



Health Advisory and Guidelines for Eating Fish from Indian Valley Reservoir (Lake County)

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LIST OF ACRONYMS AND ABBREVIATIONS

ATL	Advisory Tissue Level
CDFW	California Department of Fish and Wildlife
DDT(s)	dichlorodiphenyltrichloroethane (DDT) and its metabolites dichlorodiphenyldichloroethane (DDD) and dichlorodiphenyldichloroethylene (DDE)
DHA	docosahexaenoic acid
DWR	Department of Water Resources
EPA	eicosapentaenoic acid
FDA	Food and Drug Administration
FMP	Fish Mercury Project
Hg	mercury
MDL	method detection limit
MLML	Moss Landing Marine Laboratories
mm	millimeters
OEHHA	Office of Environmental Health Hazard Assessment
PBDEs	polybrominated diphenyl ethers
PCBs	polychlorinated biphenyls
ppb	parts per billion
RL	reporting limit
Se	selenium
SWAMP	Surface Water Ambient Monitoring Program
USDA	United States Department of Agriculture
USDHHS	United States Department of Health and Human Services
US EPA	United States Environmental Protection Agency

PREFACE

The Office of Environmental Health Hazard Assessment (OEHHA), a department in the California Environmental Protection Agency, is responsible for evaluating potential public health risks from chemical contamination of sport fish. This includes issuing fish consumption advisories, when appropriate, for the State of California. OEHHA's authorities to conduct these activities are based on mandates in the:

- California Health and Safety Code
 - Section 59009, to protect public health
 - Section 59011, to advise local health authorities
- California Water Code
 - Section 13177.5, to issue health advisories

The health advisories are published in the California Department of Fish and Wildlife Sport Fishing Regulations in the section on public health advisories.


This report presents guidelines for eating fish from Indian Valley Reservoir in Lake County. The report provides background information and a technical description of how the guidelines were developed. The resulting advice is summarized in the illustrations after the Table of Contents and the List of Figures and Tables.

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Women
(18 – 49 Years)

Children
(1 – 17 Years)



Women
(50+ Years)


Men
(18+ Years)

A GUIDE TO EATING FISH


from INDIAN VALLEY RESERVOIR

(LAKE COUNTY)


Eat the Good Fish
Eating fish that are low in chemicals may provide health benefits to children and adults.




Avoid the Bad Fish
Eating fish with higher levels of chemicals like mercury or PCBs may cause health problems in children and adults.




Choose the Right Fish
Chemicals may be more harmful to unborn babies and children.




Channel Catfish



Sunfish Species



Black Bass Species



Common Carp

1 TOTAL SERVINGS A WEEK

2 TOTAL SERVINGS A WEEK


OR

0 DO NOT EAT


1 TOTAL SERVING A WEEK

Serving Size
A serving of fish is about the size and thickness of your hand. Give children smaller servings.

For Adults




For Children




California Office of Environmental Health Hazard Assessment

web www.oehha.ca.gov/fish
 email fish@oehha.ca.gov
 phone (916) 324-7572

Eat only the skinless fillet



Eat only the meat



Some chemicals are higher in the skin, fat, and guts.

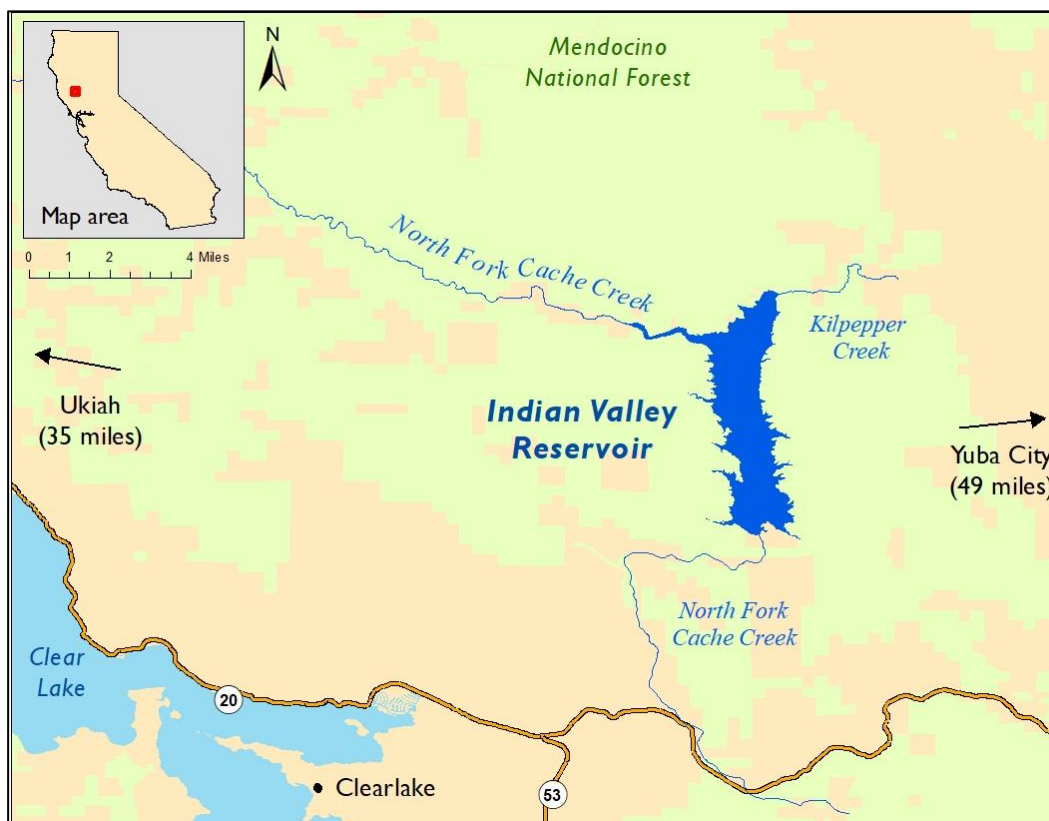
INTRODUCTION

This report presents guidelines for eating black bass species, Channel Catfish, Common Carp, and sunfish species from Indian Valley Reservoir (Figure 1). Consumption advice is based on levels of mercury found in these species.

LOCATION

Indian Valley Reservoir is located about 11 miles northeast of the town of Clearlake, in Lake County, CA. The six-mile long reservoir was formed by the construction of Indian Valley Dam in 1975, which impounded North Fork Cache Creek. The lake and dam are owned by the Yolo County Flood Control and Water Conservation District, and the Bureau of Land Management manages the surrounding Indian Valley Management Area.¹

FIGURE 1. LOCATION OF INDIAN VALLEY RESERVOIR



¹Information regarding Indian Valley Reservoir was obtained from the Yolo County Flood Control and Water Conservation District and the Bureau of Land Management. Online at: <http://ycfcwcd.org/infrastructure.html> and <https://www.blm.gov/visit/indian-valley-management-area>.

APPROACH USED

The Office of Environmental Health Hazard Assessment (OEHHA) used the results from two monitoring studies described in this report to develop the Indian Valley Reservoir Advisory. OEHHA uses the following general process in developing consumption advice for sport fish:

- 1) Evaluation of all fish contaminant data available from a water body and selection of appropriate data that meet data quality criteria and sampling plan guidelines.
- 2) Determination of fish species for which adequate data are available to issue fish consumption advice.
- 3) Calculation of an appropriate measure of central tendency (often a weighted arithmetic mean²) and other descriptive statistics of the contaminant data, as appropriate, for a chemical of potential concern for the selected fish species.
- 4) Comparison of the chemical concentrations with the OEHHA Advisory Tissue Levels (ATLs) for each chemical of potential concern.
- 5) Development of final advice based on a thorough review of the data and best professional judgment relating to the benefits and risks of consuming a particular fish species.

The ATLs (discussed further in a subsequent section of this report) are chemical levels in fish tissue that are considered acceptable, based on chemical toxicity, for a range of consumption rates. Development of the ATLs also included consideration of health benefits associated with including fish in the diet (OEHHA, 2008). The ATLs should not be interpreted as static “bright lines,” but one component of a complex process of data evaluation and interpretation used by OEHHA in the assessment and communication of the benefits and risks of consuming sport fish.

CHEMICALS OF POTENTIAL CONCERN

Certain chemicals are of potential concern for people who eat fish because of their toxicity and their ability to accumulate in fish tissue. The majority of fish consumption advisories in California are issued because of mercury (Hg), followed by polychlorinated biphenyls (PCBs) and, in a few cases, selenium (Se), polybrominated diphenyl ethers (PBDEs), or some legacy pesticides (pesticides that are no longer used but remain in the environment).

Mercury is a natural element found in some rock and soil. Human activities, such as burning coal and the historical use of mercury to mine gold, also add mercury to the environment. If mercury enters waterways, it can be converted to a more toxic form

² Means are an arithmetic average of individual values and/or composites weighted by number of fish. A weighted average of composites is calculated by multiplying the chemical concentration in each composite by the number of fish in that composite for each species. Products are then summed and divided by the total number of fish in all composites for that species.

known as methylmercury – which can pass into and build up in fish. High levels of methylmercury can harm the brain, especially in fetuses and children.

PCBs are industrial chemicals previously used in electrical transformers, plastics, and lubricating oils, often as flame retardants or electrical insulators. Their use was banned in the 1970s, but they persist in the environment because they do not break down easily and can accumulate in fish. Depending on the exposure level, PCBs may cause cancer or other health effects, including neurotoxicity, in humans.

Selenium is a naturally occurring metalloid and at low doses is an essential nutrient for many important human health processes, including thyroid regulation and vitamin C metabolism. Higher doses cause selenium toxicity, which can include symptoms ranging from hair loss and gastrointestinal distress to dizziness and tremors.

Chlordanes, dichlorodiphenyltrichloroethane (DDT), dieldrin, and toxaphene are pesticides that were banned from use in 1973 (DDT), the late 1980s (chlordanes and dieldrin) and 1990 (toxaphene), but are still found in some fish in certain California water bodies. Depending on the exposure level, these chemicals may cause cancer or adverse effects on the nervous system.

PBDEs are a class of flame retardants historically used in a variety of consumer products, including furniture, textiles, automotive parts, and electronics. The use of PBDEs in new products was largely phased out by 2013 but, due to their wide usage and persistence in the environment, they are still being detected in fish tissues. PBDEs may affect hormone levels or learning and behavior in children.

Detailed discussion of the toxicity of these chemicals and references are presented in “Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in California Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene” (OEHHA, 2008) and “Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in California Sport Fish: Polybrominated Diphenyl Ethers (PBDEs)” (OEHHA, 2011).

All fish species collected from Indian Valley Reservoir and used in advisory development were analyzed for mercury (as a measure of methylmercury). Fish species that do not normally accumulate PCBs or other organic chemicals may not be analyzed for those contaminants in a particular monitoring study. Additionally, some studies do not analyze these chemicals and instead focus only on mercury.

DATA SOURCES

The guidelines for eating fish from Indian Valley Reservoir are based on the chemicals detected in the fish collected for the two monitoring studies described below. These studies met OEHHA’s data quality criteria, including adequate documentation of sample collection, fish preparation methods (e.g., skinning or filleting), chemical analyses, quality assurance, and sufficiently low detection limits. “Sample,” as used in this report,

refers to an individual fish or a composite of multiple fish for which contaminant data were reported. “Sampling” or “sampled” refers to the act of collecting fish for chemical analysis.

FISH MERCURY PROJECT (FMP)

The FMP was a three-year (2005 to 2007) sampling program funded by the California Bay-Delta Program³ (CALFED) (SFEI, 2009). Monitoring of sport fish from Central Valley water bodies was planned and conducted by staff at the California Department of Fish and Wildlife (CDFW), OEHHA, the California Department of Public Health, the University of California-Davis, and the San Francisco Estuary Institute. Fish were collected from popular fishing locations in the Central Valley Regional Water Board jurisdiction to help characterize the spatial and temporal mercury trends in fishery resources. The study collected Channel Catfish, Common Carp, Largemouth Bass, Pumpkinseed, and Redear Sunfish from Indian Valley Reservoir in 2006, which were analyzed for total mercury.

MERCURY CONTAMINATION IN FISH FROM NORTHERN CALIFORNIA LAKES AND RESERVOIRS (DWR)

The Department of Water Resources (DWR) collected fish from twenty lakes and reservoirs in northern California during the spring and summer of 2000 and 2001 (DWR, 2007) to provide an initial summary of the mercury contamination in northern California. The study collected Channel Catfish and Largemouth Bass from Indian Valley Reservoir in 2000, which were analyzed for total mercury.

FISH SAMPLED FROM INDIAN VALLEY RESERVOIR

The fish sampling data used in this advisory were retrieved from the California Environmental Data Exchange Network (CEDEN), the state’s repository for environmental data. Samples were excluded when the fish were not legal size to take or did not meet OEHHA’s criteria for minimum “edible” size based on species size at maturity, and professional judgment (as described in OEHHA, 2005). A summary of all fish species evaluated for this advisory is shown in Table 1, including the name of the species, number of samples collected, total number of fish, project name, year sampled, and contaminants analyzed.

³ The CALFED Bay Delta Program was a state and federal partnership to improve water quality, increase water supply, as well as support ecosystem restoration and levee improvement in the San Francisco Bay-Delta.

TABLE 1. FISH SAMPLES EVALUATED FOR THE INDIAN VALLEY RESERVOIR ADVISORY

Common Name	Scientific Name	Number of Samples	Total Number of Fish	Project	Year Collected	Contaminants Analyzed
Channel Catfish	<i>Ictalurus punctatus</i>	7	7	FMP	2006	Hg
		2	5	DWR ^a	2000	Hg
Common Carp	<i>Cyprinus carpio</i>	5	5	FMP	2006	Hg
Largemouth Bass	<i>Micropterus salmoides</i>	8	8	FMP	2006	Hg
		1	4	DWR ^a	2000	Hg
Pumpkinseed	<i>Lepomis gibbosus</i>	5	5	FMP	2006	Hg
Redear Sunfish	<i>Lepomis microlophus</i>	5	5	FMP	2006	Hg

Samples were analyzed as skinless fillets, with the following exception:

^aStudy report did not specify whether skin was removed from fillets prior to tissue analysis.

CHEMICAL CONCENTRATIONS

As shown in Table 1, samples were analyzed for mercury. Fish samples collected for FMP were prepared as skinless fillets. The DWR study did not record the fillet preparation. Samples were analyzed as individual fish or composites.

For this advisory, OEHHA used the weighted (by the number of individual fish) arithmetic mean (average) of the chemical concentrations (in wet weight) for each fish species to estimate average human exposure.

MERCURY

Samples were analyzed for total mercury, as either individual fish or composite samples, using a direct mercury analyzer (DMA) at the CDFW Moss Landing Marine Laboratories (MLML). The DMA method utilizes thermal decomposition and atomic absorption. OEHHA assumed all mercury detected was methylmercury, which is the most common form found in fish and is also the more toxic form (Bloom, 1992). Table 2 shows the averages and ranges for total length⁴, as well as mercury concentrations in

⁴ Total length is the maximum length of the fish, measured from the tip of the closed mouth to the tip of the pinched tail fin.

each fish species. The DMA method detection limit (MDL)⁵ and the reporting limit (RL)⁶ for total mercury were both reported at 12 parts per billion (ppb) for the FMP study. Although mercury was detected at commonly found concentrations in the DWR study, the MDL and RL for mercury were not reported.

TABLE 2. MERCURY CONCENTRATIONS IN FISH FROM INDIAN VALLEY RESERVOIR

Species from Indian Valley Reservoir ^a	Number of Samples	Total Number of Fish	Mean* Total Length (mm)	Range of Total Lengths** (mm)	Mercury (ppb)	
					Mean*	Range**
Channel Catfish	9	12	364	281 – 499	383	186 – 911
Common Carp	5	5	518	453 – 587	456	334 – 544
Largemouth Bass	9	12	333	311 – 371	840	670 – 1140
Sunfish Species	10	10	153	137 – 173	274	173 – 414
Pumpkinseed	5	5	151	137 – 160	268	202 – 321
Redear Sunfish	5	5	155	146 – 173	279	173 – 414

^aSamples were prepared as skinless fillets, except as noted in the footnotes to Table 1.

*Means are an arithmetic average of individual values and/or a weighted average of composites.

**Range of individuals and/or range of the composites.

DEVELOPMENT OF GUIDELINES FOR EATING FISH FROM INDIAN VALLEY RESERVOIR

The OEHHA fish advisory process considers the health benefits of fish consumption as well as the risk from exposure to the chemical contaminants found in fish. Benefits are included in the advisory process because there is considerable evidence and scientific consensus that fish should be part of a healthy well-balanced diet. Fish contain many nutrients that are important for general health and, in particular, help promote optimal growth and development of babies and young children, and may reduce the incidence of heart disease in adults (FDA/US EPA, 2017; American Heart Association, 2016; OEHHA, 2008; Institute of Medicine, 2007; Kris-Etherton et al., 2002). Fish are a significant source of the beneficial omega-3 fatty acids, docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) (USDA/USDHHS, 2020; Weaver et al., 2008).

The US Department of Agriculture (USDA) recommends “including at least 8 ounces of cooked seafood⁷ per week. Young children need less, depending on their age and calorie needs” (MyPlate.gov). According to the 2020-2025 Dietary Guidelines, “women who are pregnant or lactating should consume at least 8 and up to 12 ounces of a variety of seafood per week from choices that are lower in methylmercury” (USDA/USDHHS, 2020). Additionally, “based on FDA and EPA’s advice, depending on

⁵ The MDL is the lowest quantity of a chemical that can be distinguished (as greater than zero) in a sample.

⁶ The RL is the lowest quantity of a chemical that can be accurately quantified in a sample.

⁷ Seafood as used here refers to fish and shellfish from freshwater and marine environments.

body weight, some women should choose seafood lowest in methylmercury or eat less seafood than the amounts in the Healthy U.S.-Style Dietary Pattern” (USDA/USDHHS, 2020). For more-detailed information, see USDA/USDHHS (2020) and other USDA MyPlate.gov materials. The particular fish that people eat is an important factor in determining the net beneficial effects of fish consumption. For example, studies have shown that children of mothers who ate low-mercury fish during pregnancy scored better on cognitive tests compared to children of mothers who did not eat fish or ate high-mercury fish (Oken et al., 2005 and 2008). Accordingly, because of the high mercury content of certain fish species, the US Food and Drug Administration (FDA) and the US Environmental Protection Agency recommend that women who are pregnant (or might become pregnant) or breastfeeding, and young children avoid consuming shark, swordfish, tilefish (Gulf of Mexico), bigeye tuna, marlin, orange roughy, and king mackerel (FDA/US EPA, 2017).

To address the potential health concerns associated with exposure to contaminants in sport fish, OEHHA has established ATLS for chemicals that are known to accumulate in the edible tissues of fish. ATLS consider both the toxicity of the chemical and potential benefits of eating fish. OEHHA uses the ATLS to determine the maximum number of servings per week that consumers should eat, for each species and at each location, to limit their exposure to these contaminants. Consumers can use OEHHA’s guidance when choosing which fish and how much to eat as part of an overall healthy diet.

There are two sets of ATLS for methylmercury in fish because of the age-related toxicity of this chemical (OEHHA, 2008). The fetus and children are more sensitive to the toxic effects of methylmercury. Thus, the ATLS for the sensitive population, including women who might become pregnant (typically 18 to 49 years of age) and children 1-17 years, are lower than those for women 50 years and older and men 18 years and older. The lower ATL values for the sensitive population provide additional protection to allow for normal growth and development of the brain and nervous system of unborn babies and children. Detailed discussion about the toxicity of common fish contaminants and health benefits of fish consumption, as well as derivation of the ATLS, are provided in “Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in California Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene” (OEHHA, 2008) and “Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in California Sport Fish: Polybrominated Diphenyl Ethers (PBDEs)” (OEHHA, 2011). A list of the ATLS used in this report is presented in Appendix I.

For each fish species in this advisory, OEHHA compared the mean mercury concentration detected in the fillet to the corresponding ATLS to establish the maximum number of servings per week that could be consumed (see Appendix I). For fish fillets, a serving size is considered to be 8 ounces, prior to cooking, or about the size and thickness of a hand. Children should be given smaller servings. For smaller fish species, several individual fish may be required to yield a serving.

OEHHA recommends that individuals strive to meet the US Dietary Guidelines' seafood consumption recommendations, while also adhering to federal and OEHHA recommendations to limit the consumption of fish with higher contaminant levels. The advice discussed in the following section represents the maximum recommended number of servings per week for different fish species. People should eat no more than the recommended number of servings for each fish species or species group. OEHHA's consumption advice for a particular fish species can be extended to other closely related fish species⁸ known to accumulate similar levels of contaminants.

Consumption advice should not be combined. That is, if a person chooses to eat a serving of fish from the "one-serving-a-week" category, then they should not eat any other fish from any source (including commercial) until the next week. If a person chooses to eat a serving of fish from the "two-servings-per-week" category, they can combine fish species from that category, or eat one serving of fish from that category and one from a category that recommends more than two servings per week (if available), for a total of two servings in that week. Then they should not eat any other fish from any source (including commercial) until the following week.

CONSUMPTION ADVICE FOR FISH FROM INDIAN VALLEY RESERVOIR

OEHHA's advisory protocol requires that a minimum of nine edible-size fish of a species that may be legally caught are collected and analyzed from small- and medium-sized lakes and reservoirs before an advisory can be developed. Additional fish beyond this number will increase confidence that the sample dataset is representative of the fish species population in the water body (OEHHA, 2005). The majority of fish consumption advisories in California are based on mercury, which is typically analyzed in individual fish, rather than as composites. Mercury analysis is relatively inexpensive and mercury concentrations in fish are more likely to be positively correlated with fish size than other contaminants. Thus, individual analysis allows for advice to be based on fish size, when appropriate. In some cases, an exception is made regarding the minimum sample size. This is particularly true if the advice leads to more health-protective advice than would otherwise be provided.

For Indian Valley Reservoir, the sample size criterion was met for mercury for all species except Common Carp. Although the sample size was fewer (n=5) than the preferred number of samples, the data were included because the elevated mercury concentration in these samples prompted "do not consume" advice for the sensitive population. There were not sufficient data to evaluate other species that may be found in this water body. For fish species found in Indian Valley Reservoir that are not included in this advisory, OEHHA recommends following the [statewide advisory for lakes and reservoirs without site-specific advice](#).

⁸ Fish species within the same genus are most closely related, and family is the next level of relationship.

The following advice is based solely on mercury concentrations. The sensitive population is defined as women 18 to 49 years and children 1 to 17 years, and the general population is defined as women 50 years and older and men 18 years and older.

BLACK BASS SPECIES (LARGEMOUTH BASS)

OEHHA has evaluated mercury concentrations in black bass species in many water bodies in California and has found a similar range of mercury concentrations when two or more of these species were caught from the same water body. Therefore, OEHHA extends the consumption advice for Largemouth Bass to other black bass species, including Redeye, Smallmouth, and Spotted Bass.

Based on the mean mercury concentration of 840 ppb in Largemouth Bass, OEHHA recommends no consumption of black bass species from Indian Valley Reservoir for the sensitive population, and a maximum of one serving a week for the general population.

CHANNEL CATFISH

The mean mercury concentration in Channel Catfish from Indian Valley Reservoir was 383 ppb. OEHHA recommends a maximum of one serving a week of Channel Catfish for the sensitive population, and a maximum of two servings a week for the general population.

COMMON CARP

Based on the mean mercury concentration of 456 ppb, OEHHA recommends no consumption of Common Carp from Indian Valley Reservoir for the sensitive population, and a maximum of one serving a week for the general population.

SUNFISH SPECIES (PUMPKINSEED, REDEAR SUNFISH)

OEHHA has evaluated mercury concentrations in sunfish species in many water bodies in California and has found a similar range of mercury concentrations when two or more of these species were caught from the same water body. Therefore, OEHHA extends the consumption advice for sunfish species (Pumpkinseed, Redear Sunfish) to other sunfish species, including Bluegill and Green Sunfish.

The mean mercury concentration in sunfish species from Indian Valley Reservoir was 274 ppb. Mercury concentrations for individual sunfish species were as follows, Pumpkinseed (Hg: 268 ppb), and Redear Sunfish (Hg: 279 ppb). Based on the concentration of mercury in these sunfish species, OEHHA recommends a maximum of one serving a week of sunfish species for the sensitive population, and a maximum of two servings a week for the general population.

RECOMMENDED MAXIMUM NUMBER OF SERVINGS

The recommended maximum numbers of servings per week for fish from Indian Valley Reservoir are shown in Table 3.

TABLE 3. RECOMMENDED MAXIMUM NUMBER OF SERVINGS PER WEEK FOR FISH FROM INDIAN VALLEY RESERVOIR

Fish Species from Indian Valley Reservoir	Women 18–49 years and Children 1-17 years	Women 50 years and older and Men 18 years and older
Black Bass Species	0	1
Channel Catfish	1	2
Common Carp	0	1
Sunfish Species	1	2

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APPENDIX. ADVISORY TISSUE LEVELS

Advisory Tissue Levels (ATLs; OEHHA, 2008 and 2011) guide the development of advice for people eating sport fish. ATLs are levels of contaminants found in fish that correspond to the maximum numbers of recommended fish servings. OEHHA uses ATLs to provide advice to prevent consumers from being exposed to:

- More than the reference dose⁹ on an average daily basis for chemicals not known to cause cancer, such as methylmercury, or
- For cancer-causing chemicals, a risk level greater than one additional cancer case in a population of 10,000 people consuming fish at the given consumption rate over a lifetime. This cancer endpoint is the maximum acceptable risk level recommended by the US EPA (2000b) for fish advisories.

For each chemical, ATLs were determined for both cancer and non-cancer risk, if appropriate, for one to seven eight-ounce servings per week. The most health-protective ATLs for each chemical, selected from either cancer or non-cancer based risk, are shown in the table below for zero to seven servings per week. When the guidelines for eating fish are followed, exposure to chemicals in fish would be at or below the average daily reference dose or the cancer risk probability of one in 10,000.

ADVISORY TISSUE LEVELS FOR SELECTED ANALYTES

Contaminant	Consumption Frequency Categories (8-ounce servings/week) ^a and ATLs (in ppb)							
	7	6	5	4	3	2	1	0
Chlordanes	≤ 80	>80–90	>90–110	>110–140	>140–190	>190–280	>280–560	>560
DDTs	≤ 220	>220–260	>260–310	>310–390	>390–520	>520–1,000	>1,000–2,100	>2,100
Dieldrin	≤ 7	>7–8	>8–9	>9–11	>11–15	>15–23	>23–46	>46
MeHg (Women 18–49 and children 1–17)	≤ 31	>31–36	>36–44	>44–55	>55–70	>70–150	>150–440	>440
MeHg (Women ≥ 50 and men ≥ 18)	≤ 94	>94–109	>109–130	>130–160	>160–220	>220–440	>440–1,310	>1,310
PBDEs	≤ 45	>45–52	>52–63	>63–78	>78–100	>100–210	>210–630	>630
PCBs	≤ 9	>9–10	>10–13	>13–16	>16–21	>21–42	>42–120	>120
Selenium	≤ 1000	>1,000–1200	>1,200–1,400	>1,400–1,800	>1,800–2,500	>2,500–4,900	>4,900–15,000	>15,000
Toxaphene	≤ 87	>87–100	>100–120	>120–150	>150–200	>200–300	>300–610	>610

^a Serving sizes (prior to cooking, wet weight) are based on an average 160-pound person. Individuals weighing less than 160 pounds should eat proportionately smaller amounts.

⁹ The reference dose is an estimate of the maximum daily exposure to a chemical likely to be without significant risk of harmful health effects over a lifetime.