HEALTH ADVISORY:

DRAFT SAFE EATING GUIDELINES FOR FISH AND SHELLFISH FROM THE SAN JOAQUIN RIVER AND SOUTH DELTA (CONTRA COSTA, SAN JOAQUIN, STANISLAUS, MERCED, MADERA, AND FRESNO COUNTIES)

January 2007

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FOREWORD

This draft report provides guidelines for consumption of various fish and shellfish species taken from water bodies in the San Joaquin watershed in Contra Costa, San Joaquin, Stanislaus, Merced, Madera, and Fresno Counties. These draft guidelines were developed as a result of studies of mercury concentrations in fish tested from these water bodies, and are provided to fish consumers to assist them in making choices about the types of fish and frequency of consumption considered safe to eat. Some fish tested from these water bodies showed high mercury levels, and draft guidelines are provided to protect against possible adverse health effects from methylmercury as consumed from mercury-contaminated fish. Limited data for chlorinated hydrocarbons were also considered to determine whether consumption advice more restrictive than that for mercury was warranted. Additionally, the draft guidelines provide information to aid consumers in selecting fish that are lower in mercury or other contaminants. This draft report provides background information and a description of the data and criteria used to develop the draft guidelines. The draft guidelines will be revised as appropriate, following public review, and published in a final report containing the final state advisory.

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EXECUTIVE SUMMARY

Mercury levels were evaluated in edible tissues of fish and shellfish caught from the southern portion of California's Central Valley, the San Joaquin Valley. This draft report and the safe eating guidelines contained therein pertain to fish caught from water bodies in this area, including the San Joaquin River and other water bodies (*e.g.*, sloughs, flooded tracts) located in the San Joaquin Delta to the south of the San Joaquin River. This area is situated in Contra Costa, San Joaquin, Stanislaus, Merced, Madera, and Fresno Counties. Data collected through several different projects were evaluated. The most recent data were collected and analyzed for mercury under the Fish Mercury Project (FMP), a three-year study funded by the California Bay Delta Authority. In 2005, the first year of the project, sampling focused on the San Joaquin River and other water bodies in the San Joaquin Delta south of the San Joaquin River (referred to throughout the report as the "South Delta" to distinguish it from the Sacramento Delta, north of the San Joaquin River) in order to support evaluation of mercury concentrations in fish from this area. Historical data were also assembled for fish from this area; these data were collected and analyzed through projects conducted by the Toxic Substances Monitoring Program, Surface Water Ambient Monitoring Program, the CALFED Mercury Project, and the University of California at Davis. The Central Valley Regional Water Quality Control Board compiled a large dataset comprised of the historical data. The Office of Environmental Health Hazard Assessment (OEHHA) reviewed the dataset and compared it to the original datasets from which it was derived. Data suitable for issuing fish consumption advisories were selected and verified before using them, in addition to the results from the 2005 FMP, for the evaluation and fish consumption guidelines presented in this draft report. Chlorinated hydrocarbon contaminants, including pesticides and polychlorinated biphenyls (PCBs), were also measured in a limited number of samples of fish and shellfish; these data were obtained from the Delta-San Joaquin Study (Davis *et al*., 2000) and TSMP. Dioxins/furans and PCB concentrations in a very limited sample of fish from one area collected by the California Department of Health Services were also considered. The combined contaminant data were evaluated by OEHHA to determine whether there may be potential adverse health effects associated with the consumption of sport fish from these water bodies, and to identify types of fish and/or locations where fish consumption could be recommended due to lower levels of contaminants. Based on this evaluation, draft safe eating guidelines were developed to aid consumers in selecting fish from this area with low concentrations of contaminants, thereby keeping exposure to mercury and/or other chemicals within safe levels and allowing fish consumers to continue to eat fish and enjoy the benefits.

Mercury contamination of fish is a national problem that has resulted in the issuance of fish consumption advisories in most states, including California (U.S. EPA, 2003). Mercury is a trace metal that can be toxic to humans and other organisms. Mercury occurs naturally in the environment, and is also redistributed in the environment as a result of human activities such as mining and the burning of fossil fuels. Once mercury is released into the environment, it cycles through land, air, and water. In aquatic systems, it undergoes chemical transformation to the more toxic organic form, methylmercury, which accumulates in fish and other organisms. Almost all fish contain detectible levels of mercury, more than 95 percent of which occurs as methylmercury, a potentially highly toxic form of the element. Consumption of fish is the major route of exposure to methylmercury in the United States. For more information on mercury, see Appendix I.

The critical target of methylmercury toxicity is the nervous system, particularly in developing organisms such as the fetus and children. Methylmercury toxicity can occur to the fetus during pregnancy even in the absence of symptoms in the mother. In 1985, the United States Environmental Protection Agency (U.S. EPA) set a reference dose (that is the daily exposure likely to be without significant risks of deleterious effects during a lifetime) for methylmercury of $3x10^{-4}$ milligrams per kilogram of body weight per day (mg/kg-day), based on central nervous system effects (ataxia, or loss of muscular coordination; and paresthesia, a sensation of numbness and tingling) in adults. This reference dose (RfD) was lowered to $1x10^{-4}$ mg/kg-day in 1995 (and confirmed in 2001), based on developmental neurologic abnormalities in infants exposed *in utero*. Because OEHHA finds convincing evidence that the fetus is more sensitive than adults to the neurotoxic effects of mercury, but also recognizes that fish can play an important role in a healthy diet, OEHHA chooses to use both the current and previous U.S. EPA reference doses for two distinct population groups. In this advisory, the current RfD based on effects in infants will be used for women of childbearing age and children aged 17 years and younger. The previous RfD, based on effects in adults, will be used for women beyond their childbearing years and men.

The dataset for the San Joaquin River and South Delta is comprised of fish and/or shellfish tissues that were collected and analyzed for mercury largely from the following species: Asiatic clam, bluegill, redear sunfish, crappie, carp, largemouth bass, channel catfish, white catfish, red swamp crayfish, and signal crayfish. Other fish and shellfish species collected in fewer numbers and/or locations were striped bass, hitch, brown bullhead, black bullhead, Sacramento perch, Sacramento blackfish, Sacramento pikeminnow, and Sacramento sucker. Samples were collected from a total of 102 locations on the San Joaquin River and/or in other water bodies in the South Delta.

In order to provide draft safe eating guidelines for various fish species, contaminant concentrations in fish from a water body are compared to OEHHA guidance tissue levels for those chemicals. Guidance tissue levels are used by OEHHA to determine the appropriate meal consumption advice for consumers to prevent exposure to more than the average daily reference dose for non-carcinogens or to a risk level greater than $1x10^{-4}$ for carcinogens. One or more data evaluation approaches are then used to develop consumption advice. Safe eating guidelines provide information to fish consumers as to which fish or shellfish species have high chemical concentrations and whose consumption should be restricted or avoided altogether, as well as fish or shellfish that are low in contaminants and may be consumed frequently as part of a healthy diet.

The dataset for fish from the San Joaquin Valley encompassed a very large geographic area including many separate and/or connected water bodies. Therefore, a series of approaches were undertaken to determine the best way to organize the data for the development of consumption guidelines. This process included assessment of mean mercury concentrations and other summary statistics in successive stages, beginning with individual sample sites and progressing to various groupings of the data by subregions. The sum of the approaches indicated a regional approach to be appropriate to characterize the results and to communicate them. Many of the species evaluated showed consistent mercury concentrations across the entire area. After considering the mercury data in detail, however, OEHHA found that for three key species, largemouth bass, channel catfish, and white catfish, mercury concentrations were lower in fish from water bodies in the South Delta than in the San Joaquin River south of its confluence with the Calaveras River. Therefore, to maximize opportunities for fish consumers in this area to enjoy consumption of local fish, regional differences were also presented and separate advice was included for each of two large regions: the San Joaquin Delta, including the San Joaquin River from its confluence with the Sacramento River to its confluence with the Calaveras River, and the San Joaquin River south of its confluence with the Calaveras River to Friant Dam. Review of limited data for chlorinated hydrocarbon contaminants from those locations on the San Joaquin River and/or in the South Delta that were sampled in the last ten years indicated that consumption of fish from New Mormon Slough and Old Mormon Slough near the Port of Stockton should be restricted due to dioxin accumulation. Additional data would be useful to verify that organochlorine contamination is not widespread. The guidelines are shown in the advisory tables that follow.

For general information on how to limit your exposure to chemical contaminants in sport fish (*e.g.*, eating smaller fish of legal size), see the California Sport Fish Consumption Advisories (http://www.oehha.ca.gov/fish.html) or Appendix II. Site-specific advice for other California water bodies can be found online at: http://www.oehha.ca.gov/fish/so_cal/index.html. Unlike the case for many chlorinated hydrocarbon contaminants, however, various cooking and cleaning techniques will not reduce the methylmercury content in fish.

SAFE EATING GUIDELINES

FOR WOMEN OF CHILDBEARING AGE, PREGNANT OR BREASTFEEDING WOMEN, AND CHILDREN 17 YEARS AND YOUNGER

BASED ON MERCURY IN FISH FROM THE

SOUTH DELTA*

*INCLUDING THE SAN JOAQUIN RIVER FROM ITS CONFLUENCE WITH THE SACRAMENTO RIVER TO ITS CONFLUENCE WITH THE CALAVERAS RIVER, AND ALL RIVERS, SLOUGHS, AND FLOODED TRACTS IN THE DELTA SOUTH OF THE SAN JOAQUIN RIVER

BEST CHOICES	
Two 8-ounce meals or four 4-ounce meals a week	Bluegill and other sunfish, catfish, clams, or crayfish, OR
GOOD CHOICES	
One 8-ounce meal or two 4-ounce meals a week	Crappie; carp; sucker; largemouth, smallmouth, or spotted bass

RESTRICTED	
No more than one meal per month	Striped bass (18-27 inches) or sturgeon
Do Not Eat	Striped bass over 27 inches

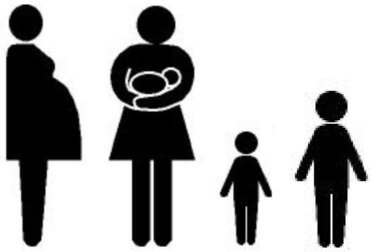
SAFE EATING GUIDELINES

FOR WOMEN OF CHILDBEARING AGE, PREGNANT OR BREASTFEEDING WOMEN, AND CHILDREN 17 YEARS AND YOUNGER

BASED ON MERCURY IN FISH FROM THE

SAN JOAQUIN RIVER*

*FROM ITS CONFLUENCE WITH THE CALAVERAS RIVER IN STOCKTON TO FRIANT DAM



BEST CHOICES	
Two 8-ounce meals or four 4-ounce meals a week	Bluegill and other sunfish, or crayfish, OR
GOOD CHOICES	
One 8-ounce meal or two 4-ounce meals a week	Catfish, crappie, carp, or sucker

RESTRICTED	
Do Not Eat	Largemouth, smallmouth, or spotted bass
Do Not Eat	ALL fish and shellfish from New Mormon Slough# and Old Mormon Slough# near the Port of Stockton

Based on dioxins

SAFE EATING GUIDELINES

FOR WOMEN BEYOND CHILDBEARING AGE AND MEN

BASED ON MERCURY IN FISH FROM THE

SOUTH DELTA*

*INCLUDING THE SAN JOAQUIN RIVER FROM ITS CONFLUENCE WITH THE SACRAMENTO RIVER TO ITS CONFLUENCE WITH THE CALAVERAS RIVER, AND ALL RIVERS, SLOUGHS, AND FLOODED TRACTS IN THE DELTA SOUTH OF THE SAN JOAQUIN RIVER

BEST CHOICES	
Daily	Bluegill and other sunfish, OR
Three 8-ounce meals or six 4-ounce meals a week	Clams, crayfish, crappie, carp, OR
Two 8-ounce meals or four 4-ounce meals a week	Catfish; sucker; largemouth, smallmouth, or spotted bass

RESTRICTED	
No more than two meals per month	Striped bass (18-35 inches) or sturgeon
Do Not Eat	Striped bass over 35 inches

SAFE EATING GUIDELINES

FOR WOMEN BEYOND CHILDBEARING AGE AND MEN

BASED ON MERCURY IN FISH FROM THE

SAN JOAQUIN RIVER*

*FROM ITS CONFLUENCE WITH THE CALAVERAS RIVER IN STOCKTON TO FRIANT DAM

BEST CHOICES	
Daily	Bluegill and other sunfish, OR
Three 8-ounce meals or six 4-ounce meals a week	Crayfish, crappie, carp, OR
Two 8-ounce meals or four 4-ounce meals a week	Catfish, sucker, OR
GOOD CHOICES	
One 8-ounce meal or two 4-ounce meals a week	Largemouth, smallmouth, or spotted bass

RESTRICTED	
Do Not Eat	ALL fish and shellfish from New Mormon Slough[#] and Old Mormon Slough[#] near the Port of Stockton

[#] Based on dioxins

ADDITIONAL GUIDELINES AND INFORMATION

Fish are nutritious and are recommended as part of a healthy, balanced diet. The American Heart Association advises healthy adults to eat at least eight ounces (or two 4-ounce portions, prior to cooking) of fish a week. It is important, however, to choose your fish wisely. OEHHA recommends that you choose fish to eat that are low in mercury and other contaminants. The recommended options are presented as “Good Choices” and “Best Choices.” When fish contain high levels of mercury or other chemicals, OEHHA recommends that you avoid eating these fish.

- **MEAL SIZE DEPENDS ON BODY WEIGHT.** Meals are based on a 160-pound adult eating 8 ounces of fish (6 ounces after cooking) — about the size of two decks of cards. You could eat two 4-ounce fish meals in place of one 8-ounce meal. If you weigh less than 160 pounds, eat smaller portions of fish. Serve smaller meals to children – about half as much as adults for children 12 and under.
- **CONSIDER THE FISH YOU BUY FROM STORES AND RESTAURANTS.** Women of childbearing age and children can safely eat up to two meals a week of a variety of fish purchased in stores or restaurants, or use this guide for eating fish caught from the San Joaquin River and South Delta. Commercial fish such as shrimp, king crab, scallops, farmed catfish, wild ocean salmon, oysters, tilapia, flounder, and sole generally contain some of the lowest levels of mercury. Women of childbearing age and children should not eat shark, swordfish, king mackerel, or tilefish, which contain the most mercury.
- If you also eat fish that you buy from stores and restaurants during a week that you eat local sport fish, choose the local sport fish that you eat from “Best Choices.”
- **FISH FROM OTHER WATER BODIES MAY ALSO CONTAIN MERCURY**. Not all water bodies in California have been tested. With the exception of ocean or river-run salmon or steelhead, which may be consumed more frequently, you can eat one 8-ounce or two 4-ounce meals a week of fish caught from places without an advisory.

SAN JOAQUIN RIVER AND DELTA SPORT FISH

Note: Images are not to scale

INTRODUCTION

Mercury is a trace metal that can be toxic to humans and other organisms. Mercury occurs naturally in the environment, and exists in various forms including elemental or metallic mercury, inorganic, and organic mercury (ATSDR, 1999; IARC, 1993). Mercury enters the environment from the breakdown of minerals in rocks and leaching from old mine sites. Cinnabar ores, naturally rich in mercury, are common in northern California, and mercury was extensively mined in California in the 1800s and early 1900s. Mercury is also emitted into air from mining deposits, the burning of fossil fuels, and other industrial sources, as well as from volcanic eruptions. Mercury contamination thus occurs as a result of both natural and anthropogenic sources and processes.

Once mercury is released into the environment, it cycles through land, air, and water. The deposition of mercury in aquatic ecosystems is a concern for public and environmental health because microorganisms (bacteria and fungi) in the sediments can convert inorganic mercury into organic methylmercury, a particularly toxic form of mercury. Once formed, methylmercury is ingested by aquatic animals and subsequently by the fish that feed on them. In this way, methylmercury "biomagnifies," reaching the highest levels in fish and other organisms at the top of the food web. Concentrations of methylmercury in fish tissues can therefore be orders of magnitude greater than concentrations in water. Consumption of fish is the principal route of exposure to methylmercury. Whether consumption of fish is harmful depends on the concentrations of methylmercury in the fish and the amount of fish consumed. Mercury contamination of fish is a national problem that has resulted in the issuance of fish consumption advisories in most states, including California (U.S. EPA, 2003).

Elevated levels of mercury have been found in fish in a number of lakes, reservoirs, and rivers in northern California. Historically, fish and shellfish tissues were collected and analyzed from water bodies in the southern portion of California's Central Valley, the San Joaquin Valley. This area includes the San Joaquin River and other waterways in the Delta south of the San Joaquin River (referred to throughout the report as the "South Delta") in Contra Costa, San Joaquin, Stanislaus, Merced, Madera, and Fresno Counties. The statutory boundary of the Delta was established in 1959 with the passage of the Delta Protection Act (Delta Protection Commission, 2006). This report covers the South Delta including the San Joaquin River from its confluence with the Sacramento River to its confluence with the Stanislaus River at the southern legal boundary of the Delta, and the San Joaquin River south of the Delta to Friant Dam.

Fish and shellfish samples were collected and analyzed under projects conducted by the Toxic Substances Monitoring Program (TSMP), the Surface Water Ambient Monitoring Program (SWAMP), the CALFED Mercury Project, and the University of California at Davis (UCD). In 2003, the Central Valley Regional Water Quality Control Board (CVRWQCB) organized these mercury data into a single electronic database; some corrections were made to originally published data at that time. Subsequently, the California Office of Environmental Health Hazard Assessment (OEHHA) received and reviewed the dataset, and data suitable for developing advisories were selected using OEHHA's criteria for minimum sizes, as described later in this report, and data reliability, as follows. Each sample was verified using the original dataset or by discussion with investigators responsible for the data, as necessary, to address discrepancies and correct errors. Samples identified as potential duplicates were confirmed as duplicates and therefore eliminated. Latitudinal and longitudinal coordinates for mapping the sampling sites, and site names were also reviewed and corrected as necessary (see Appendix III).

Several historical datasets also included results from analyses of chlorinated hydrocarbon contaminants for fish from the same area; however, current data, although limited, were considered as explained further below. Reviews of historical data showed accumulation of pesticides and PCBs (polychlorinated biphenyls) to levels of potential concern for human health (Davis, 2006; Lee and Jone-Lee, 2004). Furthermore, the County of San Joaquin issued an advisory in 1997 for fish from Old Mormon Slough, New Mormon Slough, the Port of Stockton Turning Basin, the Morelli Boat Ramp, and McCleod Lake, in Stockton. The county advisory pertains to accumulation of dioxins in fish in an area near the site of the McCormick and Baxter wood processing plant. Additional contamination likely resulted from other industrial activities in the Port of Stockton. Finally, data provided by the San Francisco Bay Regional Water Quality Control Board were used by OEHHA to issue an advisory in 1994 for fish in San Francisco Bay and the Delta (including striped bass and sturgeon from the Delta) based on mercury and PCBs in the fish that were tested.

Recent data on mercury concentrations in fish and shellfish from the San Joaquin River and South Delta were collected under a grant from the California Bay-Delta Authority (CBDA). This study, the Fish Mercury Project (FMP), was initiated in 2005 to further examine mercury in fish in the Bay-Delta watershed. In 2005, the first year of the project, sampling focused on the San Joaquin Valley including the San Joaquin River and South Delta in order to support evaluation of mercury concentrations in fish from this area. OEHHA works collaboratively on this project with researchers from UCD; the California Department of Fish and Game (CDFG), Moss Landing Marine Laboratory (MLML); the California Department of Health Services (CDHS); and the principal investigator, the San Francisco Estuary Institute (SFEI).

OEHHA is the agency responsible for evaluating public health impacts from chemical contamination of sport fish, and issuing advisories, when needed, 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, and Section 59011, to advise local health authorities; and the California Water Code Section 13177.5, to issue health advisories. Fish advisories developed by OEHHA are published in the California Sport Fishing Regulations of CDFG. OEHHA now emphasizes "safe eating guidelines" in these advisories in an effort to inform consumers of healthy choices in fish consumption as well as those that should be avoided or restricted.

OEHHA used the collective data to evaluate the potential for adverse health effects associated with consumption of sport fish from the San Joaquin River and South Delta, and to identify safer choices of fish species and locations for consumers of sport fish to fish in this area. The evaluation centered primarily on mercury concentrations in fish and shellfish because nearly all the available data for fish and shellfish from this area were analyzed for mercury. The few samples of fish analyzed in the last decade for chlorinated hydrocarbon contaminants were reviewed and used to assess potential risks from exposure to PCBs for the limited locations where these samples were obtained. The draft safe eating guidelines described in this report provide recommendations for consumption of fish or shellfish from the San Joaquin River and South Delta in Contra Costa, San Joaquin, Stanislaus, Merced, Madera, and Fresno Counties. Separate draft guidelines are included for fish from Old Mormon Slough and New Mormon Slough with dioxins.

BACKGROUND

The San Joaquin River is the second longest river in California at 330 miles, and the second largest drainage in the state. The river basin covers about one fifth (20 percent) of California. The San

Joaquin River and its major tributaries drain about 32,000 square miles of the San Joaquin Valley. River water is used to irrigate about one million acres of farmland, producing over $2 billion a year in crops in the San Joaquin Valley. The river is part of the San Francisco Bay-Delta watershed, which provides drinking water to 22 million people in California (San Joaquin River Parkway and Conservation, 2006).

The San Joaquin River originates at high elevations in the Sierra east of Fresno, and emerges from the foothills where the town of Millerton used to be and where Friant Dam, completed in 1942, forms Millerton Lake. From Friant Dam, the river flows west to Mendota and then flows north from Fresno County passing through Madera, Merced, Stanislaus, San Joaquin, and Contra Costa Counties where it joins the Sacramento River near Antioch. The confluence of these two rivers forms the Sacramento-San Joaquin Delta, and flows into the San Francisco estuary. The Sacramento-San Joaquin Delta provides habitat for several hundred species of wildlife. Since the mid-1900s, the waters of the San Joaquin River have been extensively manipulated and diverted for irrigation, hydroelectricity, and drinking water. Although agricultural return flows occur along the San Joaquin River, portions of the river in the southern reach between Mendota and the Merced River often dry up. A recent agreement, however, may provide for input of additional water to the river to maintain flows (Bureau of Reclamation, 2006).

Two distributary[1] rivers, the Old and Middle rivers, were once the main channels of the San Joaquin River. Currently, a large portion of the water from the San Joaquin River flows down the Old River due to a river bend at the head of the Old River. The water then divides between the Old and Middle rivers, and Grant Line Canal. This area of the Delta also consists of numerous other natural and man-made channels and sloughs, and a system of levees has created a large area of lowlands and wetlands popular with boaters and fishers. The draft fish consumption guidelines contained in this report apply to the San Joaquin River from Friant Dam, flowing west along the border of Fresno County and Madera County, then flowing north and passing through Merced, Stanislaus, San Joaquin, and Contra Costa counties to its confluence with the Sacramento River; the guidelines are also applicable to the other rivers, sloughs, and flooded tracts in the South Delta (see Figures 1, 2, and 3; and Table 1).

Demographic statistics vary among each of the counties through which the San Joaquin River flows. With the exception of Contra Costa County, however, comparisons with California as a whole show the populations in these counties to have lower educational attainment and lower per capita and household median income regardless of race or ethnicity (U.S. Census Bureau, 2000). Community leaders who represent specific ethnic populations that fish reported that fishing is popular among low-income residents in the San Joaquin Delta (LSAG, 2006).

Many of the most productive of California's agricultural counties are in the Central Valley, particularly the San Joaquin Valley. Agriculture is the primary industry in all of the six counties included in this report except for Contra Costa County (Umbach, 1997). In addition, much of the economy in the Central Valley that is not directly agricultural is associated with it, and includes packing, processing, shipping, and other enterprises that support agriculture such as irrigation and pesticide research (Umbach, 1997). The percentage of total land that is farmland in each of the San Joaquin counties is high (*e.g.*, over 87 percent in San Joaquin County; Umbach, 1997); and pesticide use has been an integral part of the agricultural industry. The California Department of

[1] A distributary is a branch of a river that flows *away* from the main stream and does not rejoin it.

Pesticide Regulation (DPR, 2005) reported that in 2005 and similarly in prior years, the quantity of pesticides used in the San Joaquin Valley was greater than in any other area of the state.

The California Coastal Range was one of the most productive mercury districts in the world; more than 220,000,000 pounds of elemental mercury were produced from the 1840s to the early 1960s (USGS, 2006). Mercury was also transported to the Sierra where millions of pounds of mercury were used to extract gold, especially in hydraulic placer mining operations in the Sierra Nevada. USGS (2006) reported that mercury from hydraulic mining operations has been transported along with sediments into the San Francisco Bay/Sacramento-San Joaquin Delta estuary, where it has likely contributed to mercury concentrations in fish. Some of the mercury and gold mines in the vicinity of the San Joaquin Delta are shown in Figure 4.

Popular fish species in the San Joaquin River and South Delta include sunfishes (bluegill, redear sunfish, and green sunfish); black bass (largemouth, smallmouth, and spotted bass); catfish (channel catfish, white catfish, brown bullhead, and black bullhead); crappie; and carp. Anadromous species popular with fishers are striped bass, sturgeon, Chinook salmon, steelhead, and American shad; these species are fished in certain locations within the Delta and on the San Joaquin River. Other fish species include Sacramento sucker, Sacramento pikeminnow, Sacramento blackfish, Sacramento perch, hitch, and goldfish. Crayfish are also plentiful in some areas in the Delta.

Sources of data used in this report originated from the fish tissues collected in 2005 under the FMP, which were merged with historical data collected by the CALFED Mercury Project[1], TSMP and SWAMP[2], and researchers from UCD.[3]

OEHHA merged site location spreadsheets from SFEI, TSMP, FMP, and the CVRWQCB to create a file to link tissue data with spatial locations for each sampling site. This spatially-enabled spreadsheet was brought into ArcMap, v 9.1 to create a site location shapefile of all sites, the result of which revealed inaccurate spatial information. OEHHA made every effort to ensure that the site location spreadsheets from the various sampling programs were accurate. Some site data were from ongoing sampling programs and, in a few instances, had not yet been thoroughly reviewed and checked. Sites were discovered with similar names but in different locations, and with different names in the same location. Spatial datasets varied with regard to documentation and accuracy. Some locations were created using Global Positioning System and others from site names. Potential errors were explored with program managers and staff, and corrected as feasible (see Appendix III). OEHHA reviewed and cross-checked the sampling locations provided by name and usually by NAD27 lat/long, and corrected some lat/long values from original datasets. Layers such as the NAD 27 California Hydrography layer (rivers and water bodies) originated by the Teale Geographic Information Systems (GIS) Solutions Group, were downloaded from the California Spatial Information Library (http://gis.ca.gov/casil/gis.ca.gov/teale/hydro/). Once the spatial information was reasonably dependable, maps were created and used to determine distance

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[1] The CALFED Mercury Project was funded by the CALFED Bay-Delta Program to investigate mercury cycling in the Bay-Delta System.

[2] TSMP, a state water quality-monitoring program managed by the State Water Resources Control Board, was initiated in 1976 and continued until it was subsumed under SWAMP in 1997. CDFG collects and analyzes the samples.

[3] Data from studies by UCD were supplied by electronic mail by Darell Slotton and Shaun Ayers from UCD. CALFED data were obtained from Ben Greenfield at SFEI as electronic spreadsheets. TSMP and SWAMP data are maintained in OEHHA's data files after being downloaded from the SWRCB's web site at http://www.waterboards.ca.gov/programs/smw/index.html.

between sites and logical groupings of sampling sites for statistical analyses. The resulting database can be linked to hydrology, watershed, and Delta subregion characteristics in an ArcView GIS environment.

For the FMP, OEHHA identified fish species for 19[1] locations on the San Joaquin River and other water bodies in the South Delta to be sampled in 2005 specifically for the development of advisories. Additionally, fish from eight other locations in the area were sampled under the FMP by other researchers to assess spatial and temporal variation; this sampling provided additional data useful for the evaluation of mercury concentrations in fish from this area. Sampling sites are listed in Table 1 and shown in Figures 1, 2, and 3. The CDFG MLML collected the fish samples primarily using electroshocking boats and occasionally nets. Fish species collected included sunfish, black bass, catfish, striped bass, crappie, carp, Sacramento sucker, hitch, and Sacramento perch. Samples were prepared and analyzed with the skin removed. Fish were measured (in total length) and weighed, and individual fish were analyzed for mercury as skinless fillets using a Perkin Elmer Flow Injection Mercury System (FIMS). Staff from MLML also collected and analyzed fish for the CALFED Mercury Project using the same methods. In addition to the species listed above for the FMP, CALFED collections also included small numbers of black bullhead, Sacramento blackfish, and Sacramento pikeminnow.

Fish sampled under TSMP and SWAMP were collected by staff from CDFG, Water Pollution Control Laboratory (WPCL), using electrofishing equipment, nets, and hook and line. Fish species included sunfish, catfish, largemouth bass, crappie, and Sacramento pikeminnow. Fish were measured (in fork length) and weighed, and analyzed as individuals or composites using skin-off muscle fillet[2]. Prior to 1997, composite samples were homogenized at the WPCL and analyzed for total mercury by cold vapor atomic absorption spectrophotometry; since 1997, samples were analyzed for mercury and other trace metals by MLML.

Researchers from UCD collected Asiatic clams (*Corbicula fluminea*) primarily by hand, and signal crayfish (*Pacifastacus leniusculus*) using baited traps, from several locations in the Delta. Clams were maintained live in clean water, changed twice a day for four days to purge them of all major gut contents and associated sediment, and frozen for storage. Crayfish were also frozen after digestive tracts were removed (Slotton *et al*., 2002). Clams were measured as the maximum shell diameter and weighed, and soft tissues were extracted for analyses of total mercury and, for some of the samples, methylmercury. Clams were analyzed either as individuals or composites. Crayfish were measured as carapace length and weighed; tail muscle was extracted and analyzed for total mercury. Crayfish were analyzed as individuals. Shellfish samples were dried at 60 °C, powdered, and analyzed on a dry weight basis for total mercury by UCD using a FIMS cold vapor atomic absorption system (Slotton *et al*., 2002). Moisture percentage was determined for all sample types to allow conversion of dry weight analytical results. Wet weight concentrations were calculated using a consistent multiplier determined from moisture percentage for sample type; a multiplier of 0.1312 was used for clam data and 0.22 was used for crayfish (Ayers, 2006; Slotton, 2005). Methylmercury concentrations were analyzed by Battelle Marine Science Laboratories in Sequim Washington (Slotton *et al*., 2002).

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[1] At one of the designated sampling sites, the San Joaquin River in Green Valley Grasslands State Park (adjoining the San Luis National Wildlife Refuge), collections were unsuccessful.

[2] TSMP has historically prepared samples as skin-off muscle fillets in accordance with guidance from OEHHA when the program was founded.

Although fish tissues collected under the FMP were archived for analyses of chlorinated hydrocarbon contaminants (including pesticides and PCBs), funding for these analyses was not readily available. Analyses of some of the samples in the future are planned, with results due after this report is released. Data from limited analyses for select chlorinated hydrocarbon contaminants from historical datasets were obtained and used to determine whether any locations showed excessively high concentrations of total chlordanes, dieldrin, toxaphene, total DDTs (dichlorodiphenyltrichloroethane and its metabolites), or total PCBs, common contaminants found in California sport fish. Dioxins/furans and PCB concentrations in a very limited sample of fish collected by CDHS and the Agency for Toxics Substances Registry (ATSDR) near the Port of Stockton were also considered. These samples were analyzed by the state Hazardous Materials Laboratory. Only those samples collected and analyzed since 1995 were used in this evaluation because analytical methods, including detection limits, have greatly improved over time and older data were considered less reliable. In addition, review of the dataset showed that concentrations for these chemical groups have decreased substantially since the older data were obtained. Forty-six samples collected in 1998 or 2000 and analyzed for total chlordanes, dieldrin, total DDTs, total PCBs, and toxaphene were evaluated for this draft report; an additional 10 samples analyzed for dioxins, furans, and co-planar PCBs were also reviewed.

Some of the historical data were not collected specifically with the intention of developing fish consumption advisories; however, they can be used for that purpose providing certain sampling criteria are met. For example, U.S. EPA recommends a minimum of three replicate composite samples of three fish per composite (nine total fish) in order to begin assessing the magnitude of contamination at a site. U.S. EPA also recommends that at least two fish species be sampled per location. Although composite analysis is generally the most cost-efficient method of estimating the average concentration of chemicals in a fish species, individual sampling provides a better measure of the range and variability of contaminant levels in a fish population (U.S. EPA, 2000a). Using these guidelines, OEHHA believes that a minimum of three replicates of three fish per composite or, preferably, nine individual fish samples of multiple species constitute the minimum acceptable sample size for a sampling site that will provide representative mean concentrations of chemicals for the fish populations in the water body.

The San Joaquin River and South Delta cover an extensive geographic range and the Delta is comprised of numerous rivers, channels, sloughs, and wetlands. Therefore, evaluation of the data for this area required an alternate approach than those described above in which data for fish from one location (or two to three closely linked locations, such as in a lake or reservoir) are considered for the development of consumption guidelines for discreet water bodies. This alternate approach relied heavily on creation of a GIS-linked database and maps for evaluations. Initially, summary statistics including mean mercury concentrations for each species at each sampling site (or sampling sites within one mile of each other) in the South Delta and/or on the San Joaquin River were calculated and reviewed. Subsequently, adjacent groups of sites were combined and mean mercury concentrations were calculated for these units and compared to the individual site means. Broader subregions of the South Delta were then defined following a draft report in which the CVRWQCB proposed dividing the Sacramento-San Joaquin Delta (as defined by statute) into eight regions based on hydrologic characteristics and mixing of source waters (CVRWQCB, 2006). The eight regions of the Delta identified by the CVRWQCB are shown in Figure 5. These proposed regions (referred to as "subareas" by CVRWQCB), however, are preliminary and subject to approval during the process of developing a Total Maximum Daily Load for methylmercury for the San Joaquin Delta. OEHHA used the CVRWQCB subareas (but refers to them in this draft report as "subregions") to evaluate San Joaquin Delta fish and shellfish because they provided a logical means of organizing the large dataset for the South Delta. Four of the eight proposed CVRWQCB subareas include either portions of the Delta north of the San Joaquin River, which will be evaluated separately in the future; or the lower Cosumnes and Mokelumne rivers, which have been previously evaluated in a draft advisory (Klasing *et al*., 2006). A fifth CVRWQCB subarea encompasses a small portion of Marsh Creek, which also extends beyond the Delta boundary. Data from Marsh Creek were insufficient for evaluation, and an advisory is currently in place for Marsh Creek Reservoir (DWR, 2005; Gioia, 2006; Detiens, 2006); therefore, Marsh Creek data were not addressed in this draft report. The remaining three CVRWQCB subareas were included in this evaluation: the West Delta, Central Delta, and San Joaquin Delta (Figure 2). Data for fish from the San Joaquin River south of the Delta boundary were considered as an additional subregion, identified as "San Joaquin River" (Figure 3). The southernmost stretch of the San Joaquin River was subsequently separated out as the "South San Joaquin River subregion," to evaluate potential differences in fish tissue mercury data from that area. During the process of evaluation, OEHHA determined that data were insufficient to retain the South San Joaquin River as a subregion in the final analysis to look for differences in mercury in key species between subregions. Finally, samples from the San Joaquin Delta subregion warranted separation of river and non-river sampling sites. Based on mean mercury concentrations, river sites were reallocated to the San Joaquin River subregion, and non-river sites were reallocated to the Central Delta subregion.

The analyses included a comparison of mean mercury concentrations and corresponding advice (*i.e.*, meal frequencies that would be recommended) across all sampling locations, and within and across subregions. In addition, multiple regression correlation analysis (MRC) was used to detect the degree to which location influenced mean mercury concentrations (after controlling for differences in fish length). MRC was performed on key species with larger sample sizes across subregions, including largemouth bass, white catfish, and channel catfish.

Only legal and/or edible size fish and shellfish were included in this evaluation. Minimum size requirements are shown in Table 2; case summaries of all samples used in this evaluation are presented in Appendix IV.

METHYLMERCURY TOXICOLOGY

Mercury is a metal found naturally in rocks, soil, air, and water that can be concentrated to high levels in the aquatic food chain by a combination of natural processes and human activities (ATSDR), 1999). The toxicity of mercury to humans is greatly dependent on its chemical form (elemental, inorganic, or organic) and route of exposure (oral, dermal, or inhalation). Methylmercury, an organic form, is highly toxic and can pose a variety of human health risks (NRC/NAS, 2000). Of the total amount of mercury found in fish muscle tissue, methylmercury comprises more than 95 percent (ATSDR, 1999; Bloom, 1992). Because analysis of total mercury is less expensive than that for methylmercury, total mercury is usually analyzed for most fish studies. In this study, total mercury was measured and assumed to be 100 percent methylmercury for the purposes of risk assessment.

Fish consumption is the major route of exposure to methylmercury in the United States (ATSDR, 1999). Almost all fish contain detectable levels of methylmercury, which, when ingested, is almost completely absorbed from the gastrointestinal tract (Aberg *et al.*, 1969; Myers *et al.*, 2000). Once absorbed, methylmercury is distributed throughout the body, reaching the largest concentration in kidneys. Its ability to cross the placenta as well as the blood brain barrier allows methylmercury to accumulate in the brain and fetus, which are known to be especially sensitive to the toxic effects of this chemical (ATSDR, 1999). In the body, methylmercury is slowly converted to inorganic mercury and excreted predominantly by the fecal (biliary) pathway. Methylmercury is also excreted in breast milk (ATSDR, 1999). The biological half-life of methylmercury is approximately 44 to 74 days in humans (Aberg *et al.*, 1969; Smith *et al.*, 1994), meaning that it takes approximately 44 to 74 days for one half of a single ingested dose of methylmercury to be eliminated from the body.

Human toxicity of methylmercury has been well studied following several epidemics of human poisoning resulting from consumption of highly contaminated fish (Japan) or seed grain (Iraq, Guatemala, and Pakistan) (Elhassani, 1982-83). The first recorded mass methylmercury poisoning occurred in the 1950s and 1960s in Minamata, Japan, following the consumption of fish contaminated by industrial pollution (Marsh, 1987). The resulting illness was manifested largely by neurological signs and symptoms such as loss of sensation in the hands and feet, loss of gait coordination, slurred speech, sensory deficits including blindness, and mental disturbances (Bakir *et al.*, 1973; Marsh, 1987). This syndrome was subsequently named Minamata Disease. A second outbreak of methylmercury poisoning occurred in Niigata, Japan, in the mid-1960s. In that case, contaminated fish were also the source of illness (Marsh, 1987). In all, more than 2,000 cases of methylmercury poisoning were reported in Japan, including more than 900 deaths (Mishima, 1992).

The largest outbreak of methylmercury poisoning occurred in Iraq in 1971-1972 and resulted from consumption of bread made from seed grain treated with a methylmercury fungicide (Bakir *et al.*, 1973). This epidemic occurred over a relatively short term (several months) compared to the Japanese outbreak. The mean methylmercury concentration of wheat flour samples was found to be 9.1 micrograms per gram (µg/g). Over 6,500 people were hospitalized, with 459 fatalities. Signs and symptoms of methylmercury toxicity were similar to those reported in the Japanese epidemic.

Review of data collected during and subsequent to the Japan and Iraq outbreaks identified the critical target of methylmercury as the nervous system and the most sensitive subpopulation as the developing organism (U.S. EPA, 1997). During critical periods of prenatal and postnatal structural and functional development, the fetus and children are especially susceptible to the toxic effects of methylmercury (ATSDR, 1999; IRIS, 1995). When maternal methylmercury consumption is very high, as happened in Japan and Iraq, significant methylmercury toxicity can occur to the fetus during pregnancy, with only very mild or even in the absence of symptoms in the mother. In those cases, symptoms in children were often not recognized until development of cerebral palsy and/or mental retardation many months after birth (Harada, 1978; Marsh *et al.*, 1980; Marsh *et al.*, 1987; Matsumoto *et al.*, 1964; Snyder, 1971).

The International Agency for Research on Cancer (IARC) has listed methylmercury compounds as possible human carcinogens, based on inadequate data in humans and limited evidence in experimental animals (increased incidence of tumors in mice exposed to methylmercury chloride) (IARC, 1993). Based on IARC's evaluation, OEHHA has administratively listed methylmercury compounds on the Proposition 65 list of chemicals known to the State of California to cause cancer. No estimate of the increased cancer risk from lifetime exposure has been developed for methylmercury.

DERIVATION OF REFERENCE DOSES FOR METHYLMERCURY

A reference dose (RfD) is an estimate, with uncertainty spanning perhaps an order of magnitude, of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime (IRIS, 1995). Reference doses are expressed in units of milligrams of the chemical of concern per kilogram of body weight per day (mg/kg-day). The estimate includes a safety factor to account for data uncertainty. The underlying assumption of a reference dose is that, unlike carcinogenic effects, there is a threshold dose below which certain toxic effects will not occur. The reference dose for a particular chemical is derived from review of relevant toxicological and epidemiological studies in animals and/or humans. These studies are used to determine a No-Observed-Adverse-Effect-Level (NOAEL; the highest dose at which no adverse effect is seen), a Lowest-Observed-Adverse-Effect-Level (LOAEL; the lowest dose at which any adverse effect is seen), or a benchmark dose level (BMDL; a statistical lower confidence limit of a dose that produces a certain percent change in the risk of an adverse effect) (IRIS, 1995). Based on these values and the application of uncertainty factors to account for incomplete data and sensitive subgroups of the population, a reference dose is then generated. Exposure to a level above the RfD does not mean that adverse effects will occur, only that the possibility of adverse effects occurring has increased (IRIS, 1993).

The first U.S. EPA RfD for methylmercury was developed in 1985 and set at $3x10^{-4}$ mg/kg-day (U.S. EPA, 1997). This RfD was based, in part, on a World Health Organization (WHO) report summarizing data obtained from several early epidemiological studies on the Iraqi and Japanese methylmercury poisoning outbreaks (WHO, 1976). WHO found that the earliest symptoms of methylmercury intoxication (paresthesias) were reported at blood and hair concentrations ranging from 200 to 500 micrograms per liter (µg/L) and 50-125 µg/g, respectively, in adults. In cases where ingested mercury dose could be estimated (based, for example, on mercury concentration in contaminated bread and number of loaves consumed daily), an empirical correlation between blood and/or hair mercury concentrations and onset of symptoms was obtained. From these studies, WHO determined that methylmercury exposure equivalent to long-term daily intake of 3-7 µg/kg body weight in adults was associated with an approximately 5 percent prevalence of paresthesias (WHO, 1976). U.S. EPA further cited a study by Clarkson *et al.* (1976) to support the range of blood mercury concentrations at which paresthesias were first observed in sensitive members of the adult population. This study found that a small percentage of Iraqi adults exposed to methylmercury-treated seed grain developed paresthesias at blood levels ranging from 240 to 480 µg/L. The low end of this range was considered to be a LOAEL and was estimated to be equivalent to a dosage of 3 µg/kg-day. U.S. EPA applied a ten-fold uncertainty factor to the LOAEL to reach what was expected to be the NOAEL. Because the LOAEL was observed in sensitive individuals in the population after chronic exposure, additional uncertainty factors were not considered necessary for exposed adults (U.S. EPA, 1997).

Although this RfD was derived on the basis of effects in adults, even at that time researchers were aware that the fetus might be more sensitive to methylmercury (WHO, 1976). It was not until 1995, however, that U.S. EPA had sufficient data from Marsh *et al.* (1987) and Seafood Safety (1991) to develop an oral RfD based on methylmercury exposures during the prenatal stage of development (IRIS, 1995). Marsh *et al.* (1987) collected and summarized data from 81 mother and child pairs where the child had been exposed to methylmercury *in utero* during the Iraqi epidemic. Maximum mercury concentrations in maternal hair during gestation were correlated with clinical signs in the offspring such as cerebral palsy, altered muscle tone and deep tendon reflexes, and delayed developmental milestones that were observed over a period of several years after the poisoning. Clinical effects incidence tables included in the critique of the risk assessment for methylmercury conducted by the U.S. Food and Drug Administration (FDA) (Seafood Safety, 1991) provided dose-response data for a benchmark dose approach to the RfD, rather than the previously used NOAEL/LOAEL method. The BMDL was based on a maternal hair mercury concentration of 11 parts per million (ppm). From that, an average blood mercury concentration of 44 µg/L was estimated based on a hair: blood concentration ratio of 250:1. Blood mercury concentration was, in turn, used to calculate a daily oral dose of 1.1 µg/kg-day, using an equation that assumed steady-state conditions and first-order kinetics for mercury. An uncertainty factor of 10 was applied to this dose to account for variability in the biological half-life of methylmercury, the lack of a two-generation reproductive study and insufficient data on the effects of exposure duration on developmental neurotoxicity and adult paresthesias. The oral RfD was then calculated to be $1x10^{-4}$ mg/kg-day, to protect against developmental neurological abnormalities in infants (IRIS, 1995). This fetal RfD was deemed protective of infants and sensitive adults.

The two previous RfDs for methylmercury were developed using data from high-dose poisoning events. Recently, the National Academy of Sciences was directed to provide scientific guidance to U.S. EPA on the development of a new RfD for methylmercury (NRC/NAS, 2000). Three large prospective epidemiological studies were evaluated in an attempt to provide more precise dose-response estimates for methylmercury at chronic low-dose exposures, such as might be expected to occur in the United States. The three studies were conducted in the Seychelles Islands (Davidson *et al.*, 1995, 1998), the Faroe Islands (Grandjean *et al.*, 1997, 1998, 1999), and New Zealand (Kjellstrom *et al.*, 1986, 1989). The residents of these areas were selected for study because their diets rely heavily on consumption of fish and marine mammals, which provide a continual source of methylmercury exposure (NRC/NAS, 2000).

Although estimated prenatal methylmercury exposures were similar among the three studies, subtle neurobehavioral effects in children were found to be associated with maternal methylmercury dose in the Faroe Islands and New Zealand studies, but not in the Seychelle Islands study. The reasons for this discrepancy were unclear; however, it may have resulted from differences in sources of exposure (marine mammals and/or fish), differences in exposure pattern, differences in neurobehavioral tests administered and age at testing, the effects of confounding variables, or issues of statistical analysis (NRC/NAS, 2000). The National Academy of Sciences report supported the current U.S. EPA RfD of $1x10^{-4}$ mg/kg-day for fetuses, but suggested that it should be based on the Faroe Islands study rather than Iraqi data.

U.S. EPA has recently published a new RfD document that arrives at the same numerical RfD as the previous fetal RfD, using data from all three recent epidemiological studies while placing emphasis on the Faroe Island data (IRIS, 2001). In order to develop an RfD, U.S. EPA used several scores from the Faroes data, rather than a single measure for the critical endpoint, as is customary (IRIS, 2001). U.S. EPA developed BMDLs utilizing test scores for several different neuropsychological effects with cord blood as the preferred biomarker. The BMDLs for different neuropsychological effects in the Faroes study ranged from 46 to 79 µg mercury/liter blood. U.S. EPA then chose a one-compartment model for conversion of cord blood to ingested maternal dose, which resulted in estimated maternal mercury exposures of 0.857-1.472 µg/kg-day (IRIS, 2001). An uncertainty factor of ten was applied to the oral doses corresponding to the range of BMDLs to account for inter-individual toxicokinetic variability in ingested dose estimation from cord-blood mercury levels and pharmacodynamic variability and uncertainty, leading to an RfD of $1x10^{-4}$ mg/kg-day (IRIS, 2001). In support of this RfD, U.S. EPA found that benchmark dose analysis of several neuropsychological endpoints from the Faroe Island and New Zealand studies, as well as an integrative analysis of all three epidemiological studies, converged on an RfD of $1x10^{-4}$ mg/kg-day (IRIS, 2001). U.S. EPA (IRIS, 2001) now considers this RfD to be protective for all populations. However, in their joint federal advisory for mercury in fish, U.S. EPA and FDA only apply this RfD to women who are pregnant or might become pregnant, nursing mothers, and young children (U.S. EPA, 2004).

OEHHA finds that there is convincing evidence that the fetus is more sensitive than adults to the neurotoxic and subtle neuropsychological effects of methylmercury. As noted previously, during the Japanese and Iraqi methylmercury poisoning outbreaks, significant neurological toxicity occurred to the fetus even in the absence of symptoms in the mother. In later epidemiological studies at lower exposure levels (*e.g.*, in the Faroe Islands), these differences in maternal and fetal susceptibility to methylmercury toxicity were also observed. Recent evidence has shown that the nervous system continues to develop through adolescence (see, for example, Giedd *et al.*, 1999; Paus *et al.*, 1999; Rice and Barone, 2000). As such, it is likely that exposure to a neurotoxic agent during this time may damage neural structure and function (Adams *et al.*, 2000), which may not become evident for many years (Rice and Barone, 2000). Thus, OEHHA considers the RfD based on subtle neuropsychological effects following fetal exposure to be the best estimate of a protective daily exposure level for pregnant or nursing females and children aged 17 years and younger.

OEHHA also recognizes that fish can play an important role in a healthy diet, particularly when it replaces other higher-fat sources of protein. Numerous human and animal studies have shown that fish oils have beneficial cardiovascular and neurological effects (see, for example, Harris and Isley, 2001; Iso *et al.*, 2001; Mori and Beilin, 2001; Daviglus *et al.*, 1997; von Schacky *et al.*, 1999; Valagussa *et al.*, 1999; Moriguchi *et al.*, 2000; Lim and Suzuki, 2000; Cheruka *et al.*, 2002). Nonetheless, the hazards of methylmercury that may be present in fish, particularly to developing fetuses and children, cannot be overlooked. When contaminants are present in a specific food that can be differentially avoided, it is not necessary to treat all populations in the most conservative manner to protect the most sensitive population. Sport fish consumption advisories are such a case. Exposure advice can be tailored to specific risks and benefits for populations with different susceptibilities so that each population is protected without undue burden to the other. Fish consumption guidelines utilize the best scientific data available to provide the most relevant advice and protection for all potential consumers.

In an effort to address the risks of methylmercury contamination in different populations as well as the cardiovascular and neurological benefits of fish consumption, two separate RfDs will be used to assess risk for different population groups. OEHHA has formerly used separate methylmercury RfDs for adults and pregnant females to formulate advisories for methylmercury contamination of sport fish (Stratton *et al.*, 1987). Additionally, most states issue separate consumption advice for sensitive (*e.g.*, children) and general population groups. OEHHA chooses to use both the current and previous U.S. EPA references doses for two distinct population groups. For these draft safe eating guidelines, the current RfD of 0.1 μg/kg-day, based on effects in infants will be used for women of childbearing age and children aged 17 years and younger. The previous RfD of 0.3 μg/kg-day, based on effects in adults, will be used for women beyond their childbearing years and men.

MERCURY LEVELS IN FISH AND SHELLFISH FROM THE SAN JOAQUIN RIVER AND SOUTH DELTA

Mercury concentrations in fish and other biota are dependent, in general, on the mercury level of the environment, which can vary based on differences in pH, redox potential, temperature, alkalinity, buffering capacity, suspended sediment load, and geomorphology of individual water bodies (Andren and Nriagu, 1979; Berlin, 1986; WHO, 1989). Other factors also affect the accumulation of mercury in fish tissue, including fish diet, species and age (as inferred from length) (WHO, 1989; 1990). Fish at the highest trophic levels (i.e., predatory fish) generally have the highest levels of mercury. Additionally, because of the long biological half-life of methylmercury in fish (approximately 2 years), tissue concentrations in fish increase with increased duration of exposure (Krehl, 1972; Stopford and Goldwater, 1975; Tollefson and Cordle, 1986). As a result, tissue methylmercury concentrations are expected to increase with increasing age and length within a given species, particularly in piscivorous fish.

Chemical concentrations for the data presented below are reported in wet weight. Arithmetic means, rather than geometric means, were used to represent the central tendency (average) of mercury concentrations for all species in this report. In general, arithmetic means for environmental chemical exposures are more health-protective than geometric means, and are commonly used in human health risk assessments. The mean mercury concentrations, lengths, and sample sizes for each unique sample collected and analyzed are presented in Appendix IV. Summaries of mercury concentrations and lengths for each species by subregion are shown in Table 3. All fish lengths that were reported in fork length were converted to total length for the purpose of calculating mean lengths; conversion factors for estimating total length from measured fork lengths were developed for each species by OEHHA based on the degree of the angle in the fork of the tail fin. The lengths as originally reported, however, are included in Appendix IV.

OEHHA evaluated samples of fish and shellfish from a total of 102 sampling sites, representing 53 locations on the San Joaquin River or in the Delta south of the San Joaquin River[1]. All sampling sites evaluated in this draft report are listed in Table 1, which shows original site names and combined location names. Mean mercury concentrations were compared species by species among individual sampling sites, combined locations, and among subregions. Many species, including clams, bluegill, redear sunfish, brown bullhead, carp, red swamp crayfish, and signal crayfish had similar mean mercury concentrations across sampling sites, combined locations, and subregions that corresponded to consistent (equivalent) consumption guidelines. This was the case when considering mean concentrations from combined samples meeting a minimum sample size of nine fish for the subregion and also for locations and/or subregions with smaller sample sizes (less than nine fish). Table 4 provides an example of subregional comparisons for species that were consistent across subregions. For these species, mercury levels were also consistent within subregions (not shown).

Other species showed more variation within and between subregions and key species were used to test for consistent regional differences. Largemouth bass, channel catfish, and white catfish varied the most in mean mercury concentrations (Table 5, Figures 6 and 7). Because largemouth bass were most extensively sampled, and the species is a good indicator of bioaccumulation of mercury,

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[1] Generally, sampling sites representing the same water body within approximately one mile were combined. Occasionally, combining samples from greater distances was considered acceptable if species differed and/or the water body had unique features and was not large overall (e.g., Smith Canal).

it was useful for comparing locations and subregions. Largemouth bass from the West Delta and Central Delta subregions (0.31 ppm for each subregion) were lower in mercury than those from the San Joaquin Delta subregion (0.56 ppm) and San Joaquin River subregion (0.62 ppm). The differences in mean mercury concentrations in legal-sized largemouth bass from different subregions were tested statistically using multiple regression correlation analysis (MRC; Table 6). The results in the model summary showed that length explained 59 percent of the variance, and subregion explained an additional 12 percent of unique variance. The t-statistics in the coefficients table showed that largemouth bass from the South San Joaquin River, the Central Delta, the San Joaquin River Delta, and the West Delta subregions were significantly lower in mean mercury levels than were bass from the "reference site" used in the model, the San Joaquin River subregion (Table 6). Finally, the coefficients from the MRC model were used to compare a hypothetical 350-mm largemouth bass from each subregion to assess differences without the influence of length. The results shown in the last table in Table 6 confirmed significant differences in mercury concentrations between subregions, after controlling for differences in length.

Mercury levels in catfish overall were lower than in largemouth bass. Nevertheless, a trend similar to that observed in largemouth bass was noted. Mean mercury concentrations were lower in catfish from the West Delta and Central Delta subregions compared to the San Joaquin Delta and the San Joaquin River subregions (Figure 7). Channel catfish were low in mercury in the Central Delta subregion (0.13 ppm), and had moderate mercury levels in the San Joaquin Delta (0.30 ppm) and San Joaquin River subregions (0.25 ppm). For white catfish, mercury levels were low in the West Delta (0.15 ppm) and Central Delta subregions (0.12 ppm), and moderate in the San Joaquin Delta and San Joaquin River subregions (0.29 ppm and 0.38 ppm, respectively). MRC was performed on these samples and the results confirmed that mercury levels in both species of catfish were significantly different among subregions (Tables 7 and 8). The MRC model in Table 7 indicates that length explained about 26 percent of the variance for white catfish, and after controlling for length, subregion explained an additional 26 percent of unique variance. For channel catfish, the MRC model in Table 8 shows that length explained about 16 percent of the variance, and after controlling for length, subregion explained an addition 21 percent of unique variance.

Although MRC analyses for largemouth bass and catfish provided statistical support for differences in mercury concentrations in different subregions, the critical factor when comparing species from different areas is whether consumption guidelines differ. The lower concentrations of mercury in largemouth bass, and channel catfish and/or white catfish from the West Delta and Central Delta subregions do allow for safely consuming more meals of these species from these two subregions compared to the same species from the San Joaquin Delta and San Joaquin River subregions. These differences were important for developing safe eating guidelines, as described further below. Furthermore, closer examination of the mercury data from within the San Joaquin Delta subregion indicated that mean mercury concentrations for these three species were considerably higher in samples collected from locations on the San Joaquin River compared to samples collected in other water bodies in the Delta (not in the river; Table 9). Therefore, the San Joaquin Delta subregion was further divided. For these three species, samples from San Joaquin River locations in the San Joaquin Delta subregion were combined with the samples collected in the San Joaquin River subregion. The non-river samples from the San Joaquin Delta subregion were added to the samples collected from the Central Delta subregion.

For the purpose of issuing safe eating guidelines, the original four subregions (West Delta, Central Delta, San Joaquin Delta, and San Joaquin River) were thus re-organized into two large regions as follows. The West Delta subregion and Central Delta subregion (now including non-river locations from the San Joaquin Delta subregion) constitute one region, the "South Delta" including the San Joaquin River from its confluence with the Sacramento River to its confluence with the Calaveras River as well as all other rivers, sloughs, and flooded tracts in the Delta south of the San Joaquin River. The San Joaquin River subregion, including river locations from the San Joaquin Delta subregion, constitutes the second region, the "San Joaquin River" from its confluence with the Calaveras River to Friant Dam. As a result of finding lower mercury levels in bass and catfish from the South Delta region compared to these species from the San Joaquin River region, different consumption guidelines were developed for these key species for each of the two regions. Separate consumption guidelines for these two overarching regions were not developed for other species because their mercury concentrations were similar among the two regions.

The initial subregional comparisons for largemouth bass and white catfish also indicated that the lowest mercury concentrations for these species were found in the southernmost (upstream) portion of the San Joaquin River, initially considered the South San Joaquin River subregion (Figure 6 and Figure 7). This subregion was represented by only two locations, however, and one of the two sampling sites was in Mendota Pool. Water from the Delta-Mendota Canal (aqueduct) collects in Mendota Pool as a result of a small dam, and therefore, water in Mendota Pool is different than water from the San Joaquin River. Consequently, fish data from these two sampling sites (Mendota Pool and San Joaquin River at Highway 99) were not considered as a separate subregion when developing safe eating guidelines. Further sampling on the southern (upstream) portion of the San Joaquin River would be useful to determine whether, in fact, fish consistently contain lower concentrations of mercury throughout this area.

Differences in mean mercury levels were noted for bass and catfish at a few sampling locations within the San Joaquin River subregion when compared to the overall mean concentration for the subregion. Largemouth bass from the San Joaquin River near Mossdale (0.27 ppm) and San Joaquin River near Patterson (0.42 ppm) showed lower levels of mercury than bass from all other locations on the San Joaquin River, except for the San Joaquin River at Highway 99, as discussed above. The number of samples from these locations was insufficient to investigate whether these results are consistent over years and/or among different projects. Therefore, regional advice was considered appropriate to the data, and these locations were not differentiated from the other bass samples from the San Joaquin River region. Regional guidelines also provide for keeping consumption guidelines simple and easier to understand. The overall mean mercury concentration for largemouth bass from all sampling locations on the San Joaquin River from the Calaveras River confluence to Highway 99 was 0.54 ppm.

A relatively high concentration of mercury (0.55 ppm) was reported for white catfish from the San Joaquin River near Lake Ramona. The overall mean concentration for white catfish on the San Joaquin River from the Calaveras River confluence to Highway 99 was 0.33 ppm. Because this was the only location and species combination with a mean mercury concentration higher than the overall average for the region, and because only seven catfish were collected from this location (all in the same year), OEHHA chose to maintain consistent safe eating guidelines for white catfish along the San Joaquin River, as was done for largemouth bass. Regional guidelines were deemed appropriate because the data do not provide enough information to determine whether these differences are consistent over time, nor do we have an understanding of what might cause these differences, if they are representative.

Brown bullheads were collected in sufficient numbers from only two locations in the Central Delta subregion and one location on the (South) San Joaquin River. Therefore, the overall grand mean mercury concentration for brown bullhead (0.22 ppm) was used for developing consumption guidelines. Because the mean mercury concentration for brown bullheads was similar to those for channel catfish and white catfish (0.25 and 0.23 ppm, respectively), and the sample size for black bullheads was extremely limited (see below), brown and black bullhead catfish were included in the guidelines for catfish. Thirteen Sacramento suckers were collected from the San Joaquin River subregion and San Joaquin Delta subregion (on the river), 11 from the West Delta subregion, and four from the Central Delta subregion. This species may not be as popular as other species in the Delta. Nevertheless, consumption guidelines were developed. Because sample sizes were inadequate for some subregions, and mean fish lengths for suckers were highly variable among locations, the overall mean concentration (0.26 ppm) for a total of 28 suckers was considered more representative and used to develop guidelines.

Other species with smaller sample sizes and/or distribution were not evaluated in this report. Only one composite sample each (comprised of five fish) was obtained for black bullhead and Sacramento blackfish. Five individual hitch and four individual Sacramento perch were collected from one site per species. Sacramento pikeminnow were collected at four sites, but in all but one case, only one fish was obtained per site, and the total sample size for this species was eight fish. These data were insufficient to assess mercury in these species, especially for such a large geographic area. In addition, 14 striped bass were collected from 10 locations. The mercury concentrations were highly variable between sites, and only one to three fish were sampled per site. Furthermore, advice for striped bass in the Delta is currently in place as part of the San Francisco Bay/Delta advisory. In addition, an updated striped bass advisory is expected following a special study in 2006-2007 that will include sampling and analysis of at least 100 samples of striped bass from the Delta. Therefore, striped bass samples in this dataset were not evaluated.

OTHER CONTAMINANTS IN FISH AND SHELLFISH FROM THE SAN JOAQUIN RIVER AND SOUTH DELTA

Analysis of chlorinated hydrocarbon contaminants (including pesticides and PCBs) was planned as part of the sampling design for the FMP advisory sampling sites because all potential chemicals of concern need to be evaluated to provide complete and comprehensive safe eating guidelines. However, the FMP was funded by CBDA for the express purpose of assessing mercury contamination, and thus, outside sources of funding were sought for analyses of these other chemical contaminants. Fish tissues collected under the FMP were archived; it is expected that some of the samples will be analyzed in the future, with results due after this draft report is released. In the absence of these results during the time of this evaluation, data from limited analyses for select chlorinated hydrocarbon contaminants from historical datasets were used to determine whether any locations showed excessively high concentrations of total chlordanes, dieldrin, total DDTs, total PCBs, or toxaphene, common contaminants found in California sport fish, such that the safe eating guidelines based on mercury would not be sufficiently health protective.

Select chlorinated hydrocarbon contaminants were analyzed under TSMP on fish collected from the San Joaquin River or South Delta from 1978 to 2000. As mentioned above, data collected prior to 1995 were not included in the evaluation because analytical methodologies have improved and detection limits have decreased, making recent samples more reliable than historical samples. Additionally, the TSMP data showed that concentrations of the chemicals of concern (total chlordanes, dieldrin, total DDTs, total PCBs, and toxaphene) have declined substantially between the 1970s and 2000. Eleven samples were collected in 1998 or 2000 under TSMP, and an additional 36 samples were collected in 1998 in the Sacramento-San Joaquin Delta and Lower San Joaquin River study (Davis *et al.*, 2000). The samples included largemouth bass, white catfish, black bullhead, and clams (*Corbicula fluminea*) from various water bodies in the South Delta including the San Joaquin River.

Fish with higher concentrations of chlorinated hydrocarbons were all collected near the Port of Stockton. One sample each of largemouth bass and white catfish from Smith Canal, and one sample of white catfish from the Port of Stockton Turning Basin had PCB concentrations of 112 ppb (parts per billion), 102 ppb, and 51 ppb, respectively (Table 10, first four rows). One sample of largemouth bass and one sample of 24 clams from the Port of Stockton near Mormon Slough had PCB concentrations of 32 ppb and 112 ppb, respectively. Fish in the remaining samples in this dataset were collected from an additional 15 sampling sites in the South Delta (Table 11), including the San Joaquin River. All of these samples had very low concentrations of PCBs. Additionally, none of the other chemicals of concern were detected in the samples. Most samples in these two studies were comprised of largemouth bass, a non-fatty fish species that is less suitable for examining accumulation of lipophilic chemicals such as PCBs. Therefore, further sampling and analyses of fish and shellfish for chlorinated hydrocarbon chemicals are recommended to verify whether they are present in concentrations of concern in the San Joaquin River and South Delta. Additional samples should include species more suitable for detecting chlorinated hydrocarbon contaminants, such as catfish, and species that are low in mercury and thereby recommended for frequent consumption, such as bluegill and trout.

Two studies to determine the concentrations of dioxins, furans, and co-planar PCBs in edible fish were conducted in the 1990s near the McCormick & Baxter Superfund National Priority List (NPL) site in Stockton, California. The McCormick & Baxter Creosoting Company used pentachlorophenol, which contained dioxin byproducts, as a preservative for wood treatment. Runoff from a spill caused a fish kill in Old Mormon Slough and the Port of Stockton in 1977 (CDHS, 1997). A study by Petreas and Hayward (1994) for the State Water Resources Control Board analyzed fish collected in 1992 from Old Mormon Slough (adjacent to the Superfund NPL site) and the Stockton Deep Water Channel (away from the Superfund NPL site). Two carp, two largemouth bass, and one bluegill were collected and analyzed as fillets from Old Mormon Slough; and one carp, two largemouth bass, two striped bass, and one bluegill were collected and analyzed as fillets from the Deep Water Channel. These data were considered too old to use directly in the current assessment. The authors (Petreas and Hayward, 1994, and Hayward et al., 1996) found that the dioxin and furan concentrations in these fish samples were at background levels, but that the PCB levels were elevated, possibly due to general industrial activities, discharges and shipping in the area.

ATSDR and CDHS performed follow-up assessments and collected additional fish in 1996 from a number of locations near the Superfund NPL site and the Port of Stockton. The CDHS-ATSDR samples were analyzed for dioxins, furans, and three co-planar PCBs, and used in a health assessment, which also included archived fish collected by U.S. EPA in 1995 for an ecological assessment (CDHS, 1997). The samples used in the CDHS-ATSDR study from 1995 and 1996 were analyzed as fillets and were considered in the current assessment. Samples were collected from Old Mormon Slough (one composite of three sub-legal size largemouth bass, and one composite of two white catfish); New Mormon Slough (one composite of two white catfish); McLeod Lake (one composite of three largemouth bass containing two legal and one sub-legal sized fish, and one composite of two white catfish, and one individual carp); the Port of Stockton (one composite of one legal and two sub-legal sized largemouth bass); and Louis Park on Smith

Canal (one composite of two legal and one sub-legal sized largemouth bass, one large 565-mm individual largemouth bass, and one carp; Table 10). Sample sites are shown in Figure 9. Louis Park and McLeod Lake are furthest from the Superfund NPL site; Old Mormon Slough and New Mormon Slough adjoin the site and/or previously received runoff from the site. The Port of Stockton site is part of the Deep Water Channel near the confluence of Old Mormon Slough. Based on their assessment of dioxins, furans, and co-planar PCBs, CDHS recommended no consumption of whole body fish from any of these locations and restricted consumption of fish fillets (CDHS, 1997). The San Joaquin County Department of Health subsequently recommended no consumption of fish from these areas due to dioxin contamination.

The numbers of fish of each species collected from the locations in the CDHS-ATSDR study are insufficient to statistically compare differences in concentrations of dioxin/furans or PCBs for the current assessment. In addition, all of the largemouth bass composites contained one or more sub-legal sized fish and would not normally be used to develop consumption advice. Consequently, one individual largemouth bass, six white catfish (in three composites), and two carp constituted the only valid samples for developing consumption advice applicable to a broad area. These samples do not meet the criterion for the minimum number (nine) of fish of a species at a location needed to develop consumption advice.

Total concentrations of PCBs from the CDHS study have been included in Table 10 with the fish samples from the area near the Deep Water Channel and the McCormick & Baxter site collected under different studies. Only three congeners were measured in the CDHS-ATSDR study whereas 48 congeners were measured in the other studies shown in the table. If more congeners had been measured, the results from the CDHS-ATSDR study would likely be higher. Sample sizes were small even when combining the results from all studies shown in Table 10. Dioxins and furans were analyzed in the same fish. As in the Petreas and Hayward study (1994), dioxin levels in most samples were below or near background levels (1.2 parts per trillion or ppt TEQ, Pollock, 1998). Samples from Old Mormon Slough and New Mormon Slough were considerably higher (Old Mormon Slough largemouth bass 2.97 ppt and white catfish 5.79 ppt; New Mormon Slough white catfish 5.95 ppt dioxin TEQ). Since there were not enough valid samples to develop separate consumption advice, these results were used as supporting data to determine whether consumption should be restricted to less than that determined by mercury concentrations in fish from this area. Given the limitations described for chlorinated hydrocarbon contaminant data, additional analyses would be useful for verifying that the local contamination is not more widespread.

GUIDELINES FOR FISH CONSUMPTION FOR THE SAN JOAQUIN RIVER AND SOUTH DELTA

OEHHA has developed guidance tissue levels for methylmercury (Brodberg and Klasing, 2003) and draft guidance tissue levels for other contaminants (Klasing and Brodberg, 2006) similar to risk-based consumption limits recommended by U.S. EPA (2000b). Guidance tissue levels for methylmercury in fish relate the number and size of recommended fish meals to methylmercury concentrations found in fish (Table 12). These guidance values were designed so that individuals consuming no more than a preset number of meals should not exceed the RfD for methylmercury. Meal sizes are based on a standard 8-ounce (227 grams) portion of uncooked fish, which is approximately 6 ounces after cooking, for adults who weigh roughly 70 kilograms (equivalent to 154 pounds). Guidance tissue levels for methylmercury for women beyond their childbearing years and men are approximately three times higher than for sensitive populations because of the three-fold higher RfD level used for this population group. The sensitive population is defined as women of childbearing age (including women who are pregnant or breastfeeding) and children aged 17 years and younger. The "standard" meal size of eight ounces of uncooked fish (six ounces after cooking) could be divided into multiple smaller meals, such as two 4-ounce portions of fish prior to cooking (approximately three ounces after cooking), which corresponds to the recommendations of the American Heart Association, as cited below.

OEHHA generally issues site-specific consumption advice beginning at a consumption frequency of three meals a week (12 meals per month). Fish that can be eaten at this frequency represent fish with lower levels of mercury or other contaminants. OEHHA encourages greater consumption of fish in this category in order for consumers to continue eating fish regularly while minimizing the risk. OEHHA also typically uses other consumption frequencies of two meals a week, one meal a week, one meal a month, and no consumption. Some categories have been extended to include similar meal frequencies in order to simplify the guidelines and facilitate communication. For example, the "one meal a month" and "no consumption" categories have been combined under a red header in advisory tables and labeled as "restricted" to warn consumers that eating fish from this category is a poor choice. Regular consumption of fish is recommended as part of a healthy diet due to evidence for health benefits associated with consistent fish consumption (AHA, 2005, IOM, 2007). Consumption of only one fish meal a month (based on higher levels of mercury) will likely not provide the same benefits as more frequent consumption of other lower mercury fish. Therefore, OEHHA discourages consumers from eating fish that could only be eaten once or twice a month, and provides these guidelines to assist fish consumers in finding a balance that maximizes benefits without undue risk.

The data evaluated in this draft report indicated that many species of fish and shellfish can be eaten regularly from most locations in the South Delta and the San Joaquin River. The recommendations for fish consumption in this report are primarily based on mercury concentrations in fish; limited data for chlorinated hydrocarbons, however, were used to determine whether the safe eating guidelines based on mercury would likely be protective for PCBs and dioxins. Based on draft guidance tissue levels (Klasing and Brodberg, 2006), fish containing less than 46 ppb PCBs would be considered in the Best Choices consumption category; those with concentrations of PCBs between 46 ppb and 134 ppb would be considered in the Good Choices category; and fish with concentrations greater than 134 ppb would be considered in the Restricted category. These values have been used to determine if any of the available limited PCB data support further restricting consumption recommendations that were based on mercury. A full evaluation of data for consumption advice throughout the San Joaquin Valley based on PCBs and other chlorinated hydrocarbons was not possible due to insufficient data.

Review of the CDHS-ATSDR study data (CDHS, 1997) showed that the dioxin/furan contamination in fish was largely limited to Old and New Mormon Slough, and that other fish from other sites were at or near background levels. CDHS found that people consuming fish as fillets less than once a month from Old and New Mormon Slough would exceed a cancer risk of $1x10^{-4}$ due to the dioxin contamination. This would correspond to no consumption in OEHHA's draft guidance tissue levels. Based on these findings, the portion of the San Joaquin County advice to restrict consumption of all fish from Old Mormon Slough and New Mormon Slough due to dioxin contamination is appropriate and should be continued. All populations are advised not to eat fish from Old Mormon Slough and New Mormon Slough.

As noted above, fish from other sites near the McCormick & Baxter Superfund NPL site and the Port of Stockton also had locally higher levels of PCBs. The area from which these samples were collected is upstream (south) of the confluence of the Calaveras and San Joaquin rivers, and therefore the safe eating guidelines for the San Joaquin River region would apply. Women of childbearing age and children 17 years and younger are advised to restrict consumption of largemouth bass from this region due to accumulation of high levels of mercury. Women beyond childbearing age and men can eat largemouth bass from the San Joaquin River region once a week (Good Choices category). Six of seven samples of large mouth bass that were analyzed for PCBs correspond to these guidelines as does the mean of all bass samples. This finding indicates that more restrictive advice for largemouth bass based on PCBs is not needed. The guidelines for catfish and carp in the San Joaquin River region, based on mercury, recommend consumption of one 8-ounce meal a week for women of childbearing age and children 17 years and younger (Good Choices category), and two 8-ounce meals a week for women beyond childbearing age and men (Best Choices category). Both carp samples corresponded to this advice, but three of five white catfish samples would fall into a more restrictive category (one 8-ounce meal a week) for women beyond childbearing age and men based on the samples from this area. The catfish sample with the highest concentration of PCBs, however, was collected from New Mormon Slough, and thus would fall under the "no consumption" advice recommended for that area. The one sample of clams also indicated that consumption should be limited to one 8-ounce meal a week for both population groups based on accumulation of PCBs. Only four clams from the Port of Stockton were analyzed for mercury, although the mean mercury concentration was very low and would correspond to unlimited consumption of clams on the basis of mercury. Clams were not collected from any other location in the San Joaquin River region, and are thus not included in the safe eating guidelines for this region. PCB concentrations from other areas on the San Joaquin River do not support more restrictive advice. Because regional advice is being emphasized for ease of communication, no additional advice is recommended for any species from McLeod Lake, Louis Park, the Port of Stockton, the Deep Water Channel, or Smith Canal. But as noted above, no consumption of fish or shellfish from Old Mormon Slough and New Mormon Slough is advised for anyone due to dioxin contamination.

Mean mercury concentrations in fish and shellfish species from the San Joaquin River and South Delta indicated that for key species including largemouth bass and catfish, two different sets of advice could be issued – one for all rivers, sloughs, and flooded tracts in the South Delta (including the San Joaquin River from its confluence with the Sacramento River to its confluence with the Calaveras River), and one for the San Joaquin River (south of the Calaveras River; Figure 8). The draft consumption guidelines for largemouth bass and catfish from the San Joaquin River region are more conservative than for these species caught from water bodies in the South Delta region. These differences were based on higher mercury levels in these key species in the San Joaquin River region and lower mercury levels from the same species in water bodies in the South Delta region. By distinguishing these two regions and providing separate guidelines, options for more frequent consumption of fish and shellfish (if caught in the South Delta region) are provided.

Only one species, largemouth bass, accumulated mercury at concentrations at which consumption is not recommended, and this was the case only for bass caught in the San Joaquin River region (south of the Calaveras River). Furthermore, this restriction is only applicable to the sensitive population including women of childbearing age and children. For catfish, consumption is recommended for both regions, but the frequency of recommended meals is greater for the South Delta region than for the San Joaquin River region, as detailed below. Safe eating guidelines for all other species evaluated in this draft report for mercury concentrations were consistent for all subregions and therefore for both regions in the overall area.

Consumers should be informed of the potential hazards from eating fish with high chemical concentrations, particularly those hazards relating to the developing fetus and children. OEHHA considers it equally important to inform consumers about fish species that contain low chemical levels and therefore provide better options when choosing fish to eat. Most fish and shellfish from the San Joaquin River and South Delta were low in mercury and could be eaten at least once a week. For detailed guidelines, see below. Fish consumers are encouraged to eat fish species with lower levels of mercury and other chemicals in order to enjoy the benefits from eating fish. Recreational fishers may opt to practice catch-and-release for species (such as largemouth bass from the San Joaquin River south of the Calaveras River) that contain higher levels of mercury.

Recommendations for women of childbearing age and children aged 17 years and younger

- The best choices for consumption of fish or shellfish by women of childbearing age and children aged 17 years and younger are sunfish (including bluegill or redear sunfish) or crayfish from all locations in the South Delta and San Joaquin River EXCEPT Old Mormon Slough and New Mormon Slough (see special advisory below), or catfish or clams from the South Delta. This population can eat two 8-ounce (or four 4-ounce) meals a week of these fish or shellfish from the identified regions.
- Alternatively, women of childbearing age and children aged 17 years and younger could eat one 8-ounce meal (or two 4-ounce meals) a week of either crappie, carp, or sucker from all locations in the South Delta and San Joaquin River EXCEPT Old Mormon Slough and New Mormon Slough (see special advisory below); or they could eat one 8-ounce meal (or two 4-ounce meals) a week of largemouth, smallmouth, or spotted bass from the South Delta including the portion of the San Joaquin River from its confluence with the Sacramento River to its confluence with the Calaveras River; or one 8-ounce meal (or two 4-ounce meals) a week of catfish from the San Joaquin River from its confluence with the Calaveras River to Friant Dam.
- Women of childbearing age and children aged 17 years and younger should not eat any black bass (largemouth, smallmouth, or spotted bass) from the San Joaquin River from its confluence with the Calaveras River to Friant Dam.
- The 1994 advisory for San Francisco Bay and the Delta recommended that women of childbearing age and children eat no striped bass over 27 inches. The San Francisco Bay/Delta advisory allows for consumption of one meal a month of smaller legal-sized striped bass, or sturgeon, but if striped bass or sturgeon is eaten by women of childbearing age or children, no other fish can be eaten that month. Therefore, OEHHA recommends that women of childbearing age and children avoid eating striped bass or sturgeon from the South Delta and/or San Joaquin River.

Recommendations for women beyond childbearing age and men

- Women beyond childbearing age and men can eat sunfish from the South Delta or San Joaquin River EXCEPT from Old Mormon Slough and New Mormon Slough (see special advisory below) on a daily basis.
- Alternatively, women beyond childbearing age and men can eat **three** 8-ounce meals a week of crayfish, crappie, or carp, or **two** 8-ounce meals a week of catfish or sucker, from all locations

in the South Delta and San Joaquin River EXCEPT from Old Mormon Slough and New Mormon Slough (see special advisory below).

- Alternatively, women beyond childbearing age and men can eat **three** 8-ounce meals a week of clams, or **two** 8-ounce meals a week of largemouth, smallmouth, or spotted bass, from the South Delta, including the portion of the San Joaquin River from its confluence with the Sacramento River to its confluence with the Calaveras River.
- Alternatively, women beyond childbearing age and men can eat one 8-ounce meal of largemouth, smallmouth, or spotted bass from the San Joaquin River from its confluence with the Calaveras River to Friant Dam.
- The 1994 advisory for San Francisco Bay and the Delta recommended that women beyond childbearing age and men eat no more than two meals a month of sturgeon or striped bass from the bay or Delta, and eat no striped bass over 35 inches. If striped bass or sturgeon is eaten by women beyond childbearing age or men, however, no other fish can be eaten that month. Therefore, OEHHA recommends that women beyond childbearing age and men choose to eat the other types of fish and shellfish listed above that have lower levels of mercury.

Special advisory for Old Mormon Slough and New Mormon Slough (near the Port of Stockton)

It is recommended that all fish consumers follow the current advisory issued by the County of San Joaquin that advises NO CONSUMPTION of any fish or shellfish from Old Mormon Slough and New Mormon Slough.

It is very important to note that if an individual consumes multiple species or catches fish from more than one location with an advisory, the recommended guidelines for different species and locations should not be combined (*i.e.*, added). If a person eats one 8-ounce meal or two 4-ounce meals of fish from the one-meal-per-week category, no other fish should be eaten that week. An individual can eat one species of fish one week, and the same or a different species from the one-meal-per-week category the next week. For example, if a pregnant woman were to eat an 8-ounce meal from the one meal per week category, such as carp from the San Joaquin River or South Delta, it is recommended that she not eat another meal of fish that week. Among the best choices for this pregnant woman would be for her to eat two 8-ounce or four 4-ounce meals a week of bluegill or redear sunfish from the San Joaquin River or South Delta, or from the list of low-mercury commercial fish below. That way she would be choosing a type of fish very low in mercury, and additionally, this regular consumption of low-mercury fish could also provide neurological advantages to the developing fetus (Oken *et al*., 2005; Cohen, et al., 2005). Two different fish species in the two meals per week category can be combined in the same week.

OEHHA also recommends that **women of childbearing age and children aged 17 years and younger** follow the Joint Federal Advisory for Mercury in Fish for commercial fish (U.S. EPA, 2004, see http://www.epa.gov/waterscience/fishadvice/advice.html). This advisory recommends that these individuals do not eat shark, swordfish, king mackerel, or tilefish[1] because of the high levels of mercury in these species. The federal advisory also states that these individuals can safely eat up to two 8-ounce or four 4-ounce meals per week (totaling 12 ounces after cooking) of a variety of other fish purchased at stores or restaurants such as shrimp, canned light tuna, wild

[1] King mackerel and tilefish are common on the east coast but rarely found in California or other western states, whereas shark and swordfish are commonly available on the west coast.

salmon, pollock, or (farm-raised) catfish. Albacore ("white") tuna is known to contain more mercury than canned light tuna; it is therefore recommended that no more than six ounces of albacore tuna (*e.g.*, one 6-ounce can) be consumed per week. Women of childbearing age or children could choose to eat one meal of commercial fish and one meal of sport fish in a given week provided that they select the sport fish from the Best Choices category.

For general advice on how to limit your exposure to chemical contaminants in sport fish (*e.g.*, eating smaller fish of legal size), see Appendix III. Unlike the case for many fat-soluble chlorinated hydrocarbon contaminants (*e.g.*, DDTs and PCBs), however, various cooking and cleaning techniques will not reduce the methylmercury content of fish. Meal sizes should be adjusted to body weight. Consumers weighing less than 160 pounds should eat smaller portions than the standard 8-ounce (prior to cooking; six ounces after cooking) portion, and children should also eat smaller portions, about half as much as adults. The complete recommendations (draft safe eating guidelines) for consumption of fish from the San Joaquin River and South Delta are presented in the tables below.

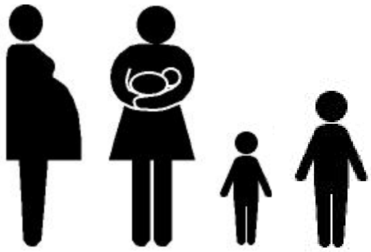
SAFE EATING GUIDELINES

FOR WOMEN OF CHILDBEARING AGE, PREGNANT OR BREASTFEEDING WOMEN, AND CHILDREN 17 YEARS AND YOUNGER

BASED ON MERCURY IN FISH FROM THE

SOUTH DELTA*

*INCLUDING THE SAN JOAQUIN RIVER FROM ITS CONFLUENCE WITH THE SACRAMENTO RIVER TO ITS CONFLUENCE WITH THE CALAVERAS RIVER, AND ALL RIVERS, SLOUGHS, AND FLOODED TRACTS IN THE DELTA SOUTH OF THE SAN JOAQUIN RIVER



BEST CHOICES	
Two 8-ounce meals or four 4-ounce meals a week	Bluegill and other sunfish, catfish, clams, or crayfish, OR
GOOD CHOICES	
One 8-ounce meal or two 4-ounce meals a week	Crappie; carp; sucker; largemouth, smallmouth, or spotted bass

RESTRICTED	
No more than one meal per month	Striped bass (18-27 inches) or sturgeon
Do Not Eat	Striped bass over 27 inches

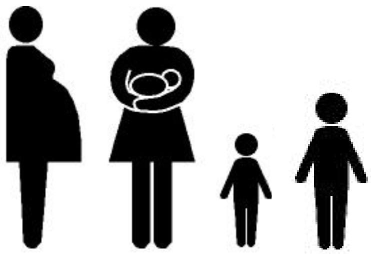
SAFE EATING GUIDELINES

FOR WOMEN OF CHILDBEARING AGE, PREGNANT OR BREASTFEEDING WOMEN, AND CHILDREN 17 YEARS AND YOUNGER

BASED ON MERCURY IN FISH FROM THE

SAN JOAQUIN RIVER*

*FROM ITS CONFLUENCE WITH THE CALAVERAS RIVER IN STOCKTON TO FRIANT DAM



BEST CHOICES	
Two 8-ounce meals or four 4-ounce meals a week	Bluegill and other sunfish, or crayfish, OR
GOOD CHOICES	
One 8-ounce meal or two 4-ounce meals a week	Catfish, crappie, carp, or sucker

RESTRICTED	
Do Not Eat	Largemouth, smallmouth, or spotted bass
Do Not Eat	ALL fish and shellfish from New Mormon Slough# and Old Mormon Slough# near the Port of Stockton

* Based on dioxins

SAFE EATING GUIDELINES

FOR WOMEN BEYOND CHILDBEARING AGE AND MEN

BASED ON MERCURY IN FISH FROM THE

SOUTH DELTA*

*INCLUDING THE SAN JOAQUIN RIVER FROM ITS CONFLUENCE WITH THE SACRAMENTO RIVER TO ITS CONFLUENCE WITH THE CALAVERAS RIVER, AND ALL RIVERS, SLOUGHS, AND FLOODED TRACTS IN THE DELTA SOUTH OF THE SAN JOAQUIN RIVER

BEST CHOICES	
Daily	Bluegill and other sunfish, OR
Three 8-ounce meals or six 4-ounce meals a week	Clams, crayfish, crappie, carp, OR
Two 8-ounce meals or four 4-ounce meals a week	Catfish; sucker; largemouth, smallmouth, or spotted bass

RESTRICTED	
No more than two meals per month	Striped bass (18-35 inches) or sturgeon
Do Not Eat	Striped bass over 35 inches

SAFE EATING GUIDELINES

FOR WOMEN BEYOND CHILDBEARING AGE AND MEN

BASED ON MERCURY IN FISH FROM THE

SAN JOAQUIN RIVER*

*FROM ITS CONFLUENCE WITH THE CALAVERAS RIVER IN STOCKTON TO FRIANT DAM

BEST CHOICES	
Daily	Bluegill and other sunfish, OR
Three 8-ounce meals or six 4-ounce meals a week	Crayfish, crappie, carp, OR
Two 8-ounce meals or four 4-ounce meals a week	Catfish, sucker, OR
GOOD CHOICES	
One 8-ounce meal or two 4-ounce meals a week	Largemouth, smallmouth, or spotted bass

RESTRICTED	
Do Not Eat	ALL fish and shellfish from New Mormon Slough[#] and Old Mormon Slough[#] near the Port of Stockton

[#] Based on dioxins

ADDITIONAL GUIDELINES AND INFORMATION

Fish are nutritious and are recommended as part of a healthy, balanced diet. The American Heart Association advises healthy adults to eat at least eight ounces (or two 4-ounce portions, prior to cooking) of fish a week. It is important, however, to choose your fish wisely. OEHHA recommends that you choose fish to eat that are low in mercury and other contaminants. The recommended options are presented as “Good Choices” and “Best Choices.” When fish contain high levels of mercury or other chemicals, OEHHA recommends that you avoid eating these fish.

- **MEAL SIZE DEPENDS ON BODY WEIGHT.** Meals are based on a 160-pound adult eating 8 ounces of fish (6 ounces after cooking) — about the size of two decks of cards. You could eat two 4-ounce fish meals in place of one 8-ounce meal. If you weigh less than 160 pounds, eat smaller portions of fish. Serve smaller meals to children – about half as much as adults for children 12 and under.
- **CONSIDER THE FISH YOU BUY FROM STORES AND RESTAURANTS.** Women of childbearing age and children can safely eat up to two meals a week of a variety of fish purchased in stores or restaurants*, or use this guide for eating fish caught from the San Joaquin River and South Delta. Commercial fish such as shrimp, king crab, scallops, farmed catfish, wild ocean salmon, oysters, tilapia, flounder, and sole generally contain some of the lowest levels of mercury. *Women of childbearing age and children should not eat shark, swordfish, king mackerel, or tilefish, which contain the most mercury.
- If you also eat fish that you buy from stores and restaurants, in the same week, choose the local sport fish you eat from “Best Choices.”
- **FISH FROM OTHER WATER BODIES MAY ALSO CONTAIN MERCURY**. Not all water bodies in California have been tested. With the exception of ocean or river-run salmon or steelhead, which may be consumed more frequently, you can eat one 8-ounce or two 4-ounce meals a week of fish caught from places without an advisory.

RECOMMENDATIONS FOR FURTHER SAMPLING

Because sampling and analysis of fish and shellfish for chlorinated hydrocarbon contaminants (including pesticides and PCBs) in recent years have provided insufficient samples for evaluation, it is recommended that more sampling be done to confirm whether the current draft guidelines for this area (based on mercury) are health protective. OEHHA also recommends that in addition to testing catfish, alternate species including sunfish and salmonids (*e.g.*, trout and salmon) be evaluated.

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Table 1. List of Sampling Sites and Combined Locations

Subregion	Site Name[1] as Combined Location	Original Site Name	Project
WD	Big Break	Big Break	FMP
WD	Big Break	Big Break	CALFED
WD	Big Break	Marsh Creek/Big Break	UCD
CD	Calaveras River	Calaveras River	FMP
CD	Calaveras River	Calaveras River	UCD
CD	Clifton Court Forebay	Clifton Court Forebay	CALFED
CD	Discovery Bay	Discovery Bay	FMP
CD	Discovery Bay	Discovery Bay	UCD
CD	Franks Tract	Franks Tract	FMP
CD	Franks Tract	Franks Tract	CALFED
CD	Franks Tract	Franks Tract	TSMP
CD	Franks Tract	Franks Tract/Northeast Side	UCD
CD	Franks Tract	Franks Tract/South Side	UCD
CD	Franks Tract	Franks Tract/Washington Cut	UCD
SJD	French Camp Slough	French Camp Slough	TSMP
SJD	Grant Line Canal	Grant Line Canal	UCD
CD	Headreach Island	Headreach Island/North Side (deep water channel)	UCD
CD	Holland Cut	Holland Cut	UCD
CD	Honker Cut	Honker Cut	FMP
CD	Italian Slough	Italian Slough	FMP
CD	Mandeville Tip	Mandeville Tip (lower)/channel to east	UCD
CD	Mandeville Tip	Mandeville Tip (upper)	UCD
SSJR	Mendota Pool	Mendota Pool/Mendota Slough	FMP
SSJR	Mendota Pool	Mendota Pool	TSMP
CD	Middle River/Bullfrog	Middle River at Bullfrog	FMP
CD	Middle River/Bullfrog	Middle River at Bullfrog	CALFED
CD	Middle River/Bullfrog	Middle River/Bullfrog	TSMP
CD	Middle River/Bullfrog	Middle River/Woodward Island	UCD
CD	Middle River/Howard Rd.	Middle River/Howard Rd.	UCD
CD	Middle River/Hwy 4	Middle River at Hwy 4	FMP
CD	Middle River/Mildred Island	Middle River at Mildred Island	FMP
CD	Middle River/Mildred Island	Mildred Island	CALFED
CD	Middle River/Mildred Island	Mildred Island	UCD
CD	Old River	Old River	TSMP
CD	Old River	Old River/btwn Little Mandeville & Rhode Islands	UCD
CD	Old River	Rhode Island	UCD
CD	Old River/Hwy 4	Old River/Hwy 4	UCD
SJD	Old River/Pumps	Old River/CV Pumps	TSMP

[1] The site names in this column reflect nearby sites that have been combined; these names were also used for mapping sampling sites.

Subregion	Site Name[1] as Combined Location	Original Site Name	Project
SJD	Old River/Pumps	Old River/Bethany Rd	UCD
SJD	Old River/Tracy Blvd.	Old River at Tracy Blvd.	FMP
SJD	Old River/Tracy Blvd.	Old River/nr Paradise Cut	CALFED
SJD	Paradise Cut	Paradise Cut	FMP
SJD	Paradise Cut	Paradise Cut	CALFED
SJD	Paradise Cut	Paradise Cut/Tracy	TSMP
SJD	Paradise Cut	Paradise Cut/Paradise Road	UCD
CD	Potato Slough	Potato Slough	FMP
SJR	SJR/Crows Landing	SJR at Crows Landing	FMP
SJR	SJR/Crows Landing	SJR/Crows Landing	CALFED
SJR	SJR/Crows Landing	SJR/Crows Landing	TSMP
CD	SJR/d/s Mokelumne River confluence	SJR/d/s Mokelumne River confluence	UCD
WD	SJR/Gallagher Slough	SJR/Gallagher Slough	UCD
SJD	SJR/Howard Road	SJR/around Bowman Road	CALFED
SJD	SJR/Howard Road	SJR/Howard Road	TSMP
SJR	SJR/Hwy 140	SJR at Fremont Ford	FMP
SJR	SJR/Hwy 140	SJR/San Luis Refuge	CALFED
SJR	SJR/Hwy 140	SJR/Hwy 140	UCD
SJD	SJR/Hwy 4	SJR/North of Hwy 4	CALFED
SJD	SJR/Hwy 4	SJR/Hwy 4	TSMP
SJD	SJR/Hwy 4	SJR/Hwy 4	UCD
SSJR	SJR/Hwy 99	SJR at Hwy 99	FMP
SSJR	SJR/HWY 99	SJR/HWY 99	TSMP
SJR	SJR/Laird Park	SJR at Laird Park	FMP
SJR	SJR/Lake Ramona	SJR/Lake Ramona	CALFED
SJR	SJR/Lake Ramona	SJR/Lake Ramona	TSMP
SJR	SJR/Landers Avenue	SJR/Landers Avenue	TSMP
SJD	SJR/Mossdale	SJR at Mossdale	FMP
SJD	SJR/Mossdale	SJR/Mossdale	TSMP
CD	SJR/Naval Station	SJR/Naval Station	CALFED
SJR	SJR/Patterson	SJR at Patterson	FMP
CD	SJR/Potato Slough	SJR/nr Potato Slough	CALFED
CD	SJR/Potato Slough	SJR/Potato Slough	CALFED
CD	SJR/Potato Slough	SJR/Potato Slough	TSMP
WD	SJR/Pt Antioch Pier	SJR/Pt Antioch Fishing Pier	CALFED
CD	SJR/Turner Cut	SJR/around Turner Cut	CALFED
CD	SJR/Turner Cut	SJR/d/s Turner Cut	TSMP
CD	SJR/Twitchell Island	SJR/Twitchell Island	TSMP
CD	SJR/Twitchell Island	SJR/d/s Sevenmile Slough	UCD
SJD	SJR/Vernalis	SJR at Vernalis	FMP
SJD	SJR/Vernalis	SJR at Vernalis	CALFED
SJD	SJR/Vernalis	SJR/d/s Vernalis	CALFED
SJD	SJR/Vernalis	SJR/Vernalis	TSMP

Subregion	Site Name[1] as Combined Location	Original Site Name	Project
WD	Sand Mound Slough	Sand Mound Slough	FMP
WD	Sand Mound Slough	Sand Mound Slough	CALFED
WD	Sand Mound Slough	Sand Mound Slough	UCD
WD	Sherman Island	Sherman Island	CALFED
WD	Sherman Island	Sherman Island	UCD
CD	Smith Canal	Smith Canal	FMP
CD	Smith Canal	Smith Canal/Yosemite Park	CALFED
CD	Smith Canal	Smith Canal/Yosemite Park	TSMP
CD	Stockton Deep Water Channel	Port of Stockton Turning Basin	CALFED
CD	Stockton Deep Water Channel	Stockton Deep Water Channel	TSMP
CD	Stockton Deep Water Channel	SJR/Port of Stockton	UCD
WD	Taylor Slough	Taylor Slough	FMP
CD	Venice Cut	Venice Cut	CALFED
CD	Venice Cut	Venice Cut	UCD
CD	Werner Dredger Cut	Werner Dredger Cut	FMP
CD	Whiskey Slough	Whiskey Slough	FMP
CD	White Slough	White Slough	CALFED
CD	White Slough	White Slough/d/s Disappointment Slough	CALFED
CD	White Slough	White Slough/Lodi	TSMP
CD	White Slough	White Slough	UCD
CD	White Slough/Lodi	White Slough/Lodi	CALFED

WD West Delta
CD Central Delta
SJD San Joaquin Delta
SJR San Joaquin River
SSJR South San Joaquin River

Table 2. Legal and/or Edible Size Criteria for Sampling Fish and Shellfish Species

Common Name	Minimum Size (mm) Total Length	Species
Asiatic clam	-[1]	*Corbicula fluminea*
Black Bullhead	170	*Amereiurus melas*
Bluegill	100	*Lepomis macrochirus*
Brown Bullhead	200	*Amereiurus nebulosus*
Carp	200	*Cyprinus carpio*
Channel Catfish	200	*Ictalurus punctalu*
Crappie	150	*Pomoxis spp.*
Red Swamp Crayfish Signal Crayfish	35[2]	*Procambarus clarkia* *Pacifastacus leniusculus*
Hitch	150	*Lavinia exilicauda*
Largemouth Bass	305	*Micropterus salmoides*
Redear Sunfish	130	*Lepomis microlophus*
Sacramento Pikeminnow	250	*Ptychocheilus grandis*
Sacramento Sucker	200	*Catostomus occidentalis*
Striped Bass Freshwater[3]	457	*Morone saxatilis*
White Catfish	200	*Amereiurus catus*

[1] All sizes in dataset accepted

[2] Carapace length

[3] Per CDFG. There is no minimum size for the Colorado River District, the Southern District, and New Hogan, San Antonio and Santa Margarita lakes.

Table 3. Descriptive Statistics for Mercury Concentrations (ppm) and Length (mm) for Legal and/or Edible-sized Fish from the San Joaquin River and South Delta by Subregion

Subregion	*Species*	*Mean Mercury Wet (ppm)*	*Min*	*Max*	*SD*	***Mean Total Length (mm)***	*Min*	*Max*	*SD*	*# Samples*	*# Indiv*
West Delta	Asiatic Clam	.08	.02	.14	.04	**22**	10	31	3	42	111
West Delta	Bluegill	.05	.04	.09	.01	**139**	115	210	27	11	15
West Delta	Carp	.19	.18	.22	.02	**576**	555	588	18	3	3
West Delta	Crappie	.26	.19	.35	.07	**285**	250	330	24	6	8
West Delta	Hitch	.24	.23	.25	.01	**187**	173	204	12	5	5
West Delta	Largemouth Bass	.31	.13	.70	.13	**377**	305	535	50	51	51
West Delta	Red Swamp crayfish	.05	.02	.13	.03	**44**	29	53	8	13	13
West Delta	Redear Sunfish	.06	.03	.09	.02	**187**	161	225	17	16	20
West Delta	Sacramento Pikeminnow	.12	.12	.12	.00	**274**	274	274	0	1	3
West Delta	Sacramento Sucker	.25	.15	.39	.09	**464**	430	511	33	8	11
West Delta	Signal crayfish	.12	.06	.19	.04	**49**	41	54	4	10	10
West Delta	White Catfish	.15	.05	.27	.06	**290**	207	388	58	13	13
Central Delta	Asiatic Clam	.03	.01	.20	.03	**25**	12	40	3	48	168
Central Delta	Black Bullhead	.05	.05	.05	.00	**306**	306	306	0	1	5
Central Delta	Bluegill	.08	.02	.37	.05	**157**	102	214	28	68	100
Central Delta	Brown Bullhead	.22	.17	.25	.02	**311**	256	390	30	34	34
Central Delta	Carp	.20	.17	.23	.02	**648**	536	829	89	15	15
Central Delta	Channel Catfish	.13	.05	.20	.05	**397**	270	563	87	13	19
Central Delta	Crappie	.15	.05	.24	.07	**233**	180	274	24	18	30
Central Delta	Largemouth Bass	.31	.06	1.26	.15	**382**	305	579	55	180	204
Central Delta	Red Swamp crayfish	.04	.02	.10	.02	**48**	42	61	5	15	15
Central Delta	Redear Sunfish	.08	.01	.38	.04	**190**	130	245	22	71	118
Central Delta	Sacramento Perch	.09	.07	.12	.02	**173**	166	185	8	4	4
Central Delta	Sacramento Pikeminnow	.25	.25	.25	.	**578**	578	578	.	1	1
Central Delta	Sacramento Sucker	.29	.23	.33	.04	**481**	458	495	16	4	4
Central Delta	Signal crayfish	.13	.00	.72	.12	**60**	36	185	26	87	99
Central Delta	Striped Bass	.29	.17	.54	.17	**622**	533	827	137	4	4
Central Delta	White Catfish	.12	.03	.48	.07	**311**	204	532	65	105	122
San Joaquin Delta *(River site)*	Asiatic Clam	.01	.01	.01	.	**27**	27	27	.	1	1
San Joaquin Delta *(River site)*	Bluegill	.13	.07	.19	.03	**175**	130	221	27	13	29
San Joaquin Delta *(River site)*	Carp	.21	.18	.24	.02	**537**	409	719	92	12	14
San Joaquin Delta *(River site)*	Channel Catfish	.32	.06	.60	.17	**348**	262	484	57	26	67

Subregion	*Species*	*Mean Mercury Wet (ppm)*	*Min*	*Max*	*SD*	***Mean Total Length (mm)***	*Min*	*Max*	*SD*	*# Samples*	*# Indiv*
San Joaquin Delta *(River site)*	Largemouth Bass	.67	.20	1.40	.31	**380**	305	530	46	49	68
San Joaquin Delta *(River site)*	Redear Sunfish	.12	.05	.18	.04	**185**	139	236	31	13	25
San Joaquin Delta *(River site)*	Sacramento Blackfish	.04	.04	.04	.00	**248**	248	248	0	1	5
San Joaquin Delta *(River site)*	Sacramento Pikeminnow	.03	.03	.03	.00	**259**	259	259	0	1	3
San Joaquin Delta *(River site)*	Sacramento Sucker	.38	.18	.55	.13	**471**	399	510	43	6	6
San Joaquin Delta *(River site)*	Striped Bass	.64	.20	1.63	.49	**629**	458	845	127	7	7
San Joaquin Delta *(River site)*	White Catfish	.35	.13	1.27	.15	**268**	205	621	85	39	84
San Joaquin Delta *(Delta site)*	Asiatic Clam	.04	.01	.05	.02	**23**	22	24	1	3	38
San Joaquin Delta *(Delta site)*	Bluegill	.07	.04	.14	.02	**140**	104	258	28	10	35
San Joaquin Delta *(Delta site)*	Carp	.18	.16	.21	.02	**575**	565	609	15	6	11
San Joaquin Delta *(Delta site)*	Channel Catfish	.16	.06	.27	.07	**427**	376	451	24	4	7
San Joaquin Delta *(Delta site)*	Crappie	.20	.17	.21	.02	**313**	309	319	5	3	3
San Joaquin Delta *(Delta site)*	Largemouth Bass	.38	.11	1.05	.25	**384**	314	574	59	36	45
San Joaquin Delta *(Delta site)*	Redear Sunfish	.07	.03	.14	.04	**202**	176	266	21	11	15
San Joaquin Delta *(Delta site)*	Striped Bass	.46	.46	.46	.	**660**	660	660	.	1	1
San Joaquin Delta *(Delta site)*	White Catfish	.18	.06	.42	.08	**310**	244	600	63	33	42
San Joaquin River	Asiatic Clam	.01	.01	.01	.	**22**	22	22	.	1	1
San Joaquin River	Bluegill	.15	.11	.26	.04	**151**	119	190	19	25	37
San Joaquin River	Carp	.23	.17	.37	.07	**456**	364	534	41	26	30
San Joaquin River	Channel Catfish	.21	.10	.36	.06	**391**	231	505	75	17	17
San Joaquin River	Largemouth Bass	.61	.18	1.66	.26	**389**	305	531	51	56	64

Subregion	Species	Mean Mercury Wet (ppm)	Min	Max	SD	**Mean Total Length (mm)**	Min	Max	SD	# Samples	# Indiv
San Joaquin River	Redear Sunfish	.12	.06	.19	.04	**176**	155	219	16	18	30
San Joaquin River	Sacramento Pikeminnow	.10	.04	.21	.07	**438**	386	468	36	5	5
San Joaquin River	Sacramento Sucker	.17	.09	.28	.08	**369**	249	528	108	7	7
San Joaquin River	Striped Bass	.48	.46	.49	.02	**501**	457	544	62	2	2
San Joaquin River	White Catfish	.37	.13	1.01	.17	**269**	199	780	125	50	50
South San Joaquin R	Bluegill	.10	.04	.20	.09	**188**	120	226	59	3	3
South San Joaquin R	Brown Bullhead	.22	.19	.25	.02	**271**	219	343	32	13	13
South San Joaquin R	Carp	.21	.18	.25	.02	**573**	370	758	135	12	12
South San Joaquin R	Channel Catfish	.09	.04	.14	.04	**445**	316	579	93	8	8
South San Joaquin R	Largemouth Bass	.23	.08	.42	.09	**353**	306	482	51	24	61
South San Joaquin R	Redear Sunfish	.07	.02	.15	.04	**187**	144	231	28	9	9

Table 4. Mean Mercury Concentrations (ppm) and Sample Sizes for Select Species from the San Joaquin River and South Delta that are Consistent across Subregions

Species	West Delta	Central Delta	San Joaquin Delta	San Joaquin River	South San Joaquin River	Overall Species Mean Hg
Asiatic Clam[1]	**.08** 111	**.03** 169	**.04** 39	.01 1		**.05** 320
Bluegill	**.05** 15	**.08** 100	**.10** 64	**.14** 42	.10 3	**.10** 228
Redear Sunfish	**.06** 20	**.08** 118	**.10** 40	**.12** 30	**.07** 9	**.09** 220
Brown Bullhead		**.22** 34			**.22** 13	**.22** 47
Carp	.19 3	**.20** 9	**.19** 25	**.23** 30	**.21** 12	**.21** 92
Red Swamp Crayfish	**.05** 13	**.04** 15				**.04** 28
Signal Crayfish	**.12** 10	**.13** 99				**.12** 117
Sacramento Sucker	**.25** 11	.29 4	.38 6	.17 7		**.26** 29

Mean mercury concentrations in parts per million (ppm) are shown in each cell followed by sample sizes. Mercury concentrations in **BOLD** represent samples that meet OEHHA's criterion of at least nine fish per sample location. In this case, sample location is defined as the subregion.

Legend: The colors signify meal categories for **women of childbearing and children** that correspond to the mean mercury concentrations, and are used here only as a visual tool to compare subregions.

[dark green] Two 8-ounce meals a week [light green] One 8-ounce meal a week

[1] Mean mercury concentrations reported for clams are for total mercury because not all samples were analyzed for methylmercury. Furthermore, the percentage of methylmercury in samples that were analyzed for methylmercury was highly variable, ranging from 6 to 83 percent. Using the average percentage of methylmercury (44%) from those samples that were analyzed for both total mercury and methylmercury to estimate methylmercury concentrations for samples not analyzed for methylmercury might not be representative. Therefore, consumption guidelines were based on total mercury concentrations, which could be conservative. However, data on chlorinated hydrocarbon contaminants in clams were limited to one sample only (from the Port of Stockton). Without knowledge of whether other contaminants such as PCBs accumulate in clams in the rest of the South Delta, a recommendation for daily consumption of clams (based on measured and estimated methylmercury concentrations) might not be health protective.

Table 5. Mean Mercury Concentrations (ppm) and Sample Sizes for Species from the San Joaquin River and South Delta that Vary by Subregion

Overall Species Mean Hg	Species	West Delta	Central Delta	San Joaquin Delta	San Joaquin River	South San Joaquin River
.25 130	Channel Catfish		**.13** 19	**.30** 74	**.25** 20	.09 8
.23 323	White Catfish	**.15** 13	**.12** 122	**.29** 126	**.38** 55	.06 7
.18 43	Crappie	.26 8	**.15** **30**	.20 3		
.40 516	Largemouth Bass	**.31** 51	**.31** 204	**.56** 113	**.62** 71	**.23** 61
.10 12	Sacramento Pikeminnow[1]	.12 3	.25 1	.03 3	.10 5	

Mean mercury concentrations are shown in each cell followed by sample sizes. Mercury concentrations in **BOLD** represent samples that meet OEHHA's criterion of at least nine fish per sample location. In this case, sample location is defined as the subregion

Legend: The colors signify meal categories for **women of childbearing and children** that correspond to the mean mercury concentrations, and are used here only as a visual tool to compare subregions.

Two 8-ounce meals a week | One 8-ounce meal a week | Restrict

[1] Samples of pikeminnow were too few at any location to be representative.

Table 6. Statistical Comparison of Mean Mercury Concentrations in Largemouth Bass

Model Summary Largemouth Bass All Sizes

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.771[a]	.594	.593	.54058	.594	480.445	2	656	.000
2	.845[b]	.713	.711	.45576	.119	67.717	4	652	.000
3	.846[c]	.715	.709	.45685	.002	.559	7	645	.789

a. Predictors: (Constant), lng_sq, TOTAL_LENGTH

b. Predictors: (Constant), lng_sq, TOTAL_LENGTH, West Delta=1; Other=0, San Joaquin River=1; Other=0, San Joaquin Delta=1; Other=0, Central Delta=1; Other=0

c. Predictors: (Constant), lng_sq, TOTAL_LENGTH, West Delta=1; Other=0, San Joaquin River=1; Other=0, San Joaquin Delta=1; Other=0, Central Delta=1; Other=0, wd_x_lng_sq, sjd_x_lng_sq, sjr_x_lng_sq, cd_x_lng_sq, sjd_x_lng, wd_x_lng, sjr_x_lng

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-1.791	.049		-36.402	.000	-1.888	-1.695
	TOTAL_LENGTH_mm	.005	.000	1.356	15.133	.000	.004	.006
	lngth_sq	-4.0E-006	.000	-.630	-7.033	.000	.000	.000
2	(Constant)	-1.633	.044		-37.314	.000	-1.719	-1.548
	TOTAL_LENGTH_mm	.005	.000	1.376	18.114	.000	.005	.006
	lngth_sq	-4.3E-006	.000	-.682	-8.995	.000	.000	.000
	South SJR=1; Other=0	-.326	.029	-.271	-11.274	.000	-.383	-.269
	San Joaquin River=1; Other=0	.070	.027	.065	2.627	.009	.018	.123
	Central Delta=1; Other=0	-.219	.020	-.294	-10.919	.000	-.258	-.179
	West Delta=1; Other=0	-.206	.029	-.171	-7.170	.000	-.262	-.150

a. Dependent Variable: hg_log10

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-4.121	.113		-36.520	.000	-4.343	-3.900
	TOTAL_LENGTH	.012	.001	1.362	15.152	.000	.010	.013
	lng_sq	-9.27E-006	.000	-.636	-7.079	.000	.000	.000
2	(Constant)	-4.512	.115		-39.288	.000	-4.738	-4.287
	TOTAL_LENGTH	.012	.001	1.386	18.055	.000	.010	.013
	lng_sq	-1.00E-005	.000	-.688	-8.983	.000	.000	.000
	Central Delta=1; Other=0	.248	.061	.145	4.039	.000	.127	.368
	San Joaquin Delta=1; Other=0	.751	.067	.368	11.248	.000	.620	.882
	San Joaquin River=1; Other=0	.894	.075	.347	11.979	.000	.748	1.041
	West Delta=1; Other=0	.277	.077	.101	3.580	.000	.125	.429

a. Dependent Variable: hg_logn

Predicted mercury for a 350-mm (Hypothetical) Largemouth Bass

SubRegion	*Predicted Mercury (ppm)*	*Lower Confidence Interval*	*Upper Confidence Interval*
West Delta	**.259**	.233	.289
Central Delta	**.252**	.238	.267
San Joaquin Delta	**.417**	.386	.450
San Joaquin River	**.481**	.435	.532
South San Joaquin River	**.197**	.177	.219

Table 7. Statistical Comparison of Mean Mercury Concentrations in White Catfish across Subregions

The difference between sub-regions, whether using West Delta as the reference site, or another subregion such as San Joaquin River, is significant (*p*<.000). After adjusting for length, subregion (represented by dummy-variables: San Joaquin Delta=1, Other=0; San Joaquin River=1, Other=0; etc.) explains an additional 26 percent of mercury variance. Transaction variables were run and not significant.

Model Summary White Catfish All Sizes

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.510[a]	.260	.256	.26128	.260	55.991	2	318	.000
2	.723[b]	.522	.515	.21102	.262	57.500	3	315	.000
3	.731[c]	.534	.519	.21010	.012	1.554	5	310	.173

a. Predictors: (Constant), lngth_sq, Total Length (mm)

b. Predictors: (Constant), lngth_sq, Total Length (mm), San Joaquin Delta=1; Other=0, San Joaquin River=1; Other=0, Central Delta=1; Other=0

c. Predictors: (Constant), lngth_sq, Total Length (mm), San Joaquin Delta=1; Other=0, San Joaquin River=1; Other=0, Central Delta=1; Other=0, sjr_X_lng_sq, c_delta_X_lng_sq, sj_delta_X_lng_sq, sjr_X_lng, sj_delta_X_lng

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	.855	.151		5.663	.000	.558	1.152
	Total Length (mm)	-.009	.001	-2.509	-10.512	.000	-.011	-.007
	lngth_sq	1.08E-005	.000	2.399	10.050	.000	.000	.000
2	(Constant)	-.133	.162		-.819	.413	-.451	.186
	Total Length (mm)	-.004	.001	-1.161	-5.011	.000	-.006	-.002
	lngth_sq	5.16E-006	.000	1.146	5.036	.000	.000	.000
	Central Delta=1; Other=0	-.095	.062	-.152	-1.535	.126	-.216	.027
	San Joaquin Delta=1; Other=0	.254	.062	.412	4.122	.000	.133	.376
	San Joaquin River=1; Other=0	.300	.068	.377	4.423	.000	.167	.434

a. Dependent Variable: hg_log10

White Catfish

Length	Subregion	# Samples	# Indiv
Less than edible size (< 200 mm TL)	Central Delta	1	1
	San Joaquin Delta	3	3
	San Joaquin River	6	6
Edible size (≥ 200mm TL)	West Delta	13	13
	Central Delta	105	122
	San Joaquin Delta	72	126
	San Joaquin River	50	50

Table 8. Statistical Comparison of Mean Mercury Concentrations in Channel Catfish across Subregions

The difference between subregions, whether using South San Joaquin River as the reference site, or another subregion such as Central Delta, is significant (*p*<.001). After adjusting for length, subregion (represented by dummy-variables San Joaquin River=1, Other=0; Central Delta=1, Other=0; etc.) explains an additional 21 percent of mercury variance. Transaction variables were run and not significant.

Model Summary Channel Catfish ALL SIZES

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.395[a]	.156	.142	.26305	.156	10.837	2	117	.000
2	.602[b]	.362	.334	.23171	.206	12.260	3	114	.000
3	.640[c]	.409	.355	.22804	.047	1.740	5	109	.131

a. Predictors: (Constant), lngth_sq, Total Length (mm)

b. Predictors: (Constant), lngth_sq, Total Length (mm), San Joaquin River=1; Other=0, Central Delta=1; Other=0, San Joaquin Delta=1; Other=0

c. Predictors: (Constant), lngth_sq, Total Length (mm), San Joaquin River=1; Other=0, Central Delta=1; Other=0, San Joaquin Delta=1; Other=0, c_delta_X_lng_sq, sjr_X_lng_sq, sj_delta_X_lng_sq, sj_delta_X_lng, sjr_X_lng

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	-1.827	.345		-5.297	.000	-2.510	-1.144
	Total Length (mm)	.007	.002	1.979	3.806	.000	.003	.011
	lngth_sq	-1.07E-005	.000	-2.180	-4.193	.000	.000	.000
2	(Constant)	-1.950	.308		-6.339	.000	-2.559	-1.340
	Total Length (mm)	.005	.002	1.448	3.094	.002	.002	.009
	lngth_sq	-7.17E-006	.000	-1.469	-3.092	.002	.000	.000
	Central Delta=1; Other=0	.127	.100	.164	1.277	.204	-.070	.325
	San Joaquin Delta=1; Other=0	.429	.093	.731	4.591	.000	.244	.614
	San Joaquin River=1; Other=0	.329	.102	.406	3.209	.002	.126	.532

a. Dependent Variable: hg_log10

Channel Catfish

Length	Subregion	# Samples	# indiv
Less than edible size (< 200 mm TL)	San Joaquin Delta	1	2
Edible size (≥ 200 ml TL)	Central Delta	13	19
	San Joaquin Delta	30	74
	San Joaquin River	17	17
	South San Joaquin Delta	8	8

Table 9. Comparison of Mercury Concentrations (ppm) in Largemouth Bass, Channel Catfish, and White Catfish from River and Non-river Sampling Sites in the San Joaquin Delta Subregion

Regression equations, with mercury (log-transformed) as the dependent variable, predicted the following mercury (ppm) concentrations:

1. For *River* sites in the San Joaquin Delta Subregion:

Hypothetical Fish	Predicted Hg	Lower CI	Upper CI
Largemouth Bass 350 mm	**.54**	.48	.62
Channel Catfish 350 mm	**.28**	.24	.33
White Catfish 350 mm	**.34**	.26	.44

2. For *Delta* sites in the San Joaquin Delta Subregion:

Hypothetical Fish	Predicted Hg	Lower CI	Upper CI
Largemouth Bass 350 mm	**.27**	.23	.31
Channel Catfish 350 mm	**.11**	.03	.46
White Catfish 350 mm	**.16**	.12	.21

Model Summary Largemouth Bass ALL SIZES San joaquin Delta Subregion River vs Delta Sites

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
	run hyp fish (code hyp=0; run others=1) = 1.00 (Selected)				R Square Change	F Change	df1	df2	Sig. F Change
1	.769[a]	.591	.585	.59203	.591	103.300	2	143	.000
2	.835[b]	.697	.690	.51155	.106	49.533	1	142	.000
3	.837[c]	.701	.691	.51123	.005	1.090	2	140	.339

a. Predictors: (Constant), lng_sq, TOTAL_LENGTH

b. Predictors: (Constant), lng_sq, TOTAL_LENGTH, River=1; Delta=0

c. Predictors: (Constant), lng_sq, TOTAL_LENGTH, River=1; Delta=0, riv_x_lng_sq, riv_x_lng

Coefficients[a,b]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95% Confidence Interval for B Lower Bound	95% Confidence Interval for B Upper Bound
1	(Constant)	-3.949	.235		-16.801	.000	-4.413	-3.484
	TOTAL_LENGTH	.013	.002	1.552	8.230	.000	.010	.017
	lng_sq	-1.31E-005	.000	-.858	-4.549	.000	.000	.000
2	(Constant)	-3.772	.205		-18.435	.000	-4.177	-3.368
	TOTAL_LENGTH	.010	.002	1.113	6.378	.000	.007	.013
	lng_sq	-7.35E-006	.000	-.480	-2.796	.006	.000	.000
	River=1; Delta=0	.653	.093	.351	7.038	.000	.470	.837
3	(Constant)	-3.713	.210		-17.690	.000	-4.128	-3.298
	TOTAL_LENGTH	.008	.002	.963	4.781	.000	.005	.012
	lng_sq	-4.40E-006	.000	-.287	-1.330	.186	.000	.000
	River=1; Delta=0	.024	1.248	.013	.019	.985	-2.444	2.491
	riv_x_lng	.005	.007	1.064	.752	.453	-.009	.019
	riv_x_lng_sq	-9.67E-006	.000	-.771	-.952	.343	.000	.000

a. Dependent Variable: hg_logn

b. Selecting only cases for which run hyp fish (code hyp=0; run others=1) = 1.00

Model Summary Channel Catfish ALL SIZES San Joaquin Delta Subregion River vs Delta Sites[d,e]

Model	R run hyp fish (code hyp=0; run others=1) = 1.00 (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change
1	.303[a]	.092	.067	.59075	.092	3.682	2	73	.030
2	.463[b]	.215	.182	.55309	.123	11.279	1	72	.001
3	.464[c]	.215	.171	.55688	.000	.025	1	71	.875

a. Predictors: (Constant), lng_sq, TOTAL_LENGTH

b. Predictors: (Constant), lng_sq, TOTAL_LENGTH, River=1; Delta=0

c. Predictors: (Constant), lng_sq, TOTAL_LENGTH, River=1; Delta=0, riv_x_lng_sq

d. Unless noted otherwise, statistics are based only on cases for which run hyp fish (code hyp=0; run others=1) = 1.00.

e. Dependent Variable: hg_logn

Coefficients[a,b]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95% Confidence Interval for B Lower Bound	95% Confidence Interval for B Upper Bound
1	(Constant)	-3.793	1.067		-3.555	.001	-5.919	-1.667
	TOTAL_LENGTH	.013	.007	1.448	1.966	.053	.000	.026
	lng_sq	-1.67E-005	.000	-1.223	-1.660	.101	.000	.000
2	(Constant)	-4.014	1.001		-4.009	.000	-6.009	-2.018
	TOTAL_LENGTH	.008	.006	.883	1.243	.218	-.005	.021
	lng_sq	-6.92E-006	.000	-.506	-.701	.485	.000	.000
	River=1; Delta=0	.827	.246	.394	3.358	.001	.336	1.319
3	(Constant)	-4.371	2.477		-1.765	.082	-9.310	.568
	TOTAL_LENGTH	.008	.007	.903	1.243	.218	-.005	.021
	lng_sq	-5.40E-006	.000	-.395	-.390	.698	.000	.000
	River=1; Delta=0	1.160	2.121	.552	.547	.586	-3.068	5.389
	riv_x_lng_sq	-1.84E-006	.000	-.162	-.158	.875	.000	.000

a. Dependent Variable: hg_logn

b. Selecting only cases for which run hyp fish (code hyp=0; run others=1) = 1.00

Model Summary **White Catfish ALL SIZES San Joaquin Delt Subregion River vs Delta Sites**

Model	R run hyp fish (code hyp=0; run others=1) = 1.00 (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.330[a]	.109	.095	.50650	.109	7.683	2	126	.001
2	.577[b]	.333	.317	.43995	.224	42.003	1	125	.000
3	.589[c]	.347	.320	.43878	.014	1.334	2	123	.267

a. Predictors: (Constant), lng_sq, TOTAL_LENGTH

b. Predictors: (Constant), lng_sq, TOTAL_LENGTH, River=1; Delta=0

c. Predictors: (Constant), lng_sq, TOTAL_LENGTH, River=1; Delta=0, riv_x_lng_sq, riv_x_lng

Correlations[a]

		hg_logn	TOTAL_LENGTH	lng_sq	River=1; Delta=0	riv_x_lng	riv_x_lng_sq
Pearson Correlation	hg_logn	1.000	-.103	-.052	.574	.549	.398
	TOTAL_LENGTH	-.103	1.000	.987	-.259	.192	.568
	lng_sq	-.052	.987	1.000	-.166	.274	.633
	River=1; Delta=0	.574	-.259	-.166	1.000	.874	.553
	riv_x_lng	.549	.192	.274	.874	1.000	.885
	riv_x_lng_sq	.398	.568	.633	.553	.885	1.000
Sig. (1-tailed)	hg_logn	.	.123	.280	.000	.000	.000
	TOTAL_LENGTH	.123	.	.000	.002	.015	.000
	lng_sq	.280	.000	.	.030	.001	.000
	River=1; Delta=0	.000	.002	.030	.	.000	.000
	riv_x_lng	.000	.015	.001	.000	.	.000
	riv_x_lng_sq	.000	.000	.000	.000	.000	.
N	hg_logn	129	129	129	129	129	129
	TOTAL_LENGTH	129	129	129	129	129	129
	lng_sq	129	129	129	129	129	129
	River=1; Delta=0	129	129	129	129	129	129
	riv_x_lng	129	129	129	129	129	129
	riv_x_lng_sq	129	129	129	129	129	129

a. Selecting only cases for which run hyp fish (code hyp=0; run others=1) = 1.00

Table 10. Higher PCB Concentrations in Fish Collected near the Port of Stockton and Smith Canal/Louis Park

Sample Location	Data source	Year	Species	Number of fish	Length single or mean (mm)	Total PCBs (ppb) Based on Sum of 48 Congeners	Total PCBs (ppb) Based on Sum of 3 Congeners
Smith Canal by Yosemite Lake	SFEI	1998	Largemouth bass	5	364	112[1]	
Smith Canal by Yosemite Lake	SFEI	1998	White catfish	5	235	102	
Port of Stockton Turning Basin	SFEI	1998	White catfish	5	277	51	
Port of Stockton near Mormon Slough	SFEI	1998	Clam (*Corbicula*)	24	33	112	
Port of Stockton Turning Basin	SFEI	1998	Largemouth bass	1	525	32	
Louis Park	CDHS	1996	Carp	1	276		21
Louis Park	CDHS	1996	Largemouth bass	3	325*		0.8
Louis Park	CDHS	1996	Largemouth bass	1	565		82
McLeod Lake	CDHS	1996	Carp	1	325		28
McLeod Lake	CDHS	1996	Largemouth bass	3	305*		57
McLeod Lake	CDHS	1995	White catfish	2	240		38
New Mormon Slough	CDHS	1995	White catfish	2	258		121

[1] This samples of largemouth bass was analyzed with the skin included and, therefore, would likely have a lower concentrations in the fillet portion of the fish, especially if prepared as a skinless fillet and cooked to remove some of the fat.

Sample Location	Data source	Year	Species	Number of fish	Length single or mean (mm)	Total PCBs (ppb) Based on Sum of 48 Congeners	Total PCBs (ppb) Based on Sum of 3 Congeners
Old Mormon Slough	CDHS	1996	Largemouth bass	3	272*		0.2
Old Mormon Slough	CDHS	1995	White catfish	2	245		37
Port of Stockton	CDHS	1996	Largemouth bass	3	310		258

Table 11. Sample Sites in the San Joaquin River and South Delta with Low (<46 ppm) Concentrations of PCBs

Sampling Location	*Species Common Name*	*Number of Fish per Sample*
Middle River at Bullfrog	Largemouth Bass	5
Middle River at Bullfrog	White Catfish	5
Old River near Paradise Cut	Largemouth Bass	5
Old River/CV Pumps	White Catfish	5
Paradise Cut	Largemouth Bass	5
San Joaquin River around Bowman Road	Largemouth Bass	5
San Joaquin River at Lander Ave/RT 165	Largemouth Bass	5
San Joaquin River between Crow's Landing & Las Palmas	Largemouth Bass	1
San Joaquin River downstream of Vernalis	Largemouth Bass	1
San Joaquin River downstream of Vernalis	Largemouth Bass	1
San Joaquin River downstream of Vernalis	Largemouth Bass	1
San Joaquin River near Potato Slough	Largemouth Bass	5
San Joaquin River off Point Antioch near fishing pier	Largemouth Bass	5
San Joaquin River/Crows Landing	Largemouth Bass	6
San Joaquin River/Crows Landing	Largemouth Bass	5
San Joaquin River/Hwy 99	Largemouth Bass	5
San Joaquin River/Hwy 99	Largemouth Bass	3
San Joaquin River/Hwy 99	White Catfish	5
San Joaquin River/Landers Ave	Largemouth Bass	5
San Joaquin River/Vernalis	Largemouth Bass	6
White Slough downstream of Disappointment Slough	Black bullhead	4
White Slough downstream of Disappointment Slough	Largemouth Bass	5

Table 12: Guidance Tissue Levels (ppm Total Mercury or Methylmercury*, wet weight) for Two Population Groups

Population group:	***Women of child-bearing age and children aged 17 years and younger***	***Women beyond childbearing age and men***
Reference Dose (RfD):	*1 x 10^{-4} mg/kg/day*	*3 x 10^{-4} mg/kg/day*
Meals per Month	***Tissue concentration (ppm)***	
30	≤ 0.03	≤ 0.09
12	> 0.03 – 0.08	> 0.09 – 0.23
8	> 0.08 – 0.12	> 0.23 – 0.35
7	> 0.12 – 0.13	> 0.35 – 0.40
6	> 0.13 – 0.16	> 0.40 – 0.47
5	> 0.16 – 0.19	> 0.47 – 0.56
4	> 0.19 – 0.23	> 0.56 – 0.70
3	> 0.23 – 0.31	> 0.70 – 0.94
2	> 0.31 – 0.47	> 0.94 – 1.40
1	> 0.47 – 0.94	> 1.40 – 2.80
0	> 0.94	> 2.80

*The values in this table are based on the assumption that 100% of total mercury measured in fish is methylmercury. This may not be true for shellfish, so methylmercury needs to be measured directly in these species for use in this table.

The recommended level for consumption of fish contaminated with a non-carcinogenic chemical such as methylmercury is below or equivalent to the chemical's reference level. People could eat more fish with a lower tissue concentration (before they exceed the reference level) than fish with a higher concentration. The following general equation can be used to calculate the fish tissue concentration (in mg/kg) at which the consumption exposure from a chemical with a non-carcinogenic effect is equal to the reference level for that chemical at any consumption level:

$$\text{Tissue concentration} = \frac{(\text{RfD mg/kg - day})(\text{kg Body Weight})(\text{RSC})}{\text{CR kg/day}}$$

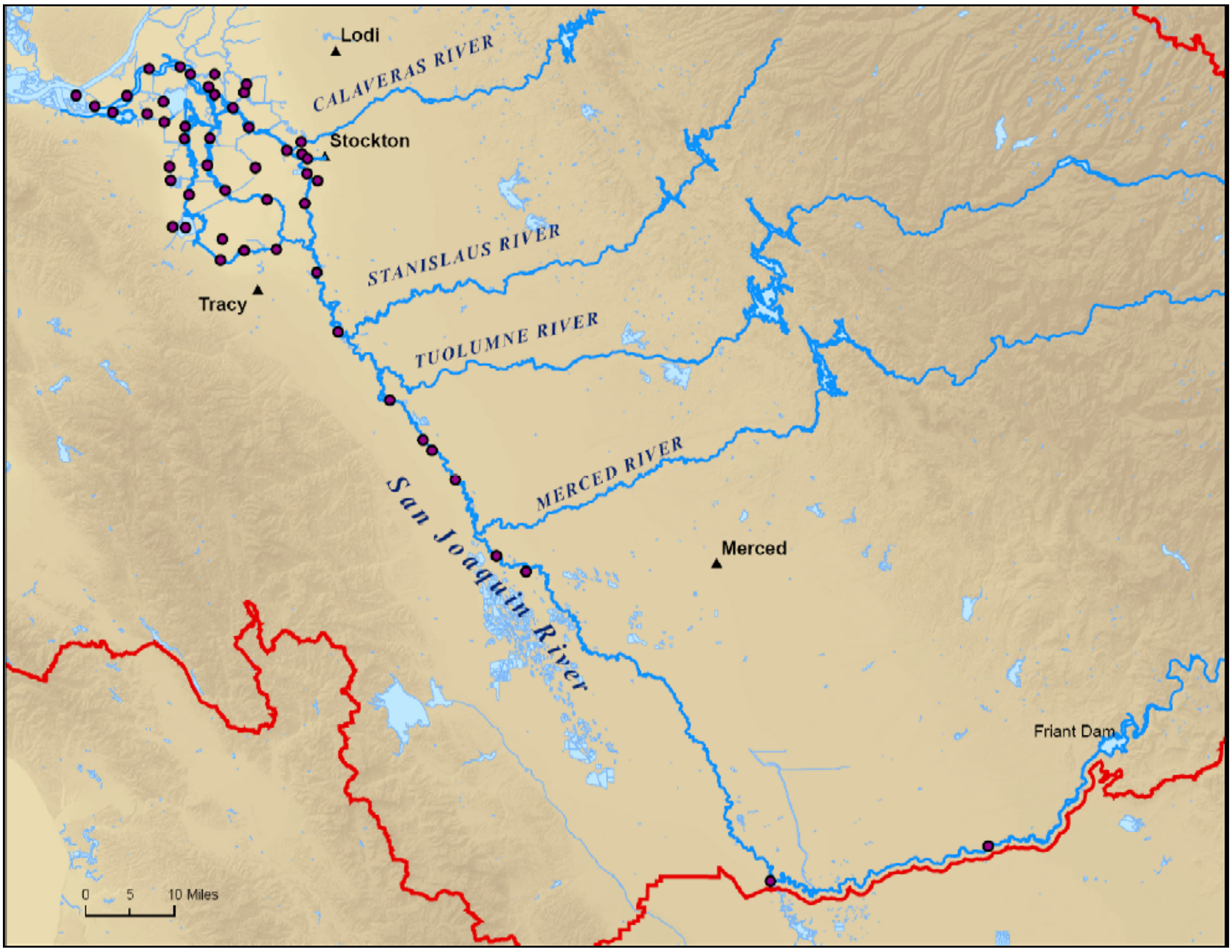
where,

RfD = Chemical specific reference dose or other reference level
BW = Body weight of consumer
RSC = Relative source contribution of fish to total exposure
CR = Consumption rate as the daily amount of fish consumed

This equation was applied above to determine tissue concentrations of methylmercury (assuming 100% of measured total mercury is methylmercury in fish) in sport fish that would be below or equivalent to the chemical's reference level when eating different amounts of fish.

Meal Sizes used in this table: Although people eat different meal sizes, their typical portion size is related to their individual body weight in a fairly consistent manner. The standard portion size eaten by an average adult (body weight 70 kg or 154 pounds) is eight ounces (227 g) (U.S. EPA, 1994). A standard portion of one fish meal a month is equivalent to 7.5 x10^{-3} kg/day, one meal per week is equivalent to 3.0 x10^{-2} kg/day, two meals per week is equivalent to 6.0 x10^{-2}, and three meals per week is equivalent to 9.0 x10^{-2} kg/day. In some cases, fish tissue concentrations corresponding to intermediate meal frequencies were incorporated into the standard meal categories used for providing "safe eating guidelines" such that the hazard quotient (the ratio of exposure to the reference dose) did not exceed 2.

Figure 1. Map of All Sampling Locations



The dark (red) line near the bottom of the map represents a portion of the southern boundary of the geographic study area as defined by CBDA.

Figure 2. Map of Sampling Locations in the South Delta

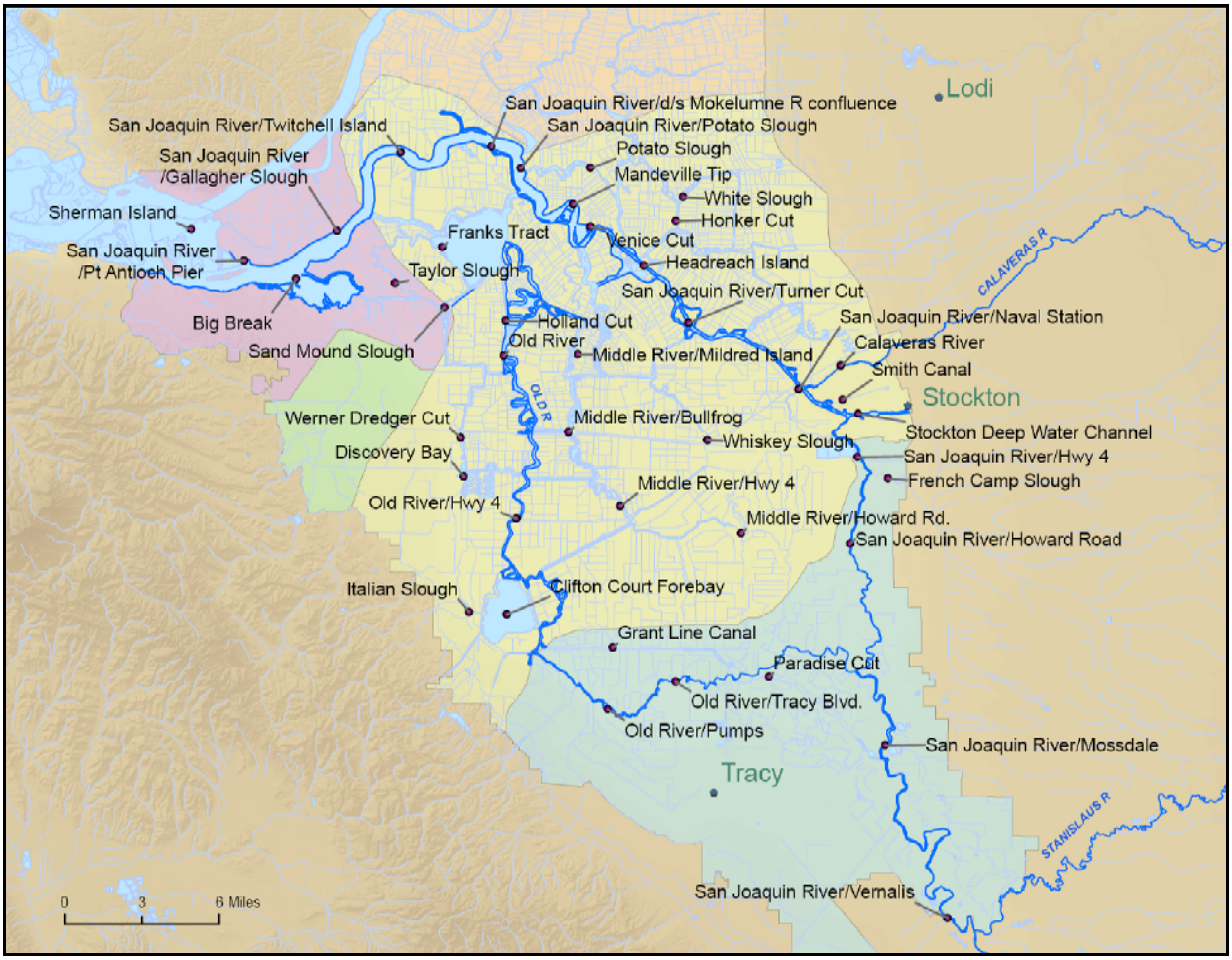


Figure 3. Map of Sampling Locations on the San Joaquin River South of the Delta

The dark (red) line near the bottom of the map represents a portion of the southern boundary of the geographic study area as defined by CBDA.

Figure 4. Map of Mercury and Gold Mines in the Vicinity of the San Joaquin Delta

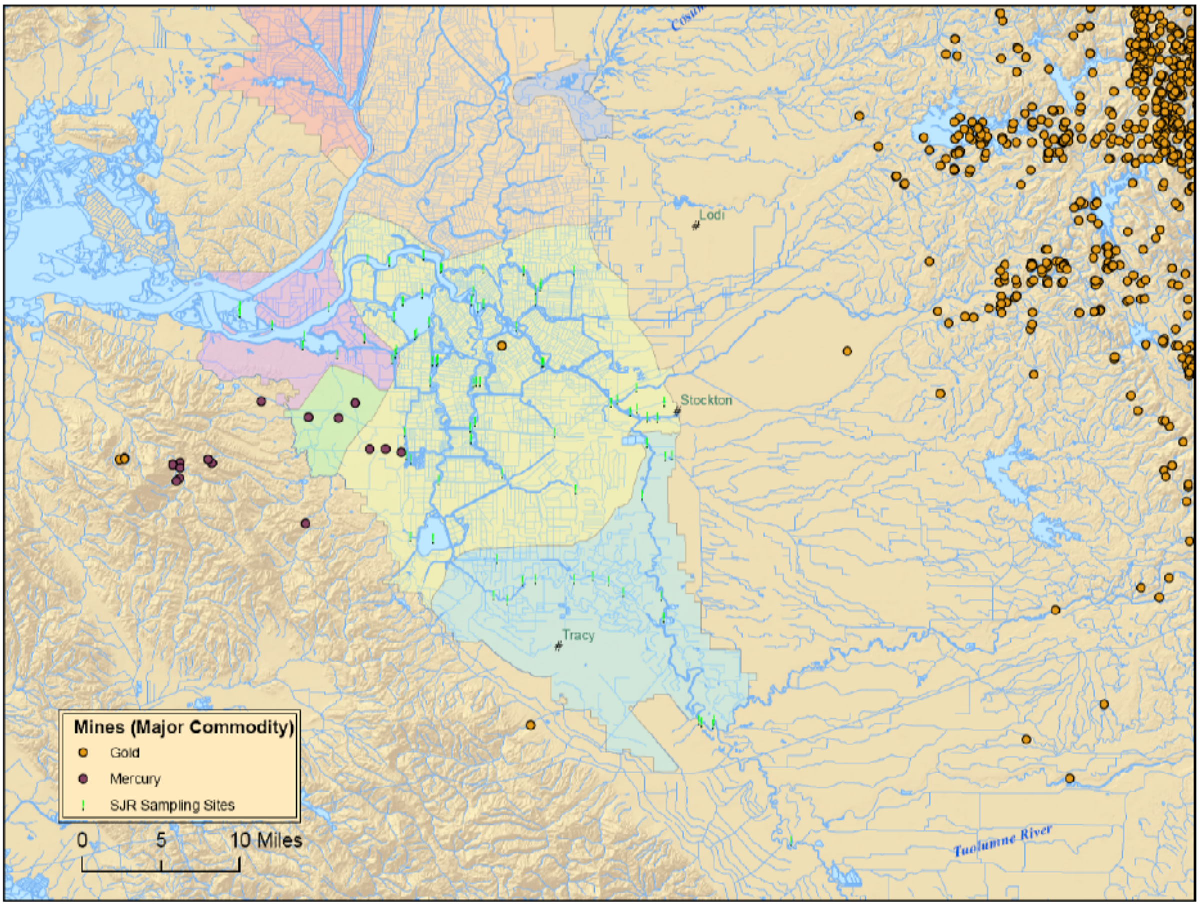


Figure 5. Sacramento-San Joaquin Delta and Eight Subareas

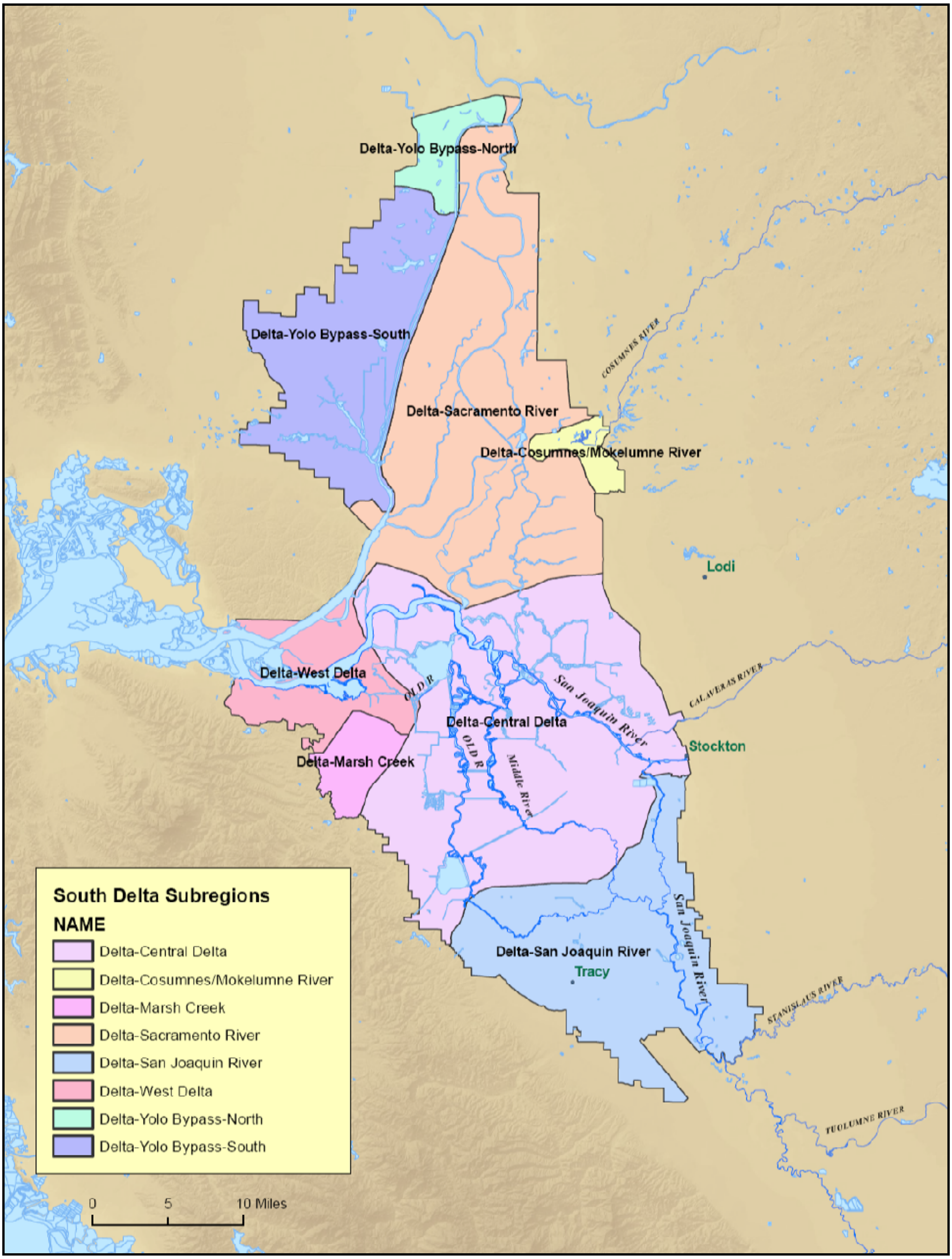
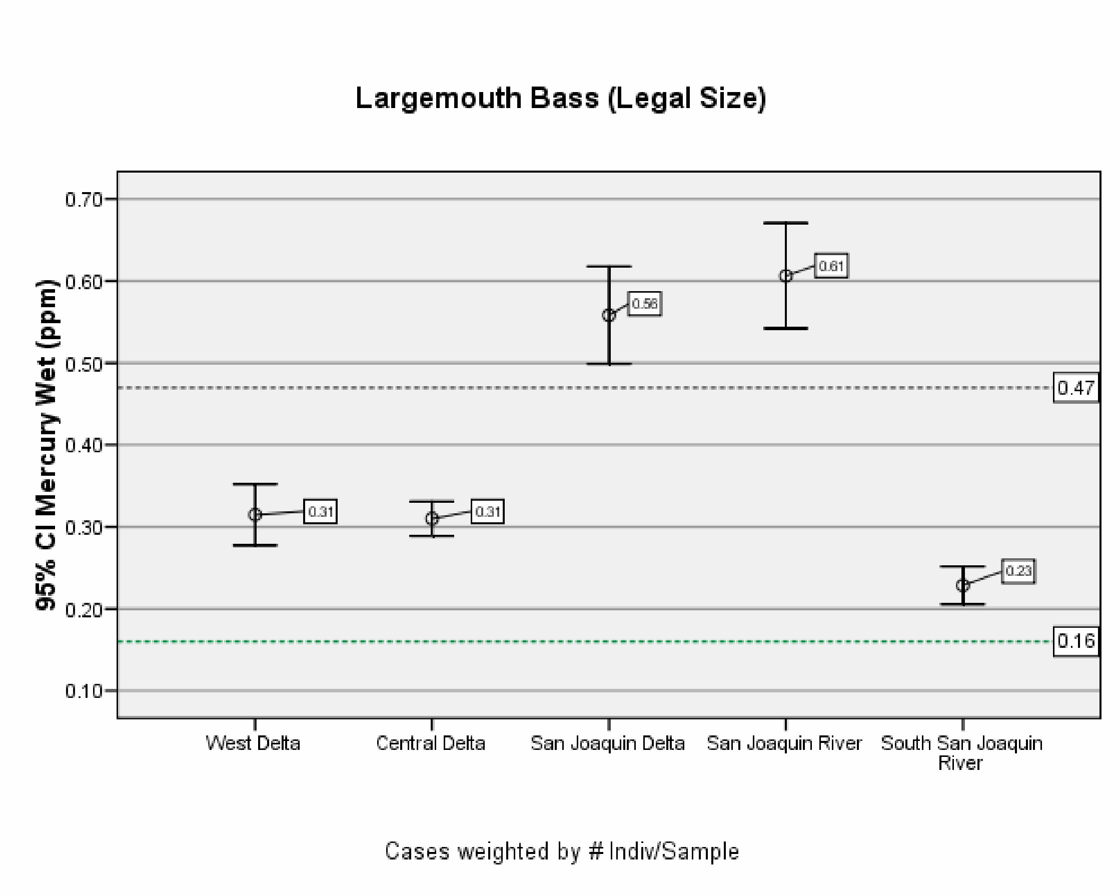
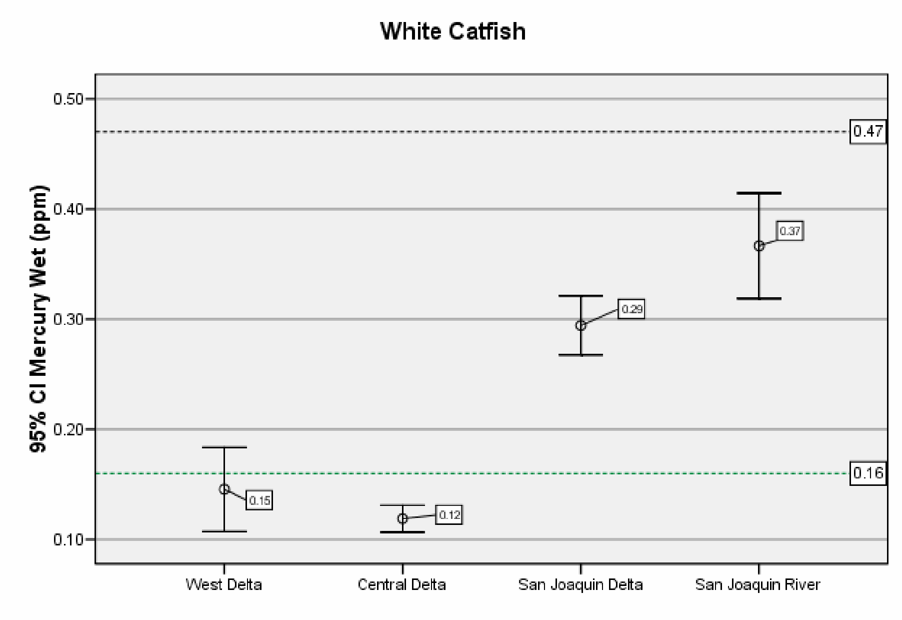


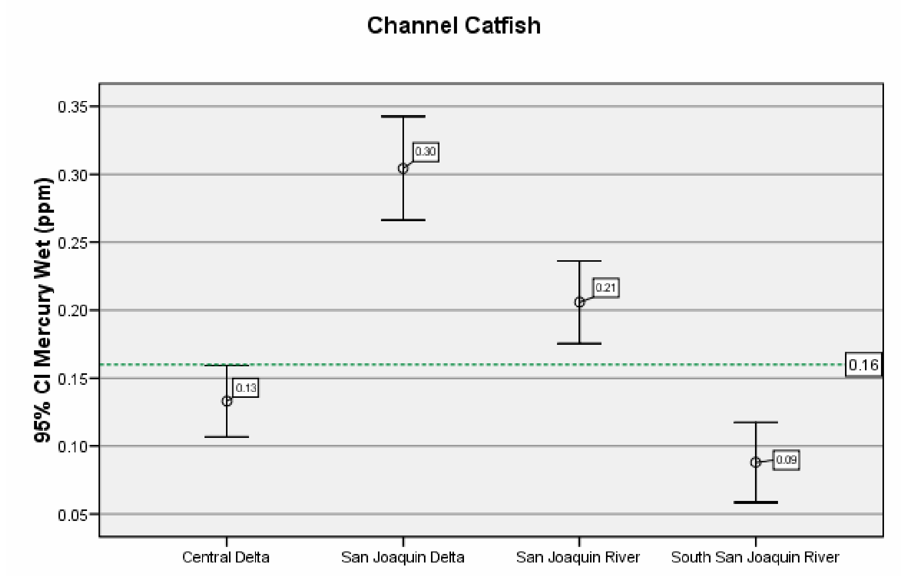
Figure 6. Comparison of Mean Mercury Concentrations in Largemouth Bass across Subregions



The line at 0.47 ppm indicates the threshold above which consumption guidelines for **women of childbearing age and children** would fall in the "red category" of "Restricted." The line at 0.16 ppm represents the threshold between one 8-oz. meal of fish a week (> 0.16 ppm) and two 8-oz. meals of fish a week (≤ 0.16 ppm). Mean mercury concentrations are shown by circles and the whiskers indicate 95% confidence intervals around the mean.

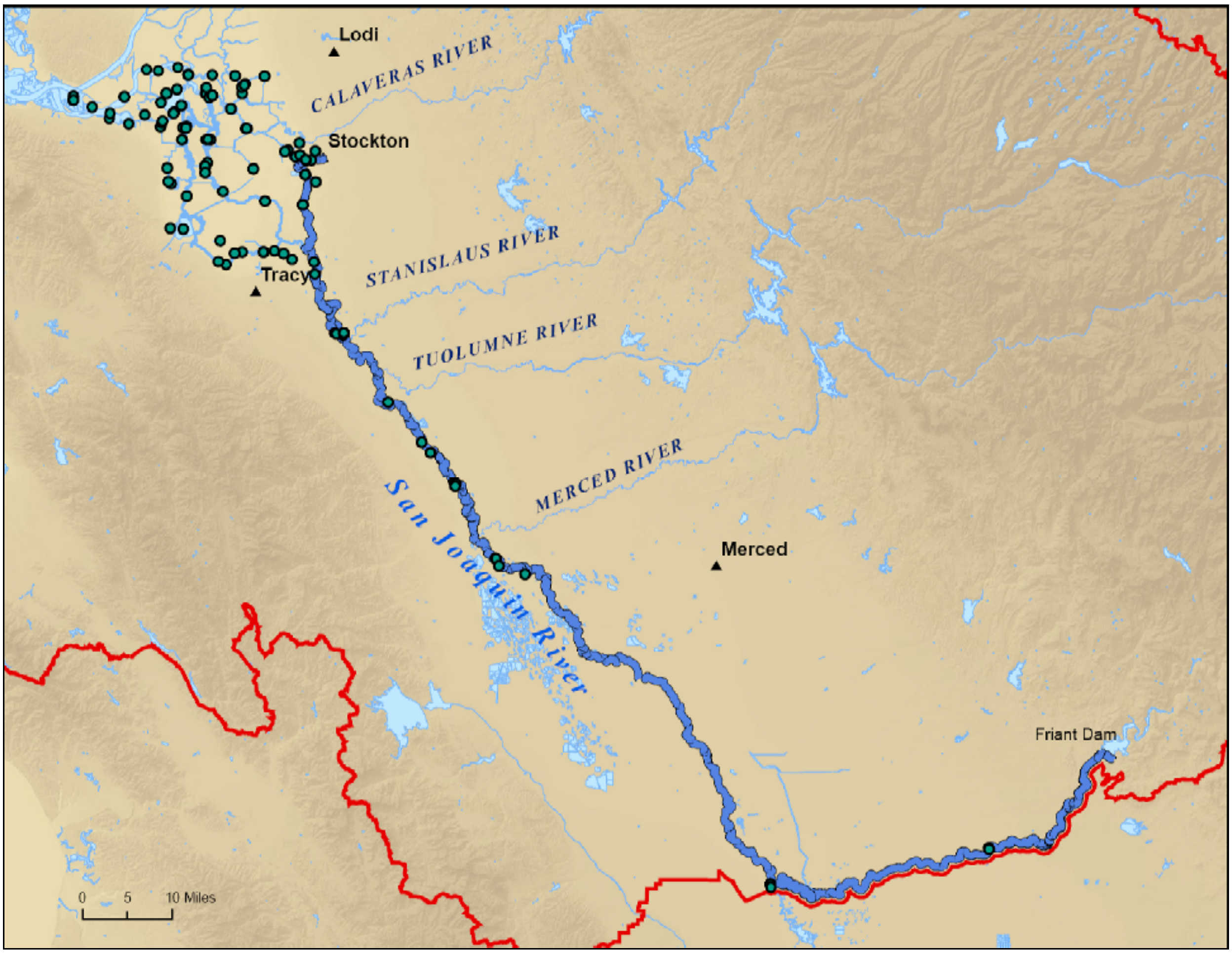
Figure 7. Comparison of Mean Mercury Concentrations in White Catfish and Channel Catfish across Subregions





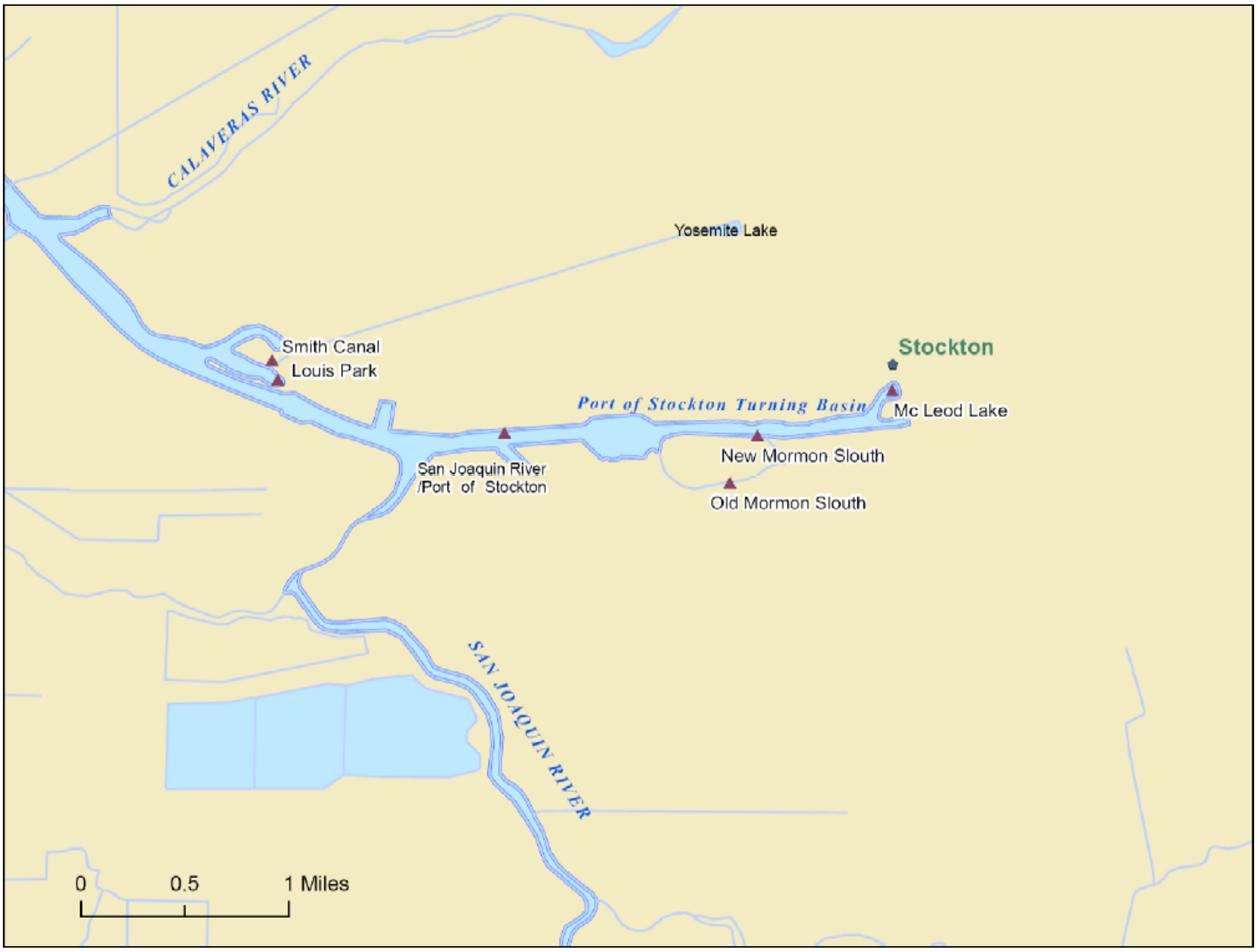
The line at 0.47 ppm indicates the threshold above which consumption guidelines for **women of childbearing age and children** would fall in the “red category” of “Restricted.” The line at 0.16 ppm represents the threshold between one 8-oz. meal of fish a week (> 0.16 ppm) and two 8-oz. meals of fish a week (≤ 0.16 ppm). Mean mercury concentrations are shown by circles and the whiskers indicate 95% confidence intervals around the mean.

Figure 8. Map Distinguishing the San Joaquin River Region from the South Delta Region



The highlighted stretch of the San Joaquin River (shown as a thicker and darker blue) indicates the San Joaquin River region used in the safe eating guidelines, and includes the San Joaquin River from its confluence with the Calaveras River to Friant Dam (dam not shown). The dark (red) line near the bottom of the map represents a portion of the southern boundary of the geographic study area as defined by CBDA.

Figure 9: Map of Sample Sites near the Port of Stockton



Appendix I: Methylmercury in Sport Fish: Information for Fish Consumers

Methylmercury is a form of mercury that is found in most freshwater and saltwater fish. In some lakes, rivers, and coastal waters in California, methylmercury has been found in some types of fish at concentrations that may be harmful to human health. The Office of Environmental Health Hazard Assessment (OEHHA) has issued health advisories to fishers and their families giving recommendations on how much of the affected fish in these areas can be safely eaten. In these advisories, women of childbearing age and children are encouraged to be especially careful about following the advice because of the greater sensitivity of fetuses and children to methylmercury.

Fish are nutritious and should be a part of a healthy, balanced diet. As with many other kinds of food, however, it is prudent to consume fish in moderation. OEHHA provides advice to the public so that people can continue to eat fish without putting their health at risk.

WHERE DOES METHYLMERCURY IN FISH COME FROM?

Methylmercury in fish comes from mercury in the aquatic environment. Mercury, a metal, is widely found in nature in rock and soil, and is washed into surface waters during storms. Mercury evaporates from rock, soil, and water into the air, and then falls back to the earth in rain, often far from where it started. Human activities redistribute mercury and can increase its concentration in the aquatic environment. The coastal mountains in northern California are naturally rich in mercury in the form of cinnabar ore, which was processed to produce quicksilver, a liquid form of inorganic mercury. This mercury was taken to the Sierra Nevada, Klamath mountains, and other regions, where it was used in gold mining. Historic mining operations and the remaining tailings from abandoned mercury and gold mines have contributed to the release of large amounts of mercury into California's surface waters. Mercury can also be released into the environment from industrial sources, including the burning of fossil fuels and solid wastes, and disposal of mercury-containing products.

Once mercury gets into water, much of it settles to the bottom where bacteria in the mud or sand convert it to the organic form of methylmercury. Fish absorb methylmercury when they eat smaller aquatic organisms. Larger and older fish absorb more methylmercury as they eat other fish. In this way, the amount of methylmercury builds up as it passes through the food chain. Fish eliminate methylmercury slowly, and so it builds up in fish in much greater concentrations than in the surrounding water. Methylmercury generally reaches the highest levels in predatory fish at the top of the aquatic food chain.

HOW MIGHT I BE EXPOSED TO METHYLMERCURY?

Eating fish is the main way that people are exposed to methylmercury. Each person's exposure depends on the amount of methylmercury in the fish that they eat and how much and how often they eat fish.

Women can pass methylmercury to their babies during pregnancy, and this includes methylmercury that has built up in the mother's body even before pregnancy. For this reason, women of childbearing age are encouraged to be especially careful to follow consumption advice, even if they are not pregnant. In addition, nursing mothers can pass methylmercury to their child through breast milk.

You may be exposed to inorganic forms of mercury through dental amalgams (fillings) or accidental spills, such as from a broken thermometer. For most people, these sources of exposure to mercury are minor and of less concern than exposure to methylmercury in fish.

AT WHAT LOCATIONS IN CALIFORNIA HAVE ELEVATED LEVELS OF MERCURY BEEN FOUND IN FISH?

Methylmercury is found in most fish, but some fish and some locations have higher amounts than others. Methylmercury is one of the chemicals in fish that most often creates a health concern. Consumption advisories due to high levels of methylmercury in fish have been issued in about 40 states. In California, methylmercury advisories have been issued for San Francisco Bay and the Delta; Tomales Bay in Marin County; and at the following inland lakes: Lake Nacimiento in San Luis Obispo County; Lake Pillsbury and Clear Lake in Lake County; Lake Berryessa in Napa County; Guadalupe Reservoir and associated reservoirs in Santa Clara County; Lake Herman in Solano County; San Pablo Reservoir in Contra Costa County; Black Butte Reservoir in Glenn and Tehama Counties; Lake Natoma and the lower American River in Sacramento County; Trinity Lake in Trinity County; and certain lakes and river stretches in the Sierra Nevada foothills in Nevada, Placer, and Yuba counties. Other locations may be added in the future as more fish and additional water bodies are tested.

HOW DOES METHYLMERCURY AFFECT HEALTH?

Much of what we know about methylmercury toxicity in humans stems from several mass poisoning events that occurred in Japan during the 1950s and 1960s, and Iraq during the 1970s. In Japan, a chemical factory discharged vast quantities of mercury into several bays near fishing villages. Many people who consumed large amounts of fish from these bays became seriously ill or died over a period of several years. In Iraq, thousands of people were poisoned by eating contaminated bread that was mistakenly made from seed grain treated with methylmercury.

From studying these cases, researchers have determined that the main target of methylmercury toxicity is the central nervous system. At the highest exposure levels experienced in these poisonings, methylmercury toxicity symptoms included such nervous system effects as loss of coordination, blurred vision or blindness, and hearing and speech impairment. Scientists also discovered that the developing nervous systems of fetuses are particularly sensitive to the toxic effects of methylmercury. In the Japanese outbreak, for example, some fetuses developed methylmercury toxicity during pregnancy even when their mothers did not. Symptoms reported in the Japan and Iraq epidemics resulted from methylmercury levels that were much higher than what fish consumers in the U.S. would experience.

Individual cases of adverse health effects from heavy consumption of commercial fish containing moderate to high levels of methylmercury have been reported only rarely. Nervous system symptoms reported in these instances included headaches, fatigue, blurred vision, tremor, and/or some loss of concentration, coordination, or memory. However, because there was no clear link between the severity of symptoms and the amount of mercury to which the person was exposed, it is not possible to say with certainly that these effects were a consequence of methylmercury exposure and not the result of other health problems. The most subtle symptoms in adults known to be clearly associated with methylmercury toxicity are numbness or tingling in the hands and feet or around the mouth; however, these symptoms are also associated with other medical conditions not related to methylmercury exposure.

In recent studies of high fish-eating populations in different parts of the world, researchers have been able to detect more subtle effects of methylmercury toxicity in children whose mothers frequently ate seafood containing low to moderate mercury concentrations during their pregnancy. Several studies found slight decreases in learning ability, language skills, attention and/or memory in some of these children. These effects were not obvious without using very specialized and sensitive tests. Children may have increased susceptibility to the effects of methylmercury through adolescence, as the nervous system continues to develop during this time.

Methylmercury builds up in the body if exposure continues to occur over time. Exposure to relatively high doses of methylmercury for a long period of time may also cause problems in other organs such as the kidneys and heart.

CAN MERCURY POISONING OCCUR FROM EATING SPORT FISH IN CALIFORNIA?

No case of mercury poisoning has been reported from eating California sport fish. The levels of mercury in California fish are much lower than those that occurred during the Japanese outbreak. Therefore, overt poisoning resulting from sport fish consumption in California would not be expected. At the levels of mercury found in California fish, symptoms associated with methylmercury are unlikely unless someone eats much more than what is recommended or is particularly sensitive. The fish consumption guidelines are designed to protect against subtle effects that would be difficult to detect but could still occur following unrestricted consumption of California sport fish. This is especially true in the case of fetuses and children.

IS THERE A WAY TO REDUCE METHYLMERCURY IN FISH TO MAKE THEM SAFER TO EAT?

There is no specific method of cleaning or cooking fish that will significantly reduce the amount of methylmercury in the fish. However, fish should be cleaned and gutted before cooking because some mercury may be present in the liver and other organs of the fish. These organs should not be eaten.

In the case of methylmercury, fish size is important because large fish that prey upon smaller fish can accumulate more of the chemical in their bodies. It is better to eat the smaller fish within the same species, provided that they are legal size.

IS THERE A MEDICAL TEST TO DETERMINE EXPOSURE TO METHYLMERCURY?

Mercury in blood and hair can be measured to assess methylmercury exposure. However, this is not routinely done. Special techniques in sample collection, preparation, and analysis are required for these tests to be accurate. Although tests using hair are less invasive, they are also less accurate. It is important to consult with a physician before undertaking medical testing because these tests alone cannot determine the cause of personal symptoms.

HOW CAN I REDUCE THE AMOUNT OF METHYLMERCURY IN MY BODY?

Methylmercury is eliminated from the body over time provided that the amount of mercury taken in is reduced. Therefore, following the OEHHA consumption advice and eating less of the fish that have higher levels of mercury can reduce your exposure and help to decrease the levels of methylmercury already in your body if you have not followed these recommendations in the past.

What if I eat fish from other sources such as restaurants, stores, or other water bodies that may not have an advisory?

Most commercial fish have relatively low amounts of methylmercury and can be eaten safely in moderate amounts. However, several types of fish such as large, predatory, long-lived fish have high levels of methylmercury, and could cause overly high exposure to methylmercury if eaten often. The U.S. Food and Drug Administration (FDA) is responsible for the safety of commercial seafood. In 2004, FDA and the U.S. Environmental Protection Agency (U.S. EPA) issued a Joint Federal Advisory for Mercury in Fish advising women who are pregnant or could become pregnant, nursing mothers, and young children not to eat shark, swordfish, king mackerel, or tilefish. The federal advisory also recommends that these individuals can safely eat up to an average of 12 ounces (two average meals) per week of a variety of other cooked fish purchased in stores or restaurants, such as shrimp, canned light tuna, salmon, pollock, or (farm-raised) catfish. Albacore ("white") tuna is known to contain more mercury than canned light tuna; it is therefore recommended that no more than six ounces of albacore tuna be consumed per week. In addition, the federal advisory recommends that women who are pregnant or may become pregnant, nursing mothers, and young children consume no more than one meal per week of locally caught fish, when no other advice is available, and eat no other fish that week. The federal advisory can be found at http://www.cfsan.fda.gov/~dms/admehg.html or http://www.epa.gov/ost/fishadvice/advice.html.

In addition, OEHHA offers the following general advice that can be followed to reduce exposure to methylmercury in fish. Chemical levels can vary from place to place. Therefore, your overall exposure to chemicals is likely to be lower if you fish at a variety of places, rather than at one location that might have high contamination levels. Furthermore, some fish species have higher chemical levels than others in the same location. If possible, eat smaller amounts of several different types of fish rather than a large amount of one type that may be high in contaminants. Smaller fish of a species will usually have lower chemical levels than larger fish in the same location because some of the chemicals may become more concentrated in larger, older fish. It is advisable to eat smaller fish (of legal size) more often than larger fish. Cleaning and cooking fish in a manner that removes fat and organs is an effective way to reduce other contaminants that may be present in fish.

Where can I get more information?

The health advisories for sport fish are printed in the California Sport Fishing Regulations booklet, which is available wherever fishing licenses are sold. OEHHA also offers a booklet containing the advisories, and additional materials such as this fact sheet on related topics. Additional information and documents related to fish advisories are available on the OEHHA Web Site at http://www.oehha.ca.gov/fish.html. County departments of environmental health may have more information on specific fishing areas.

Appendix II. General Advice for Sport Fish Consumption

You can reduce your exposure to chemical contaminants in sport fish by following the recommendations below. Follow as many of them as you can to increase your health protection. This general advice is not meant to take the place of advisories for specific areas, but should be followed in addition to them. Sport fish in most water bodies in the state have not been evaluated for their safety for human consumption. This is why we strongly recommend following the general advice given below.

Fishing Practices

Chemical levels can vary from place to place. Your overall exposure to chemicals is likely to be lower if you eat fish from a variety of places rather than from one usual spot that might have high contamination levels.

Be aware that OEHHA may issue new advisories or revise existing ones. Consult the Department of Fish and Game regulations booklet or check with OEHHA on a regular basis to see if there are any changes that could affect you.

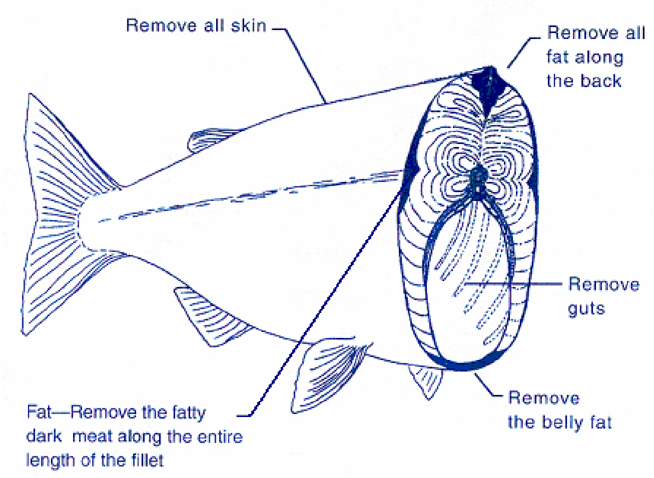
Consumption Guidelines

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

Fish Size: Smaller fish of a species will usually have lower chemical levels than larger fish in the same location because some of the chemicals may accumulate as the fish grows. It is advisable to eat smaller fish (of legal size).

Fish Preparation and Consumption

- Eat only the fillet portions. Do not eat the guts and liver because chemicals usually concentrate in those parts. Also, avoid frequent consumption of any reproductive parts such as eggs or roe.
- Many chemicals are stored in the fat. To reduce the levels of these chemicals, skin the fish when possible and trim any visible fat.
- Use a cooking method such as baking, broiling, grilling, or steaming that allows the juices to drain away from the fish. The juices will contain chemicals in the fat and should be thrown away. Preparing and cooking fish in this way can remove 30 to 50 percent of the chemicals stored in fat. If you make stews or chowders, use fillet parts.
- Raw fish may be infested by parasites. Cook fish thoroughly to destroy the parasites.



Advice for Pregnant Women, Women of Childbearing Age, and Children

Children and fetuses are more sensitive to the toxic effects of methylmercury, the form of mercury of health concern in fish. For this reason, OEHHA's advisories that are based on mercury provide special advice for women of childbearing age and children. Women should follow this advice throughout their childbearing years.

The U.S. Food and Drug Administration (FDA) is responsible for the safety of commercial seafood. Most commercial fish have relatively low amounts of methylmercury and can be eaten safely in moderate amounts. However, several types of fish such as large, predatory, long-lived fish have high levels of methylmercury, and could cause overly high exposure to methylmercury if eaten often. In 2004, FDA and the U.S. Environmental Protection Agency (U.S. EPA) issued a Joint Federal Advisory for Mercury in Fish advising women who are pregnant or could become pregnant, nursing mothers, and young children not to eat shark, swordfish, king mackerel, or tilefish. The federal advisory also recommends that these individuals can safely eat up to an average of 12 ounces (two average meals) per week of a variety of other cooked fish purchased in stores or restaurants, such as shrimp, canned light tuna, salmon, pollock, or (farm-raised) catfish. Albacore ("white") tuna is known to contain more mercury than canned light tuna; it is therefore recommended that no more than six ounces of albacore tuna be consumed per week. In addition, the federal advisory recommends that women who are pregnant or may become pregnant, nursing mothers, and young children consume no more than one meal per week of locally caught fish, when no other advice is available, and eat no other fish that week. The federal advisory can be found at http://www.cfsan.fda.gov/~dms/admehg.html or http://www.epa.gov/ost/fishadvice/advice.html.

Appendix III: San Joaquin River and South Delta Advisory Data File Comments

1. Omitted samples from Mud Slough; only affected crappie mean mercury.
2. SFEI CALFED original site name "Potato Slough" (Per M Woods), was assigned a latitude and longitude that place it in the San Joaquin River; therefore, the site name was changed to "SJR/Potato Slough"
3. G Ichikawa provided an updated latitude and longitude for FMP site name "SJR Crows Landing" (11/7/06 email) as 37.43325 -121.01601 (changed from 37.4347 –121.0135).
4. CALFED "SJR/Crow's Landing" (37.48033 –121.06517) renamed "SJR/Lake Ramona" to match site name to the latitude and longitude per instruction from G Ichikawa (11/7/06 email).
5. FMP latitude and longitude 38.0878 and -121.5203 was assigned to the original site name "SJR/Potato Slough." Site name changed to "Potato Slough" to match latitude and longitude, which place it in Potato Slough. (11/7/06 email instruction from G Ichikawa to match site name to latitude and longitude)
6. CALFED 2000 "SJR at Crows Landing" latitude and longitude was updated to 37.4265 -121.01405 per L Grenier (4/21/06 email attachment). (M Wood dataset used the same latitude and longitude as TSMP sampling site with same name.)
7. TSMP site name "SJR/French Camp Slough" changed to "French Camp Slough" to match latitude and longitude, which place it in the slough rather than the river.
8. CALFED site name "SJR/Landers Ave" with latitude and longitude 37.29803 -120.92382 was changed to "SJR/San Luis Wildlife Refuge" to distinguish it from another sampling site "SJR/Landers Ave," which is not within one mile
9. CALFED 1999 site name "SJR/Landers Ave" with latitude and longitude 37.25933 -120.87217 (per L Grenier) is located in Salt Slough; therefore the samples were deselected and the site name was changed to "Salt Slough" to match latitude and longitude.
10. In the case of those layers for which projection information was complete, the NAD27 datum was used. However, some of the layers that were acquired from other sources did not include information on the datum; layers for which the datum was unknown could be either NAD27 or NAD83. This could create a slight displacement of features. Final shapefiles were all projected to NAD83 California Teale Albers.

Appendix IV: Case Summaries for Fish and Shellfish Samples

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Calaveras River	Asiatic Clam	.02	.	24	7	UCD	1999	CD
Discovery Bay	Asiatic Clam	.01	.	23	20	UCD	1999	CD
Franks Tract/South Side	Asiatic Clam	.01	.	12	1	UCD	1999	CD
Franks Tract/Washington Cut	Asiatic Clam	.03	.	26	9	UCD	1999	CD
Grant Line Canal	Asiatic Clam	.01	.	22	8	UCD	1999	SJD
Headreach Island/North Side (deep water channel)	Asiatic Clam	.02	.	26	8	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Asiatic Clam	.05	.	26	11	UCD	1999	CD
Marsh Creek/Big Break	Asiatic Clam	.04	.	24	29	UCD	1999	WD
Middle River/Howard Rd.	Asiatic Clam	.01	.	20	3	UCD	1999	CD
Middle River/Woodward Island	Asiatic Clam	.02	.	24	19	UCD	1999	CD
Mildred Island	Asiatic Clam	.02	.	24	3	UCD	1999	CD
Old River/Bethany Rd	Asiatic Clam	.05	.	24	28	UCD	1999	SJD
Old River/btwn Little Mandeville & Rhode Islands	Asiatic Clam	.04	.	27	2	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.01	.	22	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.01	.	25	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.01	.	28	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.01	.	34	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.02	.	20	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.02	.	22	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.02	.	23	26	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.02	.	28	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.02	.	30	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.02	.	40	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.04	.	34	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.05	.	36	1	UCD	1999	CD
Old River/Hwy 4	Asiatic Clam	.08	.	39	1	UCD	1999	CD
Paradise Cut/Paradise Road	Asiatic Clam	.01	.	23	2	UCD	1999	SJD
Rhode Island	Asiatic Clam	.04	.	24	1	UCD	1999	CD
San Joaquin River/d/s Mokelumne River confluence	Asiatic Clam	.03	.	23	13	UCD	1999	CD
San Joaquin River/Gallagher Slough	Asiatic Clam	.11	.	23	16	UCD	1999	WD
San Joaquin River/Hwy 140	Asiatic Clam	.01	.	22	1	UCD	1999	SJR
San Joaquin River/Hwy 4	Asiatic Clam	.01	.	27	1	UCD	1999	SJD
San Joaquin River/Port of Stockton	Asiatic Clam	.01	.	25	4	UCD	1999	CD
Sand Mound Slough	Asiatic Clam	.07	.	26	6	UCD	1998	WD
Sherman Island	Asiatic Clam	.02	.	11	1	UCD	1999	WD
Sherman Island	Asiatic Clam	.02	.	10	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.02	.	11	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.04	.	18	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.04	.	18	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.04	.	20	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.05	.	18	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.05	.	22	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.05	.	23	1	UCD	2000	WD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Sherman Island	Asiatic Clam	.06	.	23	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.06	.	25	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.07	.	19	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.07	.	21	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.07	.	22	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.07	.	22	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.07	.	23	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.07	.	24	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.07	.	25	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.07	.	26	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.08	.	21	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.08	.	21	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.08	.	21	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.08	.	24	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.08	.	26	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.08	.	26	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.09	.	20	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.09	.	23	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.09	.	24	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.09	.	25	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.09	.	25	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.09	.	26	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.10	.	24	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.10	.	27	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.10	.	31	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.11	.	20	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.11	.	22	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.12	.	31	1	UCD	2000	WD
Sherman Island	Asiatic Clam	.14	.	20	22	UCD	1999	WD
Sherman Island	Asiatic Clam	.14	.	30	1	UCD	2000	WD
Venice Cut	Asiatic Clam	.03	.	27	6	UCD	1999	CD
Venice Cut	Asiatic Clam	.03	.	26	3	UCD	1999	CD
White Slough	Asiatic Clam	.04	.	22	1	UCD	2000	CD
White Slough	Asiatic Clam	.05	.	19	1	UCD	2000	CD
White Slough	Asiatic Clam	.05	.	27	1	UCD	2000	CD
White Slough	Asiatic Clam	.06	.	26	1	UCD	2000	CD
White Slough	Asiatic Clam	.06	.	28	1	UCD	2000	CD
White Slough	Asiatic Clam	.07	.	24	1	UCD	2000	CD
White Slough	Asiatic Clam	.07	.	27	1	UCD	2000	CD
White Slough	Asiatic Clam	.08	.	26	1	UCD	2000	CD
White Slough	Asiatic Clam	.08	.	27	1	UCD	2000	CD
White Slough	Asiatic Clam	.08	.	28	1	UCD	2000	CD
White Slough	Asiatic Clam	.08	.	32	1	UCD	2000	CD
White Slough	Asiatic Clam	.09	.	28	1	UCD	2000	CD
White Slough	Asiatic Clam	.10	.	30	1	UCD	2000	CD
White Slough	Asiatic Clam	.11	.	34	1	UCD	2000	CD
White Slough	Asiatic Clam	.12	.	27	1	UCD	2000	CD
White Slough	Asiatic Clam	.12	.	28	1	UCD	2000	CD
White Slough	Asiatic Clam	.13	.	31	1	UCD	2000	CD
White Slough	Asiatic Clam	.14	.	32	1	UCD	2000	CD
White Slough	Asiatic Clam	.16	.	30	1	UCD	2000	CD
White Slough	Asiatic Clam	.20	.	34	1	UCD	2000	CD
White Slough/Lodi	Black Bullhead	.05	.	306	5	SFEI	1999	CD
Calaveras River	Bluegill	.02	141	151	1	FMP	2005	CD
Calaveras River	Bluegill	.04	156	164	1	FMP	2005	CD
Calaveras River	Bluegill	.05	178	185	1	FMP	2005	CD
Calaveras River	Bluegill	.06	150	158	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Calaveras River	Bluegill	.06	179	187	1	FMP	2005	CD
Discovery Bay	Bluegill	.04	122	127	1	FMP	2005	CD
Discovery Bay	Bluegill	.04	131	140	1	FMP	2005	CD
Discovery Bay	Bluegill	.04	136	145	1	FMP	2005	CD
Discovery Bay	Bluegill	.06	135	140	1	FMP	2005	CD
Discovery Bay	Bluegill	.07	132	140	1	FMP	2005	CD
Franks Tract	Bluegill	.04	162	168	1	FMP	2005	CD
Franks Tract	Bluegill	.06	134	141	1	FMP	2005	CD
Franks Tract	Bluegill	.07	144	150	1	FMP	2005	CD
Franks Tract	Bluegill	.07	157	163	1	FMP	2005	CD
Franks Tract	Bluegill	.09	153	162	1	FMP	2005	CD
French Camp Slough	Bluegill	.06	134	141	14	TSMP	1985	SJD
Honker Cut	Bluegill	.04	139	148	1	FMP	2005	CD
Honker Cut	Bluegill	.04	148	156	1	FMP	2005	CD
Honker Cut	Bluegill	.04	149	159	1	FMP	2005	CD
Honker Cut	Bluegill	.05	144	153	1	FMP	2005	CD
Honker Cut	Bluegill	.05	144	160	1	FMP	2005	CD
Italian Slough	Bluegill	.04	156	164	1	FMP	2005	CD
Italian Slough	Bluegill	.05	138	144	1	FMP	2005	CD
Italian Slough	Bluegill	.05	136	145	1	FMP	2005	CD
Italian Slough	Bluegill	.07	144	149	1	FMP	2005	CD
Italian Slough	Bluegill	.07	159	166	1	FMP	2005	CD
Mendota Pool/Mendota Slough	Bluegill	.04	115	120	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Bluegill	.07	199	219	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Bluegill	.20	214	226	1	FMP	2005	SoSJR
Middle River at Bullfrog	Bluegill	.04	150	155	1	FMP	2005	CD
Middle River at Bullfrog	Bluegill	.06	125	130	1	FMP	2005	CD
Middle River at Bullfrog	Bluegill	.07	140	145	1	FMP	2005	CD
Middle River at Bullfrog	Bluegill	.07	142	150	1	FMP	2005	CD
Middle River at Bullfrog	Bluegill	.09	132	140	1	FMP	2005	CD
Middle River at Bullfrog	Bluegill	.09	152	160	1	FMP	2005	CD
Middle River at Bullfrog	Bluegill	.11	132	140	1	FMP	2005	CD
Middle River at Bullfrog	Bluegill	.11	140	150	1	FMP	2005	CD
Middle River at Bullfrog	Bluegill	.23	160	170	1	FMP	2005	CD
Middle River at Bullfrog	Bluegill	.37	163	170	1	FMP	2005	CD
Middle River at Bullfrog	Bluegill	.03	.	113	5	SFEI	1999	CD
Middle River at Bullfrog	Bluegill	.07	.	150	5	SFEI	1999	CD
Middle River at Hwy 4	Bluegill	.08	154	163	1	FMP	2005	CD
Middle River at Hwy 4	Bluegill	.09	156	165	1	FMP	2005	CD
Middle River at Hwy 4	Bluegill	.11	164	173	1	FMP	2005	CD
Middle River at Hwy 4	Bluegill	.14	152	160	1	FMP	2005	CD
Middle River at Hwy 4	Bluegill	.23	182	191	1	FMP	2005	CD
Middle River at Mildred Island	Bluegill	.08	126	133	1	FMP	2005	CD
Middle River at Mildred Island	Bluegill	.10	140	145	1	FMP	2005	CD
Middle River at Mildred Island	Bluegill	.16	128	135	1	FMP	2005	CD
Middle River at Mildred Island	Bluegill	.23	160	170	1	FMP	2005	CD
Old River at Tracy Blvd.	Bluegill	.04	110	114	1	FMP	2005	SJD
Old River at Tracy Blvd.	Bluegill	.05	98	104	1	FMP	2005	SJD
Old River at Tracy Blvd.	Bluegill	.05	115	123	1	FMP	2005	SJD
Old River at Tracy Blvd.	Bluegill	.06	107	114	1	FMP	2005	SJD
Old River at Tracy Blvd.	Bluegill	.07	109	111	1	FMP	2005	SJD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Old River/nr Paradise Cut	Bluegill	.09	.	147	5	SFEI	1999	SJD
Paradise Cut	Bluegill	.14	243	258	1	FMP	2005	SJD
Paradise Cut	Bluegill	.05	.	107	5	SFEI	1999	SJD
Paradise Cut	Bluegill	.11	.	164	5	SFEI	1999	SJD
Port of Stockton Turning Basin	Bluegill	.06	.	214	5	SFEI	1999	CD
Potato Slough	Bluegill	.06	163	171	1	FMP	2005	CD
Potato Slough	Bluegill	.07	148	155	1	FMP	2005	CD
Potato Slough	Bluegill	.07	153	160	1	FMP	2005	CD
Potato Slough	Bluegill	.07	156	160	1	FMP	2005	CD
Potato Slough	Bluegill	.09	146	155	1	FMP	2005	CD
San Joaquin River at Crows Landing	Bluegill	.11	161	170	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Bluegill	.13	159	167	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Bluegill	.14	130	136	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Bluegill	.15	129	136	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Bluegill	.16	136	143	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Bluegill	.22	163	171	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Bluegill	.15	152	156	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Bluegill	.16	140	147	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Bluegill	.18	127	135	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Bluegill	.19	125	133	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Bluegill	.24	171	181	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Bluegill	.26	157	164	1	FMP	2005	SJR
San Joaquin River at Laird Park	Bluegill	.11	134	142	1	FMP	2005	SJR
San Joaquin River at Laird Park	Bluegill	.16	165	174	1	FMP	2005	SJR
San Joaquin River at Laird Park	Bluegill	.17	183	190	1	FMP	2005	SJR
San Joaquin River at Laird Park	Bluegill	.18	129	138	1	FMP	2005	SJR
San Joaquin River at Laird Park	Bluegill	.23	157	166	1	FMP	2005	SJR
San Joaquin River at Mossdale	Bluegill	.07	209	221	1	FMP	2005	SJD
San Joaquin River at Mossdale	Bluegill	.10	189	196	1	FMP	2005	SJD
San Joaquin River at Mossdale	Bluegill	.16	182	195	1	FMP	2005	SJD
San Joaquin River at Mossdale	Bluegill	.19	168	179	1	FMP	2005	SJD
San Joaquin River at Mossdale	Bluegill	.19	183	194	1	FMP	2005	SJD
San Joaquin River at Patterson	Bluegill	.12	139	146	1	FMP	2005	SJR
San Joaquin River at Patterson	Bluegill	.15	152	159	1	FMP	2005	SJR

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
San Joaquin River at Patterson	Bluegill	.15	173	182	1	FMP	2005	SJR
San Joaquin River at Patterson	Bluegill	.16	151	156	1	FMP	2005	SJR
San Joaquin River at Patterson	Bluegill	.16	164	176	1	FMP	2005	SJR
San Joaquin River at Vernalis	Bluegill	.12	130	135	1	FMP	2005	SJD
San Joaquin River at Vernalis	Bluegill	.13	156	163	1	FMP	2005	SJD
San Joaquin River at Vernalis	Bluegill	.14	125	130	1	FMP	2005	SJD
San Joaquin River at Vernalis	Bluegill	.15	151	156	1	FMP	2005	SJD
San Joaquin River at Vernalis	Bluegill	.16	150	157	1	FMP	2005	SJD
San Joaquin River/around Bowman Road	Bluegill	.17	.	210	5	SFEI	1999	SJD
San Joaquin River/around Turner Cut	Bluegill	.13	.	206	5	SFEI	1999	CD
San Joaquin River/Lake Ramona	Bluegill	.12	.	119	5	SFEI	1999	SJR
San Joaquin River/Mossdale	Bluegill	.10	146	153	10	TSMP	1993	SJD
San Joaquin River/North of Hwy 4	Bluegill	.15	.	194	4	SFEI	1999	SJD
San Joaquin River/San Luis Refuge	Bluegill	.11	.	146	5	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Bluegill	.14	.	157	5	SFEI	2000	SJR
Sand Mound Slough	Bluegill	.05	143	152	1	FMP	2005	WD
Sand Mound Slough	Bluegill	.06	166	174	1	FMP	2005	WD
Sand Mound Slough	Bluegill	.07	145	153	1	FMP	2005	WD
Sand Mound Slough	Bluegill	.07	152	160	1	FMP	2005	WD
Sand Mound Slough	Bluegill	.09	200	210	1	FMP	2005	WD
Sand Mound Slough	Bluegill	.04	.	115	5	SFEI	1999	WD
Smith Canal/Yosemite Park	Bluegill	.12	.	197	5	SFEI	1999	CD
Taylor Slough	Bluegill	.05	113	120	1	FMP	2005	WD
Taylor Slough	Bluegill	.05	123	127	1	FMP	2005	WD
Taylor Slough	Bluegill	.05	130	135	1	FMP	2005	WD
Taylor Slough	Bluegill	.05	133	140	1	FMP	2005	WD
Taylor Slough	Bluegill	.05	134	141	1	FMP	2005	WD
Werner Dredger Cut	Bluegill	.05	120	126	1	FMP	2005	CD
Werner Dredger Cut	Bluegill	.05	136	144	1	FMP	2005	CD
Werner Dredger Cut	Bluegill	.06	134	145	1	FMP	2005	CD
Werner Dredger Cut	Bluegill	.06	146	153	1	FMP	2005	CD
Werner Dredger Cut	Bluegill	.08	129	135	1	FMP	2005	CD
Whiskey Slough	Bluegill	.02	105	111	1	FMP	2005	CD
Whiskey Slough	Bluegill	.03	98	102	1	FMP	2005	CD
Whiskey Slough	Bluegill	.03	100	108	1	FMP	2005	CD
Whiskey Slough	Bluegill	.03	111	117	1	FMP	2005	CD
Whiskey Slough	Bluegill	.03	128	136	1	FMP	2005	CD
Whiskey Slough	Bluegill	.07	167	178	1	FMP	2005	CD
White Slough/d/s Disappointment Slough	Bluegill	.09	.	172	5	SFEI	1999	CD
White Slough/Lodi	Bluegill	.06	.	165	5	SFEI	1999	CD
White Slough/Lodi	Bluegill	.07	.	115	5	SFEI	1999	CD
Franks Tract	Brown Bullhead	.20	305	306	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Franks Tract	Brown Bullhead	.20	315	318	1	FMP	2005	CD
Franks Tract	Brown Bullhead	.23	285	290	1	FMP	2005	CD
Franks Tract	Brown Bullhead	.23	297	298	1	FMP	2005	CD
Franks Tract	Brown Bullhead	.25	302	303	1	FMP	2005	CD
Italian Slough	Brown Bullhead	.20	309	317	1	FMP	2005	CD
Italian Slough	Brown Bullhead	.21	300	308	1	FMP	2005	CD
Italian Slough	Brown Bullhead	.21	315	321	1	FMP	2005	CD
Italian Slough	Brown Bullhead	.21	335	340	1	FMP	2005	CD
Italian Slough	Brown Bullhead	.22	297	302	1	FMP	2005	CD
Italian Slough	Brown Bullhead	.23	251	256	1	FMP	2005	CD
Italian Slough	Brown Bullhead	.23	352	354	1	FMP	2005	CD
Italian Slough	Brown Bullhead	.24	343	348	1	FMP	2005	CD
Italian Slough	Brown Bullhead	.25	314	319	1	FMP	2005	CD
Italian Slough	Brown Bullhead	.25	314	322	1	FMP	2005	CD
Mendota Pool/Mendota Slough	Brown Bullhead	.20	259	264	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Brown Bullhead	.21	275	279	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Brown Bullhead	.23	263	266	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Brown Bullhead	.24	287	291	1	FMP	2005	SoSJR
Middle River at Bullfrog	Brown Bullhead	.17	340	341	1	FMP	2005	CD
Middle River at Bullfrog	Brown Bullhead	.20	288	290	1	FMP	2005	CD
Middle River at Bullfrog	Brown Bullhead	.20	289	290	1	FMP	2005	CD
Middle River at Bullfrog	Brown Bullhead	.21	261	265	1	FMP	2005	CD
Middle River at Bullfrog	Brown Bullhead	.21	310	311	1	FMP	2005	CD
Middle River at Bullfrog	Brown Bullhead	.21	338	340	1	FMP	2005	CD
Middle River at Bullfrog	Brown Bullhead	.22	280	281	1	FMP	2005	CD
Middle River at Bullfrog	Brown Bullhead	.22	387	390	1	FMP	2005	CD
Middle River at Bullfrog	Brown Bullhead	.24	322	325	1	FMP	2005	CD
Middle River at Bullfrog	Brown Bullhead	.25	272	275	1	FMP	2005	CD
Potato Slough	Brown Bullhead	.20	321	339	1	FMP	2005	CD
Potato Slough	Brown Bullhead	.22	296	301	1	FMP	2005	CD
Potato Slough	Brown Bullhead	.24	270	275	1	FMP	2005	CD
Potato Slough	Brown Bullhead	.24	333	342	1	FMP	2005	CD
San Joaquin River at Hwy 99	Brown Bullhead	.19	229	234	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Brown Bullhead	.20	257	261	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Brown Bullhead	.21	215	219	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Brown Bullhead	.21	291	295	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Brown Bullhead	.21	294	299	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Brown Bullhead	.21	336	343	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Brown Bullhead	.23	253	256	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Brown Bullhead	.24	245	249	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Brown Bullhead	.25	265	269	1	FMP	2005	SoSJR
Werner Dredger Cut	Brown Bullhead	.22	315	320	1	FMP	2005	CD
Werner Dredger Cut	Brown Bullhead	.24	254	256	1	FMP	2005	CD
Whiskey Slough	Brown Bullhead	.22	320	327	1	FMP	2005	CD
Whiskey Slough	Brown Bullhead	.23	302	312	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Whiskey Slough	Brown Bullhead	.25	271	276	1	FMP	2005	CD
Big Break	Carp	.18	530	588	1	FMP	2005	WD
Big Break	Carp	.19	505	555	1	FMP	2005	WD
Big Break	Carp	.22	525	584	1	FMP	2005	WD
Calaveras River	Carp	.19	517	563	1	FMP	2005	CD
Calaveras River	Carp	.19	547	597	1	FMP	2005	CD
Calaveras River	Carp	.19	590	643	1	FMP	2005	CD
Calaveras River	Carp	.20	547	585	1	FMP	2005	CD
Calaveras River	Carp	.22	561	609	1	FMP	2005	CD
Italian Slough	Carp	.19	723	786	1	FMP	2005	CD
Italian Slough	Carp	.21	692	750	1	FMP	2005	CD
Italian Slough	Carp	.21	696	762	1	FMP	2005	CD
Mendota Pool/Mendota Slough	Carp	.22	329	370	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Carp	.22	471	535	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Carp	.22	524	577	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Carp	.23	349	391	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Carp	.23	507	561	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Carp	.24	482	536	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Carp	.25	359	400	1	FMP	2005	SoSJR
Paradise Cut	Carp	.17	516	578	1	FMP	2005	SJD
Paradise Cut	Carp	.18	525	581	1	FMP	2005	SJD
Paradise Cut	Carp	.20	539	594	1	FMP	2005	SJD
Paradise Cut	Carp	.20	542	609	1	FMP	2005	SJD
Paradise Cut	Carp	.21	509	574	1	FMP	2005	SJD
Paradise Cut/Tracy	Carp	.16	514	565	6	TSMP	1986	SJD
Potato Slough	Carp	.17	549	595	1	FMP	2005	CD
San Joaquin River at Crows Landing	Carp	.18	468	519	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Carp	.19	414	457	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Carp	.20	394	440	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Carp	.20	409	452	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Carp	.22	437	484	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Carp	.24	411	461	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Carp	.18	428	475	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Carp	.19	335	378	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Carp	.19	407	458	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Carp	.20	354	396	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Carp	.20	452	503	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Carp	.20	459	509	1	FMP	2005	SJR
San Joaquin River at Hwy	Carp	.18	589	651	1	FMP	2005	SoSJR

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
99								
San Joaquin River at Hwy 99	Carp	.18	679	739	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Carp	.18	699	758	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Carp	.19	575	655	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Carp	.19	634	705	1	FMP	2005	SoSJR
San Joaquin River at Laird Park	Carp	.20	432	475	1	FMP	2005	SJR
San Joaquin River at Laird Park	Carp	.21	451	505	1	FMP	2005	SJR
San Joaquin River at Laird Park	Carp	.23	395	439	1	FMP	2005	SJR
San Joaquin River at Laird Park	Carp	.23	409	456	1	FMP	2005	SJR
San Joaquin River at Laird Park	Carp	.25	409	456	1	FMP	2005	SJR
San Joaquin River at Mossdale	Carp	.18	461	509	1	FMP	2005	SJD
San Joaquin River at Mossdale	Carp	.19	567	626	1	FMP	2005	SJD
San Joaquin River at Mossdale	Carp	.19	604	654	1	FMP	2005	SJD
San Joaquin River at Mossdale	Carp	.20	662	719	1	FMP	2005	SJD
San Joaquin River at Mossdale	Carp	.21	451	510	1	FMP	2005	SJD
San Joaquin River at Patterson	Carp	.17	361	402	1	FMP	2005	SJR
San Joaquin River at Patterson	Carp	.18	381	434	1	FMP	2005	SJR
San Joaquin River at Patterson	Carp	.18	438	486	1	FMP	2005	SJR
San Joaquin River at Patterson	Carp	.18	483	534	1	FMP	2005	SJR
San Joaquin River at Patterson	Carp	.19	407	459	1	FMP	2005	SJR
San Joaquin River at Patterson	Carp	.19	453	510	1	FMP	2005	SJR
San Joaquin River at Patterson	Carp	.21	366	403	1	FMP	2005	SJR
San Joaquin River at Patterson	Carp	.24	318	364	1	FMP	2005	SJR
San Joaquin River at Vernalis	Carp	.18	495	558	1	FMP	2005	SJD
San Joaquin River at Vernalis	Carp	.19	424	461	1	FMP	2005	SJD
San Joaquin River at Vernalis	Carp	.22	417	535	1	FMP	2005	SJD
San Joaquin River at Vernalis	Carp	.23	430	478	1	FMP	2005	SJD
San Joaquin River at Vernalis	Carp	.24	419	465	1	FMP	2005	SJD
San Joaquin River/San Luis Refuge	Carp	.37	.	446	5	SFEI	2000	SJR
San Joaquin River/Vernalis	Carp	.21	372	409	2	TSMP	1981	SJD
San Joaquin River/Vernalis	Carp	.22	536	590	2	TSMP	1982	SJD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Smith Canal	Carp	.17	749	829	1	FMP	2005	CD
Smith Canal	Carp	.19	478	536	1	FMP	2005	CD
Smith Canal	Carp	.19	539	605	1	FMP	2005	CD
Smith Canal	Carp	.19	572	644	1	FMP	2005	CD
Smith Canal	Carp	.22	550	604	1	FMP	2005	CD
Smith Canal	Carp	.23	546	611	1	FMP	2005	CD
Discovery Bay	Channel Catfish	.05	435	488	1	FMP	2005	CD
Discovery Bay	Channel Catfish	.05	516	563	1	FMP	2005	CD
Discovery Bay	Channel Catfish	.06	405	460	1	FMP	2005	CD
Discovery Bay	Channel Catfish	.07	352	396	1	FMP	2005	CD
Mendota Pool/Mendota Slough	Channel Catfish	.04	493	545	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Channel Catfish	.06	355	400	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Channel Catfish	.06	373	424	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Channel Catfish	.08	368	421	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Channel Catfish	.10	373	316	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Channel Catfish	.10	309	357	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Channel Catfish	.13	531	579	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Channel Catfish	.14	463	516	1	FMP	2005	SoSJR
Middle River at Bullfrog	Channel Catfish	.06	410	459	1	FMP	2005	CD
Middle River at Bullfrog	Channel Catfish	.09	310	343	1	FMP	2005	CD
Middle River at Bullfrog	Channel Catfish	.12	424	478	1	FMP	2005	CD
Middle River at Bullfrog	Channel Catfish	.15	339	382	1	FMP	2005	CD
Middle River at Mildred Island	Channel Catfish	.10	420	460	1	FMP	2005	CD
Old River	Channel Catfish	.19	259	298	4	TSMP	1984	CD
Old River at Tracy Blvd.	Channel Catfish	.06	412	451	1	FMP	2005	SJD
Old River at Tracy Blvd.	Channel Catfish	.10	337	376	1	FMP	2005	SJD
Old River at Tracy Blvd.	Channel Catfish	.27	399	446	1	FMP	2005	SJD
Old River/nr Paradise Cut	Channel Catfish	.18	.	429	4	SFEI	1999	SJD
Potato Slough	Channel Catfish	.17	267	281	1	FMP	2005	CD
Potato Slough	Channel Catfish	.20	258	270	1	FMP	2005	CD
San Joaquin River at Crows Landing	Channel Catfish	.16	306	344	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Channel Catfish	.20	309	344	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Channel Catfish	.21	299	329	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Channel Catfish	.24	472	485	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Channel Catfish	.10	460	505	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Channel Catfish	.19	202	231	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Channel Catfish	.20	330	371	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Channel Catfish	.22	275	315	1	FMP	2005	SJR
San Joaquin River at Laird Park	Channel Catfish	.14	452	504	1	FMP	2005	SJR
San Joaquin River at Laird	Channel Catfish	.16	421	464	1	FMP	2005	SJR

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Park								
San Joaquin River at Laird Park	Channel Catfish	.18	322	361	1	FMP	2005	SJR
San Joaquin River at Laird Park	Channel Catfish	.19	382	426	1	FMP	2005	SJR
San Joaquin River at Laird Park	Channel Catfish	.19	381	427	1	FMP	2005	SJR
San Joaquin River at Laird Park	Channel Catfish	.23	307	341	1	FMP	2005	SJR
San Joaquin River at Laird Park	Channel Catfish	.27	376	416	1	FMP	2005	SJR
San Joaquin River at Laird Park	Channel Catfish	.28	311	351	1	FMP	2005	SJR
San Joaquin River at Laird Park	Channel Catfish	.36	387	430	1	FMP	2005	SJR
San Joaquin River at Vernalis	Channel Catfish	.15	229	335	1	FMP	2005	SJD
San Joaquin River at Vernalis	Channel Catfish	.16	299	340	1	FMP	2005	SJD
San Joaquin River at Vernalis	Channel Catfish	.18	309	355	1	FMP	2005	SJD
San Joaquin River at Vernalis	Channel Catfish	.24	312	353	1	FMP	2005	SJD
San Joaquin River at Vernalis	Channel Catfish	.38	269	305	1	FMP	2005	SJD
San Joaquin River/around Turner Cut	Channel Catfish	.16	.	444	4	SFEI	1999	CD
San Joaquin River/d/s Vernalis	Channel Catfish	.50	.	434	5	SFEI	1999	SJD
San Joaquin River/d/s Vernalis	Channel Catfish	.58	.	392	5	SFEI	1999	SJD
San Joaquin River/Vernalis	Channel Catfish	.06	331	381	1	TSMP	1991	SJD
San Joaquin River/Vernalis	Channel Catfish	.09	287	330	1	TSMP	1991	SJD
San Joaquin River/Vernalis	Channel Catfish	.09	293	337	1	TSMP	1991	SJD
San Joaquin River/Vernalis	Channel Catfish	.09	363	417	1	TSMP	1991	SJD
San Joaquin River/Vernalis	Channel Catfish	.10	262	301	1	TSMP	1991	SJD
San Joaquin River/Vernalis	Channel Catfish	.10	330	380	1	TSMP	1991	SJD
San Joaquin River/Vernalis	Channel Catfish	.12	308	354	1	TSMP	1991	SJD
San Joaquin River/Vernalis	Channel Catfish	.12	421	484	1	TSMP	1991	SJD
San Joaquin River/Vernalis	Channel Catfish	.16	228	262	5	TSMP	1981	SJD
San Joaquin River/Vernalis	Channel Catfish	.16	358	412	1	TSMP	1991	SJD
San Joaquin River/Vernalis	Channel Catfish	.18	235	270	5	TSMP	1981	SJD
San Joaquin River/Vernalis	Channel Catfish	.18	229	263	5	TSMP	1986	SJD
San Joaquin River/Vernalis	Channel Catfish	.32	324	373	6	TSMP	1982	SJD
San Joaquin River/Vernalis	Channel Catfish	.35	314	361	2	TSMP	1987	SJD
San Joaquin River/Vernalis	Channel Catfish	.36	316	363	3	TSMP	1983	SJD
San Joaquin River/Vernalis	Channel Catfish	.36	328	377	5	TSMP	1984	SJD
San Joaquin River/Vernalis	Channel Catfish	.40	324	373	6	TSMP	1979	SJD
San Joaquin River/Vernalis	Channel Catfish	.42	380	437	1	TSMP	1991	SJD
San Joaquin River/Vernalis	Channel Catfish	.60	267	307	5	TSMP	1985	SJD
Big Break	Crappie	.19	237	250	1	FMP	2005	WD
Big Break	Crappie	.19	292	300	1	FMP	2005	WD
Big Break	Crappie	.20	291	300	1	FMP	2005	WD
Big Break	Crappie	.22	312	330	1	FMP	2005	WD
Big Break	Crappie	.25	269	271	1	FMP	2005	WD
Discovery Bay	Crappie	.17	234	245	1	FMP	2005	CD
Discovery Bay	Crappie	.19	182	192	1	FMP	2005	CD
Discovery Bay	Crappie	.19	238	248	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Discovery Bay	Crappie	.20	205	215	1	FMP	2005	CD
Discovery Bay	Crappie	.21	252	261	1	FMP	2005	CD
Franks Tract	Crappie	.21	195	208	1	FMP	2005	CD
Franks Tract	Crappie	.23	259	268	1	FMP	2005	CD
Italian Slough	Crappie	.18	243	251	1	FMP	2005	CD
Italian Slough	Crappie	.19	242	255	1	FMP	2005	CD
Italian Slough	Crappie	.19	252	264	1	FMP	2005	CD
Italian Slough	Crappie	.19	263	274	1	FMP	2005	CD
Italian Slough	Crappie	.24	270	273	1	FMP	2005	CD
Old River	Crappie	.13	214	220	6	TSMP	1984	CD
Paradise Cut	Crappie	.17	303	311	1	FMP	2005	SJD
Paradise Cut	Crappie	.20	305	319	1	FMP	2005	SJD
Paradise Cut	Crappie	.21	302	309	1	FMP	2005	SJD
San Joaquin River/Naval Station	Crappie	.05	.	236	4	SFEI	2000	CD
Sherman Island	Crappie	.35	.	277	3	SFEI	2000	WD
Smith Canal/Yosemite Park	Crappie	.06	.	238	5	SFEI	1999	CD
Werner Dredger Cut	Crappie	.24	172	180	1	FMP	2005	CD
Werner Dredger Cut	Crappie	.24	186	194	1	FMP	2005	CD
Werner Dredger Cut	Crappie	.24	200	210	1	FMP	2005	CD
Big Break	Hitch	.23	175	190	1	FMP	2005	WD
Big Break	Hitch	.23	185	204	1	FMP	2005	WD
Big Break	Hitch	.24	171	189	1	FMP	2005	WD
Big Break	Hitch	.25	157	173	1	FMP	2005	WD
Big Break	Hitch	.25	161	179	1	FMP	2005	WD
Big Break	Largemouth Bass	.15	318	329	1	FMP	2005	WD
Big Break	Largemouth Bass	.17	299	313	1	FMP	2005	WD
Big Break	Largemouth Bass	.25	301	310	1	FMP	2005	WD
Big Break	Largemouth Bass	.29	447	465	1	FMP	2005	WD
Big Break	Largemouth Bass	.35	300	311	1	FMP	2005	WD
Big Break	Largemouth Bass	.38	404	419	1	FMP	2005	WD
Big Break	Largemouth Bass	.38	456	463	1	FMP	2005	WD
Big Break	Largemouth Bass	.40	329	341	1	FMP	2005	WD
Big Break	Largemouth Bass	.18	.	335	1	SFEI	2000	WD
Big Break	Largemouth Bass	.22	.	358	1	SFEI	2000	WD
Big Break	Largemouth Bass	.22	.	426	1	SFEI	2000	WD
Big Break	Largemouth Bass	.31	.	439	1	SFEI	2000	WD
Big Break	Largemouth Bass	.33	.	361	1	SFEI	2000	WD
Big Break	Largemouth Bass	.34	.	349	1	SFEI	2000	WD
Big Break	Largemouth Bass	.41	.	424	1	SFEI	2000	WD
Big Break	Largemouth Bass	.41	.	471	1	SFEI	2000	WD
Big Break	Largemouth	.46	.	413	1	SFEI	2000	WD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
	Bass							
Calaveras River	Largemouth Bass	.10	296	308	1	FMP	2005	CD
Calaveras River	Largemouth Bass	.14	310	330	1	FMP	2005	CD
Calaveras River	Largemouth Bass	.18	339	356	1	FMP	2005	CD
Calaveras River	Largemouth Bass	.22	389	403	1	FMP	2005	CD
Calaveras River	Largemouth Bass	.27	437	454	1	FMP	2005	CD
Calaveras River	Largemouth Bass	.42	350	370	1	FMP	2005	CD
Calaveras River	Largemouth Bass	.52	497	514	1	FMP	2005	CD
Discovery Bay	Largemouth Bass	.13	320	338	1	FMP	2005	CD
Discovery Bay	Largemouth Bass	.13	329	345	1	FMP	2005	CD
Discovery Bay	Largemouth Bass	.17	334	350	1	FMP	2005	CD
Discovery Bay	Largemouth Bass	.23	463	481	1	FMP	2005	CD
Discovery Bay	Largemouth Bass	.24	358	370	1	FMP	2005	CD
Franks Tract	Largemouth Bass	.15	330	339	1	FMP	2005	CD
Franks Tract	Largemouth Bass	.15	339	353	1	FMP	2005	CD
Franks Tract	Largemouth Bass	.16	355	368	1	FMP	2005	CD
Franks Tract	Largemouth Bass	.17	362	372	1	FMP	2005	CD
Franks Tract	Largemouth Bass	.21	430	440	1	FMP	2005	CD
Franks Tract	Largemouth Bass	.28	390	405	1	FMP	2005	CD
Franks Tract	Largemouth Bass	.49	544	562	1	FMP	2005	CD
Franks Tract	Largemouth Bass	.08	.	345	1	SFEI	2000	CD
Franks Tract	Largemouth Bass	.12	.	350	1	SFEI	2000	CD
Franks Tract	Largemouth Bass	.18	.	420	1	SFEI	2000	CD
Franks Tract	Largemouth Bass	.30	.	446	1	SFEI	2000	CD
Franks Tract	Largemouth Bass	.39	.	366	1	SFEI	2000	CD
Franks Tract	Largemouth Bass	.47	.	397	1	SFEI	2000	CD
Honker Cut	Largemouth Bass	.12	332	346	1	FMP	2005	CD
Honker Cut	Largemouth Bass	.12	331	346	1	FMP	2005	CD
Honker Cut	Largemouth Bass	.13	338	349	1	FMP	2005	CD
Honker Cut	Largemouth Bass	.18	378	399	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Honker Cut	Largemouth Bass	.19	432	449	1	FMP	2005	CD
Honker Cut	Largemouth Bass	.23	326	344	1	FMP	2005	CD
Honker Cut	Largemouth Bass	.26	369	384	1	FMP	2005	CD
Honker Cut	Largemouth Bass	.26	379	396	1	FMP	2005	CD
Honker Cut	Largemouth Bass	.27	349	361	1	FMP	2005	CD
Honker Cut	Largemouth Bass	.37	496	521	1	FMP	2005	CD
Honker Cut	Largemouth Bass	.40	473	489	1	FMP	2005	CD
Italian Slough	Largemouth Bass	.20	293	305	1	FMP	2005	CD
Italian Slough	Largemouth Bass	.26	374	396	1	FMP	2005	CD
Italian Slough	Largemouth Bass	.27	379	401	1	FMP	2005	CD
Italian Slough	Largemouth Bass	.28	303	317	1	FMP	2005	CD
Italian Slough	Largemouth Bass	.28	442	461	1	FMP	2005	CD
Italian Slough	Largemouth Bass	.29	338	356	1	FMP	2005	CD
Italian Slough	Largemouth Bass	.31	309	324	1	FMP	2005	CD
Mendota Pool	Largemouth Bass	.15	292	307	6	TSMP	1996	SoSJR
Mendota Pool	Largemouth Bass	.21	294	309	6	TSMP	2000	SoSJR
Mendota Pool	Largemouth Bass	.22	320	336	5	TSMP	1986	SoSJR
Mendota Pool	Largemouth Bass	.25	294	309	6	TSMP	1998	SoSJR
Mendota Pool	Largemouth Bass	.25	361	379	6	TSMP	2001	SoSJR
Mendota Pool	Largemouth Bass	.32	365	383	3	TSMP	1988	SoSJR
Mendota Pool	Largemouth Bass	.35	298	313	6	TSMP	2003	SoSJR
Mendota Pool/Mendota Slough	Largemouth Bass	.13	333	341	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Largemouth Bass	.16	291	306	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Largemouth Bass	.21	359	376	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Largemouth Bass	.25	453	470	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Largemouth Bass	.26	393	409	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Largemouth Bass	.32	445	472	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Largemouth Bass	.42	341	363	1	FMP	2005	SoSJR
Middle River at Bullfrog	Largemouth Bass	.17	300	310	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth	.24	295	310	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
	Bass							
Middle River at Bullfrog	Largemouth Bass	.25	310	320	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.26	302	315	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.28	360	370	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.33	390	405	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.34	289	305	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.35	325	340	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.37	375	385	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.40	490	510	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.41	489	510	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.45	530	550	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.49	402	420	1	FMP	2005	CD
Middle River at Bullfrog	Largemouth Bass	.11	.	331	1	SFEI	1999	CD
Middle River at Bullfrog	Largemouth Bass	.16	.	347	1	SFEI	1999	CD
Middle River at Bullfrog	Largemouth Bass	.17	.	356	1	SFEI	1999	CD
Middle River at Bullfrog	Largemouth Bass	.23	.	316	1	SFEI	1999	CD
Middle River at Bullfrog	Largemouth Bass	.23	.	342	1	SFEI	1999	CD
Middle River at Bullfrog	Largemouth Bass	.23	.	394	1	SFEI	1999	CD
Middle River at Bullfrog	Largemouth Bass	.27	.	375	1	SFEI	1999	CD
Middle River at Hwy 4	Largemouth Bass	.20	326	337	1	FMP	2005	CD
Middle River at Hwy 4	Largemouth Bass	.24	313	335	1	FMP	2005	CD
Middle River at Hwy 4	Largemouth Bass	.26	378	396	1	FMP	2005	CD
Middle River at Hwy 4	Largemouth Bass	.26	484	499	1	FMP	2005	CD
Middle River at Hwy 4	Largemouth Bass	.27	331	350	1	FMP	2005	CD
Middle River at Hwy 4	Largemouth Bass	.30	444	460	1	FMP	2005	CD
Middle River at Hwy 4	Largemouth Bass	.31	378	390	1	FMP	2005	CD
Middle River at Hwy 4	Largemouth Bass	.39	415	435	1	FMP	2005	CD
Middle River at Hwy 4	Largemouth Bass	.45	405	426	1	FMP	2005	CD
Middle River at Mildred Island	Largemouth Bass	.19	309	325	1	FMP	2005	CD
Middle River at Mildred Island	Largemouth Bass	.20	337	350	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Middle River at Mildred Island	Largemouth Bass	.24	409	426	1	FMP	2005	CD
Middle River at Mildred Island	Largemouth Bass	.25	327	342	1	FMP	2005	CD
Middle River at Mildred Island	Largemouth Bass	.29	352	369	1	FMP	2005	CD
Middle River/Bullfrog	Largemouth Bass	.23	357	375	5	TSMP	1999	CD
Mildred Island	Largemouth Bass	.14	.	312	1	SFEI	2000	CD
Mildred Island	Largemouth Bass	.16	.	347	1	SFEI	2000	CD
Mildred Island	Largemouth Bass	.19	.	327	1	SFEI	2000	CD
Mildred Island	Largemouth Bass	.25	.	315	1	SFEI	2000	CD
Mildred Island	Largemouth Bass	.27	.	340	1	SFEI	2000	CD
Mildred Island	Largemouth Bass	.34	.	427	1	SFEI	2000	CD
Old River at Tracy Blvd.	Largemouth Bass	.11	304	316	1	FMP	2005	SJD
Old River at Tracy Blvd.	Largemouth Bass	.12	329	349	1	FMP	2005	SJD
Old River at Tracy Blvd.	Largemouth Bass	.12	334	351	1	FMP	2005	SJD
Old River at Tracy Blvd.	Largemouth Bass	.15	327	336	1	FMP	2005	SJD
Old River at Tracy Blvd.	Largemouth Bass	.15	341	355	1	FMP	2005	SJD
Old River at Tracy Blvd.	Largemouth Bass	.19	299	314	1	FMP	2005	SJD
Old River at Tracy Blvd.	Largemouth Bass	.25	363	381	1	FMP	2005	SJD
Old River at Tracy Blvd.	Largemouth Bass	.26	392	414	1	FMP	2005	SJD
Old River at Tracy Blvd.	Largemouth Bass	.35	494	514	1	FMP	2005	SJD
Old River/nr Paradise Cut	Largemouth Bass	.20	.	339	1	SFEI	1999	SJD
Old River/nr Paradise Cut	Largemouth Bass	.24	.	333	1	SFEI	1999	SJD
Old River/nr Paradise Cut	Largemouth Bass	.41	.	390	1	SFEI	1999	SJD
Old River/nr Paradise Cut	Largemouth Bass	.43	.	468	1	SFEI	1999	SJD
Old River/nr Paradise Cut	Largemouth Bass	.44	.	353	1	SFEI	1999	SJD
Old River/nr Paradise Cut	Largemouth Bass	.58	.	374	1	SFEI	1999	SJD
Old River/nr Paradise Cut	Largemouth Bass	.58	.	452	1	SFEI	1999	SJD
Paradise Cut	Largemouth Bass	.12	332	350	1	FMP	2005	SJD
Paradise Cut	Largemouth Bass	.13	304	317	1	FMP	2005	SJD
Paradise Cut	Largemouth Bass	.15	339	361	1	FMP	2005	SJD
Paradise Cut	Largemouth	.17	306	320	1	FMP	2005	SJD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
	Bass							
Paradise Cut	Largemouth Bass	.17	415	431	1	FMP	2005	SJD
Paradise Cut	Largemouth Bass	.18	352	366	1	FMP	2005	SJD
Paradise Cut	Largemouth Bass	.19	374	386	1	FMP	2005	SJD
Paradise Cut	Largemouth Bass	.21	354	375	1	FMP	2005	SJD
Paradise Cut	Largemouth Bass	.23	339	355	1	FMP	2005	SJD
Paradise Cut	Largemouth Bass	.33	547	574	1	FMP	2005	SJD
Paradise Cut	Largemouth Bass	.64	528	545	1	FMP	2005	SJD
Paradise Cut	Largemouth Bass	.52	.	353	1	SFEI	1999	SJD
Paradise Cut	Largemouth Bass	.58	.	329	1	SFEI	1999	SJD
Paradise Cut	Largemouth Bass	.61	.	379	1	SFEI	1999	SJD
Paradise Cut	Largemouth Bass	.64	.	380	1	SFEI	1999	SJD
Paradise Cut	Largemouth Bass	.85	.	480	1	SFEI	1999	SJD
Paradise Cut	Largemouth Bass	.91	.	485	1	SFEI	1999	SJD
Paradise Cut	Largemouth Bass	1.05	.	380	1	SFEI	1999	SJD
Paradise Cut/Tracy	Largemouth Bass	.26	342	359	6	TSMP	1987	SJD
Paradise Cut/Tracy	Largemouth Bass	.68	364	382	5	TSMP	1999	SJD
Port of Stockton Turning Basin	Largemouth Bass	.31	.	386	1	SFEI	1999	CD
Port of Stockton Turning Basin	Largemouth Bass	.46	.	419	1	SFEI	1999	CD
Port of Stockton Turning Basin	Largemouth Bass	.47	.	376	1	SFEI	1999	CD
Port of Stockton Turning Basin	Largemouth Bass	.50	.	412	1	SFEI	1999	CD
Port of Stockton Turning Basin	Largemouth Bass	.61	.	382	1	SFEI	1999	CD
Port of Stockton Turning Basin	Largemouth Bass	.62	.	434	1	SFEI	1999	CD
Potato Slough	Largemouth Bass	.30	308	321	1	FMP	2005	CD
Potato Slough	Largemouth Bass	.31	374	387	1	FMP	2005	CD
Potato Slough	Largemouth Bass	.31	420	438	1	FMP	2005	CD
Potato Slough	Largemouth Bass	.35	461	482	1	FMP	2005	CD
Potato Slough	Largemouth Bass	.42	342	360	1	FMP	2005	CD
Potato Slough	Largemouth Bass	.44	401	414	1	FMP	2005	CD
Potato Slough	Largemouth Bass	.45	338	350	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Potato Slough	Largemouth Bass	.95	510	529	1	FMP	2005	CD
San Joaquin River at Crows Landing	Largemouth Bass	.18	296	316	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.25	341	355	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.30	290	305	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.31	303	316	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.31	309	321	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.36	344	364	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.38	310	336	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.40	317	389	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.42	402	419	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.45	384	402	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.54	445	463	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.62	441	461	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Largemouth Bass	.74	431	450	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Largemouth Bass	.33	309	324	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Largemouth Bass	.35	375	389	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Largemouth Bass	.36	303	324	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Largemouth Bass	.40	354	373	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Largemouth Bass	.40	378	396	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Largemouth Bass	.46	382	398	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Largemouth Bass	.51	427	439	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Largemouth Bass	.69	339	354	1	FMP	2005	SJR
San Joaquin River at Hwy 99	Largemouth Bass	.08	304	319	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Largemouth Bass	.08	321	336	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Largemouth Bass	.10	303	347	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Largemouth Bass	.10	359	375	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Largemouth Bass	.11	401	416	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Largemouth Bass	.12	304	324	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Largemouth Bass	.13	416	440	1	FMP	2005	SoSJR
San Joaquin River at Hwy	Largemouth	.14	404	424	1	FMP	2005	SoSJR

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
99	Bass							
San Joaquin River at Mossdale	Largemouth Bass	.24	351	368	1	FMP	2005	SJD
San Joaquin River at Mossdale	Largemouth Bass	.24	351	371	1	FMP	2005	SJD
San Joaquin River at Mossdale	Largemouth Bass	.26	353	369	1	FMP	2005	SJD
San Joaquin River at Mossdale	Largemouth Bass	.30	449	466	1	FMP	2005	SJD
San Joaquin River at Mossdale	Largemouth Bass	.36	415	436	1	FMP	2005	SJD
San Joaquin River at Mossdale	Largemouth Bass	.38	302	319	1	FMP	2005	SJD
San Joaquin River at Mossdale	Largemouth Bass	.50	452	476	1	FMP	2005	SJD
San Joaquin River at Patterson	Largemouth Bass	.27	307	321	1	FMP	2005	SJR
San Joaquin River at Patterson	Largemouth Bass	.33	311	334	1	FMP	2005	SJR
San Joaquin River at Patterson	Largemouth Bass	.34	371	390	1	FMP	2005	SJR
San Joaquin River at Patterson	Largemouth Bass	.39	424	441	1	FMP	2005	SJR
San Joaquin River at Patterson	Largemouth Bass	.42	300	322	1	FMP	2005	SJR
San Joaquin River at Patterson	Largemouth Bass	.42	441	462	1	FMP	2005	SJR
San Joaquin River at Patterson	Largemouth Bass	.43	403	416	1	FMP	2005	SJR
San Joaquin River at Patterson	Largemouth Bass	.78	507	531	1	FMP	2005	SJR
San Joaquin River at Vernalis	Largemouth Bass	.33	331	346	1	FMP	2005	SJD
San Joaquin River at Vernalis	Largemouth Bass	.35	342	360	1	FMP	2005	SJD
San Joaquin River at Vernalis	Largemouth Bass	.40	450	464	1	FMP	2005	SJD
San Joaquin River at Vernalis	Largemouth Bass	.47	339	460	1	FMP	2005	SJD
San Joaquin River at Vernalis	Largemouth Bass	.48	355	370	1	FMP	2005	SJD
San Joaquin River at Vernalis	Largemouth Bass	.55	345	350	1	FMP	2005	SJD
San Joaquin River at Vernalis	Largemouth Bass	.56	402	421	1	FMP	2005	SJD
San Joaquin River at Vernalis	Largemouth Bass	.58	477	499	1	FMP	2005	SJD
San Joaquin River at Vernalis	Largemouth Bass	.44	.	348	1	SFEI	2000	SJD
San Joaquin River at Vernalis	Largemouth Bass	.50	.	330	1	SFEI	2000	SJD
San Joaquin River at Vernalis	Largemouth Bass	.55	.	320	1	SFEI	2000	SJD
San Joaquin River at Vernalis	Largemouth Bass	.95	.	348	1	SFEI	2000	SJD
San Joaquin River at Vernalis	Largemouth Bass	1.10	.	450	1	SFEI	2000	SJD
San Joaquin River at Vernalis	Largemouth Bass	1.22	.	330	1	SFEI	2000	SJD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
San Joaquin River at Vernalis	Largemouth Bass	1.27	.	394	1	SFEI	2000	SJD
San Joaquin River at Vernalis	Largemouth Bass	1.40	.	530	1	SFEI	2000	SJD
San Joaquin River/around Bowman Road	Largemouth Bass	.75	.	387	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	Largemouth Bass	.81	.	339	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	Largemouth Bass	.84	.	420	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	Largemouth Bass	.87	.	414	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	Largemouth Bass	.96	.	417	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	Largemouth Bass	1.03	.	328	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	Largemouth Bass	1.05	.	381	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	Largemouth Bass	1.09	.	391	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	Largemouth Bass	1.12	.	364	1	SFEI	1999	SJD
San Joaquin River/around Turner Cut	Largemouth Bass	.20	.	311	1	SFEI	1999	CD
San Joaquin River/around Turner Cut	Largemouth Bass	.20	.	322	1	SFEI	1999	CD
San Joaquin River/around Turner Cut	Largemouth Bass	.22	.	318	1	SFEI	1999	CD
San Joaquin River/around Turner Cut	Largemouth Bass	.43	.	338	1	SFEI	1999	CD
San Joaquin River/around Turner Cut	Largemouth Bass	.49	.	380	1	SFEI	1999	CD
San Joaquin River/around Turner Cut	Largemouth Bass	.50	.	320	1	SFEI	1999	CD
San Joaquin River/around Turner Cut	Largemouth Bass	.52	.	380	1	SFEI	1999	CD
San Joaquin River/Crows Landing	Largemouth Bass	.58	.	382	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	Largemouth Bass	.66	.	393	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	Largemouth Bass	.67	.	379	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	Largemouth Bass	.68	.	345	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	Largemouth Bass	.83	.	408	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	Largemouth Bass	.84	.	380	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	Largemouth Bass	.91	.	413	1	SFEI	2000	SJR
San Joaquin River/d/s Turner Cut	Largemouth Bass	.37	336	353	5	TSMP	1999	CD
San Joaquin River/d/s Vernalis	Largemouth Bass	.61	.	305	1	SFEI	1999	SJD
San Joaquin River/d/s Vernalis	Largemouth Bass	.64	.	306	1	SFEI	1999	SJD
San Joaquin River/d/s Vernalis	Largemouth Bass	.74	.	339	1	SFEI	1999	SJD
San Joaquin River/d/s	Largemouth	.80	.	409	1	SFEI	1999	SJD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Vernalis	Bass							
San Joaquin River/d/s Vernalis	Largemouth Bass	1.03	.	418	1	SFEI	1999	SJD
San Joaquin River/Howard Road	Largemouth Bass	.96	338	355	5	TSMP	1999	SJD
San Joaquin River/Hwy 4	Largemouth Bass	.77	384	403	5	TSMP	1999	SJD
San Joaquin River/HWY 99	Largemouth Bass	.15	348	365	5	TSMP	2000	SoSJR
San Joaquin River/HWY 99	Largemouth Bass	.42	459	482	3	TSMP	2000	SoSJR
San Joaquin River/Lake Ramona	Largemouth Bass	.63	.	415	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	Largemouth Bass	.71	.	410	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	Largemouth Bass	.73	.	415	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	Largemouth Bass	.74	.	310	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	Largemouth Bass	.77	.	383	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	Largemouth Bass	.79	.	315	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	Largemouth Bass	1.08	.	426	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	Largemouth Bass	1.66	.	490	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	Largemouth Bass	.78	410	431	5	TSMP	1999	SJR
San Joaquin River/Landers Avenue	Largemouth Bass	.67	358	376	5	TSMP	1999	SJR
San Joaquin River/Mossdale	Largemouth Bass	.20	339	356	6	TSMP	1993	SJD
San Joaquin River/Naval Station	Largemouth Bass	.18	.	340	1	SFEI	2000	CD
San Joaquin River/Naval Station	Largemouth Bass	.23	.	310	1	SFEI	2000	CD
San Joaquin River/Naval Station	Largemouth Bass	.24	.	368	1	SFEI	2000	CD
San Joaquin River/Naval Station	Largemouth Bass	.27	.	350	1	SFEI	2000	CD
San Joaquin River/Naval Station	Largemouth Bass	.28	.	385	1	SFEI	2000	CD
San Joaquin River/Naval Station	Largemouth Bass	.36	.	358	1	SFEI	2000	CD
San Joaquin River/Naval Station	Largemouth Bass	.46	.	318	1	SFEI	2000	CD
San Joaquin River/Naval Station	Largemouth Bass	.57	.	338	1	SFEI	2000	CD
San Joaquin River/Naval Station	Largemouth Bass	.57	.	540	1	SFEI	2000	CD
San Joaquin River/North of Hwy 4	Largemouth Bass	.55	.	357	1	SFEI	1999	SJD
San Joaquin River/North of Hwy 4	Largemouth Bass	.60	.	438	1	SFEI	1999	SJD
San Joaquin River/North of Hwy 4	Largemouth Bass	.65	.	372	1	SFEI	1999	SJD
San Joaquin River/North of Hwy 4	Largemouth Bass	.76	.	315	1	SFEI	1999	SJD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
San Joaquin River/North of Hwy 4	Largemouth Bass	.86	.	370	1	SFEI	1999	SJD
San Joaquin River/North of Hwy 4	Largemouth Bass	.93	.	317	1	SFEI	1999	SJD
San Joaquin River/North of Hwy 4	Largemouth Bass	1.12	.	438	1	SFEI	1999	SJD
San Joaquin River/nr Potato Slough	Largemouth Bass	.24	.	340	1	SFEI	1999	CD
San Joaquin River/nr Potato Slough	Largemouth Bass	.26	.	314	1	SFEI	1999	CD
San Joaquin River/nr Potato Slough	Largemouth Bass	.26	.	322	1	SFEI	1999	CD
San Joaquin River/nr Potato Slough	Largemouth Bass	.30	.	333	1	SFEI	1999	CD
San Joaquin River/nr Potato Slough	Largemouth Bass	.33	.	321	1	SFEI	1999	CD
San Joaquin River/nr Potato Slough	Largemouth Bass	.39	.	380	1	SFEI	1999	CD
San Joaquin River/nr Potato Slough	Largemouth Bass	.41	.	360	1	SFEI	1999	CD
San Joaquin River/nr Potato Slough	Largemouth Bass	.47	.	399	1	SFEI	1999	CD
San Joaquin River/Potato Slough	Largemouth Bass	.20	.	355	1	SFEI	2000	CD
San Joaquin River/Potato Slough	Largemouth Bass	.24	.	358	1	SFEI	2000	CD
San Joaquin River/Potato Slough	Largemouth Bass	.37	.	339	1	SFEI	2000	CD
San Joaquin River/Potato Slough	Largemouth Bass	.40	.	387	1	SFEI	2000	CD
San Joaquin River/Potato Slough	Largemouth Bass	.44	.	366	1	SFEI	2000	CD
San Joaquin River/Potato Slough	Largemouth Bass	.76	.	360	1	SFEI	2000	CD
San Joaquin River/Potato Slough	Largemouth Bass	1.26	.	519	1	SFEI	2000	CD
San Joaquin River/Potato Slough	Largemouth Bass	.32	338	355	5	TSMP	1999	CD
San Joaquin River/Pt Antioch Fishing Pier	Largemouth Bass	.20	.	375	1	SFEI	1999	WD
San Joaquin River/Pt Antioch Fishing Pier	Largemouth Bass	.26	.	375	1	SFEI	1999	WD
San Joaquin River/Pt Antioch Fishing Pier	Largemouth Bass	.30	.	350	1	SFEI	1999	WD
San Joaquin River/Pt Antioch Fishing Pier	Largemouth Bass	.33	.	332	1	SFEI	1999	WD
San Joaquin River/Pt Antioch Fishing Pier	Largemouth Bass	.59	.	410	1	SFEI	1999	WD
San Joaquin River/San Luis Refuge	Largemouth Bass	.20	.	329	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Largemouth Bass	.34	.	305	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Largemouth Bass	.50	.	430	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Largemouth Bass	.70	.	340	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Largemouth Bass	.78	.	470	1	SFEI	2000	SJR
San Joaquin River/San Luis	Largemouth	.80	.	361	1	SFEI	2000	SJR

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Refuge	Bass							
San Joaquin River/San Luis Refuge	Largemouth Bass	.88	.	437	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Largemouth Bass	.93	.	374	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Largemouth Bass	.95	.	429	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Largemouth Bass	1.01	.	429	1	SFEI	2000	SJR
San Joaquin River/Vernalis	Largemouth Bass	.32	342	359	3	TSMP	1990	SJD
San Joaquin River/Vernalis	Largemouth Bass	.76	355	373	5	TSMP	1999	SJD
Sand Mound Slough	Largemouth Bass	.13	351	368	1	FMP	2005	WD
Sand Mound Slough	Largemouth Bass	.16	316	328	1	FMP	2005	WD
Sand Mound Slough	Largemouth Bass	.20	327	338	1	FMP	2005	WD
Sand Mound Slough	Largemouth Bass	.20	359	373	1	FMP	2005	WD
Sand Mound Slough	Largemouth Bass	.27	317	329	1	FMP	2005	WD
Sand Mound Slough	Largemouth Bass	.33	395	406	1	FMP	2005	WD
Sand Mound Slough	Largemouth Bass	.42	389	400	1	FMP	2005	WD
Sand Mound Slough	Largemouth Bass	.23	.	353	1	SFEI	1999	WD
Sand Mound Slough	Largemouth Bass	.27	.	369	1	SFEI	1999	WD
Sand Mound Slough	Largemouth Bass	.28	.	333	1	SFEI	1999	WD
Sand Mound Slough	Largemouth Bass	.42	.	421	1	SFEI	1999	WD
Sand Mound Slough	Largemouth Bass	.59	.	535	1	SFEI	1999	WD
Sand Mound Slough	Largemouth Bass	.64	.	470	1	SFEI	1999	WD
Sand Mound Slough	Largemouth Bass	.70	.	397	1	SFEI	1999	WD
Sherman Island	Largemouth Bass	.18	.	316	1	SFEI	2000	WD
Sherman Island	Largemouth Bass	.26	.	380	1	SFEI	2000	WD
Sherman Island	Largemouth Bass	.27	.	305	1	SFEI	2000	WD
Sherman Island	Largemouth Bass	.29	.	348	1	SFEI	2000	WD
Sherman Island	Largemouth Bass	.37	.	358	1	SFEI	2000	WD
Sherman Island	Largemouth Bass	.42	.	395	1	SFEI	2000	WD
Sherman Island	Largemouth Bass	.46	.	386	1	SFEI	2000	WD
Sherman Island	Largemouth Bass	.48	.	382	1	SFEI	2000	WD
Smith Canal	Largemouth Bass	.12	329	331	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Smith Canal	Largemouth Bass	.17	407	426	1	FMP	2005	CD
Smith Canal	Largemouth Bass	.19	473	494	1	FMP	2005	CD
Smith Canal	Largemouth Bass	.21	406	429	1	FMP	2005	CD
Smith Canal	Largemouth Bass	.24	366	385	1	FMP	2005	CD
Smith Canal	Largemouth Bass	.77	547	579	1	FMP	2005	CD
Smith Canal/Yosemite Park	Largemouth Bass	.06	.	330	1	SFEI	1999	CD
Smith Canal/Yosemite Park	Largemouth Bass	.10	.	326	1	SFEI	1999	CD
Smith Canal/Yosemite Park	Largemouth Bass	.16	.	376	1	SFEI	1999	CD
Smith Canal/Yosemite Park	Largemouth Bass	.23	.	332	1	SFEI	1999	CD
Smith Canal/Yosemite Park	Largemouth Bass	.38	.	429	1	SFEI	1999	CD
Smith Canal/Yosemite Park	Largemouth Bass	.42	.	363	1	SFEI	1999	CD
Smith Canal/Yosemite Park	Largemouth Bass	.49	.	436	1	SFEI	1999	CD
Smith Canal/Yosemite Park	Largemouth Bass	.33	387	406	5	TSMP	1999	CD
Stockton Deep Water Channel	Largemouth Bass	.49	399	419	5	TSMP	1999	CD
Taylor Slough	Largemouth Bass	.13	298	308	1	FMP	2005	WD
Taylor Slough	Largemouth Bass	.17	320	333	1	FMP	2005	WD
Taylor Slough	Largemouth Bass	.19	360	375	1	FMP	2005	WD
Taylor Slough	Largemouth Bass	.19	380	400	1	FMP	2005	WD
Taylor Slough	Largemouth Bass	.21	390	406	1	FMP	2005	WD
Taylor Slough	Largemouth Bass	.25	390	408	1	FMP	2005	WD
Taylor Slough	Largemouth Bass	.39	340	356	1	FMP	2005	WD
Werner Dredger Cut	Largemouth Bass	.14	305	318	1	FMP	2005	CD
Werner Dredger Cut	Largemouth Bass	.15	314	327	1	FMP	2005	CD
Werner Dredger Cut	Largemouth Bass	.19	315	329	1	FMP	2005	CD
Werner Dredger Cut	Largemouth Bass	.30	432	450	1	FMP	2005	CD
Whiskey Slough	Largemouth Bass	.11	295	306	1	FMP	2005	CD
Whiskey Slough	Largemouth Bass	.11	404	420	1	FMP	2005	CD
Whiskey Slough	Largemouth Bass	.14	368	377	1	FMP	2005	CD
Whiskey Slough	Largemouth Bass	.17	413	431	1	FMP	2005	CD
Whiskey Slough	Largemouth	.18	318	327	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
	Bass							
White Slough	Largemouth Bass	.13	.	407	1	SFEI	2000	CD
White Slough	Largemouth Bass	.20	.	331	1	SFEI	2000	CD
White Slough	Largemouth Bass	.20	.	370	1	SFEI	2000	CD
White Slough	Largemouth Bass	.21	.	395	1	SFEI	2000	CD
White Slough	Largemouth Bass	.24	.	446	1	SFEI	2000	CD
White Slough	Largemouth Bass	.30	.	342	1	SFEI	2000	CD
White Slough	Largemouth Bass	.36	.	475	1	SFEI	2000	CD
White Slough	Largemouth Bass	.46	.	395	1	SFEI	2000	CD
White Slough/d/s Disappointment Slough	Largemouth Bass	.31	.	343	1	SFEI	1999	CD
White Slough/d/s Disappointment Slough	Largemouth Bass	.32	.	388	1	SFEI	1999	CD
White Slough/d/s Disappointment Slough	Largemouth Bass	.37	.	388	1	SFEI	1999	CD
White Slough/d/s Disappointment Slough	Largemouth Bass	.40	.	321	1	SFEI	1999	CD
White Slough/d/s Disappointment Slough	Largemouth Bass	.43	.	396	1	SFEI	1999	CD
White Slough/d/s Disappointment Slough	Largemouth Bass	.49	.	385	1	SFEI	1999	CD
White Slough/d/s Disappointment Slough	Largemouth Bass	.51	.	429	1	SFEI	1999	CD
White Slough/d/s Disappointment Slough	Largemouth Bass	.54	.	438	1	SFEI	1999	CD
White Slough/Lodi	Largemouth Bass	.13	.	313	1	SFEI	1999	CD
White Slough/Lodi	Largemouth Bass	.15	.	365	1	SFEI	1999	CD
White Slough/Lodi	Largemouth Bass	.22	.	350	1	SFEI	1999	CD
White Slough/Lodi	Largemouth Bass	.29	.	379	1	SFEI	1999	CD
White Slough/Lodi	Largemouth Bass	.33	.	400	1	SFEI	1999	CD
White Slough/Lodi	Largemouth Bass	.35	.	372	1	SFEI	1999	CD
White Slough/Lodi	Largemouth Bass	.44	.	491	1	SFEI	1999	CD
White Slough/Lodi	Largemouth Bass	.63	.	432	1	SFEI	1999	CD
White Slough/Lodi	Largemouth Bass	.34	383	402	5	TSMP	1999	CD
Franks Tract/Washington Cut	Red Swamp crayfish	.04	.	49	1	UCD	1998	CD
Franks Tract/Washington Cut	Red Swamp crayfish	.04	.	52	1	UCD	1998	CD
Franks Tract/Washington Cut	Red Swamp crayfish	.05	.	48	1	UCD	1998	CD
Franks Tract/Washington Cut	Red Swamp crayfish	.05	.	50	1	UCD	1998	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Mandeville Tip (upper)	Red Swamp crayfish	.05	.	46	1	UCD	1998	CD
Marsh Creek/Big Break	Red Swamp crayfish	.02	.	29	1	UCD	1998	WD
Marsh Creek/Big Break	Red Swamp crayfish	.04	.	49	1	UCD	1998	WD
Middle River/Woodward Island	Red Swamp crayfish	.05	.	47	1	UCD	1999	CD
Mildred Island	Red Swamp crayfish	.10	.	50	1	UCD	1998	CD
Sand Mound Slough	Red Swamp crayfish	.02	.	46	1	UCD	1998	WD
Sand Mound Slough	Red Swamp crayfish	.02	.	50	1	UCD	1998	WD
Sand Mound Slough	Red Swamp crayfish	.04	.	35	1	UCD	1998	WD
Sand Mound Slough	Red Swamp crayfish	.04	.	41	1	UCD	1998	WD
Sand Mound Slough	Red Swamp crayfish	.06	.	46	1	UCD	1998	WD
Sand Mound Slough	Red Swamp crayfish	.06	.	48	1	UCD	1998	WD
Sand Mound Slough	Red Swamp crayfish	.08	.	44	1	UCD	1998	WD
Sherman Island	Red Swamp crayfish	.04	.	31	1	UCD	1998	WD
Sherman Island	Red Swamp crayfish	.04	.	53	1	UCD	1999	WD
Sherman Island	Red Swamp crayfish	.06	.	53	1	UCD	1998	WD
Sherman Island	Red Swamp crayfish	.13	.	50	1	UCD	1998	WD
Venice Cut	Red Swamp crayfish	.02	.	42	1	UCD	1998	CD
Venice Cut	Red Swamp crayfish	.02	.	42	1	UCD	1998	CD
Venice Cut	Red Swamp crayfish	.02	.	42	1	UCD	1998	CD
Venice Cut	Red Swamp crayfish	.02	.	42	1	UCD	1998	CD
Venice Cut	Red Swamp crayfish	.03	.	49	1	UCD	1998	CD
Venice Cut	Red Swamp crayfish	.04	.	45	1	UCD	1998	CD
Venice Cut	Red Swamp crayfish	.04	.	61	1	UCD	1998	CD
Venice Cut	Red Swamp crayfish	.05	.	52	1	UCD	1999	CD
Big Break	Redear Sunfish	.06	180	185	1	FMP	2005	WD
Big Break	Redear Sunfish	.06	192	203	1	FMP	2005	WD
Big Break	Redear Sunfish	.07	216	225	1	FMP	2005	WD
Big Break	Redear Sunfish	.08	181	189	1	FMP	2005	WD
Big Break	Redear Sunfish	.09	217	223	1	FMP	2005	WD
Calaveras River	Redear Sunfish	.03	198	206	1	FMP	2005	CD
Calaveras River	Redear Sunfish	.04	165	175	1	FMP	2005	CD
Calaveras River	Redear Sunfish	.05	166	173	1	FMP	2005	CD
Calaveras River	Redear Sunfish	.07	198	203	1	FMP	2005	CD
Calaveras River	Redear Sunfish	.09	190	199	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Discovery Bay	Redear Sunfish	.07	208	217	1	FMP	2005	CD
Discovery Bay	Redear Sunfish	.07	206	219	1	FMP	2005	CD
Discovery Bay	Redear Sunfish	.09	230	243	1	FMP	2005	CD
Discovery Bay	Redear Sunfish	.11	234	245	1	FMP	2005	CD
Discovery Bay	Redear Sunfish	.16	209	219	1	FMP	2005	CD
Franks Tract	Redear Sunfish	.02	147	154	1	FMP	2005	CD
Franks Tract	Redear Sunfish	.04	155	164	1	FMP	2005	CD
Franks Tract	Redear Sunfish	.05	157	165	1	FMP	2005	CD
Franks Tract	Redear Sunfish	.08	178	185	1	FMP	2005	CD
Franks Tract	Redear Sunfish	.11	190	200	1	FMP	2005	CD
Honker Cut	Redear Sunfish	.02	132	140	1	FMP	2005	CD
Honker Cut	Redear Sunfish	.03	130	139	1	FMP	2005	CD
Honker Cut	Redear Sunfish	.03	140	149	1	FMP	2005	CD
Honker Cut	Redear Sunfish	.04	139	146	1	FMP	2005	CD
Honker Cut	Redear Sunfish	.05	162	169	1	FMP	2005	CD
Italian Slough	Redear Sunfish	.06	174	186	1	FMP	2005	CD
Italian Slough	Redear Sunfish	.07	176	186	1	FMP	2005	CD
Italian Slough	Redear Sunfish	.07	191	200	1	FMP	2005	CD
Italian Slough	Redear Sunfish	.11	173	185	1	FMP	2005	CD
Italian Slough	Redear Sunfish	.38	204	219	1	FMP	2005	CD
Mendota Pool/Mendota Slough	Redear Sunfish	.02	178	189	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Redear Sunfish	.07	182	194	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Redear Sunfish	.08	185	197	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Redear Sunfish	.09	183	193	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Redear Sunfish	.09	217	231	1	FMP	2005	SoSJR
Mendota Pool/Mendota Slough	Redear Sunfish	.15	205	214	1	FMP	2005	SoSJR
Middle River at Bullfrog	Redear Sunfish	.10	210	219	1	FMP	2005	CD
Middle River at Bullfrog	Redear Sunfish	.11	219	230	1	FMP	2005	CD
Middle River at Bullfrog	Redear Sunfish	.12	210	220	1	FMP	2005	CD
Middle River at Bullfrog	Redear Sunfish	.16	215	225	1	FMP	2005	CD
Middle River at Bullfrog	Redear Sunfish	.19	225	230	1	FMP	2005	CD
Middle River at Bullfrog	Redear Sunfish	.10	.	210	4	SFEI	1999	CD
Middle River at Hwy 4	Redear Sunfish	.07	172	184	1	FMP	2005	CD
Middle River at Hwy 4	Redear Sunfish	.07	194	203	1	FMP	2005	CD
Middle River at Hwy 4	Redear Sunfish	.09	174	181	1	FMP	2005	CD
Middle River at Hwy 4	Redear Sunfish	.13	202	215	1	FMP	2005	CD
Middle River at Hwy 4	Redear Sunfish	.15	202	209	1	FMP	2005	CD
Middle River at Mildred Island	Redear Sunfish	.03	148	152	1	FMP	2005	CD
Middle River at Mildred Island	Redear Sunfish	.03	149	156	1	FMP	2005	CD
Middle River at Mildred Island	Redear Sunfish	.05	184	195	1	FMP	2005	CD
Middle River at Mildred Island	Redear Sunfish	.06	172	178	1	FMP	2005	CD
Middle River at Mildred Island	Redear Sunfish	.07	186	190	1	FMP	2005	CD
Middle River at Mildred Island	Redear Sunfish	.09	190	200	1	FMP	2005	CD
Mildred Island	Redear Sunfish	.08	.	173	3	SFEI	2000	CD
Old River	Redear Sunfish	.09	181	190	8	TSMP	1987	CD
Old River	Redear Sunfish	.10	180	189	9	TSMP	1987	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Old River at Tracy Blvd.	Redear Sunfish	.03	193	204	1	FMP	2005	SJD
Old River at Tracy Blvd.	Redear Sunfish	.04	164	176	1	FMP	2005	SJD
Old River at Tracy Blvd.	Redear Sunfish	.04	173	181	1	FMP	2005	SJD
Old River at Tracy Blvd.	Redear Sunfish	.04	180	193	1	FMP	2005	SJD
Old River at Tracy Blvd.	Redear Sunfish	.05	168	179	1	FMP	2005	SJD
Old River/nr Paradise Cut	Redear Sunfish	.11	.	197	5	SFEI	1999	SJD
Paradise Cut	Redear Sunfish	.04	199	211	1	FMP	2005	SJD
Paradise Cut	Redear Sunfish	.05	192	202	1	FMP	2005	SJD
Paradise Cut	Redear Sunfish	.05	197	209	1	FMP	2005	SJD
Paradise Cut	Redear Sunfish	.05	209	221	1	FMP	2005	SJD
Paradise Cut	Redear Sunfish	.14	255	266	1	FMP	2005	SJD
Potato Slough	Redear Sunfish	.03	166	176	1	FMP	2005	CD
Potato Slough	Redear Sunfish	.04	146	154	1	FMP	2005	CD
Potato Slough	Redear Sunfish	.04	164	174	1	FMP	2005	CD
Potato Slough	Redear Sunfish	.04	166	176	1	FMP	2005	CD
Potato Slough	Redear Sunfish	.05	145	155	1	FMP	2005	CD
San Joaquin River at Crows Landing	Redear Sunfish	.06	144	155	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Redear Sunfish	.06	161	172	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Redear Sunfish	.10	174	186	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Redear Sunfish	.11	185	196	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Redear Sunfish	.17	189	200	1	FMP	2005	SJR
San Joaquin River at Hwy 99	Redear Sunfish	.03	136	144	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Redear Sunfish	.04	150	155	1	FMP	2005	SoSJR
San Joaquin River at Hwy 99	Redear Sunfish	.04	156	165	1	FMP	2005	SoSJR
San Joaquin River at Laird Park	Redear Sunfish	.06	173	182	1	FMP	2005	SJR
San Joaquin River at Laird Park	Redear Sunfish	.07	179	188	1	FMP	2005	SJR
San Joaquin River at Laird Park	Redear Sunfish	.07	187	196	1	FMP	2005	SJR
San Joaquin River at Laird Park	Redear Sunfish	.12	199	211	1	FMP	2005	SJR
San Joaquin River at Laird Park	Redear Sunfish	.13	181	189	1	FMP	2005	SJR
San Joaquin River at Mossdale	Redear Sunfish	.06	207	219	1	FMP	2005	SJD
San Joaquin River at Mossdale	Redear Sunfish	.11	222	232	1	FMP	2005	SJD
San Joaquin River at Mossdale	Redear Sunfish	.12	221	234	1	FMP	2005	SJD
San Joaquin River at Mossdale	Redear Sunfish	.13	224	236	1	FMP	2005	SJD
San Joaquin River at Mossdale	Redear Sunfish	.17	214	224	1	FMP	2005	SJD
San Joaquin River at Patterson	Redear Sunfish	.06	154	164	1	FMP	2005	SJR
San Joaquin River at Patterson	Redear Sunfish	.07	172	182	1	FMP	2005	SJR
San Joaquin River at Patterson	Redear Sunfish	.07	171	184	1	FMP	2005	SJR

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
San Joaquin River at Patterson	Redear Sunfish	.08	168	176	1	FMP	2005	SJR
San Joaquin River at Patterson	Redear Sunfish	.10	196	219	1	FMP	2005	SJR
San Joaquin River at Vernalis	Redear Sunfish	.05	170	182	1	FMP	2005	SJD
San Joaquin River at Vernalis	Redear Sunfish	.12	186	197	1	FMP	2005	SJD
San Joaquin River at Vernalis	Redear Sunfish	.13	154	163	1	FMP	2005	SJD
San Joaquin River at Vernalis	Redear Sunfish	.15	200	211	1	FMP	2005	SJD
San Joaquin River at Vernalis	Redear Sunfish	.16	188	200	1	FMP	2005	SJD
San Joaquin River at Vernalis	Redear Sunfish	.09	.	139	5	SFEI	2000	SJD
San Joaquin River/around Bowman Road	Redear Sunfish	.09	.	175	5	SFEI	1999	SJD
San Joaquin River/around Turner Cut	Redear Sunfish	.10	.	195	5	SFEI	1999	CD
San Joaquin River/Crows Landing	Redear Sunfish	.11	.	170	5	SFEI	2000	SJR
San Joaquin River/Crows Landing	Redear Sunfish	.12	.	161	5	SFEI	2000	SJR
San Joaquin River/d/s Vernalis	Redear Sunfish	.18	.	191	5	SFEI	1999	SJD
San Joaquin River/Lake Ramona	Redear Sunfish	.19	.	164	5	SFEI	1999	SJR
San Joaquin River/Naval Station	Redear Sunfish	.10	.	200	5	SFEI	2000	CD
San Joaquin River/Naval Station	Redear Sunfish	.10	.	202	5	SFEI	2000	CD
San Joaquin River/Potato Slough	Redear Sunfish	.11	.	220	4	SFEI	2000	CD
Sand Mound Slough	Redear Sunfish	.03	165	173	1	FMP	2005	WD
Sand Mound Slough	Redear Sunfish	.05	157	166	1	FMP	2005	WD
Sand Mound Slough	Redear Sunfish	.05	162	170	1	FMP	2005	WD
Sand Mound Slough	Redear Sunfish	.05	175	186	1	FMP	2005	WD
Sand Mound Slough	Redear Sunfish	.06	172	180	1	FMP	2005	WD
Sand Mound Slough	Redear Sunfish	.08	.	189	5	SFEI	1999	WD
Smith Canal	Redear Sunfish	.04	176	190	1	FMP	2005	CD
Smith Canal	Redear Sunfish	.04	178	192	1	FMP	2005	CD
Smith Canal	Redear Sunfish	.05	173	182	1	FMP	2005	CD
Smith Canal	Redear Sunfish	.05	174	185	1	FMP	2005	CD
Smith Canal	Redear Sunfish	.07	179	191	1	FMP	2005	CD
Taylor Slough	Redear Sunfish	.03	153	161	1	FMP	2005	WD
Taylor Slough	Redear Sunfish	.03	176	184	1	FMP	2005	WD
Taylor Slough	Redear Sunfish	.04	154	165	1	FMP	2005	WD
Taylor Slough	Redear Sunfish	.04	189	200	1	FMP	2005	WD
Taylor Slough	Redear Sunfish	.05	182	191	1	FMP	2005	WD
Werner Dredger Cut	Redear Sunfish	.04	158	168	1	FMP	2005	CD
Werner Dredger Cut	Redear Sunfish	.07	193	204	1	FMP	2005	CD
Werner Dredger Cut	Redear Sunfish	.08	189	198	1	FMP	2005	CD
Werner Dredger Cut	Redear Sunfish	.10	182	193	1	FMP	2005	CD
Werner Dredger Cut	Redear Sunfish	.11	187	197	1	FMP	2005	CD
Whiskey Slough	Redear Sunfish	.01	121	130	1	FMP	2005	CD
Whiskey Slough	Redear Sunfish	.01	123	131	1	FMP	2005	CD
Whiskey Slough	Redear Sunfish	.02	141	148	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Whiskey Slough	Redear Sunfish	.03	186	193	1	FMP	2005	CD
White Slough	Redear Sunfish	.06	.	171	5	SFEI	2000	CD
White Slough	Redear Sunfish	.06	.	197	5	SFEI	2000	CD
White Slough/Lodi	Redear Sunfish	.03	.	179	5	SFEI	1999	CD
San Joaquin River/d/s Vernalis	Sacramento Blackfish	.04	.	248	5	SFEI	1999	SJD
Franks Tract	Sacramento Perch	.07	164	173	1	FMP	2005	CD
Franks Tract	Sacramento Perch	.08	157	166	1	FMP	2005	CD
Franks Tract	Sacramento Perch	.09	161	169	1	FMP	2005	CD
Franks Tract	Sacramento Perch	.12	176	185	1	FMP	2005	CD
San Joaquin River/North of Hwy 4	Sacramento Pikeminnow	.03	.	259	3	SFEI	1999	SJD
San Joaquin River/Pt Antioch Fishing Pier	Sacramento Pikeminnow	.12	.	274	3	SFEI	1999	WD
San Joaquin River/San Luis Refuge	Sacramento Pikeminnow	.04	.	459	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Sacramento Pikeminnow	.06	.	386	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Sacramento Pikeminnow	.08	.	460	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Sacramento Pikeminnow	.13	.	415	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	Sacramento Pikeminnow	.21	.	468	1	SFEI	2000	SJR
San Joaquin River/Twitchell Island	Sacramento Pikeminnow	.25	525	578	1	TSMP	1984	CD
Big Break	Sacramento Sucker	.21	415	436	1	FMP	2005	WD
Big Break	Sacramento Sucker	.27	441	464	1	FMP	2005	WD
Big Break	Sacramento Sucker	.32	400	430	1	FMP	2005	WD
Big Break	Sacramento Sucker	.39	465	500	1	FMP	2005	WD
Potato Slough	Sacramento Sucker	.23	465	495	1	FMP	2005	CD
Potato Slough	Sacramento Sucker	.30	452	484	1	FMP	2005	CD
Potato Slough	Sacramento Sucker	.30	465	486	1	FMP	2005	CD
Potato Slough	Sacramento Sucker	.33	435	458	1	FMP	2005	CD
San Joaquin River at Crows Landing	Sacramento Sucker	.09	239	249	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Sacramento Sucker	.10	256	266	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Sacramento Sucker	.15	331	352	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Sacramento Sucker	.15	365	383	1	FMP	2005	SJR
San Joaquin River at Crows Landing	Sacramento Sucker	.27	500	528	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	Sacramento Sucker	.13	296	312	1	FMP	2005	SJR
San Joaquin River at	Sacramento	.28	463	494	1	FMP	2005	SJR

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Patterson	Sucker							
San Joaquin River at Vernalis	Sacramento Sucker	.18	379	399	1	FMP	2005	SJD
San Joaquin River at Vernalis	Sacramento Sucker	.30	437	441	1	FMP	2005	SJD
San Joaquin River at Vernalis	Sacramento Sucker	.41	469	500	1	FMP	2005	SJD
San Joaquin River at Vernalis	Sacramento Sucker	.42	488	510	1	FMP	2005	SJD
San Joaquin River at Vernalis	Sacramento Sucker	.43	453	479	1	FMP	2005	SJD
San Joaquin River at Vernalis	Sacramento Sucker	.55	470	498	1	FMP	2005	SJD
San Joaquin River/Pt Antioch Fishing Pier	Sacramento Sucker	.15	.	440	4	SFEI	1999	WD
Taylor Slough	Sacramento Sucker	.27	490	510	1	FMP	2005	WD
Taylor Slough	Sacramento Sucker	.33	477	498	1	FMP	2005	WD
Taylor Slough	Sacramento Sucker	.39	485	511	1	FMP	2005	WD
Clifton Court Forebay	Signal crayfish	.00	.	159	1	SFEI	2001	CD
Clifton Court Forebay	Signal crayfish	.00	.	185	1	SFEI	2001	CD
Franks Tract	Signal crayfish	.05	.	52	5	TSMP	1991	CD
Franks Tract	Signal crayfish	.06	.	59	5	TSMP	1991	CD
Franks Tract	Signal crayfish	.07	.	58	5	TSMP	1991	CD
Franks Tract/Northeast Side	Signal crayfish	.08	.	40	1	UCD	1999	CD
Franks Tract/Northeast Side	Signal crayfish	.14	.	41	1	UCD	1998	CD
Franks Tract/Northeast Side	Signal crayfish	.14	.	42	1	UCD	1999	CD
Franks Tract/Northeast Side	Signal crayfish	.15	.	48	1	UCD	1998	CD
Franks Tract/Northeast Side	Signal crayfish	.15	.	52	1	UCD	1999	CD
Franks Tract/Northeast Side	Signal crayfish	.17	.	47	1	UCD	1998	CD
Franks Tract/Northeast Side	Signal crayfish	.17	.	50	1	UCD	1998	CD
Franks Tract/Northeast Side	Signal crayfish	.18	.	49	1	UCD	1998	CD
Franks Tract/Northeast Side	Signal crayfish	.20	.	47	1	UCD	1998	CD
Franks Tract/Northeast Side	Signal crayfish	.22	.	36	1	UCD	1998	CD
Franks Tract/Northeast Side	Signal crayfish	.27	.	55	1	UCD	1998	CD
Franks Tract/Northeast Side	Signal crayfish	.30	.	41	1	UCD	1998	CD
Franks Tract/Northeast Side	Signal crayfish	.42	.	60	1	UCD	1998	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.04	.	47	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.05	.	40	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.05	.	43	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.06	.	44	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.06	.	52	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.07	.	55	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.08	.	42	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.08	.	42	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.08	.	46	1	UCD	1999	CD
Headreach Island/North	Signal crayfish	.08	.	48	1	UCD	1999	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Side (deep water channel)								
Headreach Island/North Side (deep water channel)	Signal crayfish	.09	.	43	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.09	.	45	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.10	.	39	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.23	.	59	1	UCD	1999	CD
Headreach Island/North Side (deep water channel)	Signal crayfish	.25	.	52	1	UCD	1999	CD
Holland Cut	Signal crayfish	.05	.	38	1	UCD	1999	CD
Holland Cut	Signal crayfish	.06	.	46	1	UCD	1999	CD
Holland Cut	Signal crayfish	.06	.	47	1	UCD	1999	CD
Holland Cut	Signal crayfish	.06	.	55	1	UCD	1999	CD
Holland Cut	Signal crayfish	.07	.	49	1	UCD	1999	CD
Holland Cut	Signal crayfish	.07	.	49	1	UCD	1999	CD
Holland Cut	Signal crayfish	.08	.	50	1	UCD	1999	CD
Holland Cut	Signal crayfish	.08	.	52	1	UCD	1999	CD
Holland Cut	Signal crayfish	.08	.	52	1	UCD	1999	CD
Holland Cut	Signal crayfish	.09	.	53	1	UCD	1999	CD
Holland Cut	Signal crayfish	.09	.	60	1	UCD	1999	CD
Holland Cut	Signal crayfish	.12	.	52	1	UCD	1999	CD
Holland Cut	Signal crayfish	.18	.	64	1	UCD	1999	CD
Holland Cut	Signal crayfish	.20	.	61	1	UCD	1999	CD
Holland Cut	Signal crayfish	.20	.	70	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.07	.	47	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.08	.	51	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.09	.	49	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.09	.	54	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.13	.	63	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.15	.	54	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.15	.	55	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.16	.	49	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.16	.	57	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.17	.	52	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.17	.	57	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.18	.	62	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.23	.	63	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.28	.	61	1	UCD	1999	CD
Mandeville Tip (lower)/channel to east	Signal crayfish	.29	.	65	1	UCD	1999	CD
Mandeville Tip (upper)	Signal crayfish	.18	.	47	1	UCD	1998	CD
Mandeville Tip (upper)	Signal crayfish	.24	.	62	1	UCD	1998	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Mandeville Tip (upper)	Signal crayfish	.30	.	51	1	UCD	1998	CD
Mandeville Tip (upper)	Signal crayfish	.72	.	64	1	UCD	1998	CD
San Joaquin River/d/s Sevenmile Slough	Signal crayfish	.11	.	45	1	UCD	1999	CD
San Joaquin River/d/s Sevenmile Slough	Signal crayfish	.12	.	46	1	UCD	1999	CD
San Joaquin River/d/s Sevenmile Slough	Signal crayfish	.14	.	39	1	UCD	1999	CD
San Joaquin River/d/s Sevenmile Slough	Signal crayfish	.14	.	40	1	UCD	1999	CD
San Joaquin River/d/s Sevenmile Slough	Signal crayfish	.14	.	47	1	UCD	1999	CD
San Joaquin River/d/s Sevenmile Slough	Signal crayfish	.16	.	47	1	UCD	1999	CD
San Joaquin River/d/s Sevenmile Slough	Signal crayfish	.21	.	47	1	UCD	1999	CD
San Joaquin River/d/s Sevenmile Slough	Signal crayfish	.27	.	55	1	UCD	1999	CD
San Joaquin River/d/s Sevenmile Slough	Signal crayfish	.38	.	48	1	UCD	1999	CD
San Joaquin River/d/s Sevenmile Slough	Signal crayfish	.62	.	56	1	UCD	1999	CD
San Joaquin River/Gallagher Slough	Signal crayfish	.06	.	47	1	UCD	1999	WD
San Joaquin River/Gallagher Slough	Signal crayfish	.08	.	41	1	UCD	1999	WD
San Joaquin River/Gallagher Slough	Signal crayfish	.09	.	45	1	UCD	1999	WD
San Joaquin River/Gallagher Slough	Signal crayfish	.10	.	50	1	UCD	1999	WD
San Joaquin River/Gallagher Slough	Signal crayfish	.11	.	53	1	UCD	1999	WD
San Joaquin River/Gallagher Slough	Signal crayfish	.13	.	48	1	UCD	1999	WD
San Joaquin River/Gallagher Slough	Signal crayfish	.14	.	54	1	UCD	1999	WD
San Joaquin River/Gallagher Slough	Signal crayfish	.15	.	47	1	UCD	1999	WD
San Joaquin River/Gallagher Slough	Signal crayfish	.15	.	50	1	UCD	1999	WD
San Joaquin River/Gallagher Slough	Signal crayfish	.19	.	54	1	UCD	1999	WD
Venice Cut	Signal crayfish	.00	.	89	1	SFEI	2001	CD
Venice Cut	Signal crayfish	.00	.	102	1	SFEI	2001	CD
Venice Cut	Signal crayfish	.00	.	102	1	SFEI	2001	CD
Venice Cut	Signal crayfish	.00	.	106	1	SFEI	2001	CD
Venice Cut	Signal crayfish	.00	.	113	1	SFEI	2001	CD
Venice Cut	Signal crayfish	.00	.	114	1	SFEI	2001	CD
Venice Cut	Signal crayfish	.00	.	119	1	SFEI	2001	CD
Venice Cut	Signal crayfish	.00	.	121	1	SFEI	2001	CD
Venice Cut	Signal crayfish	.00	.	124	1	SFEI	2001	CD
Venice Cut	Signal crayfish	.00	.	126	1	SFEI	2001	CD
Paradise Cut	Striped Bass	.46	.	660	1	SFEI	1999	SJD
Port of Stockton Turning Basin	Striped Bass	.24	.	562	1	SFEI	1999	CD
Port of Stockton Turning Basin	Striped Bass	.54	.	827	1	SFEI	1999	CD
San Joaquin River at	Striped Bass	.88	580	625	1	FMP	2005	SJD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Vernalis								
San Joaquin River/around Bowman Road	Striped Bass	.30	.	715	1	SFEI	1999	SJD
San Joaquin River/d/s Vernalis	Striped Bass	.41	.	510	1	SFEI	1999	SJD
San Joaquin River/d/s Vernalis	Striped Bass	.60	.	845	1	SFEI	1999	SJD
San Joaquin River/d/s Vernalis	Striped Bass	1.63	.	627	1	SFEI	1999	SJD
San Joaquin River/Lake Ramona	Striped Bass	.46	.	457	1	SFEI	1999	SJR
San Joaquin River/Naval Station	Striped Bass	.20	.	533	1	SFEI	2000	CD
San Joaquin River/North of Hwy 4	Striped Bass	.20	.	458	1	SFEI	1999	SJD
San Joaquin River/North of Hwy 4	Striped Bass	.48	.	625	1	SFEI	1999	SJD
San Joaquin River/Potato Slough	Striped Bass	.17	.	567	1	SFEI	2000	CD
San Joaquin River/San Luis Refuge	Striped Bass	.49	.	544	1	SFEI	2000	SJR
Big Break	White Catfish	.11	321	340	1	FMP	2005	WD
Big Break	White Catfish	.16	267	285	1	FMP	2005	WD
Big Break	White Catfish	.16	272	286	1	FMP	2005	WD
Big Break	White Catfish	.19	289	308	1	FMP	2005	WD
Calaveras River	White Catfish	.06	257	278	1	FMP	2005	CD
Calaveras River	White Catfish	.07	217	231	1	FMP	2005	CD
Calaveras River	White Catfish	.07	249	267	1	FMP	2005	CD
Calaveras River	White Catfish	.07	254	271	1	FMP	2005	CD
Calaveras River	White Catfish	.07	260	278	1	FMP	2005	CD
Calaveras River	White Catfish	.08	220	239	1	FMP	2005	CD
Calaveras River	White Catfish	.12	240	261	1	FMP	2005	CD
Calaveras River	White Catfish	.13	238	253	1	FMP	2005	CD
Calaveras River	White Catfish	.17	253	270	1	FMP	2005	CD
Discovery Bay	White Catfish	.05	286	305	1	FMP	2005	CD
Discovery Bay	White Catfish	.05	304	326	1	FMP	2005	CD
Discovery Bay	White Catfish	.05	366	394	1	FMP	2005	CD
Discovery Bay	White Catfish	.11	239	259	1	FMP	2005	CD
Franks Tract	White Catfish	.03	436	404	1	FMP	2005	CD
Franks Tract	White Catfish	.05	320	346	1	FMP	2005	CD
Franks Tract	White Catfish	.06	350	372	1	FMP	2005	CD
Franks Tract	White Catfish	.09	295	315	1	FMP	2005	CD
Franks Tract	White Catfish	.09	335	351	1	FMP	2005	CD
Franks Tract	White Catfish	.10	460	491	1	FMP	2005	CD
Franks Tract	White Catfish	.11	287	304	1	FMP	2005	CD
Franks Tract	White Catfish	.13	297	319	1	FMP	2005	CD
Franks Tract	White Catfish	.17	230	246	1	FMP	2005	CD
Franks Tract	White Catfish	.17	288	310	1	FMP	2005	CD
Franks Tract	White Catfish	.22	492	530	1	FMP	2005	CD
Italian Slough	White Catfish	.05	361	385	1	FMP	2005	CD
Italian Slough	White Catfish	.07	311	331	1	FMP	2005	CD
Italian Slough	White Catfish	.09	220	238	1	FMP	2005	CD
Italian Slough	White Catfish	.09	259	274	1	FMP	2005	CD
Italian Slough	White Catfish	.12	232	252	1	FMP	2005	CD
Italian Slough	White Catfish	.23	229	246	1	FMP	2005	CD
Middle River at Bullfrog	White Catfish	.08	291	310	1	FMP	2005	CD
Middle River at Bullfrog	White Catfish	.11	290	300	1	FMP	2005	CD
Middle River at Bullfrog	White Catfish	.13	288	304	1	FMP	2005	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Middle River at Bullfrog	White Catfish	.16	236	250	1	FMP	2005	CD
Middle River at Bullfrog	White Catfish	.18	230	250	1	FMP	2005	CD
Middle River at Bullfrog	White Catfish	.22	223	229	1	FMP	2005	CD
Middle River at Bullfrog	White Catfish	.23	220	235	1	FMP	2005	CD
Middle River at Bullfrog	White Catfish	.29	215	228	1	FMP	2005	CD
Middle River at Hwy 4	White Catfish	.16	257	274	1	FMP	2005	CD
Middle River at Mildred Island	White Catfish	.15	230	251	1	FMP	2005	CD
Middle River at Mildred Island	White Catfish	.37	190	204	1	FMP	2005	CD
Old River at Tracy Blvd.	White Catfish	.07	266	286	1	FMP	2005	SJD
Old River at Tracy Blvd.	White Catfish	.09	250	271	1	FMP	2005	SJD
Old River at Tracy Blvd.	White Catfish	.09	267	289	1	FMP	2005	SJD
Old River at Tracy Blvd.	White Catfish	.10	272	292	1	FMP	2005	SJD
Old River at Tracy Blvd.	White Catfish	.11	291	309	1	FMP	2005	SJD
Old River at Tracy Blvd.	White Catfish	.12	289	311	1	FMP	2005	SJD
Old River at Tracy Blvd.	White Catfish	.13	299	322	1	FMP	2005	SJD
Old River at Tracy Blvd.	White Catfish	.13	327	346	1	FMP	2005	SJD
Old River at Tracy Blvd.	White Catfish	.14	257	280	1	FMP	2005	SJD
Old River/CV Pumps	White Catfish	.22	273	300	5	TSMP	1998	SJD
Old River/nr Paradise Cut	White Catfish	.10	.	360	1	SFEI	1999	SJD
Old River/nr Paradise Cut	White Catfish	.17	.	290	1	SFEI	1999	SJD
Old River/nr Paradise Cut	White Catfish	.17	.	319	1	SFEI	1999	SJD
Old River/nr Paradise Cut	White Catfish	.18	.	352	1	SFEI	1999	SJD
Old River/nr Paradise Cut	White Catfish	.24	.	315	1	SFEI	1999	SJD
Old River/nr Paradise Cut	White Catfish	.27	.	306	1	SFEI	1999	SJD
Old River/nr Paradise Cut	White Catfish	.32	.	284	1	SFEI	1999	SJD
Paradise Cut	White Catfish	.06	284	305	1	FMP	2005	SJD
Paradise Cut	White Catfish	.08	236	254	1	FMP	2005	SJD
Paradise Cut	White Catfish	.08	254	270	1	FMP	2005	SJD
Paradise Cut	White Catfish	.11	469	519	1	FMP	2005	SJD
Paradise Cut	White Catfish	.12	549	600	1	FMP	2005	SJD
Paradise Cut	White Catfish	.15	228	244	1	FMP	2005	SJD
Paradise Cut	White Catfish	.15	294	311	1	FMP	2005	SJD
Paradise Cut	White Catfish	.16	280	301	1	FMP	2005	SJD
Paradise Cut	White Catfish	.22	237	251	1	FMP	2005	SJD
Paradise Cut	White Catfish	.14	.	356	1	SFEI	1999	SJD
Paradise Cut	White Catfish	.30	.	298	1	SFEI	1999	SJD
Paradise Cut	White Catfish	.32	.	320	1	SFEI	1999	SJD
Paradise Cut	White Catfish	.33	.	283	1	SFEI	1999	SJD
Paradise Cut	White Catfish	.33	.	286	1	SFEI	1999	SJD
Paradise Cut	White Catfish	.42	.	265	1	SFEI	1999	SJD
Paradise Cut/Tracy	White Catfish	.20	259	285	6	TSMP	1986	SJD
Port of Stockton Turning Basin	White Catfish	.09	.	271	1	SFEI	1999	CD
Port of Stockton Turning Basin	White Catfish	.10	.	271	1	SFEI	1999	CD
Port of Stockton Turning Basin	White Catfish	.11	.	241	1	SFEI	1999	CD
Port of Stockton Turning Basin	White Catfish	.17	.	305	1	SFEI	1999	CD
Port of Stockton Turning Basin	White Catfish	.18	.	265	1	SFEI	1999	CD
Potato Slough	White Catfish	.13	307	327	1	FMP	2005	CD
San Joaquin River at Crows Landing	White Catfish	.19	239	249	1	FMP	2005	SJR
San Joaquin River at Crows Landing	White Catfish	.22	219	233	1	FMP	2005	SJR

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
San Joaquin River at Crows Landing	White Catfish	.30	210	225	1	FMP	2005	SJR
San Joaquin River at Crows Landing	White Catfish	.30	220	239	1	FMP	2005	SJR
San Joaquin River at Crows Landing	White Catfish	.38	540	583	1	FMP	2005	SJR
San Joaquin River at Crows Landing	White Catfish	.53	484	526	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	White Catfish	.24	210	224	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	White Catfish	.24	249	266	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	White Catfish	.26	192	200	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	White Catfish	.26	222	229	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	White Catfish	.29	189	201	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	White Catfish	.31	196	210	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	White Catfish	.32	237	256	1	FMP	2005	SJR
San Joaquin River at Fremont Ford	White Catfish	.33	239	254	1	FMP	2005	SJR
San Joaquin River at Laird Park	White Catfish	.13	572	624	1	FMP	2005	SJR
San Joaquin River at Laird Park	White Catfish	.20	210	226	1	FMP	2005	SJR
San Joaquin River at Laird Park	White Catfish	.27	229	243	1	FMP	2005	SJR
San Joaquin River at Laird Park	White Catfish	.30	219	234	1	FMP	2005	SJR
San Joaquin River at Laird Park	White Catfish	.31	230	246	1	FMP	2005	SJR
San Joaquin River at Laird Park	White Catfish	.35	218	231	1	FMP	2005	SJR
San Joaquin River at Laird Park	White Catfish	.40	216	229	1	FMP	2005	SJR
San Joaquin River at Laird Park	White Catfish	.44	212	229	1	FMP	2005	SJR
San Joaquin River at Mossdale	White Catfish	.14	243	262	1	FMP	2005	SJD
San Joaquin River at Mossdale	White Catfish	.14	253	269	1	FMP	2005	SJD
San Joaquin River at Mossdale	White Catfish	.15	263	279	1	FMP	2005	SJD
San Joaquin River at Mossdale	White Catfish	.16	259	274	1	FMP	2005	SJD
San Joaquin River at Mossdale	White Catfish	.17	227	243	1	FMP	2005	SJD
San Joaquin River at Mossdale	White Catfish	.17	243	256	1	FMP	2005	SJD
San Joaquin River at Mossdale	White Catfish	.26	206	221	1	FMP	2005	SJD
San Joaquin River at Mossdale	White Catfish	.27	233	250	1	FMP	2005	SJD
San Joaquin River at Mossdale	White Catfish	.45	250	276	1	FMP	2005	SJD
San Joaquin River at	White Catfish	.24	191	203	1	FMP	2005	SJR

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Patterson								
San Joaquin River at Patterson	White Catfish	.32	244	261	1	FMP	2005	SJR
San Joaquin River at Patterson	White Catfish	.44	207	221	1	FMP	2005	SJR
San Joaquin River at Vernalis	White Catfish	.13	236	253	1	FMP	2005	SJD
San Joaquin River at Vernalis	White Catfish	.14	252	265	1	FMP	2005	SJD
San Joaquin River at Vernalis	White Catfish	.18	196	205	1	FMP	2005	SJD
San Joaquin River at Vernalis	White Catfish	.18	260	273	1	FMP	2005	SJD
San Joaquin River at Vernalis	White Catfish	.22	540	598	1	FMP	2005	SJD
San Joaquin River at Vernalis	White Catfish	.24	222	240	1	FMP	2005	SJD
San Joaquin River at Vernalis	White Catfish	.24	464	504	1	FMP	2005	SJD
San Joaquin River at Vernalis	White Catfish	.29	244	256	1	FMP	2005	SJD
San Joaquin River at Vernalis	White Catfish	.32	519	555	1	FMP	2005	SJD
San Joaquin River at Vernalis	White Catfish	.35	224	235	1	FMP	2005	SJD
San Joaquin River at Vernalis	White Catfish	.37	230	240	1	FMP	2005	SJD
San Joaquin River/around Bowman Road	White Catfish	.15	.	242	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	White Catfish	.19	.	252	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	White Catfish	.24	.	274	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	White Catfish	.25	.	294	1	SFEI	1999	SJD
San Joaquin River/around Bowman Road	White Catfish	.31	.	253	1	SFEI	1999	SJD
San Joaquin River/Crows Landing	White Catfish	.22	.	230	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	White Catfish	.24	.	210	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	White Catfish	.31	.	236	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	White Catfish	.37	.	212	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	White Catfish	.42	.	232	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	White Catfish	.45	.	235	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	White Catfish	.45	.	250	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	White Catfish	.47	.	230	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	White Catfish	.49	.	210	1	SFEI	2000	SJR
San Joaquin River/Crows Landing	White Catfish	.50	.	237	1	SFEI	2000	SJR
San Joaquin River/d/s Vernalis	White Catfish	.51	.	621	1	SFEI	1999	SJD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
San Joaquin River/d/s Vernalis	White Catfish	1.27	.	587	1	SFEI	1999	SJD
San Joaquin River/Lake Ramona	White Catfish	.18	.	199	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	White Catfish	.36	.	246	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	White Catfish	.37	.	224	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	White Catfish	.40	.	222	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	White Catfish	.62	.	267	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	White Catfish	.94	.	625	1	SFEI	1999	SJR
San Joaquin River/Lake Ramona	White Catfish	1.01	.	780	1	SFEI	1999	SJR
San Joaquin River/Naval Station	White Catfish	.05	.	272	1	SFEI	2000	CD
San Joaquin River/Naval Station	White Catfish	.07	.	481	1	SFEI	2000	CD
San Joaquin River/Naval Station	White Catfish	.08	.	310	1	SFEI	2000	CD
San Joaquin River/Naval Station	White Catfish	.10	.	316	1	SFEI	2000	CD
San Joaquin River/Naval Station	White Catfish	.13	.	498	1	SFEI	2000	CD
San Joaquin River/Naval Station	White Catfish	.14	.	510	1	SFEI	2000	CD
San Joaquin River/Naval Station	White Catfish	.15	.	450	1	SFEI	2000	CD
San Joaquin River/Naval Station	White Catfish	.20	.	465	1	SFEI	2000	CD
San Joaquin River/Naval Station	White Catfish	.29	.	346	1	SFEI	2000	CD
San Joaquin River/Naval Station	White Catfish	.30	.	448	1	SFEI	2000	CD
San Joaquin River/North of Hwy 4	White Catfish	.27	.	246	1	SFEI	1999	SJD
San Joaquin River/North of Hwy 4	White Catfish	.30	.	270	1	SFEI	1999	SJD
San Joaquin River/North of Hwy 4	White Catfish	.41	.	248	1	SFEI	1999	SJD
San Joaquin River/North of Hwy 4	White Catfish	.47	.	285	1	SFEI	1999	SJD
San Joaquin River/San Luis Refuge	White Catfish	.15	.	210	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	White Catfish	.25	.	224	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	White Catfish	.29	.	221	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	White Catfish	.33	.	222	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	White Catfish	.36	.	219	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	White Catfish	.48	.	206	1	SFEI	2000	SJR
San Joaquin River/San Luis Refuge	White Catfish	.52	.	220	1	SFEI	2000	SJR
San Joaquin River/San Luis	White Catfish	.60	.	228	1	SFEI	2000	SJR

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
Refuge								
San Joaquin River/Twitchell Island	White Catfish	.16	268	295	6	TSMP	1984	CD
San Joaquin River/Vernalis	White Catfish	.24	385	424	2	TSMP	1986	SJD
San Joaquin River/Vernalis	White Catfish	.26	197	217	4	TSMP	1980	SJD
San Joaquin River/Vernalis	White Catfish	.33	206	227	12	TSMP	1998	SJD
San Joaquin River/Vernalis	White Catfish	.37	208	229	11	TSMP	1987	SJD
San Joaquin River/Vernalis	White Catfish	.38	222	244	6	TSMP	1978	SJD
San Joaquin River/Vernalis	White Catfish	.43	208	229	2	TSMP	1985	SJD
San Joaquin River/Vernalis	White Catfish	.45	247	272	8	TSMP	1984	SJD
San Joaquin River/Vernalis	White Catfish	.52	223	245	8	TSMP	1983	SJD
Sand Mound Slough	White Catfish	.05	325	347	1	FMP	2005	WD
Sand Mound Slough	White Catfish	.09	251	266	1	FMP	2005	WD
Sand Mound Slough	White Catfish	.09	336	378	1	FMP	2005	WD
Sand Mound Slough	White Catfish	.12	197	207	1	FMP	2005	WD
Sand Mound Slough	White Catfish	.12	234	251	1	FMP	2005	WD
Sand Mound Slough	White Catfish	.12	362	388	1	FMP	2005	WD
Sand Mound Slough	White Catfish	.16	220	235	1	FMP	2005	WD
Sand Mound Slough	White Catfish	.25	238	250	1	FMP	2005	WD
Sand Mound Slough	White Catfish	.27	220	232	1	FMP	2005	WD
Smith Canal	White Catfish	.06	247	262	1	FMP	2005	CD
Smith Canal	White Catfish	.07	229	249	1	FMP	2005	CD
Smith Canal	White Catfish	.07	275	294	1	FMP	2005	CD
Smith Canal	White Catfish	.08	233	252	1	FMP	2005	CD
Smith Canal	White Catfish	.09	219	240	1	FMP	2005	CD
Smith Canal	White Catfish	.10	231	252	1	FMP	2005	CD
Smith Canal	White Catfish	.11	209	225	1	FMP	2005	CD
Smith Canal	White Catfish	.11	249	266	1	FMP	2005	CD
Smith Canal	White Catfish	.12	263	281	1	FMP	2005	CD
Smith Canal/Yosemite Park	White Catfish	.09	.	272	1	SFEI	1999	CD
Smith Canal/Yosemite Park	White Catfish	.10	.	243	1	SFEI	1999	CD
Smith Canal/Yosemite Park	White Catfish	.15	.	278	1	SFEI	1999	CD
Smith Canal/Yosemite Park	White Catfish	.16	.	254	1	SFEI	1999	CD
Smith Canal/Yosemite Park	White Catfish	.48	.	302	1	SFEI	1999	CD
Stockton Deep Water Channel	White Catfish	.18	271	298	8	TSMP	1986	CD
Werner Dredger Cut	White Catfish	.06	326	347	1	FMP	2005	CD
Werner Dredger Cut	White Catfish	.07	303	325	1	FMP	2005	CD
Werner Dredger Cut	White Catfish	.07	304	326	1	FMP	2005	CD
Werner Dredger Cut	White Catfish	.07	361	380	1	FMP	2005	CD
Werner Dredger Cut	White Catfish	.09	305	325	1	FMP	2005	CD
Werner Dredger Cut	White Catfish	.10	248	260	1	FMP	2005	CD
Werner Dredger Cut	White Catfish	.14	238	252	1	FMP	2005	CD
Whiskey Slough	White Catfish	.06	285	308	1	FMP	2005	CD
Whiskey Slough	White Catfish	.06	318	335	1	FMP	2005	CD
Whiskey Slough	White Catfish	.07	282	306	1	FMP	2005	CD
Whiskey Slough	White Catfish	.07	329	350	1	FMP	2005	CD
Whiskey Slough	White Catfish	.09	319	340	1	FMP	2005	CD
Whiskey Slough	White Catfish	.11	261	281	1	FMP	2005	CD
Whiskey Slough	White Catfish	.11	400	532	1	FMP	2005	CD
Whiskey Slough	White Catfish	.12	330	354	1	FMP	2005	CD
Whiskey Slough	White Catfish	.14	336	362	1	FMP	2005	CD
White Slough	White Catfish	.04	.	239	1	SFEI	2000	CD
White Slough	White Catfish	.04	.	285	1	SFEI	2000	CD
White Slough	White Catfish	.04	.	321	1	SFEI	2000	CD
White Slough	White Catfish	.06	.	315	1	SFEI	2000	CD
White Slough	White Catfish	.06	.	390	1	SFEI	2000	CD

Site	Common Name	**Mercury Wet (ppm)**	Fork Length (mm)	Total Length (mm)	# Indiv	Project	Year	Sub Region
White Slough	White Catfish	.07	.	345	1	SFEI	2000	CD
White Slough	White Catfish	.08	.	348	1	SFEI	2000	CD
White Slough	White Catfish	.09	.	329	1	SFEI	2000	CD
White Slough	White Catfish	.11	.	345	1	SFEI	2000	CD
White Slough	White Catfish	.12	.	309	1	SFEI	2000	CD
White Slough/Lodi	White Catfish	.03	.	373	1	SFEI	1999	CD
White Slough/Lodi	White Catfish	.05	.	285	1	SFEI	1999	CD
White Slough/Lodi	White Catfish	.06	.	360	1	SFEI	1999	CD
White Slough/Lodi	White Catfish	.08	.	274	1	SFEI	1999	CD
White Slough/Lodi	White Catfish	.12	.	265	1	SFEI	1999	CD
White Slough/Lodi	White Catfish	.09	303	333	6	TSMP	1986	CD