



## THE CALIFORNIA OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT ("OEHHA")

### San Francisco Bay Advisory Frequently Asked Questions

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#### **Q 1: Why was extensive testing of chemicals in fish done for San Francisco Bay?**

A: A pilot study conducted by the State and Regional Water Boards in 1994 showed contamination of certain fish species from San Francisco Bay by mercury, PCBs, and other chemicals. OEHHA issued an interim advisory for San Francisco Bay fish following the pilot study. Additional monitoring of chemicals in San Francisco Bay fish has been conducted every three years following the pilot study. These data were provided to OEHHA to evaluate whether consumption of bay fish and some shellfish poses health concerns. OEHHA used the newer data to update the advisory guidelines for San Francisco Bay fish and shellfish.

#### **Q 2: Which fish and shellfish were tested?**

A: Over the years, the California Department of Fish and Game has collected the following fish and shellfish species: brown rockfish, brown smoothhound shark and leopard shark, California halibut, Chinook (king) salmon, jacksmelt, red rock crab, shiner perch and other surfperch species, striped bass, white croaker, and white sturgeon.

Some bay fish species migrate between freshwater (the Delta or the rivers that flow into the Delta), San Francisco Bay, and the ocean. These species are Chinook (king) salmon, striped bass, and white sturgeon.

#### **Q 3: What chemicals were found in the fish and shellfish tested?**

A: The California Department of Fish and Game analyzed samples and found significant levels of mercury and PCBs in fish and shellfish.

Mercury is widely found in nature in rock and soil, and is washed into surface waters during storms. Historic mining operations and the remaining tailings from abandoned mercury and gold mines have contributed to the release of large amounts of mercury into California's surface waters. Mercury can also be released into the environment from industrial sources, including the burning of fossil fuels and solid wastes, and disposal of mercury-containing products. Once mercury gets into water, much of it settles to the bottom where bacteria in the mud or sand convert it to the organic form of methylmercury. Methylmercury, a more toxic form of mercury, is passed up the food chain from small aquatic organisms and builds up in larger and older fish. Although total mercury was measured, it represents the methylmercury level in the fish, which comprises about 95 percent of total mercury.

PCBs are a group of man-made chemicals used in electrical transformers, plastics, and lubricating oils. They were banned for most uses in 1979 because they do not break down easily, stay in the environment for a long time, and are toxic to living organisms. Spills, leaks, and improper disposal are the main ways that PCBs enter the water.

The other chemicals tested (DDTs, dieldrin, chlordane, PBDEs, and selenium) were below levels of health concern.

**Q 4: What are the health concerns for people eating fish and shellfish with these chemicals?**

A: The levels of mercury and PCBs in some San Francisco Bay fish were of potential health concern.

Methylmercury is of health concern because it targets the central nervous system. Scientists discovered that the developing nervous systems of fetuses are particularly sensitive to the toxic effects of methylmercury. In recent studies of children from high fish-eating populations exposed to low levels of methylmercury, some children whose mothers frequently ate seafood during pregnancy showed slight decreases in learning ability, language skills, attention and/or memory. Children may have increased susceptibility to the effects of methylmercury through adolescence, as the nervous system continues to develop during this time.

PCBs affect many body functions resulting in a variety of health problems. People exposed to very high levels of PCBs at work or from accidental poisoning showed harmful effects to their skin, eyes, and nervous system. Studies with animals showed PCBs affect the liver and digestive tract, as well as the immune, reproductive, nervous, and endocrine systems. Human studies suggest that PCBs might affect I.Q. or memory in children. Some forms of PCBs have been found to cause cancer in animal studies.

The levels of mercury and PCBs in California fish vary with species and locations. OEHHA's consumption guidelines are designed to minimize human exposure to these chemicals when eating sport fish.

**Q 5: How was the number of servings per week for each fish and shellfish species in the advisory determined?**

A: OEHHA evaluated the toxicity of the chemicals and developed Advisory Tissue Levels (ATLs) as a starting point in the advisory process to develop consumption advice. OEHHA's ATLs, as well as advisories and safe eating guidelines, balance the risks and benefits of fish consumption. Multiple ATLs are developed for each chemical corresponding to different serving frequencies. The recommended number of servings of fish that can be eaten in a week depends on the chemical concentrations in the fish.

OEHHA uses two sets of guidelines for fish with mercury, because babies and children are most sensitive to possible health effects from methylmercury. One set of guidelines

is for women 18–45 years (to protect the fetus in pregnant women) and children 1–17 years. The second set of guidelines is for women over 45 years and men over 17 years, who can safely eat more fish.

**Q 6: How do the chemical levels in fish and shellfish from San Francisco Bay compare to other water bodies in the state?**

A: Mercury is found in fish in water bodies throughout California, the United States, and globally. Mercury levels vary between different species of fish and shellfish. Predatory fish tend to accumulate more mercury than non-predators. This is the case in San Francisco Bay where sharks, a highly predatory species, had the highest mercury levels. Overall, the mercury levels in fish and shellfish from San Francisco Bay range from high to low, depending on species. Comparisons between San Francisco Bay and other California water bodies are difficult because of differences in species composition.

PCBs are also found in fish throughout California. They tend to be higher in fish from water bodies near urban and industrial areas and in fish with high fat content. In San Francisco Bay, shiner perch had the highest levels of PCBs. Other species had low to medium levels of PCBs.

**Q 7: Were fish and shellfish tested at other nearby water bodies?**

A: Fish have also been tested from various water bodies in the Delta including the Sacramento and San Joaquin rivers, and from numerous bay area reservoirs. The safe eating guidelines OEHHA developed for these water bodies can be found at [www.oehha.ca.gov/fish.html](http://www.oehha.ca.gov/fish.html) (click on “Safe Eating Guidelines”).

**Q 8: Should I eat fish and shellfish from water bodies without advisories?**

A: Yes, you can continue to eat fish, but it is advisable to follow the guidance below. The general guidance can also be found at: <http://www.oehha.ca.gov/fish/general/broch.html>.

*Fishing Practices:*

Fish at a variety of places. Chemical levels can vary from place to place. Your overall exposure to chemicals is likely to be lower if you fish at several different water bodies, rather than at one location that might have high contamination levels. Catching and releasing fish is also a good practice anywhere; it allows you to relax and enjoy fishing and conserve natural resources, too.

*Fish Species:*

Some fish species have higher chemical levels than other fish from the same location. If possible, eat smaller amounts of several different types of fish rather than a large amount of one type that may be high in contaminants.

*Fish Size:*

Smaller fish of a species will usually have lower chemical levels than larger ones in the same location, because some chemicals become more concentrated in larger, older fish. It is advisable to eat smaller fish (of legal size) more often than larger fish.

*Fish Preparation and Consumption:*

Eat only the fillet portions. Do not eat the guts, liver, or skin because chemicals usually concentrate in those parts.

*Species Selection:*

Avoid species that generally have higher levels of contaminants. Predatory fish, in particular, accumulate more mercury. In freshwater, bass species (e.g., striped bass, largemouth bass, smallmouth bass, and spotted bass) are often the top predators. Women and children are more sensitive to the harmful effects of methylmercury and should not eat these species regularly.

Eat species that generally have lower levels of contaminants. Rainbow trout and various sunfish (e.g., bluegill and redear sunfish) are often the least contaminated fish in water bodies. They are safer to eat.

There is general scientific agreement that eating fish provides health benefits. Fish contain proteins, vitamins, and omega-3 fatty acids. Omega-3 fatty acids are not only good for the heart, brain, and eyes, but also for brain development in babies and children. Therefore, OEHHA recommends that people, especially pregnant women, eat fish that are high in omega-3 fatty acids and low in chemical contaminants. Fatty fish species have higher levels of omega-3 fatty acids including salmon, trout, anchovy, mackerel, herring, sardines, sablefish ("black cod"), and albacore tuna.

**Q 9: Where can I get more information on the guidelines for San Francisco Bay fish and shellfish?**

A: OEHHA's recommendations are presented in the "Guide to Eating San Francisco Bay Fish and Shellfish." People can continue to safely eat San Francisco Bay fish and shellfish by following these safe eating guidelines. The advisory brochure, the OEHHA report "Health Advisory and Safe Eating Guidelines for San Francisco Bay Fish and Shellfish," and a fact sheet can be found online at:  
<http://www.oehha.ca.gov/fish/general/sfbaydelta.html>

Consumption guidelines for San Francisco Bay and other water bodies can also be found in the Fish and Game Freshwater and Oceans Regulation booklets at:  
[www.dfg.ca.gov/regulations](http://www.dfg.ca.gov/regulations) and on the OEHHA web site at:  
<http://www.oehha.ca.gov/fish.html>