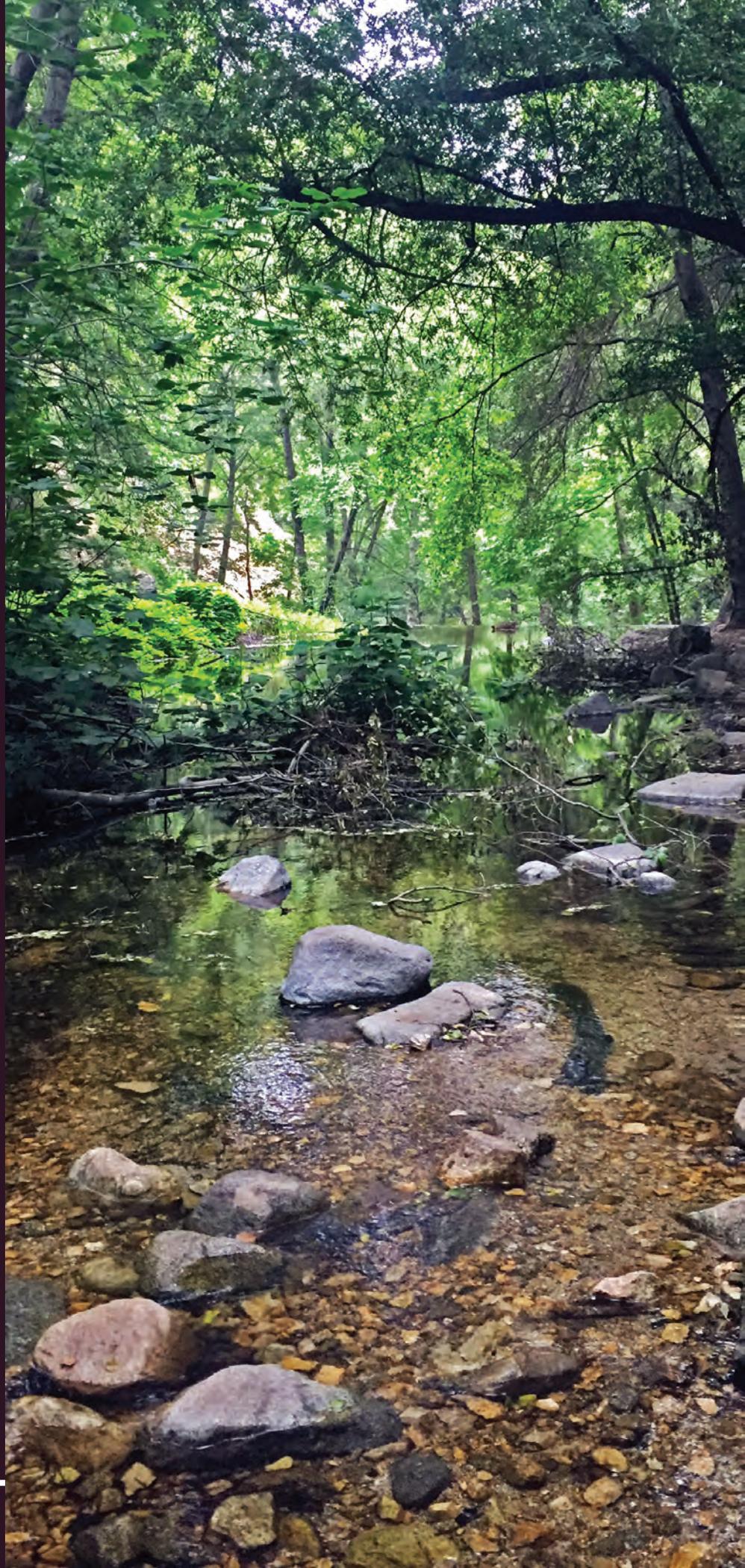


2 0 1 8
STATE OF THE

**LOS ANGELES
RIVER WATERSHED
EXECUTIVE SUMMARY**





THE LOS ANGELES RIVER WATERSHED is a dynamic, heavily urbanized area, consisting of 1,400 miles of streams from the San Gabriel Mountains to the Pacific Ocean. It is home to over 4.5 million people and a wide collection of plants and animals.

We envision a healthy and sustainable Los Angeles River Watershed that balances the water quality and supply, flood management, recreational and habitat needs of its human and ecological communities. Understanding the LA River Watershed's overall health and how it is changing is paramount to ensuring the sustainability and resilience of its communities.

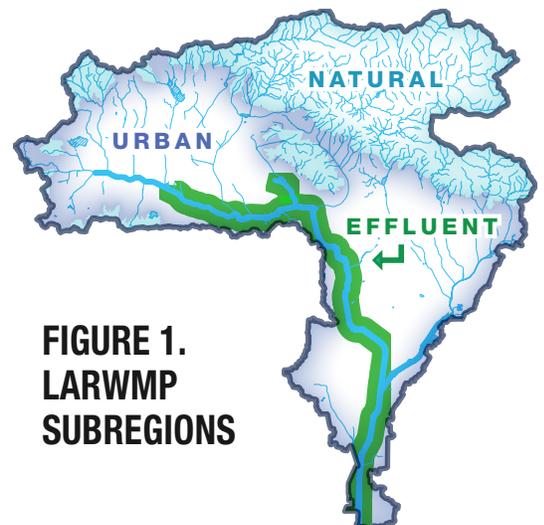
The LA River Watershed is divided into 3 subregions: natural streams, urban tributaries and the effluent-dominated main river branch (Figure 1). The sampling design integrates both randomly selected and fixed sites to provide a more complete picture of the Watershed as a whole. The 2018 State of the Los Angeles River Watershed Report summarizes assessment results over nine years from 2008-2017.

THE LOS ANGELES RIVER WATERSHED MONITORING PROGRAM

In 2007, local, state, and federal stakeholders formed the Los Angeles River Watershed Monitoring Program (LARWMP) to provide land managers and the public with a more complete picture of the conditions and trends in the LA River Watershed. The objective was to develop an understanding of surface water conditions beyond city boundaries, including the entire watershed area, and to improve coordination and integration of regional monitoring efforts.

The LARWMP framework describes the overall condition of the Los Angeles River Watershed by answering five questions:

- 1 What is the condition of streams in the watershed?
- 2 Are conditions at areas of unique interest getting better or worse?
- 3 Are receiving waters near discharges meeting water quality objectives?
- 4 Is it safe to recreate in the river and its tributaries?
- 5 Are locally caught fish safe to eat?



**FIGURE 1.
LARWMP
SUBREGIONS**

QUESTION 1 What is the condition of streams in the watershed?

A total of eighty stream sites were monitored from 2008-2017 across each subregion (natural, urban and effluent). Stream health is evaluated based on water chemistry, physical habitat assessments, and two bioassessment indices– the Southern California Algae Index of Biological Integrity (Algae IBI) and the California Stream Condition Index (CSCI), in which algae and benthic macroinvertebrates (BMI) living in streams are assessed. The results of these measurements are then compared to reference sites with nearly pristine health conditions and provide a baseline for future management actions.

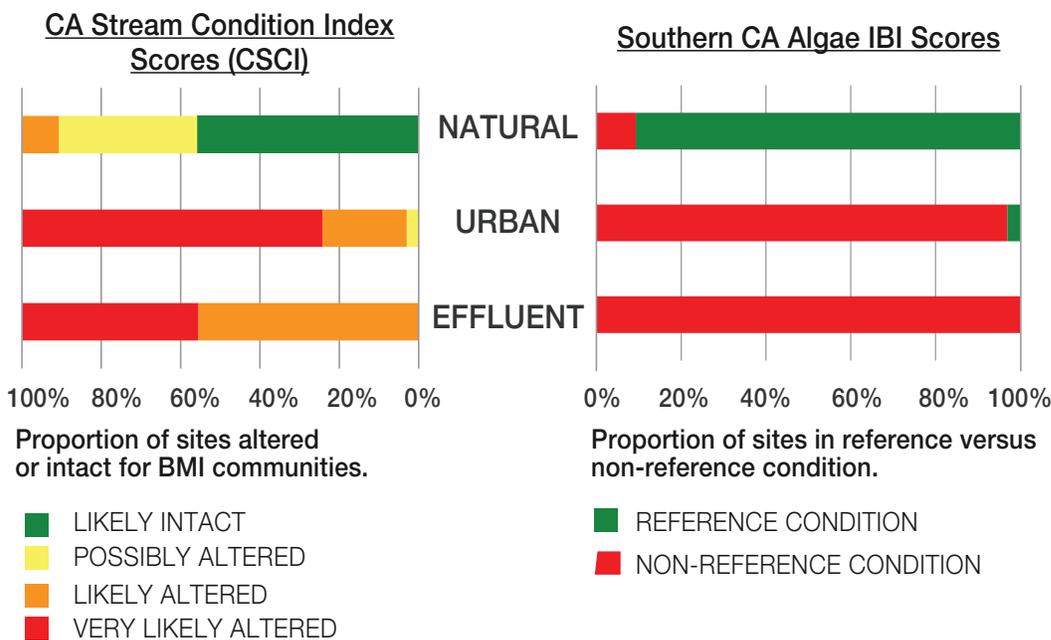
Benthic Macroinvertebrates and Stream Health

One way LARWMP determines the health of streams is by assessing the organisms that make up the base of the food chain. Benthic macroinvertebrates (BMI) are small, bottom-dwelling animals lacking a backbone, such as snails and aquatic insects pictured on the right. BMI are sensitive to environmental changes and respond to stress in predictable ways, making them an important indicator of stream health. Understanding the BMI community in a stream, like the number of species and their feeding strategies, helps to assess biological conditions and can serve as early indicators of stream degradation. BMI information at a site is compiled into a California Stream Condition Index (CSCI) score, allowing for standardized comparisons across sites.



Image Source: Aquatic Bioassay Consulting Laboratories

FIGURE 2. BIOASSESSMENT RESULTS



Stream Condition Findings

- 57-75% of sites in the watershed aren't healthy based on Algae IBI and CSCI scores, respectively.
- Reference algal condition was met at about 91% of "natural" sites, 3% of "urban" sites, and no "effluent" sites (Figure 2).
- BMI communities were only "likely intact" for a little over 50% of natural sites. At the majority of urban and effluent-dominated sites, BMI communities were "likely altered" (Figure 2).



QUESTION 2 Are conditions at areas of unique interest getting better or worse?

Assessing how habitat conditions are changing over time is useful for land management practices. Each year, biological, chemical, and physical conditions were monitored at confluence sites. The physical habitat condition of sites located in “areas of unique interest” were also recorded annually. These areas have remnants of riparian habitat or provide important context about changing conditions for the LA River Watershed as a whole. In total, the sites of unique interest include four confluence sites, nine high-value wetland sites, and the Los Angeles River Estuary.

There were few strong temporal trends in biological condition and riparian habitat condition across sites of unique interest during the ten-year monitoring period (Figure 3).

QUESTION 3 Are receiving waters near discharges meeting water quality objectives?

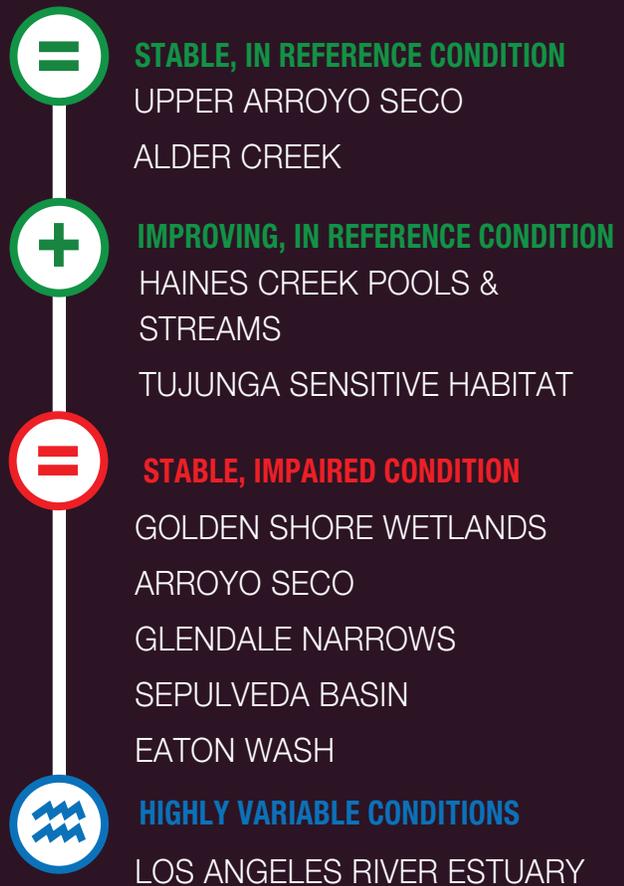
Water and pollutants enter the River from discharge sources. Treated water or "effluent" released into the river from wastewater reclamation plants is the main source of flow in the River, particularly during the dry-season. Effluent is monitored to comply with water quality objectives issued by the California State Water Resources Control Board. Some of the indicators measured in receiving waters include:

HEAVY METALS Metals e.g. copper, zinc, and selenium are harmful at high concentrations because they impact reproduction, growth, metabolism, and survival of aquatic organisms.

E. COLI *E. coli* concentrations may indicate the presence of fecal pathogens that can be harmful to human health.

NUTRIENTS Excessive nutrients, e.g. ammonia and nitrate, disrupt the nutrient balance of ecosystems. In a river with excess nutrients, algae thrive and deplete oxygen, choking our waterways.

FIGURE 3. TRENDS IN AREAS OF UNIQUE INTEREST



Findings in Receiving Waters

LARWMP assessed how levels of three indicators differed upstream and downstream of three Publicly-Owned Treatment Works (POTWs), specifically:

- City of Los Angeles Donald C. Tillman Water Reclamation Plant
- City of Burbank Water Reclamation Plant
- Cities of Los Angeles and Glendale Water Reclamation Plant

Water quality findings downstream from the POTWs are as follows:

HEAVY METALS

Concentrations are below regulatory thresholds at upstream and downstream sites with the exception of copper. Effluent generally dilutes heavy metals but copper levels are still above chronic thresholds at both upstream and downstream of POTWs.

E. COLI

Concentrations are similar above and below discharge points. About half of all samples exceed regulatory thresholds. Although effluent itself has very low bacteria levels, other sources of *E. coli*, such as wildlife and runoff, are likely contributors.

NUTRIENTS Levels increased downstream of POTWs.



E. coli is a "fecal indicator bacteria." Although most strains of *E. coli* aren't harmful, its presence indicates that there may be human or animal fecal matter in the water. The presence of *E. coli* can also indicate more harmful pathogens, such as *Salmonella* and *Giardia*.

QUESTION 4

Is it safe to recreate?

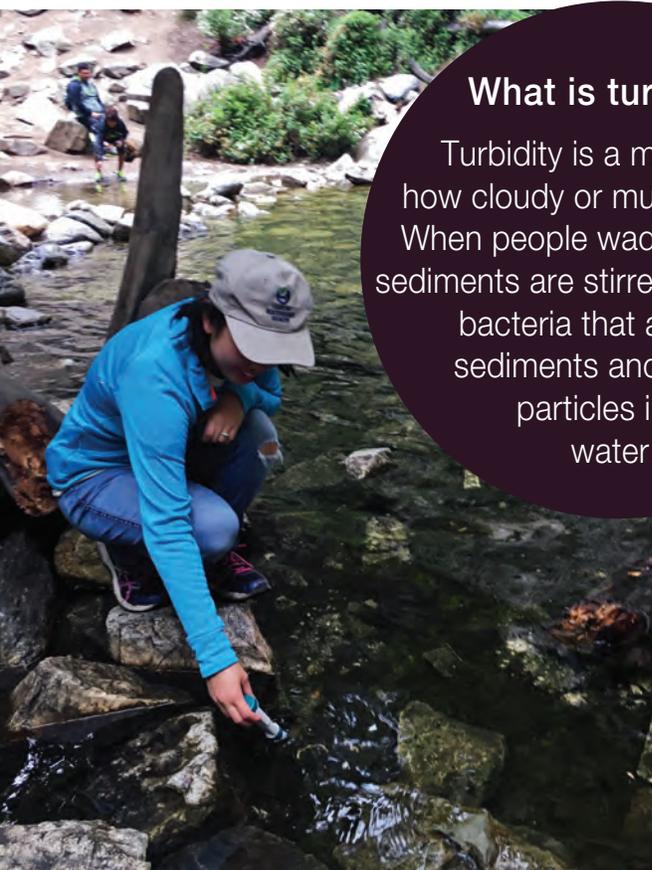
Thousands of people swim in the streams of the upper Los Angeles River Watershed and recreate along the Los Angeles River. However, prior to LARWMP, little was known about water quality at these sites. Sixteen recreational swim sites were monitored for the presence of the bacteria *E. coli* and reported for 2013-2017. Five kayak sites in the LA River Recreation Zone were added in 2016. These sites were sampled during the summer, especially on weekends and holidays when there were more visitors present.

Results in Recreational Waters

- From 2013-2017, 27% of samples exceeded *E. coli* standards (Figure 4).
- There was no relationship between the number of people during the time of sampling and *E. coli* levels.
- *E. coli* levels and turbidity were strongly correlated.

What is turbidity?

Turbidity is a measure of how cloudy or murky water is. When people wade and swim, sediments are stirred, suspending bacteria that attach to sediments and organic particles in the water.



E.coli Water Quality Objective

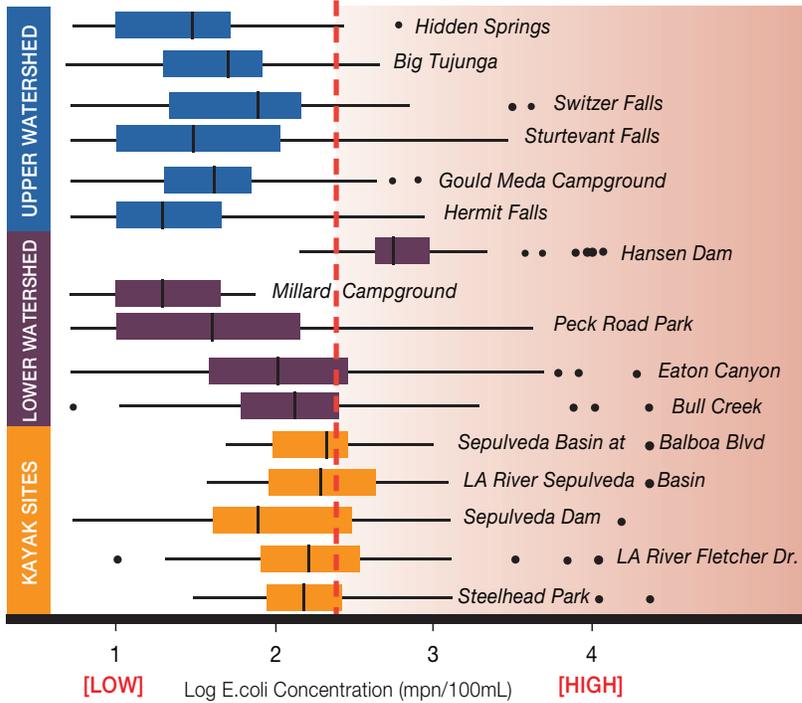


FIGURE 4. BOX-PLOT OF E. COLI CONCENTRATION RANGE AT RECREATION SITES FROM 2009-2017

Concentrations are compared to the E. coli water quality objective. The dark, vertical line on each bar represents the median. Dots represent values abnormally outside the range of values observed.

QUESTION 5

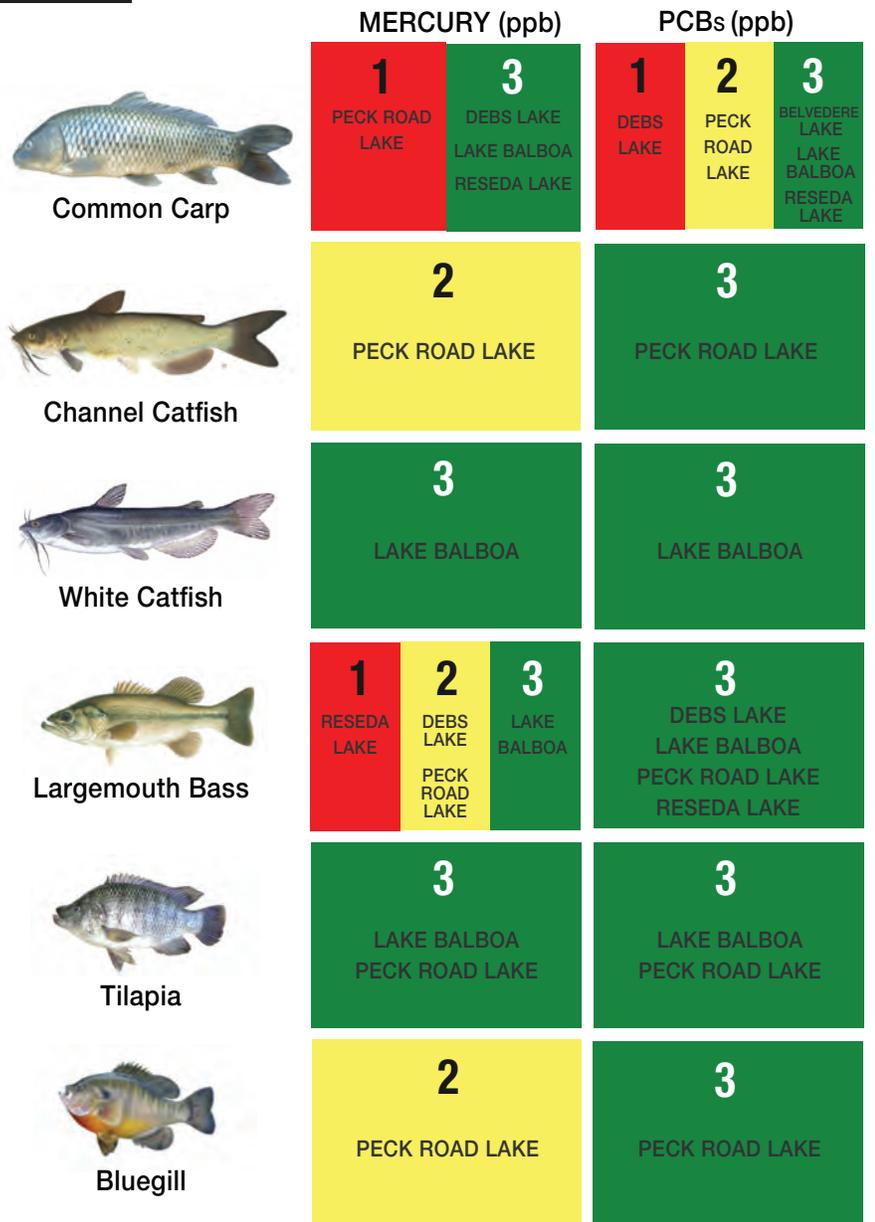
Are locally caught fish safe to eat?

Certain contaminants bioaccumulate in fish tissue, posing a health risk to those that eat locally caught fish. In order to protect the public from the risk of eating fish with high levels of contaminants, LARWMP assessed contaminant levels in fish tissues from lakes and streams in the watershed. Fish were collected from lakes in the LA River Watershed between 2009 and 2017 and analyzed for four pollutants: mercury, selenium, total DDTs, and total PCBs. Based upon contaminant levels found in fish tissues, LARWMP can advise how often per week people can eat each fish species from lakes across the LA River Watershed. LARWMP targeted 6 fish species (Figure 5).

Fish Consumption Findings

- Fish commonly caught and consumed from lakes in the watershed are safe to eat in moderate amounts (Figure 5).
- For 2013-2017, there was not a species or location with fish contaminant levels close to the “No Consumption” advisory (this was not true for lakes sampled from 2008-2013. See CWH, 2013).
- Tilapia is one of the safest species to eat. Mercury and PCB concentrations were below detection level at all sites.
- Selenium and DDTs didn’t exceed consumption thresholds in any species.

FIGURE 5. GUIDE TO SAFELY CONSUME LOCAL FISH



■ THREE 8 OZ SERVINGS PER WEEK
■ TWO 8 OZ SERVINGS PER WEEK
■ ONE 8 OZ SERVINGS PER WEEK

*BASED ON THE CA OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT’S GUIDELINES.
 *NOT ALL FISH ARE PRESENT AT EACH SITE.

SPECIAL THANKS

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Technical Stakeholder Group

City of Burbank
City of Los Angeles
Los Angeles County Flood Control District
Los Angeles Regional Water Quality Control Board
Council for Watershed Health
Southern California Coastal Water Research Project
U.S. Environmental Protection Agency (US EPA)
U.S. Forest Service
Aquatic Bioassay Consulting Laboratories
Friends of the LA River
Heal the Bay
LA Waterkeeper

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To access our 2018 State of the LA River Watershed Report visit: www.watershedhealth.org/reports