

SAN FRANCISCO¹

San Francisco earned a water quality and compliance grade of Poor for 2000 and 2001.

Factors in this grade included the following:

Although San Francisco's source water is generally very well protected, the city had high levels of cancer-causing contaminants called total trihalomethanes, or TTHMs, by-products of the heavy use of chlorine for disinfection of its tap water. San Francisco is one of the few large cities in the United States with TTHM levels still in excess of a new EPA tap water standard that went into effect in January 2002. San Francisco also has potentially dangerous high spikes in the levels of these chemicals in its tap water. The city applied for and received a two-year extension from the EPA for bringing the system into compliance with this standard. The San Francisco Public Utilities Commission (SFPUC) should not have allowed this problem to continue into 2002. The city says it is taking steps to reduce its TTHM levels by 2003, but its "solution," a switch to chloramine disinfection, is a half-measure that will only moderately reduce TTHM levels and will not kill chlorine-resistant microbes. The EPA announced the reduced standard more than eight years ago, in July 1994, after extensive regulatory negotiations resulted in an agreement with the water industry—a process of which San Francisco was well aware.³ The final rule was issued in 1998.⁴ Under NRDC's grading system, any water system that exceeds the new EPA standard for chemicals that cause cancer and potentially cause miscarriage and birth defects can receive a water quality grade no higher than Poor.

In addition, San Francisco's water in 2000 and 2001 raised other concerns:

Cryptosporidium and *Giardia*, waterborne microbes that can present human health concerns, particularly for individuals with weakened immune systems, were found at low levels in San Francisco's *treated* tap water. The presence of these pathogens even at fairly low levels is of some concern. That is particularly the case because the city does not filter its Hetch Hetchy water supply, and this unfiltered water occasionally had spikes in turbidity levels (cloudiness in the water that can indicate the presence of pathogens) of up to 0.76 nephelometric turbidity units (NTU) in 2001. Unfiltered water has a standard of 5 NTU and filtered water a standard of 1 NTU, so while the turbidity of this water supply does not violate EPA standards, it bears continued careful scrutiny. Installation of advanced alternative disinfection to kill chlorine-resistant pathogens like *Crypto* is recommended, and would reduce TTHM levels as well.

Lead levels were found in excess of the EPA health goal. In 2001, lead levels at 4 of 53 tested residences (8 percent) were over the EPA action level. The EPA allows up to 10 percent of tap water to exceed the action level, so the city was not in violation. But San Francisco's lead problem is a concern for children and pregnant women who drink from taps containing excessive lead.



WHAT'S □ ON TAP?

*Grading Drinking
Water in U.S. Cities*

**EARLY RELEASE
CALIFORNIA EDITION**

October 2002

SAN FRANCISCO	
System Population Served	2.4 million ²
Water Quality and Compliance	2000 ► Poor 2001 ► Poor
Right-to-Know Report—Citizenship	2000 ► Fair 2001 ► Fair
Threats to Source Water	2 (1=least threat to 6=highest threat)
REPORT CARD	

San Francisco has an ongoing cross-connection risk because it operates two separate water supply systems: one for potable domestic use and one that contains non-potable water for fire fighting use when the domestic water system is insufficient to meet demand. This could result in contaminated bay water entering the drinking water system, putting customers at risk. While the SFPUC has conducted a study of the problem in response to a state order and tried to identify any cross connections, worries persist about the prospect of contaminated water commingling with drinking water supplies as a result of this highly unusual arrangement.

San Francisco earned a Fair for its 2000 and 2001 right-to-know reports

On the “good citizen” side of the ledger:

- ▶ San Francisco accurately named and described its water sources in its right-to-know report, and described some of the risks to these sources.
- ▶ The 2000 report included information on the risks of lead in water, as well as tips on minimizing risks. Unfortunately, little of this information appeared in the 2001 report.
- ▶ According to the 2000 census, 46 percent of San Franciscans speak languages other than English at home, and 25 percent speak English “less than very well.” Fully 26 percent of the city speaks Asian languages at home, with 16 percent speaking Asian languages but little or no English. An additional 12 percent of the population speaks Spanish at home, with 6 percent speaking Spanish but little or no English. San Francisco included in its reports an EPA- and state-required notice in more than a dozen languages alerting customers that the reports include important information and should be translated, and provided a phone number for additional information in Chinese, Spanish, and Tagalog. Ideally, the city would also have provided a written translation into any language spoken by more than 10 percent of the city population that cannot speak English well. However, the availability of city translators for the three biggest foreign languages on demand was a good second choice to a printed translation.

On the “not-so-good citizen” side of the ledger:

- ▶ The reports included overarching, prominent (first paragraph), and unwarranted claims that the city’s water is “top quality.” This assertion ignored the high TTHM level problem, and undermined the report’s subsequent mandatory, and less prominent, warnings to vulnerable populations, potentially deterring many readers from reading through the full report to reach these warnings.
- ▶ San Francisco minimized the risks posed by *Cryptosporidium* and *Giardia* and failed to provide an adequate warning for vulnerable populations by neglecting to display prominent warnings for immuno-compromised individuals. Despite the high number of people in San Francisco living with HIV/AIDS, a “*Cryptosporidium* and *Giardia* Information” section of the 2001 report noted that these parasites pose special risks to “some people” but never mentioned the special threats to immuno-compromised people or people living with HIV/AIDS. This section was not highlighted in either the 2000 or 2001 report. The 2001 report directly violated the EPA regulations for these reports by failing to include the required, explicit warning to immuno-compromised people about the hazards of infection from tap water.⁵ The 2000 report did include this information.

- ▶ The reports did not discuss how the city treats drinking water provided to the public.
- ▶ The reports buried in a footnote the information that 4 of 53 tested homes had registered lead readings that exceeded the EPA action level.
- ▶ The reports included neither a map nor any detailed narrative noting any specific polluters in its watersheds. EPA and California rules require utilities to name any known or likely sources of any specific regulated contaminant found in tap water.⁶
- ▶ The reports did not provide information on the health effects of some contaminants found at levels below EPA standards, but above EPA health goals. Although not legally required, this information would have assisted local citizens in protecting their health and fighting for better protection of their water.

SFPUC Says \$3.6 Billion Needed to Restore, Upgrade San Francisco Water System

The San Francisco Public Utilities Commission (SFPUC) approved a long-term capital improvement program in May 2002 with a total cost of \$3.6 billion dollars.

The SFPUC said that the improvements are needed because:

- ▶ Many of the pipes and system components were built in the late 1800s or early 1900s and are decrepit and vulnerable to failure, deterioration, and contamination.⁷ For example, state engineers believe the Calaveras Dam near San Jose is unstable, and would be particularly threatened during seismic activity. It is situated a quarter mile from a fault.⁸
- ▶ Better treatment is needed to improve water quality.⁹
- ▶ Fully 85 percent of the city's water is transported from the Sierra Nevada to San Francisco via 160 miles of tunnels and pipelines. Along the way, the water crosses or runs adjacent to three earthquake faults—the Hayward, Calaveras, and San Andreas faults. SFPUC says a major earthquake could cut off water for 60 days, and yet the city has no backup facilities to provide water in the event that the existing tunnels and pipelines are rendered inoperable by an earthquake.¹⁰
- ▶ Water demand is projected to increase substantially over the next 30 years, necessitating additional improvements, according to the SFPUC.¹¹ Some experts are concerned, however, that major increases in water supply could trigger environmental harm from sprawl.

Of the total projected cost of \$3.6 billion, \$2.9 billion would be spent rehabilitating the regional water system.¹² The SFPUC says its 1.6 million customers outside of San Francisco would pay 70 percent of that \$2.9 billion, while city and county customers would pay the remaining 30 percent. San Francisco users would also pay \$715 million for rehabilitating and improving the water system within the city and county of San Francisco. The SFPUC estimates that water bills in the city would gradually increase to as much as \$1 more per day between now and 2015, bringing the average bill to \$41 per month from the current \$14 per month.^{13,14}

The capital improvement proposal has triggered significant controversy, exacerbated by recent assertions by the *San Francisco Chronicle* that San Francisco “looted the region's water system, and diverted millions into city coffers.”¹⁵ The *Chronicle* reported that since 1979, city officials have diverted \$670 million from the Hetch Hetchy system into the city's general fund, instead of paying for repairs to the

system.¹⁶ To pay for the upgrades, San Francisco voters are being asked to approve Proposition A, a \$1.6 billion bond to pay for the city's share of the system upgrades. In addition, suburban voters are asked to pay higher rates. Suburban bills have increased from an average of \$32 per month to \$71 per month to pay for newer water systems still being paid off.¹⁷ While many civic leaders are supporting Proposition A, a coalition of landlords, real estate interests, hotels, and some environmental groups is opposing it.¹⁸

Environmental groups have split on the issue. The San Francisco League of Conservation Voters and the Green Party support Proposition A, saying the upgrades and investment are needed. However, the Sierra Club, Restore Hetch Hetchy, NRDC, and some other groups argue against it. The environmental opponents say they support funding replacement of aging pipes in the Hetch Hetchy system, but want a study of whether the O'Shaughnessy Dam at Hetch Hetchy can be torn down and returned to its natural state, and want more emphasis on water conservation, before a major multibillion-dollar decision is made on what to do next with the Hetch Hetchy system.¹⁹ They also are concerned about the potential for sprawl to be catalogued by major new infusions of water supply.

This fight has also triggered legislation to subject the SFPUC to more rigorous oversight by the state, and by suburban users of the Hetch Hetchy system (AB1823, Lou Papan, D-Millbrae). Other state legislation would create a regional financing authority to issue \$2 billion in bonds to pay for suburban customers' share of the upgrades (SB1870, Jackie Speier, D-Hillsborough), and would create a Bay Area-wide water agency to tackle water conservation and water issues on a regional basis (AB2058, Lou Papan, D-Millbrae).²⁰

San Francisco earned a "Threats to Source Water" rating of 2 on a scale of 1 (least threat) to 6 (highest threat).

Eighty-five percent of San Francisco's drinking water comes from the Hetch Hetchy watershed, an area located in Yosemite National Park yielding generally very well protected, high-quality water. The remaining 15 percent of San Francisco's total water supply is provided by the Alameda and Peninsula watersheds, which capture rain, local runoff, and a small amount of groundwater. Water from the Alameda and Peninsula water sources is also fairly well protected, but it faces potential threats from the presence of grazing animals and from human recreational activity, and potential problems from runoff and from possible future development of non-PUC parcels of land in the watershed.²¹ As discussed in detail in the source water section below, the overall grade for San Francisco's source water is therefore a 2 on the ranking scale ranging from 1 (least threat) to 6 (highest threat).

KEY CONTAMINANTS FOUND ABOVE NATIONAL HEALTH GOALS

The following contaminants are found in San Francisco's drinking water. For more information on their properties and health effects, see Chapter 2, "Health Concerns for Common Tap Water Contaminants."

MICROBIOLOGICAL CONTAMINANTS**Total Coliform Bacteria**

Levels found 1999 2.9% maximum 0.7% average²²

Levels found 2000 1.3% maximum 0.3% average²³

Levels found 2001 0.3% maximum 0.1% average²⁴

National Standard: 5% in highest month²⁵

National Health Goal: 0%—there is no known, fully safe level of coliform bacteria

Total coliform bacteria are a microbial contaminant whose presence is a potential indicator that disease-causing organisms may be present in tap water. Coliform bacteria have been found in San Francisco's water. The highest reported level in any month per year in San Francisco was 2.9 percent of the samples in 1999, 1.3 percent in 2000, and 0.3 percent in 2001. The federal standard allows up to 5 percent coliform-positive samples per month, so the coliform bacteria finding in San Francisco is not viewed as a serious health threat to healthy consumers, although it may indicate some regrowth of bacteria is occurring in the city's water mains.

Two microscopic pathogens, *Cryptosporidium* and *Giardia*, have been found at low levels in San Francisco's source water, as well as in its finished, treated water.²⁶ *Cryptosporidium* (*Crypto*) is a waterborne microbial parasite that presents human health concerns, especially to immuno-compromised individuals. *Giardia* is another common microscopic protozoan parasite that can cause disease in humans, and is a particular concern for immuno-compromised people. It has caused waterborne disease in the United States, but is somewhat more vulnerable to chlorine than *Crypto*. As with *Crypto*, well-calibrated filtration can reduce its levels in treated tap water.

Turbidity (Cloudiness)

Levels Found 2000 (in Nephelometric Turbidity Units, or NTU)

Hetch Hetchy Water (Tesia Portal) 0.3 average 0.64 maximum

Harry Tracy Water Treatment Plant 0.1 average 0.29 maximum

Sunol Valley Water Treatment Plant 0.1 average 0.1 maximum

Levels Found 2001 (in Nephelometric Turbidity Units, or NTU)

Hetch Hetchy Water (Tesia Portal) 0.3 average 0.76 maximum

Harry Tracy Water Treatment Plant 0.2 average 0.23 maximum

Sunol Valley Water Treatment Plant 0.1 average 0.16 maximum

National Standard (TT)

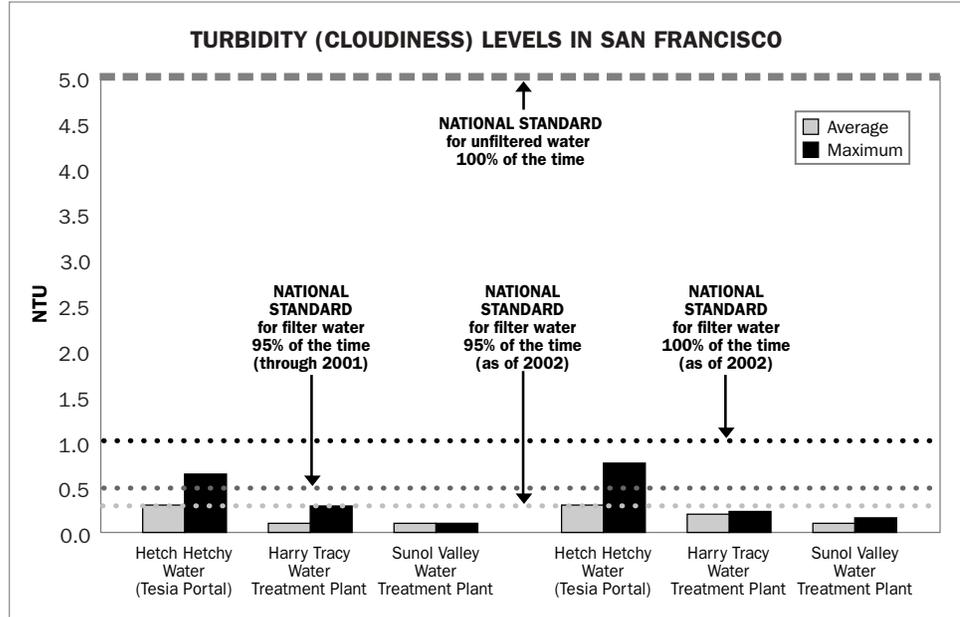
Filtered water 0.5 NTU, 95% of the time (through 2001)

0.3 NTU, 95% of the time (as of 2002)

1 NTU, 100% of the time (as of 2002)

Unfiltered water 5 NTU maximum, 100% of time

Turbidity is a measure of the cloudiness of water, and is used as an indicator that water may be contaminated with *Cryptosporidium* or other pathogens. In addition, turbidity can interfere with disinfection of the water, because it can impede the effectiveness of chlorine or other chemical disinfectants. San Francisco apparently did not violate the standards for turbidity, but did approach the new standard of



0.3 Nephelometric Turbidity Units in its filtered water occasionally, and had periodic spikes in its unfiltered water from Hetch Hetchy.

ORGANIC CONTAMINANTS

Total Trihalomethanes

Levels Found 1999²⁷	75 ppb average	107 ppb maximum
Levels Found 2000²⁸	84 ppb average (exceeds standard)	145 ppb maximum
Levels Found 2001²⁹	82 ppb average (exceeds standard)	99 ppb maximum

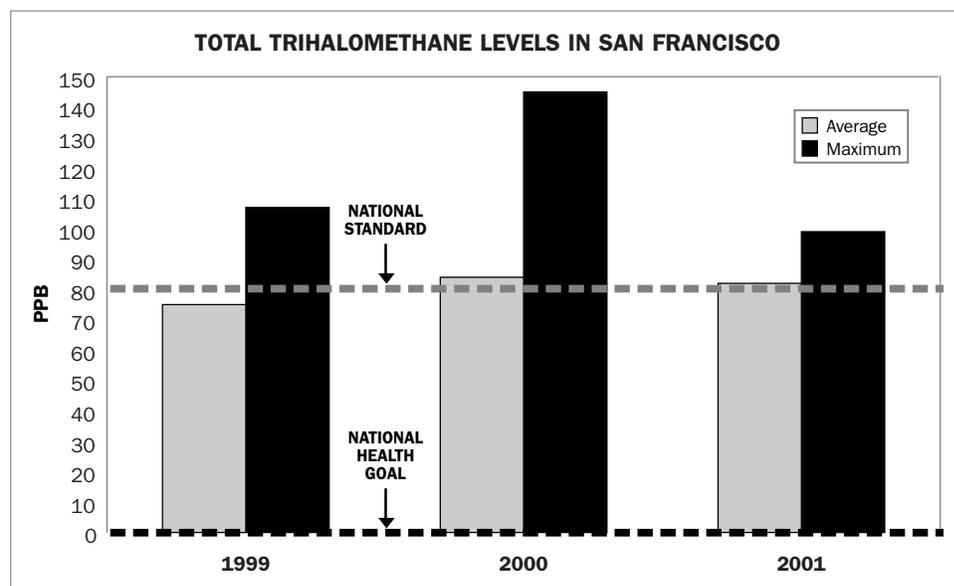
San Francisco reports that it applied for and received a two-year extension of the January 1, 2002 deadline for compliance with the 80 ppb standard for total trihalomethanes. See SFPUC 2001 Water Quality Report, available online at http://sfwater.org/detail.cfm/MC_ID/10/MSC_ID/51/MTO_ID/NULL/C_ID/718/.

National Standard (MCL): 80 ppb (average) (effective 2002) (100 ppb effective through 2001)

National Health Goal (MCLG): 0 ppb—there is no known fully safe level of trihalomethanes.

Total trihalomethanes (TTHMs) consist of a sum of the levels of four closely related chemicals—chloroform, dibromochloromethane, bromoform, and bromdichloromethane—which occur together at varying ratios when water is chlorinated. The latter two TTHMs have health goals of zero. The EPA promulgated and then withdrew (after a court decision) a zero health goal for chloroform, and has not yet issued a new goal for chloroform. Dibromochloromethane has a health goal of 60 ppb. Since water systems generally report only the combined TTHM level, and since it is essentially chemically impossible to create one trihalomethane in tap water without some level of the others, we list the health goal for TTHMs as zero.

Total trihalomethanes³⁰ (TTHMs) are chemical contaminants that result when chlorine used to treat drinking water interacts with organic matter in the water. Many



studies show that these chemicals are linked with cancer, and the EPA has classified some TTHMs as probable human carcinogens. Recent preliminary studies also link TTHMs to miscarriages and birth defects.

The high average TTHM levels in San Francisco tap water pose a cancer concern, and the spike levels reaching as high as 145 parts per billion in 2000 pose a miscarriage and birth defect concern. Because spikes found in San Francisco were similar to those found to pose a risk, and because levels in San Francisco averaged 82 parts-per-billion, women in the first three months of pregnancy should exercise caution.

San Francisco has obtained a two-year extension for complying with the new 80 parts-per-billion EPA standard. It is unfortunate and troubling that the San Francisco Public Utilities commission (SFPUC) allowed this problem to continue into 2002. The EPA announced the reduced standard in 1994 in the *Federal Register* after extensive regulatory negotiations with the water industry. SFPUC was well aware of the negotiations and the final rule, and in fact had a representative at many of the negotiating meetings.³¹ The final rule was issued in 1998, and SFPUC had plenty of warning to get a solution in place before that rule was issued.³² SFPUC's quick-fix solution is to install a system-wide conversion from chlorine to chloramines as a drinking water disinfectant to reduce the formation of disinfection by-products. The target date to complete the conversion to chloramine is in the summer of 2003.

Unfortunately, this solution is short-sighted and temporary. Chloramines will only modestly reduce TTHM levels, and they do essentially nothing to reduce *Crypto* risks. As discussed further below, SFPUC should instead forge ahead with significant improvements in treatment by following the lead of other cities that use unfiltered water, such as Seattle, and installing an alternative primary disinfectant of ultraviolet light or ozone (with chloramines as a secondary disinfectant only). This switch to alternative disinfectants would more substantially reduce TTHMs and other dis-

infection by-products, and would improve the kill rate of *Crypto* and other chlorine- and chloramine-resistant pathogens in San Francisco’s water.

Haloacetic Acids

Levels Found 2001 17 ppb average 29 ppb maximum

National Standard (MCL): 60 ppb (average) (effective 2002; no previous standard)

National Health Goal (MCLG): 0 ppb—there is no known fully safe level of haloacetic acids

Some of the haloacetic acids have national health goals of 0 and others have non-zero goals. For the sake of simplicity and understandability, since there is a single haloacetic acid standard, and because it is essentially chemically impossible under normal conditions in tap water to create one regulated haloacetic acid without creating the others at some level, we have listed the national health goal as 0.

Haloacetic acids, like TTHMs, are by-products of chlorine disinfection. People exposed to haloacetic acids in drinking water over the long-term may be at risk of developing cancer.³³

INORGANIC CONTAMINANTS

Lead

Levels Found 1999

2 to 160 ppb range; 4 ppb at 90th percentile³⁴

3 of 102 residences were over the action level at consumer taps

Levels Found 2000

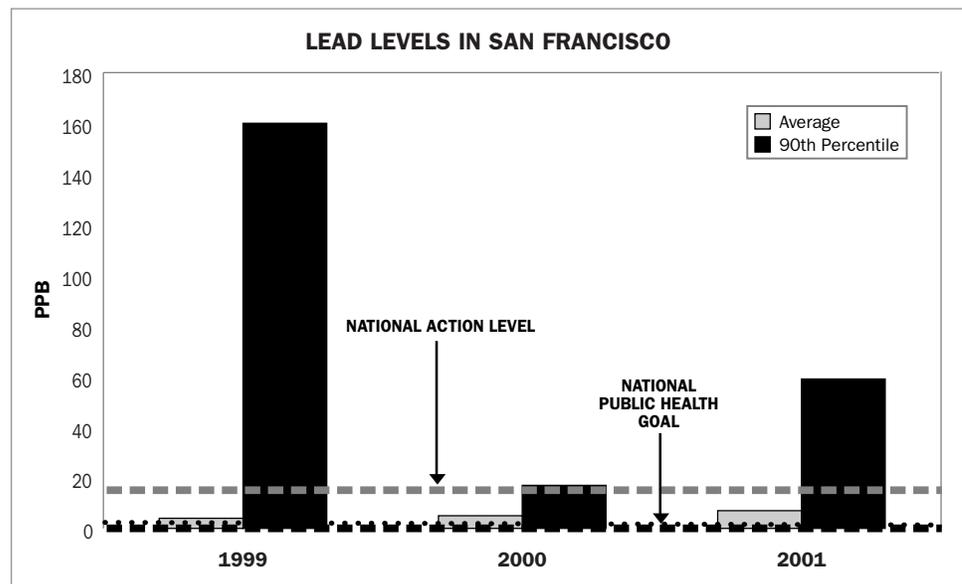
2 to 17 ppb range, 5 ppb at 90th percentile³⁵

1 of 53 residences was over the action level at consumer taps

Levels Found 2001

2 to 59 ppb range, 7 ppb at 90th percentile³⁶

4 of 53 residences were over the action level at consumer taps



National Standard (TT): 15 ppb (action level)

The action level standard for lead is different than the standard for most other contaminants. Water utilities are required to take many samples of lead in the tap water distribution system. If the amount of lead detected in the samples is more than 15 ppb at the 90th percentile (which means that 90 percent of the samples have 15 ppb or less), then the amount is said to exceed the action level. Under the complex EPA lead rule, a water system that exceeds the action level is not necessarily in violation. If a system exceeds the action level, additional measures such as chemical treatment to reduce the water's corrosivity (ability to corrode pipes and thus its ability to leach lead from pipes) must be taken. If this chemical treatment does not work, the water system may have to replace lead portions of its distribution system if they are still contributing to the lead problem.

National Health Goal (MCLG): 0 ppb—there is no known, fully safe level of lead

Lead is a major environmental threat; no amount is considered safe.³⁷ Infants, young children, and fetuses are particularly susceptible to the adverse health effects of lead. Lead in San Francisco's water is cause for concern. The EPA's lead rule allows 10 percent of homes tested to exceed 15 parts per billion. In 2001, about 8 percent of the city's tested taps exceeded the action level—just shy of a violation of the rule.

PROTECTING SAN FRANCISCO'S DRINKING WATER

Following are approaches to treating San Francisco's drinking water, as well as a discussion of threats to source water. Also included in this section is information on how individuals can protect drinking water.

TREATMENT OPTIONS AVAILABLE FOR CONTAMINANTS OF GREATEST CONCERN

NRDC offers the following recommendations to the San Francisco Public Utilities commission:

Treatment to Reduce Disinfection By-products (Trihalomethanes and Haloacetic Acids).

San Francisco's disinfection by-product levels are very high compared to most large U.S. cities. SFPUC is now converting system-wide from free chlorine to chloramines as the primary drinking water disinfectant. Chloramine treatment involves the addition of chlorine and ammonia, and will reduce the formation of disinfection by-products somewhat. While a useful interim step, chloramines are not a long-term solution, because they:

- ▶ only modestly reduce trihalomethanes and haloacetic acids;
- ▶ fail to kill such chlorine-resistant pathogens as *Cryptosporidium*; and
- ▶ create N-Nitrosodimethylamine (NDMA), a likely carcinogen.³⁸

San Francisco should further reduce its levels of disinfection by-products by using enhanced coagulation and activated carbon at its existing treatment plants, and by following the lead of other large unfiltered water systems, including Seattle's, by switching to an alternative primary disinfectant such as ozone or ultraviolet light for Hetch Hetchy and other water. Chloramines can continue to be used as a secondary disinfectant in the pipes after the water leaves the treatment plant. These alternative

disinfectants, particularly ultraviolet light, produce fewer disinfection by-products and, as discussed below, are more effective at killing *Crypto* than is chlorine.

Cross-Connection Issues. San Francisco must also do everything it can to find and remedy any cross-connection problems. San Francisco has two separate water supply systems, one for potable domestic use and one strictly for fire-fighting, the Auxiliary Water Supply System (AWSS). The AWSS contains non-potable, high-pressure water designed for use when the domestic water system is insufficient. In 1999 the SFPUC began a program to ensure that water supply lines had not been inadvertently connected to the AWSS. In response to a state order, SFPUC completed in 2000 a review of thousands of domestic service connections near AWSS mains, verifying that they were not connected to the AWSS. So, while progress has been made, the concern continues. Currently the SFPUC sends a representative to every 2-alarm (or more) fire to assure that no cross-connection problems arise. SFPUC needs a detailed engineering and action plan to resolve this issue permanently.

***Cryptosporidium* and *Giardia*.** San Francisco should do all it can to eliminate *Cryptosporidium* and *Giardia* in its source and finished drinking water. The Hetch Hetchy water supply, which provides about 85 percent of the city's water, is unfiltered. This means that watershed protection and chemical disinfection are the only barriers to waterborne disease in San Francisco. But the city's current and future disinfection method—chlorine and chloramines—are ineffective at killing *Crypto*. In addition, because the water is unfiltered, it can carry more turbidity and organic matter than many filtered water supplies, with potential impacts on the effectiveness of any form of chemical disinfection.

SFPUC must be vigilant about preventing *Crypto* and other pathogens from getting into both Hetch Hetchy and the Alameda and Peninsula sources. Regarding development and recreational activity that may threaten water quality, aggressive prevention is warranted. To avoid contamination of the water supply by cattle and from stables and other human or animal waste, a complete ban on grazing in the watershed or the strictest possible measures are warranted.

The SFPUC is now evaluating its filtration practices at the Harry Tracy and Sunol Water Treatment Plants, with an eye toward optimizing particulate removal. Ultraviolet light disinfection or ozone, perhaps in combination with granular activated carbon (GAC), would offer a measure of additional assurance that *Crypto* and *Giardia* pose no risk to San Francisco. These treatment technologies not only reduce or virtually eliminate many of the riskiest disinfection byproducts, but they are far more effective at killing these and certain other resistant parasites than is chlorine, the disinfectant currently used by San Francisco, or chloramines, the future disinfectant for the city.

The San Francisco Public Utilities Commission reports that its initial studies, however, have shown that the required ozone dose for deactivating *Cryptosporidium* in Hetch Hetchy would "require a much longer reaction time than is conventionally used for ozonation, running the risk of stimulating the growth of opportunistic

bacteria in plumbing.”³⁹ This potential problem with organic matter being made available, due to ozonation creating “food” for bacteria in the pipes likely could be resolved by using biologically active GAC filters. (The reason that “much longer” than usual ozone reaction time would be necessary has not been publicly reported, but may suggest ultraviolet light is preferable). In the interim, the RTK report must make it clear that these microbial contaminants can cause serious health risks to persons with compromised immune systems, and that elevated levels of disinfection by-products pose both a cancer risk and a potential risk to pregnant women and their babies.

Lead. San Francisco has many homes whose tap water contains more lead than is desirable, particularly for infants, children under six years old, and pregnant women. The city should evaluate whether additional corrosion control measures may be able to reduce lead levels at the tap.

In addition, the SFPUC should mount a campaign to advise parents and pregnant women to flush their faucets if they have not been used for a few hours (e.g., overnight or when returning home from work) before using water for drinking, cooking, or making baby bottles. Flushing is easy: the customer just runs the water for about 30 seconds to a minute, until the water temperature changes noticeably; this will reduce the lead levels from water that has been sitting in the faucet or pipes that are leaching lead. That first 30 seconds of water flow could be used for watering plants or other household uses. Parents should also consider having their household water tested by a certified lab—generally a \$15–\$25 expense. To find a state-certified lab to test household water, consumers can check the state’s website list of labs at www.dhs.ca.gov/ps/ls/elap/Elapindex.htm.

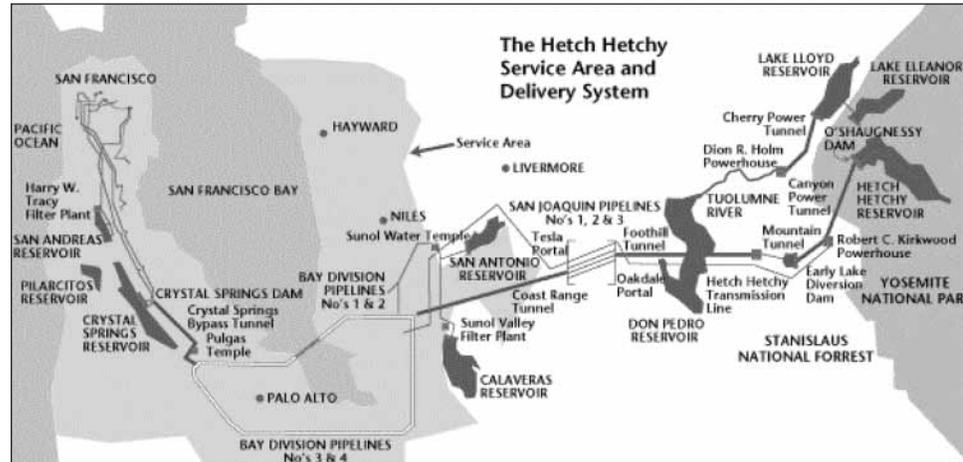
CURRENT AND FUTURE THREATS TO SOURCE WATER

The San Francisco Public Utilities Commission (SFPUC) completed its source-water pollution assessment in 2000. Levels of contaminants have generally been very low in the watersheds, but they are vulnerable to contaminants associated with wildlife and human recreational activity. In addition, the Alameda County system may be vulnerable to contaminants from grazing animals and possible future development of non-PUC owned land. Because people and their activities are a major potential source of water contamination, the SFPUC has an intensive management program to limit human access.

Eighty-five percent of San Francisco’s drinking water comes from the Hetch Hetchy watershed, an area located in Yosemite National Park that captures water inflows from the watershed in the Hetch Hetchy Reservoir and snowmelt runoff from the Tuolumne River. As the report indicates, the water in the Hetch Hetchy Reservoir is of high quality. According to the EPA’s Index of Watershed Indicators (IWI), the Upper Tuolumne River, which feeds the Hetch Hetchy reservoir, scored a 3 out of 6 (1 is least threatened; 6 is most threatened). In the EPA’s words, “The overall IWI score . . . describes the health of the aquatic resources for this watershed. A score of 3 indicates Less Serious Water Quality Problems—Low Vulnerability to stressors such as pollutant loadings.”⁴⁰

Figure 2
San Francisco's Hetch Hetchy Service Area and Delivery System

Source: S.F. Public Utilities Commission, 2002



However, NRDC's review of the most recent available information on the Hetch Hetchy area's watershed in the EPA Envirofacts database, and our review of SFPUC, USGS, and other information on the area immediately around and upstream from the reservoir, leads us to rank the Hetch Hetchy as a 2 on the 1-6 scale, using EPA's IWI criteria (high water quality, relatively low vulnerability). Currently, the water is of generally good quality, but it is vulnerable to recreational activities and wildlife in the watershed. The Hetch Hetchy is in Yosemite National Park and abuts Stanislaus National Forest, a largely inaccessible area with little development. However, some recreational activity takes place in the area (at reservoirs and in watersheds, camping areas, septic tanks, and stables, for example), and some turbidity, sediment, and pathogens such as *Cryptosporidium* and *Giardia* have been found in the raw water from the Hetch Hetchy.⁴¹

The remaining 15 percent of the total water supply is provided by the Alameda and Peninsula watersheds, which capture rain, local runoff, and a small amount of groundwater. The watersheds feeding into the city's reservoirs from Alameda, Santa Clara, and San Mateo counties and the Peninsula are largely SFPUC-owned and managed to protect the city's water, and most of the watershed has very limited public access. However, it could be contaminated by organic material or microbial contaminants from agricultural livestock operations (some cattle are permitted to graze in parts of the watershed), from recreational activity, from runoff from spills along highways crossing the watershed, and from wildlife. In addition, some parcels of land in the watersheds which are not owned and protected by the SFPUC could be developed in the future, posing a potential threat to water quality if not well controlled. In sum, while water from the Alameda and Peninsula water sources are treated and filtered and are generally of good quality, they do face moderate potential threats from the presence of grazing animals, human recreational activity, and runoff.⁴²

The SFPUC has outlined a source water protection program that limits access to vulnerable areas and imposes Best Management Practices for livestock grazing and controls for other potential pollution sources. For example, about five years ago, the SFPUC developed Best Management Practices for cattle operations in the Alameda watershed to prevent waterborne pathogens from cattle from getting into city water

supplies. The SFPUC reports that the effort has been fairly successful.⁴³ The source water assessment and initial suggestions for a protection plan are available from the SFPUC by calling (877) 737-8297.

HOW INDIVIDUALS CAN PROTECT SOURCE WATER

You can take steps to protect San Francisco's drinking water by protecting its sources.

Reduce the amount of water you use. Plant drought-resistant plants or "xeriscape" (use plants that need little or no watering), use low-flow shower-heads, shorten your shower time, don't spray down your driveway to clean it, minimize the number of times (and how long) you water your lawn. Consider installing low-flush toilets. If you install one and check in with SFPUC first, you can get a \$50 rebate, and you'll save about \$90 per year in water bills. Also consider buying a front-loading washer—again, if you check with SFPUC first, you can get a \$75 rebate for installing one of these water-efficient washers.

For more tips on water conservation, see:

- ▶ SFPUC's brochure, *SF's Water Is Too Good to Waste*, (call phone number above)
- ▶ www.nrdc.org/greengate/guides/water.asp
- ▶ www.monolake.org
- ▶ www.mwdh2o.com/mwdh2o/pages/conserv/save/tentips/tentips01.html

Apply for the rate break San Francisco offers customers who certify that they have installed low-flow shower heads, faucet aerators, and have low-flush toilets (or have taken simple steps to reduce the amount of water used per flush in their standard toilet). For details on these San Francisco water conservation rebates and rate-break programs, see www.sfwater.org or call SFPUC at (415) 923-2676.

Avoid using pesticides in the home or yard, or storing pesticides in the home. Consumer pesticide use in the home leads to runoff into water resources.

Buy organic foods, if possible. Purchasing organically grown food helps prevent the drinking water source contamination from pesticide and herbicide runoff that results from conventional agricultural practices.

SAN FRANCISCO WATER UTILITY INFORMATION⁴⁴

San Francisco Public Utilities Commission
SFPUC Customer Service Bureau
425 Mason Street
San Francisco, CA 94102
Toll-Free Number: (877) 737-8297
<http://sfwater.org>

Attend meetings of the San Francisco Public Utilities Commission. The SFPUC meets twice a month on the second and fourth Tuesday at 1:30 P.M. Meetings are held at City Hall, Room 400. Inquiries about these meetings can be made by calling the Office of the Commission Secretary at (415) 554-3165.

Learn more from these groups:

- ▶ Clean Water Action, www.cleanwater.org
- ▶ NRDC, www.nrdc.org
- ▶ Waterkeepers, www.waterkeepers.org
- ▶ CALPIRG, www.calpirg.org
- ▶ Tuolumne River Preservation Trust, www.tuolumne.org
- ▶ Restore Hetch Hetchy (Walnut Creek), www.hetchhetchy.org
- ▶ Clean Water Network, www.cwn.org.

NOTES

1 Peer Reviewers of the San Francisco report included Gina Solomon and David Beckman, NRDC, and Marguerite Young, California Clean Water Action.

2 The San Francisco Public Utilities Commission serves 2.4 million people in the Bay Area, including 1.6 million customers in Santa Clara, San Mateo, and Alameda Counties, and 790,000 in the City of San Francisco (see service area map later in this report for areas served). San Francisco Public Utilities Commission, www.sfwater.org (last visited September 20, 2002).

3 See EPA Proposed Stage I Disinfection Byproducts Rule, 59 Fed. Reg. 38668 (July 29, 1994).

4 See EPA Final Stage I Disinfection Byproducts Rule, 63 Fed. Reg. 69389 (December 16, 1998).

5 See 40 C.F.R. § 141.154(a): “(a) All reports must prominently display the following language: 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. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).”

6 See EPA regulations at 40 C.F.R. § 141.153(d)(4)(ix), which provide that the RTK report must include “the likely source(s) of detected contaminants to the best of the operator’s knowledge. Specific information about the contaminants may be available in sanitary surveys and source water assessments, and should be used when available to the operator.” While EPA allows reliance upon general lists of potential sources where the water system is not aware of the specific source of pollution, where the water system *is* aware of the pollution source, the rules require that polluter to be identified.

7 SFPUC, “Fact Sheet: Proposal to Rebuild San Francisco’s Water System,” August 2002, available online at www.sfwater.org/detail.cfm/MSID/6/MTO_ID/NULL/MCID/7/CID/543/holdSession/1.

8 Susan Sward, Chuck Finnie, “S.F. Looted Region’s Water System, Diverted Millions into City Coffers: Now \$3.6 Billion Sought to Repair and Expand Aging Hetch Hetchy,” *San Francisco Chronicle*, September 15, 2002.

9 See note 7.

10 Ibid.

11 Ibid.

12 Ibid.

13 Ibid.

14 Ibid.

15 Ibid.

16 Ibid.

17 Ibid.

18 Chuck Finnie, Susan Sward, “Foes Vow to Sink SF Water Measure: Unlikely Coalition Opposes \$3.6 Billion Hetch Hetchy Upgrade,” *San Francisco Chronicle*, September 17, 2002.

19 See *ibid.*; see also Restore Hetch Hetchy website at www.hetchhetchy.org.

20 Chuck Finnie, Susan Sward, "Brown Depserately Tries to Head Off State Role in Hetch Hetchy Revamp, But Davis Expected to Sign 3 Bills that Would Pacify Frustrated Suburban Customers," San Francisco Chronicle, September 20, 2002.

21 See SFPUC Water Quality Report 2000, June 2001, available online at www.sfwater.org/detail.cfm/C_ID/296; SFPUC, *Cryptosporidium 2*, available online at www.sfwater.org/detail.cfm/MC_ID/10/MS_C_ID/51/MTO_ID/NULL/C_ID/445; see also SFPUC Watershed Sanitary Survey, available upon request from SFPUC: call 877-737-8297. See also EPA EnviroMapper (showing water pollution sources near Alameda and Peninsula water sources) at <http://map2.epa.gov/enviromapper/>. For example, to see sources near the Crystal Springs Reservoir, see: http://map2.epa.gov/scripts/.esrimap?name=iwi2&threshold=0.3&zoomFactor=2&layersCode=1111110000001001011&IWIColor=0&queryCode=16&fipsCode=18040009&IndexMap=on&cursorX=136&cursorY=102&Cmd=Pan&CmdOld=Identify&Left=-122.418425166417&Bottom=37.4748421282691&Right=-122.301237666417&Top=37.5627327532691&layer_0=0&layer_1=1&layer_2=2&layer_3=3&layer_4=4&layer_5=5&layer_13=13&layer_Query=16&layer_16=16&layer_18=18&layer_19=19&zoomInScalar=2.0&zoomRadius=0.0&LocationMap=on&zoomOutScalar=2.0&mapOption=Pan&click.x=323&click.y=172.

22 San Francisco Public Utilities Commission, 2000 Water Quality Report, pg. 2 (June 2000) (last visited March 22, 2002).

23 San Francisco Public Utilities Commission, 2000 Water Quality Report, pg. 2 (June 2001), available online at www.sfwater.org/detail.cfm/C_ID/296 (last visited March 22, 2002).

24 San Francisco Public Utilities Commission, 2001 Water Quality Report, pg. 2 (April 2002), available online at http://sfwater.org/detail.cfm/MC_ID/10/MS_C_ID/51/MTO_ID/NULL/C_ID/718/ (last visited April 23, 2002).

25 Note that the contaminant levels are presented as a percentage. Total coliform is regulated as a percentage of positive samples that are present in water. The national health standard of 5 percent means that if more than 5 percent of the utility's total coliform samples test positive, then the national health standard has been violated. To say that a sample tests positive is to say that there are total coliform bacteria present in the sample. Therefore, for compliance purposes, the utilities provide the percentage of total coliform samples that tested positive.

26 San Francisco Public Utilities Commission, Water Quality Report, page 2 (June 2001), available online at www.sfwater.org/detail.cfm/C_ID/296 (visited March 22, 2002); SFPUC, *Cryptosporidium 2*, available online at www.sfwater.org/detail.cfm/MC_ID/10/MS_C_ID/51/MTO_ID/NULL/C_ID/445 (visited March 22, 2002).

27 San Francisco Public Utilities Commission, Water Quality Report, pg. 2 (June 2000).

28 San Francisco Public Utilities Commission, Water Quality Report, pg. 2 (June 2001), available online at www.sfwater.org/detail.cfm/C_ID/296 (last visited March 22, 2002).

29 San Francisco Public Utilities Commission, Water Quality Report, pg. 2 (June 2001), available online at www.sfwater.org/detail.cfm/C_ID/296 (last visited March 22, 2002).

30 Health effects information on disinfection byproducts is summarized from NRDC, *Trouble on Tap* (1995); NRDC, *Bottled Water: Pure Drink or Pure Hype?* (1999), available online at www.nrdc.org/water/drinking/bw/bwinx.asp; and EPA, Draft Preamble for Stage 2 Disinfection Byproducts Regulation, available online at www.epa.gov/safewater/mdbp/st2dis-preamble.pdf.

31 See EPA Proposed Stage I Disinfection Byproducts Rule, 59 Fed. Reg. 38668 (July 29, 1994).

32 See EPA Final Stage I Disinfection Byproducts Rule, 63 Fed. Reg. 69389 (December 16, 1998).

33 See note 30.

34 Ibid.

35 Ibid.

36 SFPUC, Water Quality Report, pg. 2 (June 2001), available online at www.sfwater.org/detail.cfm/C_ID/296 (last visited March 22, 2002).

37 See EPA, "Consumer Fact Sheets on Lead," www.epa.gov/safewater/Pubs/lead1.html and www.epa.gov/safewater/standard/lead&co1.html, and IRIS summary for lead online at <http://www.epa.gov/iris/subst/0277.htm>.

38 See California Department of Health Services, California Drinking Water: NDMA-Related Activities, available online at www.dhs.ca.gov/ps/ddwem/chemicals/NDMA/NDMAindex.htm.

39 SFPUC, *Cryptosporidium 2*, available online at www.sfwater.org/detail.cfm/MC_ID/10/MS_C_ID/51/MTO_ID/NULL/C_ID/445 (last visited March 22, 2002).

40 EPA Index of Watershed Indicators, available online at www.epa.gov/iwi/hucs/07120003/score.html (last visited March 13, 2002); see also <http://map2.epa.gov/scripts/.esrimap?name=iwi2&Cmd=ZoomInByCat&CmdOld=ZoomInByScalar&threshold=360.0&zoomFactor=2.0&layersCode=00011&queryCode=99&IWIColor=0&fipsCode=18040009&click.x=300&click.y=200&IndexMap=on&Left=-126.0&Bottom=23.0&Right=-66.0&Top=50.0>.

41 See SFPUC, *Cryptosporidium*, 2 of 2, available online at www.sfwater.org/detail.cfm/MC_ID/10/MS_C_ID/51/MTO_ID/NULL/C_ID/445.

42 See note 21.

43 See SFPUC, *Cryptosporidium 2*, available online at www.sfwater.org/detail.cfm/MC_ID/10/MS_C_ID/51/MTO_ID/NULL/C_ID/445.

44 SFPUC, Water Quality Report, page 2 (June 2001), pg. 5.