



Health Advisory and Guidelines for Eating Fish from Shadow Cliffs Lake (Alameda 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 dichlorodiphenyl dichloroethane (DDD) and dichlorodiphenyldichloroethylene (DDE) |
| FDA | Food and Drug Administration |
| Hg | Mercury |
| OEHHA | Office of Environmental Health Hazard Assessment |
| MDL | method detection limit |
| mm | millimeters |
| PCBs | polychlorinated biphenyls |
| ppb | parts per billion |
| RL | reporting limit |
| RWB-2 | Regional Water Quality Control Board, San Francisco Bay Region |
| 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 task 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 Shadow Cliffs Lake in Alameda County. The report provides background information and a description of how the guidelines were developed. The resulting advice is summarized in the illustration after the Table of Contents and List of Figures and Tables.

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A Guide to Eating Fish from Shadow Cliffs Lake

Women 18 - 45 years and Children 1 - 17 years



Catfish



Sunfish species



Carp



Black bass species

2 servings a week

OR

1 serving a week

Do not eat

Women 46 years and older and Men 18 years and older



Catfish



Sunfish species



Black bass species ♥



Carp

No fish in this group

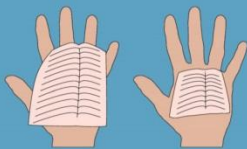
6 servings a week

OR

1 serving a week

Do not eat

What is a serving?



For Adults For Children

A serving is the size and thickness of your hand. Give children smaller servings.

♥ Why eat fish?

Eating fish is good for your health. Fish have Omega-3s that can reduce your risk for heart disease and improve how the brain develops in unborn babies and children.

♥ = Fish high in Omega-3s

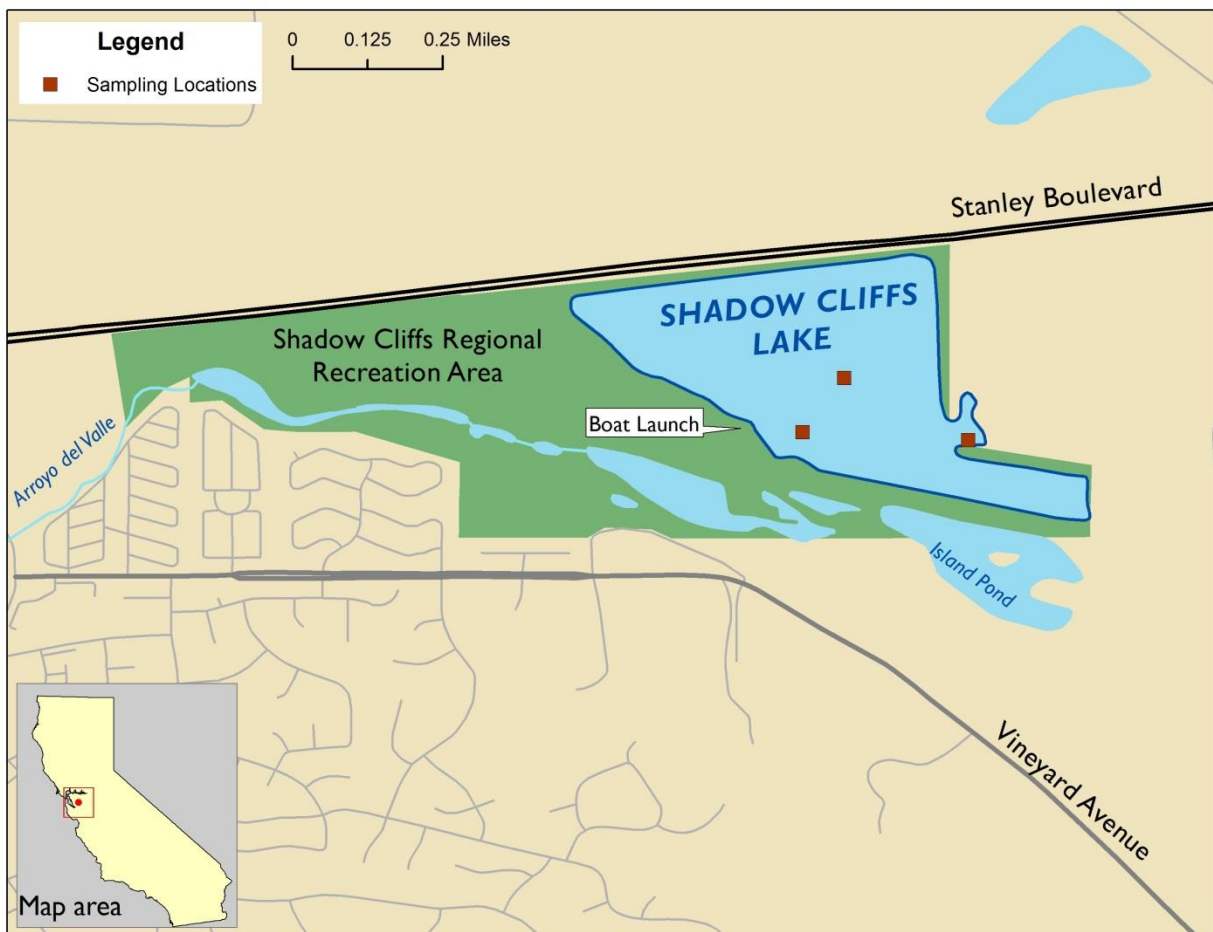
What is the concern?

Some fish have high levels of mercury and PCBs. Mercury can harm the brain, especially in unborn babies and children. PCBs can cause cancer.

INTRODUCTION

This report presents guidelines for eating fish from Shadow Cliffs Lake (Figure 1) in Alameda County, California, between Pleasanton and Livermore. The lake was formerly a rock quarry owned by Kaiser Industries and donated to the East Bay Regional Park District (EBRPD). Shadow Cliffs Regional Recreation Area (SCRRA) was opened in 1971. The lake has a surface area of about 80 acres. A number of water bodies are connected to the lake by an arroyo.¹ This advisory only applies to Shadow Cliffs Lake and not adjacent water bodies.

FIGURE 1. LOCATION OF SHADOW CLIFFS LAKE IN CALIFORNIA



¹ http://www.ebparks.org/parks/shadow_cliffs
Shadow Cliffs Lake Fish Advisory

APPROACH USED

OEHHA used the results from three monitoring projects described in this report to develop the fish advisory for Shadow Cliffs Lake. 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 mean) and other descriptive statistics, 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 benefits and risks of consuming a particular fish species.

The ATLs (discussed further in a subsequent section of this report) are chemical exposure 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 benefits and risks of consuming fish.

CHEMICALS OF POTENTIAL CONCERN

Certain chemicals are considered to be 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 methylmercury (the more toxic form of mercury found in fish), followed by polychlorinated biphenyls (PCBs), and in a few cases, some legacy pesticides (pesticides that are no longer used but remain in the environment).

High levels of methylmercury can harm the brain, especially in fetuses and children as they grow. PCBs are man-made 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 can cause cancer and other health effects, including neurotoxicity, in humans. Chlordanes, DDT, and dieldrin are pesticides that were banned from use in 1973 (DDT) and in the late 1980s (chlordanes and dieldrin) but have been found in some fish in certain water bodies in California. Depending on the exposure level, these chemicals may cause cancer or other adverse effects on the nervous system. 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).

Fish samples from Shadow Cliffs Lake were analyzed for mercury (as a measure of methylmercury), PCBs, and the pesticides dieldrin, chlordanes, and DDTs (DDT and its metabolites).

DATA SOURCES

The guidelines for eating fish from Shadow Cliffs Lake are based on chemical analysis of fish samples from the three monitoring studies described below. These studies met OEHHA’s data quality criteria, including adequate documentation of sample collection, fish preparation, chemical analyses, quality assurance, and low detection limits.

SURFACE WATER AMBIENT MONITORING PROGRAM (SWAMP)

The SWAMP, operated by the State Water Resources Control Board (SWRCB), monitors water quality in California’s surface waters. In 2007 and 2008, the program performed a statewide survey of inland water bodies. The survey collected Channel Catfish and Largemouth Bass from Shadow Cliffs Lake in 2008. Channel Catfish were analyzed for chlordanes, dieldrin, DDTs, mercury, and PCBs. Largemouth Bass were analyzed for mercury only.

REGIONAL WATER QUALITY CONTROL BOARD, SAN FRANCISCO BAY (RWB-2) FISH CONTAMINATION STUDY

The RWB-2 collected Largemouth Bass and Rainbow Trout to analyze for mercury in 2005. Bluegill, Carp and Channel Catfish were also collected in the same year to characterize levels of chlordanes, DDTs, dieldrin, PCBs, and mercury. Additional Channel Catfish were collected in 2010 as a follow-up study to fill in data gaps from a statewide SWAMP sampling effort.

TOXIC SUBSTANCES MONITORING PROGRAM (TSMP)

The TSMP (1976-2003) was a state water quality-monitoring program managed by the State Water Resources Control Board (SWRCB, 2013). Its objective was to provide statewide information on the occurrence of toxic substances by monitoring water bodies with known or suspected water quality impairment. California Department of Fish and Wildlife (CDFW) staff collected Largemouth Bass, Carp, and Channel Catfish from Shadow Cliffs Lake as part of the TSMP. Fish samples were analyzed for the suite of common fish contaminants (mercury, PCBs, DDTs, chlordanes, and dieldrin).

The fish sampled from Shadow Cliffs Lake are shown in Table 1, including the species, number of samples collected, total number of fish, project, year, and contaminants

analyzed. The samples collected either met the California Department of Fish and Wildlife’s (CDFW) legal size requirements (for Largemouth Bass; CDFW, 2015-2016), or OEHHA’s criteria for minimum “edible” size based on species size at maturity and professional judgment (OEHHA, 2005).

TABLE 1. FISH COLLECTED FROM SHADOW CLIFFS LAKE

| Common Name | Scientific Name | Number of Samples | Total Number of Fish | Project | Year | Contaminants Analyzed |
|-----------------|------------------------------|-------------------|----------------------|---------|------|--------------------------------------|
| Bluegill | <i>Lepomis macrochirus</i> | 2 | 12 | RWB-2 | 2005 | Chlordanes, DDTs, Dieldrin, Hg, PCBs |
| Carp | <i>Cyprinus carpio</i> | 1 | 3 | TSMP | 2002 | Chlordanes, DDTs, Dieldrin, Hg |
| | | 2 | 6 | RWB-2 | 2005 | Chlordanes, DDTs, Dieldrin, Hg, PCBs |
| Channel Catfish | <i>Ictalurus punctatus</i> | 1 | 3 | TSMP | 2002 | Chlordanes, DDTs, Dieldrin, Hg |
| | | 3 | 9 | RWB-2 | 2005 | Chlordanes, DDTs, Dieldrin, Hg, PCBs |
| | | 2 | 10 | RWB-2 | 2010 | Hg, PCBs |
| | | 3 | 9 | SWAMP | 2008 | Chlordanes, DDTs, Dieldrin, Hg, PCBs |
| Largemouth Bass | <i>Micropterus salmoides</i> | 2 | 2 | TSMP | 2002 | Hg |
| | | 3 | 10 | RWB-2 | 2005 | Hg |
| | | 7 | 7 | SWAMP | 2008 | Hg |
| Rainbow Trout | <i>Oncorhynchus mykiss</i> | 2 | 2 | RWB-2 | 2005 | Hg |

RWB-2 = San Francisco Regional Water Quality Control Board

SWAMP = Surface Water Ambient Monitoring Program

TSMP = Toxic Substances Monitoring Program

Hg = Mercury

CHEMICAL CONCENTRATIONS

Fish samples were prepared as skinless fillets. They were analyzed for total mercury, legacy pesticides, and PCBs (54 congeners²), either as individual fish or composite samples, prepared from equal amounts of tissue from several similarly sized fish of a species. For composite samples, the total length of the smallest fish in the sample must be at least 75% of the length of the largest fish in the composite. OEHHA used the

² Congeners are related compounds with similar chemical forms. Of the 209 possible PCB congeners, 54 are generally reported.

arithmetic mean (average) of the chemical concentrations for each fish species to estimate average human exposure.

MERCURY

The CDFW Moss Landing Marine Laboratories analyzed all species collected from Shadow Cliffs Lake for total mercury, either as individual fish or composite samples, using a DMA (direct mercury analyzer). This method is an integration of thermal decomposition and atomic absorption. OEHHA assumed all total mercury detected was methylmercury, the more toxic form that is present in fish, because nearly all mercury present in fish is methylmercury (Bloom, 1992). Table 2 shows the averages and ranges for total length³ and mercury concentrations in each fish species. Results were reported in wet weight. The method detection limit (MDL)⁴ for total mercury was either 9 or 12 parts per billion (ppb). The reporting limit (RL)⁵ was either 12, 26 or 36 ppb.

PESTICIDES AND PCBs

Composite samples comprised of 3-5 individual fish were analyzed for legacy pesticides and PCBs in Bluegill, Carp and Channel Catfish. Pesticides and PCBs were analyzed by gas chromatography at the CDFW Water Pollution Control Laboratory.

For PCBs, chlordanes, and DDTs, each of the concentrations presented was the sum of the detected parent compound, congeners, or metabolites, where applicable. Since the MDLs or RLs were relatively low, ≤ 0.5 and ≤ 5 ppb, respectively, individual congeners or metabolites with concentrations reported as non-detects were assumed to be zero. This is a standard method of handling non-detect values for PCBs and other chemicals with multiple congeners or metabolites in a given sample when detection levels are adequate (US EPA, 2000a). Table 2 shows the averages and ranges for total length and PCB concentrations in each fish species. Concentrations of chlordanes, dieldrin, and DDTs were not sufficiently high to alter consumption advice and are not shown.

³ 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.

⁴ The MDL is the lowest quantity of a chemical that can be distinguished (as greater than zero) in a sample.

⁵ The RL is the lowest quantity of a chemical that can be accurately quantified in a sample.

TABLE 2. MERCURY AND PCB CONCENTRATIONS IN FISH FROM SHADOW CLIFFS LAKE

| Fish Species | Number of Samples | Total Number of Fish | Mean Total Length (mm) | Range of Total Lengths (mm)* | Mercury (ppb) | |
|-----------------|-------------------|----------------------|------------------------|------------------------------|---------------|---------|
| | | | | | Mean** | Range |
| Bluegill | 2 | 12 | 180 | 155-205 | 106 | 99-112 |
| Carp | 3 | 9 | 707 | 635-790 | 160 | 157-162 |
| Channel Catfish | 9 | 31 | 484 | 426-570 | 102 | 29-181 |
| Largemouth Bass | 12 | 19 | 396 | 322-551 | 529 | 302-712 |
| | | | | | PCBs (ppb) | |
| Bluegill | 1 | 6 | 190 | 179-205 | 3 | N/A*** |
| Carp | 2 | 6 | 743 | 665-790 | 57 | 57-58 |
| Channel Catfish | 7 | 23 | 494 | 440-570 | 10 | 2-18 |

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

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

***Not available; concentration was derived from a single composite of six fish.

DEVELOPMENT OF GUIDELINES FOR EATING FISH FROM SHADOW CLIFFS LAKE

GENERAL INFORMATION

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, 2014; American Heart Association, 2014; OEHHA, 2008; Institute of Medicine, 2007; Kris-Etherton et al., 2002). Fish is a significant source of the specific omega-3 fatty acids, docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) thought to be associated with these beneficial health effects (USDA/USDHHS, 2015; Weaver et al., 2008).

The 2015-2020 U.S. Dietary Guidelines recommend that 1) the general population “consume eight or more ounces per week (less for young children)” of a variety of

seafood⁶ “for the total package of nutrients that seafood provides, including its EPA and DHA content” and 2) “women who are pregnant or breastfeeding should consume at least eight and up to twelve ounces of a variety of seafood per week from choices that are lower in methylmercury” (USDA/USDHHS, 2015). 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, 2008). Accordingly, because of the high mercury content of certain fish species, the Food and Drug Administration and US Environmental Protection Agency recommend that women who are pregnant (or might become pregnant) or breastfeeding and young children do not consume shark, swordfish, tilefish, or king mackerel, and limit consumption of white (albacore) tuna to six ounces per week (FDA/US EPA, 2004; 2014).

In order to address the potential health concerns associated with consuming 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 can 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 45 years of age) and children, are lower than for women 46 years and older, and men. 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). 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, PCB, DDTs, chlordane, and dieldrin concentrations detected in the fillet to the ATLS for each of the chemicals to establish the maximum number of servings per week that could be consumed (see Appendix I). The concentrations of DDTs, chlordanes, and dieldrin

⁶ “Marine animals that live in the sea and in freshwater lakes and rivers. Seafood includes fish, such as salmon, tuna, trout, and tilapia, and shellfish, such as shrimp, crab, and oysters” (USDHHS/USDA, 2015).

were lower than the corresponding ATL threshold values for daily consumption (OEHHA, 2008). These pesticides were therefore not considered further for developing consumption advice. Consumption advice was based on mercury and PCB concentrations.

The consumption advice for a fish species is initially based on the chemical with the lowest allowable number of fish servings per week. Because both mercury and PCBs are known to affect the nervous system, particularly during brain development, additivity of toxicity is assumed and assessed by using a multiple chemical exposure methodology (US EPA, 1989 and 2000b). The presence of both chemicals in fish tissue may result in advice for the sensitive population to consume fewer meals per week than would be the case for the presence of either chemical alone, in a similar concentration. For the Shadow Cliffs Lake advisory, the potential effect of multiple chemical exposure was assessed and determined not to affect consumption advice for the species that were evaluated. When consumption advice is followed, the exposure to mercury and PCBs from eating fish caught at Shadow Cliffs Lake would be at or below the average daily reference dose or cancer risk as outlined 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).

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 from this water body. People should eat no more than the recommended number of servings for each fish species or species group. OEHHA’s advice on consuming a particular fish species can be extended to other closely related fish species⁷ known to accumulate similar levels of contaminants.

Consumption advice should not be combined. That is, if a person chooses to eat a fish from the “one-serving-a-week” category, then they should not eat any other fish from any source until the next week. If a person chooses to eat a fish from the “two-servings-per-week” category, they can combine fish species from that category for a total of two servings in that week. Then they should not eat any other fish from any source until the following week.

CONSUMPTION ADVICE FOR FISH FROM THE SHADOW CLIFFS LAKE

OEHHA’s advisory protocol requires at least nine fish of a species to be collected from a water body before an advisory can be developed for the primary contaminant of

⁷ Fish species within the same genus are most closely related, and Family is the next level of relationship.

concern. This is to ensure the sample dataset is representative of the population in the water body. Contaminant concentrations for fewer than nine fish of a species may be evaluated for secondary contaminants of concern to evaluate multiple chemical exposures. Sample sizes were sufficient to develop advice for Black Bass species (Largemouth), Carp, Channel Catfish, and Sunfish species (Bluegill). Only two Rainbow Trout were collected, so advice was not developed for this species.

BLACK BASS SPECIES (LARGEMOUTH)

Based on the mean mercury concentration in Largemouth Bass (529 ppb), OEHHA recommends no consumption of black bass species for the sensitive population (women 18 to 45 years and children 1 to 17 years) and a maximum of one serving a week for the general population (women 46 years and older, and men 18 or older). Black bass species include Largemouth, Smallmouth, Redeye, and Spotted Bass, all members of the same genus.

OEHHA evaluated mercury concentrations in black bass species in California and found a similar range of concentrations when two or more of these species were present in the same water body. Therefore, the advice for Largemouth Bass can be extended to other black bass species. Largemouth Bass were not analyzed for PCBs.

CARP

The mean mercury and PCB concentrations in carp were 160 and 57 ppb, respectively. Based on the average mercury concentration, OEHHA recommends that women 18-45 years and children 1-17 years eat only one serving of carp per week. The same advice is recommended for women over 45 years and men 18 or older, because of PCB concentrations.

CHANNEL CATFISH

The mean mercury and PCB concentrations in Channel Catfish were 102 and 10 ppb, respectively. OEHHA recommends a maximum of two servings per week of Channel Catfish for the sensitive population and six servings a week for women 46 years and older, and men 18 or older.

SUNFISH SPECIES (BLUEGILL)

The mean mercury level in Bluegill was 106 ppb. PCBs were detected in Bluegill at a concentration of 3 ppb. OEHHA recommends a maximum of two servings a week of sunfish for the sensitive population and six servings a week for women 46 years and older, and men 18 or older.

OEHHA evaluated the mercury levels in small sunfish species in California including Bluegill, Redear Sunfish, and Green Sunfish, and found the concentrations within a

water body were similar between species. Therefore, the advice for Bluegill can be extended to the other small sunfish species.

MAXIMUM RECOMMENDED NUMBER OF SERVINGS

The maximum recommended number of servings per week for fish from Shadow Cliffs Lake are shown in Table 3.

TABLE 3. RECOMMENDED MAXIMUM NUMBER OF SERVINGS PER WEEK FOR FISH FROM SHADOW CLIFFS LAKE

| Fish Species | Women 18–45 years and Children 1–17 years | Women 46 years and older and Men 18 years and older |
|--------------------|---|---|
| Black Bass Species | 0 | 1 |
| Carp | 1 | 1 |
| Channel Catfish | 2 | 6 |
| Sunfish Species | 2 | 6 |

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APPENDIX I. ADVISORY TISSUE LEVELS

Advisory Tissue Levels (ATLs) 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 average daily reference dose⁸ 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 from Shadow Cliffs Lake are followed, exposure to chemicals in fish from the areas comprising Shadow Cliffs Lake 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 ^b (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 18-45 and children 1-17) | ≤ 31 | >31-36 | >36-44 | >44-55 | >55-70 | >70-150 | >150-440 | >440 |
| MeHg (Women > 45 and men) | ≤ 94 | >94-109 | >109-130 | >130-160 | >160-220 | >220-440 | >440-1,310 | >1,310 |
| PCBs | ≤ 9 | >9-10 | >10-12 | >12-15 | >15-21 | >21-42 | >42-120 | >120 |

^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.

^bWhen residue data are compared to this table they should also first be rounded to the second significant digit.

⁸ The reference dose is an estimate of the maximum daily exposure to a chemical likely to be without significant risk of harmful health effects during a lifetime.