2011 Annual Water Quality Report

Stanford University Utilities Services

Top Quality Water

May 2012

Stanford Utilities Services is pleased to provide you with the 2011 Annual Water Quality Report. During 2011, the San Francisco Public Utilities Commission (SFPUC) and Stanford University monitored water quality for both source and treated water supplies, and in all cases the water quality was in compliance with the California Department of Public Health (CDPH) and the United States Environmental Protection Agency (USEPA) drinking water requirements. We continue our commitment to provide our customers with safe, high quality drinking water. It is the policy of Stanford Utilities Services to fully inform its consumers about the water quality standards and typical concentrations.

Utilities Services manages the storage, distribution, maintenance, and monitoring programs for Stanford's drinking water supply. Stanford's water supply is both chloraminated and fluoridated.

Stanford routinely collects water quality samples from various locations within the campus distribution system. The most frequently collected samples are analyzed for coliform bacteria, chloramine residual, and general physical parameters. Additional water quality samples are collected to monitor for more constituents in compliance with CDPH requirements. A California certified laboratory analyzes all samples. Stanford submits monthly reports to the CDPH that include all monitoring results.

SFPUC also collects daily water quality samples from various locations within their transmission system. The samples are analyzed for primary standards that apply to the protection of public health and secondary standards that refer to the aesthetic qualities of water, such as taste and odor.

Stanford Utilities Services also maintains flushing, cross-connection, and backflow prevention programs to ensure a consistent high quality drinking water supply.

In This Report

Stanford University's Drinking Water Sources

Water supplied to Stanford by the SFPUC comes from three major sources: the Hetch Hetchy watershed, the Alameda watershed and the San Mateo watershed.

Hetch Hetchy Watershed

Hetch Hetchy Reservoir, is the largest reservoir in the SFPUC system, it is located in Yosemite National Park. In 2011, the Hetch Hetchy Watershed provided the majority of the total water supply, with the remainder contributed by the two local watersheds. For the SFPUC system, the major source originates from spring snowmelt flowing down the Tuolumne River to the Hetch Hetchy Reservoir, where it is stored. This pristine Sierra water source meets all federal and state criteria for watershed protection. The SFPUC also maintains stringent disinfection treatment practices, extensive bacteriological-quality monitoring, and high operational standards. As a result, the California Department of Public Health and USEPA has granted the Hetch Hetchy water source a filtration exemption. This exemption is contingent upon the Hetch Hetchy water quality continuing to meet all filtration avoidance criteria.

Alameda Watershed

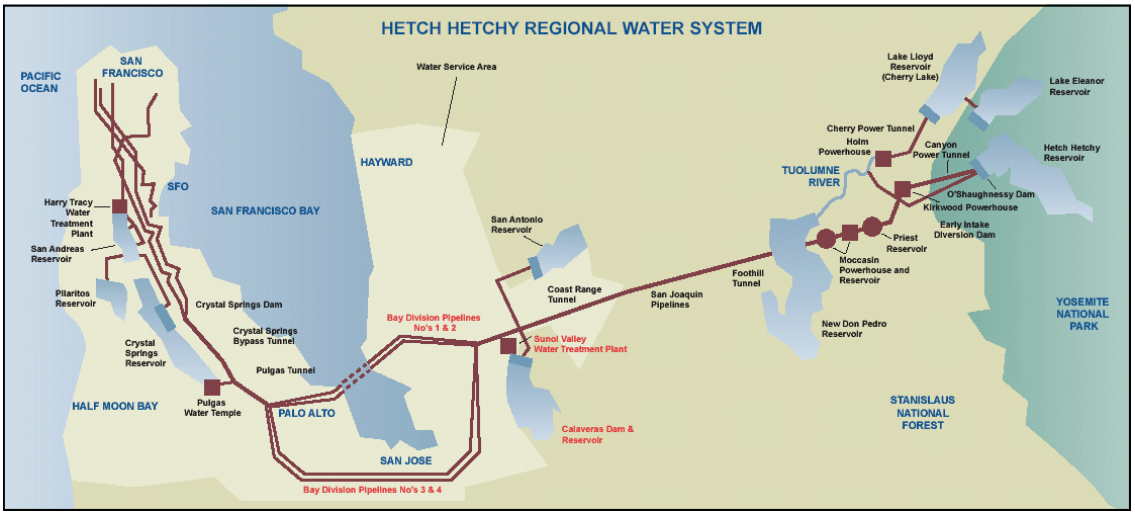
The Alameda watershed, spans more than 35,000 acres in Alameda and Santa Clara Counties. Surface water from rainfall and runoff is collected in the Calaveras and San Antonio Reservoirs. Prior to distribution, water from the watershed is treated at the Sunol Valley Water Treatment Plant.

San Mateo Watershed

Surface water from rainfall and runoff captured in the 23,000 acre Peninsula watershed, located in San Mateo County, is stored in reservoirs, including Crystal Springs (Lower and Upper), San Andreas, and Pilarcitos. The water from these reservoirs is treated at the Harry Tracy Water Treatment Plant.

Watershed Protection

The SFPUC actively protects the water resources entrusted to its care. Hetch Hetchy Watershed is surveyed annually to evaluate the sanitary conditions, water quality, potential contamination sources, and the results of watershed management activities conducted by SFPUC and its partner agencies (including National Park Service and US Forest Service). Once every five years the local watersheds and the approved standby water sources in Early Intake Watershed, which includes Cherry Lake and Lake Eleanor are surveyed. The latest five year survey was completed in 2011 for the period of 2006-2010. These surveys identified wildlife, stock, and human activities as potential contamination sources. The reports are available for review at the CDPH San Francisco District office, 510-620-3474.



Contaminants in Drinking Water

In order to ensure that tap water is safe to drink, the USEPA and CDPH prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. CDPH regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

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 USEPA's Safe Drinking Water Hotline (800) 426-4791.

The sources of drinking water (both tap and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, which in some cases are radioactive. It can also pick up substances resulting from the presence of animals or from human activity. Such substances are called contaminants.

Contaminants that may be present in source water include:

Inorganic Contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharge, oil and gas production, mining, or farming.

Radioactive Contaminants, can be naturally occurring or the result of oil and gas production and mining activities.

Pesticides and Herbicides, may originate from a variety of sources, such as agricultural, urban stormwater runoff, and residential uses.

Organic Chemical Contaminants, including synthetic and volatile organic chemicals that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems.

Microbial Contaminants, such as viruses and bacteria, may come from sewage treatment plants, septic systems, agricultural live stock operations, and wildlife.

Cryptosporidium

Cryptosporidium is a parasitic microbe found in most surface water.

The SFPUC tests regularly for this water-borne pathogen, and found it at very low levels in source water and treated water in 2011. However, current test methods approved by the USEPA do not distinguish between dead organisms and those capable of causing disease. If ingested, these parasites may produce symptoms of nausea, stomach cramps, diarrhea, and associated headaches. *Cryptosporidium* must be ingested to cause disease, and it may be spread through means other than drinking water.

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. USEPA / Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the USEPA's Safe Drinking Water Hotline (800) 426-4791 or Website: *www.epa.gov/safewater*

Important Definitions

Water Quality Data Table
The Water Quality Data table (Page 5) summarizes the 2011 detected drinking water contaminants and the information about their typical sources. An extensive water sample collection and testing protocol is used at the various water sources throughout the SFPUC transmission system and in the campus distribution system. Contaminants below detection limits are not shown, in accordance with CDPH guidance.

The following are definitions of key terms noted on the adjacent water quality data table. These terms refer to the standards and goals for water quality.

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs (see definitions below) as is economically and technologically feasible. Secondary MCLs (SMCLs) are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

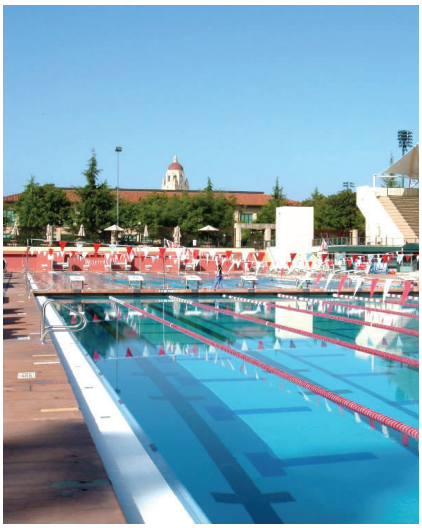
Primary Drinking Water Standard (PDWS): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

Regulatory Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Treatment Techniques (TT): A required process intended to reduce the level of a contaminant in drinking water.

Turbidity: A water clarity indicator that is also used to indicate the effectiveness of the filtration plants. High turbidity can hinder the effectiveness of disinfectants.

Diverse Uses of Campus Domestic Water



Swimming Pools

Drinking Fountains

Laboratories

Water Quality Data
Stanford University's Annual Water Quality Data for 2011 (1)

DETECTED CONTAMINANTS

CONSTITUENTS WITH PRIMARY STANDARDS	Unit	MCL	PHG or (MCLG)	Range or Result	Average or (Maximum)	Typical Sources in Drinking Water
TURBIDITY (SFPUC samples)						
Unfiltered Hetch Hetchy Water	NTU	5	N/A	0.2 - 0.7 (2)	(2.1) (3)	Soil runoff
Filtered Water - Sunol Valley WTP	NTU	1(4)	N/A	-	(0.36)	Soil runoff
Minimum 95 % of samples ≤ 0.3 NTU (4)	-	-	N/A	99.9% -100%	-	Soil runoff
DISINFECTION BY-PRODUCTS (SFPUC samples)						
Total Trihalomethanes (TTHMs)	ppb	80	N/A	10 - 84	(45) (5)	By-product of drinking water chlorination
Total Haloacetic Acids (HAAs)	ppb	60	N/A	4 - 59	(33) (5)	By-product of drinking water chlorination
Total Organic Carbon (TOC) (6)	ppm	TT	N/A	2.6 - 2.9	2.7	Various natural and man-made sources
DISINFECTION BY-PRODUCTS (Stanford samples)						
Total Trihalomethanes (TTHMs)	ppb	80	N/A	39 - 73	(55) (5)	By-product of drinking water chlorination
Total Haloacetic Acids (HAAs)	ppb	60	N/A	22 - 53	(43) (5)	By-product of drinking water chlorination
MICROBIOLOGICAL						
Total Coliform (Stanford samples) percentage of positives detected in any month	%	≤5	(0)	-	(0)	Naturally present in the environment
Giardia Lamblia (SFPUC samples)	cyst/L	TT	(0)	ND - 0.07	(0.07)	Naturally present in the environment
INORGANIC CHEMICALS						
Fluoride (source water)(7) (SFPUC samples)	ppm	2.0	1.0	ND - 0.12	ND (8)	Erosion of natural deposits
Total Chlorine (Stanford samples)	ppm	MRDL=4	MRDLG=4	0.6 - 3.0	(2.2) (5)	Water disinfectant added for treatment
RADIONUCLIDES						
Radium-226	pCi/L	N/A	0.05	ND - 1.2	<1	Erosion of natural deposits

CONSTITUENTS WITH SECONDARY STANDARDS (SFPUC samples, except Color)	Unit	SMCL	PHG	Range	Average	Typical Sources in Drinking Water
Aluminum(9)	ppb	200	600	ND - 53	<50	Erosion of natural deposits
Chloride	ppm	500	N/A	3 - 20	11	Runoff / leaching from natural deposits
Color (Stanford samples)	unit	15	N/A	<5 - 9	<5	Naturally occurring organic materials
Specific Conductance	µS/cm	1600	N/A	39 - 289	181	Substances that form ions when in water
Sulfate	ppm	500	N/A	1.3 - 36	18	Runoff/leaching from natural deposits
Total Dissolved Solids	ppm	1000	N/A	83 - 194	132	Runoff / leaching from natural deposits
Turbidity	NTU	5	N/A	0.06 - 0.35	0.16	Soil runoff

LEAD AND COPPER RULE STUDY (Stanford Samples, 55 samples collected)	Unit	AL	PHG	Range	90th Percentile	Typical Sources in Drinking Water
Copper	ppb	1300	300	<20 - 220	95 (10)	Corrosion of household plumbing systems
Lead	ppb	15	0.2	<5.6 - 21	5 (11)	Corrosion of household plumbing systems

OTHER WATER QUALITY PARAMETERS (SFPUC Samples)	Unit	ORL	Range	Average
Alkalinity (as $CaCO_3$)	ppm	N/A	10 - 84	49
Calcium (as Ca)	ppm	N/A	3 - 24	13
Chlorate (12)	ppb	(800)NL	36 - 488	89
Hardness (as $CaCO_3$)	ppm	N/A	10 - 98	57
Magnesium	ppm	N/A	<0.04 - 8.2	4.9
pH	unit	N/A	6.7 - 9.7	8.6
Sodium	ppm	N/A	3 - 20	13.5

Key:		
</≤	=	less than / less than equal to
AL	=	Action Level
NA	=	Not Applicable
ND	=	Non-detect
NL	=	Notification Level
NTU	=	Nephelometric Turbidity Unit
ORL	=	Other Regulatory Level
ppb	=	parts per billion
ppm	=	parts per million
µS/cm	=	microSiemens/centimeter

1. All results met State and Federal drinking water health standards.
2. Turbidity is measured every four hours. These are monthly average turbidity values.
3. This is the highest turbidity of the unfiltered water served to customers in 2011. This turbidity spike was the result of a flow rate change, and it was not observed downstream at Alameda East.
4. There is no MCL for filtered water turbidity. The limits are based on the TT requirements in the CDPH drinking water regulations.
5. This is the highest, quarterly running, annual average value.
6. Total organic carbon is a precursor for disinfection byproduct formation. The TT requirement applies to the filtered water from the SVWTP only. These are compliance data for SVWTP raw water.
7. The SFPUC adds fluoride to the naturally occurring fluoride to help prevent dental caries in consumers. The CDPH requires fluoride levels in the treated water to be maintained within a range of 0.8 ppm - 1.5 ppm. In 2011, the range and average of our fluoride levels were 0.6 ppm - 1.3 ppm and 1.0ppm respectively.
8. The naturally occurring fluoride levels in the Hetch Hetchy and SVWTP raw water were ND and 0.12 ppm, respectively.
9. Aluminum also has an MCL of 1000 ppb.
10. In 2009, no residences were over the copper Action Level at consumer taps. Customer tap sampling is required again in 2012.
11. In 2009, 1 residence was over the lead Action Level at the consumer's tap. Customer tap sampling is required again in 2012.
12. The detected chlorate in treated water is a degradation byproduct of sodium hypochlorite, the primary disinfectant used by SFPUC for water disinfection.

Additional Information About Water for Residents

Chloramine Degradation of Rubber Parts
Stanford University purchases 100% of our domestic water (disinfected with chloramines) from the SFPUC. Chloramines provide longer lasting water disinfection while complying with more stringent regulatory requirements for disinfection byproducts. Chloramines can cause faster breakdown of rubber parts used in household plumbing than the previously used disinfectant—chlorine. Typical household parts that can be affected by chloramines are:

Stainless steel braided flex connectors

Rubber flapper valves in toilets

The degradation can cause soft, black flakes in the water, usually on the first draw from the tap, but then the water quickly clears up. These flakes sometimes have a “greasy” appearance and will frequently stick and smear on surfaces.
To solve this problem, the degraded part should be replaced with new chloramine resistant materials (silicone-based rubber, synthetic polymers, copper, or nylon flex lines). These products should say “chloramine resistant”.

Emergency Preparedness
In the event of an earthquake, will you have enough drinking water?

Although Stanford strives to ensure a reliable supply of water for our customers, a natural disaster such as a major earthquake could interrupt water delivery. Residents are encouraged to store drinking water in case of an emergency.

<u>Keep a 3-day water supply just in case</u>

- Each family member (including pets!) needs 1 gallon per day
- Store tap water in food-grade plastic containers; replace every 6 months
- Store bottled water in the original sealed containers; replace every 6 months

<u>If your supply runs out, you can treat your tap water</u>

- Boil it for 3 minutes, or disinfect it by adding regular household bleach
- Add 8 drops of bleach per gallon of water
- Shake or stir then let it stand for 30 minutes

To learn more about emergency preparedness for yourself and your family, visit http://lbre.stanford.edu/sem/drinking_water
or www.72hours.org.

Water Conservation for Residents

Stanford has partnered with the Santa Clara Valley Water District (SCVWD) to offer residents valuable incentives on water conservation products, programs, and educational opportunities.

The following are some of the programs that are currently available. See our website for additional information: http://lbre.stanford.edu/sem/facultyandstaff

Water Wise House Call
Contact the Santa Clara Valley Water District to schedule your FREE Water Wise House Call at: **(800) 548-1882.**

A SCVWD representative will meet with you to review your home water use and identify where you can improve efficiency. They will tell you about all the conservation rebate programs available for your residence.

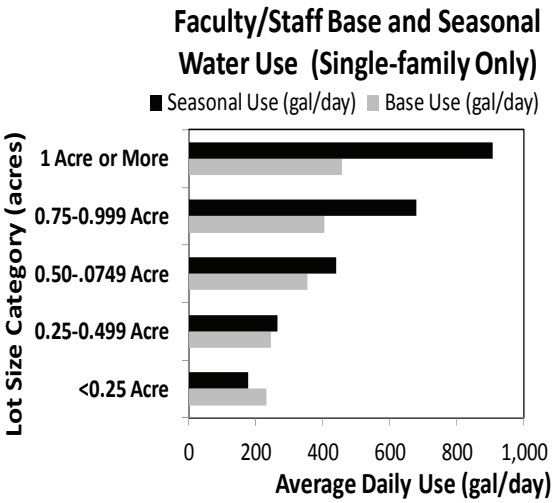
High Efficiency Toilet Rebate
You can receive a rebate by replacing toilets that use more than 3.5 gallons per flush. Stanford Utilities will also pay for recycling your old toilet(s). A maximum of three toilets can be replaced per household.

Landscape Rebate Program
Replace your lawn with drought tolerant plantings and receive $75 per 100 square feet of landscape retrofitted with either mulch or replacement plants. (You must participate in the Water Wise House Call prior to being eligible for this rebate).

Free Water Saving Devices
Receive FREE showerheads (*2.0 gpm*), kitchen (*2.2 gpm*) and bathroom (*1.5 gpm*) faucet aerators, shower timers and toilet leak detection tablets. Contact Lowell Price at (650) 725-8963 or lowell.price@stanford.edu

Faculty/Staff Base & Seasonal Water Use
Did you know that on average landscaping accounts for 60% of total single family residential household water use at Stanford?

See graph below that compares seasonal use in black (primarily outdoor use) to base use, in grey (primarily indoor use) for single-family faculty staff housing residents, by lot size.



Graph Notes:
Based on July – June water year
Seasonal Use – Outdoor use (April – November bill periods)
Base Use – Indoor use (December – March bill periods)

We would like your input. What can we do to help? What water conservation and rebate information are you interested in seeing? Please contact us at: akern@stanford.edu

Rebate Participation (Number of Rebates or Replacement Fixtures)	FY 2009	FY 2010	FY 2011
Water Wise House Call	37	24	13
Landscape Rebate Program (Turf Removal)	0	6	4
Landscape Irrigation Equipment Upgrade	0	6	2
High Efficiency Toilet	79	57	17
High Efficiency Clothes Washer	31	38	40

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Contact Information

USEPA Drinking Water Homepage:
www.epa.gov/safewater/ or
Safe Drinking Water Hotline
(800) 426-4791

CDPH Drinking Water Program Homepage:
http://www.cdph.ca.gov/certlic/drinkingwater/

SFPUC's Homepage: sfwater.org

Stanford's Utilities Water Homepage:
http://lbre.stanford.edu/sem/drinking_water

Este reporte contiene información muy importante sobres el agua que toma. Llame a Stanford University 650-725-8030 sí necesita ayuda en español.

If you have questions or need additional information about this report or Stanford's water quality, please contact:

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