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2021 Water Quality Report

NASA Ames Research Center, Moffett Field, California

July 2022

Ames Environmental Management Division Fact Sheet

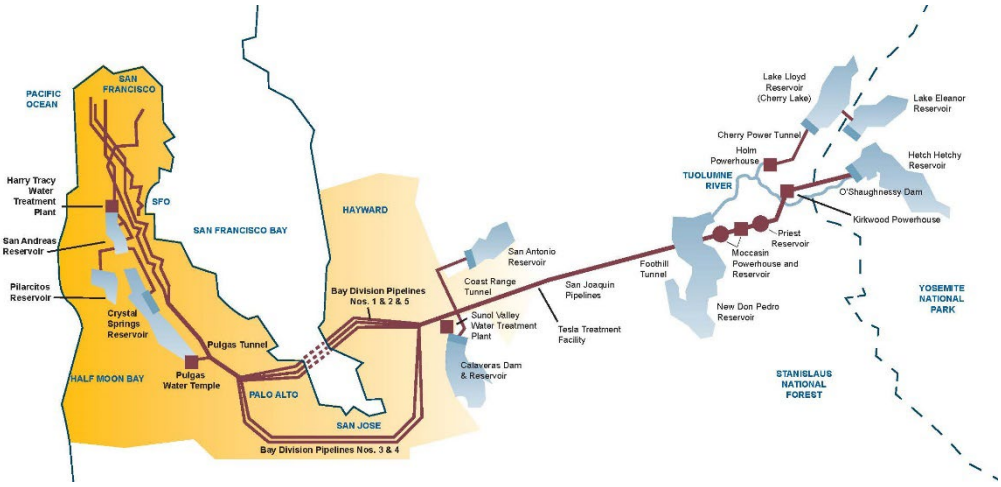
OUR DRINKING WATER QUALITY AND SOURCE

Federal and State law requires that NASA Ames Research Center (NASA Ames) make this report every year by July 1st for the previous calendar year (CY) concerning the sources and quality of the water provided to our customers by our drinking water distribution system.

This report contains important information about your drinking water. Please contact Jaclyn Satira at (650) 604-1800, jaclyn.m.satira@nasa.gov or Brian Kawashima at (650) 604-0296, brian.l.kawashima@nasa.gov for assistance. Este informe contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien. Para la ayuda en español entre en contacto con a Tito Martinez en (650) 604-1523, norberto.martinezmendez@nasa.gov.

For CY 2021, the water provided by the distribution system for NASA Ames (which includes Moffett Field) was monitored and analyzed by both the supplier and NASA Ames in accordance with Federal and State regulations. This report presents the results of those analyses with the details shown in the table on the last page. Most of the data in this table is provided to us by our supplier and the NASA Ames monitoring results are shown in the shaded regions.

Hetch Hetchy Water System Map



Drinking water at NASA Ames is supplied by the San Francisco Regional Water System (SFRWS), which is owned and operated by the San Francisco Public Utilities Commission (SFPUC). Our major drinking water supply consists of surface water and groundwater that are well protected and carefully managed by the SFPUC. These sources are diverse in both the origin and the location with the surface water stored in reservoirs located in the Sierra Nevada, Alameda County, and San Mateo County, and groundwater stored in a deep aquifer located in the northern part of San Mateo County.

To meet drinking water standards for consumption, all surface water supplies including the upcountry non-Hetch Hetchy sources (UNHHS) undergo treatment by the SFRWS before it is delivered. Water from Hetch Hetchy Reservoir is exempt from federal and State filtration requirements but receives the following treatment: disinfection using ultraviolet light and chlorine, 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. Water from local Bay Area reservoirs in Alameda County and UNHHS is delivered to Sunol Valley Water Treatment Plant (SVWTP); whereas water from local reservoirs in San Mateo County is delivered to Harry Tracy Water Treatment Plant (HTWTP). Water treatment at these plants consists of filtration, disinfection, fluoridation, optimum corrosion control, and taste and odor removal.

In 2021, no UNHHS water was used. However, a small amount of groundwater from four wells was added to the SFRWS's surface water supply through blending in the transmission pipelines.

Protecting our Watersheds

SFRWS conducts watershed sanitary surveys for the Hetch Hetchy source annually and for non-Hetch Hetchy surface water sources every five years. The latest sanitary surveys for the non-Hetch Hetchy watersheds were completed in 2021 for the period of 2016-2020. All these surveys together with our stringent watershed protection management activities were completed 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 continue 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.

Water Quality

Together with the SFRWS, samples are collected from reservoirs and designated sampling points throughout the system and tested to ensure the water delivered to you meets or exceeds federal and State drinking water standards. In 2021, the SFRWS conducted more than 48,320 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. To ensure that tap water is safe to drink, the United States Environmental Protection Agency (USEPA) and the SWRCB 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.

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 intelligence quotient (IQ) and attention span and increases in learning and behavior problems. The children of women who are exposed to lead before or during pregnancy can have increased risk of these adverse health effects. Adults can have increased risks of heart disease, high blood pressure, 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 our water distribution system. We are responsible for providing high quality drinking water and removing lead pipes, but we cannot control the variety of materials used in plumbing components in your home. 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 tap water, flush your pipes for several minutes by running your tap, taking a shower, doing laundry or a load of dishes. You can also use a filter certified by an American National Standards Institute accredited certifier to remove lead from drinking water. If you are concerned about lead in the NASA Ames water supply, contact Jaclyn Satira at (650) 604-1800, jaclyn.m.satira@nasa.gov or Brian Kawashima at (650) 604-0269, brian.l.kawashima@nasa.gov. For information about lead in drinking water, testing methods, and steps you can take to minimize exposure is available at **www.epa.gov/safewater/lead**.

Ames conducts lead and copper surveys every three years. The last survey was conducted in 2020. The majority of the water distribution system at the former Naval Air Station Moffett Field or NASA Research Park (NRP) is cast iron pipe (CIP) with lead joints and was constructed in the 1940's and 1950's. Additional portions of the system were added as the site expanded. Tap sampling locations were selected from Tier 2 sample criteria based on Section 64676, Title 22 of California Code of Regulations (CCR §64676). A drinking water service line survey was conducted in 2020 per California Health and Safety code, Section 116885, and no lead service lines were found at NASA Ames.

Lead and Copper Tap Sampling Results

Determination of the level of exceedance for lead and copper was based on CCR §64678. A total of 20 samples were collected and analyzed for exceedance in more than 10 percent of the samples (90th percentile). Based upon the results of the sampling data, Ames did not exceed the action levels for the 90th percentiles for lead or copper. However, two sampling locations were at or above the action level for lead concentration. Both buildings had restricted access at the time of sampling due to the COVID-19 Pandemic, therefore, lack of frequent use was suspected to be the main contributor to the higher lead concentrations at the taps. This suspicion was confirmed when supplementary sampling was conducted and concentrations were found to be lower than the initial test. Furthermore, even lower concentrations were observed after flushing for 2 minutes. As flushing remains to be an effective means of lowering consumer exposure to lead, building occupants will continue to be briefed on the importance of periodically flushing the taps when preceded by long durations of decreased usage. Continued monitoring for lead and copper will take place triennially as required with our next sampling event planned for September 2023.

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 (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 ***www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Fluoridation.shtml***, or the CDC website **www.cdc.gov/fluoridation**.

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 ***www.epa.gov/safewater***.

Monitoring of Per- and Polyfluoroalkyl Substances (PFAS)

PFAS is a group of approximately 5,000 man-made, persistent chemicals used in a variety of industries and consumer products. In 2021, our wholesaler conducted a second round of voluntary monitoring using a newer analytical method adopted by the USEPA for some other PFAS contaminants. No PFAS were detected above the SWRCB's Consumer Confidence Report Detection Levels in surface water and groundwater sources. For additional information about PFAS, you may visit SWRCB website **waterboards.ca.gov/pfas**, SFPUC website **PFAS_factsheet.pdf (sfpuc.org)**, and/or USEPA website **epa.gov/pfas**.

State Revised Total Coliform Rule

This report reflects changes in drinking water regulatory requirements during 2021, in which the SWRCB adopted the California version of the federal Revised Total Coliform Rule. The revised rule, effective on July 1, 2021, maintains the purpose to protect public health by ensuring the integrity of the drinking water distribution system and monitoring for the presence of microbials (i.e., total coliform and *E. coli* bacteria). Greater public health protection is anticipated, as the revised rule requires water systems that are vulnerable to microbial contamination to identify and

fix problems. Water systems that exceed a specified frequency of total coliform occurrences are required to conduct an assessment to determine if any sanitary defects exist. If found, these must be corrected by the water system.

Contaminants and Regulations

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.

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 ***www.epa.gov/safewater***.

Frequently Asked Questions

Why is my water yellow or brown?
The most common reason for discolored water is the plumbing. When water is not circulated regularly (unused over weekends), it can pick up color from the pipes. Distribution mains can also accumulate small amounts of sediment that settles out. When NASA Ames opens hydrants this sediment can become re-suspended. Let the water run a few minutes to clear the discoloration.

Why does my water sometimes look cloudy?
Tiny air bubbles that can cause cloudy water often originates when water is pumped during distribution. The cloudy appearance should clear when the water is allowed to stand for a few minutes.

Why tap vs. bottled?
On February 28, 2005 the bottled water service was canceled since our tap water meets Federal and State health standards. Therefore, the Center cannot expend public funds for bottled water.

What should I consider before buying bottled water?
Consider why you are buying bottled water. Many people choose bottled water because of its taste. One of the key taste differences between tap water and bottled water is based on the disinfection method. Tap water can be disinfected with chlorine, chloramine, ozone, or ultraviolet light. Generally, bottlers prefer ozone because it does not leave a taste. Bottled water is not necessarily safer than tap water and costs hundreds of times more than tap water on a per gallon basis. Consumers who choose to purchase bottled water should carefully read its label to understand what they are buying, whether it is a better taste, or a certain method of treatment.

Drinking tap water is a sustainable choice. Bottled water manufacturing processes use oil, release carbon dioxide emissions, and use fuel for transportation and delivery.

Key Water Quality Terms

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.

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 2021. 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.

NASA Ames Research Center - Water Quality Data for 2021 (1)

The table below lists all 2021 detected drinking water contaminants and the 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.

(Data based on Hetch Hetchy water and effluents from both SVWTP and HTWTP)

NASA Ames Research Center - Water Quality Data for Year 2021 (1)

DETECTED CONTAMINANTS	Unit	MCL/TT	PHG or (MCLG)	Range or Level Found	Average or [Max]	Typical Sources in Drinking Water
TURBIDITY						
Unfiltered Hetch Hetchy Water	NTU	5	N/A	0.2 - 0.4 (2)	[3.3]	Soil runoff
Filtered Water from Sunol Valley Water Treatment Plant (SVWTP)	NTU	1 (3)	N/A	-	[0.4]	Soil runoff
	-	Min 95% of samples	N/A	99.8% - 100%	-	Soil runoff
Filtered Water from Harry Tracy Water Treatment Plant (HTWTP)	NTU	1 (3)	N/A	-	[0.2]	Soil runoff
	-	Min 95% of samples	N/A	100%	-	Soil runoff
DISINFECTION BYPRODUCTS AND PRECURSOR						
Total Trihalomethanes	ppb	80	N/A	29.0 - 56.0	37.9 (4)	Byproduct of drinking water disinfection
Five Haloacetic Acids	ppb	60	N/A	13.7 - 34.4	26.2 (4)	Byproduct of drinking water disinfection
Bromate	ppb	10	0.1	ND - 1.9	[2.1] (5)	Byproduct of drinking water disinfection
Total Organic Carbon (6)	ppm	TT	N/A	1.2 - 2.2	1.8	Various natural and man-made sources
Total Coliform (7)	-	NoP ≤ 5.0% of monthly samples	(0)	ND	[0%]	Naturally present in the environment
Fecal coliform and *E. coli* (8)	-	0 Positive Sample	(0)	ND	[0]	Human or animal fecal waste
Giardia lamblia	cyst/L	TT	(0)	0 - 0.04	0.01	Naturally present in the environment
INORGANICS						
Fluoride (source water) (9)	ppm	2.0	1	ND - 0.8	0.4 (10)	Erosion of natural deposits; water additive to promote strong teeth
Chloramine (as chlorine)	ppm	MRDL = 4.0	MRDLG = 4	0.57 - 2.46	1.74 (5)	Drinking water disinfectant added for treatment

CONSTITUENTS WITH SECONDARY STANDARDS	Unit	SMCL	PHG	Range	Average	Typical Sources in Drinking Water
Chloride	ppm	500	N/A	<3 - 11	6.7	Runoff / leaching from natural deposits
Specific Conductance	µS/cm	1600	N/A	34 - 217	135	Substances that form ions when in water
Sulfate	ppm	500	N/A	1.1 - 29	13	Runoff / leaching from natural deposits
Total Dissolved Solids	ppm	1000	N/A	<20 - 96	52	Runoff / leaching from natural deposits
Turbidity	NTU	5	N/A	ND - 0.2	ND	Soil runoff

LEAD AND COPPER	Unit	AL	PHG	Range	90th Percentile	Typical Sources in Drinking Water
Copper	ppb	1300	300	8.7 - 86 (11)	51	Internal corrosion of household water plumbing systems
Lead	ppb	15	0.2	2.2 - 18 (12)	10	Internal corrosion of household water plumbing systems

NON-REGULATED WATER QUALITY PARAMETERS	Unit	ORL	Range	Average
Alkalinity (as $CaCO_3$)	ppm	N/A	4.5 - 79	37
Boron	ppb	1000 (NL)	ND - 123	ND
Calcium (as Ca)	ppm	N/A	3 - 17	9.5
Chlorate (13)	ppb	800 (NL)	28 - 420	162
Hardness (as $CaCO_3$)	ppm	N/A	7.7 - 60	34
Magnesium	ppm	N/A	<0.2 - 5.5	2.9
pH	-	N/A	8.6 - 9.7	9.2
Phosphate (ortho)	ppm	N/A	<0.3 - 0.3	<0.3
Potassium	ppm	N/A	0.4 - 1.1	0.7
Silica	ppm	N/A	3 - 5.9	4.8
Sodium	ppm	N/A	3.1 - 17	12
Strontium	ppb	N/A	14 - 181	83

KEY:	
< / ≤	= less than / less than or equal to
AL	= Action Level
Max	= Maximum
Min	= Minimum
N/A	= Not Available
ND	= Non-detect
NL	= Notification Level
NoP	= Number of Coliform-Positive Sample
NTU	= Nephelometric Turbidity Unit
ORL	= Other Regulatory Level
pCi/L	= picocurie per liter
ppb	= part per billion
ppm	= part per million
µS/cm	= microSiemens/centimeter

Footnotes:

(1) All results met State and Federal drinking water health standards.

(2) These are monthly average turbidity values measured every 4 hours daily.

(3) This is a TT requirement for filtration systems.

(4) This is the highest locational running annual average value.

(5) This is the highest 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.

(7) Systems collecting < 40 coliform samples monthly should report the highest number (not the percentage) of total coliform positive samples collected in any one month. This MCL was no longer in effect on July 1, 2021.

(8) The MCL was changed to *E. coli* based starting on July 1, 2021 when the State Revised Total Coliform Rule became effective.

(9) The SWRCB recommended an optimal fluoride level of 0.7 ppm be maintained in the treated water. In 2021, the range and average of the fluoride levels were 0.6 ppm - 0.9 ppm and 0.7 ppm, respectively.

(10) Natural fluoride in the Hetch Hetchy source was ND. Elevated fluoride levels in raw water at the SVWTP and HTWTP were attributed to the transfer of fluoridated Hetch Hetchy water into the local reservoirs.

(11) The most recent Lead and Copper Rule monitoring was in 2020. 0 of 20 site samples collected at consumer taps had copper concentrations above the AL.

(12) The most recent Lead and Copper Rule monitoring was in 2020. 2 of 20 site samples collected at consumer taps had lead concentrations above the AL.

(13) The detected chlorate in the treated water is a degradation product of sodium hypochlorite used by the SFRWS for water disinfection.

Note: Additional water quality data may be obtained by calling the NASA Ames Research Center phone number at (650) 604-1800 or (650) 604-0296

Your Views are Welcome

If you have any questions, please let us know. Technical staff investigate drinking water complaints.

Requirements

NASA Ames ensures that a clean, constant supply of drinking water is provided by testing the water, maintaining the distribution systems, and reporting on the water quality.

For Questions about:

Water quality, please contact Jaclyn Satira at (650) 604-1800, jaclyn.m.satira@nasa.gov or Brian Kawashima at (650) 604-0269, brian.l.kawashima@nasa.gov for assistance.

Calidad del agua, contacta a Tito Martinez en (650) 604-1523, norberto.martinezmendez@nasa.gov.

Maintenance, contact the Ames Trouble Desk at (650) 604)-5212.

Health & Safety, contact your representative.

Con alguien que lo entienda bien. 此份水質報告，內有重要資訊。請找他人為你翻譯和解說清楚。

Ames Environmental Management Division
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