2012 WATER QUALITY REPORT

TACOMA S WATER

HE CHANGES WE'RE MAKING TO THE WATER SYSTEM TODAY ARE CREATING NEEDED, LONG-LASTING IMPROVEMENTS THAT WILL PROTECT AND IMPROVE YOUR WATER FOR DECADES TO COME.

As you'll see in this report, we're in the process of building a filtration facility on the Green River, which is Tacoma Water's primary source of water. Filtering the water will greatly improve the barrier between contaminants in the river and the water that comes out of your tap.

Maintaining our complex system of pipes, pumps and storage tanks is another area of focus in our commitment to provide you high-quality water. In addition to replacing many miles of aging water lines, in 2012 we completed a 30-year effort to upgrade our open reservoirs to enclosed tanks.



As always, we follow a stringent process – from protecting the areas surrounding our water sources to training system operators to planning for emergencies – to give you the very best water every day. You can count on us for both the immediate and long-term care of the water system, making thoughtful, strategic decisions for you and the community.

Please take a look through this 2012 Water Quality Report. We are proud of the work we do to maintain and improve your water and hope you will be, too.

LINDA McCREA | Tacoma Water Superintendent

CLEAN, RELIABLE WATER SINCE 1913

In 2013, Tacoma Water will mark a very important anniversary: 100 years of providing high-quality drinking water from the Green River.

In the late 1800s, Tacoma was establishing itself. The population was growing, but there was no dependable water supply, even though it was desperately needed for both drinking and fire safety. In 1884, people were relieved when Charles Wright incorporated the Tacoma Light & Water Company and began the search for water.

In 1893, the City of Tacoma became the new owner of the water utility, which was literally falling apart. It had significant leaks – not surprising for a system built of wood. And there was still the problem of the lack of a dependable source. Many options were explored as the public suffered with discolored, lukewarm, earthy-tasting and foul-smelling water.

A well field in South Tacoma proved the first workable option, and a few wells were producing water by 1906. Meanwhile, the mayor orchestrated



the purchase of water rights in two places on the Green River. It would prove a wise decision.

Still, political battles followed, with some who preferred wells to the Green River. The issue went to a public vote, and the Green River proposition failed. But as the quality of the existing system continued to deteriorate, the issue went back to the voters. They had a change of heart and finally approved a Green River pipeline. Work on the system took two full years, with hundreds of men doing the grueling work of laying 43 miles of pipe from Enumclaw to Tacoma. Finally, on July 12, 1913, all the water valves in Tacoma were fully opened and Green River water – 42 million gallons per day – flowed into Tacoma, giving the city its permanent water supply. At the time, it was the largest municipal project in the city's history. Today, the gravitybased system remains the core of Tacoma's water delivery method.

LAYERS ARE A GOOD THING

Safe and reliable drinking water is critical to personal health and the economic health of our community. To ensure that the water delivered to your tap meets or exceeds all drinking water regulations, Tacoma Water relies on the multiple barrier concept: We create one layer of protection after the other to prevent or remove contamination.

This is what multiple barriers of protection looks like from the Green River to your tap: **SOURCE WATER PROTECTION:** We safeguard the Green River – the source of most of our water – through security and surveillance of activities in the watershed, as well as agreements with those who work there. We protect wells through the South Tacoma Groundwater Protection District, a program that educates people who live and work near the wells about preventing contamination.

TREATMENT: We remove or reduce naturally occurring and man-made contaminants to comply with drinking water regulations.

STORAGE: We build and maintain covered and protected tanks, reservoirs and standpipes.

DISTRIBUTION SYSTEM DESIGN: We adhere to accepted, established engineering practices and material standards to ensure the pipes delivering water to your home keep the water safe.

OPERATOR TRAINING / CERTIFICATION: Our system operators are trained and certified according to Washington State Department of Health requirements.

WATER QUALITY MONITORING: We regularly test the water supply, all the way from the source to your tap.

CROSS-CONNECTION CONTROL: We ensure potential sources of contamination from individual customer connections cannot get into the public water supply.

EMERGENCY PLANNING: We have backup plans in place to quickly identify and correct problems in the water system.

LAND PURCHASE NEAR GREEN RIVER HELPS PROTECT WATER

Protecting, restoring and improving the area around the Green River is one of the most important ways we ensure high-quality water today and in the future. It is also the first important step leading to the delivery of safe drinking water to your home.

By recently acquiring 344 acres of forest land in the Sawmill Creek area of the Green River watershed, we continued a long-term investment in protecting your water supply.

The land, which includes the largest piece of old growth timber remaining in private ownership in the watershed, was bought by Forterra, an organization dedicated to land conservancy. Forterra received a \$1.8 million federal grant administered by Washington Department of Natural Resources to make this possible.





Forterra then transferred the land to Tacoma Water for management. From there, we worked closely with all involved to develop a plan that protects water quality and improves habitat for wildlife species dependent on old growth and mature forest habitats.

Sawmill Creek, together with adjacent parcels of well-preserved, undeveloped habitat, will provide longterm protection for our water supply, as well as other important ecological benefits. By securing these lands, we are improving our ability to provide water of the highest quality to benefit you and our region today and into the future.

GREEN RIVER FILTRATION FACILITY TO BRING A HEALTHY SUPPLY OF WATER

Although filtration is an expensive step forward, Tacoma's legacy of managing the Green River watershed continues to pay off. While many cities must build even more expensive treatment to address contaminants in their water supplies from development and agriculture, we have avoided that problem by vigorously protecting the area.

Tacoma Water is one year into building the Green River Filtration Facility – a new and robust layer of protection for your water. When completed in 2014, the facility will be able to deliver up to 150 million gallons of water per day, a healthy supply of high-quality water for generations to come.

Filtering the water from the Green River will ensure that Tacoma Water complies with a new federal regulation requiring treatment for cryptosporidium, a naturally occurring microorganism. While levels of cryptosporidium in the Green River are low, we must meet the federal requirement. In 2010, Tacoma Water, its partners, policymakers and customers thoroughly considered the cost, benefits and risks of building a filtration plant against the more moderate cost and lesser benefits of ultraviolet light treatment. Unlike ultraviolet light, filtration will significantly improve reliability of the Green River water supply and provide substantial water quality benefits, including:

- Protecting against a broad range of contaminants
- Improving the taste, odor and appearance of the water
- Reducing the amount of silt and sand entering water pipes
- Minimizing organic material in the water



Tacoma Water and the entire project team, from design experts to the construction manager, will deliver a high-quality facility at the lowest possible cost. We originally estimated the project cost at \$211 million, but found additional savings and reduced our estimated total cost to \$195 million. Tacoma Water is responsible for 67% of the project cost. The remaining expenses are divided among the other project partners: Lakehaven Utility District, Covington Water District and the City of Kent.

> LEFT | Filtration construction site in May 2012. RIGHT | What the completed facility will look like.





BURYING MAJOR PIPELINE BETTER PROTECTS WATER SUPPLY

In 2012, Tacoma Water replaced a 1,200-foot-long section of pipeline near Orting, adding another layer of protection to the water supply.

The original pipeline, installed in 1912, carried water from the Green River through the Puyallup River Valley. It rested on above-ground concrete supports and had a high risk of being destroyed in an earthquake or a lahar, which would disrupt your water service.

The new, underground pipe increases reliability due to its placement out of the way of potential mud and volcanic flow from Mt. Rainier.

The great improvements to the pipeline did not come easily. During the excavation process, large deposits of wood – the remnants from old, devastating mudflows that wiped out forests – were found and had to be removed.

The project encountered even more challenges because the path for both old and new pipelines passed through a small wetland area. Tacoma Water mitigated the impacts by developing a detailed vegetation plan and committing to conducting years of monitoring.

In the end, the wetlands were restored and the pipeline was safely buried – one more way Tacoma Water has ensured reliable water for generations to come.

тор Old, above-ground pipeline.



KEEPING YOU HEALTHY

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline, (800) 426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. Environmental Protection Agency/Centers for Disease Control guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline, (800) 426-4791.

DELIVERING YOUR WATER

Most of your water comes from the Green River in south King County. The Green River Watershed is a 231-square-mile forested area that serves as a collection point for melting snow and seasonal rainfall in an uninhabited area of the Cascade Mountains between Chinook and Snoqualmie passes. Tacoma Water owns about 11% of the watershed land along the river.

Through agreements with other landowners, we limit watershed access and carefully control activities, such as recreation, road maintenance and logging.

We also own and operate seven wells on the North Fork of the Green River and take water from them during periods when Green River water is too turbid to use.

We supplement the Green River supply with groundwater from more than 20 additional wells to meet peak summer demands. Most are in Tacoma city limits.

REPORTING CHEMICALS IN YOUR WATER

The water quality table here shows substances we identified at the water source, treatment plant and distribution system in 2012. The table does not include the other 37 volatile organic chemicals and 74 synthetic organic chemicals we tested for – including many industrial chemicals, herbicides and pesticides – but did not find.

For more information, contact us at (253) 502-8665 or waterquality@cityoftacoma.org.

DEFINITIONS

(MCL) Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available technology.

(MCLG) Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's allow for a margin of safety.

ppm – one part per million

ppb – one part per billion

NTU – Nephelometric Turbidity Unit is a standard to measure water clarity.

AL – Action Level is the concentration which, if exceeded, triggers treatment or other requirements which a water system must follow. Action Levels are reported at the 90th percentile for homes at greatest risk.

 $\rm ND-\rm Not$ Detected, result was below the laboratory minimum detection level.

 ${\rm TT}-{\rm Treatment}$ technique is a required process intended to reduce the level of a contaminant in drinking water.

	Highest Level Allowed (MCL)	Highest Level Detected	ldeal Goals (MCLG)	Range of level Detected or # exceed AL		
REGULATED	AT THE GROU	NDWATER SO	URCES			
Arsenic Barium Chromium Ethylbenzene Nickel Nitrate Total Xylenes Trichloroethylene R-228	10 ppb 2 ppm 100 ppb 700 ppb 100 ppb 10 ppm 10 ppm 5 ppb 5 pCi/L	7 ppb 0.070 ppm 2 ppb 18.3 ppb 4.61 ppm 0.1587 ppm 2 ppb 1.3 ± 0.3 pCi/L	0 2 ppm 100 ppb 700 ppb 100 ppb 10 ppm 10 ppm 0 0	0 - 7 ppb 0 - 0.070 ppm 0 - 2 ppb 0 - 18.3 ppb 0 - 4.61 ppm 0 - 0.1587 ppm 0 - 2 ppb 0 - 1.3 ± 0.3 pCi/L	Yes Yes Yes Yes Yes Yes Yes Yes Yes	Natural erosion Natural erosion Natural erosion Industrial contamination Natural erosion Agricultural uses, septic Industrial contamination Industrial contamination Decay of natural deposits
UNREGULAT	ED AT THE GR	OUNDWATER	SOURCES			
Chloroform	not regulated	6.68 ppb	not regulated	0 - 6.68 ppb Average 0.83 ppb	not regulated	Industrial contamination
REGULATED	AT THE TREA	TMENT PLAN	т			
Fluoride Turbidity	4 ppm 5 NTU	2.02 ppm 4.1 NTU	4 ppm not applicable	0.71 - 2.02 ppm 0.06 - 4.1 NTU	Yes Yes	Treatment additive Soil erosion
Disinfection byproducts	Highest running annual average allowed	Our running annual average	MCLG	Range of level Detected	Regulation Met?	Potential sources of contaminant
REGULATED	IN THE DISTR	RIBUTION SYS	TEM			
Total Trihalomethane Haloacetic Acid Bromate	80 ppb <i>average</i> 60 ppb <i>average</i> 10 ppb	not applicable not applicable ND	not applicable not applicable 0	11.7 - 59.4 ppb 18.8 - 33.3 ppb ND	Yes Yes Yes	Disinfection interaction Disinfection interaction Disinfection interaction
			_			
Lead & Copper: sampled in 2010; required once every 3 years	90% of taps sampled must be below action level	90% of taps sampled were at or below this level	MCLG	# of sites above the AL	Regulation Met?	Potential sources of contaminant
Lead & Copper: sampled in 2010; required once every 3 years REGULATED	90% of taps sampled must be below action level	90% of taps sampled were at or below this level UMERS' TAP	MCLG	# of sites above the AL	Regulation Met?	Potential sources of contaminant

FINDING SUBSTANCES **IN YOUR WATER**

Tap water and bottled water sources include rivers, lakes, streams, reservoirs, springs and wells. As water travels over or through the ground, it dissolves naturally occurring minerals and can pick up other substances resulting from the presence of animals or human activity. Those substances may include inorganic material such as salts and metals, synthetic and volatile organic material from industrial processes, storm water runoff and septic systems, and pesticides and herbicides from agriculture and residential uses. To ensure your drinking water is safe, the EPA and/or the Washington State Board of Health prescribe regulations that limit the amount of certain contaminants in public water systems.

organisms during monthly testing. New

federal drinking water rules require us to

Giardia lamblia is a microscopic organism

commonly found in open-surface waters

such as rivers, lakes and streams. Like other

water systems that use open surface water

sources, federal and state regulations require

us to treat Green River water for Giardia. We

kill Giardia effectively with disinfecting

chemicals like chlorine and ozone.

treat for cryptosporidium by 2014.

Giardia (GEE-are-DEE-uh)

Organisms

(KRIP-toe-spo-RID-ee-um)

Cryptosporidium is another microscopic organism commonly found in open surface water sources. Swallowing cryptosporidium can cause diarrhea, fever and other stomach and abdominal symptoms. We test the Green River for cryptosporidium on a monthly basis. Since 2001, samples have been collected and analyzed using the best available method approved by the EPA. We did detect cryptosporidium in the untreated Green River in 2012. We have had no reported instances of cryptosporidiumrelated health problems in our service area, and since 2001, we have only found three

Gases

Radon

Radon is a naturally occurring radioactive gas. Breathing radon can cause lung cancer in humans. Ninety-eight percent of detected radon comes from indoor air generally released from soil beneath homes. Radon can release from tap water, but in much smaller guantities – only about 1 percent of radon exposure comes from drinking water.

We test for radon in our groundwater sources. Federal guidelines require drinking water to contain no more than 4.000 picocuries per liter (a picocurie is a measure of radiation). We took 109 samples and tested them between 1992 and 2012. Findings show an average of 292 picocuries per liter. Our largest single test shows 530 picocuries per liter.

Minerals

Lead & Copper

Studies cited by the EPA show swallowing lead or copper can cause health problems. especially in pregnant women and young children. Lead and copper found in drinking water usually come from home plumbing. Some homes have higher levels than other homes. Water with a low pH can cause copper to dissolve directly from pipes into water and lead to dissolve from solder used

to join copper pipes. Lead-based solder was banned in 1986, but small amounts of lead can still be found in many brass-plumbing fixtures and can slowly dissolve into water after standing in pipes for a long time.

Federal and state drinking water rules establish "action levels" allowable for lead and copper in water samples collected from homes. At least 90 percent of samples may have no more than 0.015 milligrams of lead in one liter of water and no more than 1.3 milligrams of copper per liter. Once every three years, we sample at least 50 homes for lead and copper. The most recent sampling was completed in 2010. Results show our system met action levels for both lead and copper, however, we found a few homes with elevated levels of lead. Though we meet regulatory requirements, we will continue to monitor and adjust pH levels to reduce corrosion in pipes. We will sample again for lead and copper in 2013.

Pregnant women and young children can be more vulnerable to lead in drinking water than the general population. If you have concerns about lead levels in the water at your home, have your water tested. Running water between 30 seconds and two minutes after it sits stagnant in the pipe for a few hours can help clean the tap and reduce the amount of lead and or copper in your water.

A change in the temperature of water will also tell vou when fresh water arrives.

Information on lead in drinking water. testing methods and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (800-426-4791) or at www.epa.gov/safewater/lead.

Sand & Silt

Because we take our water from the Green River, which is an unfiltered water source, pipeline shutdowns and fire flows from hydrants can stir up sand and silt that sits in the bottom of water mains throughout the water supply system. Even though this water is treated, turbid events like these can cause water to appear visually unpleasant, but it remains safe.

Throughout the past six years, you might have experienced slightly yellow water late in the summer. We saw this only in isolated areas in the past, however, it was more widespread in 2007. In response, we conducted extensive testing of our Green River water supply to determine the cause

In 2007, and to a lesser extent in 2008-2012 our tests showed a seasonal increase in levels of the dissolved minerals manganese and iron in the Green River water supply. Chlorine and ozone treatment cause these minerals to become visible by giving them a yellow tint.



We treat the Green River Supply with four chemicals: chlorine, fluoride, caustic soda and ozone.

Treating water with chemical disinfectants, chlorine and ozone is important to protecting your health when water is drawn from a surface supply like the Green River. Placing disinfecting chemicals in water kills germs and microorganisms, making it safe to drink.

Fluoride

Tacoma voters approved fluoride treatment in 1988 and 1989 because of the dental health benefits it provides. The Tacoma City Council then enacted an ordinance directing fluoridation of the water supply. We currently fluoridate at a level of 0.8 ppm.

Chlorine

Drinking water rules label iron and

manganese as "secondary," or aesthetic,

contaminants that can cause objectionable

appearance or taste. They do not have any

We also reviewed how changes in the

environment affect the color of water.

Increased storage in the watershed may

have caused an increase in the mineral

levels found in 2007-2012. We work to

expect similar conditions in the Green

River in 2013.

minimize the impacts of vellow water, but

harmful health effects at the levels we found

Chlorine is our primary disinfection treatment. While it does an excellent job of killing the microorganisms that may be harmful to you, chlorine also reacts with natural organic material commonly found in surface water sources like lakes, rivers and streams. This reaction forms compounds called "disinfection byproducts." We must meet drinking water standards for two groups of disinfection byproduct compounds. Byproduct levels found in water depend primarily on:

2012 WATER QUALITY REPORT

TREATING YOUR WATER

- The amount of natural organic material in the water
- The amount of chlorine used to treat the water
- The amount of time it takes water to reach the customer

Byproduct levels vary throughout the year. Byproducts often increase during the warmest months when the water supply has its highest levels of natural organic material and chemical reactions happen faster. We work to minimize byproduct levels and have adjusted portions of our system operations. We have placed new covered storage tanks at McMillin Reservoir. replacing the last of our open reservoirs. This will improve water quality and help reduce disinfection byproducts. Filtration will remove a percentage of the natural organic material, further reducing byproducts.

Caustic Soda

We treat our Green River water supply with caustic soda to raise the pH (a measurement of acidity) of the water. to make it less corrosive on plumbing and reduce the amount of lead and copper that can dissolve into drinking water.

Ozone

We treat the Green River water supply with ozone. Algae and other organic material in the river can create objectionable taste and odor in drinking water. Ozone effectively destroys objectionable taste and odors that can occur in the water and provides disinfection benefits to help ensure water remains safe to drink.

Ozone gas is generated when pure oxygen gas is exposed to electricity in an ozone generator. After ozone gas is created, it is combined with water and injected into pipeline reactors at the Green River Headworks. Ozone only lasts for a few minutes in the water, and is not present in the water supply when it leaves the treatment site.

A MESSAGE FROM THE **ENVIRONMENTAL PROTECTION AGENCY**

Your drinking water currently meets EPA's revised drinking water standard for arsenic. However, it does contain low levels of arsenic. There is a small chance that some people who drink water containing low levels of arsenic for many years could develop circulatory disease, cancer or other health problems. Most types of cancer and circulatory diseases are due to factors other than exposure to arsenic. EPA's standard balances the current understanding of arsenic's health effects against the costs of removing arsenic from drinking water.

Open to learn more about what's in your water.

PROTECTING YOUR WATER SUPPLY

People use water for a variety of purposes, some of which can pose a threat to the quality of the public water supply through cross-connections. A cross-connection is any actual or potential physical connection between the water supply and any non-potable liquid, solid or gas that could contaminate the water.

Common examples of cross-connections include lawn irrigation systems, boilers, fire sprinkler systems, portable hose connections (such as fertilizer sprayers) and carbonated beverage machines

Through an active cross-connection control program, and as part of the multiple barrier approach, Tacoma Water ensures that those hazards are isolated or eliminated by requiring installation and testing of backflow prevention assemblies. A properly installed and maintained backflow prevention assembly protects the water supply system, and testing the assembly ensures that it is working properly.

To learn more about Tacoma Water's cross-connection control program and how you can help protect the water supply, please call (253) 502-8215 or visit TacomaWater.com.

WATER SMART

Water conservation makes it possible to use existing supplies more efficiently and provides opportunities to develop our regional water supply and fish enhancement programs. This helps ensure enough water remains available regionally to meet your needs and the needs of our community as well as those of fish, animals and the environment.

The Washington State Department of Health requires municipal water suppliers to establish a water conservation goal and report on its progress annually. Tacoma Water's conservation goal is to reduce the amount of water each person uses by 8.4% between Jan. 1, 2011 and Jan. 1, 2018. With the focus on "smart use" of water, we know that working together we can achieve and are making progress toward that goal. Please see TacomaWater.com/smart to learn ways you can be "water smart."

TACOMA PUBLIC UTILITY BOARD

The Tacoma Public Utility Board is the governing and policy-making body for Tacoma Water. To become involved in water quality decisions, you may participate in public meetings, held on the second and fourth Wednesdays of each month at 6:30 p.m. in the Tacoma Public Utilities Auditorium, 3628 S. 35th St. in Tacoma.

YOUR WATER QUALITY REPORT

This report contains information about your drinking water.

Congress and the EPA require us to inform you annually about your drinking water and its impacts. Although most content in this report is required, we are pleased to share additional helpful information about your water and the work we do to get it to you.

We produced and mailed this report for about 38 cents per customer.

U.S. Environmental

Safe Drinking Water

Protection Agency

(800) 426-4791

epa.gov/safewater

Hotline

CONTACT INFORMATION

Rates

Water Quality (253) 502-8207 waterguality@ cityoftacoma.org

(253) 502-8974 National Radon Hotline (800) 55-RADON

(800) 557-2366 Washington State **Department of Health** doh.wa.gov/ehp/dw

conservation@ cityoftacoma.org

Conservation

(253) 502-8723

Cross Connection Control/Backflow Prevention (253) 502-8215 backflow@ cityoftacoma.org

in drinking water, testing take to minimize exposure.

TACOMAWATER COM

The hotline and FPA website offer information about drinking water contaminants and their potential health effects as well as auidelines from the U.S. about appropriate ways to reduce the risk of infection by cryptosporidium and other microbial contaminants. Both sources also offer information about lead methods and steps you can



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