first step taken by the KWD trustees was to begin the process of moving the source from Messalonskee Stream to China Lake in order to avoid using the often contaminated waters of the stream for the KWD source.

In Maine today, there are some municipal water departments and some private water suppliers, but water districts abound and all can thank Eaton's foresight for the structure that allows them to flourish. The model originally constructed for water utilities also formed the basis for other districts across the U.S. including sewer, school, fire, soil and water conservation, and others.



Depiction of the Two Cent Bridge over the Kennebec, circa 1906, just a few years after the Kennebec Water District became the first of its kind in the U.S.

Portland Water District

By the Staff at the Portland Water District

In 1862, a group of citizens foresaw the necessity of improving the water supply to the Portland community to ensure continued growth. The once-adequate private wells were no longer sufficient for increasing domestic and fire protection use. These citizens formed the Portland Water Company. In 1869, the first water flowed from Sebago Lake to Portland, and the first water service was turned on in Portland on Thanksgiving Day.

In 1908, the Portland Water District bought the Portland Water Company plant and the Standish Water and Construction Company, and began serving the cities of Portland, South Portland, and Westbrook, the town of Cape Elizabeth, the Gorham Water Company, and the Falmouth Water Company.

In the 20 or so years that followed, expansion continued, including the amendment of the Portland Water District's charter to supply water to the towns of Cumberland, Falmouth, and Gorham, and to the islands in Casco Bay. During the next 45 years, Greater Portland established itself as an industrial and financial center of the state. The Portland area's growth required several expansions of the Portland Water District's plant, including construction of water supply systems to serve North Windham, Steep Falls, Standish Village, and Standish Corner.

What your water utility does for you

By Greg Cataldo
WOODARD & CURRAN

It's easy to take water for granted. It's everywhere: in our lakes and rivers, in the rain and snowfall, and when you turn on your tap. Most people rarely spare a thought for where their fresh, clean water comes from, but tragedies like the recent earthquake in Haiti make it clear just how crucial access to water is to our health and survival. Nature provides water, but public utilities like water and wastewater treatment facilities play crucial roles in bringing it to you and protecting the water cycle.

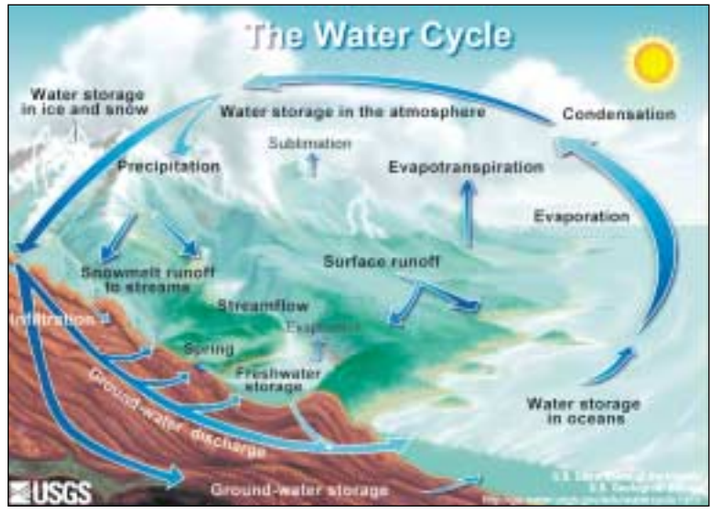
Water moves through our environment in a continuous cycle. It enters the atmosphere through evaporation from streams, rivers, lakes, and oceans, and through transpiration, the process by which plants release water from their leaves that they have taken in through their roots. Once in the atmosphere, water condenses into clouds. When the clouds become heavy enough, the water falls back to earth as rain or snow, where some re-enters surface water and some percolates down through the soil and rock to recharge underground aquifers. This is where water utilities get involved.

The Role of Water and Wastewater Utilities

Water treatment and distribution facilities generally extract water from the ground in order to provide it to the communities they serve. Instead of simply pumping it out to residents, they first treat the water to remove any potentially harmful minerals or compounds so they don't find their way into residents' bodies when they drink or cook with the water from their taps.

Water treatment systems also use disinfection technologies to prevent the growth of bacteria in water distribution systems, so that clean water leaving the treatment plant doesn't become contaminated on its way to residents. This treatment ensures that only high-quality water reaches your tap, helping safeguard public health.

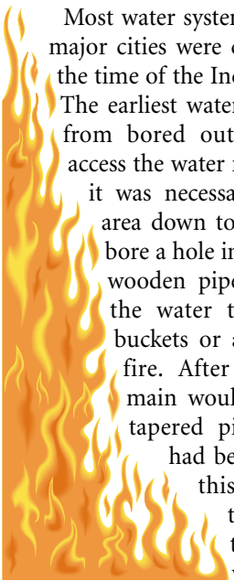
Wastewater utilities serve an equally critical function. When water and waste leave a house and enter a sewer system, they are transported to a wastewater treatment facility. At the facility, screens are used to remove large debris and a series of clarifiers and aeration tanks, pumps, and other machines separate most of the solid waste from the water. The water is then treated to eliminate much of the bacteria and other compounds that could adversely affect the environment. Once treatment is complete, water is discharged back into the environment, where it rejoins the water cycle.



Water and wastewater utilities are essential to the way we live, particularly in larger communities. They allow us to participate in the water cycle safely, bringing us the water we need to live, and protecting the environment from the negative impacts of untreated waste. Both utilities are critical to our health and our way of life.

The role of WATER in FIRE PROTECTION

By Jeff McNelly
MAINE WATER UTILITIES ASSN.



Most water systems in our country's major cities were constructed around the time of the Industrial Revolution. The earliest water mains were made from bored out wooden logs. To access the water mains during a fire, it was necessary to excavate the area down to the pipe and then bore a hole into it to tap into the wooden pipe, thereby allowing the water to be collected by buckets or a hose to fight the fire. After use, the wooden main would be plugged by a tapered piece of wood that had been whittled to size; this water plug was then inserted into the hole in the wooden pipe and the area dug out to access the main filled back in.

It was truly a hunt-and-peck method of accessing water mains during fires. The advent of cast-iron pipe in the early 19th century was heralded as a great improvement, and permanent access points to the mains evolved from there. Fire protection was then readily available at designated points in the distribution system simply by connecting the fire hose to a hydrant valve.

Community water providers not only have the task of providing adequate treatment to ensure the water is safe to drink, but they must also provide a reasonable network of piping to distribute that water to customers and some means of providing adequate pressure throughout the system. A significantly greater investment, however, is required to also provide the flows and pressures required to extinguish fires.

There are many critical design considerations needed in the development of any public water supply that also provides fire protection. After adequate sizing of the mains to handle the water volumes required for fire protection, the placement and sizing of storage facilities are key. Their size, height, type, location, and composition are totally dependent upon the hydraulics of any given system.

In recent years, new building and plumbing codes requiring sprinkler systems has enhanced fire protection — not only in larger commercial structures but, in many towns and cities, residential single and multi-family dwellings as well. Sprinkler systems can put out localized, smaller fires before they spread throughout a structure more quickly and with less water volume than if fire hydrants have to be tapped to their capacity. To assist with public fire fighting, hydrants are typically color-coded throughout water systems indicating the pressure and volume of water available. This can help maximize the effectiveness of extinguishing any given fire.

Overall, there are many benefits from a public water system that is designed, constructed, and maintained with fire protection being a primary consideration. The most obvious benefit is the protection of life and property; the value of a house diminishes the most when it is on fire! Structures located on public water systems also have lower insurance rates than structures that are not. For every $100 of residential insurance, a homeowner would be paying an additional $58 if unprotected by the availability of hydrants for fire protection. According to the Maine Fire Marshal's office, billions of dollars are lost each year in this country to fires. Having a public water supply that makes fire protection a priority in your community is indeed a good thing!

Bangor Water District

By Kathy Moriarty
BANGOR WATER DISTRICT

Can you imagine water that tasted like "sawdust and moose dropping"? That's how Bangor's water, drawn from the Penobscot River, was described in the 1940s. Towns and industries upriver sent waste of all types downstream, presenting a serious challenge for those charged with maintaining drinkable water. Even earlier in the city's history, outbreaks of typhoid appeared to be linked to city water, resulting in construction of filter plant in 1908 and later the addition of chlorine to the treatment process.

By the mid-1950s — and after no small amount of debate — sentiment for a new source of water carried a public vote, and Bangor's water department gave way to the Bangor Water District. Legislative action allowed the District to tap Floods Pond in Otis as a new, pristine source of drinking water — the same source that is used today.

On July 28, 1959, water began flowing from Floods Pond via Johnston Pump Station. In the ensuing years, other changes have occurred — including an updated treatment plant, and a shift from "flat rate" to "metered" service to fairly charge customers based on use.

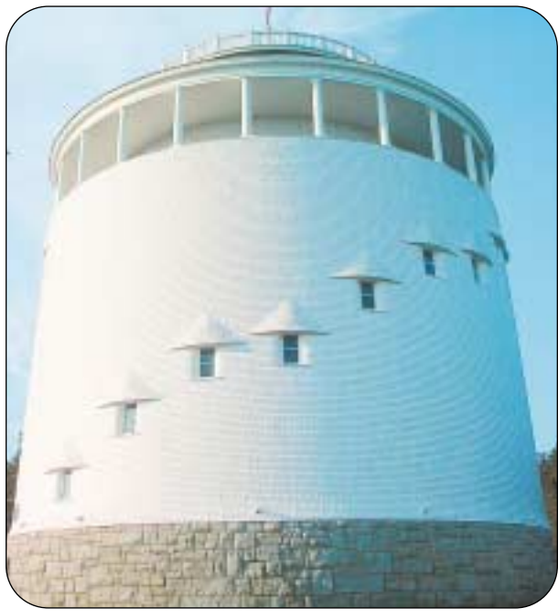
Today, Bangor Water District provides service to parts of seven communities as well as the Hampden Water District through 180 miles of pipe and 11,000 individual service lines, and pumps an average of 4 million gallons per day.

The Queen City's Crown

Thomas Hill Standpipe, which holds 1.75 million gallons of water, is a riveted, wrought-iron tank with a wood frame jacket located on Thomas Hill in Bangor. The tank is 50 feet high and 75 feet in diameter. Built in l897, it is the Bangor Water District's oldest standpipe and has been in use since its construction. Its purpose is the same today: to help regulate Bangor's water pressure in the downtown area and to provide water storage for emergencies.

The construction employed 22 men and erected a portable saw mill and blacksmith shop on the site. The entire project took about six months to complete. It's really two structures in one; the standpipe consists of steel plates riveted one outside the other. The building that encloses it is 85 feet in diameter and 110 feet high. Originally, the exterior was painted dark gray with the pillars and latticework painted white. During World War II, it was painted drab olive for camouflage purposes, but was repainted white in 1949. Once open to the public, it was closed in the 1940s following an accident in which an 11-year-old boy was killed when he fell while climbing on beams under the stairway. A fire-detection system and a "dry" sprinkler system, which can be filled from an outside hydrant, were added several years ago to protect the landmark structure.

This standpipe is a National Historic Landmark as designated by the Register of Historic Places and the Maine Historic Preservation Commission. It is also designated an American Water Landmark by the American Water Works Association and a state civil engineering landmark by the American Society of Civil Engineers.



Top: The Thomas Hill Standpipe today. (NEWS Photo by David M. Fitzpatrick.) Right: The 1.75-million-gallon Standpipe under construction in 1897. The inner steel structure is visible here. The project, employing 22 men, took six months to complete.

Auburn Water District

By Norm Lamie
AUBURN WATER DISTRICT

The first corporation to manage the distribution of water in Auburn was the privately owned Auburn Aqueduct Company, formed in 1869. The three men who founded this company, Frank Jordan, Edward Little, and Joel Vickery, had decided to personally lay log piping to provide water to their own homes from springs near High Street. The desire of many of their neighbors to connect to this line spawned the formation of the company. In 1870, the Auburn Aqueduct Company built a reservoir on High Street at a cost of $700.

In the late 1880s, a water line froze and customers affected were told simply that they must take their water from the river. The Soap House Fire of 1890 brought things to a culminating point. The Soap House burned as firefighters tried helplessly to pump water out of a pressureless nozzle. The Soap House Fire roused a great deal of citizen agitation that led city officials to seek their own authorization to form a separate public entity to manage the water system for the city. A series of subsequent public reorganizational structures eventually led to the formation of the Auburn Water District in 1923, the public entity charged with providing drinking water to Auburn customers to this day.

Maine Water Bodies that are Public Water Sources

Unfiltered sources appear in *italics.*

SOURCE	WATER SYSTEM
Adams Pond	Boothbay Region Water District
Big Wood Pond	Jackman Water District
Boulter Pond	Kittery Water District
Branch Brook	Kennebunk, Kennebunkport, Wells Water District
Branch Lake	Ellsworth Water Department
Carlton Pond	Greater Augusta Utility District
Chases Pond	York Water District
China Lake	Kennebec Water District
Cobbossee Lake	Greater Augusta Utility District
Eagle Lake	Bar Harbor Water Department
Floods Pond	Bangor Water District
Round Pond	Vinalhaven Water District
Fresh Pond	North Haven Water Department
Ferguson Pond	Aqua Maine, Millinocket Division
Grassy Pond	Aqua Maine, Camden & Rockland Division
Halls Pond	Hebron Water Company
Hancock Pond	Madison/Anson Water Districts
Hatcase Pond	Brewer Water Department
Jordan Pond	Mt. Desert Water District
Kennebec River	Aqua Maine Skowhegan Division
Knickerbocker Pond	Boothbay Region Water District
Lake Anasagunticook	Canton Water District
Lake Auburn	Auburn Water District and Lewiston Water Division
Lake Wassookeag	Dexter Utilities District
Little Madawaska River	Loring Development Authority
Little Pond	Great Salt Bay Sanitary District
Long Pond (Southwest Harbor)	Southwest Harbor Water Company
Long Pond (Sullivan)	Long Pond Water District
Lower Hadlock Pond	Mt. Desert Water District
Mirror Lake	Aqua Maine, Camden & Rockland Division
Moose Hill Pond	Livermore Falls Water District
Nequasset Lake	Bath Water District
Lower Pond	Aqua Maine Skowhegan Division
Nokomis Pond	Newport Water District
North Pond	Buckfield Water Department
Pattee Brook	Fort Fairfield Utility District
Presque Isle Stream	Presque Isle Water District
Saco River	Biddeford and Saco Water Company
Salmon Falls River	Berwick Water Department
Salmon Pond	Dover-Foxcroft Water District
Sebago Lake	Portland Water District/Frye Island Water
Sebec River	Milo Water District
Silver Lake	Aqua Maine, Bucksport Division
Petite Brook	St. Francis Water District
Upper Narrows Pond	Winthrop Utilities District
Varnum Pond	Wilton Water Department
Young Lake	Mars Hill & Blaine Water Company

A Splash of HISTORY

1902-1903: The waterborne typhoid epidemic

Jeff LaCasse
KENNEBEC WATER DISTRICT

In 1902 and 1903, a typhoid-fever epidemic claimed 74 deaths in the Waterville and Augusta area. Out of 723 total cases, there were 371 cases and 40 deaths in Waterville. The cause of the epidemic was contamination of the public water supplies.

Typhoid was not unheard of in Waterville prior to the epidemic. From 1892 to 1900 there were typically two or three typhoid deaths annually. However, that number exploded over the winter of 1902-1903. Thankfully, the epidemic faded over the course of the winter with the natural dissipation of the epidemic's precursors.

An epidemiological study conducted by noted expert George C. Whipple detailed the perfect storm of events that led to the epidemic. The primary factors that combined to cause the catastrophe:

• There was a resident of the Waterville Alms House who had typhoid. The Alms House was in close proximity to Messalonskee Stream, between Waterville and Oakland.

• There also were five typhoid cases in the house of a Waterville milkman who lived a short distance away in Oakland next to the stream.

• In November 1902, both the milkman and the Alms House cleaned their privies and cesspools, spreading the contents on the frozen soil of gardens next to the stream as fertilizer — without disinfecting the contents.

• Heavy rains hit the area on December 16 and again on December 22, washing the fertilizer into the stream.

• The intake for the Maine Water Company was about one mile downstream. At that time, Maine Water Company served as the water supplier for much of the urban sector of Waterville. (The Kennebec Water District was still in litigation to take over the works of MWC in 1902 and 1903.)

• Messalonskee Stream empties into the Kennebec River. In 1903, the city of Augusta and the town of Richmond both used the river as their source and both were downstream of the Messalonskee. The contaminated water from Messalonskee Stream eventually contaminated the waters of the Kennebec.

• Typhoid bacillis is very hardy and stays viable in water for an extended period.

• None of the water suppliers disinfected or filtered water prior to pumping to customers.

Based on those factors, it's easy to see how the epidemic spread from Oakland to Waterville to Augusta to Richmond. In fact, Whipple made an exhaustive study of several other water supplies in the U.S. and Europe that had similar epidemics around the same time period, many with similar factors initiating the epidemics.

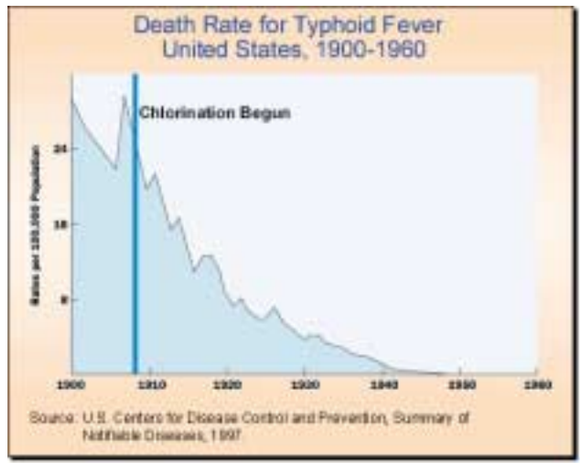


IMAGE COURTESY OF U.S. CENTERS FOR DISEASE CONTROL

As more public water suppliers and well owners began chlorinating water, the numbers of typhoid-fever cases dropped dramatically. By 1950, typhoid had been all but eradicated in the United States. In the 1902-1903 epidemic in the Augusta-Waterville area, there were 723 cases; 371 of them, with 40 deaths, were in Waterville alone. Typhoid is still a major problem in many countries, particularly in Africa, Asia, Central America, South America, and the Middle East.

As soon as the Kennebec Water District gained full control of the MWC works in October 1903, its trustees initiated the search for a new, safe water supply. As a public water utility, its mission was to provide a service for the public good rather than for profit. KWD began a massive undertaking to install eight miles of pipe from China Lake into Waterville. Pristine China Lake water initially began flowing into the KWD system on May 23, 1905.

In 1910, another typhoid epidemic struck the Waterville area. Focus naturally fell on the water supply initially, but it was ultimately determined, in an epidemiological report commissioned by the trustees of the Kennebec Water District, that the source of the epidemic was infected milk from a local farm.

The introduction of disinfection (primarily using chlorine) as a standard treatment practice for public water supplies taken from surface waters has been the primary factor in eliminating typhoid in drinking-water systems. Currently known as salmonella typhi, typhoid still exists in the world, as poor sanitation practices are still a problem. Epidemics still occur with recent outbreaks in the Congo and in Haiti.

Lewiston Water Works

By Richard Burnham
LEWISTON PUBLIC SERVICES DEPT.

The city of Lewiston began providing public water to its residents in 1872, using the Androscoggin River as the source. At that time, the Water Commission was authorized $600,000 to develop the plant required for the downtown. A pump station was built where the CMP Hydro Power Plant is currently located, which withdrew water from the Androscoggin River. Fourteen miles of water pipe were installed, including the 24-inch-diameter water main on Main Street and the 20-inch main on Sabattus Street. An early goal was to develop water storage; by 1900, the so-called Webber Avenue Reservoir was built and connected to the system.

Recognizing the risk of pollution to the existing source, the city obtained state statutory rights to use Lake Auburn as a public water supply. Pressured by pollution in the river, the city developed the lake as its source by constructing a new 17,500-foot-long, 24-inch-diameter cast-iron transmission main from the lake, crossing the river at the upper part of the falls and connecting to the existing pump station. Water wheels provided power for pumping, and the distribution system grew as the city grew.

The city acquired water rights from the Franklin company to develop hydro power and installed a turbine in the existing pump station to generate electric power for running the pump station and the city's street lights. The Water Division as we know it today was established in the mid-1960s.

Microfiltration membrane technology comes to Maine

By Madeleine Storer
AQUA MAINE

In 2009, Aqua Maine Inc. began construction of a $7 million water treatment plant expansion to provide membrane filtration at its Mirror Lake facility. The Mirror Lake water system serves approximately 25,000 people in the communities of Rockland, Rockport, Camden, Thomaston, Owls Head, and Warren. The new treatment technology is expected to be in operation in August 2010.

Like other Maine water systems, the pristine water supply of Mirror Lake has, to date, met all the regulatory requirements for public drinking water without filtration because of its excellent water quality. But new Environmental Protection Agency regulations under the Safe Drinking Water Act require further treatment beyond Aqua Maine's current process. This is not due to any degradation in Mirror Lake, but to ensure that the water treatment process can fully protect customers from newly regulated contaminants.

Specifically, all surface-water systems in the U.S. must provide specific treatment for Cryptosporidium, a chlorine-resistant microbiological pathogen that has been the cause of waterborne disease outbreaks in other states. The new regulations also restrict disinfection byproducts in the water distribution system. After a lengthy review of alternatives, it was determined that adding filtration to the Mirror Lake system would be the most cost-effective long-term solution.

Traditional water-filtration facilities use chemicals to consolidate suspended and dissolved organic material before large media filters to remove unwanted particles and contaminants. The facilities tend to be large and expensive to operate. After three years of pilot testing, Aqua selected a microfiltration membrane system from Pall Corporation in New York. The process simply strains the water through a microscopic membrane using pressure. Unwanted particles and contaminants are trapped on the membrane as the water passes through. This will be the first large-scale membrane-filtration facility in Maine, and the application of this technology is possible because of the superior quality of Mirror Lake.

Benefits of the membrane technology include:

- Capable of capturing natural organic material as well as all other particles, including bacteria and protozoa.
- Highly efficient, offering low operating and maintenance costs in comparison with other filtration technologies.
- No chemical addition needed prior to the filters; a greener process.
- Requires a relatively small footprint.

The building addition to house the new filters is designed to LEED standards for commercial structures, and active solar energy will assist in heating the water needed to clean the membranes. Microfiltration membrane technology is an innovative treatment technique that uses clean and efficient technology to produce potable water capable of meeting new more stringent regulations without the need for additional chemical additives.

Sebago Lake Land Reserve: 'Respect the land, protect the lake'

By Paul Thomas Hunt
PORTLAND WATER DISTRICT

That's the slogan for the Sebago Lake Land Reserve, 1,800 forested acres located at the southern end of Sebago Lake. Owned by the Portland Water District, the land is open to the public for day-time recreational access. The SLLR was established in 2005 in an effort to provide clean water and also meet the demand for public access.

The ideal water supply is a pristine lake in a remote, forested natural area which is completely owned by the state or water utility and is off-limits to the public. Sebago Lake, the drinking water supply for 11 Maine communities, doesn't exactly fit the bill. It is located in populous southern Maine and is a treasured destination for visitors on vacation and native Mainers who love the outdoors. The PWD owns 2,500 acres of land around the Lower Bay of the lake, from where the drinking water is drawn. This land is an irresistible draw for visitors. For decades the public used it; neither they nor the PWD had a clear idea of what was allowed and what wasn't. Some areas were fenced off; some were posted. In others, reasonable access was tolerated; in others it wasn't. The "system" that was used throughout the last century can best be described as a passive-aggressive approach to land management: use the land in a way you think is reasonable and if we don't like it we'll ask you to stop. It satisfied no one.

In 2005, the SLLR was established. Some key features:

- The 700 acres closest to the lake (Red Zone) and water intakes are fenced and posted "No trespassing."
- The remaining 1,800 acres (Green Zone) are open for free recreational access.
- You access the Green Zone by filling out a one-day permit at one of 11 visitor kiosks.
- Rules are clearly posted at each kiosk and on the permit.
- The land is patrolled seven days a week; warning tickets are issued for violations.
- Multiple violators can have their visitor privileges suspended.
- Hunting, hiking, and snowmobiling are allowed. Fires, camping, and ATV riding are not.

The first visitors were welcomed in 2005. We consider the SLLR an unqualified success. Most importantly, our water quality continues to be outstanding — but visitor traffic also continues to increase. The rules are clear to the staff and the public, so there are few misunderstandings. We continue to receive mostly positive feedback from visitors. Some long-time visitors who can no longer access a particular location that is now in the Red Zone might be less glowing in their praise; this is the area closest to our shoreline intakes, where we never wanted people anyway. Most visitors appreciate the privilege and don't want to lose it; they have become watchdogs, cleaning up trash they find or reporting problems. We have many more eyes and ears out there now.


Photo by Jeanne MacNevin

Through visitors filling out permits and warning tickets for violations, success can be measured: we know how many visit and we know how often rules are broken. Ideally, the first number will go up and the second down; this is exactly what has happened. In 2006, the first full year of kiosk use, we recorded 6,059 visitors and 337 rules violations. In 2009, we recorded 9,515 visitors and 173 violations.

The Sebago Lake Land Reserve represents an effort to balance the need for clean, safe water with the public's desire for outdoor recreation. It is successful for at least two important reasons. First, almost all visitors recognize that use of the land is a privilege, and they act accordingly. Second, the Portland Water District has established a system of permit and patrol that encourages accountable behavior. Visitors continue to respect the land and protect the lake.

Androscoggin Land Trust: Protecting watersheds through conservation

Jonathan LaBonte
ANDROSCOGGIN LAND TRUST

Since 1989, the Androscoggin Land Trust has worked to protect important natural areas, traditional landscapes and the outdoor experience in the Androscoggin River watershed through land conservation and stewardship. While we have successfully conserved over 3,600 acres, predominantly near the population centers of the watershed in Lewiston, Auburn, Lisbon, and Livermore Falls, the community benefits of conserving land are not always understood.

At its core, conserving land puts in place some level of restriction on a piece of property in perpetuity. This restriction, in the case of land trusts, must pass a legal test of providing for public benefit. After all, as non-profit organizations, land trusts need to demonstrate that they serve the public good.

Restrictions can take various forms. They might allow building recreational trails, help to ensure that land stays available to support farming or sustainable-timber harvesting, or protect sensitive natural areas important for wildlife or watersheds. There are many reasons why land might be protected through conservation in projects that our organization and others throughout Maine have undertaken.


Bangor Daily News File Photo

Conserving land often means acquiring ownership of the land or putting in place a conservation easement, a legal document restricting the property and putting the enforcement of those restrictions in the hands of a third party. Unlike a land trust or community owning land, an easement is placed on property still owned by a private party.

To advance conservation in our region, it takes more than simply the vision and partnerships between land trusts and the community. Conservation-minded and willing landowners are the critical ingredient to make land protection a success. For many Maine families, land has been passed down from generation to generation, so capturing the spirit and ethic of that family connection to land often becomes central to helping conserve it.

The connection between land conservation and the value we place on the watersheds of our community drinking water supplies is worth a closer look. Land naturally acts as a buffer and filter to pollutants introduced into the environment. And although these "ecosystem services" have their limits, they often offer the most efficient line of defense for our communities' public drinking water. Protecting land from development through conservation can help to sustainably protect drinking water from a key driver of water-source degradation.

According to reports from the Environmental Protection Agency, the leading cause of negative impacts on drinking water sources is nonpoint source pollution. NPS is pollution that cannot be traced back to an exact location, such as an outlet pipe. It includes runoff from lawns, fields, forests, driveways, roads, and parking lots.

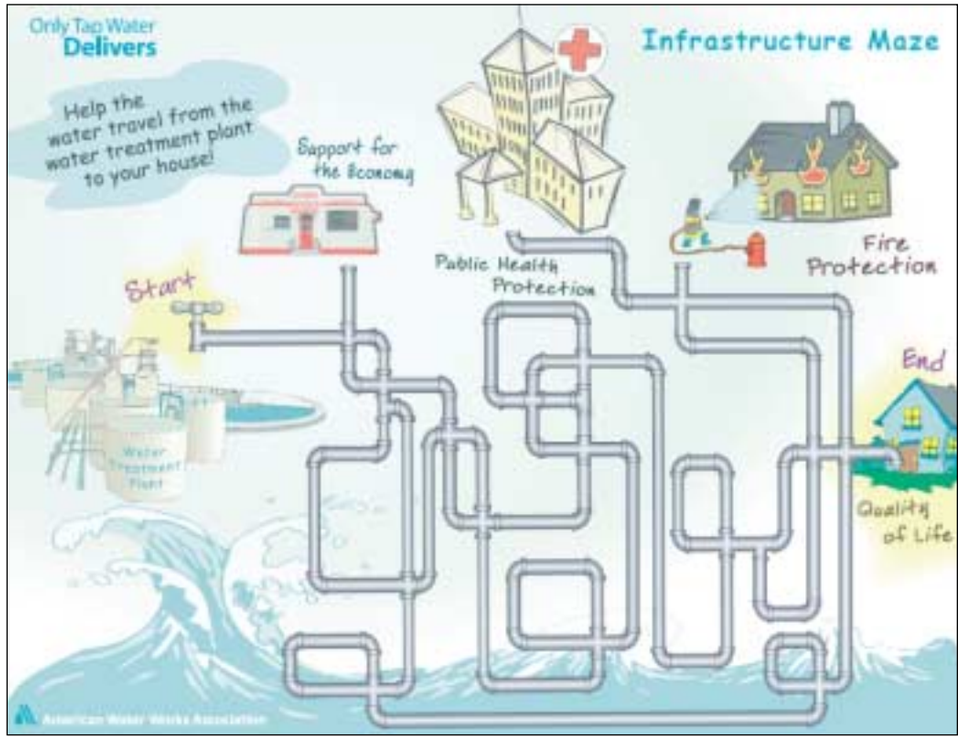
While agriculture is currently the leading NPS source nationally, runoff from areas of residential and commercial development is the fastest growing. With the cumulative effect of developing land and removing nature's natural buffers and pollutant filters, and the threat to watersheds and drinking-water sources is significant.

Treatment and filtration are the most visible and capital-intensive means to ensure safe, high-quality drinking water, but the scale of those systems is driven by the quality of the water at the source. An integrated approach that advances protecting the natural landscape in watersheds or aquifer recharge areas can reduce the magnitude of likely future investments from the source to the tap. And the benefits flow beyond those potential cost savings.

Those same lands, conserved for a primary focus of safe drinking water, can also ensure support for local farms, timber supplies for area businesses are sustained, and recreational opportunities exist to enhance quality of life for residents and visitors alike.

KIDS' PAGE!

Color this picture!



WATER WORD SEARCH

Find the red words in the clues below in the word find!

1. Our local water utility maintains fire hydrants.
2. A period of time with little or no rainfall is called a drought.
3. Pipes run underground and make up the infrastructure of the water system.
4. Tap water protects us against the threat of fire.
5. Safe tap water contributes to quality of life by increasing productivity and safety.
6. Water utilities provide their customers with a report on the quality of their drinking water each year.
7. Did you know that the first water systems in North America were built to provide fire protection?
8. Only tap water delivers public health protection,fire protection,support for the economy, and the quality of life we enjoy.
9. Replacing old pipes in the United States is expected to cost more than 250 billion dollars over the next 20 years.
10. In 2004,U.S.fire departments responded to over one million fires across the United States.

Z	A	U	D	N	N	Q	Y	N	N	F	V	T	T	H	G	U	O	R	D	K	W	M	D	I
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S	D	H	V	E	E	P	P	U	H	V	Q	K	E	L	Z	Q	C	B	B	P	N	J	E	P

Conserving Water in your Home

Kirsten Ness, Water Resource Specialist
PORTLAND WATER DISTRICT

In a time of growing populations, stress on natural resources is increasing. Water is one of our most important and vulnerable resources, even in a state as water-rich as Maine. Clean water is necessary for recreation, economics, and safe drinking water. Conservation is important to help preserve clean water for future generations.

Water conservation at the residential level can help reduce your water and wastewater bills, but also help reduce the storm water that flows off your property. Storm water carries pollutants to rivers and lakes that can reduce water quality. If the water body is a source of drinking water, pollutants could lead to increased costs in treating water to make it safe to drink. Pollutants can also reduce the recreational and economic value of a water body.

There are many ways to conserve water in and around your home.

- Turn off the water when you're shaving or brushing your teeth.
- Install a toilet dam to help reduce water usage when you flush.
- Use low-flow showerheads and take shorter showers.
- Fix leaky faucets and toilets.
- Purchase water-efficient appliances.
- Keep a water pitcher in the refrigerator instead of running the faucet for cold water.
- Use a rain barrel to collect roof runoff to water lawns and gardens
- Water lawns and gardens only when necessary.
- Plant trees and shrubs that require less water.

For more information about water conservation, please contact your local water utility.

MWUA awards $1,000 scholarships to three UMaine students

Three students at the University of Maine have received scholarships from the Maine Water Utilities Association.

Sarah Lingley of Bangor, Tyler Marcet of Gorham, and Nathan Veilleux of Oakland were all honored with a $1,000 scholarship by the Maine Water Utilities Association at its 84th annual meeting and trade show in Portland on February 8, 2010.

Lingley is a senior at UMaine and has served as a summer intern in the water utility field for Woodard & Curran, a 550-person, integrated engineering, science, and operations company with nine locations in seven states, including offices in Bangor and Portland.

Marcet is also a senior at UMaine and has served as a summer intern in the water utility field for the Brunswick & Topsham Water District, which has served its two communities since 1903.

Veilleux is a junior at UMaine and has served as a summer intern in the water utility field for the Greater Augusta Utilities District.

"This is the second year we have had the privilege of awarding these scholarships," said MWUA Executive Director Jeff McNelly. "The Association's Public Awareness Committee undertook the challenge of developing this scholarship program and we were very pleased that we were able to raise enough funds to be able to award three scholarships this year."

The MWUA is a membership organization with many utility volunteers working together to promote and ensure the delivery of quality water and service to some 750,000 customers throughout the state of Maine. The MWUA was formed in 1925, and for the past 84 years has hosted an annual trade show. This year's show, which was held at the Holiday Inn by the Bay in Portland, ran February 8 and 9, 2010, and featured water utilities, vendors, and other exhibitors connected to the water industry.

For more information, please visit the association's Web site at www.mwua.org or call (207) 832-2263.

BANGOR DAILY NEWS PHOTO BY DAVID M. FITZPATRICK

The MWUA awarded $1,000 scholarships to three students at the MWUA's annual trade show, held at the Holiday Inn in Portland in February 2010. Pictured here are Mary Jane Dillingham of the Auburn Water District; Tyler Marcet, a UMaine senior who interned at the Brunswick & Topsham Water District; Sarah Lingley, a UMaine senior who interned at Woodard & Curran; and John Storer, the outgoing MWUA president. Absent from the trade show was the third winner, UMaine junior Nathan Veilleux. This is the second year the MWUA has awarded scholarships.