2019 Annual Water Quality Report

Stanford University Water Resources and Civil Infrastructure

May 2020

High Quality Water

Stanford University Water Resources and Civil Infrastructure (WRCI) is pleased to provide you with the 2019 Annual Water Quality Report. The San Francisco Public Utilities Commission (SFPUC) and WRCI monitored water quality for both source and treated water supplies during 2019, and the water quality was in compliance with the State Water Resources Control Board - Division of Drinking Water (SWRCB-DDW) and the United States Environmental Protection Agency (USEPA) drinking water requirements (see page 5 for details). We continue our commitment to provide our customers with safe, high quality drinking water. The policy of WRCI is to fully inform its consumers about the water quality standards and typical concentrations. Stanford's water supply is both chloraminated and fluoridated by the SFPUC.

The SFPUC collects daily water quality samples from various locations within the San Francisco Regional Water System (SFRWS). 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 also routinely collects water quality samples from various locations within the campus distribution system. The most frequently collected samples are analyzed for chloramine residual, coliform bacteria, and general physical parameters. Additional water quality samples are collected to monitor for more constituents in compliance with applicable requirements. A California certified laboratory analyzes required samples. Stanford submits monthly reports to the SWRCB-DDW that include monitoring results.

Stanford Water Resources

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

SFRWS Drinking Water Sources and Treatment

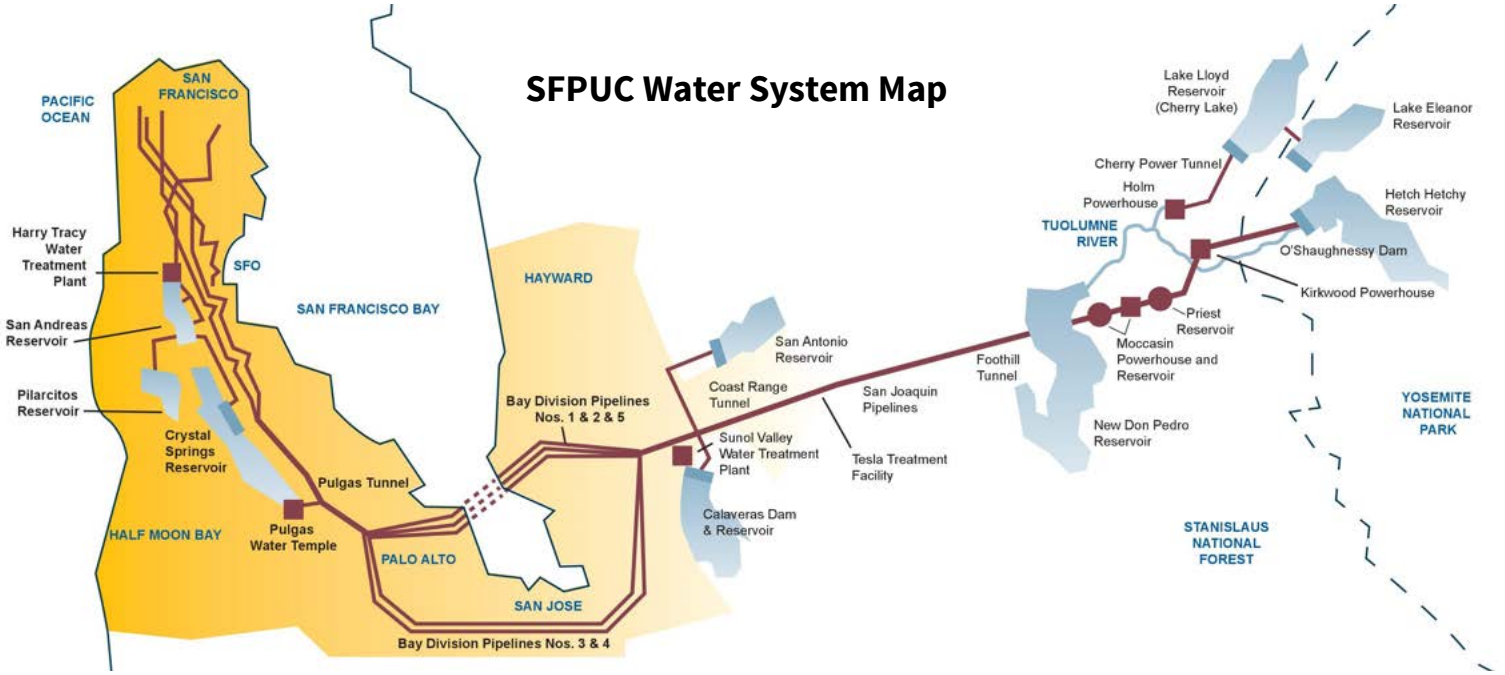
The San Francisco Regional Water System's (SFRWS) major water source is in Yosemite National Park and originates from spring snowmelt flowing down the Tuolumne River to storage in Hetch Hetchy Reservoir. The well-protected Sierra water source is exempt from federal and state filtration requirements. To meet the appropriate drinking water standards for consumption, water from Hetch Hetchy Reservoir receives treatment consisting of ultraviolet light and chlorine disinfection, pH adjustment for optimum corrosion control, fluoridation for dental health protection, and chloramination for maintaining disinfectant residual and minimizing the formation of regulated disinfection byproducts.

The Hetch Hetchy water supply is supplemented with surface water from local watersheds and upcountry non-Hetch Hetchy sources (UNHHS). Rainfall and runoff from the 35,000-acre Alameda Watershed in Alameda and Santa Clara counties are first collected in Calaveras Reservoir and San Antonio Reservoir for storage followed by delivery to the Sunol Valley Water Treatment Plant (SVWTP) for treatment. Rainfall and runoff from the 23,000-acre Peninsula Watershed in San Mateo County are stored in Crystal Springs Reservoir, San Andreas Reservoir and Pilarcitos Reservoir, and are delivered to the Harry Tracy Water Treatment Plant. Water delivered to the two treatment plants is subject to filtration, disinfection, fluoridation, optimum corrosion control, and taste and odor removal to ensure the water supplied to our customers meet the federal and state drinking water standards. SFRWS did not use the UNHHS in 2019.

Watersheds Protection

SFRWS conducts watershed sanitary surveys for the Hetch Hetchy source annually and for the local water sources and UNHHS every five years. The latest local sanitary survey was completed in 2016 for the period of 2011-2015. The last watershed sanitary survey for UNHHS was conducted in 2015 as part of SFRWS's drought response plan efforts. All these surveys together with the stringent watershed protection management activities were completed by SFRWS with support from partner agencies including the National Park Service and US Forest Service. The purposes of the surveys are to evaluate the sanitary conditions and water quality of the watersheds and to review results of watershed management activities conducted in the preceding years. Wildlife, stock, and human activities continued to be the potential contamination sources. You may contact the San Francisco District office of the State Water Resources Control Board's Division of Drinking Water (SWRCB-DDW) at (510) 620-3474 for the review of these reports.

SFPUC Water System Map



Contaminants in Drinking Water

SFRWS regularly collects and tests water samples from reservoirs and designated sampling points throughout the sources and the transmission system to ensure the water delivered to you meets or exceeds federal and State drinking water standards. In 2019, SFRWS conducted more than 53,650 drinking water tests in the sources and the transmission system. This is in addition to the extensive treatment process control monitoring performed by SFRWS's certified operators and online instruments.

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. In order to ensure that tap water is safe to drink, the United States Environmental Protection Agency (USEPA) and the SWRCB-DDW prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The U.S. Food and Drug Administration regulations and California law also establish limits for contaminants in bottled water that provide the same protection for public health.

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

- **Microbial contaminants**, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife,
- **Inorganic contaminants**, such as salts and metals, that can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming,
- **Pesticides and herbicides** that may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses,
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems,
- **Radioactive contaminants**, which can be naturally occurring or be the result of oil and gas production and mining activities.

Drinking water and lead

Exposure to lead, if present, can cause serious health effects in all age groups, especially for pregnant women and young children. Infants and children who drink water containing lead could have decreases in IQ and attention span and increases in learning and behavior problems. Lead exposure among women who are pregnant increases prenatal risks. Lead exposure among women who later become pregnant has similar risks if lead stored in the mother's bones is released during pregnancy. Recent science suggests that adults who drink water containing lead have increased risks of heart disease, high blood pressure, and kidney or nervous system problems.

Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. There are no known lead service lines in the SFRWS or Stanford distribution system. We are responsible for providing high quality drinking water, but we cannot control the variety of materials used in plumbing components. You share the responsibility for protecting yourself and your family from the lead in your home plumbing. You can take responsibility by identifying and removing lead materials within your home plumbing and taking steps to reduce your family's risk. Before drinking, flush your pipes for several minutes by running your tap, taking a shower, or doing laundry or a load of dishes. You can also use a filter certified to remove lead from drinking water. If you are concerned about lead in your water and wish to have your water tested, please call the Water Information Line at (650) 725 -8030 or contact one of our team members listed on page 8. Information about lead in drinking water, testing methods, and steps you can take to minimize exposure is available at epa.gov/safewater/lead.

As previously reported in 2018, at the completion of the lead user service line (LUSL) inventory, there were no known pipelines and connectors between water mains and meters made of lead (nor were there any pipelines or connectors made of unknown materials). Our policy is to remove and replace any LUSL promptly if it is discovered during pipeline repair and/or maintenance.

More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (800) 426-4791, or at epa.gov/safewater.

Contaminants in Drinking Water, continued

Cryptosporidium

Cryptosporidium is a parasitic microbe found in most surface water. SFRWS regularly tests for this waterborne pathogen and found it at very low levels in source water and treated water in 2019. However, current test methods approved by the USEPA do not distinguish between dead organisms and those capable of causing disease. Ingestion of *Cryptosporidium* may produce symptoms of nausea, abdominal cramps, diarrhea, and associated headaches. *Cryptosporidium* must be ingested to cause disease, and it may be spread through means other than drinking water.

Special Health Needs

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as those with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly people and infants, can be particularly at risk from infections.

These people should seek advice about drinking water from their healthcare providers. USEPA/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 at epa.gov/safewater.

Important Definitions

The table (page 5) lists all 2019 detected drinking water contaminants and information about their typical sources. Contaminants below detection limits for reporting are not shown, in accordance with regulatory guidance. SFRWS holds a SWRCB-DDW monitoring waiver for some contaminants in its surface water supply and therefore the associated monitoring frequencies are less than annual. The following are definitions of key terms referring to standards and goals of water quality noted on the data table.

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 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.

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 as is economically and technologically feasible. Secondary MCLs (SMCLs) are set to protect the odor, taste, and appearance of drinking water.

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.

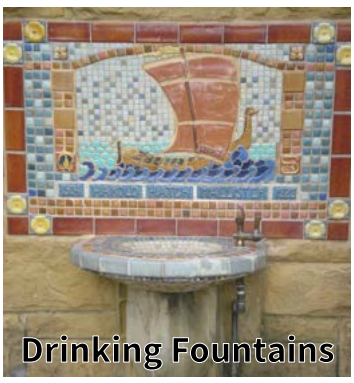
Regulatory Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

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

Turbidity: A water clarity indicator that measures cloudiness of the water, and is also used to indicate the effectiveness of the filtration system. High turbidity can hinder the effectiveness of disinfectants.

Diverse Uses of Campus Domestic Water


Swimming Pools


Drinking Fountains


Laboratories

Stanford University's Annual Water Quality Data for 2019 (1)

DETECTED CONTAMINANTS * SFPUC Samples † Stanford samples

CONSTITUENTS WITH PRIMARY STANDARDS	Unit	MCL	PHG or (MCLG)	Range or Level Found	Average or [Max]	Major Sources in Drinking Water
TURBIDITY						
* Unfiltered Hetch Hetchy Water	NTU	5	N/A	0.3 - 0.7 (2)	[2.1]	Soil runoff
* Filtered Water – Sunol Valley Water Treatment Plant (SVWTP)	NTU	1 (3)	N/A	-	[1]	Soil runoff
	-	Min 95 % of samples ≤ 0.3 NTU (3)	N/A	99.89 - 100%	-	Soil runoff
* Filtered Water – Harry Tracy Water Treatment Plant (HTWTP)	NTU	1 (3)	N/A	-	[0.1]	Soil runoff
	-	Min 95 % of samples ≤ 0.3 NTU (3)	N/A	100%	-	Soil runoff
DISINFECTION BYPRODUCTS AND PRECURSOR						
† Total Trihalomethanes (TTHMs)	ppb	80	N/A	17.2 - 67.1	[44.3] (4)	By-product of drinking water disinfection
† Haloacetic Acids 5 (HAA5)	ppb	60	N/A	10.9 - 59.6	[39.8] (4)	By-product of drinking water disinfection
* Total Organic Carbon (TOC)(5)	ppm	TT	N/A	1.6 - 2.6	2.1	Various natural and man-made sources
MICROBIOLOGICAL						
† Total Coliform	-	NoP ≤ 5% of monthly samples	(0)	-	[0%](6)	Naturally present in the environment
* *Giardia lamblia*	cyst/L	TT	(0)	0 - 0.09	0.02	Naturally present in the environment
INORGANIC CONTAMINANTS						
* Fluoride (source water) (7)	ppm	2.0	1	ND - 0.9	0.3 (8)	Erosion of natural deposits; water additive to promote strong teeth
† Chloramine (as chlorine)	ppm	MRDL = 4.0	MRDLG = 4	0.7 - 3.0	[2.6] (9)	Water disinfectant added for treatment

CONSTITUENTS WITH SECONDARY STANDARDS	Unit	SMCL	PHG	Range	Average	Major Sources of Contaminant
* Aluminium(10)	ppb	200	600	ND - 68	ND	Erosion of natural deposits; some surface water treatment residue
* Chloride	ppm	500	N/A	<3 - 17	8.7	Runoff / leaching from natural deposits
† Color	unit	15	N/A	<5 - 15	-	Naturally occurring organic materials
* Specific Conductance	µS/cm	1600	N/A	32 - 234	158	Substances that form ions when in water
* Sulfate	ppm	500	N/A	1 - 29	15	Runoff / leaching from natural deposits
* Total Dissolved Solids	ppm	1000	N/A	<20 - 119	76	Runoff / leaching from natural deposits
* Turbidity	NTU	5	N/A	ND - 0.5	0.2	Soil runoff

LEAD AND COPPER	Unit	AL	PHG	Range	90th Percentile	Major Sources in Drinking Water
† Copper (30 samples collected)	ppb	1300	300	<50 - 200	70 (11)	Internal corrosion of household water plumbing systems
† Lead (40 samples collected)	ppb	15	0.2	<5 - 8.9	<5 (11)	Internal corrosion of household water plumbing systems

OTHER WATER QUALITY PARAMETERS	Unit	ORL	Range	Average
* Alkalinity (as $CaCO_3$)	ppm	N/A	3.5 - 97	46
* Boron	ppb	1000 (NL)	ND - 107	ND
* Calcium (as Ca)	ppm	N/A	3.3 - 20	12
* Chlorate (12)	ppb	800 (NL)	40 - 220	84
* Chromium (VI) (13)	ppb	N/A	0.04 - 0.19	0.12
* Hardness (as $CaCO_3$)	ppm	N/A	8.9 - 77	47
* Magnesium	ppm	N/A	0.2 - 6.6	4.2
* pH	-	N/A	8.8 - 10.1	9.3
* Potassium	ppm	N/A	0.3 - 1.2	0.8
* Silica	ppm	N/A	4.9 - 8	6.1
* Sodium	ppm	N/A	2.8 - 21	14
* Strontium	ppb	N/A	13 - 230	107

Key:

< / ≤	=	less than / less than equal to
AL	=	Action Level
Max	=	Maximum
Min	=	Minimum
N/A	=	Not Applicable
ND	=	Non-detect
NL	=	Notification Level
NoP	=	Number of Coliform-Positive Samples
NTU	=	Nephelometric Turbidity Unit
ORL	=	Other Regulatory Level
ppb	=	parts per billion
ppm	=	parts per million
µS/cm	=	microSiemens / centimeter

Footnotes:

1. Only detected contaminants shown. All results met State and Federal drinking water health standards.
2. These are monthly average turbidity values measured every 4 hours daily.
3. There is no turbidity MCL for filtered water. The limits are based on the TT requirements for filtration systems.
4. This is the highest locational running annual average (LRAA), which is used to determine compliance.
5. Total organic carbon is a precursor for disinfection by-product formation. The TT requirement applies to the filtered water from the SVWTP only.
6. The highest percentage of positive detections in a given month.
7. In May 2015, the SWRCB recommended an optimal fluoride level of 0.7 ppm be maintained in the treated water. In 2019, the range and average of the fluoride levels were 0.2 ppm - 0.9 ppm and 0.7 ppm, respectively (see Page 6).
8. The natural fluoride level in the Hetch Hetchy supply was ND. Elevated fluoride levels in the SVWTP and HTWTP raw water were attributed to the transfer of fluoridated Hetch Hetchy water into the local reservoirs.
9. This is the highest running annual average value.
10. Aluminium also has a primary MCL of 1,000 ppb.
11. Lead and copper monitoring was conducted in 2018 at 30 homes. Lead monitoring was conducted at 2 public schools. All results were below the lead and copper Action Levels. Lead and copper tap sampling in homes is required again in 2021.
12. The detected chlorate in treated water is a degradation product of sodium hypochlorite used by the SFRWS for water disinfection.
13. Chromium (VI) has a PHG of 0.02 ppb but no MCL. The previous MCL of 10 ppb was withdrawn by the SWRCB-DDW on September 11, 2017. Currently, the SWRCB-DDW regulates all chromium through a MCL of 50 ppb for Total Chromium, which was not detected in our water in 2019.

Additional Information about Water for Residents

Fluoridation and Dental Fluorosis

Mandated by State law, water fluoridation is a widely accepted practice proven to be safe and effective for preventing and controlling tooth decay. The fluoride target level in the water is 0.7 milligram per liter (mg/L, or part per million, ppm), consistent with the May 2015 State regulatory guidance on optimal fluoride level. Infants fed formula mixed with water containing fluoride at this level may still have a chance of developing tiny white lines or streaks in their teeth. These marks are referred to as mild to very mild fluorosis, and are often only visible under a microscope. Even in cases where the marks are visible, they do not pose any health risk. The Centers for Disease Control and Prevention (CDC) considers it safe to use optimally fluoridated water for preparing infant formula. To lessen this chance of dental fluorosis, you may choose to use low-fluoride bottled water to prepare infant formula. Nevertheless, children may still develop dental fluorosis due to fluoride intake from other sources such as food, toothpaste and dental products.

Contact your healthcare provider or SWRCB-DDW if you have concerns about dental fluorosis. For additional information about fluoridation or oral health, visit:

- The SWRCB-DDW website waterboards.ca.gov/drinking_water/certlic/drinkingwater/Fluoridation.html
- Or the CDC website cdc.gov/fluoridation.

Quinoline Monitoring

SFRWS conducted voluntary monitoring for the contaminant quinoline. The monitoring effort was part of SFRWS' assessment to identify if quinoline is a contaminant of concern in its water sources and/or transmission system. The monitoring results confirm that the raw water sources and transmission system have no quinoline detected.

Monitoring of Per- and Polyfluoroalkyl Substances (PFAS)

PFAS is a group of approximately 5,000 man-made chemicals used in a variety of industries and consumer products. These chemicals are very persistent in the environment and human body. SFRWS conducted proactive and voluntary PFAS monitoring of its water sources and transmission system in 2019. The monitoring effort was not under any federal or State order/permit requirements; it was conducted with the objective to identify if SFRWS's water supplies are impacted by PFAS. Using the State's stringent sampling procedures and based on the currently approved/certified method of analysis for 18 PFAS contaminants, results indicated that no PFAS was detected in its water sources and transmission system. Considering USEPA's recent development of a newer method of analysis for additional PFAS contaminants, SFRWS intends to conduct additional monitoring when the new analytical method is available at its contract laboratory. For additional information about PFAS, visit the SWRCB-DDW website waterboards.ca.gov/pfas and/or USEPA website epa.gov/pfas.

Boron Detection Above Notification Level in Source Water

In 2019, boron was detected at a level of 1.49 ppm in the raw water stored in Pond F3 East, one of SFRWS's approved sources in Alameda Watershed. A similar level was also detected in the same pond in 2017. Although the detected value is above the California Notification Level of 1 ppm for source water, the corresponding level in the treated water from the SVWTP was only 0.1 ppm. Boron is an element in nature, and is typically released into air and water when soils and rocks naturally weather.

Unregulated Contaminant Monitoring Rule

Stanford is currently participating in the EPA's fourth Unregulated Contaminant Monitoring Rule (UCMR4). Results will be available after 2021.

Water Conservation for Residents

Conservation is a Stanford Way of Life

California is a drought-prone state that experiences sporadic weather cycles. Conserving water now will make us more resilient to water scarcity in the future and help protect the ecosystems we share our water with. As a reminder, the following water-wasting practices remain prohibited:

1. Allowing irrigation to run off from lawns and landscaping
2. Washing cars with an open-ended hose
3. Washing pavement (except for health and safety needs)
4. Using fountains without a recirculation system
5. Irrigation during and within 48 hours of measurable rainfall

For more information about water conservation, including conservation tips, fact sheets, and rebate details, visit suwater.stanford.edu or call the Water Information Line at (650) 725-8030.

Help Us Detect Leaks

If you see a water leak on campus, please report it to the 24-hour water hotline at (650) 723-2281. Thank you!

Water Conservation Opportunities

DIY Water Wise Indoor Survey Kit

Valley Water has a Do-It-Yourself Indoor Survey Kit to help you test for leaks and discover the flow rates of different fixtures. Contact Erica Kudyba at EKudyba@stanford.edu to get your Kit, or find a digital version at valleywater.org/saving-water/residential. Upon completion, you may qualify for free showerheads, aerators, and toilet flappers.

Water Wise Outdoor Survey

Call Valley Water at (408) 630-2000 or visit valleywater.org/saving-water/residential to schedule a free outdoor water use survey. A professional will evaluate your irrigation system and provide tips.

Landscape Rebates

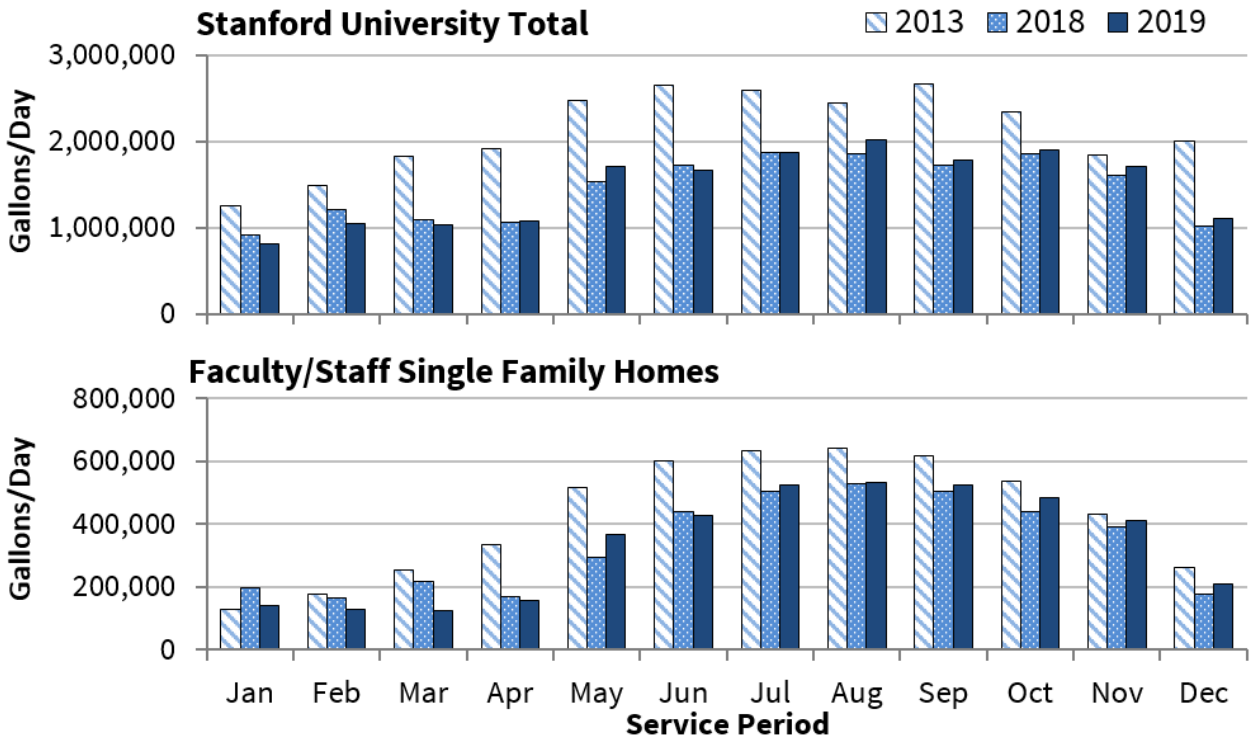
Stanford residents are eligible for up to $2,000 for turf replacement, swimming pool removal, drip irrigation, irrigation equipment upgrades, and rainwater capture. Contact Valley Water before starting your project. Learn more at suwater.stanford.edu/rebates.

Free Landscape Classes

Learn how to maintain a beautiful, water-efficient garden. Free workshops are offered in the Spring and Fall each year, online and at various locations in the Bay Area. Visit bawsca.org/classes to learn more.

2013, 2018, and 2019 Domestic Water Use

The graphs below show SFPUC domestic water use for the entire University and for faculty/staff single family homes. Thank you for continuing to conserve water.



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Visit Our Website!
Visit our website for more information about Stanford's water systems, water conservation programs that are available, and other resources.
suwater.stanford.edu

Contact Information

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

SWRCB - Division of Drinking Water Program Homepage:
waterboards.ca.gov/drinking_water/programs

SFPUC Homepage:
sfwater.org

Stanford Water Resources Homepage:
suwater.stanford.edu

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 sobres el agua que toma. Llame a Stanford University (650) 725-8030 sí necesita ayuda en español.