

Cruise Report for the  
Surface Waters Ambient Monitoring Program (SWAMP)  
Safe to Eat Workgroup (STEW)

**Screening Study of Bioaccumulation in Rivers and  
Streams in California**

Sampling Dates: June 27th, 2022-November 10th, 2022

Prepared by the Marine Pollution Studies Laboratory (MPSL) at Moss Landing  
Marine Laboratories

**Introduction**

In 2011, the Surface Water Ambient Monitoring Program’s (SWAMP) Bioaccumulation Monitoring Program (BMP) implemented a statewide river and stream screening survey with the goal of sampling a set of 63 river and stream locations across California. With input from the Safe to Eat Workgroup (STEW) minor modifications were suggested for the monitoring design and a monitoring plan was developed to match what was outlined in the 2011 Monitoring Plan.

One significant difference from the 2011 design was the addition of prey fish species which has now become a standard element of BMP mercury monitoring. Prey fish were to be composited whole-body by species from each site and analyzed for mercury and selenium.

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## 1.0 Cruise Report

### 1.1 Objectives

Samples were collected at four river sites, including one fish hatchery site selected to be representative of salmon species in California rivers. Primary and secondary fish species to be collected were defined, as outlined in the 2022 Monitoring and Analysis Plan for the Screening Study of Bioaccumulation in Rivers and Streams in California (2022 Monitoring Plan). Analytes to be tested for are also outlined in the Monitoring Plan.

Sample sites were accessed by boat, when possible, or from shore. Fish were collected by electrofishing vessel, fish traps, and netted at the fish hatchery location.

All attempts were made to obtain the requested species, number of fish and size ranges for each site.

### 1.2 MPSL Sampling personnel

Wesley Heim	Project Director
William Jakl	Project Associate, Crew Lead
Chris Beebe	Research Technician, Crew Lead
April Sjoboen-Guimarães	Research Technician
Scot Lucas	Research Technician
Gary Ichikawa	Research Assistant

### 1.3 Authorization to collect samples

All work was completed under MPSL scientific collecting permit # S-183470004-20339-002 authorized by the California Department of Fish and Wildlife. MPSL personnel were contracted through San Jose State University Research Foundation (SJSURF) to conduct the sample collection activities listed herein.

## 1.4 Station selection

Four stations were targeted for sampling. Sampling stations were identified as priorities based on input from Central Valley Regional Water Quality Control Board who contributed funding for monitoring. Stations were selected to collect data on fish frequently caught by recreational anglers and prey fish species that are standard element of BMP mercury monitoring.

## 1.5 Summary of types of samples authorized to be collected



Targeted species were determined by what are frequently caught and consumed by anglers in each of the selected sampling locations. Upon collection, each fish was tagged with a unique ID corresponding to the station where it was collected. Physical parameters collected for each individual fish include: weight, total length, fork length (if fork present), and presence of any abnormalities. Fish samples were stored on dry ice until returned to the laboratory facility for dissection.

Specific details on sampling and analysis can be found in the 2022 Monitoring Plan.

## 1.6 Results

A detailed fish catch summary can be found below. Maps of all stations are provided showing locations of successful fishing effort and unsuccessful fishing effort. Tables below each figure summarize the types, quantity, and sizes (total length [TL] in mm) of fish caught at each site. The [Table of Contents](#) above indicates on which page collection details for each station can be found.

### Figure Key

Symbol	Description
	Unsuccessful fish trap
	Estimated electrofishing area

## Sacramento River at Bend Bridge Near Red Bluff (508ADVSBB)

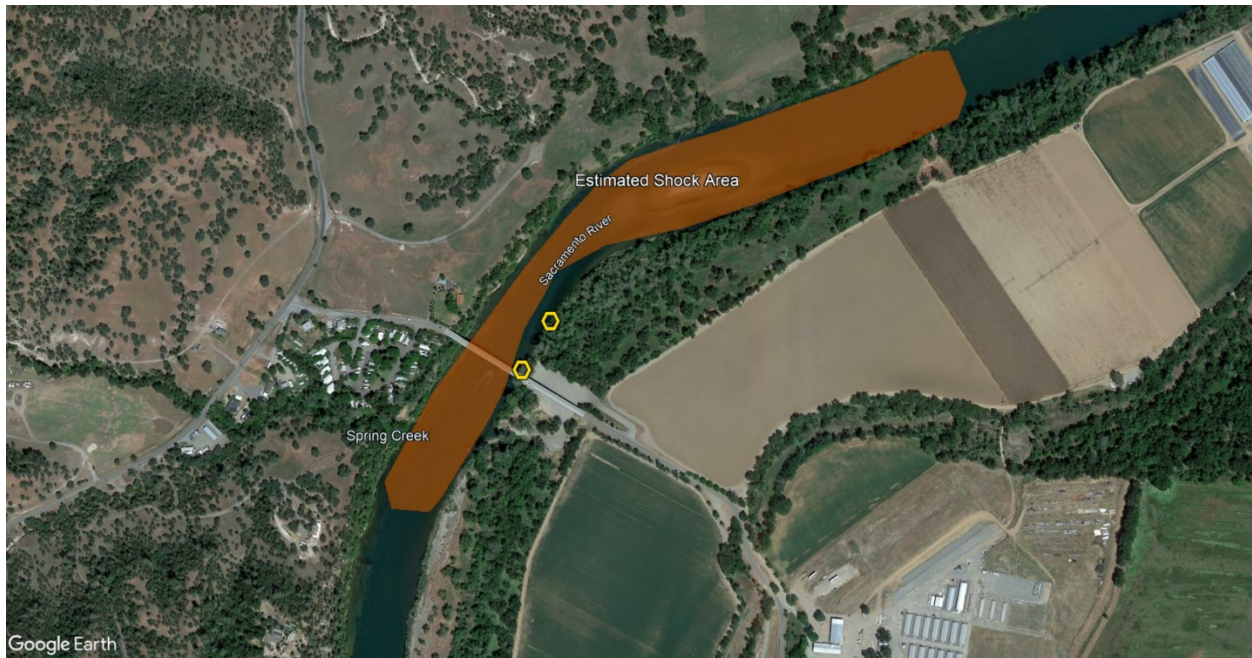
**Latitude:** 40.25283

**Longitude:** -122.22667

**Collection Method:** Electrofishing Vessel, Fish Traps

**Dates of Collection:** 06/27/2022 and 06/28/2022

**Samplers:** William Jakl and Chris Beebe



Rainbow Trout, TL (mm)				
344	373	377	384	387

Sacramento Pikeminnow, TL (mm)						
250	265	265	271	293	316	321
401	426	430	432	448	610	--

Sacramento Sucker (Prey), TL (mm)				
33	34	35	39	42
42	42	45	46	49

Sacramento Sucker, TL (mm)				
447	459	459	488	498

**Comments:** All fish were caught using the electrofishing vessel. Low water levels and hazards in the water restricted sampleable area. Fish traps were put out in shallow area with the hope of catching prey species but were unsuccessful. Samplers noticed evidence suggesting this site is popular among anglers and interacted with several local fishermen at the site who were targeting Rainbow Trout.

## Feather River upstream Yuba City (515FRUPYC)

**Latitude:** 39.33486

**Longitude:** -121.63230

**Collection Method:** Electrofishing Vessel

**Dates of Collection:** 06/28/2022

**Samplers:** William Jakl and Chris Beebe



Hardhead, TL (mm)				
384	415	415	433	435

Sacramento Pikeminnow (Prey), TL (mm)				
74	81	93	99	99
100	102	102	102	106

Sacramento Pikeminnow, TL (mm)						
212	215	270	300	310	320	322
385	392	396	403	404	407	--

Sacramento Sucker (Prey), TL (mm)				
74	81	93	99	99
100	102	102	102	106

Sacramento Sucker, TL (mm)				
438	440	466	475	512

Tule Perch (Prey), TL (mm)				
53	53	56	57	57
60	60	6	69	99

**Comments:** All fish were caught using the electrofishing vessel. Low water levels, submerged hazards, and strong flow made sampling challenging but all targets were successfully caught.



## American River at Discovery Park (519AMNDVY)

**Latitude:** 38.60094

**Longitude:** -121.5055

**Collection Method:** Electrofishing Vessel

**Dates of Collection:** 07/20/22, and 07/21/2022

**Samplers:** Chris Beebe and April Sjoboen-Guimarães



Largemouth Bass, TL (mm)						
205	209	254	266	292	325	365

Striped Bass, TL (mm)				
289	333	365	387	472

Sacramento Pikeminnow, TL (mm)				
470	475	488	554	603

Sacramento Sucker, TL (mm)				
215	339	385	415	461

Bluegill (Prey), TL (mm)				
57	62	72	79	81
87	95	97	97	98

**Comments:** Samplers access the site from the Discovery Park launch ramp and proceeded to the American River via the Sacramento River. With a very popular recreation location at the conflux of these two rivers samplers focused their effort upstream of the rec area. The location

was dominated by deeper (~3m) waters which were not favorable for electrofishing. Samplers mostly fished along the banks. With a large population of houseless individuals utilizing the southern bank of the river, samplers mostly fished along the northern bank. Over two days samplers were able to collect the required targets for the study through strictly electrofishing.



## Mokelumne River (Mokelumne River FH) (531ADVMOK)

**Latitude:** 38.22029

**Longitude:** -121.03551

**Collection Method:** BankNet

**Dates of Collection:** 11/10/2022

**Samplers:** Scot Lucas and Gary Ichikawa



Chinook Salmon, TL (mm)			
659	720	721	746
797	802	844	858

**Comments:** Chinook Salmon were donated from the Mokelumne River Fish Hatchery as a representation of Salmon in the river systems of the Sacramento Delta region.

## **1.7 Discussion**

With an extremely dry year across the state, samplers anticipated challenges with flow and water levels. Aside from one site being designated as unsampleable due to low water levels all other sites were successfully sampled. Most all targets for sample collection were met and samples collected were aligned with BMP goals including the newly designated prey species collections.