

# 2009 Annual Water Quality Report

## Stanford University Utilities Services

### Top Quality Water

May 2010

Stanford Utilities Services is pleased to provide you with the 2009 Annual Water Quality Report. During 2009, 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. Stanford's water supply is both chloraminated and fluoridated.

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

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

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

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# 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, which is the largest reservoir in the SFPUC system, located in Yosemite National Park. In 2009, the Hetch Hetchy Watershed provided approximately 87%, with the remainder contributed by the two local watersheds. Spring snowmelt flows down the Tuolumne River and fills the Hetch Hetchy Reservoir. The high quality Hetch Hetchy water supply meets all federal and state criteria for watershed protection, disinfection treatment, bacteriological quality, and operational standards. As a result, the USEPA and CDPH 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 (SVWTP).

## San Mateo Watershed

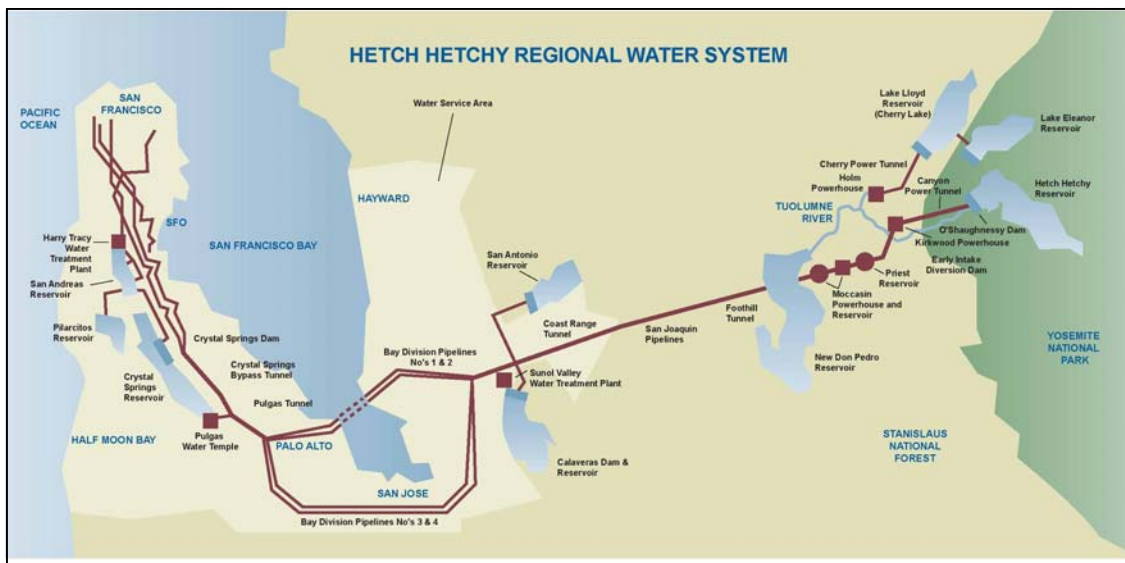
Surface water from rainfall and runoff captured in the 23,000-acre Peninsula watershed, located in San Mateo County, is stored in reservoirs, including Crystal Springs (Lower and Upper), San Andreas, and Pilarcitos. The water from these reservoirs is treated at the Harry Tracy Water Treatment Plant (HTWTP).

## Watershed Protection

The SFPUC actively and aggressively protects the natural water resources en-

trusted to its care. An annual report on the Hetch Hetchy is prepared to evaluate the sanitary conditions, water quality, and potential contamination sources. This report also presents performance results for watershed management activities implemented by the SFPUC and its partner agencies, such as the National Park Service, to reduce or eliminate the potential contamination sources. The 2009 Hetch Hetchy sanitary survey concludes that very low levels of contaminants associated with wildlife and human activities exist in the watershed.

The SFPUC also conducts sanitary surveys of the local Alameda and San Mateo watersheds every five years. The potential contamination sources identified in the latest survey in 2005 survey are similar to the upcountry watersheds. These survey reports are available at the CDPH San Francisco District office (510-620-3474).



## *Protecting Our Water Quality*

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.

### **Contaminants in Drinking Water**

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 and can pick up substances resulting from the presence of animals or from human activity.

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**, that 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, which 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 waterborne pathogen, and found it at very low levels in source water and treated water in 2009. 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. Immunocompromised 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: [epa.gov/safewater](http://epa.gov/safewater)

## Important Definitions

### Water Quality Data Table

The Water Quality Data table (Page 5) summarizes the 2009 sampling results from laboratory analyses of parameters detected in SFPUC's source water supply and Stanford's distribution system. 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. Both the SFPUC and Stanford monitor for many additional parameters, which were not detected.

The Water Quality Data table contains the name of each substance, the highest level allowed by regulation (MCL), the ideal goals for public health (PHG), the average and range, and the typical sources of such contamination. Footnotes explaining these data and a key to units of measurement are also included.

**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 drink-

ing 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 level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**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.

### Diverse Uses of Campus Domestic Water



Swimming Pools



Drinking Fountains



Laboratories

# Water Quality Data

## Stanford University's Annual Water Quality Data for 2009 <sup>(1)</sup>

### DETECTED CONTAMINANTS

CONSTITUENTS WITH PRIMARY STANDARDS	Unit	MCL	PHG or (MCLG)	Range or Result	Average or (Maximum)	Typical Sources in Drinking Water
<b>TURBIDITY <sup>(2)</sup> (SFPUC samples)</b>						
Unfiltered Hetch Hetchy Water, max 5 NTU	NTU	5	NS	0.27 - 0.52 <sup>(3)</sup>	(3.87) <sup>(4)</sup>	Soil run-off
Filtered Water - Sunol Valley WTP, max 1 NTU	NTU	1	NS	NA	(0.26)	Soil run-off
95 percent of time ≤ 0.3 NTU	NTU	1	NS	100% <sup>(5)</sup>	NA	Soil run-off
<b>DISINFECTION BY-PRODUCTS (SFPUC samples)</b>						
Total Trihalomethanes (TTHMs)	ppb	80	NS	9 - 54	(33) <sup>(6)</sup>	By-product of drinking water chlorination
Total Haloacetic Acids (HAAs)	ppb	60	NS	5 - 27	(21) <sup>(6)</sup>	By-product of drinking water chlorination
Total Organic Carbon (TOC) <sup>(7)</sup>	ppm	TT	NS	2.3 - 3.2	2.7	Various natural and man-made sources
<b>DISINFECTION BY-PRODUCTS (Stanford samples)</b>						
Total Trihalomethanes (TTHMs)	ppb	80	NS	27 - 50	(40) <sup>(6)</sup>	By-product of drinking water chlorination
Total Haloacetic Acids (HAAs)	ppb	60	NS	6 - 39	(28) <sup>(6)</sup>	By-product of drinking water chlorination
<b>MICROBIOLOGICAL</b>						
Total Coliform (Stanford samples) percentage of positives detected in any month	%	≤5	(0)	0	(0)	Naturally present in the environment
Giardia Lamblia (SFPUC samples)	cyst/L	TT	(0)	0.01 - 0.05	(0.05)	Naturally present in the environment
<b>INORGANIC CHEMICALS</b>						
Fluoride (source water) (SFPUC samples)	ppm	2.0	1.0	<0.1 - 0.8	0.3	Erosion of natural deposits
Fluoride (treated water) <sup>(8)</sup> (SFPUC samples)	ppm	2.0	1.0	0.7 - 1.3	1.0	Treatment to prevent dental caries
Total Chlorine (Stanford samples)	ppm	MRDL=4	MRDLG=4	1.5 - 2.4	(2.0) <sup>(6)</sup>	Water disinfectant added for treatment

CONSTITUENTS WITH SECONDARY STANDARDS (SFPUC samples, except Color)	Unit	SMCL	PHG	Range	Average	Typical Sources in Drinking Water
Aluminum	ppb	200	NA	<50-51	<50	
Chloride	ppm	500	NS	4 - 14.6	9.5	Runoff / leaching from natural deposits
Color (Stanford samples)	unit	15	NS	<5 - 8	<5	Naturally occurring organic materials
Specific Conductance	µS/cm	1600	NS	30 - 309	170	Substances that form ions when in water
Sulfate	ppm	500	NS	1.1 - 35.6	16.6	Runoff/leaching from natural deposits
Total Dissolved Solids	ppm	1000	NS	22 - 168	92	Runoff / leaching from natural deposits
Turbidity	NTU	5	NS	0.08 - 0.33	0.16	Soil runoff

LEAD AND COPPER RULE STUDY (Stanford Samples, 55 samples collected)	Unit	AL	PHG	Range	90th Percentile <sup>(9)</sup>	Typical Sources in Drinking Water
Copper	ppb	1300	300	<20 - 220	95 <sup>(10)</sup>	Corrosion of household plumbing systems
Lead	ppb	15	0.2	<5.6 - 21	5 <sup>(11)</sup>	Corrosion of household plumbing systems

OTHER WATER QUALITY PARAMETERS (SFPUC Samples)	Unit	ORL	Range	Average
Alkalinity (as CaCO <sub>3</sub> )	ppm	NS	8 - 102	50
Boron	ppb	NA	<100-102	<100
Bromide	ppb	NA	<10-16	<10
Calcium (as Ca)	ppm	NA	2 - 26	12
Chlorate <sup>(12)</sup>	ppb	(800)NL	56 - 511	258
Hardness (as CaCO <sub>3</sub> )	ppm	NS	12 - 108	55
Magnesium	ppm	NS	0.2 - 8.8	4.5
pH	unit	NS	8.7 - 8.8	8.7
Potassium	ppm	NS	0.24 - 1.5	0.9
Silica	ppm	NS	4.8 - 7.5	5.9
Sodium	ppm	NS	3 - 23	14

Key:		
</≤	=	less than / less than equal to
AL	=	Action Level
NA	=	Not Applicable
NL	=	Notification Level
NS	=	No Standard
NTU	=	Nephelometric Turbidity Unit
ORL	=	Other Regulatory Level
ppb	=	parts per billion
ppm	=	parts per million
TT	=	Treatment Technique
µS/cm	=	microSiemens/centimeter

- All results met State and Federal drinking water health standards.
- Turbidity is a water clarity indicator; it also indicates the effectiveness of the filtration plants.
- Turbidity is measured every four hours. These are monthly average turbidity values.
- This is the highest turbidity of the unfiltered water served to customers in 2009. The highest single turbidity measurement of the unfiltered water in 2009 was 10 NTU but the turbid water was pumped away to San Antonio Reservoir without serving customers. The startup of San Joaquin Pipelines caused elevated turbidities as a result of sediment resuspension in the pipelines.
- There is no MCL for turbidity. The limits are based on the TT requirements in the State Drinking Water regulations.
- This is the highest, quarterly running, annual average value.
- Total organic carbon is a precursor for disinfection byproduct formation. The TT requirement applies to the filtered water from the SVWTP only.
- The SFPUC adds fluoride to the naturally occurring level to help prevent dental caries in consumers. The fluoride levels in the treated water are maintained within a range of 0.8 - 1.5 ppm, as required by CDPH regulations.
- The 90th percentile levels of lead and copper must not be greater than the action levels.
- In 2009, no residences were over the copper Action Level at consumer taps. Customer tap sampling is required again in 2012.
- In 2009, 1 residence was over the lead Action Level at the consumer's tap. Customer tap sampling is required again in 2012.
- There was no chlorate detected in the raw water sources. The detected chlorate in treated water is a byproduct of the degradation of sodium hypochlorite, the primary disinfectant used by SFPUC for water disinfection.



## *Additional Information About Water for Residents*

### **Chloramine Degredation 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**

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. Stanford recommends storing at least three days worth of water (one gallon of water per person, per day, including pets) in food-grade plastic containers, such as two-liter soda bottles, and replacing supplies every six months.

To learn more about emergency preparedness for yourself and your family, visit [http://lbre.stanford.edu/sem/drinking\\_water](http://lbre.stanford.edu/sem/drinking_water) (Quick Links Box) or [www.72hours.org](http://www.72hours.org).



### **Stormwater Pollution Prevention**

The storm drain on your street carries water directly to San Francisco Bay without any treatment. You can help prevent storm water pollution of the local creeks and Bay by following these tips:

- Clean up garbage and debris lying in gutters, ditches or storm drains.
- Make sure your car is in good repair and not leaking fluids.
- Clean up your pest waste and dispose of in the trash.
- Buy non-toxic household cleaning products and dispose of empty or partially empty containers properly.
- Take your car to a car wash. Soap in storm drains leads to pollution in the Bay.

More information can be found on our website: <http://lbre.stanford.edu/sem/environmental>

# 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.**

### 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, and tell you about all the conservation rebate programs available for your residence.

### High Efficiency Toilet Rebate

You can receive up to \$200 by replacing toilets that use more than 3 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](mailto:lowell.price@stanford.edu)

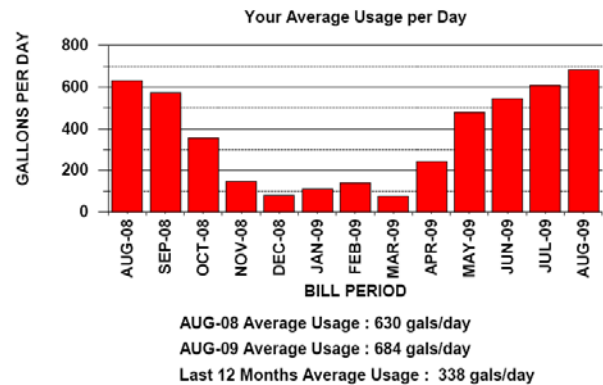
For more information about the Stanford Utilities Water Conservation program, water efficiency tips, and current rebates visit:

[http://lbre.stanford.edu/sem/water\\_conservation](http://lbre.stanford.edu/sem/water_conservation)

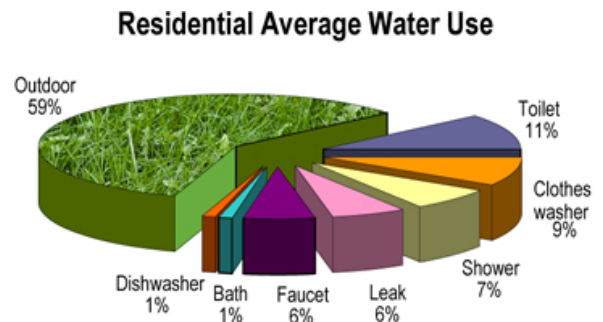
### Calculating Residential Outdoor Use:

Using the graph below (similar to the graph displayed on your monthly water bill), use the average of the lowest two months; for this example it is 85 gallons per day (gpd) [December 90 gpd, and March 80 gpd/ 2 months = 85 gpd].

Assuming this residence did not irrigate during December and March, the 85 gpd is representative of the average day indoor water use for the household. In order to figure out the average day outdoor use for each month, subtract 85 gpd from months where water use is higher. Outdoor use is highest mid-summer, however the typical irrigation season for California runs from April through October (depending on annual weather fluctuations).



The pie chart below illustrates the consumption of residential water use for the average single family home.



Source: AWWA Research Foundation, End Uses of Water, 1999.

## *Contact Information*

**USEPA Drinking Water Homepage:**

[www.epa.gov/safewater/](http://www.epa.gov/safewater/) or  
Safe Drinking Water Hotline  
(800) 426-4791

**CDPH Drinking Water Program Home-  
page:**

<http://www.cdph.ca.gov/certlic/drinkingwater/>

**SFPUC's Homepage:** [sfwater.org](http://sfwater.org)

**Stanford's Utilities Water Homepage:**

[http://lbre.stanford.edu/sem/drinking\\_water](http://lbre.stanford.edu/sem/drinking_water)

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

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