



Water Body Prioritization Process for Developing or Updating Fish Advisories

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LIST OF ACRONYMS AND ABBREVIATIONS

CDFW	California Department of Fish and Wildlife
CEDEN	California Environmental Data Exchange Network
CES	CalEnviroScreen
Hg	mercury
OEHHA	Office of Environmental Health Hazard Assessment
PCBs	polychlorinated biphenyls
ppb	parts per billion
RWB	Regional Water Board

PREFACE

The Office of Environmental Health Hazard Assessment (OEHHA), a department in the California Environmental Protection Agency, is responsible for evaluating potential public health risks from chemical contamination of sport fish.¹ This includes issuing fish consumption advisories, when appropriate, for the State of California. OEHHA's authorities to conduct these activities are based on mandates in the:

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

The health advisories are published in the California Department of Fish and Wildlife's (CDFW) Inland and Ocean Sport Fishing Regulations in their respective sections on public health advisories.²

This report presents a process implemented by OEHHA to prioritize water bodies for fish advisory development and updates.

¹ Sport fish includes all fish and shellfish caught from California waters for non-commercial purposes (e.g., recreational, tribal/cultural, and subsistence practices).

² CDFW's Inland and Ocean Sport Fishing Regulations can be found online at: <https://wildlife.ca.gov/Fishing/Inland> and <https://wildlife.ca.gov/Fishing/Ocean>, respectively.

BACKGROUND

The Office of Environmental Health Hazard Assessment (OEHHA) develops fish advisories to provide safe eating guidelines for people who catch and eat fish and shellfish from California water bodies. Various state and regional monitoring programs provide the majority of fish contaminant data that are used to develop fish advisories. When these data are uploaded into the California Data Exchange Network (CEDEN)³ or otherwise provided to OEHHA, they can be used for advisory development.

OEHHA develops new or updates current advisories under a three-tiered process. First, OEHHA identifies and evaluates available fish tissue data of sufficient quality for fish caught from California water bodies. Second, OEHHA identifies those California water bodies with sufficient data to develop new or update existing advisories and generates an annual list of eligible water bodies. Lastly, OEHHA prioritizes those water bodies using both a quantitative ranking scheme and qualitative considerations. For example, advisories for smaller water bodies can often be developed relatively quickly; site-specific guidelines for larger water bodies and statewide advisories often require many months to develop or update.

PROCESS FOR PRIORITIZING WATER BODIES FOR NEW OR UPDATED ADVISORY DEVELOPMENT

ANNUAL REVIEW OF FISH TISSUE DATA

In order to identify water bodies with sufficient data to develop or update an advisory, OEHHA conducts an annual review of all fish contaminant data available in CEDEN. OEHHA also considers and includes data from other sources, as appropriate.⁴ All data used in advisory development must be of sufficient quality and detail, as described in OEHHA's sampling and analysis protocol.⁵ Data are selected based on the following considerations:

- analyte measured (either total mercury or polychlorinated biphenyl [PCB] congeners) in at least three species;⁶
- location;⁷
- total length above legal or "edible" size; and
- availability of tissue samples from fish with established edible or legal size limits and of the appropriate tissue type and preparation;

³ Online at: <http://ceden.waterboards.ca.gov/AdvancedQueryTool>.

⁴ Example sources include federal agencies, public utility companies, and academic research institutions.

⁵ The Protocol for Fish Sampling and Analysis to Support the Development of Fish Advisories in California (OEHHA, 2022),

<https://oehha.ca.gov/media/downloads/fish/report/fishadvisorysamplinganalysisprotocolreport2022.pdf>.

⁶ Some exceptions, such as for high elevation and/or trout lakes, per OEHHA (2022).

⁷ Marine water bodies and freshwater bodies are prioritized separately.

- tissue type is typically fillet for finfish or meat for shellfish,
- sample preparation is skin-off or on; whole body or fillet.⁸

OEHHA compiles the data available for the development of fish advisories for the various water bodies in the state into a data set. The dataset is refined by filling in missing information (such as tissue name or total length when they can be obtained from the original data source), grouping species (e.g., “Largemouth Bass” to “Black Bass Species”), removing duplicate records, converting dry weight to wet weight (as necessary), and removing PCB data on samples collected prior to the year 2000.⁹ The various station names that may have been used while sampling a water body are consolidated and assigned to a Water Board region¹⁰ and county. OEHHA then calculates weighted averages for mercury and PCBs and sums the total number of fish for each species or species group by water body.

IDENTIFICATION OF WATER BODIES CONSIDERED FOR NEW OR UPDATED ADVISORIES

Water bodies considered for new advisory development typically have sufficient data to provide advice for a minimum of three species. One criterion for sufficient data includes nine or more individuals per species, with each individual meeting the minimum length/size requirement per the California Department of Fish and Wildlife (CDFW) regulations,¹¹ when applicable, or the OEHHA edible size criteria that indicate maturity. Members of a species group such as black bass or sunfish, which typically have similar contaminant levels, are counted as one species. For water bodies that support mainly trout species, an advisory may be developed for less than three species.

Water bodies with existing advisories are considered for an update when:

- a new species can be added,
- the advice changes for one or more species,
- newer data are available and the advisory is based on data that are more than 10 years old, or
- the site-specific advice for a water body does not have a detailed data report, such as those described in the OEHHA “2009 Update of California Sport Fish Advisories,”¹² which includes site-specific advice and only a brief technical narrative for each of more than 35 individual water bodies.

⁸ Some whole body and skin-on samples are used in advisory development per OEHHA (2022).

⁹ Data for organic chemicals (chlordanes, DDTs, dieldrin, PCBs or toxaphene) generated prior to 2000 are excluded from the analysis because data that are more recent are considered more reliable due to improved analytical methods and are likely to be more representative of fish caught today.

¹⁰ Online at: https://www.waterboards.ca.gov/waterboards_map.html.

¹¹ CDFW Inland and Ocean Sport Fishing Regulations are available online at <https://wildlife.ca.gov/Fishing/Inland> and <https://wildlife.ca.gov/Fishing/Ocean>, respectively.

¹² OEHHA (2009) available online at https://oehha.ca.gov/media/downloads/advisories/discadvupdates031309_11.pdf.

OEHHA may also update an existing advisory when CDFW regulations change which species are legal to take.

SCORING OF WATER BODIES

To prioritize water bodies for new or updated advisory development, OEHHA applies a scoring scheme to each water body with sufficient data on four categories:

- fish contamination;
- CalEnviroScreen percentile;
- distance to closest water body with an advisory (rivers excluded); and
- number of species with adequate data.

Each criterion score is assigned a priority level that corresponds to numerical values, as follows: low (green) = 0, medium (yellow) = 1, and high (red) = 2.

CONTAMINATION SCORE

Water bodies are assigned a contamination score based on the average levels of fish tissue contaminants in species with sufficient data. Mercury and PCBs are the most common fish tissue contaminants in California that typically result in the most restrictive advice for a species. Although other contaminants, such as selenium, occasionally impact advice, their inclusion would have minimal impact on the scoring metric. For lakes and reservoirs, if only black bass species exceed the “do not consume” mercury threshold for the sensitive population (> 440 parts per billion, or ppb), the water body is assigned as a low priority and receive 0 points because the statewide advisory for lakes and reservoirs¹³ already recommends that this population group not consume black bass species.

TABLE 1. CONTAMINATION CRITERION BASED ON THE AVERAGE MERCURY OR PCB FISH TISSUE LEVELS

Average Contaminant Level	Score
Mercury ≤ 399 ppb or PCBs ≤ 42 ppb	0
Mercury 400 – 439 ppb or PCBs 43 – 119 ppb	1
Mercury > 440 ppb in non-black bass species or PCBs ≥ 120 ppb	2

¹³ OEHHA statewide advisory for eating fish from California’s lakes and reservoirs without site-specific advice is available online at <https://oehha.ca.gov/advisories/statewide-advisory-eating-fish-californias-lakes-and-reservoirs-without-site-specific>.

CALENVIROSCREEN (CES) SCORE

OEHHA uses the CalEnviroScreen Tool¹⁴ to incorporate the population characteristics and pollution burden into the prioritization process. The water body of interest is located on the CES map and any census tracts that encompass the water body are identified. The CES percentiles of any tracts are compared to the categories presented below. If the water body spans more than one census tract, with differing CES percentiles, the highest value is used. CES percentiles of neighboring census tracts may also be taken into consideration if the particular census tract encompassing the water body is not representative of the greater area. For rivers that may cover several tracts, the CES score that corresponds to the majority of the river portions within the advisory boundaries is selected.

TABLE 2. CES CRITERION BASED ON THE OVERALL CES PERCENTILE CATEGORY

CES percentile	Score
1 – 24	0
25 – 49	1
50 – 100	2

DISTANCE SCORE

Distance scores are applied to lakes and reservoirs based on the estimated driving travel time, in hours, from the water body of interest to the nearest lake with an OEHHA advisory. Water bodies with 'do not consume' advice for all species are not included in this calculation because the intention of this category is to provide fishers with regional alternatives. Rivers are excluded from the distance criterion because they can extend over larger or variable distances in comparison to lakes and reservoirs.

TABLE 3. DISTANCE CRITERION BASED ON THE DRIVING TRAVEL TIME CATEGORY

Driving Travel Time	Score
Less than 1 hour	0
1 – 2 hours	1
More than 2 hours	2

¹⁴ OEHHA CalEnviroScreen Tool available online at <https://oehha.ca.gov/calenviroscreen>.

NUMBER OF SPECIES SCORE

Most water bodies that meet the initial criteria for a new or updated advisory have data sufficient to develop advice for at least three species. The number of species score is assigned to the water body based on the number and type of species for which there are sufficient data.

TABLE 4. NUMBER OF SPECIES CRITERION BASED ON THE NUMBER AND TYPE OF SPECIES CATEGORY

Number and Type of Species	Score
3 rd species is a baitfish	0
n/a	1
3 or more popular species or a trout lake with 2 species	2

TOTAL SCORE

The sum of the individual scores for the four categories results in a total score that is used to rank each water body in order of priority. Total scores range from 0 – 8 for discrete water bodies and 0 – 6 for rivers (excludes distance score). Higher scores indicate a higher priority for advisory development.

CONSIDERATION OF QUALITATIVE PRIORITIZATION FACTORS

Water bodies may also be prioritized for advisory development based on additional qualitative factors such as fishing pressure, stakeholder requests, and geographic diversity. In addition, when advice is expected to be significantly different relative to that for similar species in the statewide or nearby site-specific advisories a water body may receive a higher priority.

CONCLUSION

Annually, OEHHA conducts a data review and considers several factors to prioritize water bodies for fish advisory development. Both a quantitative ranking scheme and qualitative considerations are used to identify those water bodies that should be considered for the development of new advisories or the update of existing advisories in the next 12-month period. Figure 1 shows the considerations that underpin the prioritization approach.

OEHHA aims to release approximately nine advisories a year. OEHHA currently provides site-specific consumption advice for more than 140 California water bodies¹⁵ in addition to four statewide advisories for those areas without site-specific advice.¹⁶

¹⁵ OEHHA site-specific fish advisories are available online at <https://oehha.ca.gov/fish/advisories>.

¹⁶ OEHHA statewide fish advisories for coastal locations; lakes and reservoirs; rivers, streams, and creeks; and the advisory for fish that migrate are available online at <https://oehha.ca.gov/fish/advisories>.

FIGURE 1. WATER BODY PRIORITIZATION PROCESS DIAGRAM

