

**2009 UPDATE  
OF  
CALIFORNIA  
SPORT FISH ADVISORIES**

**March 2009**

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**Office of Environmental Health Hazard Assessment (OEHHA)  
2009 Update of California Sport Fish Advisories**

**March 2009**

**Office of Environmental Health Hazard Assessment  
California Environmental Protection Agency**

## Table of Contents

OEHHA’s Protocol for Updating Fish Advisories .....	1
Advisory Tissue Levels (ATLs) .....	1
New Data for Fish from California Water Bodies .....	2
Internal Guidelines for Consistency .....	2
Water Bodies with Updated Advice .....	5
1. Trinity Lake including East Fork Trinity River (Trinity County) .....	5
2. Trout from Lewiston Lake, Carrville Pond, and Trinity River upstream of Trinity Lake (Trinity County).....	6
3. Black Butte Reservoir (Glenn and Tehama Counties).....	6
4. Stony Gorge Reservoir (Glenn County) .....	6
5. East Park Reservoir (Colusa County) .....	7
6. Lake Pillsbury (Lake County).....	8
7. Lake Mendocino (Mendocino County).....	9
8. Clear Lake and Cache Creek (Lake, Yolo, and Colusa Counties).....	10
9. Northern Sierra Nevada Foothills (Nevada, Placer, and Yuba Counties).....	10
10. Lake Englebright (Yuba and Nevada Counties) .....	11
11. Rollins Reservoir (Nevada and Placer Counties).....	12
12. Camp Far West Reservoir (Yuba, Nevada, and Placer Counties) .....	12
13. Lake Combie (Placer and Nevada Counties) .....	13
14. Lower Feather River (Butte, Yuba and Sutter Counties).....	13
15. Lake Sonoma (Sonoma County).....	14
16. Lake Berryessa (Napa County).....	15
17. Putah Creek including Lake Solano (Yolo and Solano Counties).....	15
18. Lower American River (Sacramento County) .....	15
19. Soulajule Reservoir (Marin County).....	16
20. Nicasio Reservoir (Marin County).....	16
21. Bon Tempe Reservoir (Marin County) .....	16
22. Lake Herman (Solano County) .....	17
23. Central and South Delta—including the San Joaquin River from the Port of Stockton to Pittsburg.....	17
24. Lower Cosumnes River (Sacramento County) .....	18
25. Lower Mokelumne River (Sacramento and San Joaquin Counties).....	19
26. Mokelumne River at Lodi Lake (San Joaquin County).....	20
27. Lafayette Reservoir (Contra Costa County) .....	21
28. Lake Chabot (Alameda County) .....	21
29. Shadow Cliffs Reservoir (Alameda County) .....	22
30. Del Valle Reservoir (Alameda County).....	22
31. Stevens Creek Reservoir (Santa Clara County) .....	22
32. Anderson Reservoir (Santa Clara County) .....	23
33. San Joaquin River from Friant Dam to the Port of Stockton.....	23
34. Grasslands (Merced County) .....	24
35. Lake Nacimiento (San Luis Obispo County).....	24
36. Harbor Park Lake (Lake Machado) (Los Angeles County).....	26
37. Salton Sea (Imperial and Riverside Counties).....	26

38. Tomales Bay (Marin County) .....	27
Water Bodies with No Changes in Advice .....	27
1. Bear Creek (Colusa County) .....	27
2. Guadalupe Reservoir, Calero Reservoir, Almaden Reservoir, Guadalupe River, Guadalupe Creek, Alamos Creek, and the associated percolation ponds along the river and creeks (Santa Clara County) .....	27
3. San Francisco Bay.....	27
4. Southern California.....	28
Safe Eating Guidelines issued for Water Bodies in 2008 – 2009 .....	28
1. Folsom Lake (Sacramento County) .....	28
2. Lake Natoma (Sacramento County).....	28
3. San Pablo Reservoir (Contra Costa County), February 2009 .....	28
4. Sacramento River (from below Shasta Lake to Pittsburg) and the Northern Delta (other water bodies in the Delta north of Highway 12) .....	28

# **OEHHA's Protocol for Updating Fish Advisories**

The purpose of this report is to describe the process the Office of Environmental Health Hazard Assessment (OEHHA) used to update existing sport fish advisories. Two factors prompted the update procedure: 1) the development of advisory tissue levels, or ATLs, and 2) new chemical data for fish from California water bodies with advisories. OEHHA included the updated advisories in the California Department of Fish and Game 2009 Sport Fishing Regulations booklets, published in spring 2009. Not all advisories were updated at this time. Updated advisories are also posted on OEHHA's Web site ([http://www.oehha.ca.gov/fish/so\\_cal/index.html](http://www.oehha.ca.gov/fish/so_cal/index.html)).

## ***Advisory Tissue Levels (ATLs)***

OEHHA's fish advisories are also called "safe eating guidelines." They provide information to sport fish consumers in California to assist them in choosing to eat fish low in contaminants and high in beneficial fats. OEHHA developed ATLs for evaluating fish tissue data and developing advisories. ATLs were determined after several steps.

### **Safe Exposure Thresholds**

First, OEHHA established limits for exposure to common chemicals in fish based on a review of the toxicity of these chemicals. OEHHA used these safe exposure thresholds to develop the ATLs. OEHHA applies ATLs to measured levels of chemicals in sport fish to determine how much fish can be safely eaten.

### **Benefits of Eating Fish**

Second, OEHHA reviewed studies that showed regular fish consumption—such as twice a week—provides many types of health benefits. ATLs were thus designed to achieve two outcomes that support public health:

1. Discourage eating sport fish that cannot be eaten often because of chemical contamination
2. Encourage consumption of sport fish that can be safely eaten in amounts likely to confer health benefits

### **Improving Communication**

Third, OEHHA took into account principles of good communication when developing the ATLs. For example, ATLs simplify advice by limiting the number of possible recommendations. The ATLs identify the contaminant threshold for fish that can safely be eaten at least once a week. OEHHA uses the ATLs to organize fish with different chemical levels into high, medium, and low level groups.

OEHHA also worked with the California Department of Public Health to simplify advisories and improve their design.

For further information on ATLS and the toxicology of common chemicals in fish, see the June 2008 OEHHA report<sup>1</sup> by Klasing and Brodberg at:  
<http://www.oehha.ca.gov/fish/gtlsx/crn062708.html>.

## ***New Data for Fish from California Water Bodies***

OEHHA obtained new data on mercury and other chemicals in fish from several sources.

(1) The California Surface Water Ambient Monitoring Program (SWAMP)

This program collected mainly largemouth bass, but also several other fish species, from lakes throughout California in 2007. In addition to mercury, SWAMP analyzed some samples for selenium and chlorinated hydrocarbon contaminants.

(2) The Fish Mercury Project (FMP)

The California Bay-Delta Authority funded researchers from several organizations to study mercury in the Central Valley. Fish samples were collected for three years, 2005 – 2007. (See <http://www.sfei.org/cmr/fishmercury/> for more information on this project.)

(3) The United States Geological Survey (USGS)

USGS provided fish data to OEHHA from studies of mercury at several water bodies.

(4) The City of Benicia

The City of Benicia sampled fish from a local water body in 1998 and tested them for mercury.

OEHHA combined new data with data staff previously used to develop safe eating guidelines. OEHHA then evaluated the combined dataset—using the ATLS—to update the existing safe eating guidelines.

## ***Internal Guidelines for Consistency***

A major goal in updating the advisories was to ensure that current and future advisories are based on consistent guidelines. OEHHA developed and used the following guidelines for that purpose.

### **Sample Size**

OEHHA issues advice for fish or shellfish species only when there are enough samples to evaluate.

- OEHHA requires at least nine individual fish from a species at a water body to issue advice for that species.

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<sup>1</sup> This report is titled “Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene.”

- An exception can apply to a few fish species commonly known to build up high levels of mercury.
  - Examples include largemouth bass and Sacramento pikeminnow.
  - When at least five individuals, but less than nine, of one of these species have been sampled at a water body, OEHHA will consider giving advice for that species.
  - OEHHA will compare mercury levels in that species and others from the same water body that build up mercury. OEHHA will consider giving the same advice for both species.

### **Related Species**

Closely related species can be hard to tell apart, and often have similar levels of contamination. OEHHA used these guidelines to simplify advice for related species.

- Closely related species are evaluated together as a group.
- Examples of closely related species are:
  - Black bass—largemouth, smallmouth, and spotted bass
  - Sunfish—bluegill, redear, and green sunfish
- The species group must contain at least nine individual fish of two or more of the related species.
- An average chemical concentration of all fish in the species group is used for the group. The average is weighted by the number of individual fish per species.
  - For example, the average chemical level measured in a composite of ten fish from one species would count ten times more than the level in one fish sampled from a second species.

### **Balancing Risks and Benefits**

OEHHA recommends eating fish species known to have high levels of beneficial fats—omega-3 fatty acids—that can provide health benefits to consumers. OEHHA will consider the omega-3 content of fish species when its chemical level is close to the border between two consumption recommendations.

- If the species has high levels of omega-3 fatty acids, OEHHA will consider recommending the greater amount of consumption.
- When omega-3 levels are low, or unknown, OEHHA will consider giving the more restrictive recommendation.

### **Keeping Communication Simple**

Safe eating guidelines are matched to a familiar color code scheme as follows:

- Fish with high mercury levels are shown in a red category
- Fish with medium mercury levels are shown in a yellow category
- Fish with low mercury levels are shown in a green category

When the advice differs for species within the same category, OEHHA may make minor changes for some species to keep the safe eating guidelines simple and easier to follow. For example, OEHHA may choose the most restrictive advice, the most common, or an average of possible recommendations within the category. In these cases, OEHHA considers specific factors for each situation.

The process OEHHA used to update the safe eating guidelines presented in this report can also serve for developing consistent advisories in the future. By using the ATLs to evaluate all fish data and following the internal guidelines described above, OEHHA can provide more uniform advice for eating fish.

## Water Bodies with Updated Advice

The following sections of this report describe the process for updating safe eating guidelines at water bodies with advisories.

- When newer data were available for a water body, OEHHA combined the new data with data previously used for the advisory.
- OEHHA evaluated the combined dataset—using ATLS—to update the safe eating guidelines.

### Information about New Data

SWAMP collected a range of sizes of largemouth, smallmouth, and spotted bass including individual fish that did not meet legal requirements for minimum size. Although SWAMP included sub-legal sized bass in composite samples they analyzed for mercury, OEHHA did not evaluate samples with bass smaller than legal size.

SWAMP analyzed some fish species for these chlorinated hydrocarbon contaminants: chlordane, dieldrin, DDTs, PCBs, and PBDEs. This report will refer to this group of chemicals as “organics” for simplicity. The following acronyms stand for these chemicals groups:

- DDTs = dichlorodiphenyltrichloroethane and its main metabolites
- PCBs = polychlorinated biphenyls
- PBDEs = polybrominated diphenylethers.

For information about these chemicals and their toxicity, see the OEHHA report<sup>2</sup> by Klasing and Brodberg (2008).

### ***1. Trinity Lake including East Fork Trinity River (Trinity County)***

The updated safe eating guidelines for Trinity Lake and the East Fork Trinity River included new data. More information about this updated advisory is given below.

**New data:** SWAMP collected four additional composite samples of rainbow trout (including a total of 20 trout) from Trinity Lake in 2007.

- The samples were analyzed for mercury, selenium, and organics. None of the organics, or selenium, was at a level of health concern.
- The mercury results were combined with those from previous samples of rainbow trout, brown trout, and brook trout.
- OEHHA evaluated the combined data, using the ATLS, to update the advisory.

**Related species:** OEHHA grouped the following related species:

- Bass: largemouth and smallmouth bass
- Catfish: white catfish and bullhead catfish
- Trout: rainbow, brown, and brook trout

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<sup>2</sup> Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene

**Sample size:** Fish species with insufficient sample sizes (less than a minimum of nine individuals) were not included in the safe eating guidelines:

- Two chinook salmon
- Two green sunfish

Table 1 shows average mercury concentrations for all fish samples from Trinity Lake and the East Fork Trinity River used in the updated safe eating guidelines.

Table 1. Average Mercury and Size in Fish from Trinity Lake and East Fork Trinity River

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Bass	47	0.47	354
Catfish	35	0.11	293
Trout	76	0.12	293

## ***2. Trout from Lewiston Lake, Carrville Pond, and Trinity River upstream of Trinity Lake (Trinity County)***

In the updated advisories, OEHHA issued separate safe eating guidelines for Lewiston Lake, Carrville Pond, and the Trinity River upstream of Trinity Lake. Previously, these three water bodies were included with the advisory for Trinity Lake. Because no new data were available for these water bodies, the updated guidelines were based on prior data and the ATLS.

## ***3. Black Butte Reservoir (Glenn and Tehama Counties)***

No new data were available for Black Butte Reservoir. Carp and crappie were excluded in the updated safe eating guidelines because only one composite sample, made of three fish, was analyzed for each of these two species. The updated safe eating guidelines were based on prior data and the ATLS.

## ***4. Stony Gorge Reservoir (Glenn County)***

OEHHA previously included Stony Gorge Reservoir in the advisory for nearby Black Butte Reservoir, although Stony Gorge had not been sampled. New data allowed OEHHA to develop a separate advisory for Stony Gorge Reservoir.

**New data:** Stony Gorge Reservoir was sampled in 2006 under the FMP; the fish were analyzed for mercury. Samples included:

- 9 bluegill
- 13 channel catfish
- 17 carp
- 10 goldfish
- 2 legal-size largemouth bass

In 2007, SWAMP sampled 15 legal-size largemouth bass from Stony Gorge Reservoir and analyzed them for mercury. SWAMP also analyzed two composite samples (with five suckers

each) for mercury; and one composite sample of all ten suckers for selenium and organics. None of the chemicals was found at a level of health concern<sup>3</sup>.

**Related species:** OEHHA grouped the following related species:

- Carp and goldfish

**Beneficial fats:** The average mercury level in largemouth bass from Stony Gorge Reservoir corresponds to “one serving a week” for the sensitive population, women ages 18 – 45 and children 1 – 17 years. However, this mercury level is close to the limit for consumption by the sensitive population. Because this species is high in omega-3 fatty acids, OEHHA did not change the advice from one serving a week to “no consumption.”

Table 2 shows a summary of all data collected for fish from Stony Gorge Reservoir and used in the safe eating guidelines.

Table 2. Average Mercury and Size in Fish from Stony Gorge Reservoir

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Bluegill	9	0.12	168
Carp and goldfish	27	0.24	407
Channel catfish	13	0.19	439
Largemouth bass	17	0.42	368

## 5. East Park Reservoir (Colusa County)

OEHHA previously included East Park Reservoir with nearby Black Butte Reservoir, although East Park had not been sampled. New data allowed OEHHA to develop a separate advisory for East Park Reservoir.

**New data:** East Park Reservoir was sampled in 2006 under the FMP. These samples were analyzed for mercury and included:

- 10 bluegill
- 5 redear sunfish
- 10 carp
- 9 goldfish
- 25 channel catfish
- 11 largemouth bass

SWAMP sampled 14 legal-size largemouth bass in 2007 and analyzed them for mercury. They also collected ten carp. Two composite samples of five carp each were analyzed for mercury; the results were similar to those from FMP samples. One composite sample of all ten carp was analyzed for selenium and organics, none of which was found at a level of health concern.

**Related species:** OEHHA grouped the following related species:

- Carp and goldfish
- Sunfish: bluegill and redear sunfish

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<sup>3</sup> OEHHA did not know the sample sizes for sucker at the time of evaluation and, therefore, did not include SWAMP data for sucker in its evaluation or safe eating guidelines for Stony Gorge Reservoir.

**Sample size:** Only two black crappie were collected. This fish species was not included in the safe eating guidelines because of insufficient sample size (less than a minimum of nine individuals).

Table 3 shows the average mercury concentrations for fish in the safe eating guidelines for East Park Reservoir.

Table 3. Average Mercury and Size in Fish from East Park Reservoir

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Carp and goldfish	19	0.22	387
Channel catfish	25	0.22	447
Sunfish	15	0.07	141
Largemouth bass	25	0.40	351

**Beneficial fats:** The average mercury level in largemouth bass corresponds to “one serving a week” for the sensitive population, women ages 18 – 45 and children 1 – 17 years. However, this level is close to the limit for consumption by the sensitive population. Because this species is high in omega-3 fatty acids, OEHHA did not change the advice from one serving a week to “no consumption.”

## 6. Lake Pillsbury (Lake County)

OEHHA issued an advisory for Lake Pillsbury in 2000. At that time, most samples of largemouth bass and Sacramento pikeminnow exceeded the U.S. Food and Drug Administration (FDA) Action Level of 1.0 ppm. FDA Action Levels represent limits at or above which FDA will take legal action to remove products from the market. OEHHA issued the advisory for Lake Pillsbury because of the exceptionally high mercury levels.

**New data:** Using a combination of prior data and new data, and the ATLS, OEHHA updated the advisory for Lake Pillsbury.

- SWAMP sampled 20 legal-size largemouth bass in 2007 and analyzed them for mercury. Two composite samples of 11 largemouth bass each were also analyzed for selenium and organics, none of which was at a level of health concern<sup>4</sup>.
- The California Department of Fish and Game sampled fish at Lake Pillsbury between 1989 and 2000. These fish were collected for the Toxic Substance Monitoring Program (TSMP), which is now included under SWAMP. The samples were analyzed for mercury. OEHHA combined the TSMP and recent SWAMP samples when updating this advisory.

**Related species:** OEHHA grouped the following related species:

- Sunfish: green sunfish and bluegill

Table 4 shows a summary of data used in the updated advisory for Lake Pillsbury.

<sup>4</sup> The composite samples included bass smaller than the legal minimum size. Therefore, OEHHA did not include them with other bass samples in its evaluation of mercury levels.

Table 4. Average Mercury and Size in Fish from Lake Pillsbury

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Sunfish	10	0.54	171
Largemouth bass	77	1.37	419
Rainbow trout	14	0.20	333
Sacramento pikeminnow	28	1.36	390

## 7. Lake Mendocino (Mendocino County)

The updated safe eating guidelines for Lake Mendocino included new data. More information about this updated advisory is given below.

**New data:** SWAMP sampled 14 legal-size largemouth bass in 2007 at Lake Mendocino. They also sampled ten carp. Two composite samples of five carp each were analyzed for mercury; and one composite sample of all ten carp was analyzed for selenium and organics. None of the chemicals was measured at a level of health concern<sup>5</sup>. OEHHA used a combination of prior and new data for largemouth bass, redear sunfish, and striped bass to update the safe eating guidelines for these species.

**Sample size:** Fish species with insufficient sample sizes (less than a minimum of nine individuals) were not included in the safe eating guidelines:

- Four channel catfish
- Two rainbow trout

In addition, OEHHA excluded crappie from the updated advisory because previously issued advice for this species was based on data for crappie from Lake Sonoma. Crappie were not sampled at Lake Mendocino.

**Known accumulator species:** Seven striped bass were sampled from Lake Mendocino. Although the sample consisted of fewer than nine fish, this species is a “known accumulator” of mercury. The average mercury level in these striped bass was high. Therefore, OEHHA gave the same advice for striped bass that was given for largemouth bass, another high-mercury species at Lake Mendocino.

Table 5 shows a summary of average mercury concentrations for fish in the Lake Mendocino safe eating guidelines.

Table 5. Average Mercury and Size in Fish from Lake Mendocino

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Largemouth bass	50	0.58	380
Redear sunfish	12	0.26	285
Striped bass	7	0.74	622

<sup>5</sup> OEHHA did not know the sample sizes for carp at the time of evaluation and, therefore, did not include SWAMP data for carp in its evaluation or safe eating guidelines for Lake Mendocino. This species can be added at the next round of updates.

## **8. Clear Lake and Cache Creek (Lake, Yolo, and Colusa Counties)**

As in the previous safe eating guidelines for Clear Lake and Cache Creek, these two connected water bodies were combined in one advisory. No new data were available; however, the safe eating guidelines were revised using the ATLS.

**Related species:** OEHHA grouped the following related species:

- Bass: largemouth and smallmouth bass
- Catfish: channel catfish, white catfish, and brown bullhead
- Crappie: black and white crappie
- Sunfish: bluegill and green sunfish

**Sample size:** All species in the updated safe eating guidelines had ample sample sizes. Trout, which had been included in the previous advisory, were dropped from the updated advice because they were not sampled.

**Beneficial fats:** The average mercury level for crappie was close to the limit for consumption by the sensitive population, women ages 18 – 45 and children 1 – 17 years. Crappie are not known to contain high levels of omega-3 fatty acids, so OEHHA changed the advice from one serving a week to “no consumption” for the sensitive population.

The average mercury level in the catfish group was also close to the “no consumption” limit for the sensitive population. Catfish are also not known to be high in omega-3 fatty acids. OEHHA made the same change from one serving a week to “no consumption” for the sensitive population for catfish.

**Other considerations:** Many fish species have been studied at Clear Lake for mercury levels. Six different species had medium levels of mercury. This group includes blackfish, carp, hardhead, hitch, sucker, and sunfish species. The advice differed between species for the general population, men over 17 years and women over 45 years. Recommendations ranged from two to four servings a week. To simplify the safe eating guidelines, OEHHA decided to give the most conservative advice (two servings per week) to the general population for all species in this group.

## **9. Northern Sierra Nevada Foothills (Nevada, Placer, and Yuba Counties)**

OEHHA previously issued an advisory for a combination of several reservoirs, rivers, and creeks in the Sierra foothills. In the advisory update process, only fish species with sufficient sample sizes were given safe eating guidelines. Because sample sizes were not adequate for any fish species from the following water bodies, safe eating guidelines *are no longer provided*. It was not possible to determine whether fish from these water bodies are safe to eat based on the limited data.

- Bear River below Highway 20
- Deer Creek
- South Yuba River

- Scotts Flat Reservoir

**Other considerations:** Seven largemouth bass were sampled from Scotts Flat Reservoir, and bass are a known accumulator of mercury. However, the average mercury level in bass from Scotts Flat Reservoir (0.38 ppm) was lower than mercury levels in bass from the other reservoirs in the Sierra foothills region. This lower level also corresponds to safe consumption. Because no other fish species were analyzed from Scotts Flat Reservoir, OEHHA was not able to evaluate whether consumption of bass (or other fish species) from Scotts Flat Reservoir could be recommended.

The remaining water bodies in the Sierra foothills advisory—Lake Englebright, Rollins Reservoir, Camp Far West Reservoir, and Lake Combie—were updated. Separate safe eating guidelines were issued for each water body, as explained below.

## 10. *Lake Englebright (Yuba and Nevada Counties)*

The updated safe eating guidelines for Lake Englebright included new data combined with prior data. More information about this updated advisory is given below.

**New data:** OEHHA received fish data collected and analyzed for mercury at Lake Englebright by University of California at Davis researchers (in cooperation with the U.S. Geological Survey—USGS) as part of the 2002 Upper Yuba River Studies Program<sup>6</sup>. The dataset included:

- 29 bluegill
- 3 largemouth bass
- 11 smallmouth bass
- 25 spotted bass
- 49 rainbow trout

**Related species:** OEHHA grouped the following related species:

- Bass: largemouth, smallmouth, and spotted bass
- Sunfish: bluegill and green sunfish

Table 6 shows a summary of data used in the updated advisory for Lake Englebright.

Table 6. Average Mercury and Size in Fish from Lake Englebright

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Sunfish	31	0.30	161
Bass	56	0.45	338
Rainbow trout	49	0.08	290

<sup>6</sup> Slotton, D.G., Ayers, S.M., and Alpers, C.N., in preparation, Mercury concentrations in fishes and zooplankton from Englebright Lake, Yuba River Watershed, California, 2002. U.S. Geological Survey Data Series Report. (Status: Draft report in preparation. USGS approval and publication expected during 2009.)

## **11. Rollins Reservoir (Nevada and Placer Counties)**

No new data were available for Rollins Reservoir. The updated safe eating guidelines were based on prior data and the ATLS. Only channel catfish had an adequate sample size for inclusion in the updated advisory. OEHHA omitted the following fish species because sample sizes were too small:

- Three bluegill
- Four brown trout
- One crappie
- Two largemouth bass

## **12. Camp Far West Reservoir (Yuba, Nevada, and Placer Counties)**

The updated safe eating guidelines for Camp Far West Reservoir included new data. More information about this updated advisory is given below.

**New data:** OEHHA combined previous data with new data for Camp Far West Reservoir from two sources to update the safe eating guidelines:

- SWAMP sampled 13 legal-size spotted bass from Camp Far West Reservoir in 2007 and analyzed them for mercury. They also sampled ten channel catfish and analyzed them for mercury, selenium, and organics.
  - Selenium and organics concentrations were below levels of health concern.
  - OEHHA combined the results for mercury levels with prior data to update the advisory.
- In addition to sampling in 2000, which provided data for the previous advisory, USGS collected additional samples in 2002 from Camp Far West Reservoir<sup>7</sup>. The samples were analyzed for mercury and included:
  - 16 bluegill
  - 10 spotted bass

**Related species:** OEHHA grouped the following related species:

- Bass: largemouth bass and spotted bass

**Beneficial fats:** The mean mercury level for catfish from Camp Far West Reservoir was close to the limit for “no consumption” for the sensitive population, women aged 18 – 45 and children 1 – 17 years. Because catfish are not known to have high omega-3 levels, OEHHA changed the recommendation for the sensitive population from one serving a week to “no consumption.”

Table 7 shows a summary of average mercury concentrations in the fish samples from Camp Far West Reservoir.

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<sup>7</sup> Saiki, M.K., Martin, B.A., May, T.W., and Alpers, C.N., in press, Mercury contamination in fish from a Sierra Nevada foothill reservoir located downstream from historic gold-mining operations. Environmental Monitoring and Assessment.

Table 7. Average Mercury and Size in Fish from Camp Far West Reservoir

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Bluegill	19	0.19	140
Channel catfish	13	0.44	443
Largemouth and spotted bass	38	0.85	357

### 13. *Lake Combie (Placer and Nevada Counties)*

The updated safe eating guidelines for Lake Combie included new data combined with prior data. More information about this updated advisory is given below.

**New data:** In 2007, SWAMP sampled two fish species from Lake Combie. Ten legal-size largemouth bass were analyzed for mercury. One composite sample of five suckers was analyzed for mercury, selenium, and organics. A second composite sample of five suckers was also analyzed for mercury.

- The concentrations of organics and selenium were below levels of health concern.
- Average mercury levels in the largemouth bass and two composite samples of sucker were included in the updated advice.

**Sample size:** Fish species with insufficient sample sizes (less than a minimum of nine individuals) were not included in the safe eating guidelines:

- Two bluegill
- Two rainbow trout

Table 8 shows average mercury concentrations in the combined fish data for the updated safe eating guidelines for Lake Combie.

Table 8. Average Mercury and Size in Fish from Lake Combie

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Largemouth bass	19	0.90	393
Sucker	10	0.53	444

### 14. *Lower Feather River (Butte, Yuba and Sutter Counties)*

OEHHA updated the safe eating guidelines for the Lower Feather River using new data combined with prior data and the ATLS.

**New data:** Fish from several locations on the Lower Feather River were sampled and analyzed for mercury under the FMP in 2005 and 2006. FMP samples included:

- 10 American shad
- 5 bluegill
- 10 redear sunfish
- 5 carp
- 5 crappie
- 14 largemouth bass
- 23 pikeminnow

- 30 sucker

**Sample size:** Crappie was the one fish species with insufficient sample size (less than a minimum of nine individuals) to include in the safe eating guidelines. Bluegill data were combined with those for redear sunfish, and carp samples were combined with prior data for carp. In addition, five river-run Chinook salmon and six river-run steelhead trout were collected at the Feather River Hatchery. Although samples sizes were too small for evaluating these fish specifically, OEHHA issued general safe eating guidelines in 2009 for river-run salmon as follows.

River-run salmon from rivers in northern California are generally low in contaminants. Unless otherwise noted, prohibited, or restricted, they can be eaten 2 to 3 servings a week by women ages 18 – 45 and children ages 1 – 17 years; and 7 servings a week by men over 17 years and women over 45 years old.

**Known accumulator species:** Striped bass are known to accumulate high levels of mercury. OEHHA provided advice for six striped bass based on the advice for largemouth bass and pikeminnow, species also high in mercury in the Lower Feather River.

Table 9 shows a summary of mercury data for fish in the updated safe eating guidelines for the Lower Feather River.

Table 9. Average Mercury and Size in Fish from the Lower Feather River

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
American Shad	10	0.05	436
Bluegill and redear sunfish	30	0.18	172
Carp	16	0.24	504
Channel and White Catfish	47	0.43	465
Largemouth Bass	61	0.71	337
Sacramento Pikeminnow	38	0.87	345
Sacramento Sucker	38	0.25	424
Striped Bass	6	1.27	652

## 15. Lake Sonoma (Sonoma County)

The updated safe eating guidelines for Lake Sonoma included new data. More information about this updated advisory is given below.

**New data:** In 2007, SWAMP collected 14 legal-size largemouth bass from Lake Sonoma and analyzed them for mercury. In addition, they analyzed two composite samples of 11 largemouth bass for organics and selenium. The composite samples included bass that were below the minimum legal size<sup>8</sup>, but the results did not show levels of health concern for organics or selenium.

Table 10 shows a summary of average mercury levels in fish in the updated advisory for Lake Sonoma.

<sup>8</sup> OEHHA did not include the largemouth bass composite samples in its evaluation of mercury levels because they included sub-legal sized fish.

Table 10. Average Mercury and Size in Fish from Lake Sonoma

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Largemouth bass	78	0.80	370
Redear sunfish	27	0.25	167
Crappie	10	0.25	156

### **16. Lake Berryessa (Napa County)**

No new data were available for Lake Berryessa. OEHHA updated the safe eating guidelines using prior data and the ATLS.

### **17. Putah Creek including Lake Solano (Yolo and Solano Counties)**

No new data were available for Putah Creek. OEHHA updated the safe eating guidelines using prior data and the ATLS.

### **18. Lower American River (Sacramento County)**

OEHHA issued an advisory for Lake Natoma and the Lower American River in 2004. Advice for Lake Natoma was updated when OEHHA released a new advisory for Lake Natoma and Folsom Lake in 2008. Since then, OEHHA updated the safe eating guidelines for the Lower American River using prior data combined with new data, and the ATLS. More information about this updated advisory is given below.

**New data:** The FMP sampled several locations on the Lower American River in 2005 and 2006. Samples were analyzed for mercury and included:

- 10 American shad
- 7 largemouth bass
- 10 Sacramento pikeminnow
- 14 Sacramento sucker
- 4 white catfish

Table 11 shows average mercury levels in fish included in the updated safe eating guidelines for the Lower American River.

Table 11. Average Mercury and Size in Fish from the Lower American River

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
American shad	10	0.05	439
Largemouth bass	48	0.81	375
Pikeminnow	51	0.53	317
Redear sunfish	10	0.19	181
Sucker	84	0.30	437
White catfish	13	0.36	268

The updated safe eating guidelines for the Lower American River also include advice for striped bass as provided in the San Francisco Bay-Delta advisory.

### **19. Soulajule Reservoir (Marin County)**

OEHHA used new data for Soulajule Reservoir to update the safe eating guidelines and make them a state advisory. The advisory was previously issued as an interim advisory in 2004 by Marin County.

**New data:** SWAMP sampled largemouth bass from Soulajule Reservoir in 2007:

- Seven legal-size largemouth bass were analyzed for mercury
- A composite sample of five largemouth bass was analyzed for selenium and organics, none of which was found at a level of concern

**Sample size:** One fish species with insufficient sample sizes (less than a minimum of nine individuals) was not included in the safe eating guidelines:

- Two channel catfish

Table 12 shows the average mercury levels in fish included in the updated safe eating guidelines for Soulajule Reservoir.

Table 12. Average Mercury and Size in Fish from Soulajule Reservoir

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Channel catfish	2	0.26	613
Crappie	15	0.33	169
Largemouth bass	36	0.85	332

### **20. Nicasio Reservoir (Marin County)**

No new data were collected for Nicasio Reservoir. OEHHA updated the safe eating guidelines using prior data and the ATLS. The interim advisory issued in 2004 by Marin County is now a state advisory.

### **21. Bon Tempe Reservoir (Marin County)**

OEHHA used new data for Bon Tempe Reservoir to update the safe eating guidelines and make them a state advisory. The advisory was previously issued as an interim advisory in 2004 by Marin County.

**New data:** SWAMP sampled largemouth bass from Bon Tempe Reservoir in 2007:

- Seven legal-size largemouth bass were analyzed for mercury
- A composite sample of five largemouth bass was analyzed for selenium and organics, none of which was found at a level of concern

## 22. *Lake Herman (Solano County)*

OEHHA used new data for Lake Herman collected in 1998 by the City of Benicia, and the ATLS, to update the advisory for this water body.

**New data:** The City of Benicia sampled nine largemouth bass from Lake Herman and analyzed them for mercury.

**Sample size:** Seven goldfish were not included in the advisory because sample size was too small.

Table 13 shows the average mercury levels in largemouth bass at Lake Herman.

Table 13. Average Mercury and Size in Fish from Lake Herman

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Largemouth bass	31	0.81	357

## 23. *Central and South Delta—including the San Joaquin River from the Port of Stockton to Pittsburg—and all other water bodies south of Highway 12 (except the Sacramento River)*

OEHHA updated the safe eating guidelines for water bodies in the Central and South Delta using the ATLS and new data combined with prior data for this region. More information on the updated guidelines is provided below.

**New data:** Several projects collected fish samples in the region.

- In 2007, the FMP collected fish from several locations. OEHHA combined the results with prior data for the species collected. FMP samples were analyzed for mercury and included:
  - 8 brown bullhead
  - 17 carp
  - 3 channel catfish
  - 1 white catfish
  - 32 largemouth bass
  - 28 redear sunfish
- SWAMP sampled fish from Discovery Bay in 2007 including:
  - 12 legal-sized largemouth bass, analyzed for mercury, which OEHHA combined with prior data
  - A composite sample of five largemouth bass analyzed for selenium and organics, none of which was at a level of concern, and mercury<sup>9</sup>
- SWAMP sampled fish from Yosemite Lake in 2007, including:

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<sup>9</sup> OEHHA did not know the sample size for the composite sample of largemouth bass at the time of evaluation and, therefore, did not include it in its evaluation of new data. The mercury level, however, is consistent with other data for this species in the region.

- Seven legal-size largemouth bass, analyzed for mercury, which OEHHA combined with prior data
- One composite sample of five carp analyzed for mercury, selenium, and organics, none of which was found at a level of concern
- One additional composite sample of five carp, analyzed for mercury, was not at a level of concern

**Related species:** OEHHA grouped the following related species:

- Catfish: channel catfish, white catfish, and brown bullhead
- Crayfish: red swamp crayfish, signal crayfish, and northern crayfish
- Sunfish: bluegill, redear sunfish, and Sacramento perch

**Other considerations:** OEHHA changed the name of the region covered in this advisory from “South Delta” to “Central and South Delta” to better describe the area. OEHHA made this change in response to comments received from a stakeholder.

Table 14 shows the average mercury levels for fish and shellfish from water bodies in the Central and South Delta.

Table 14. Average Mercury and Size in Fish from the Central and South Delta including the San Joaquin River from the Port of Stockton to Pittsburg

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Asiatic clam	313	0.05	24
Carp	53	0.19	592
Catfish	238	0.14	323
Crappie	37	0.19	251
Largemouth bass	369	0.30	379
Sucker	15	0.26	469
Sunfish	329	0.08	173

The safe eating guidelines for the Central and South Delta including the San Joaquin River from the Port of Stockton to Pittsburg also include advice for striped bass and sturgeon as provided in the San Francisco Bay-Delta advisory.

## **24. Lower Cosumnes River (Sacramento County)**

OEHHA updated the safe eating guidelines for the Lower Cosumnes River using the ATLs and new data for this region. More information on the updated guidelines is provided below.

**New data:** Several projects collected fish samples in the region.

- In 2005 and 2006, the FMP collected fish from the Lower Cosumnes River. OEHHA combined the results with prior data for the species collected. FMP samples were analyzed for mercury and included:
  - 11 bluegill
  - 15 redear sunfish

- 15 carp
  - 13 channel catfish
  - 3 white catfish
  - 11 crappie
  - 5 hitch
  - 23 largemouth bass
  - 2 spotted bass
  - 19 sucker
- SWAMP sampled 12 legal-sized largemouth bass from the Lower Cosumnes River in 2007. The samples were analyzed for mercury as individual fish. SWAMP also analyzed a composite sample of largemouth bass for organics and selenium, none of which was found at a level of concern.

**Related species:** OEHHA grouped the following related species:

- Bass: largemouth and spotted bass
- Catfish: channel catfish and white catfish
- Crayfish: red swamp crayfish and signal crayfish
- Sunfish: bluegill and redear sunfish

Table 15 shows the average mercury levels for fish and shellfish from the Lower Cosumnes River.

Table 15. Average Mercury and Size in Fish from the Lower Cosumnes River

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Asiatic clam	77	0.04	27
Bass	55	1.18	366
Carp	15	0.30	514
Catfish	21	0.62	384
Crappie	11	1.38	212
Crayfish	28	0.39	43
Sucker	26	0.32	371
Sunfish	44	0.38	162

The safe eating guidelines for the Lower Cosumnes River also include advice for striped bass and sturgeon as provided in the San Francisco Bay-Delta advisory.

## **25. Lower Mokelumne River (Sacramento and San Joaquin Counties)**

OEHHA combined new data with prior data and used the ATLs to update the safe eating guidelines for the Lower Mokelumne River. More information on the updated guidelines is provided below.

**New data:** The FMP sampled the Mokelumne River in 2007 including the following samples analyzed for mercury:

- Three brown bullhead
- Three channel catfish
- Eight pikeminnow

**Sample size:** Seven suckers were not used in the updated advisory because sample size was too small.

**Related species:** OEHHA grouped the following related species:

- Catfish: channel catfish, white catfish, brown bullhead

Table 16 shows the average mercury levels for fish and shellfish from the Lower Mokelumne River.

Table 16. Average Mercury and Size in Fish from the Lower Mokelumne River

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Asiatic clam	105	0.03	22
Bluegill	25	0.25	176
Crayfish	83	0.18	48
Catfish	13	0.32	284 <sup>10</sup>
Largemouth bass	37	0.81	368
Pikeminnow	11	0.82	377

The safe eating guidelines for the Lower Mokelumne River also include advice for striped bass and sturgeon as provided in the San Francisco Bay-Delta advisory.

## 26. Mokelumne River at Lodi Lake (San Joaquin County)

In 2007, the FMP sampled upstream in the Mokelumne River at Lodi Lake. Lodi Lake was created by the Woodbridge Diversion Dam on the Mokelumne River, which was completed in 1910. It has a normal surface area of 474 acres. OEHHA developed separate guidelines for this part of the river because mercury levels in fish were lower compared to fish downstream in the Lower Mokelumne River.

Table 17 shows the samples and average mercury levels in fish from Lodi Lake.

Table 17. Average Mercury and Size in Fish from the Mokelumne River at Lodi Lake

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Largemouth bass	9	0.28	441
Rainbow trout	9	0.04	317
Sucker	9	0.30	457

<sup>10</sup> Length was not provided for one catfish. Relative to the other catfish samples, its weight was greater. Therefore, the true mean length is probably larger than 284 mm.

## 27. Lafayette Reservoir (Contra Costa County)

No new data were collected for Lafayette Reservoir. OEHHA updated the safe eating guidelines using prior data and the ATLS. The interim advisory issued in 2004 by Contra Costa County is now a state advisory.

**Sample size:** OEHHA excluded three channel catfish from the safe eating guidelines due to small sample size.

## 28. Lake Chabot (Alameda County)

OEHHA updated the safe eating guidelines for Lake Chabot (in Alameda County) using new data combined with prior data and the ATLS. The interim advisory issued in 2004 by Alameda County is now a state advisory.

**New data:** SWAMP collected the following samples in 2007:

- Seven legal-sized largemouth bass were analyzed for mercury
- Ten carp were analyzed for mercury, selenium, and organics as two composite samples of five carp each
  - In addition to relatively high mercury levels in the carp, PCBs were also high in the previous data and the new data. Advice for carp was based on PCBs.
  - Selenium and other organics were below levels of concern.

**Sample size:** Six redear sunfish were included in the interim advisory for Lake Chabot. Due to an oversight, redear sunfish were included in the updated safe eating guidelines despite a small sample size.

Table 18 shows average mercury levels and PCBs, when relevant, for fish included in the updated safe eating guidelines for Lake Chabot.

Table 18. Average Mercury and Size in Fish from Lake Chabot

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)	Mean PCBs (ppb)
Carp	22	0.56	484	230
Catfish	9	– <sup>11</sup>	416	44
Largemouth bass	16	0.55	371	NA
Redear sunfish	6	0.16	143	NA

NA = not analyzed

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<sup>11</sup> One composite sample of three channel catfish analyzed for mercury was dropped from the dataset due to concerns about data quality. Therefore, sample size was too small for evaluation of mercury levels. Advice for catfish was based on PCB levels.

### 29. *Shadow Cliffs Reservoir (Alameda County)*

Alameda County issued an interim advisory for Shadow Cliffs Reservoir in 2004. No new data were collected for the reservoir, and sample sizes for each fish species previously collected were too small. Therefore, OEHHA did not issue a state advisory for Shadow Cliffs Reservoir.

**Sample sizes:** The number of fish for each species collected at Shadow Cliffs Reservoir was insufficient for OEHHA to evaluate:

- Three carp
- Three channel catfish
- Two largemouth bass

### 30. *Del Valle Reservoir (Alameda County)*

No new data were collected for Del Valle Reservoir. OEHHA updated the safe eating guidelines using prior data and the ATLS. The interim advisory issued in 2004 by Alameda County is now a state advisory.

### 31. *Stevens Creek Reservoir (Santa Clara County)*

Using new data combined with prior data and the ATLS, OEHHA updated the safe eating guidelines for Stevens Creek Reservoir. The interim advisory issued in 2004 by Santa Clara County is now a state advisory.

**New data:** SWAMP sampled at Stevens Creek Reservoir in 2007 and collected the following samples:

- Three legal-sized largemouth bass were analyzed for mercury
- Ten carp were analyzed for mercury, selenium, and organics as two composite samples with five carp each
  - Selenium and organics were below levels of concern; medium mercury levels were measured<sup>12</sup>

**Sample size:** OEHHA did not include three channel catfish in the updated advisory because sample size was too small.

Table 19 shows average mercury levels of fish from Stevens Creek Reservoir used in the updated safe eating guidelines.

Table 19. Average Mercury and Size in Fish from Stevens Creek Reservoir

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Crappie	20	0.60	200
Largemouth bass	15	1.42	446

<sup>12</sup> OEHHA did not know sample sizes for carp at the time of evaluation and, therefore, did not include the SWAMP results in its evaluation. In future advisory updates, advice for mercury can be given for carp at Stevens Creek Reservoir.

### **32. Anderson Reservoir (Santa Clara County)**

Using new data combined with prior data and the ATLS, OEHHA updated the safe eating guidelines for Anderson Reservoir. The interim advisory issued in 2004 by Santa Clara County is now a state advisory.

**New data:** SWAMP collections at Anderson Reservoir in 2007 included:

- Seven legal-sized largemouth bass were analyzed for mercury
- One composite sample of five carp was analyzed for mercury, selenium, and organics
  - Results for selenium and organics were below levels of concern
- An additional composite sample of five carp was analyzed for mercury
- OEHHA evaluated the new mercury data for bass and carp, combined with prior data, when updating the advisory

Table 20 shows average mercury levels for fish included in the safe eating guidelines for Anderson Reservoir.

Table 20. Average Mercury and Size in Fish from Anderson Reservoir

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Carp	22	0.42	458
Crappie	12	0.24	185
Largemouth bass	19	1.13	377

### **33. San Joaquin River from Friant Dam to the Port of Stockton**

OEHHA updated the safe eating guidelines for the San Joaquin River and associated creeks and sloughs using the ATLS and new data for this region. More information on the updated guidelines is provided below.

**New data:** Two projects collected fish samples in the region in 2007.

- The FMP collected fish from several locations on the San Joaquin River and nearby sloughs. OEHHA combined the results with prior data for the species collected. FMP samples were analyzed for mercury and included:
  - 10 bluegill
  - 46 carp
  - 8 channel catfish
  - 18 largemouth bass
  - 10 sucker
- SWAMP sampled fish from an unnamed marsh in Fresno Slough. Sampling included:
  - Ten legal-sized largemouth bass that were analyzed for mercury

- One composite sample of five brown bullheads was analyzed for mercury, selenium, and organics, none of which was at a level of concern
- One additional composite sample of five brown bullheads was analyzed for mercury, which was not found at a level of concern

**Related species:** OEHHA grouped the following related species:

- Catfish: channel catfish, white catfish, and brown bullhead
- Sunfish: bluegill and redear sunfish

Table 21 shows average mercury levels for fish included in the safe eating guidelines for the San Joaquin River from Friant Dam to the Port of Stockton.

Table 21. Average Mercury and Size in Fish from the San Joaquin River

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Bass	186	0.56	385
Carp	95	0.30	558
Catfish	342	0.31	318
Sucker	23	0.29	442
Sunfish	220	0.12	168

The safe eating guidelines for the San Joaquin River also include advice for striped bass and sturgeon as provided in the San Francisco Bay-Delta advisory.

### **34. Grasslands (Merced County)**

Water bodies in the Grasslands in Merced County are within the geographic boundaries covered by the San Joaquin River advisory. Fish from water bodies in the Grasslands were sampled under the FMP and analyzed for mercury. No new selenium data were available for fish from the Grasslands. A comparison of older data for fish from the Grasslands to the ATLS shows that selenium is not at levels of concern. The safe eating guidelines for the San Joaquin River between Friant Dam and the Port of Stockton, based on mercury, apply to water bodies in the Grasslands.

### **35. Lake Nacimiento (San Luis Obispo County)**

OEHHA updated the safe eating guidelines for Lake Nacimiento using new data combined with prior data, and the ATLS. The interim advisory issued in 2007 by San Luis Obispo County<sup>13</sup> is now a state advisory.

**New data:** SWAMP collected the following samples at Lake Nacimiento in 2007:

- 23 legal-size smallmouth bass were analyzed for mercury as individuals

<sup>13</sup> The county issued the interim advisory after consultation with the California Department of Public Health and OEHHA.

- 3 composite samples of five carp each were analyzed for mercury
- A composite sample of all 15 carp was analyzed for selenium and organics, none of which was at a level of concern

**Related species:** OEHHA grouped the following related species:

- Black bass: largemouth, smallmouth, and spotted bass

Table 22 shows average mercury levels for fish included in the safe eating guidelines for Lake Nacimiento.

Table 22. Average Mercury and Size in Fish from Lake Nacimiento

Common Name	Number of Fish	Mean Mercury (ppm)	Mean Total Length (mm)
Bluegill	46	0.36	160
Carp	55	0.50	470
Channel catfish	25	0.54	405
Crappie	22	0.45	251
Sucker	9	0.35	373
Black bass	108	1.01	355
White bass	59	1.15	361

### 36. Harbor Park Lake (Lake Machado) (Los Angeles County)

OEHHA is rescinding the advisory for Harbor Park Lake (also called Lake Machado). SWAMP collected two composite samples of five carp each from Harbor Park Lake in 2007, and analyzed the samples for mercury, selenium, and organics. No chemicals were found at levels of concern.

### 37. Salton Sea (Imperial and Riverside Counties)

OEHHA updated the Salton Sea advisory using new data and the ATLS. The data described below from the Toxic Substances Monitoring Program (TSMP) were collected after the advisory was originally issued for the Salton Sea. The TSMP was subsumed under SWAMP.

**New data:** OEHHA combined data from two sources for the Salton Sea.

- SWAMP analyzed four composite samples, including five tilapia each, for mercury and selenium. One composite of all 20 tilapia was analyzed for organics. None of the organics or mercury was at a level of concern.
- OEHHA combined the SWAMP data with TSMP samples collected in 1991, 1997, 1998, and 2000. The samples were analyzed for selenium and included:
  - 27 tilapia
  - 22 orangemouth corvina
  - 4 sargo
  - 2 Bairdiella (no known common name)

**Other considerations:** Sample sizes are too small for two species, sargo and Bairdiella. These species were more abundant in the past. Populations of fish species in the Salton Sea are reportedly changing from year to year because of extreme and variable water conditions. OEHHA's advice for the Salton Sea is generally for all species that are caught.

Table 23 shows average selenium levels for fish included in the updated safe eating guidelines for the Salton Sea.

Table 23. Average Selenium and Size in Fish from the Salton Sea

Common Name	Number of Fish	Mean Selenium (ppm)	Mean Length <sup>14</sup> (mm)
Tilapia	47	2.42	302
Corvina	22	2.47	590

### **38. Tomales Bay (Marin County)**

No new data were collected for Tomales Bay. OEHHA updated the safe eating guidelines using prior data and the ATLS.

## **Water Bodies with No Changes in Advice**

This section presents water bodies with advice that has not changed at the time of releasing this report.

### **1. Bear Creek (Colusa County)**

No new data were available, and the prior advice for Bear Creek did not change. OEHHA continues to recommend that no one eat fish or shellfish from this water body.

### **2. Guadalupe Reservoir, Calero Reservoir, Almaden Reservoir, Guadalupe River, Guadalupe Creek, Alamitos Creek, and the associated percolation ponds along the river and creeks (Santa Clara County)**

No new data were available, and the prior advice for these water bodies in the Guadalupe and Almaden area did not change. OEHHA continues to recommend that no one eat fish from these water bodies.

### **3. San Francisco Bay**

The advisory for San Francisco Bay has not been updated yet. New data are available, which OEHHA will use to update the advisory in the future.

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<sup>14</sup> TSMP measured fish fork length, which is slightly less than the total length. SWAMP measured total length. The mean length for tilapia includes both fork length and total length. The mean length for corvina is in fork length.

#### **4. Southern California**

The advisory for Southern California including Santa Monica Bay has not been updated yet. At the time of writing and release of this report, OEHHA is evaluating new data for Santa Monica and San Pedro bays. An updated advisory is planned for this area.

### **Safe Eating Guidelines issued for Water Bodies in 2008 – 2009**

OEHHA issued safe eating guidelines for the following water bodies in late 2008 or 2009. The ATLS were used in data evaluation for these water bodies. Therefore, no updates were needed.

#### **1. Folsom Lake (Sacramento County)**

OEHHA issued safe eating guidelines for Folsom Lake in October 2008.

#### **2. Lake Natoma (Sacramento County)**

OEHHA issued safe eating guidelines for Lake Natoma in October 2008.

#### **3. San Pablo Reservoir (Contra Costa County), February 2009**

OEHHA issued safe eating guidelines for San Pablo Reservoir in February 2009. The recent advisory is an update of previous guidelines issued by OEHHA and Contra Costa County.

#### **4. Sacramento River (from below Shasta Lake to Pittsburg) and the Northern Delta (other water bodies in the Delta north of Highway 12)**

The safe eating guidelines for the Sacramento River and Northern Delta did not change. The draft guidelines, which were based on the ATLS, were issued in April 2008 and updated in August 2008. New data were not considered at that time, but they are consistent with the previous findings.

**New data:** Water bodies in this region were sampled in 2007 under two projects.

- In 2007, SWAMP sampled the following fish species from Meadows Slough in the Northern Delta:
  - Seven legal-sized largemouth bass were analyzed for mercury
  - Two composite samples made of five suckers each were analyzed for mercury
  - One of the two composite samples (made of five suckers) was analyzed for selenium and organics, none of which was at a level of concern

- The FMP sampled several water bodies in the Northern Delta including locations on the Sacramento River in 2007. The following species were analyzed for mercury as part of this sampling:
  - 13 bluegill
  - 26 redear sunfish
  - 15 carp
  - 12 crappie
  - 8 channel catfish
  - 6 white catfish
  - 33 largemouth bass
  - 8 pikeminnow
  - 24 sucker
  - 7 tule perch

**Other considerations:** The addition of seven tule perch to the previous sample of six tule perch would allow OEHHA to issue advice. This species can be added in the next round of updates for this advisory.