



Health Advisory and Guidelines for Eating Fish from Wiest Lake (Imperial County)

June 2017



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ACKNOWLEDGMENTS

Developing fish consumption advisories depends on sampling and analysis of fish. The Office of Environmental Health Hazard Assessment (OEHHA) acknowledges the contribution of information from the following entities: the State Water Resources Control Board (SWRCB), the California Department of Fish and Wildlife and its analytical resources, the Moss Landing Marine Laboratories and the Water Pollution Control Laboratory. Data were obtained from the California Environmental Data Exchange Network (<http://www.ceden.us/AdvancedQueryTool>). The map was created the map using ArcMap (10.3) from Environmental Systems Resource Institute (ESRI, Redlands, California).

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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
EPA	eicosapentaenoic acid
FDA	Food and Drug Administration
Hg	mercury
MDL	method detection limit
MLML	Moss Landing Marine Laboratories
mm	millimeters
n	sample size
OEHHA	Office of Environmental Health Hazard Assessment
PBDEs	polybrominated diphenyl ethers
PCBs	polychlorinated biphenyls
ppb	parts per billion
RL	reporting limit
RWB7	Regional Water Board 7
Se	selenium
SWAMP	Surface Water Ambient Monitoring Program
TMDL	Total Maximum Daily Load

TSMF	Toxic Substances 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 Wiest Lake in Imperial 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 List of Figures and Tables.

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A Guide to Eating Fish from Wiest Lake

Men, Women and Children 1 - 17 years

 <p>Channel Catfish</p>	 <p>♥ Black Bass species</p>	 <p>Sunfish species</p>  <p>Crappie</p>		
7 total servings a week	OR	6 total servings a week	OR	4 total servings a week
<p>What is a serving?</p>  <p>For Adults For Children</p> <p>A serving is about the size and thickness of your hand for fish fillets. Give children smaller servings.</p>	<p>Why eat fish?</p> <p>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.</p> <p>♥ = Fish high in omega-3s</p>	<p>What is the concern?</p> <p>High levels of selenium can cause health problems.</p>		
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INTRODUCTION

This report presents guidelines for eating fish from Wiest Lake (Figure 1) in Imperial County, located approximately 6 miles northeast of Brawley, California.

LOCATION

Wiest Lake is located at Wiest Lake Park between the Alamo and New rivers. This lake is managed by the Imperial County Planning and Development Services Department.¹ Wiest Lake is adjacent to other small lakes, creeks, and rivers, but this advisory applies only to Wiest Lake.

FIGURE 1. LOCATION OF WIEST LAKE



¹ Information regarding Wiest Lake was obtained from the Imperial County Planning and Development Services web page. Online at: <http://www.icpds.com/?pid=547>.

APPROACH USED

The Office of Environmental Health Hazard Assessment (OEHHA) used the results from five monitoring studies described in this report to develop the Wiest Lake 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 benefits and risks of consuming sport 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 mercury, followed by polychlorinated biphenyls (PCBs) and, in a few cases, selenium 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 historic 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 a weighted average of composites. 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, combined.

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 water bodies in California. Depending on the exposure level, these chemicals may cause cancer or adverse effects on the nervous system.

Polybrominated diphenyl ethers (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 Wiest Lake and used in advisory development were analyzed for mercury (as a measure of methylmercury) and selenium. Additionally, black bass species, Channel Catfish, and crappie were analyzed for PCBs, and the legacy pesticides (chlordanes, dieldrin, DDTs [DDT and its metabolites], and toxaphene). Channel Catfish were also analyzed for PBDEs. Fish species that do not normally accumulate PCBs or other organic chemicals may not be analyzed for those contaminants in a particular monitoring study. Among the chemicals analyzed in fish tissue samples from Wiest Lake, only selenium levels were sufficiently high to impact consumption advice. For this reason, levels of other contaminants are not shown in this report.

DATA SOURCES

The guidelines for eating fish from Wiest Lake are based on the chemicals detected in the fish collected for the five monitoring studies described below. These studies met OEHHA's data quality criteria, including adequate documentation of sample collection, fish preparation method (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 was reported. "Sampling" or "sampled" refers to the act of collecting fish for chemical analysis.

CONTAMINANTS IN FISH FROM CALIFORNIA LAKES AND RESERVOIRS, 2007-2008 (SWAMP)

The Surface Water Ambient Monitoring Program (SWAMP), operated by the SWRCB in cooperation with Regional Water Quality Control Board staff, monitors water quality in California's surface waters. The program collected Black Crappie and Channel Catfish from Wiest Lake in 2007 to analyze mercury in both species, and PCBs, chlordanes, DDTs, dieldrin, PBDEs, and selenium in Channel Catfish, as part of a SWAMP statewide sampling effort to survey contaminants in sport fish found in California lakes and reservoirs (SWRCB, 2010).

COLORADO RIVER BASIN REGIONAL WATER QUALITY CONTROL BOARD, SPORT FISH MONITORING PROGRAM (RWB7)

The Region 7 Water Board (RWB7) staff, in cooperation with SWRCB staff, monitors water quality in California's surface waters. In 2004 and 2014, the program performed regional monitoring surveys of Wiest Lake to evaluate contaminants in commonly consumed sport fish and to gain information about contamination in the greater aquatic food web (RWQCB, 2013). The surveys collected Black Crappie, Channel Catfish, Largemouth Bass, and Redear Sunfish from Wiest Lake. Fish samples were analyzed for several common fish contaminants (mercury, chlordanes, DDTs, dieldrin, PCBs, selenium, and toxaphene).

TOTAL MAXIMUM DAILY LOAD (TMDL) PROGRAM

The US Environmental Protection Agency (US EPA) TMDL Program develops plans and actions to help impaired water bodies comply with water quality standards, pursuant to Section 303(d) of the Clean Water Act (1972)³. Fish sampling is a multi-agency effort and integral part of the TMDL. US EPA, in cooperation with Region 7 Water Board

³ US EPA Clean Water Act §303(d). <http://www.epa.gov/tmdl>

staff, collected Black Crappie and Largemouth Bass from Wiest Lake during 2015 and 2016. Fish samples were analyzed for chlordanes, DDTs, dieldrin, and PCBs.

TOXIC SUBSTANCES MONITORING PROGRAM (TSMP)

The TSMP (1976-2003) was a state water quality-monitoring program managed by the SWRCB (SWRCB, 2007 and 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. The California Department of Fish and Wildlife (CDFW), then known as the California Department of Fish and Game, collected Largemouth Bass (1999) from Wiest Lake, as part of the program. All fish samples were analyzed for mercury and selenium.

CALFED BAY-DELTA PROGRAM (CALFED)

The CALFED Bay-Delta Program was a state and federal interagency group, established in 1994, to develop strategies and provide funding for projects that improve water quality, increase water supply, and support ecosystem restoration and levee improvement in the San Francisco Bay-Delta. This program was composed of more than 20 state and federal agencies including the California Environmental Protection Agency, the California Department of Fish and Wildlife, the US Environmental Protection Agency, and the US Fish and Wildlife Service. CALFED funded SWAMP sampling efforts for historical bioaccumulation studies in fish (CALFED, 1999). Bluegill and Largemouth Bass were collected from Wiest Lake (1999) and samples were analyzed for mercury.

FISH SAMPLED FROM WIEST LAKE

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 included in 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.

TABLE 1. FISH SAMPLES EVALUATED FOR THE WIEST LAKE ADVISORY

Common Name	Scientific Name	Number of Samples	Total Number of Fish	Project	Year Collected	Contaminants Analyzed
Black Crappie	<i>Pomoxis nigromaculatus</i>	3	10	RWB7	2004	chlordanes, DDTs, dieldrin, Hg, PCBs, Se, toxaphene
		1	5	SWAMP	2007	Hg
		2	9	RWB7	2014	Hg, Se
		1	5	TMDL	2016	chlordanes, DDTs, dieldrin, PCBs
Bluegill	<i>Lepomis macrochirus</i>	1 ^b	5	CalFed	1999	Hg
Channel Catfish	<i>Ictalurus punctatus</i>	3	8	RWB7	2004	chlordanes, DDTs, dieldrin, Hg, PCBs, Se, toxaphene
		1	3	SWAMP	2007	chlordanes, DDTs, dieldrin, Hg, PCBs, Se, PBDEs
		2	12	RWB7	2014	chlordanes, DDTs, dieldrin, PCBs
		3	12	RWB7	2014	Hg
		12	12	RWB7	2014	Se
Largemouth Bass	<i>Micropterus salmoides</i>	1 ^a	5	TSMP	1999	Hg, Se
		1 ^b	8	CalFed	1999	Hg
		9	9	RWB7	2014	Hg, Se
		2	6	TMDL	2015-2016	chlordanes, DDTs, dieldrin, PCBs

Common Name	Scientific Name	Number of Samples	Total Number of Fish	Project	Year Collected	Contaminants Analyzed
Redear Sunfish	<i>Lepomis microlophus</i>	1	3	RWB7	2014	Hg, Se

DDTs = dichlorodiphenyltrichloroethane (DDT) and its metabolites
 dichlorodiphenyldichloroethane (DDD)
 dichlorodiphenyldichloroethylene (DDE)

PBDEs = polybrominated diphenyl ethers PCBs = polychlorinated biphenyls Se = Selenium

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

^bSkin was not removed from fillets prior to tissue analysis.

CHEMICAL CONCENTRATIONS

As shown in Table 1, samples were analyzed for one or more of the following: total mercury, selenium, chlordanes, DDTs, dieldrin, PBDEs, PCBs (54-55 congeners⁴), and toxaphene. All fish samples were prepared as skinless fillets, except for the CALFED study where the skin was not removed from the Bluegill and Largemouth Bass fillet samples, and the TSMP study where the fillet preparation method for Largemouth Bass was not recorded. For fillet samples, the presence or absence of skin did not alter advice. Samples were analyzed as individual fish or composites.

Composites were prepared from equal amounts of tissue from several similarly sized individual fish of a species. For composite samples, the total length of the smallest fish in a composite sample must be at least 75% of the length of the largest fish in the sample (US EPA, 2000a). Composite samples for all species from Wiest Lake met this requirement, except for a composite of 4 Channel Catfish and a composite with 9 Channel Catfish where lengths of the smallest fish in the composites were 70% and 71%, respectively, of the lengths of the largest fish in the 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). The

⁴ Congeners are related compounds with similar chemical forms. Of the 209 possible PCB congeners, 54-55 are generally reported.

DMA method detection limit (MDL)⁵ and the reporting limit (RL)⁶ for total mercury were reported at 4, 12, or 25 and 12, 28, or 36 parts per billion (ppb), respectively. Although mercury was detected at commonly found concentrations in the TSMP study, the MDL and RL for mercury were not reported for this study. Concentrations of mercury were not sufficiently high to alter consumption advice and are not shown.

PCBS, PBDES, AND PESTICIDES

Some composite samples were analyzed for PCBs, PBDEs, and the legacy pesticides (chlordanes, DDTs, and dieldrin) by gas chromatography at the CDFW Water Pollution Control Laboratory. For chlordanes, DDTs, PCBs, and PBDEs, 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, ≤ 0.9 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). Concentrations of chlordanes, dieldrin, DDTs, PBDEs, PCBs, and toxaphene were not sufficiently high to alter consumption advice and are not shown.

SELENIUM

The CDFW MLML analyzed species collected from Wiest Lake for selenium, as composite samples, using inductively coupled plasma-mass spectrometry (ICP-MS). The ICP-MS method utilizes desolvation, atomization and ionization with ion separation based on a mass-to-charge ratio to detect the total selenium concentration in a sample. The ICP-MS MDL and RL for total selenium were reported at 33, 100, or 150 and 100 or 400 ppb, respectively. Although selenium was detected in the TSMP study at commonly found concentrations, the MDL and RL for selenium were not reported for this study. Table 2 shows the averages and ranges for total length⁷, as well as selenium concentrations in each fish species. The selenium concentrations were sufficiently high to alter consumption advice.

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 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.

TABLE 2. SELENIUM CONCENTRATIONS IN FISH FROM WIEST LAKE

Species from Wiest Lake	Number of Samples	Total Number of Fish	Mean* Total Length (mm)	Range of Total Lengths** (mm)	Selenium (ppb)	
					Mean*	Range**
Black Crappie	5	19	303	250-355	1758	1630-1920
Channel Catfish	16	23	428	281-630	602	360-840
Largemouth Bass	10	14	418	332-536	1156	880-1350
Redear Sunfish	1	3	167	141-184	1020	n/a

*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 WIEST LAKE

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, 2014; OEHHA, 2008; Institute of Medicine, 2007; Kris-Etherton et al., 2002). Fish are 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 seafood⁸ “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

⁸ “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).

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 FDA and US EPA 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).

In order 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 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. A list of the ATLS used in this report is presented in Appendix I. As noted above, for the fish in Wiest lake, only for selenium were contaminant levels elevated above its ATL.

For each fish species in this advisory, OEHHA compared the selenium concentrations detected in the fillet to the corresponding ATLS to establish the maximum number of servings per week that could be consumed (see Appendix I).

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 advice on consuming a particular fish species can be extended to other closely related fish species⁹ 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 (including commercial) 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, or eat one 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.

⁹ Fish species within the same genus are most closely related, and Family is the next level of relationship.

CONSUMPTION ADVICE FOR FISH FROM WIEST 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 concern. This is to ensure the sample dataset is representative of the fish species population in the water body. In some cases, an exception is made for species that are commonly caught and consumed from a given water body but where available data may be limited. Only eight sunfish were collected from Wiest Lake, all of which were analyzed for mercury (the most common contaminant of concern in California water bodies). However, only three sunfish were analyzed for selenium (the primary contaminant of concern in Wiest Lake). OEHHA considers it appropriate to offer consumption advice for this species group because of this water body's relatively small size (i.e., a smaller number of fish may be considered representative of a small lake), the relatively low mercury and selenium concentrations observed in this species group, and the overall similarity of selenium levels among species in this water body (see discussion below). For Wiest Lake, the sample size criterion was thus met for the following species: Black Crappie, Channel Catfish, Largemouth Bass, and sunfish species. There were not sufficient data to evaluate other species that may be found in this water body.

BLACK BASS SPECIES (LARGEMOUTH)

Based on the mean selenium concentration of 1156 ppb, OEHHA recommends a maximum of six servings a week of black bass species for both the sensitive population (women 18 to 45 years and children 1 to 17 years), and the general population (women 46 years and older, and men 18 years and older).

Mercury concentrations in black bass species are generally similar within the same water body. Selenium levels are presumed to show a similar pattern with comparable concentrations expected to be observed in individual black bass species within the same water body. Therefore, the advice for Largemouth Bass can be extended to other black bass species, including Smallmouth Bass, Redeye Bass, and Spotted Bass.

CHANNEL CATFISH

The mean selenium concentration in Channel Catfish from Wiest Lake was 602 ppb. OEHHA recommends a maximum of seven servings a week of Channel Catfish for both the sensitive population (women 18 to 45 years and children 1 to 17 years), and the general population (women 46 years and older, and men 18 years and older), based on selenium.

CRAPPIE (BLACK CRAPPIE)

The mean selenium concentration in crappie from Wiest Lake was 1758 ppb. OEHHA recommends a maximum of four servings a week of crappie for both the sensitive population (women 18 to 45 years and children 1 to 17 years), and the general

population (women 46 years and older, and men 18 years and older), based on selenium.

Contaminant concentrations in crappie species are generally similar within the same water body. Therefore, the advice for Black Crappie can be extended to White Crappie.

SUNFISH SPECIES (BLUEGILL, REDEAR SUNFISH)

Selenium was only evaluated in Redear Sunfish (n=3 fish), which had a concentration of 1020 ppb. Although contaminant data from three fish is generally considered insufficient to provide consumption advice, because of the overall consistent levels of selenium in all fish analyzed from this water body, OEHHA determined that providing health protective consumption advice was appropriate in this case. As such, advice for sunfish was based on the species with the highest selenium concentration in this water body (crappie). OEHHA thus recommends a maximum of four servings a week of sunfish species for both the sensitive population (women 18 to 45 years and children 1 to 17 years), and the general population (women 46 years and older, and men 18 years and older), based on selenium.

Selenium concentrations in sunfish species in this region of California are generally similar within the same water body. Therefore, the advice for Redear Sunfish can be extended to Bluegill, Green Sunfish, and Pumpkinseed.

RECOMMENDED MAXIMUM NUMBER OF SERVINGS

The recommended maximum numbers of servings per week for fish from Wiest Lake are shown in Table 3.

TABLE 3. RECOMMENDED MAXIMUM NUMBER OF SERVINGS PER WEEK FOR FISH FROM WIEST 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	6	6
Channel Catfish	7	7
Crappie	4	4
Sunfish species	4	4

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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 dose¹⁰ 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 Wiest Lake are followed, exposure to chemicals in fish from Wiest 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 (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
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.

¹⁰ 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.