

## BY the NUMBERS

**0.002 mg/L**

The maximum allowable concentration of mercury in drinking water (set by U.S. EPA)

**0.000050 mg/L**

The maximum allowable concentration of mercury in raw water (set by California Regional Water Quality Control Board)

**<0.000010 mg/L**

The concentration of mercury in raw water from Stevens Creek Reservoir in 2010-2012 (SCVWD)

**0.3 mg/kg**

National Recommended Water Quality Criterion for mercury in fish (U.S. EPA)

**0.44 mg/kg**

The threshold concentration of mercury in fish where state regulators would consider recommending no consumption of contaminated species for the most sensitive population—women between 18 and 45 years of age and children between 1 and 17 years of age

**0.7 mg/kg**

The concentration of mercury in a largemouth bass taken from Stevens Creek Reservoir in 2008 (State Water Resources Control Board)

### MeHg in FISH:

Almaden Reservoir	3.720 mg/kg
Guadalupe Reservoir	3.170 mg/kg
Lake Almaden	3.010 mg/kg
Chesboro Reservoir	1.040 mg/kg
Anderson Reservoir	0.980 mg/kg
Stevens Creek Reservoir	0.700 mg/kg
Calero Almaden	0.510 mg/kg

Due to elevated fish methylmercury concentrations, the state regulators added Stevens Creek Reservoir to the 303(d) list of impaired water bodies in 2006.

# MERCURY in the LOWER PENINSULA WATERSHEDS



## WHAT IS MERCURY?

**mer-cu-ry** [mur-kyuh-ree]

Mercury is the most toxic of all natural metals and the only one that is liquid at room temperature. Named for the solar system's fastest moving planet and the winged sandaled messenger in Roman mythology because of its highly mobile elemental form, mercury readily cycles through the environment once released.

## IN THE ECOSYSTEM

Mercury in aquatic environments is mobile, transported with sediment and able to be converted to another form if the right conditions exist. In anoxic environments—areas of low oxygen—bacteria convert the metal into the more toxic methylmercury. Methylmercury can be taken up by insects, the fish that eat the invertebrates and humans who eat the fish. Mercury's concentration increases at each level up the food chain in a process known as biological magnification.

Exposure to mercury can be particularly hazardous for pregnant women and small children. Methylmercury accumulates in the fatty tissues of organisms like fish, and humans are exposed primarily by eating fish. Exposure to even small amounts of mercury can result in serious neurological damage and death, especially for infants and children.

## IN YOUR WATERSHED

Mercury levels in the Lower Peninsula Watersheds are substantially lower than in other areas in Santa Clara County. The sources of mercury within the Lower Peninsula Watersheds are the local geology, atmospheric deposition, wastewater discharges and stormwater runoff. While the concentrations are much lower than those areas with legacy mining, they are still considered elevated compared to areas that are not downstream of geologically-enriched soils.

There are no health concerns relating to the water in Stevens Creek Reservoir. The Santa Clara Valley Water District conducts regular testing of water quality and the results from this testing indicate that mercury levels are well below safe drinking water levels. Mercury is relatively insoluble in water and will instead settle with the sediment to the bottom of reservoirs. Since mercury is present in the environment, it can travel up the food web and accumulate in fish. This creates the possibility of it ultimately reaching the people who eat fish. This fact sheet, with input from some of the water district's most knowledgeable staff on the matter, provides a "snapshot" of the agency's current understanding of mercury in this watershed.

## LOWER PENINSULA WATERSHEDS



The 98-square mile Lower Peninsula Watersheds encompass one reservoir and major creeks such as Permanente, Stevens, Adobe, Matadero, Haney, San Francisquito, Swiss, Barron, Deer, Arastradero, Magdalena, Hale, Ohlone, Deer, and Montebello, all of which drain to San Francisco Bay.

Mercury in the Lower Peninsula Watersheds can trace its roots to a variety of sources, including cinnabar deposits in the local geology, atmospheric deposition (largely from coal-fired power plants, steelmaking and burning hazardous waste), wastewater discharges and stormwater runoff. All of these sources are relatively minor. Their effects measured in other watersheds are dwarfed by the mercury left behind from legacy mining.

## TOXIC EFFECTS OF MERCURY CONTAMINATION

Mercury's toxic effects vary depending on the chemical form it takes and the way a person or animal gets exposed to it. The most dangerous form is methylmercury, also called organic mercury. While mercury is not present in the drinking water supply, it's of great concern to the Santa Clara Valley Water District. Methylmercury tends to increase up the food web, particularly in lakes.

Eating contaminated fish and other organisms at the top of the aquatic food web is the most common way that people become exposed to methylmercury. It can cause problems with the immune system and damage a person's nervous system, creating issues with coordination and the senses of touch, taste and sight. Because it's readily absorbed when ingested and excreted very slowly, most of it stays in a person's system.

- The mud at the bottom of a lake may have 100 or 1000 times the amount of mercury than is in the water.
- Worms and insects in the mud extract and concentrate the organic mercury.
- Small fish that eat these critters further concentrate the mercury in their bodies.
- The chain continues as larger fish eat smaller fish until the top predator fish may have mercury levels up to 1,000,000 times the mercury level in the water.

Nursing mothers and young children are the most susceptible to mercury poisoning.

The heavy metal sinks to the bottom in harmless inorganic or elemental form until bacteria turns it into methylmercury, a harmful form of mercury that can be absorbed by animal tissue.

### BACTERIA

Small bottom feeders absorb traces of methylmercury and as prey move up the food chain, the mercury is concentrated. The top predators in the lake, such as largemouth bass, can end up with concentrations of mercury that can trigger health advisories to limit human consumption.

# WHAT WE'VE DONE TO IMPROVE WATER QUALITY

In Santa Clara County, it's the Santa Clara Valley Water District that carries the responsibility to provide stream stewardship, wholesale water supply and flood protection to the residents. The water district encompasses all the county's 1,300 square miles and serves the area's 15 cities, 1.8 million residents and more than 200,000 commuters. As the responsible stream steward, the water district is taking action to remediate the problem. The water district has intensely monitored the mercury situation – given that less than a teaspoon of methylmercury can poison thousands of fish – with the goal to remove the mercury before it affects people and wildlife, or prevent methylmercury from forming.

Since methylmercury forms when oxygen levels are very low, the water district has installed solar-powered circulators in one lake and two reservoirs within Santa Clara County. These circulators increase the amount of mixing in the water from surface to reservoir bottom, in order to increase dissolved oxygen concentrations at depth. The district has also begun installation of full scale oxygenation systems at Stevens Creek and Calero reservoirs, which should be operational by the end of 2012. By reducing the amount of methylmercury formed, the mercury concentrations in fish should be decreased over time. This will also improve the fish habitat, both within the reservoir and downstream of the reservoir.

## Drinking water supply not affected

It's important to note that mercury is not in the drinking water supply. In the Lower Peninsula Watersheds, the water district does not utilize Stevens Creek Reservoir to store drinking water. None of the district's reservoirs that do provide sources for drinking water have mercury contamination issues.



FOR MORE INFORMATION  
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