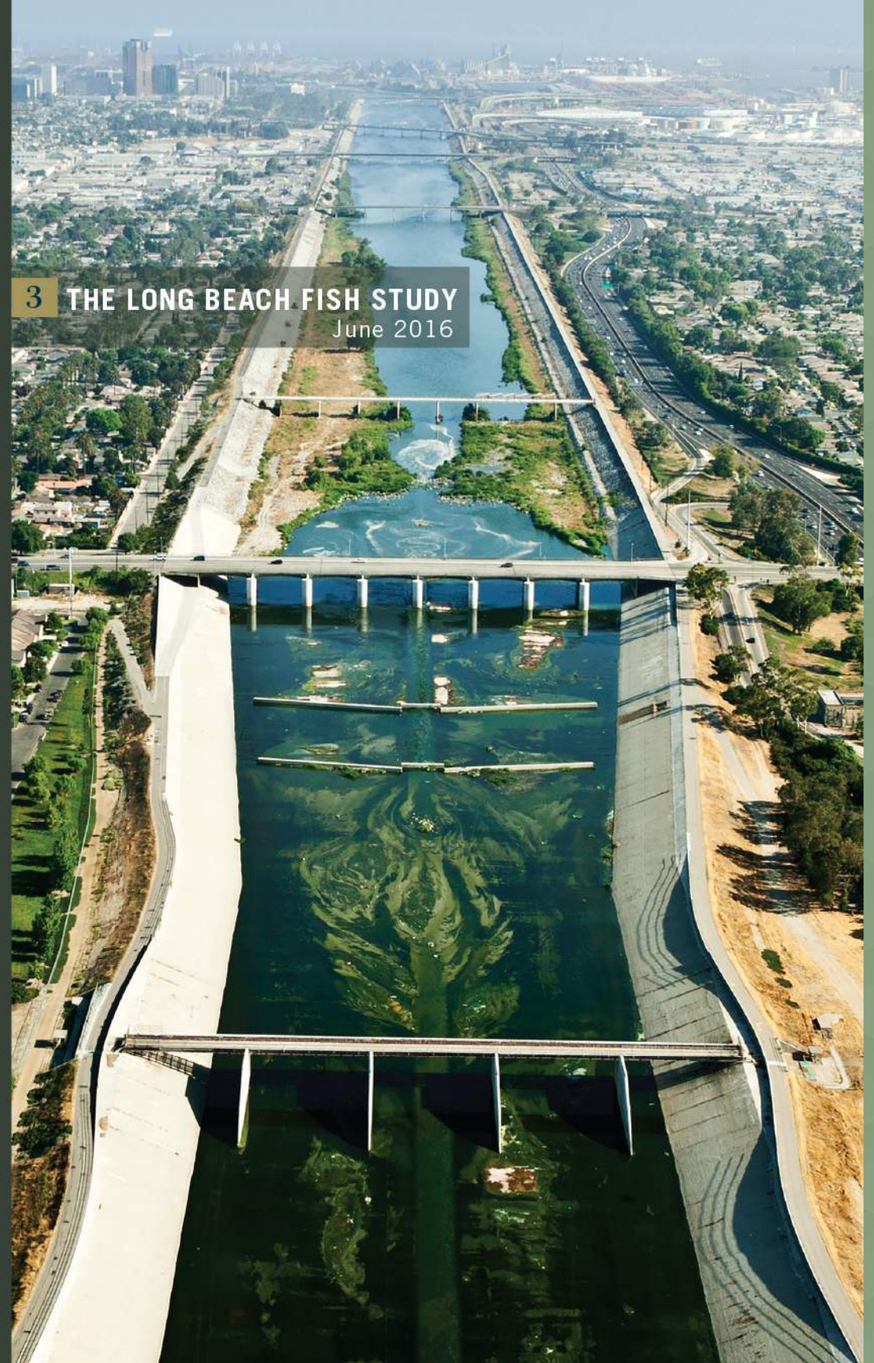
FOLAR

FRIENDS OF THE LOS ANGELES RIVER

STATE OF THE RIVER 3

THE LONG BEACH FISH STUDY

June 2016



CONTENTS

CONTENTS [cont.]

INTRODUCTION




Welcome to the mighty Los Angeles River! The first time I came to Willow Street in Long Beach was to announce our first LA River cleanup in the 1980's. We called for 10,000 people to join us in trash collection and only about 10 showed up. Most people would have seen this as an abject failure. Not us. We thrived on that failure. To us this was a victory, a way to bring people down to the river, just like in the old gospel hymn.

The first grant FoLAR ever received was from State Senator David Roberti (D) that became a collaboration between bird genius Dan Cooper and Kimball L. Garrett - a veteran ornithologist from the Natural History Museum of Los Angeles County. This became the first biota study of the Los Angeles River, paving the way for future efforts. The hands on research supported the discovery that there were as many as 200 species of birds living in and around river. Combining hard science with river lore, it was the first time in its wayward human history that our meandering river was seen in a positive light.

Today, in collaboration with the Aquarium of the Pacific, FoLAR published its first ever look at the Lower River at Willow Street. We were witness to sea lions in the estuary alongside sea turtles where the fresh water from the river, mixed with the salty water from the ocean. But nothing could grab our hearts like the fate of the steelhead trout, a once thriving population reduced to endangerment. The Aquarium of the Pacific (who we cannot thank more as an invaluable partner on this project) has launched a permanent steelhead exhibition that only makes us hungry for the real thing. At the end of this book you will find coloring pages that allow you to introduce your own steelhead story to future generations of citizen scientists.

Just when people were beginning to wrap their brains around the idea that the LA River even existed, they were now forced to deal with the fresh reality - that the river was supporting a rich fish ecology all its own. Everything we do takes us one day closer to a Fishable, Boatable, Bikeable, Los Angeles River from the mountains to the sea. This paper is meant to inspire more research within the Los Angeles River watershed and to mobilize our community around this invaluable resource.

Lewis MacAdams
Founder/President FoLAR



"I thought of nature as fragile, but it is us humans that are fragile."

— Lewis MacAdams

SECTION 1 Description of Area

The boundaries of the Los Angeles River Watershed encompass 834 square miles stretching from the Simi Hills to the San Gabriel Mountains on the northern end of the Los Angeles Basin to the Pacific Ocean at the Long Beach Estuary.

Topography of the Los Angeles River Watershed (watershed boundary outlined in blue). Map courtesy of Council for Watershed Health

What is an Estuary?

According to the Environmental Protection Agency, estuaries are places where rivers meet the sea. They are highly productive ecosystems and distinct from all other places on earth. The tidal, sheltered waters of estuaries also support an assortment of specialized plants, animals, and micro organisms especially adapted for life in unique waters. Estuaries are among the most productive ecosystems on earth, creating more organic matter each year. Thousands of species of birds, mammals, fish, and other wildlife depend on estuarine habitats as places to live, feed, and reproduce. They are called the "nurseries of the seas," as many species of fish spawn in their sheltered and protected waters. In addition, estuaries also filter out sediments and pollutants before it reaches the ocean. The plants and soils can act as a natural buffer between the land and ocean.

The Los Angeles River estuary is a 1.46 mile, soft bottom stretch of the river between the Willow Street Bridge to Queensway Bay in Long Beach.Year-round flow is maintained by urban and agricultural run-off and discharges of treated wastewater. During the drier months up to 80 million gallons per day enter Queensway Bay. In a 100 year flood the U.S. Army Corps of Engineers has calculated a discharge of 175,000 cfs (cubic feet per second) from the river where it enters Queensway Bay.

Floodplain Willow Forests

In the days before channelization, the Los Angeles River was known to flood its banks periodically, meander, and shift its course to the ocean. The resulting erosion and widespread deposit of sediment created flat strips of land called floodplains. These deposits resulted in the growth of willows, cottonwoods, and other aquatic and semi-aquatic plants. At one time these lowland forests formed one of the most biologically rich habitats of the River watershed. Since channelization, these areas are harder to find, but reestablished areas and remnants still exist. The best examples are behind damns including Hansen, Sepulveda, as well as in the Glendale Narrows and the Willow Street Estuary in Long Beach.

While there are numerous species of willow trees and shrubs in Southern California, the White Willow (*Salix alba*) and Arroyo Willow (*Salix lasiolepis*) are often found in the natural bottom portions of the River and its tributaries. Their leaves are almost four-times as long as they are wide, and have a pale underside. Willows are deciduous, shallow-rooting plants that favor moist soils typical of riverbanks. This study took place in the Willow Street section of the Los Angeles River in Long Beach. Floodplain plants and trees also have a natural ability to clean pollutants through the process of biofiltration and phytoremediation.

January 2016 rain event at Willow Street, in the Los Angeles River at Long Beach. Photo by Andrea White-Kjoss

In these processes, pollutants from urban run off found within the water and soil, are captured, broken down, and treated. Other important functions of these floodplain forests include stream bank stabilization (bioengineering), slope stabilization, soil erosion control, soil building, and wildlife habitat.

In addition, flood plain willow forests serve as a vital habitat for urban wildlife. These forests support a rich and diverse population of birds and migrating birds that nest in and under its lush canopy. The willow gold finch, willow flycatcher, yellow warbler, western wood pee wee, herons, egrets, cormorants, ducks, redtail hawks and osprey are a few of the species that can be seen in natural bottom portions of the Los Angeles River. In addition, these forests also provide shade required by a diversity of fish, aquatic insects and plants in the River's ecosystem.

Freshwater Marsh

Thousands of years ago the Los Angeles River created and flowed through several fresh water marshes. Marshes can form in almost any shallow depression that is kept wet by streams or ground water. Along the Los Angeles River, these marshes formed in places where the water table was high year round. Fresh water marshes contain layers of low, non-woody vegetation in soil saturated with moisture. These wetlands serve important hydrolic, biological, and habitat functions. Hydrologic functions include long term and short term water storage, subsurface water storage for ground water recharge, energy dissipation, and moderation of groundwater flow or discharge.

Fresh water marshes also convert water, sunlight and minerals to biomass at rates much higher than in dry ecosystems. They also provide a lush and safe environment for a wide range of life, from plank-tonic and filamentous algae to animals such as frogs and water fowl. Cattails are often a symbol for these wetland habitats and found with other plants such as duckweed that float along the surface and sedges and grasses that are found around the edges of the marsh. These plants stabilize sediments and add organic matter.

While many of these original wetlands along the Los Angeles River have disappeared as a result of changing typography and human development and growth, efforts are underway to restore portions of important wetland habitats along the Los Angeles River.

Softbottom Riparian

In four stretches along the course of the Los Angeles River you will find soft-bottom portions where the natural river bed has not been lined with concrete; north or upstream of the Sepulveda Dam, the Glendale Narrows, Compton Creek, and the Estuary downstream from Willow Street in Long Beach. Instead, the riverbed is lined with sediment and boulders and offers a glimpse of the River as it once was. Fortunately, the high water table in these areas made it impossible for the River bottom to be sealed in concrete, and the River's natural bed is preserved along with a diversity of plants and wildlife. Today, approximately 13 miles of the present-day 51-mile River is natural bottom. (For more information about these areas, please visit FoLAR.org).

Islands of willow trees, sycamores spring up in the middle and long the sides of the River in the Glendale Narrows while thick layers of sedges and grasses line the bed of Compton Creek and both trees, shrubs and grasses line the banks of the River upstream from the Sepulveda Dam to Balboa Blvd. Oxygen content is high in moving parts of the River for several reasons; shade from trees, the agitated shallow water exposes a large surface to the air, oxygen consuming debris is washed away, and the water is often cooler in water that is constantly moving. As a result, these areas are rich with animal, plant, and macro-invertebrate life and are excellent places to conduct biotic surveys when it is not raining.

The Soft Bottom Section of the Los Angeles River is from Anaheim to the concrete lip at Willow Street; 7, 683.80ft or 1.46 miles. The actual river would be Ocean Blvd. The rest is the mouth, so from Ocean Blvd. up to the soft-bottom-ending concrete lip at Willow would be 13, 358.49 ft. or 2.53 miles. The City of Long Beach ends at the Los Angeles River at 70th Street. Anaheim to 70th Street is 36,390.75 ft. or 6.89 miles. Ocean Blvd. to 70th Street is 41,915.01 ft. or 7.94 miles.

What keeps these soft bottom areas green and thriving in a "Seasonal River"?

Tertiary-treated effluents from three publicly-owned treatment works (POTWs) dominate dry-weather flows in the river on the coastal plain. Their treatment capacities range from nine-million gallons per day (MGD) for the Burbank Water Reclamation Plant (WRP) to 20 MGD and 80 MGD for the Los Angeles Glendale and Los Angeles D.C. Tillman Water Reclamation Plants, respectively (Table 1). Las Virgenes Municipal Water District's Tapia Plant is permitted to discharge 2 MGD to the Los Angeles River at certain times of the year, but generally discharges much less. These facilities produce recycled water for landscape irrigation and industrial processes. The rest is discharged to surface waters, with the Tillman Plant's discharge first being used for recreation enhancement in Lake Balboa, Wildlife Lake, and Japanese Garden Lake, before flowing into the river.

Photo by Peter Bennett, Citizen of the Planet

History of the Los Angeles River

The Greatest Generation tamed a lush, yet unpredictable Mediterranean ecosystem that we now know as the Los Angeles River. To understand this watershed, we must know it's history.

The Mediterranean ecosystem occurs only in five small areas in the world: Chile, South Africa, Australia, Southern California into Baja California Mexico, and of course the areas bordering the Mediterranean Sea.

Going back a few centuries, the first known description of the area that was to become Los Angeles was penned in 1769 by Spanish explorer, Juan Crespi: "Through a pass between low hills, a spacious valley well-grown with cottonwood and alders, among which ran a beautiful river." The mature crops that were harvested by the Native Tongva gave the explorers hope that this land could become a future settlement.

Fast-forward into the boomtown of the City of Angels, where the L.A. River was the sole source of water for the city. The El Pueblo area was fed by water-wheels into brick-lined channels called the "Zanja System." The main water line to the City of Los Angeles, known as the Zanja Madre or "Mother Ditch," came from a water-wheel near the Spring Street Bridge. During the floods of 1914 all the water-wheels in and around the Los Angeles River were destroyed. But there was little worry, since the year prior, William Mulholland had built his 223 mile-long pipeline to the Owens River Valley that fed this growing city its necessary water supply.

It was at this point that the Los Angeles River became a useless entity and was turned into a dumping ground for everything from lame horses to household trash. As the L.A. River became an ever-growing eyesore, the Great Flood of Los Angeles (1938) was the straw that broke the camel's back. The City of Los Angeles was ready to give up its rights to the river and hand it over to anyone who could keep the city streets dry and direct the water as quickly as possible into the Pacific Ocean

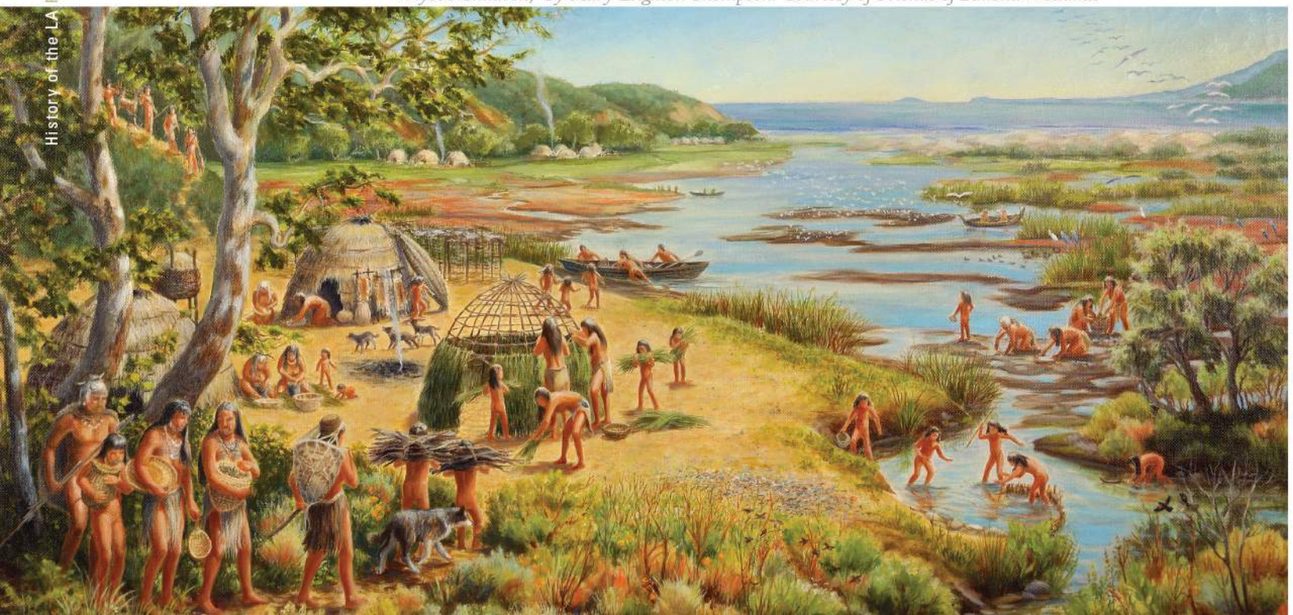
The United States Army Corps of Engineers was up to the task. It took in 3 million barrels of concrete and created 17,000 jobs for day-laborers, who came from far and wide after hearing about opportunities to work on this engineering marvel. Today, we see areas of the river, such as the Glendale Narrows, where the high groundwater table pushed up the concrete over the years to expose dormant native plants, which began to thrive. This natural-bottom area, along with two

others in the Sepulveda Basin and Willow Street (in Long Beach), are good examples of concrete overrun by native plants, and what can be done to restore other areas of this concrete wonder that was once a thriving riparian wetland.

Much of what the River looked like hundreds of years ago exits only in tiny fragments along our mostly channelized River of today. The history of the River has been ever changing as topography; weather and human settlement have all had their influence. Thousands of years ago, the LA Basin was largely grassland with the Los Angeles River meadnering its way through basin to the ocean. Naturally shallow, the River flooded and changed course throughout the year. Before it was channelized, the L.A. River shifted course several times across the coastal plain). Flooding deposited rich soil and created marshes and small ponds throughout the LA Basin turning it into a rich alluvial plain that in turn created ecologically diverse habitats for wildlife.

1000 + YEARS AGO The Tongva people were the original settlers along the Los Angeles River and they developed a way of life uniquely suited to this area. The lush environment provided them with food, water, clothing and tools. The Tongva acknowledged and respected their environment and the natural climate cycles of flooding and drought and built their settlements accordingly. Their dwellings were made out of willow and tule and located on higher ground well outside the floodplain.

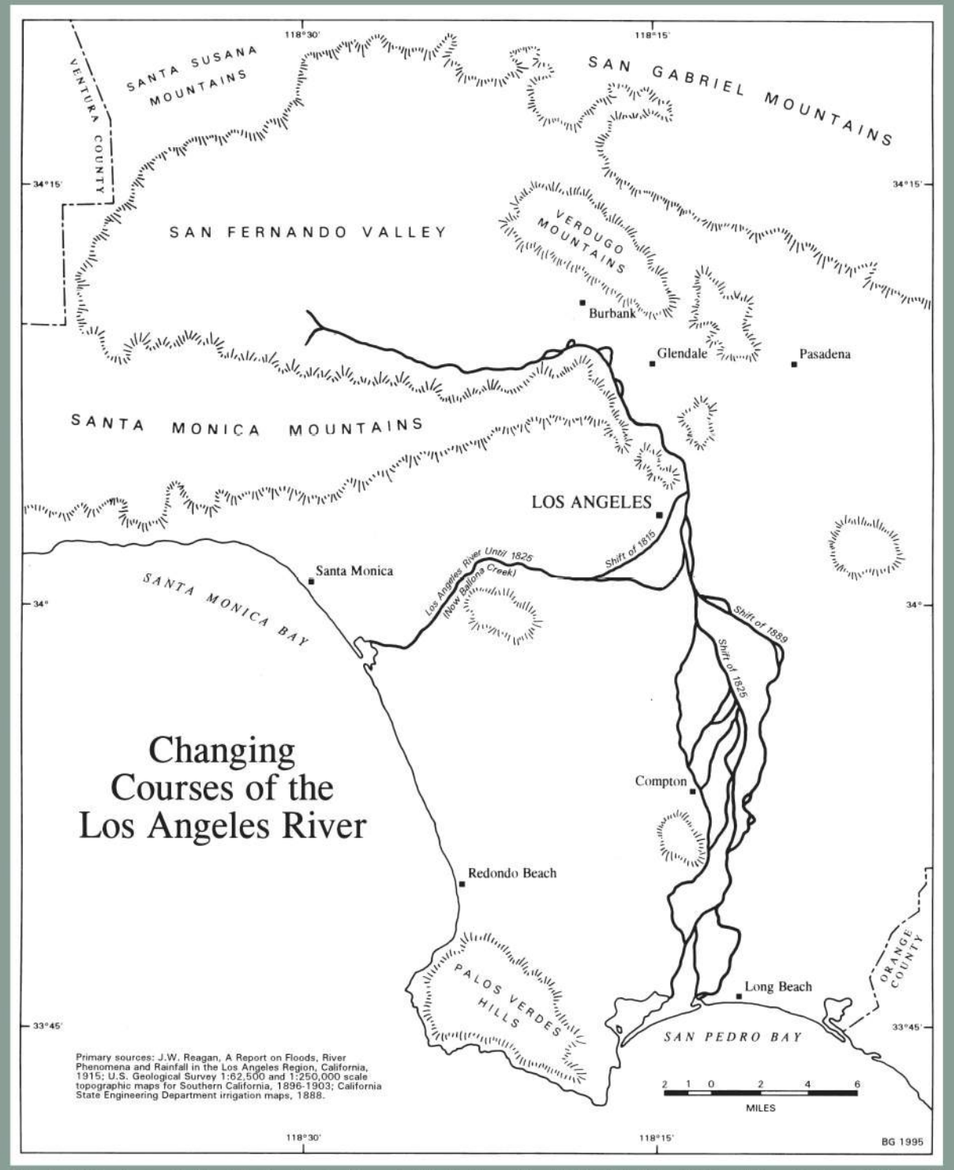
"Wiyot's Children," by Mary Leighton Thompson. Courtesy of Friends of Ballona Wetlands



A HISTORY OF FLOODS

The first major flood to affect the city occurred in 1815. The pueblo was washed away, and a new one was built. Since that time the River changed its course several times and ran into what is now Ballona Creek. In 1825, another flood caused the River to change its course again. This time it flowed south to Long Beach. The River was known to flow gently for many years of low rainfall, and then rage wildly during occasional years of flooding. Because of the ever- changing nature of the River, settlements could be safe for years, then be washed away overnight. During the recorded history of Los Angeles, the River changed course at least nine times.

Left: The Los Angeles River floods along the Riverside / Figueroa Bridge, then known as the Dayton Avenue Bridge. Right: The Los Angeles River floods Ventura Blvd. at Laurel Canyon, 1938.



Map by Blake Gumprecht, from The Los Angeles River: Its life, Death and Possible Rebirth. Johns Hopkins University Press. 1999 pg. 30

Long Beach 1784-1949

1784: The area that is now Long Beach was first settled as part of a massive Spanish land grant to soldier Manuel Nieto, encompassing the historic 28,000-acre Ranch Los Alamitos and its sister rancho, 27,000-acre Rancho Los Cerritos.

1866: Rancho Los Cerritos was sold to Lewellyn Bixby and then managed by his brother Jotham. The Bixby family soon became prominent ranchers and developers of Long Beach.

1882: Long Beach, originally planned as Willmore City by developer William Willmore, began forming along the coast.

1885: Competition between the new Santa Fe Railroad and older southern Pacific Railroad attracted hordes of visitors to Long Beach and created a real estate boom.

1888: Original residents of the foiled Willmore City renamed their town Long Beach, after its long, wide beaches, and the city became incorporated.

1902: The introduction of the Pacific Elecric trolley caused the city to grow both as a resort and commercial center.

1902: From 1902 to 1910 Long Beach was the fastest growing city in the United States.

1911: The Port of Long Beach was established.

1921: Oil was discovered on Signal Hill. Long Beach flourished with a million-dollar-per-month building boom downtown.

1933: Long Beach was struck by a major earthquake. Downtown Long Beach was rebuilt in Art Deco style.

1941: The U.S. Naval Shipyard dry dock built to service the largest naval ships.

1947: The first and only flight of Howard Hughes' Spruce Goose, the world's largest airplane, took off over Long Beach Harbor.

1949: California State University Long Beach was founded.*

*FOLAR would like to thank Dr. Gossett at California State University Long Beach who has worked from 2007-2016 and beyond, on all things Fish/Science related within the L.A. River Watershed.

From the Archives of the Historical Society of Long Beach. April, 1939.

History of Long Beach

The Los Angeles River was even more footloose as it reached the ocean in Long Beach. Before 1825, the Los Angeles River ran under a bluff between the present Main and Los Angeles streets before turning west into the ciénegas – the sloughs and willow forests that lay between the Baldwin and Beverly hills in the Cahuenga Valley. After 1825, the river flowed more or less south and emptied into San Pedro Bay. This channel, however, was only provisional.

Just a few inches of sudden rain could send the river down one of its old beds. At one point in the late 19th century, the San Gabriel River captured the Los Angeles River north of the Lakewood area, and the merged rivers flowed together to the sea at Long Beach.

More flooding in 1884 led to the start of channelization of the wayward river, beginning with a system of dikes and levees at the foot of downtown Los Angeles. By 1910, the Los Angeles River was bound for much of its course south of the city by levees and railroad embankments. These mostly kept the poorly defined southern reach of the river in its "official bed." (In reality, the bed was only lines on a map.)

From the Archives of the Historical Society of Long Beach., Lawrence Inman, 1931.

Thanks to the Historical Society of Long Beach (HSLB) for these great photos of the Los Angeles River decades ago as it ran through our study area. Visitors to the HSLB will find much to enjoy. With a collection that dates back to the 1880s, there is something for everyone. The HSLB has one of the broadest collections of the city's history. Whether your interest is architecture, photography, early film studios, the Navy, your own home and neighborhood, the Pike, the city's schools, or local city government, you will probably find something in their collection that will intrigue you.

STUDY OVERVIEW

WHERE THE CONCRETE MEETS THE OCEAN: Fish of the LA River in Long Beach

by Rosi Dagit
Senior Conservation Biologist
Resource Conservation District of the Santa Monica Mountains (RCDSMM)

In 2008, FoLAR published the results of a survey of fish species composition and abundance in the Glendale Narrows. That report recognized the need to examine other reaches of the river, in particular, the river mouth.

With the goal of finding ways to recover the population of iconic, federally endangered southern steelhead trout in mind, we conducted three surveys of the one mile reach where the concrete ends at the Willow Street Bridge, downstream to the Pacific Coast Highway bridge using a variety of methods and the help of over 130 volunteers.

For a variety of reasons, there have not been many surveys for fish of this lower river reach. Because of its connection through the Long Beach Harbor to the Pacific Ocean, there are confirmed observations of marine species such as sea lions coming as far up as the Willow Street Bridge, where the concrete river bottom begins.

Based on the brackish water conditions and tidal influence, we anticipated finding a mix of both freshwater exotic species such as carp, alongside more marine species like topsmelt. Swift et al. (1993) and Moyle and Davis (2000) generated a list of both native and non-native species likely to occur in freshwater systems which include most of the commonly observed species such as tilapia, carp, largemouth bass, various catfish species, fathead and other minnows, as well as released aquarium species such as Plecostomus.

STUDY AREA

This reach has a soft bottom cluttered with blocks of concrete, rebar, shopping carts and miscellaneous detritus that made pulling seine nets impossible, although we tried! Depth varied with tidal stage, between 1 to over 2 meters in the center of the channel. The banks drop off sharply except for in a few areas where depositional sandbars have formed. Vegetation along the east bank included dense cattails and tules, mixed with numerous non-native annuals and perennials, such as *Arundo donax*, castor bean, and cocklebur. Much of the bank from the channel to the rip rap is routinely mowed to bare earth for flood control purposes. A few scattered willow trees remain and serve both as shade for transient camps and nesting areas. Riparian habitat is slightly more consistent on the west bank, as it is tightly constrained to a 5-10 meter width below the concrete slope, but not as rigorously removed. There is a depositional "island" in the center of the channel just downstream of the Willow Street concrete apron that supports a mixed rookery in mature willows, surrounded by cattail and tule thickets.

Access to the river is down the steep riprap/concrete bank below the bike path and restricted by permits from LA County Flood Control.

Figure 1. LA River Fish Survey reaches 5.13.14

WATER QUALITY

Salinity is variable throughout the reach depending on the tidal stage, but levels from 0 parts per thousand (ppt) were collected on the concrete apron below Willow Street, up to 10 ppt during a high tide.

The pH was between 8-10, which is fairly alkaline. No measurements were taken of turbidity, nutrients or bacteria.

Water temperature varied also with the tidal stage, time of day and season but was found to be between 16 – 29^{o}C, which could be a thermal constraint to the species present. Steelhead prefer water temperatures ranging up to 18^{o}C but can tolerate higher temperatures for short time frames.

FISHING EFFORTS AND RESULTS

The Resource Conservation District of the Santa Monica Mountains (RCDSMM) coordinated with FoLAR to conduct five fishing events in this reach between May 2014 and August 2015. Effort was made to sample over a variety of tidal stages, which also resulted in both morning and afternoon sampling.

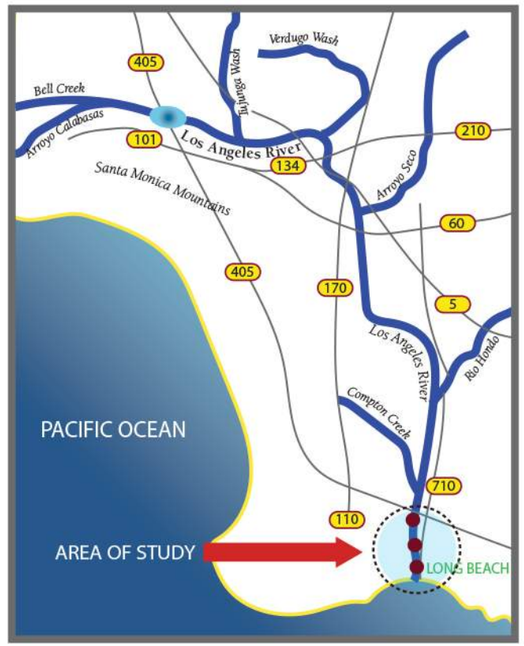
In May 2014, we attempted to utilize blocking and seine nets (10m x 2 m x 2 mm mesh) but were unsuccessful along most of the reach due to snagging the nets on bottom debris. We complimented this effort with the assistance of volunteer anglers using both standard and fly rods. While numerous carp, stripped mullet and topsmelt were observed from the banks and jumping in the channel, landing the fish was very difficult.

Anglers used a variety of baits, from clams and squid to masa balls and various wet and dry flies. Fish were caught on willy worms, trout lures, Crazy Charlie fly, night crawler and red worms.

We obtained use of a shrimp trawl net, but were unable to find a motorized boat to use due to access difficulties. An extremely shallow draft (<2 feet) is needed to pass over a concrete levee submerged at high tide near the Anaheim Rd. bridge. Volunteers helped us creatively organize a flotilla of four kayaks and a floating chair to try and pull the net with paddle power. Although they did a great job and managed to pull the net upstream over ¼ mile, it was too slow and allowed the fish to escape. Definitely a heroic effort! Next time, we really need a boat with a strong motor!

We have also initiated an online project in iNaturalist called Fish of the Los Angeles River. Anglers can sign on and upload photos and data about fish they catch at their convenience. It is through this and other informal connections that we have expanded our species list to include pacu, a south American relative of the piranha!

AREA OF STUDY: LONG BEACH



We hope that as this project expands over time we will be able to learn more about what fish are found in each river reach, spawning events and examine seasonal growth patterns.

Because we caught so few individuals, all were kept on ice, eventually frozen and sent to Dr. Gossett at California State University Long Beach for toxicology analysis. Results of that analysis are pending.

Table 1. Level of Effort and Catch Per Event

DATE/TIME	NUMBER OF PARTICIPANTS	NUMBER OF ANGLERS	FISHING GEAR USED	CATCH
5 May, 2014 0800-1500	28	17	Fly Rods, Standard Rods, Seine Nets, Dip Nets	May 3, 2014 No fish landed by anglers. >500 Mosquitofish, ~500 Fathead Minnows, ~1000 Larval Smelt captured in nets, Carp, adult smelt and stripped mullet observed jumping
4 Oct., 2014 0600-1200	23	15	Fly Rods, Standard Rods	Oct. 4, 2014 3 Northern Anchovies (2-3 inches) dropped by cormorants!
3 Jan., 2015 1345-1645	39	29	Fly Rods, Standard Rods	Jan. 3, 2015 3 carp (22-24 inches) 2 topsmelt (7.8-8.2 inches) stripped mullet observed
28 March 2015 1345-1645	20	14	Fly Rods, Standard Rods	Mar. 28, 2015 2 carp (20-21 inches)
15 Aug, 2015 0730-1500	23	18	Fly Rods, Standard Rods, 6-ft. Shrimp Trawl Net pulled by 4 Kayaks Dip Nets Along Shore	Aug. 15, 2015 1 carp (20 inches) 1 California Killifish (1.5 inches) stripped mullet and smelt sp. observed

Biologist Rosi Dagit (RCDSMM) poses with the "Catch of the Day."

"The Steelhead Trout were avoiding us and the Cormorants were watching us with glee and knew that a dozen grown men and our all-female biology team did not hook anything. One Cormorant showed his sympathy by dropping us our only catch of the day, making Rosi smile with frustration."

Lewis MacAdams

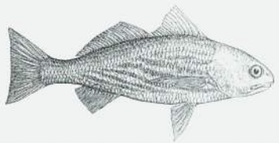
Table 2. Summary of Fish Species Caught / Observed in the Upper Estuary of the Los Angeles River 2014-2015

GENUS NAME	COMMONLY KNOWN AS
Atherinops affinis	Topsmelt
Cyprinus carpio	Carp
Engraulis mordax	Northern Anchovy
Gambusia affinis	Mosquitofish
Mugil cephalus	Stripped mullet
Pimephales promelas	Fathead minnow
Plecostomus sp.	Suckermouth catfish

Jenna Krug inspects a bag of *Gambusia affinis*.

Fish Found in the LA River at Long Beach in 2002

California Halibut, 69 cm in length



White Croaker, 23.1 cm in length

Barred Sand Bass, 33.2 cm in length

NEXT STEPS

The path to recovery for southern steelhead in the LA River is still extremely challenging, and the overall regional population status is quite dire, with fewer than 500 anadromous adults thought to be found between the Mexican border and San Luis Obispo. However, this species has shown its tremendous resilience, evolving to cope with the extremely variable ocean and freshwater conditions of southern California. In other places where fish passage barriers have been removed, habitat restored and water quality improved, fish have returned.

We know that we will never return the Los Angeles River to the meandering riparian corridor that historically supported steelhead, but we definitely can take action to improve conditions to the point where it would be feasible for native species such as the Arroyo chub, Santa Ana sucker, Santa Ana Speckled dace could once again recolonize reaches upstream like the Glendale Narrows and Sepulveda Basin areas.

For steelhead, it is more complicated. We suspect that some of the wild rainbow trout in the upper reaches of the watershed could become anadromous if we could restore connection to the ocean. That means we need to make thermal refugia, flow adjustments, improve water quality and expand riparian habitat to support benthic macroinvertebrate food sources. It also means we need to provide passage for ocean anadromous adults to get upstream to restored spawning and rearing areas.

It took significant effort to encase the Los Angeles River in concrete many years ago, and on-going effort to maintain that system. Similarly, it will take significant and coordinated efforts to restore the function of the river so that it could once again support native species like southern steelhead trout.

FoLAR, the RCDSMM and many other partners hope to spread that vision so that step by step, our actions accumulate and build together towards that goal.

FIELD NOTES: Day 1

by Rosi Dagit
Senior Conservation Biologist / Resource Conservation District of the Santa Monica Mountains

Arrived at meeting site - pedestrian access ramp to bike path at DeForest and 25th Street, Long Beach.

0830- Safety briefing and logistics review
0900 Drove Rosi's truck and Kevin Reed's truck (with kayak) along the bike path about half way between the oil pipe and PCH bridge.
Hiked all gear down the riprap bank and staged near the willow tree.

WEATHER
Sunny, warm, NE breeze (beaufort 2-3)

GENERAL NOTES
FoLAR had organized a creek clean up help on 11 May during which they observed fish jumping in a small pool under the Pacific Coast Highway (PCH) bridge. They also outlined several killdeer nests with caution tape to prevent disturbance.

High tide: 0928

A. HABITAT MAPPING and WATER QUALITY
Because the habitat was consistent between the PCH bridge and oil pipeline, we decided to start the habitat mapping at the large willow tree located approximately two-thirds upstream from PCH and the oil pipeline. Using the willow as our starting point, the habitat mapping team (Steve Williams, Richard Brody, Jayni Shuman) pulled a meter tape upstream to map the habitat.

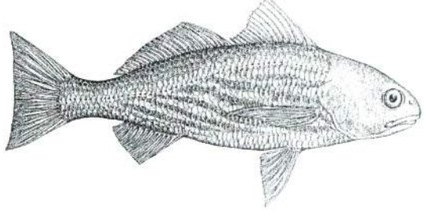
REACH 1 – Upper estuary to the oil pipeline (33.80259, -118.20174)

Habitat type: channel/estuary
Length: 0-212 meters
Wetted Width: 80 meters
Average depth: 104 cm (measured from kayak)
Maximum depth: 174 cm (thalweg may have been deeper but hard to find)
Substrate: silt and sand dominant, riprap along banks and scattered throughout
Flow not measured but steady
Little instream habitat complexity observed due to turbidity and poor clarity
East (right) bank vegetation: 90% cover along the bank composed of tules, castor bean, grasses, numerous non-native species, all under 2 meters tall
West (left) bank vegetation: 90% cover along the bank composed of tules, castor bean, grasses, numerous non-native species, all under 2 meters tall

WATER QUALITY

0930 by the willow tree, east bank
Surface salinity: 6 ppt
Dissolved O_2 – 7.18 mg/l, 78.4 %
pH: 8.44
Conductivity: 9500 µS/cm
Water Temp: 18.6ºC

No algae observed.



Karen Hondrick, Sandra Albers along east bank of Reach 1
Photo by Rosi Dagit

REACH 2 – Oil pipeline upstream to riffle complex (33.80259, -118.20174)

Habitat type: 212-346 meters
channel/estuary, 345-445 meters – riffle/cascade
Wetted Width: 80 meters
Average depth: estimated at 100 cm
Maximum depth: estimated at over 170 cm (consistent with lower reach)
Riffle/cascade depth: estimated at 30-50 cm
Flow too strong to allow safe measurement.
Substrate: silt and sand dominant, riprap along banks and scattered throughout
East (right) bank vegetation: 90% cover along the bank composed of tules, castor bean, grasses, numerous non-native species, all under 2 meters tall
West (left) bank vegetation: 90% cover along the bank composed of tules, castor bean, grasses, numerous non-native species, all under 2 meters tall

Approaching the pipeline, the channel split, with a shallow (<50cm) backwater side channel on the east bank.

Riffle/cascade was approximately 3-5 meters wide, cobble and boulder dominated

WATER QUALITY

1100 just upstream of the pipeline

Surface salinity: 0 ppt	Dissolved O_2 – 16.9 mg/l, 197 % (high flow)
pH: 9.27	Conductivity: 2400 µS/cm
Water Temp: 23^{o}C	Air T: 33.1oC

Little algae observed in the deeper area, but 60% attached cover of boulders in riffle.

REACH 3 – Riffle complex – pool ends at Willow Street Bridge concrete apron (33.80313, -118.20506)

Habitat type: mid- channel pool upstream of riffle complex
Length: 445-500m
Wetted Width: 100m estimated for pool,
Average depth: 60cm
Maximum depth: estimated over 170cm
Substrate: mix of riprap boulders, rebar, concrete blocks, sand, silt. Very mucky, with lots of hydrogen sulfides released with seining. Heavy siltation on boulders observed.

WATER QUALITY

1300 just below the Willow Ave. concrete apron

Surface salinity: 0 ppt	Dissolved O_2 – error reading
pH: 10.04	Conductivity: 1060 µS/cm
Water Temp: 30.3^{o}C	Air T: 30^{o}C

Willow dominated island in the middle of the pool with a variety of grasses, tules along the perimeter.

100% cover of attached algae (Cladophora?) observed on concrete apron.

Photos by Rosi Dagit

B. FISH SURVEY – Angling

Anglers (Bob and Harrison Blankenship, Ken Wheeland, Craig deRecat. Francis Willis, Kevin, Ezekiel and Finn Reed) fanned out along the east bank both downstream and upstream of the willow start point.

All anglers observed carp, mullet and silverside/smelt type fish (~10inches) jumping in the mid channel.

A variety of baits and gears were used, including mussels, squid, anchovies, wooly buggers, douser minnows, marshmallows, cheese, bread, catfish "stinkbait" and bare lures.

Using the kayak, carp were caught but not landed in the main channel and under the PCH bridge.

Anglers targeted the riffle complex with no success.

No fish were landed by the anglers.

C. FISH SURVEY – Seining

Several teams using 2-3m x 1 m 0.25mm mesh seine nets conducted a total of 30 pulls varying from 5-10 meters long.

REACH 1 – Upper estuary to the oil pipeline (33.80259, -118.20174)

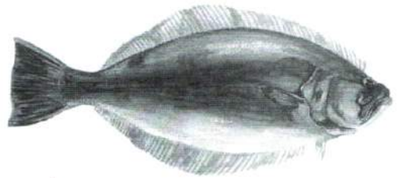
10 pulls along the east bank near the vegetation (too deep to seine more than 2 meters from bank)

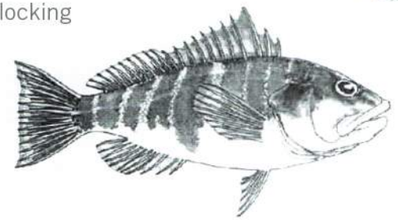
RESULTS: >500 Gambusia mostly <5cm, one 5-10cm

REACH 2 – Oil pipeline upstream to riffle complex (33.80259, -118.20174)

5 pulls along the east bank, 5 pulls across the channel west – east
Set blocking nets from east bank extending mid-channel, then did 4 seine pulls from upstream to downstream.
Observed carp, silversides/smelt and possibly striped mullet jumping in this reach, concentrated just downstream of the riffle.

RESULTS: >300 topsmelt larva (3.5cm) (collected voucher samples for further identification)
Few Gambusia (<100)
1 ~10" carp jumped out, hit Jenna in the face and overtopped the blocking net to escape.





West Bank

East Bank, Looking Upstream

Photos by Rosi Dagit

REACH 3 – Riffle complex pool ends at Willow Street Bridge concrete apron (33.80313, -118.20506)

This reach was extremely difficult to seine due to riprap and concrete blocks and rebar debris. Each step into the muck released clouds of hydrogen sulfide and turbidity. Majority of boulders were covered with silt.

Observed no fish jumping in this pool.
Tried several strategies to seine, including pulling nets from riffle to the island, setting 3 seines as blocks at the upstream end of the riffle and holding for 2 minutes.

RESULTS: 100-500 topsmelt larva (3.5 cm), <50 Gambusia, <50 fathead minnows
1 dead crayfish observed near riffle

FISH SPECIES SUMMARY

Captured in seines:		
Atherinops affinis	**Topsmelt**	**>1000**
Gambusia affinis	**Mosquitofish**	**>500**
Pimephales promelas	**Fathead minnow**	**>500**

Photos by Rosi Dagit

Photos by Rosi Dagit

Downstream end of riffle complex

Looking west across downstream end of pool and riffle inlet

Upstream end of riffle complex, pool tail

Larval silversides/topsmelt and fathead minnows captured

Larval silversides/topsmelt and fathead minnows captured in reach 2 and 3

Louis Sahagun, Karen Hondrick, Cassanddra Davis and Rosi Dagit setting blocking net downstream of the riffle complex

Observed/hooked not landed:

Atherinops affinis	Topsmelt
Cyprinus carpio	Carp
Mugil cephalus	Stripped mullet

Trash in seine nets:

Condom	Surgical glove
Tea kettle	Doritos bags
Ketchup	Trash bags
Men's brown sock	

SURVEY ENDED 1345

Moved trucks closer to Willow Ave to make loading easier. Used the grouted riprap to carry gear back up to bike path.
Cooler was stolen from the bed of Rosi's truck between lunch and 1345.

OTHER OBSERVATIONS

10 red eared sliders basking on rocks near oil pipeline bank
4 more turtles (species not identified) basking on rocks upstream of pipeline.
Osprey in willow tree at start of survey.
Killdeer nesting on east bank area (4 nests observed, probably more).
Black neck stilts nesting on west bank and willow island near Willow Ave. Bridge.

A partially eaten dead dog was observed between 346-445 meters on the east bank, being fed upon by a healthy looking coyote. Tag still present so called the owners to let them know what happened. Dog had taken off several days ago. Rich got a great shot of the coyote!

Participants: Lewis MacAdams (FoLAR), William Preston Bowling (FoLAR), Jo Nelson (FoLAR), Sabrina Drill (UCCE), Dr. Rich Gossett (CSULB-IIRMES), Rosi Dagit (RCDSMM), Delmar Latheres (RCDSMM Stream Team), Jenna Krug (RCDSMM), Jayni Shuman (RCDSMM Stream Team), Steve Williams (RCDSMM), Sandra Albers (RCDSMM), Richard Brody (RCDSMM), Ken Wheeland (RCDSMM Stream Team), Lizzy Montgomery (WSP-RCDSMM), Crystal Garcia (WSP-RCDSMM), Kevin Reed (RCDSMM Stream Team), Ezekial Reed (RCDSMM Stream Team), Finn Reed (RCDSMM Stream Team), Craig deRecat (RCDSMM Stream Team), Karen Hondrick (RCDSMM Stream Team), Robert Blankenship (Trout Unlimited), Harrison Blankenship (Trout Unlimited), Kim Thompson (Aquarium of the Pacific), Marilyn Padilla (Aquarium of the Pacific), Cassandra Davis (Aquarium of the Pacific), Francis O. Willis, Louis Sahagun (LA Times – Reporter), Rick Loomis (LA Times – Photographer)

Birds observed:

Great blue heron
Tricolored heron
Snowy egret
Common egret
Pigeon gullemot
Black neck stilt
Killdeer
CA gull
Caspian tern
Osprey
Northern rough winged swallows
Cliff swallows
Mallard families
(with at least 6 ducklings)
Cormorant
Crows
Red-winged blackbird
Coots
American Kestrel
Common yellowthroat
Song sparrow
House finch

FIELD NOTES: Day 2

by Rosi Dagit
Senior Conservation Biologist / Resource Conservation District of the Santa Monica Mountains

At 0600, Volunteers signed in and took their fishing gear and buckets down to the river. Folks were requested to fish between the Willow Street and PCH bridges.

WEATHER
We started at dawn with cool temps in 14^{0}C, clear skies. Air temperature increased to ~30^{0}C by 1000.
High Tide was at 0715.
We observed flow downstream of Willow Ave Bridge continuously. Foam and bubbles covered ~75% of surface just below concrete apron.

GENERAL NOTES
All vegetation on the east bank had been scraped to bare earth leaving scattered patches of tules and cattails along the bank and scattered mature willow trees. A fox was observed darting into a thicket patch. West bank vegetation was less impacted. Three pairs of killdeer were observed but no nests.

Survey Equipment
Buckets
Fish measuring boards Scale
Camera
Dip nets
Data sheets
Thermometer
Refractometer

Angling Gear
Fly rods
Standard rod

Bait tried
Clams
Squid
Glow bugs
Variety of flies
Special masa mix with garlic Tortillas
Cheese worms

WATER TEMPERATURE AND SALINITY

Pattern of salinity increasing moving downstream towards the estuary. Water temperature increased with sun exposure.

TIME	LOCATION SAMPLED	WATER TEMP (*C)	SALINITY (ppt)
0630	Near Willow Ave. Bridge	16	0
0730	Just upstream of Pipe Bridge	17	4
	Willow tree downstream of Pipe Bridge	17	7
	Downstream of Willow tree	17	10
1000	Just below Pipe Bridge	20	4

FISHING RESULTS

Although several large carp were observed swimming, no fish were caught on any gear. Three northern anchovies were dropped by birds and picked up along the shore. These were given to Dr. Gossett who will hold them until we get more and then conduct the toxic analysis.

SURVEY RESULTS

Upon signing the release form to participate, anglers were asked to provide the following information:
Have you fished in the LA River before?
How often?
What Location?
What did you catch?
What bait did you use?
A total of 13 anglers had previously fished in the LA River.
Most fished between once a year, several times monthly and weekly.

What Anglers Told Us About Fishing in the LA River:

Locations Fished
Glendale Narrows
Throughout softbottom section
Long Beach

Fish Caught
Carp
Largemouth bass
Green sunfish

Bait Tried
Dry flies
Tortillas
Ghost shrimp

Birds Observed
Coots
Green Heron
Osprey
Black Neck Stilts
Great Blue Heron
Double Crested Cormorants
Belted Kingfisher
Osprey
Gulls (unid)
Kildeer (3 pairs)

The Anglers.

The catch!

Site condition

Looking downstream from pipe overcrossing

Looking upstream to Willow Ave. Bridge from bike path access ramp

Participants: William Preston Bowling (FoLAR), Shelly Backlar (FoLAR), Jo Nelson (FoLAR), Sabrina Drill (UCCE), Dr. Rich Gossett (CSULB-IIRMES), Rosi Dagit (RCDSMM), Robert Blankenship (Trout Unlimited), Drew Irby (Trout Unlimited), Francis O. Willis, Jim Burns (LA River Flyfishing), Christian Gomez, Ansel Trevino, Roland Trevino, Tim Okasaki, Jocelyn Davis, Anelle Samuelson (USC Film Student), Andres Aguilar (Cal State LA), Ray Webb, Rowland Santos, Roland Inocentes, Shawn Warren (FoLAR), Jack Powell (Cal State LA), Doug Shepard

Above photos by Rosi Dagit

FIELD NOTES: Day 3

by Rosi Dagit
Senior Conservation Biologist / Resource Conservation District of the Santa Monica Mountains

At 1345 - 1345 Volunteers signed in and took their fishing gear and buckets down to the river. Folks were requested to fish between the Willow Street and PCH bridges.

WEATHER
We started with clear sunny skies, light breeze and water temperature of 16ºC. Low Tide was at 1316 . Flow was definitely mixed.

GENERAL NOTES
Areas of pooled water remained as evidence of high flow events associated with the December 2014 rains which dropped close to 4 inches into the system. Chuck Kopczck from the CA Science Center kayaked with GPS and lead line to sound the depths in preparation for a possible trawl survey.

Survey Equipment Used
Buckets
Fish measuring boards
Scale
Camera
Dip nets
Data sheets
Thermometer

Water Temperature and Salinity
No salinity measurements taken.
Water temperature taken only once at 1500.

Angling Gear
Fly rods
Standard rod

Bait Tried
Variety of flies
Special masa mix with garlic
Wolly worms
Trout lures
Gulp Alive

FISHING RESULTS

Anglers at work.

Although several large stripped mullet were observed swimming, none were caught on any gear.

Carp – 22" TL, 2.77 kg (5.94 lbs) Steve Simon on trout lure
Carp – 23.2 TL, 3.1 kg Nigh Faught on willy worm
Carp – 24 " TL, 3.4 kg Greg Madrigal on Crazy Charlie fly
Topsmelt – 7.8 inches (20 cm) TL, 0.05 kg Greg Armijo on night crawler
Topsmelt – 8.2 inches (21 cm) TL, 0.06 kg Greg Armijo on red worms

Whole fish were frozen and were picked up from RCDSMM by William Preston Bowling (1.5.15) and taken to Dr. Gossett on January 6, 2015.

Chuck Kopczck from the CA Science Center kayaked with GPS and lead line to sound the depths in preparation for a possible trawl survey.

What Anglers Told Us About Fishing in the LA River:

Locations Fished
Glendale Narrows
Marsh Park
Long Beach

Fish Caught
Carp
Largemouth bass
Green sunfish
Bluegill
Tilapia

Bait Tried
Dry flies
Tortillas
Ghost shrimp
Glowbug fly
Plugs
Corn
Flies
Squid

Birds Observed
Coots
Double Crested Cormorants
Great Blue Heron
Osprey
Cinnamon Teal
Black Neck Stilts
Green Heron
Belted Kingfisher
Gulls (unid)

Photos by Rosi Dagit

SURVEY RESULTS

Upon signing the release form to participate, anglers were asked to provide the following information:

Have you fished in the LA River before?
How often?
What Location?
What did you catch?
What bait did you use?

A total of 27 anglers had previously fished in the LA River.

Most fished between once a year, several times monthly and weekly.

Observed no fish jumping in this pool.
Tried several strategies to seine, including pulling nets from riffle to the island, setting 3 seines as blocks at the upstream end of the riffle and holding for 2 minutes.

Participants: *William Preston Bowling (FoLAR), Shelley Backer (FoLAR), Jo Nelson (FoLAR), Sabrina Drill (UCCE), Rich Gossett (CSULB-IIRMES), Rosi Dagit (RCDSMM), Robert Blankenship (Trout Unlimited), Jim Burns (LA River Flyfishing), Steve Simons (LA River Rod and Reel Club), Nick Faught, Greg Armijo, Zino Nakasuji, John Tegmeyar, Luis Rincon, Jack Mayfield, Robert Mayfield, Donald Bell (South Bay Flyfishers), James Ragan, Douglas Lock, James Trombetti, Steve Hollowell, Chuch Kopczak (CA Science Center), Jesus Corona, Zenna Evans, Chris Evans, Will Friday, Sierra Friday, Kamakshi Hart, Greg Madrigal, Stan Adermann, Donald Goldsobel, Ban Luu (FoLAR), Moises, Jonathan Chiner, Nicholas Ekdahl, Paul Cruz, Emily Cruz, Jacob Cruz, Theodore Yeager*

Carp 2 with Nick Faught

Topsmelt

Site Condition Photos

Looking downstream from bike path access

Looking upstream to Willow Street Bridge from bike path access ramp

Photos by Rosi Dagit

FIELD NOTES: Day 4

by Rosi Dagit
Senior Conservation Biologist / Resource Conservation District of the Santa Monica Mountains

At 1345 Volunteers signed in and took their fishing gear and buckets down to the river. Folks were requested to fish between the Willow Street and PCH bridges.

WEATHER

We started with clear sunny skies, and light breeze. Air temp got as high as 40^{o}C!
Low Tide was at 1227. Flow was definitely mixed incoming. High tide was at 1917.

GENERAL NOTES

Bank vegetation is regrowing. Nesting killdeer were observed in several locations and Sabrina even found some eggs in a nest!
High tide: 0928

WATER TEMPERATURE AND SALINITY

Water samples were collected at the bottom of the riffle complex just downstream of the Willow Ave. Bridge.
29^{o}C at the start time (1400) and dropped to 28^{o}C with incoming tide and wind.
Salinity stayed at 0ppt for the whole event.

Survey Equipment Used
Buckets
Fish measuring boards
Scale
Camera
Dip nets
Data sheets
Thermometer
Refractometer

Angling Gear
Fly rods
Standard rod

Bait Tried
Variety of flies
Special masa mix with garlic
Wolly worms
Tortilla Fly
Clouser Minnow

FISHING RESULTS

Although several large stripped mullet were observed swimming, none were caught on any gear.
Carp – 21" TL, 2.25 kg
Tod Suttle on tortilla fly Carp – 20 TL, 2.0 kg
Mike Ward on clouser minnow
Whole fish were frozen and were picked up from RCDSMM by William Preston Bowling of FoLAR and taken to Dr. Gossett.

SURVEY RESULTS

Upon signing the release form to participate, anglers were asked to provide the following information:

Have you fished in the LA River before?
How often?
What Location?
What did you catch?
What bait did you use?

Six new fishers participated, and the rest of the fishers had previously fished in the river, monthly and bi-monthly, with carp and flies.

What Anglers Told Us About Fishing in the LA River:

Locations Fished
Glendale Narrows
Los Feliz
Long Beach

Fish Caught
Carp

Bait Tried
Dry flies

Birds Observed
Coots
Green Heron
Black neck stilts
Great Blue Heron
Double crested cormorants
Belted Kingfisher
Osprey
Kildeer
Gulls (unid)
Mallards

FIELD NOTES: Day 5

by Rosi Dagit
Senior Conservation Biologist / Resource Conservation District of the Santa Monica Mountains

At 0730, Volunteers signed in and took their fishing gear and buckets down to the river. Folks were requested to fish between the Willow Street and PCH bridges. Teams headed Rosi took the kayaking team with Chuck and Bob driving their trucks on the bike path downstream to the put in. It was not possible to drive the trucks into the channel bottom due to high water at both the upstream and downstream access points.

WEATHER

We started with clear sunny skies, light breeze and water temperature of 24ºC. Air temp got as high as 40ºC! Low Tide was at 1620 (1.6). Flow was definitely mixed incoming. High tide was at 1052 (4.6). New moon phase.

GENERAL NOTES

Bank vegetation is regrowing and dominated by sunflowers on the sandy banks. Water was pooled, probably associated with the new moon high tide. Several homeless encampments were encountered near the willow trees. Lots, and lots of trash everywhere. We were able to launch the kayaks through the narrow outfall channel below the culvert where homeless also live. It is shallow almost to the edge of the vegetation, and then drops off to about 4 ' deep. It took about 1 hour and a team of 8 people to haul the kayaks and gear from the bike path down the riprap slope to the channel bottom.

We had hoped to have a dinghy with an outboard motor to work the shrimp net borrowed from SMBRF, but it was not available. We decided to try pulling the net with the kayaks. Two lines were tied to the trawl doors on each side and each one pulled by an individual kayak. Chris followed along using a floating fishing chair to help detach the net when it got snagged.

Tide was incoming and the first pull was upstream from the culvert channel outlet to the sandy bank area just downstream of the pipe overcrossing. It was a tough pull and slow enough so that although schools of carp and stripped mullet, as well as possibly topsmelt were observed, no fish were caught in the net, just a lot of trash. It took approximately 1 hour for them to pull the net that far.

The kayak team decided to give it a try pulling downstream against the tide to return to the starting point. Again it took about an hour to go the distance, and again, nothing but trash was caught, although more schools of fish were observed. While not successful, at least we tried! We need to add weight to the bottom of the net and find motorized pull.

SURVEY RESULTS

Upon signing the release form to participate, anglers were asked to provide the following information: Have you fished in the LA River before? Six new fishers participated, and the rest of the fishers had previously fished in the river, monthly and bi-monthly.
What Location? What did you catch?

Survey Equipment Used
Buckets
Fish measuring boards
Scale
Camera
Dip nets
Data sheets
Thermometer
Refractometer
Shrimp trawl net

4 kayaks
1 floating fishing chair

Angling Gear
Fly rods
Standard rods
Shrimp trawl net

Bait Tried
Variety of flies
Special masa mix with garlic
Wolly worms
Tortilla fly
Clouser minnow
Garlic marshmellows
Corn
Jerk bairs

What Anglers Told Us About Fishing in the LA River:

Locations Fished
Glendale Narrows
Long Beach

Fish Caught
Carp
Largemouth bass
Tilapia

Bait Tried
Dry flies

Birds Observed
Coots
Black neck stilts
Double crested cormorants
Green Heron
Osprey
Great Blue Heron
Gulls (unid)
Belted Kingfisher
Mallards

FISHING RESULTS

Although several large stripped mullet were observed swimming, none were caught on any gear.
Carp – 20" TL, 3.2 kg Zino Nalasyii
CA Killifish - <20 mm, hand caught by Dobin Lee in the shallows along the beach by the pipeline
Whole fish were frozen and were picked up by Dr. Gossett.

WATER TEMPERATURE AND SALINITY

Water samples were collected at the bottom of the riffle complex just downstream of the Willow Street Bridge. 29^{o}C at the start time (1400) and dropped to 28^{o}C with incoming tide and wind.
Salinity stayed at 0ppt for the whole event.

Photo by Peter Bennett

We Found a California Native!!!

Top: Dabin Lee (California State University Los Angeles) smiles at the camera as she catches a Killifish with her bare hands. Bottom: Fundulus parvipinnis (California Killifish)

"After all the thousands of dollars of professional gear hiked into the riverbed to collect fish, it takes a lone college student to summon the *Native Fundulus parvipinnis* (California Killifish) into her bare hands – by far, the most important catch of the day."

— Lewis MacAdams
Founder / President
FoLAR

Friends of the Los Angeles River

OFF THA' HOOK

since 2014

ANNUAL FISHING THROWBACK

Since Senate Bill 1201 (De Leon - signed by Governor Brown) - fishing with a State License in the Los Angeles River as well as recreational Kayaking is now permitted. With that, FoLAR took the lead in 2014 to start the first ever fishing derby along the banks of the L.A. River; "Off tha' Hook" was born. The attention placed on this event was huge, as it was curious as well as the topic of many jokes of fishing in a storm drain. The skepticism was put aside when the press and public were astonished to see families fishing side by side with professional anglers and the press loved it.

Our event is Catch & Release with an experienced angler contest including a kids fish where anglers teach kids stewardship of fishing. In 2015 we had over 100 kids fishing in the Los Angeles River, many of them first-timers. The FoLAR Education Team was on hand to help teach kids about the river and what they can do to keep it beautiful.

With putting on an event such as this and advocating for recreational fishing along the Los Angeles River, FoLAR found that there had been injuries to the wildlife from discarded fishing line. Turn the page to read how a little research and a grant from Trout Unlimited was able to help curb these injuries.

Use the QR Code for Additional Information.

FoLAR's Fishing Line Recycling Program

In 2015, FoLAR began the Fishing Line Recycling Program. Together with Trout Unlimited, FoLAR strategically placed innovative tubes along the river, wherein anglers can deposit used fishing line to keep it from injuring birds and other wildlife.

FoLAR

Friends of the Los Angeles River Celebrating 30 Years in 2016

A partial list of our completed and ongoing achievements leading up to 2016:

Our 3rd Annual Catch-and-Release fishing derby, "Off Tha Hook."
LONG BEACH fish study discovered the Native California Killi Fish
SEPULVEDA BASIN fish study currently in process
Atwater Village Wildlife Protection Corridor in Motion
L.A. River Map (Middle, Lower River Complete)
The Man One L.A. River mural, "Meeting of Styles."
The mobile L.A. River class room, the Los Angeles River Rover
The WDR Working Group: working with the Los Angeles County Flood Control District and the Regional Water Quality Control Board to create a forum for discussion and collaboration rather than conflict and hostility.
2009 "Watershed Wonders" teacher resource guide
"Source to Sea" watershed education
2014 standards-based curriculum tailored to align classroom content to L.A. history, science and art. Students are visited by the L.A. River Rover, design a future river, and explore the L.A. River on a culminating field trip.
FoLAR, in collaboration with The Topanga Film Institute & Festival, created a "Virtual Reality" experience that can bring the river to anyone with a smart phone.
The Frog Spot, located in Frogtown on the banks of the L.A. River

SECTION 3

FISH OF THE LA RIVER PROJECT ON iNATURALIST

by Lizzy Montgomery

Fish of the LA River/Peces del Río de Los Angeles is a citizen science project open to the public at iNaturalist.org. The mission of Fish of the LA River is to encourage collaboration between fish biologists and the Los Angeles area fishing community to collect better data on fish populations in the LA River. This project aims to be bilingual, with directions available in both English and Spanish. iNaturalist.org is an online network of biologists, naturalists, and citizen scientists that facilitates data collection for over 2000 projects (and counting!) across the globe. Citizen science projects rely on citizens to assist with collecting data, making observations, or monitoring. Fish observations added to the Fish of the LA River webpage will be incorporated into the Los Angeles River Fish Study, which aims to characterize the existing fish community and identify ways to restore native fishes to the river. This study is a collaboration between Friends of the Los Angeles River, RCDSMM, UC Extension and other partners.

Anglers anywhere on the Los Angeles River can join the project by creating a free account on iNaturalist.org or with the iNaturalist mobile app, and then searching for 'Fish of the LA River' under the 'Projects' tab. Once on the project page, anglers virtually share their catch by clicking 'add an observation.'

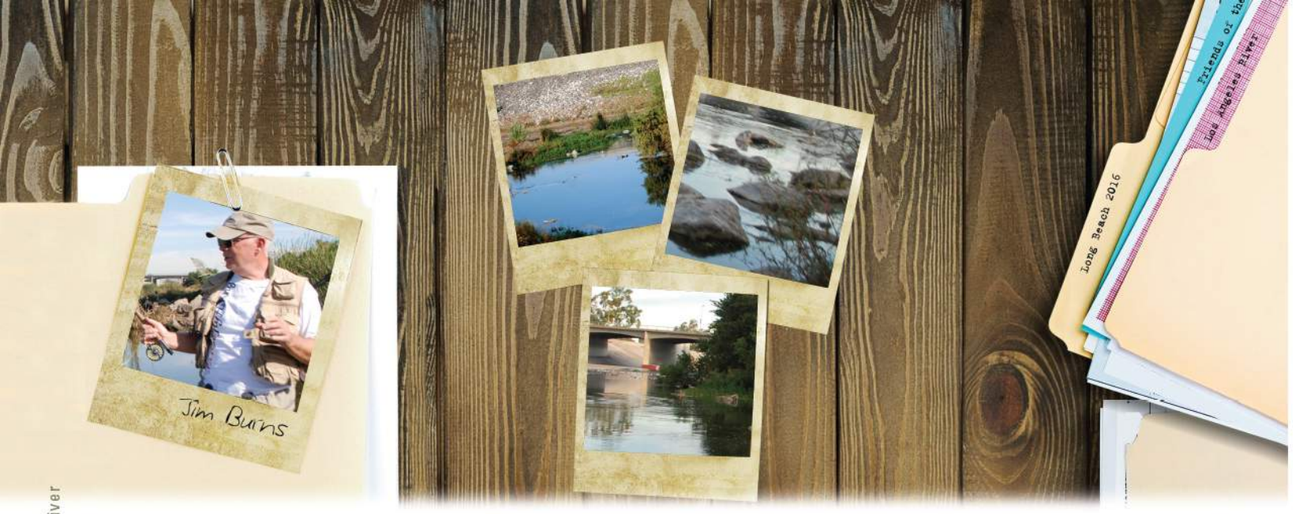
Users are prompted to add a fish photograph, and to answer questions about where and when the fish was caught, as well as fish species, length, weight, and condition. Answering every question is not mandatory; users are asked to share the information they are comfortable giving about the catch. Anglers can add the location of their catch and still keep their favorite fishing spot secret by selecting to obscure their location. With this option, catch location is made available to the study biologists, but not the general public.

When an observation is added to Fish of the Los Angeles River, a fish biologist will confirm the species name, making the observation research grade. Fish data is then downloaded by the project administrators and entered into a scientific database. The data is used to supplement surveys conducted along the LA River in order to better characterize existing fish populations and distribution.

"To date, 35 fish collected by thirteen L.A. River anglers have been added to the iNaturalist project; representing seven different species."

— Rosi Dagit
Biologist
Resource Conservation District
of the Santa Monica Mountains

Learn more about iNaturalist's project, and add your own observations!



ANGLING THE L.A. RIVER

by Jim Burns

Student Media Adviser & Adjunct Professor, Occidental College

Founder, LARiverFlyfishing.com

Of my own fishing adventures, none has been more satisfying than as a sponsor of Off Tha' Hook. Ironically, it's one in which I never cast a fly line into the water, nor raised a fish in to a net.

I remember clearly when William Preston Bowling and I walked the North Atwater section of the river in mid-2014. The day was hot, and from the look of the weeds rhythmically swaying in the Los Angeles River current, internally I was shaking my head. This section of the river, with its access point of treated water, is generally warmer than the rest of the river, making it an excellent winter spot for catching carp. However, for the first fishing derby in river history, FoLAR suggested it be on one of two free fishing days when a California Dept. of Fish and Wildlife fishing license wasn't required.

That decision put the derby in early September, our hottest month, in a spot that was known for winter – not summer – fishing. As I threw my line in, hoping to catch something that first scouting morning with Bill, nothing nibbled and as I am on the superstitious side, it seemed an omen of what could come.

Yet, in the months preceding the derby, something drew me past my own hesitations, a vision of the L.A. River as a healthy, vital place for recreation. In fact, the two recreational zones had popped into being, also in the summer, thanks to California Senate Bill 1201. Kayaking figured prominently in recreational, as well as in media, terms in 2013. But I knew from writing the LARiverFlyFishing blog for several years that, in fact, fishing was the largely untold urban recreational opportunity.

So, we planned, we waited, we fretted. Weeks flew by. I ordered logo-emblazoned T- shirts, then thought myself rather foolish for having done so. I worried about what I would put in my booth above the fishing fray in the park when the "big day" finally arrived. And, closer to that day, I began receiving media calls that, if nothing else, made the event go from the planning stage to real.

And real it was. I'll never forget that early morning in September when all manner of mostly fly fishers came walking into the park to compete: some were young, some old; many sported elaborate gear, gear that spoke of their love of the sport; there was only one woman, yet in a sport largely dominated by men, this was in itself a thrill. And, as I looked at the crowd, it represented Los Angeles in all of its multiracial dynamism.

Part of the beauty of the contest was catch and release for citizen science. Biologists Rosi Dagit and Sabrina Drill measured and weighed each fish before releasing it back into the water. As a member of the "bucket brigade," those who shuttled large orange buckets filled with water and catch from the fisher to the weighing station, my arms felt tired that morning, but my heart felt increasingly full. The event proved the river, even in a not-so-great spot at an awkward time of year, held a viable fishery. The catch, while not spectacular, held both carp and largemouth bass.

After an hour devoted to the adult "professional" fishers, the fun really began as children and their parents carefully picked their way down the rip-rap to the water's edge. Many of the adult fishers stayed on to help the kids, many of whom had never fished before. The free gear, provided by the Los Angeles Rod & Reel Club, brought grins to the kids' faces as volunteers guided their baited hooks into the water.

Years earlier, another seminal experience occurred on the water when three boys on bicycles befriended me. We four went searching for fish off an island of putrid earth, rotting plastic bags and who knows what else. It made me angry that children such as these should have to contend with so much garbage and ugliness in what was possibly the only river they'd ever seen.

Yet as the children at the derby threw their lines into the now cleaner, clearer water, it was almost as if they were casting into the future, one in which the river has been reclaimed for the city. As they age, I hope they will remember that first derby as fondly as I will. We have the beginnings of a river we can all enjoy.

LA River Flyfishing
Fishing for carp, waiting for steelhead

Photo by Peter Bennett, Citizen of the Planet >

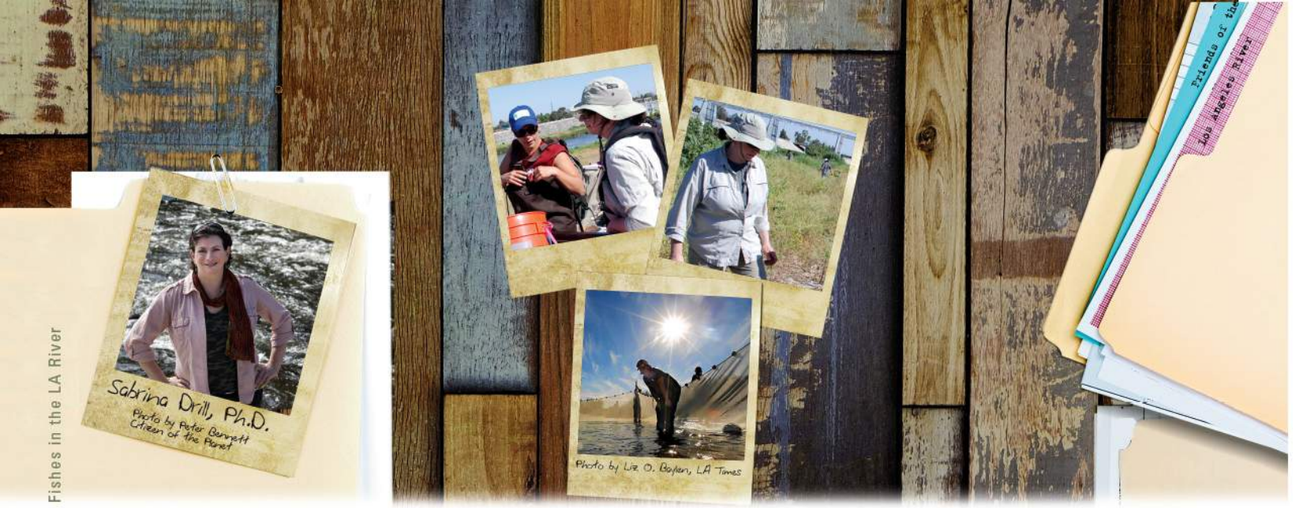
LOWER RIVER FISHING

by Bob Blankenship

The South Coast Chapter of Trout Unlimited had the pleasure of joining FoLAR in their fish survey of the LA River in Long Beach. Since I live in Long Beach I visit and fish this section of the river regularly. I've caught a bunch of big carp, with a few big catfish and some smallish largemouth bass thrown in. It's a great place to get outside and explore with the added bonus that you never know what you are going to catch. I always have in the back of my mind hooking into a sleek steelhead fresh from the ocean – one of the historic residents of the river that still use many of our coastal streams, although in greatly diminished numbers.

Our efforts on the Long Beach section of the LA demonstrated why it's called fishing, not catching. It seems like we had beautiful suntan weather each day of the survey: bright, hot, southern California beautiful. But suntan weather is usually not good fishing weather and we worked hard for the few fish that we were able to catch in Long Beach. Nonetheless, it was heartening to see FoLAR's commitment to the entire river and a great experience sharing the ongoing restoration awareness with the growing community of LA River fans.

Trout Unlimited
South Coast Chapter #923
Conserving, protecting and restoring our country's coldwater fisheries and their watersheds



NATIVE VS. EXOTIC FISHES IN THE LOS ANGELES RIVER

by Sabrina Drill, Ph.D.

Natural Resources Advisor, UC Cooperative Extension

It is without doubt that most of the fish now living in the LA River watershed, and especially within our study area, are not native to the region. Native fishes are predominantly restricted to the upper watershed, above dams such as Sepulveda, Hansen, and Devil's Gate on Arroyo Seco, and to the very lower, estuarine reaches where marine and brackish adapted species may enter the LA River from the ocean. In recent surveys including the work presented here and the earlier FoLAR Fish Study from 2008, no native fishes were collected in the freshwater reaches of the lower river. In the brackish estuarine reach near Long Beach, three native species, California killifish, Northern anchovy, and topsmelt were collected and striped mullet were visually observed but not collected. Instead, most of the river supports a suite of exotic fishes that were observed through research days as well as fishing events upstream, including carp, largemouth bass, fathead minnows, mosquitofish, and various catfish species.

For some, the measure of a "functioning" ecosystem is whether it supports native biodiversity. By that criteria, and many others, the Los Angeles River's in-stream community is failing (the riparian community, on the other hand, supports numerous species of native plants, insects, and birds, along with a suite of exotics).

For others, however, ecosystem "function" is less about its native-ness, and more to be measured on the human scale, and at this, the LA shines more brightly, as in recent years especially the urban community is again embracing it, with active fishing, kayaking, and other forms of recreation and nature enjoyment. Hence, the meaning of the suite of fishes in the river now is open to interpretation, and depends a bit on your starting point. If the reader was unaware that the river had at least the physical and chemical qualities to support fish at all, they may be pleasantly surprised, but if the future desired state of the LA River is one closer to natural, than the fact that the fish community is dominated by exotics is disheartening. It's likely that one of the major factors contributing to a shift from native to exotic species is higher than natural water temperature, which is affected by urban run-off as well as the concrete channel itself storing and radiating heat, and the lack of shade over that concrete especially in the channelized sections that then feed into the natural bottom areas we sampled. In addition to being an indicator that the system is not now supporting native fishes, the exotic species themselves present a problem, as these species may prey on, compete with, or alter physical habitat for native species.

Learn more about
The University of California Cooperative Extension's
Natural Resources Program

NATIVE SPECIES

Native Freshwater Fishes of Southern California		Upland and Lowland
Petromyzonidae	*Lampetra tridentata*	Pacific lamprey
Salmonidae	*Oncorhynchus mykiss*	Steelhead/Rainbow trout
Gasterosteidae	*Gasterosteum aculeatus microcephalus*	Partially armored threespine stickleback
Cyprindiae	*Gila orcutti* *Rhinichthys cf. osculus*	Arroyo chub Santa Ana speckled dace
Catostomidae	*Catostomus santaanae*	Santa Ana sucker
Cottidae	*Cottus asper* *Cottus aleuticus*	Prickly sculpin Coastrange sculpin
Fundulidae	*Fundulus parvipinnis*	California Killifish

Native Species

Native Freshwater Fishes of Southern California		Lowland Only
Petromyzonidae	*Lampetra cf. pacifica*	Pacific brook lamprey
Gasterosteidae	*Gasterosteum aculeatus aculeatus*	Fully armored threespine stickleback
	Gasterosteum aculeatus williamsoni	Unarmored threespine stickleback
	Gasterosteum aculeatus ssp.	Shay Creek stickleback San Antonio stickleback

Marine and Brackish Water

Eucyclogobius newberryi	Tidewater goby
Fundulus parvipinnis	California killifish
Leptocottus armatus	Staghorn sculpin
Platichthys stellatus	Starry flounder
Hypsopsetta guttulata	Diamond turbot
Mugil cephalus	Striped mullet
Atherinops affinis	Topsmelt
Clupea harengus	Pacific herring
Cymatogaster aggregata	Shiner perch

IT ALL COMES DOWN TO SCIENCE

by Dr. Rich Gossett

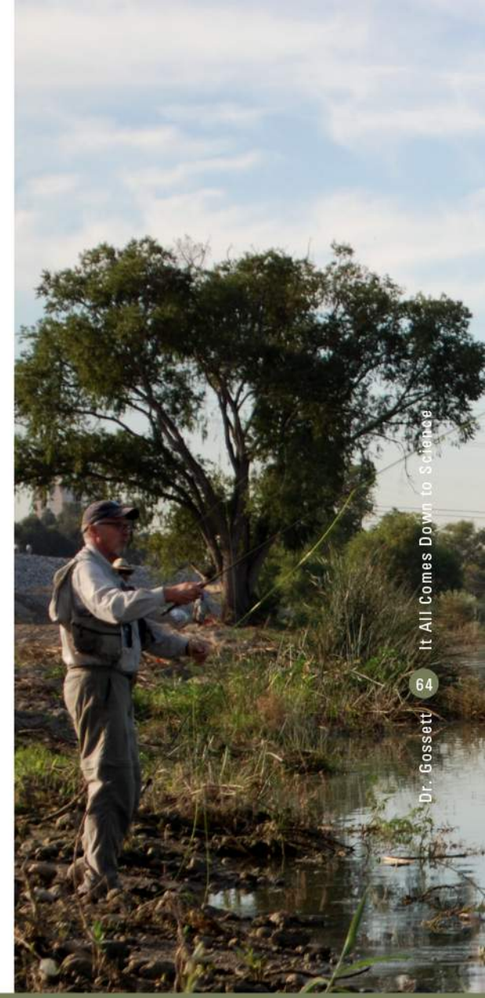
Institute for Integrated Research in Materials, Environment, and Society (IIRMES)

After graduating from CSULB I was very fortunate to land a position in the trace organic chemistry laboratory at the Southern California Coastal Water Research Project (SCCWRP) where I stayed for over 14 years until 1991. My research at SCCWRP originally was focused on DDTs and PCBs in sediments off the PV Shelf and their accumulation in the food web. During that time I worked on an NSF grant on "Seafood Hazards to Man", a grant from NOAA where I published a paper on "Predicting the Bioaccumulation of organic contaminants using Octanol/Water partition Coefficients", PAHs in southern California Harbors, congener-PCB analytical methods, petroleum hydrocarbon fingerprinting, PCB congener fingerprinting and many other projects. Also during my tenure at SCCWRP I founded and served as President of the Southern California Environmental Chemists Society (SCECS).

I am very indebted to all of my colleagues at SCCWRP and my mentors who included Dr. Dave Young, Dr. Alan Mearns, Dr. Dave Brown, Dr. Robert Eganhouse,Dr. Bruce Thompson, Dr. Jeff Cross, and most especially Ted Heesen. Working at SCCWRP was an opportunity of lifetime and I am very grateful for all my time there.

Upon leaving SCCWRP I took a position as supervisor of the Trace Organics Laboratory at Orange County Sanitation Districts new laboratory where I was responsible for the analysis of wastewater, tissues, and sediments using GCMS not only for chlorinated pesticides, PCBS, and PAHs, but also for Volatile Organics and Sulfur Compounds in Air. After leaving OCSD, I decided to try the private sector so I opened CRG Marine Laboratories where I emphasized high quality analytical support and service. In 2009 I was offered a position as Director of the Institute for Integrated Research in Materials, Environments, and Society (IIRMES) at California State University, Long Beach. This position has been a challenge to me to learn many new techniques and instruments including scanning electron microscopy, laser ablation ICPMS, isotope ratio mass spectrometry, LC-ICPMS, Thermoluminescence Dating, and Matrix-Assisted Laser Desorption Ionization (MADLI-TOF-TOF) for Proteomics. And finally, I am still in the private sector and part-owner of Physis Environmental Laboratories in Anaheim.

On the side I enjoy playing jazz and full-court basketball and being with my wife of over 40 years. I have had a very enjoyable career over the past 35 years and I have been fortunate to work with some of the legends in the environmental field who have taught me a lot. This is a fantastic field to work in and the folks that are working in this field are all dedicated to the single cause of improving the environment and should all be congratulated for you efforts towards making this a better world.



Located in Long Beach, California, IIRMES facilitates the application of new technologies and approaches in scientific inquiry and collaboration across diverse disciplines.

TOXICITY RESULTS Friends of the Los Angeles River Fish Sample Data Summary

Sample ID			13285	13287	13288	13289	13289	13290	13291	13292	13293	13294	13295		13285	13285	13289	13289	13286
Replicate Number			B1	R1	R1	R1	R2	R1	R1	R1	R1	R1	R1		BS1	BS2	MS1	MS2	CRM1
Sample Description		Method Detection Limit	Lab Blank	Carp 1	Carp 2	Carp 3	Carp 3 Lab Duplicate	Carp 2	Carp 2	Carp 1	Anchovies	Topsmelt 1	Topsmelt 2		Blank Spike	Blank Spike Duplicate	Matrix Spike	Matrix Spike Duplicate	CRM NIST 1947
Date Collected				8/15/15	8/15/15	8/15/15	8/15/15	1/13/15	1/13/15	No Date	10/4/15	1/3/15	1/3/15						
Parameter	Units													Units					
Chlorinated Pesticides																			
(TCMX)	% Recovery	NA	71	61	58	71	79	66	71	63	76	71	72	% Recovery	73	74	87	88	81
(PCB030)	% Recovery	NA	76	59	56	71	79	67	66	62	75	67	69	% Recovery	76	76	81	83	79
(PCB112)	% Recovery	NA	91	69	62	97	110	89	89	86	92	92	90	% Recovery	90	91	105	104	99
(PCB198)	% Recovery	NA	85	77	54	77	82	83	79	75	84	86	84	% Recovery	87	90	76	78	75
BHC-alpha	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	77	81	87	90	100
Hexachlorobenzene	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	79	80	91	93	87
BHC-beta	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	76	83	88	84	NA
BHC-gamma	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	79	75	83	91	NA
BHC-delta	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	73	75	91	91	NA
Heptachlor	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	110	114	123	128	NA
Aldrin	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	77	80	78	90	NA
Heptachlor Epoxide	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	105	110	97	97	113
Ocychlordane	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	93	92	84	84	90
4,4'-DDMU	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	102	104	85	87	NA
Chlordane-gamma	ng/wet g	1	ND	ND	ND	1.2	ND	ND	ND	ND	2	1.6	ND	% Recovery	101	102	116	108	177
2,4'-DDE	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	104	107	122	116	124
Endosulfan-I	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	108	110	123	112	NA
Chlordane-alpha	ng/wet g	1	ND	ND	ND	1.2	1.4	ND	ND	ND	2.6	3	1.7	% Recovery	102	101	121	118	126
trans-Nonachlor	ng/wet g	1	ND	ND	ND	1.3	1.4	ND	ND	ND	3.1	3.6	2.2	% Recovery	97	98	117	118	121
4,4'-DDE	ng/wet g	1	ND	2.1	2.9	7.4	7.5	4.2	4	1.1	44	11.1	6.8	% Recovery	104	107	135	135	118
Dieldrin	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	85	85	101	99	115
2,4'-DDD	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	112	118	124	117	106
Perthane	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	146	146	168	174	NA
Endrin	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	90	81	87	96	NA
Endosulfan-II	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	98	94	94	83	NA
4,4'-DDT	ng/wet g	1	ND	ND	ND	1.1	1.5	ND	ND	1.1	ND	2.9	2.4	% Recovery	120	122	117	117	115
2,4'-DDT	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	105	103	137	136	115
cis-Nonachlor	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	2.4	1.4	1.1	% Recovery	98	96	104	105	119
Endrin Aldehyde	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	119	118	10	10	NA
Endosulfan Sulfate	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	91	94	100	111	NA
4,4'-DDT	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	120	116	164	170	130
Endrin Ketone	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	81	83	101	94	NA
Methoxychlor	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	172	168	226	230	NA
Mirex	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	80	84	73	72	118

TOXICITY RESULTS Friends of the Los Angeles River Fish Sample Data Summary

Sample ID			13285	13287	13288	13289	13289	13290	13291	13292	13293	13294	13295		13285	13285	13289	13289	13286
Replicate Number			B1	R1	R1	R1	R2	R1	R1	R1	R1	R1	R1		BS1	BS2	MS1	MS2	CRM1
Sample Description		Method Detection Limit	Lab Blank	Carp 1	Carp 2	Carp 3	Carp 3 Lab Duplicate	Carp 2	Carp 2	Carp 1	Anchovies	Topsmelt 1	Topsmelt 2		Blank Spike	Blank Spike Duplicate	Matrix Spike	Matrix Spike Duplicate	CRM NIST 1947
Date Collected				8/15/15	8/15/15	8/15/15	8/15/15	1/13/15	1/13/15	No Date	10/4/15	1/3/15	1/3/15						
Parameter	Units													Units					
Polychlorinated Biphenyls (PCBs)																			
PCB003	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	102	102	122	124	NA
PCB008	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	98	101	116	114	NA
PCB018	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	96	98	109	99	93
PCB031	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	116	110	99	101	82
PCB028	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	93	100	100	103	97
PCB033	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	97	99	98	100	NA
PCB052	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	4.9	1	1.1	% Recovery	100	103	95	93	100
PCB049	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	4.1	ND	ND	% Recovery	92	98	90	91	83
PCB044	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	101	102	92	93	77
PCB037	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	108	111	104	106	NA
PCB074	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	98	103	86	90	88
PCB070	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	96	102	87	91	101
PCB066	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	2.9	ND	ND	% Recovery	98	101	103	104	99
PCB095	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	2.5	ND	ND	% Recovery	95	98	81	84	87
PCB056/060	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	106	109	84	87	100
PCB101	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	5.9	1.3	ND	% Recovery	95	103	78	83	81
PCB099	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	4.9	ND	ND	% Recovery	96	103	80	79	72
PCB119	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	98	105	77	80	NA
PCB097	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	97	99	76	78	NA
PCB087	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	4	ND	ND	% Recovery	98	104	77	78	98
PCB081	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	106	110	84	88	NA
PCB110	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	5	1.1	ND	% Recovery	94	98	76	76	70
PCB077	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	102	108	83	88	NA
PCB151	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	97	104	74	76	64
PCB149	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	3.7	ND	ND	% Recovery	92	101	69	73	77
PCB123	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	99	105	76	77	NA
PCB118	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	4.8	1.1	1.1	% Recovery	102	107	76	79	79
PCB114	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	101	109	76	80	NA
PCB153	ng/wet g	1	ND	ND	ND	1.2	1.4	1.2	ND	ND	11	2.2	1.6	% Recovery	114	120	119	135	115
PCB168+132	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	198	207	213	203	79
PCB105	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	99	104	113	114	120
PCB141	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	107	116	112	120	NA
PCB138	ng/wet g	1	ND	ND	ND	1.4	1.8	1.4	ND	ND	9.1	2.3	1.5	% Recovery	104	113	115	115	130
PCB158	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	102	117	104	108	120
PCB126	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	109	115	120	127	NA

TOXICITY RESULTS Friends of the Los Angeles River Fish Sample Data Summary

Polychlorinated Biphenyls (PCBs)

Sample ID			13285	13287	13288	13289	13289	13290	13291	13292	13293	13294	13295		13285	13285	13289	13289	13286
Replicate Number			B1	R1	R1	R1	R2	R1	R1	R1	R1	R1	R1		BS1	BS2	MS1	MS2	CRM1
Sample Description		Method Detection Limit	Lab Blank	Carp 1	Carp 2	Carp 3	Carp 3 Lab Duplicate	Carp 2	Carp 2	Carp 1	Anchovies	Topsmelt 1	Topsmelt 2		Blank Spike	Blank Spike Duplicate	Matrix Spike	Matrix Spike Duplicate	CRM NIST 1947
Date Collected				8/15/15	8/15/15	8/15/15	8/15/15	1/13/15	1/13/15	No Date	10/4/15	1/3/15	1/3/15						
Parameter	Units													Units					
Polychlorinated Biphenyls (PCBs)																			
PCB187	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	4.8	ND	ND	% Recovery	102	108	103	100	109
PCB183	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	101	113	104	106	95
PCB128	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	102	113	106	116	109
PCB167	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	101	114	100	113	NA
PCB174	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	106	110	103	101	124
PCB177	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	107	113	105	102	NA
PCB156	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	107	116	112	115	125
PCB200	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	103	110	92	93	NA
PCB157	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	108	116	102	102	130
PCB180	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	4.1	1.4	ND	% Recovery	109	112	95	94	101
PCB169	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	109	114	117	119	NA
PCB170	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	104	109	93	94	98
PCB201	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	108	113	86	77	123
PCB189	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	108	116	95	94	NA
PCB195	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	107	108	90	90	123
PCB194	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	107	109	84	85	121
PCB206	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	106	111	83	73	50
PCB209	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	102	107	76	77	49

OEHHA ADVISORY TISSUE LEVELS (ATLS) FOR SELECTED FISH CONTAMINANTS

CONTAMINANT	THREE 8-OZ SERVINGS* A WEEK	TWO 8-OZ SERVINGS* A WEEK	ONE 8-OZ SERVINGS* A WEEK	NO CONSUMPTION
Methylmercury (Women aged 18-45 yearsand children aged 1-17 years) nc	≤70 ppb	>70-150 ppb	>150-440 ppb	>440 ppb
PCBs nc	≤21 ppb	>21-42 ppb	>42-120 ppb	>120 ppb

* Serving sizes are based on an average 160 lbs. person.nc ATLs are based on non cancer (undetectable)

TOXICITY RESULTS Friends of the Los Angeles River Fish Sample Data Summary

Polybromonated Dephenyl Ethers (PBDEs)

Sample ID			13285	13287	13288	13289	13289	13290	13291	13292	13293	13294	13295		13285	13285	13289	13289	13286
Replicate Number			B1	R1	R1	R1	R2	R1	R1	R1	R1	R1	R1		BS1	BS2	MS1	MS2	CRM1
Sample Description		Method Detection Limit	Lab Blank	Carp 1	Carp 2	Carp 3	Carp 3 Lab Duplicate	Carp 2	Carp 2	Carp 1	Anchovies	Topsmelt 1	Topsmelt 2		Blank Spike	Blank Spike Duplicate	Matrix Spike	Matrix Spike Duplicate	CRM NIST 1947
Date Collected				8/15/15	8/15/15	8/15/15	8/15/15	1/13/15	1/13/15	No Date	10/4/15	1/3/15	1/3/15						
Parameter	Units													Units					
Polybromonated Dephenyl Ethers (PBDEs)																			
(FTBDE)	% Recovery	NA	91	88	80	97	103	88	97	92	108	97	111	% Recovery	96	104	124	139	NA
(DFPBDE)	% Recovery	NA	84	55	66	84	78	66	83	87	101	91	97	% Recovery	90	98	58	53	NA
PBDE017	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	0.78	1.02	ND	% Recovery	104	115	73	80	NA
PBDE028	ng/wet g	1	ND	ND	4.75	7.15	7.54	5.68	5.71	ND	ND	1.12	ND	% Recovery	91	106	64	77	NA
PBDE071	ng/wet g	1	ND	0.3	0.26	3.19	2.64	1.04	1.47	0.72	2.27	4.62	4.27	% Recovery	99	115	48	52	NA
PBDE074	ng/wet g	1	ND	17.2	21.1	114	102	50.9	40.6	12.3	9.34	52	27.9	% Recovery	98	105	87	88	NA
PBDE066	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	0.43	2.31	0.73	% Recovery	94	105	51	51	NA
PBDE100	ng/wet g	1	ND	2.02	2.48	11.4	10.2	7.77	4.36	1.45	3.86	9.16	4.4	% Recovery	94	105	114	102	NA
PBDE099	ng/wet g	1	ND	0.16	ND	ND	ND	ND	4.63	0.67	2.59	7.87	3.03	% Recovery	81	87	99	84	NA
PBDE085	ng/wet g	1	ND	ND	ND	ND	ND	ND	0.36	ND	ND	ND	ND	% Recovery	77	89	90	89	NA
PBDE154	ng/wet g	1	ND	ND	0.16	4.04	5.3	0.89	1.96	0.34	1.42	5.01	3.19	% Recovery	104	106	131	124	NA
PBDE154	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	0.87	6.46	2.64	% Recovery	90	100	117	112	NA
PBDE138	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	91	94	97	102	NA
PBDE183	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	94	104	82	91	NA
PBDE190	ng/wet g	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	% Recovery	88	101	62	74	NA
PBDE209	ng/wet g	1	ND	0.19	ND	ND	ND	ND	ND	ND	0.12	ND	ND	% Recovery	68	90	38	105	NA

Summary of Results

Species	Date Sampled	Total DDT (ng/wet g, ppb)	Total Chlordane (ng/wet g, ppb)	Mercury (ng/wet g, ppb)	Total PCB (ng/wet g, ppb)	Total PBDE (ng/wet g, ppb)
Carp #1	8/15/15	2.1	ND (<1.0)	ND (<1.0)	19.9	40
Carp #2	8/15/15	2.9	ND (<1.0)	ND (<1.0)	28.7	110
Carp #2 (Lab Duplicate)	8/15/15	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	100
Carp #3	8/15/15	8.5	3.7	2.6	140	40
Carp #3 (Lab Duplicate)	8/15/15	9.0	2.8	3.2	128	Not Analyzed
Carp #4	1/3/15	4.2	ND (<1.0)	2.6	66.3	50
Carp #5	1/3/15	4.0	ND (<1.0)	ND (<1.0)	59.1	50
Carp #6	No Date	1.1	ND (<1.0)	ND (<1.0)	15.5	30
Anchovy #1	10/4/15	44.0	10.1	71.7	21.7	Not Analyzed
Topsmelt #1	1/3/15	14.0	9.6	10.4	89.6	5.0
Topsmelt #2	1/3/15	9.2	5.0	5.3	46.2	7.0

For information on consumption recommendations for children and pregnant women please visit:
www.epa.gov.waterscience/fish/advice or www.oehha.ca.gov/fish/so_cal/

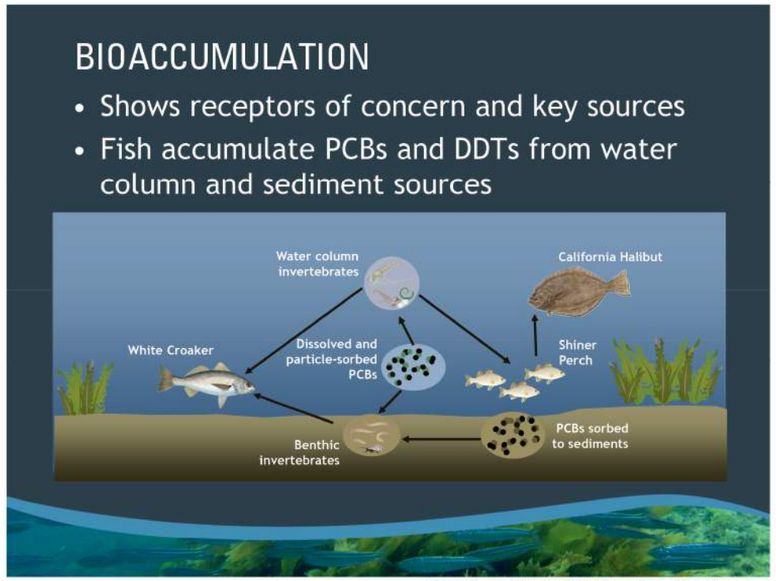


Illustration courtesy of Matt Arms, Port of Long Beach

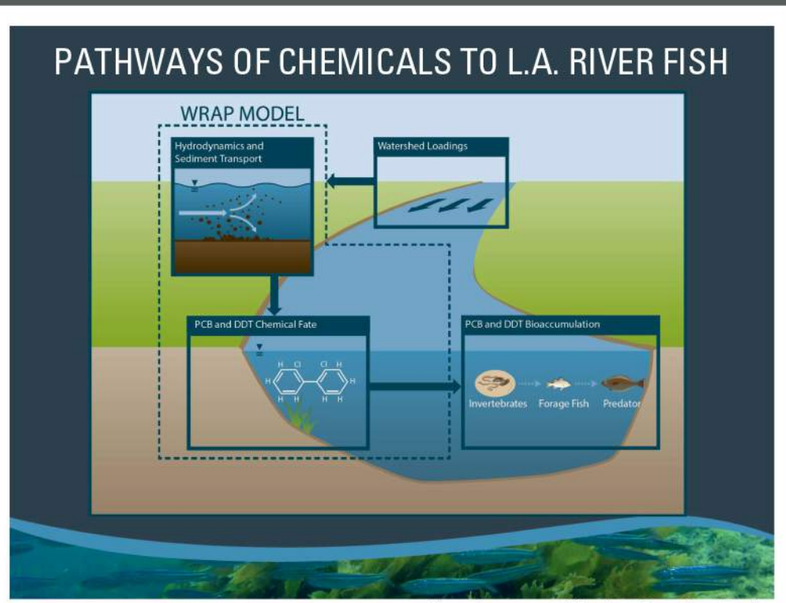


Illustration courtesy of Matt Arms, Port of Long Beach

CONCLUSIONS

By Dr. Rich Gossett

The fish contamination survey presented in this document were focused on the legacy contaminants such as the pesticide DDT (Dichlorodiphenyltrichloroethane), the industrial chemical PCBs (Polychlorinated Biphenyls), PBDEs (Polybromonated Diphenyl Ethers which were used as flame retardants) and Mercury. These constituents are important because they have the potential to accumulate in fish tissues, due to the fact that they are very hydrophobic (they hate water). They prefer to attach to particles in the water then accumulate in the fatty part of the fish tissue. The typical pathway for exposure to these chemicals is that they attach to the particles (dirt) and get transferred into the river through runoff, then settle to the bottom and/or get eaten by small worms, clams, fish etc. The small animals have the potential to get eaten by bigger animals then get eaten by humans.

During the dry-weather season the majority of the water flowing into the Los Angeles River comes from the Publicly Owned Wastewater Treatment plants who discharge their treated effluent into the river. These plants treat their wastewater to either secondary or tertiary levels which results in two improvements in the quality of the water. First, a large majority of the particles are removed thus removing the majority of the hydrophobic contaminants. Second, the harmful water-soluble constituents are reduced by biological or chemical treatment. Other sources of water to the river would include street runoff from residential and industrial sources that potentially contain these same chemicals of concern but this is less likely in today's society since many of these chemicals have been banned for many years now.

In this Study, 9 samples of fish were collected near the mouth of the Los Angeles River between Willow Street and Pacific Coast Highway in Long Beach. Six samples of Carp, one sample of Anchovies, and 2 samples of Topsmelt were collected. Tissue samples from the fillets were removed from the Carp but the Topsmelt and Anchovies were analyzed whole (Ground into one sample) due to their small sizes. The samples were analyzed for the legacy chlorinated pesticides such as the DDTs and Chlordane, the PCBs and for the first time the PBDEs. These chlorinated and brominated contaminants are known to accumulate in fish tissues from the bottom sediments and their food sources. DDTs, Chlordane and PCBs have been banned for use since the 1970's and PBDEs have been banned since 2006.

Anglers were able to bring in Common Carp & Mirror Carp; similar to the ones found in the Glendale Narrows Study, 2008 Fish Study AREA. The only species that can be compared between the 2008 Fish Study and the 2016 Fish Study is carp. In 2008, the Total PCBs ranged from 9.4 ng/wet g to 16.3 ng/wet g and in 2015 (n=7) Total PCBs ranged from Not Detectable at 1 ng/wet g to 3.2 ng/wet g. Two other species of fish were collected in 2015; Anchovies (n=1) with 71.7 ng/wet g and topsmelt (n=2) which ranged from 5.3 ng/wet g to 10.4 ng/wet g. DDTs and Polybromonated diphenyl ethers (PBDEs) were also analyzed in 2015. Carp Total DDTs ranged from 1.9 to 9.0 ng/wet g, Anchovies 44 ng/wet g, and topsmelt ranged from 9.2 to 14 ng/wet g. Carp Total PBDEs ranged from 15.5 to 140 ng/wet g, anchovies were 21.7 ng/wet g, and topsmelt ranged from 46.6 to 89.6 ng/wet g.

Steelhead in Ballona Creek March 2008. Photo by the RCDSMM Stream Team

The last record of a steelhead trout caught in the Los Angeles River. Steelhead trout are the only native California species that travel from the mountains to the sea and back. Recently, steelhead have been seen as nearby as Malibu and San Mateo Creek.

It is believed that when the steelhead return to the Los Angeles River, the ecological health of the River will have been achieved.

Steelhead in Ballona Creek March 2008. Photos by the RCDSMM Stream Team

A SONG FOR STEELHEAD

by Rosi Dagit

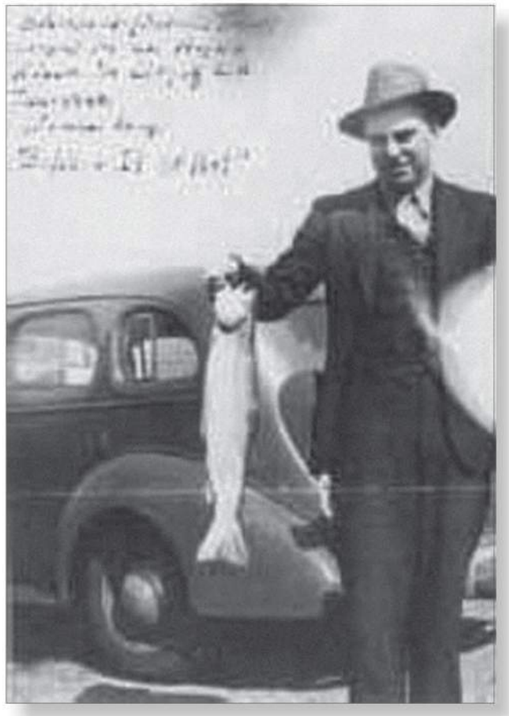
Senior Conservation Biologist / RCDSMM

Slowly I slipped into the shallow pool, making sure not to disturb the substrate and create a cloud. I could see the fish leisurely swimming back and forth beneath the bubble cascade curtain, waiting for a tasty morsel to float by. It was so calm, master of its world, confident that food would appear and indifferent to my presence. The music of the creek flowing over the boulders provided a soothing sound track. For a few seconds, we were eye to eye. A 20 inch steelhead in all its glory, muscles rippling as it slowly hovered, assessing whether I was a threat, and then deliberately turning its back and swimming away into a boulder crevice. Moments like this are what keep me motivated and willing to deal with long cold hikes through miles of creek in search of the few remaining southern steelhead trout.

Once steelhead were so abundant that the front page of the Los Angeles Times reported on the opening day of trout season, excitedly mentioning the hundreds of fishermen and women that lined the banks of local rivers and streams, eagerly catching their limit in a single day. Santa Ynez, Ventura, and Los Angeles Rivers – all supported thousands of steelhead returning each winter and spring on their journey back from the sea and up the rivers to spawn. The annual ritual was newsworthy for much of the early 1900's but by mid-century the cumulative impacts of dams, culverts, water diversions, road crossings and coastal development changed the picture. The sadly famous photograph of

Charles Hogue and his steelhead catch on the Los Angeles River in 1940 is the last record of steelhead in the Glendale Narrows section of the river. By the time I started my study of steelhead in 1998, steelhead had made their way from an iconic spring event to the endangered species list.

Instead of numbers in the thousands, the National Marine Fisheries Service (2012) now estimates that there are approximately 500 adult steelhead left in the southern California Distinct Population Segment, extending from San Luis Obispo to the Mexican border. In 2014, I compiled all the records available from everyone studying steelhead in that region and we found that between 2000 and 2014, a total of 149 adults had actually been observed, with over 50 of them seen in 2008 (RCDSMM unpublished data). In the past 20 years, ocean conditions have changed, freshwater conditions and habitat accessibility have not significantly increased, and the two adults seen hanging out inside the frame of a broken television in Ballona Creek in 2008 seemed symbolic of how hard life has become for steelhead in southern California.



Twenty-five inch steelhead trout caught in the river near Glendale in January 1940. Courtesy, family of Dr. Charles L. Hogue. From Blake Gumprechts' *The Los Angeles River: Its Life, Death and Possible Rebirth*. pg. 242 fig. 6.5

Most years, fewer than 10 adult steelhead were seen throughout the whole area, concentrated in just a few rivers and creeks. Even when taking into account varying levels of effort to document the abundance and distribution of steelhead, knowing that we are not adequately surveying all possible streams, and then adjusting this to estimate that perhaps fewer than 10% of all adult steelhead were observed, this was a horrifying low number of sightings. Where have all the steelhead gone?

Steelhead are the ocean-going life history phase of rainbow trout, who tend to remain in the rivers where they were born. Becoming "anadromous" is a huge physiological step, with 6-8 inch juvenile trout migrating downstream, changing from rainbow colors to steelhead gray as their bodies make the shift from fresh to salt water. When the rains come and flows connect the creeks to the ocean, they head to sea. Several years later, the now larger adults patrol the coast, searching for the freshwater connections that will lead them back up to their natal creek, or if that is not accessible, into other nearby creeks to spawn. Imagine what the shift from salt to freshwater feels like, truly an amazing transformation. What is unusual about southern steelhead is that they don't die after they spawn. They can travel back out to sea, or sometimes are stuck in the creek for the summer, waiting for the next season's rains to open the connection again to the ocean. Steelhead can live for up to nine years in captivity, but we are not sure how many times they can make the trip from creek to ocean and back again.

This remarkable flexibility was the key to their success for millennium. In some ways steelhead are the ultimate reflection of southern California culture – go with the flow, hang out in cool places, tolerate the heat spells, be ready to move when conditions change....But these days, the search for steelhead has become frustratingly difficult. Despite hours of snorkel surveys, days of seining and trapping, and huge efforts, the fish are just not to be found.

Our recent surveys in the Los Angeles River mouth and upstream soft bottom sections have revealed a community of fish species native to many parts of the world, none native to southern California. Tilapia, carp, largemouth bass, and even aquarium fish like plecostomus are now the dominant residents of the river. Water temperatures are high and concrete bottoms and banks prevail, creating a river system that would be difficult if not impossible for steelhead to navigate successfully. Even our resident wild rainbow trout still hanging on in the upper watershed have trouble making their way downstream to the ocean through the myriad obstacles.

Faced with these huge limitations, it is easy to despair. How can we ever recover this amazing species so that once again steelhead trout fill the rivers? It will not be easy, but the wild rainbow trout in the upper watershed are waiting for the chance to make it to the ocean where they could once again participate in the steelhead lifestyle. The genetic influx of these fish could help the regional population as a whole.

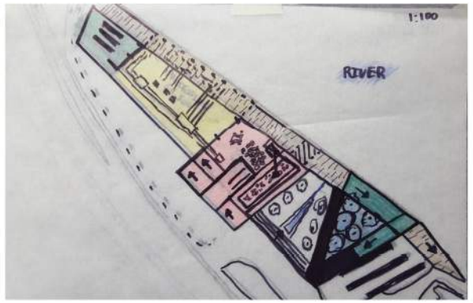
I have hope that as a society enough of us care, enough of us are willing to do the hard work of restoring river habitat and function, cleaning up water quality, removing invasive predators; that step by step, taking many small actions, we will cumulatively make it possible for steelhead and other native species from frogs to birds to survive. Taking down Rindge Dam in Malibu for instance is a work in progress. Removal of that barrier would open up much of the historic habitat for steelhead in the second largest watershed in the Santa Monica Bay. Implementing projects like this and making sure that the reinvention of the Glendale Narrows reach of the LA River attempts to moderate water quality and reduce water temperatures, removes concrete and restores riparian function are all steps that are within our reach.

Imagine a day in the future, when it is possible to snorkel in the Los Angeles River and come face to face with a steelhead. “Please, please, I’ve lost my way, the current is too strong. In the name of love, kind sir I pray, in the name of love”... the song by Gordon Lightfoot points out that perhaps love is the answer. Those of us who love our rivers, oceans and fish, need to keep up the effort to make sure the future holds the chance for us to one day sing a song of joy to the returning steelhead trout.

"Rainbow Trout"

by Gordon Lightfoot

In the name of love she came
This foolish winsome girl
She was all decked out like a rainbow trout
Swimmin' up stream in the world
And she said "Please, please, I've lost my way
The current is too strong
In the name of love, kind sir I pray, in the name of love"
So I took her by the hand,
she took me by the will
She was all dolled up like a blue eyed pup
Looking for something to spill
And she said "Please, please, I've lost my way
The current is too strong
In the name of love, kind sir I pray, in the name of love"
In the name of love she came
This foolish winsome girl
She was all decked out like a rainbow trout
Swimmin' upstream in the world
And she gave one flip of the rainbow tip of her tail
And she swam back down
And she said "Please, please, I've lost my way
The current is too strong
In the name of love, kind sir I pray, in the name of love"



LA RIVER RECYCLE

(re)vive - (re)define

Kyle Baron, a graduate student at Roger Williams University in Rhode Island reached out to FoLAR to share his ideas about plastic and the Los Angeles River. In preparation to complete his Masters degree in Architecture he must extensively research and design for an implication of social change through a built environment, this will serve as his graduate thesis. Kyle recently discovered the "Great Pacific Garbage Patch" better known as that swirling island of garbage in the largest of our world's four oceans. The patch itself is comprised of mainly plastics, because they are not biodegradable by nature. The best way of visualizing The Great Pacific Garbage Patch is to imagine a big soup floating in the ocean (composed of mainly plastics) similar to the way oil does. The direction of the ocean currents causes water to circulate like a vortex and trap garbage floating for infinite amounts of time.

As he began to research and develop his plan for change he was thinking too big, initially he was set out to design a facility in Hawaii to harness the trash that washes up on the beaches by the tons year after year. After much research and the consideration of expert's opinions Kyle decided to shift his focus. He decided the focus needed to be on where all the trash is coming from, not where it ends up. His new mentality led him to a search on the west coast for its largest trash chute (river). He was drawn in to the Los Angeles River, not for its grandeur, but for its characteristic as a troubled waterway. The LA River falls 3,000 ft. in elevation in just 51 miles, makingit a high-speed transport for trash from the single most populated county in the country, Los Angeles County.

His idea extends far beyond the design of your typical everyday recycling facility. The design involves a fully functioning recycling facility with a large portion dedicated to raising education and awareness. What is pivotal to the design is the presence it must create at the mouth of the Los Angeles River. Typically cities place their recycling in a low profile area in an effort to not attract attention to it, by developing a facility that highlights the importance we can break the mold of recycling and open the eyes of the public to the process. The facilities location on the water would allow for transportation by barge, removing countless vehicles from roadways and offering a more sustainable solution. The facility would operate as a PRF, or plastic recycling facility, where it would focus on sorting plastics more in depth than your standard recycling facility to maximize reuse and lessen plastic residue in land fills. The location would also lend itself to the development of a system to remove and process plastics

This process would generate income for the city, raise public awareness, and help decrease the impact humans have on oceanic life.

directly from the river, before they ever reach the ocean. The process would generate income for the city, raise public awareness, and help decrease the impact humans have on oceanic life. Kyle's project serves as an idea that could better a particular society (Los Angeles), but this idea is something much bigger than Los Angeles. Recycling is an integral component of our society, so let's celebrate the process and help others realize that we CAN make a difference.

LA RIVER TRASH SORT

The Los Angeles River runs through the second largest urban area in the United States, draining a watershed that is home to 14 million people. As with many urban rivers, trash and litter are a common occurrence in the LA River. Realizing that the best strategy to reduce trash depends on where that trash originates, Friends of the Los Angeles River (FoLAR) began conducting trash sorts in 2004 to determine the types of trash found in the River. Trash sorts have taken place at five sites: Lake Balboa in the San Fernando Valley, Fletcher Drive and Steelhead Park in the Glendale Narrows, Compton Creek, and the Los Angeles River Estuary at Willow Street four miles from the River's mouth. A randomly selected subset of trash (approximately every 5th bag) collected at each of these sites was sorted into categories and then weighed. Plastic film was generally found to be the largest trash category by volume, especially single-use plastic bags and snack and candy packaging.

Metal, cloth and molded plastic were also found to be common. Polystyrene (more commonly referred to as Styrofoam) was abundant at two sites. Based on these findings, FoLAR recommends the increased use of closed-top trash cans, the creation of anti-litter educational programs at supermarkets, convenience stores and fast food restaurants (from which most of the LA River trash seems to originate); and that the recent ban of plastic bags in unincorporated Los Angeles be extended to the rest of the cities within Los Angeles County. FoLAR encourages corporations to take part financially and with their personnel at Los Angeles River cleanups, particularly those whose products consistently show up in the River. FoLAR also recognizes the importance of monitoring and working to reduce the smaller pieces of plastic found in the River's flow that are still able to make it through the mesh of the trash-excluding screens that have been installed in the LA River stormwater system. The Los Angeles River Trash Total Maximum Daily Load (TMDL) and the associated governmental efforts to cut down on trash in the waterway has brought the goal of a trash-free LA River closer than ever before. With this achievement in sight, FoLAR emphasizes the continued importance of trash-reduction efforts.

The Los Angeles River ("LA River") has seemed more like a repository for waste than a river ever since most of it was encased in concrete by the U.S. Army Corps of Engineers in the 1940's and 1950's. "Cradle to River" seems to be the life cycle of numerous disposable wrappers, containers, bags and cigarette butts, and the 21st-century midden heaps along the River's banks have included relics of urban life as odd as saunas, phone booths, suitcases, couch cushions, hub caps and wet suits. Indeed, items as bizarre as human skulls, car-halves and even a bloody Santeria sword have been found in the River.

The Friends of the Los Angeles River (FoLAR) began the Great Los Angeles River CleanUp in 1990 with the goal of bringing people to the banks of the LA River and giving them the chance to see it in a new light: as a part of the local environment that must be maintained. A trash-free LA River has long been a goal of FoLAR. Since the first Great Los Angeles River CleanUp, the LA River has become significantly cleaner. FoLAR and others have succeeded in removing many larger items, and efforts to cleanup the River have increased. Thousands of people have participated in the past 22 cleanups helping to transform the River's public perception. This is exemplified by Mayor Villaraigosa's teaming up with FoLAR to declare the first ever LA River Day of Service, in conjunction with the CleanUp on April 30th, 2011. A recent convergence of governmental and non-governmental efforts to clean up the River has brought this goal closer to reality than every before. In 2011, 4,000 people participated in the CleanUp.

In September 2001, the Environmental Protection Agency adopted the Los Angeles River Trash Total Maximum Daily Load (TMDL), a mandate requiring Southern California cities to reduce their trash contribution to the LA River by 10% each year for a period of 10 years with the goal of zero trash by 2015. The TMDL defines trash as debris of human origin that is trapped by a 5 mm mesh screen, encompassing all improperly discarded waste material including grass clippings and other yard wastes. These goals have thus far been achieved through public outreach, street sweeping, and most importantly the installation of catch basin inserts that catch trash within the stormwater system and prevent it from being carried into the River. Proposition O, approved by LA City residents in the November 2004 election authorized the City to issue $500 million in general bonds for cleaning up and preventing pollution of our waterways and beaches, has also provided funding for projects that cut down on trash carried by stormwater into the Los Angeles River. Most recently, Los Angeles County environmental supervisors voted in July 2011 to ban plastic bags in unincorporated parts of the county, an area encompassing 1.1 million people.

Download "A Trash Biography,"
Friends of the Los Angeles River's Trash Report
2004-2011

WILLOW SPRINGS WETLANDS
Restoration Project

Size: 12 acres
Completion: In Progress
Project Team: Mia Lehrer - *President*, Claire Latané - *Senior Associate*
Jeff Hutchins - *Principal*, Brendan Kempf - *Project Designer*
Owner: City of Long Beach

The Willow Springs Wetlands Restoration Project is a 12-acre effort to restore the function and increase the habitat area of a remnant of wetland in Long Beach. Willow Springs was the site of the City's first water supply well. What was once a reservoir now serves as a detention basin to collect water from the 405 freeway before it heads to the Los Angeles River. The Wetlands Restoration Project transforms the retention basin into a constructed wetland and redirects overflow from a below-ground stormwater pipe into a bioswale to feed the site's remaining historic wetland. Mia Lehrer + Associates (MLA) developed a concept plan provided by the City of Long Beach to include educational gathering places and an improved pedestrian pathway along a road serving the surrounding oil extraction industry.

In addition to increasing wetland and coastal sage scrub habitat, the project highlights the site's historic progression by re-using abandoned oil pipes as fence and rail material and working with the many easements to provide shaded gathering places in previously developed areas. In addition to a stormwater easement, the design works around crisscrossing oil easements and functioning oil rigs. This project is one phase in the on-going improvements of Willow Springs Park, which will one day include opportunities for nature play and active restoration.

Willows inhabit the basin.

Mulefat in a bioswale along future path.

Retention basin captures runoff from 405 freeway.

Willow in the remnant wetland.

Design Team:

Mia Lehrer + Associates	*Prime Consultant, Landscape Architect*
Tetra Tech	*Civil Engineer, Biologist*
Restoration Design Group:	*Wetlands Consultant*

CITIZEN SCIENCE

by William Preston Bowling

I'm not a scientist, but I play one on T.V. As project manager and co/author of this study, many people make assumptions. There are no words to express my gratitude for the professionalism of the team of biologists, volunteers, docents and staff that collaborated on this project. Call me a Citizen Scientist, a new buzzword in the river community. "Citizen science" is the term used to describe scientific research conducted by individuals participating outside of their own professional scope. As a SAG-AFTRA member, all I really want to do is direct, so why not direct a team of scientists around?

In 2008 Friends of the Los Angeles River (FoLAR) completed a two-year study of fish in the Glendale Narrows and found the fish to be healthy in comparison to other river fish across the nation. As a contributor to the 2008 study (I shot the cover photo) it was shocking to hear there were fish in the Los Angeles River. In 1986 Lewis MacAdams envisioned FoLAR as a long-term art project, and it has grown to educate thousands of students each year and to advocate for restoring river habitat. In 2005, we began our scientific *State of the River* reports, and contine today with this study.

I was introduced to Lewis by Lauren Bon and we immediately hit it off, talking about a proper cleanup of the Santa Susana Field Lab. This began my working relationship with FoLAR. Fast forward to 2014 where I created the first catch-and-release fishing derby on the L.A. River, called "Off tha' Hook". With an overwhelming response to the event, we were "hooked"! Lewis and I wrangled in biologist Rosi Dagit for discussions about expanding FoLAR's State of the River reports to include Sepulveda Basin and Long Beach.

We thought for sure there were Steelhead Trout lurking in the river at Long Beach waiting for concrete removal so they can make their way back upstream as they did for the last time in 1940, but no such luck. The California Killifish was discovered in this study and could be an indicator for water temperatures that a Steelhead could survive in. Based on conversation with everyone from Trout Unlimited to local anglers, the Willow Street area of the Los Angeles River could have a potential for a Steelhead sighting. It is a soft-bottom section of fresh water that turns brackish south around Pacific Coast Highway. Two types of Carp were found in this section of the river, yet no sign of Steelhead. These Carp were most likely pushed into this area from the Glendale Narrows during heavy rains and settled at Willow Street, as it is a freshwater pocket. As legend has it, the Chinese built the railroads along the banks of the Los Angeles River over 100 years ago and they brought with them Asian Carp and freshwater Asian Clams (both of which we still find in the Glendale Narrows and Willow Street). Some of the ponds they built for theses species were destroyed in the flood of 1914 and the fish escaped into the river system and year after year repopulate their kind. How the other fish found their way into the river remained a mystery until we found documentation that in 1973 thru '74, the City of Los Angeles stocked the river with Tilapia to help curb the algae, hoping to end a mosquito problem due to ponding water. Since 1976, there has been little ponding along the river, as it is fed millions of gallons per day by Tillman, Glendale, Burbank and occasionally the Tapia Water Reclamation Plants.

FoLAR is not unfamiliar with Long Beach, as we have been cleaning up the trash in this area for close to two decades (27 years of cleaning trash in other sections) and we just opened our Long Beach office in addition to our River Center & Gardens location. This study has found the river fish in Long Beach to be lower in PCBs than the ones collected in the 2008 Glendale Narrows State of the River. The reasoning could be the river is cleaner overall since the Environmental Protection Agency declared the river "Navigable", we will re-sample the Glendale Narrow this year to make this determination.

If it were not for the help of Kim Thompson and Dr. Jennifer Lentz at the Aquarium of the Pacific, who are partners on this study with FoLAR, this report could not have been possible and I thank them for all their connections and support. Recently I was selected as a representative from FoLAR to serve on the AB 530 (Rendon) Working Group that was signed into law by Governor Brown. More science on the Lower River to follow. Enjoy the read!

William Preston Bowling, *Special Projects Manager, Friends of the Los Angeles River*

SAN GABRIEL RIVER SEA TURTLE MONITORING PROGRAM

by Kim Thompson

Kim Thompson is the program manager of Seafood for the Future at the Aquarium of the Pacific. She works closely with various stakeholders in the seafood industry to promote healthy and responsible seafood choices. Thompson has built strong relationships within the local fishing community as well as with aquaculture producers and has made the promotion of local seafood and responsible aquaculture priorities for the program.

The Sea Turtle Monitoring Citizen Science Program at the Los Cerritos Wetlands enables citizens to collect important baseline data and see firsthand the connection between a charismatic and endangered marine species, the Los Cerritos Wetlands, the ocean, and our urban influence. The goal of this initiative is to improve estimates of the total number of individual sea turtles and determine areas most highly frequented in order to better understand the population dynamics of Pacific green sea turtles in the San Gabriel River. Monitoring sessions take place along the San Gabriel River bike trail in Long Beach.

Volunteers watch, count, and record each sea turtle sighting for 30 minutes at stations arranged at set intervals where sea turtles are known to surface. The data collected will be recorded and used to understand how many individual sea turtles might be living in the river systems and to help with additional tracking and monitoring efforts.

Contact the Aquarium of the Pacific and join us in this exciting opportunity to help scientists better understand this urban population of green sea turtles residing in our own back yard!

Program Partners: Los Cerritos Wetlands Authority, Tidal Influence, and NOAA Fisheries.

Photos courtesy of Aquarium of the Pacific

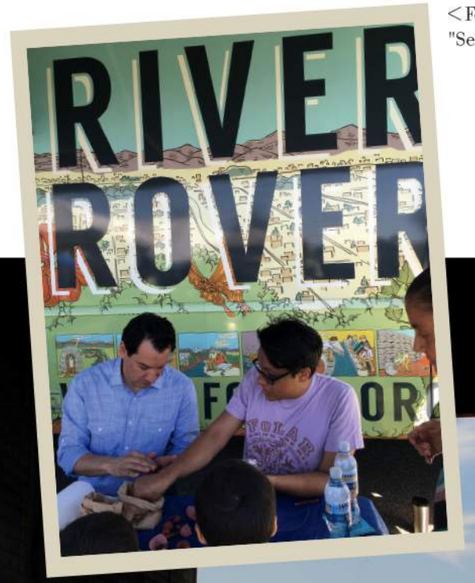
SECTION 4

LOWER RIVER IN PHOTOGRAPHS

Citizen Scientists, FoLAR staff, contracted biologists and volunteers create a "daisy chain" to get all of the fishing and science gear into the soft-bottom section of the Los Angeles River at Willow Street.


ARDS A SWIMMABLE, FISHABLE, BOATABLE
LOS ANGELES RIVER
KAYAK

In February of 2016 Writer and Long Beach native Tamara Lang set out with photographer Glenn Lewis for a Bike/Hike along the banks of the Los Angeles River from Long Beach up into the San Fernando Valley. During their "Trek" they spotted a Sea Lion coming up for air in the FoLAR Fish Study Research Area. With an abundance of fish in this area, we can see why these pups brave the fresh water for some "Sushi."



< FoLAR's Community Programs Manager, Stephen Mejia makes native plant "Seed Bombs" with Assembly Speaker Anthony Rendon, author of AB 530.

> May 3rd, 2016 - FoLAR advocates for a Recreation Zone in Long Beach along with habitat restoration in the first AB 530 Working Group meeting.

Assembly Bill 530, introduced by Assembly Member Anthony Rendon, requires the appointment of a Lower Los Angeles River Working Group in order to develop a Lower LA River revitalization plan. The working group consists of representatives of LA County, elected officials of river-adjacent cities, and other River stakeholders. By March 1, 2017, this working group is required to develop a plan that addresses the unique concerns of the Lower LA River and will enhance/be incorporated into LA County's currently existing LA River Master Plan. Staffing for the group will be provided by the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC).

Photo by Peter Bennett, Citizen of the Planet

Los Angeles River Map & Guide

LOWER RIVER

Friends of the Los Angeles River

FoLAR.org

Photo by Peter Bennett, Citizen of the Planet

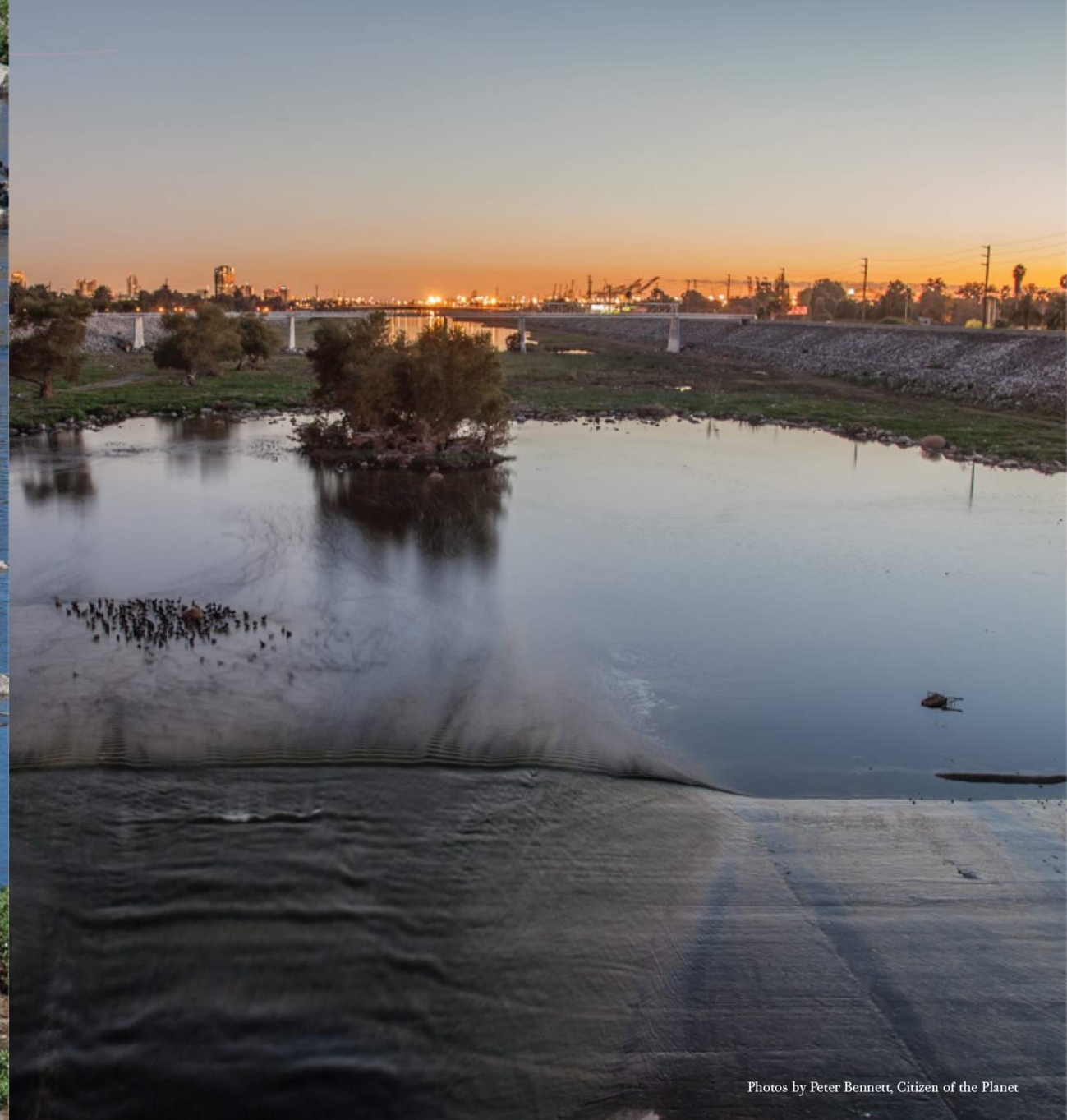
The Los Angeles River Bike Path in Long Beach continues North into Hollydale Park, City of South Gate. Click on the QR Code and link to FoLAR's "Lower River Map" to locate access points (South Gate, Bell, Lynwood) for bike path entry.

The "Trash Boom" at the mouth of the river does the best that it can do without netting the entire length to provide a Safe Passage for Aquatic Animals that migrate back and forth. Hopefully, one day, it will provide a safe passage for the elusive Steelhead Trout.

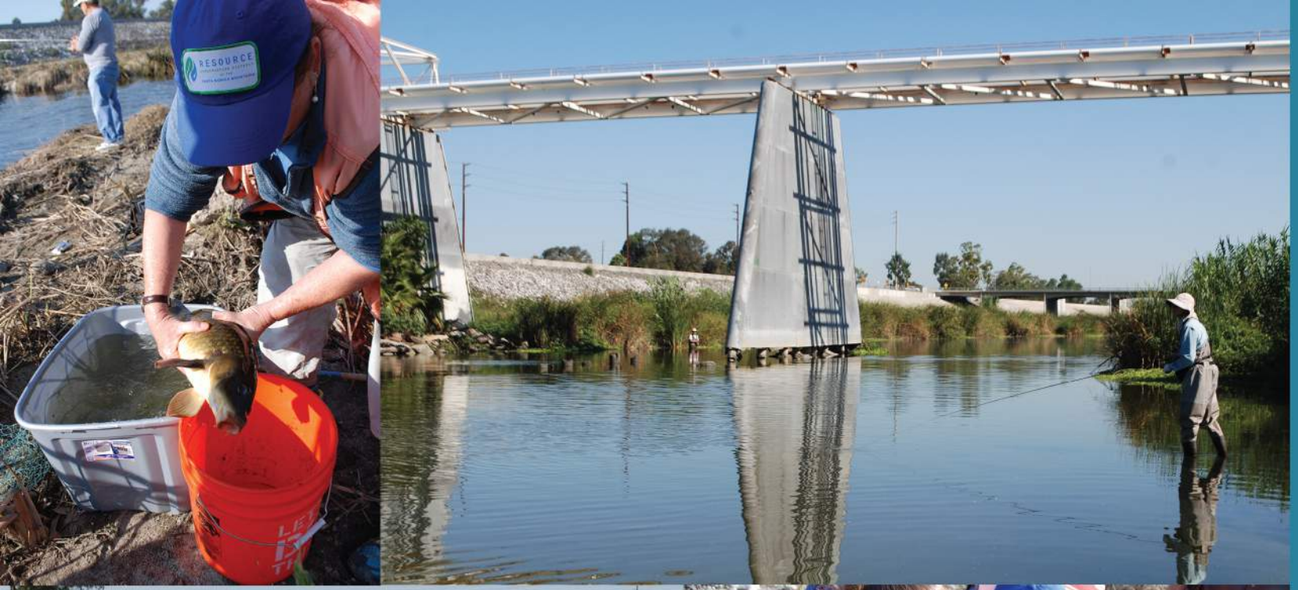
< Photograph by Blake Gumprecht
In 1995, Lewis MacAdams vs. Bulldozers -With only 20 years of growth, we can now see his vision of a healthy Los Angeles River.

FoLAR and partners succeeded, and now we are engaged with LA County Flood Control District looking at how to change vegetation maintenance practices not only in the estuary, but in all soft-bottom reaches the County manages in the LA River watershed.

Every year in preparation for winter rains, LA County Flood Control District bulldozes the estuary of the Los Angeles River in Long Beach – one of only three soft-bottom sections of the LA River. While conducting a study of contamination in fish in the estuary, FoLAR witnessed firsthand the devastation this maintenance practice has on this unique ecosystem. This led FoLAR to petition the Regional Water Quality Control Board, who permits this maintenance, to include greater protections for vegetation and wildlife.



Photos by Peter Bennett, Citizen of the Planet



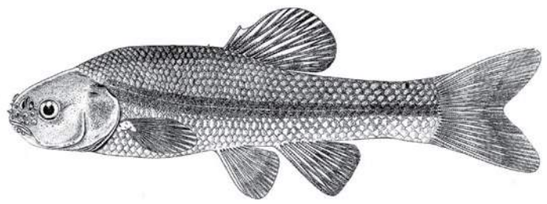
Artwork by ManOne

Photos by Tom Underhill

FISH INDEX

Fish profiles excerpted from: *Inland Fishes of California,*
Peter B. Moyle, University of California Press, Berkeley, 2002.

{**Fathead Minnow** *Pimephales promelas*}



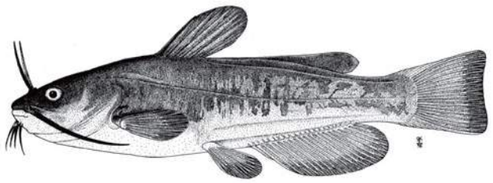
STATUS
Non-native species that is widespread and expanding. These fish are aggressive invaders that are still expanding their range to all suitable habitats in the state. 43 collected in FoLAR's L.A. River sample.

DESCRIPTION
The fathead minnow in its wild form is generally dull olive-grey in appearance, with a dusky stripe extending along the back and side, and a lighter belly. Breeding males acquire a large, grey fleshy growth on the nape, as well as approximately 16 white breeding tubercles on the snout. They range in size from 2.16 – 3.34 inches.

DISTRIBUTION
Flathead minnows are native to most of the eastern and Midwestern United States. They have multiple origins and continue to be brought to California from other states. They first came to California as bait in the Colorado River in the early 1950s and were reared in central California by both commercial breeders and the California Department of Fish and Game (CDFG). A popular bait fish, most flathead minnows are said to have been introduced to new waterways by anglers who release their left over bait.

ENVIRONMENT
They can be expected in any watershed where there are small, muddy pools of warm water 73.4 degrees Fahrenheit. They can withstand alkalinities of more than 2,100 mg/liter and low levels of dissolved oxygen (<1mg/liter).

{**Black bullhead**, *Ameiurus melas*}



STATUS
Non-native species that is widespread and stable. Bullheads seem to be expanding their range in California and becoming increasingly abundant in highly disturbed lowland aquatic environments. Their impact on other species is not known. 24 collected in FoLAR's L.A. River sample

DESCRIPTION
Ameiurus translates as "without less tail," and presumably refers to the squared tail fin, and melas means black. Under optimal conditions with artificial feeding, bullheads can reach 11inches and 1-2 lbs in a year. In the wild, they would need 3-9 years to reach a similar size. They are omnivorous bottom feeders and are known to feed on aquatic insects, crustaceans, dead fish, amphipods, isopods, snails and other invertebrates. Adult black bullheads are nocturnal and prefer feeding at night while the young feed during the day

DISTRIBUTION
Black bullheads are native to much of the U.S. east of the Rocky Mountains except the eastern seaboard. Their range has been greatly filled in and expanded through introductions and now includes most Western states. Their introduction to California is not known because early introductions were recorded as "catfish" or "bullheads." The earliest confirmed record is from the Colorado River in 1942. Often mistaken for brown or yellow bullheads, the Black bullhead is now the most common bullhead catfish in California.

ENVIRONMENT
They are capable of surviving in water temperatures up to 95 degrees Fahrenheit, salinities as high as 13 ppt, and low dissolved oxygen levels 1-2 mg/liter.

{**Carp** *Cyprinus carpio*}

STATUS
Non-native species widespread and expanding. There are some who believe carp are not the creators of adverse conditions but rather moved into an area already disturbed. Their ecological role in California is poorly understood because they are found in disturbed and polluted habitats. 58 collected in FoLAR's L.A. River

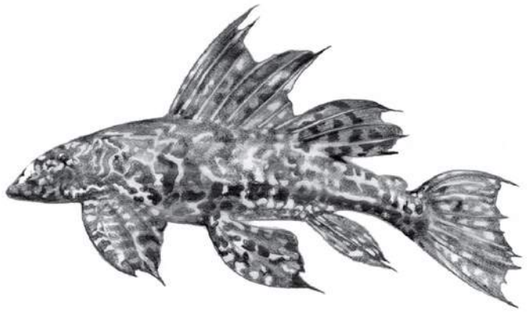
DESCRIPTION
During their first summer they may average 5 inches and grow 3-4 inches per year until their fourth year when growth slows down. Wild carp are said to live 12-15 years and grow to around 31 inches and 9 lbs. The largest carp recorded in California was caught in Lake Nacimiento, San Luis Obispo County and weighed 58 lbs and there have been reports of 23 lb carp caught in the Glendale Narrows section of the Los Angeles River.

DISTRIBUTION
Common carp in California are descended from domesticated carp from Germany and Japan. They have survived in the West due to their ability to survive adverse conditions. They can withstand exceptionally high turbidity, sudden temperature changes, and low oxygen concentrations. They are omnivorous bottom feeders and their preferred foods are aquatic insect larvae and adults are known to feed on aquatic plants and algae. Usually living in deep turbid water, in clearer water, cover, such as submerged tree branches and beds of aquatic vegetation, becomes important.

ENVIRONMENT
Optimum water temperature for carp is around 75.2 degrees Fahrenheit and they can withstand exceptionally high turbidity, sudden temperature change, low oxygen concentrations (0.5-3.0 ppm), and salinities up to 16 ppt. Omnivorous feeders, diet consists of zooplankton, phytoplankton (algae), benthic insect larvae, invertebrates, and aquatic plants.

Found in Long Beach During This Study

{**Amazon sailfin catfish,** *Pteroplinchthys pardalis*}



STATUS
Non-native species. 7 collected in FoLAR's L.A. River sample.

DESCRIPTION
Maximum size of these sucker mouth, armored catfish ranges from 15-16 inches. Their bodies have dark, leopard like spots of variable size with geometric patterns on the head.

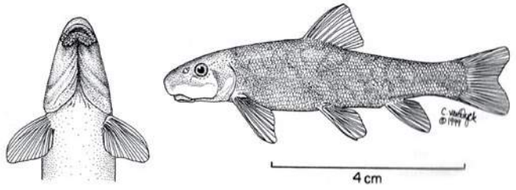
DISTRIBUTION
South America: Lower, middle and Upper Amazon River basin. Introduced to countries outside its range. Popular and hardy aquarium fish, they may also be found in Freshwater environments in swift-flowing streams from lowlands up to 3,000 m.

ENVIRONMENTThese catfish are able to live in water with a pH range of 7.0-7.5 and temperature between 73.4 – 82.4 degrees Fahrenheit. Normally a bottom-dwelling fish, they have the ability to breathe air from the surface of the water during dry periods and those in which dissolved oxygen is too low.

FISH INDEX

Fish profiles excerpted from: *Inland Fishes of California,*
Peter B. Moyle, University of California Press, Berkeley, 2002.

{**Santa Ana Sucker**, *Catostomus santaanea*}



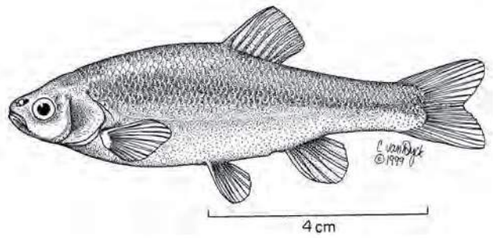
STATUS
Native species of the L.A. River that is threatened and/or endangered. Once widespread in the Los Angeles River, Santa Ana suckers have been found in recent years only in lower Big Tujunga Creek and below Big Tujunga Dam. The population appears to be hanging on, although it shows wide fluctuations in numbers. This species is likely to become extinct or extirpated in the near future (<25 years) unless steps are taken to save it. An endangered species is on a more rapid path to extinction than a threatened species. Most of these species are formally listed by either the State or the Federal Government.

DESCRIPTION
Santa Ana Suckers live 2-3 years and usually don't grow larger than 6 inches. Color in living fish is silvery white on the bellly and dark gray on the sides and back with irregular dorsal blotches on the sides and faint patterns of pigmentation arranged in lateral stripes.

DISTRIBUTION
Santa Ana Suckers are native to the Los Angeles, San Gabriel, and Santa Clara river systems of southern California. In the Los Angeles and San Gabriel Rivers they once occurred downstream to the mouths but are now restricted to the larger stream sections that still exist in the headwater areas.

ENVIRONMENT
These fish like cool (<71.6 degrees Fahrenheit), flowing water, with flows ranging from slight to swift. Like most mountain suckers, Santa Ana Suckers feed mostly on algae and detritis, which they scrape from rocks and other surfaces. Small numbers of aquatic insect larvae are also taken.

{**Arroyo Chub**, *Gila orcutti*}



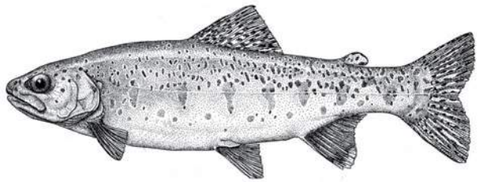
STATUS
Native species of California of special concern. The species is in decline or has a very limited distribution, so special management is needed to keep it from becoming threatened or endangered. Because of the undertain status of most populations, annual surveys are needed for this species in its native range; these should be performed every five years at all known sites.

DESCRIPTION
Typical adult lengths range from 2.75-3.9 inches. Body color is silver or gray to olive green dorsally and white ventrally. They are named for the gullies and small canyons (arroyos) of their native southern California.

DISTRIBUTION
Native to Los Angeles, San Gabriel, San Luis Rey, Santa Ana, and Santa Margarita Rivers to Malibu and San Juan Creeks. They are now extirpated from much of their native range but remain abundant in the upper Santa Margarita River, Trabuco Creek, San Juan Creek, Malibu Creek, and the WEst fork of the upper San Gabriel River. They also occur (but are scarce) in Big Tujunga Canyon, Pacoima Creek, the Sepulveda Flood Control Basin, the Los Angeles River, and middle Santa Ana River tributaries between Riverside and Orange County.

ENVIRONMENT
They are most abundant in slow moving or backwater sections of water with muddy or sandy bottoms with temperatures ranging from 50-75.2 degrees Fahrenheit. But they are also found in fast-moving (velocities or 80cm/sec or more) sections. They are omnivorous, feeding on algae, insects, and small crustaceans.

{**Southern Steelhead Trout** or **Coastal rainbow trout** *Oncorhynchus mykiss irideus*}



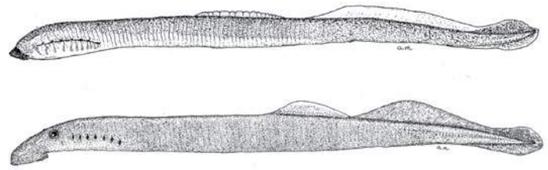
STATUS
Native species extirpated from the Los Angeles River. Southern steelhead were listed as Endangered by NMFS in 1997. Most streams and rivers have been dammed, diverted and urbanized to one degree or another. It is now absent from 39 of the 92 streams in which Southern steelhead historically spawned including all streams south of Ventura County, except Malibu Creek and San Mateo Creek. The total stream miles in which juveniles now rear amount to less than 1% of their historical number. Restoration is possible if adequate flows are provided, habitats are restored on a watershed scale, and access is provided to historical spawning and rearing areas.

DESCRIPTION
Southern steelheads are an anadromous species that spends most of its life in the ocean only returning to freshwater streams to spawn and rear. A member of the rainbow trout family which are highly variable in color, body shape, and characteristics, southern steelhead are silvery with numerous black spots on the tail, fins, and back, an iridescent pink to red lateral band and pinkish cheeks.

DISTRIBUTION
Originally native to the Pacific coast from Alaska down to streams in Baja in California, southern steelhead trout include populations south of Point Conception to Baja California. Its high genetic diversity may help to explain their remarkable capacity to persist in seemingly unfavorable environments.

ENVIRONMENT
Temperatures of 59-64.4 degrees Fahrenheit are optimal but many southern steelheads have escaped higher water temperatures in deep pools or fast running water where water temperature is lower. However, expended energy and low levels of dissolved oxygen are the trade off. They can survive oxygen concentrations as low as 1.5-2.0 mg/liter and their tolerance for varying chemical conditions is also very broad. They can survive pH values from 5.8-9.6.

{**Pacific Lamprey**, *Lampetra tridentate*}



STATUS
Native species. The anadromous species is extirpated from the Los Angeles River and is on P.B. Moyle's Watch List for species in decline or with every limited distribution. Special management is needed to keep it from becoming threatened or endangered.

DESCRIPTION
The lamprey has a round, elongate, flexible cartilaginous body, and skin with no scales. They range from 11.8 to 29.9 inches in size, with drawf, landlocked populations ranging from 5.9 to 11.9 inches. Pacific lamprey are born in freshwater streams, migrate out to the ocean, and return to fresh water as mature adults to spawn and rear.

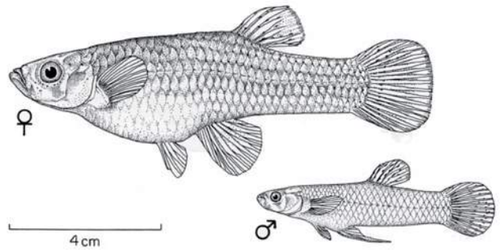
DISTRIBUTION
Malibu Creek seems to be the southernmost point of regular Lamprey occurrence in California. In general lampreys have a scattered distribution south of San Luis Obispo County with regular runs also found in the Santa Clarita River. In the Ocean they have been captured from waters near Japan to Baja California.

ENVIRONMENT
Lamprey enter streams from July to October. They ascend rivers by swimming upstream briefly, then sucking to rocks and resting. Spawning takes place the following spring in sandy bottoms with water temperatures between 50 and 60 degrees Fahrenheit. Adults die within four days of spawning, after depositing about 10,000 to 100,000 small eggs in their nest. The young hatch in 2-3 weeks and swim to areas of low stream velocity where sediments are soft and rich in dead plant materials. They burrow into the muddy bottom where they filter the mud and water, eating microscopic plants (mostly diatoms) and animals. They juvenile lamprey will stay burrowed in the mud for 4 to 6 years, moving only rarely to new areas. After a two month metamorphosis, triggered by unknown factors, they emerge as adults averaging 4.5 inches long. Then, during high water periods, in late winter or early spring the new adults migrate to the ocean. During its ocean phase of life the Pacific lamprey are scavengers on larger prey such as salmon and marine mammals. After 2 to 3 years in the ocean they will return to freshwater to spawn.

FISH INDEX

Fish profiles excerpted from: *Inland Fishes of California,*
Peter B. Moyle, University of California Press, Berkeley, 2002.

{Western Mosquitofish *Gambusia affinis*}



STATUS
Non-native species that is widespread and expanding. Western mosquito fish have been a popular mosquito control agent in California and they have been planted in warm waters throughout the state. They have been accused of eliminating smaller fish species as well as feeding on and reducing the number of eggs and larvae of endemic invertebrate and amphibians. In California they are said to have contributed to the decline of the Amargosa pupfish populations. However, other factors are important to consider such as destruction of habitat and introduction of other species. 668 collected in FoLAR's L.A. River sample.

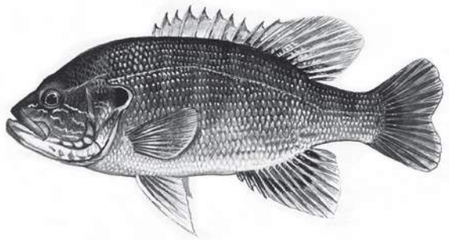
DESCRIPTION
Females are approximately 2 inches and males 1.37 inches. When examined closely, they will often have a teardrop-like black streak below each eye and rows of speckles on the caudal and dorsal fins.

CHARACTERISTICS
They are omnivorous, opportunistic feeders that feed mainly during the day. Mosquito larvae and pupa form a substantial portion of their diet but they also are know to feed on what is abundant. Typically this will include algae, zooplankton, terrestrial insects, and miscellaneous aquatic invertebrates.

ENVIRONMENT
Western mosquito fish are well adapted for life in shallow, often stagnant waters with high temperatures. They are capable of withstanding water temperatures of 95 degrees Fahrenheit, pH ranges of 4.7-10.2, low oxygen levels (0.2 mg/liter), and salinity at 0-58ppt. High levels of selenium however impact reproductive rates and produce malformed young.

Found in Long Beach During This Study

{Green sunfish *Lepornis cyanelius*}



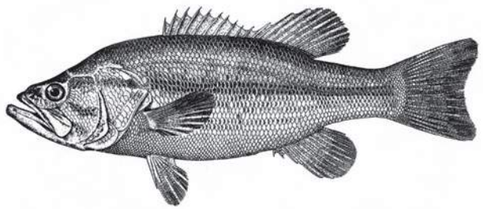
STATUS
Non-native species widespread and expanding. There are some who believe carp are not the creators of adverse conditions but rather moved into an area already disturbed. Their ecological role in California is poorly understood because they are found in disturbed and polluted habitats. 58 collected in FoLAR's L.A. River

DESCRIPTION
During their first summer they may average 5 inches and grow 3-4 inches per year until their fourth year when growth slows down. Wild carp are said to live 12-15 years and grow to around 31 inches and 9 lbs. The largest carp recorded in California was caught in Lake Nacimiento, San Luis Obispo County and weighed 58 lbs and there have been reports of 23 lb carp caught in the Glendale Narrows section of the Los Angeles River.

DISTRIBUTION
Common carp in California are descended from domesticated carp from Germany and Japan. They have survived in the West due to their ability to survive adverse conditions. They can withstand exceptionally high turbidity, sudden temperature changes, and low oxygen concentrations. They are omnivorous bottom feeders and their preferred foods are aquatic insect larvae and adults are known to feed on aquatic plants and algae. Usually living in deep turbid water, in clearer water, cover, such as submerged tree branches and beds of aquatic vegetation, becomes important.

ENVIRONMENT
Optimum water temperature for carp is around 75.2 degrees Fahrenheit and they can withstand exceptionally high turbidity, sudden temperature change, low oxygen concentrations (0.5-3.0 ppm), and salinities up to 16 ppt. Omnivorous feeders, diet consists of zooplankton, phytoplankton (algae), benthic insect larvae, invertebrates, and aquatic plants.

{Largemouth bass, *Micropterus salmoides*}



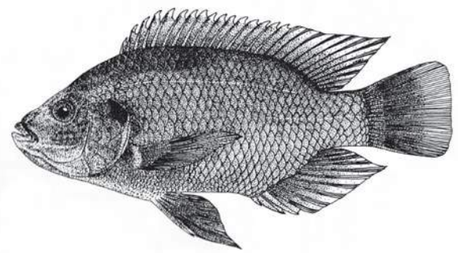
STATUS
Non-native species that is widespread and stable. The species is widely distributed but seems to have reached the limits of its range. Presumably such species are integrated into local ecosystems. 1 collected in FoLAR's L.A. River sample.

DESCRIPTION
Distinguished by their large mouth and heavy black stripe on each side, largemouth bass range in size from 1 inch – 4.9 inches. Their flexible foraging strategies and wide environmental tolerances have made them a keystone predator in many bodies of water. Juveniles feed mainly on rotifers and small crustaceans and then progress to aquatic insects and fish fry, including those of their own species, crayfish and tadpoles.

DISTRIBUTION
Historically these bass ranged from northeastern Mexico through much of the Mississippi. They have been introduced into all the continental United States (and Hawaii) and most provinces of Canada. In California, largemouth bass were brought from Illinois and planted in San Diego and Colusa County in 1891 They have since been spread statewide by anglers and agency biologists.

ENVIRONMENT
Warm shallow waters of moderate clarity and beds of aquatic plants are the usual habitat of largemouth bass. They like water temperatures between 96.8-98.6 degrees Fahrenheit with dissolved oxygen levels as low as 1 mg/liter and in California, have been found in water with salinities at 3 ppt.

{Tilapia *Oreochromis sp*}



STATUS
Non-native species to California that is widespread and expanding. Mozambique tilapia (in reality a hybrid form) are now one of the most common fish in the Salton Sea, the lower Colorado River and the lower reaches of some southern California streams. 271 collected in FoLAR's L.A. River sample.

DESCRIPTION
Three species of Tilapia (Mozambique, Blue, and Nile) are documented in California along with hybrids of these species. All can not be identified in California with out using biochemical techniques.

DISTRIBUTION
Mozambique tilapia now in California evolved from southeast Africa, and brought to San Francisco through Hawaii where they were used for aquaculture. In 1953 the Steinhart Aquarium in San Francisco served as a distribution point for the mainland. In 1972 and 1973 Mozambique tilapia were deliberately introduced to the lower Santa Ana, San Gabriel, and Los Angeles Rivers.

ENVIRONMENT
The thermal tolerance zone for the Mozambique tilapia is 59-96.8 degrees Fahrenheit and they can also tolerate salinities of 69-120ppt. Preferred habitat includes warm, weedy canals and river backwaters. They are omnivorous feeders and feed on planktonic algae, aquatic plants and detritus. They can digest plant material because of the extreme acidity of their stomach fluids.

RECOMMENDATIONS by Lewis MacAdams

I hope you've enjoyed reading State of the River 3 – The Long Beach Fish Study as much as I have. In 2008 Friends of the Los Angeles River completed their two-year study of fish in the Glendale Narrows section of the Los Angeles River. With over 2000 fish collected and a dozen taken to Dr. Gossett at Cal State Long Beach for sampling, we found that the fish in the Glendale Narrows are low in Mercury and Polychlorinated Biphenyls (PCBs) in comparison to other river fish from across the nation.

This study that started in 2014 was a partnership between FoLAR and the Aquarium of the Pacific. Once again, we hired Dr. Gossett for this study and we can't thank them enough for their dedication and service.

On November 20th, 2015 FoLAR embarked on our third study, the Sepulveda Basin Fish Study. Upon completion, this study will help establish baseline health of fish species among the Lower, Middle and Upper reaches of the Los Angeles River. Once again, Dr. Gossett has been hired for this study with results expected in 2018.

During the first outing of the Sepulveda Basin Fish Study, with help from a dozen volunteers, we captured around 3,699 fish, the majority of which were under 1 inch. Based on the few larger fish (up to 3 inches), most appeared to be Redbreasted Tilapia (Tilapia Rendalli). As we learned from Historical Records, the City of Los Angeles stocked the river with Tilapia in 1973 and 1974 to eat algae and to curb the mosquito populations that were problematic at the time. In 1985 when the Donald C. Tillman Water Reclamation Plant began discharging treated water into the Los Angeles River, the stagnant ponding became a thing of the past so the Tilapia were never really able to prove themselves as a vector mitigation effort.

Today the fish in the LA River are lower in toxins at Willow Street in Long Beach than the Glendale Narrows (Page 74). Perhaps this means that since EPA's Lisa Jackson declared the river "Navigable" in 2010, Clean Water Act regulations reduced NPDES (National Pollutant Discharge Elimination System) pollution from local industry. Most of the fresh water fish at Willow Street are refugees from the Glendale Narrows being pushed downriver in heavy rains that are trapped between concrete and ocean salinity.

FoLAR is proud to be part of the AB 530 (Rendon) Lower River Working Group and with the help of our sponsors, FoLAR has recently opened our Lower River office in downtown Long Beach. FoLAR has completed 27 years of trash removal through the LA Gran Limpieza and in the 2016 clean up, over 9,000 people showed up to make a difference.

We hope you enjoyed learning about the fish in our mighty river as much as I did.

Lewis MacAdams
Founder/President FoLAR

Under Los Feliz Blvd (below). Photo of osprey (top left) by Steve Appleton – L.A. River Kayak Safari

Father and son, crate-fishing for carp beneath the Los Feliz bridge (above).

REFERENCES

The Los Angeles River: Its Life, Death, and Possible Rebirth (2001) by Blake Cumprecht

The First State of the Los Angeles River Report (2005) by FoLAR

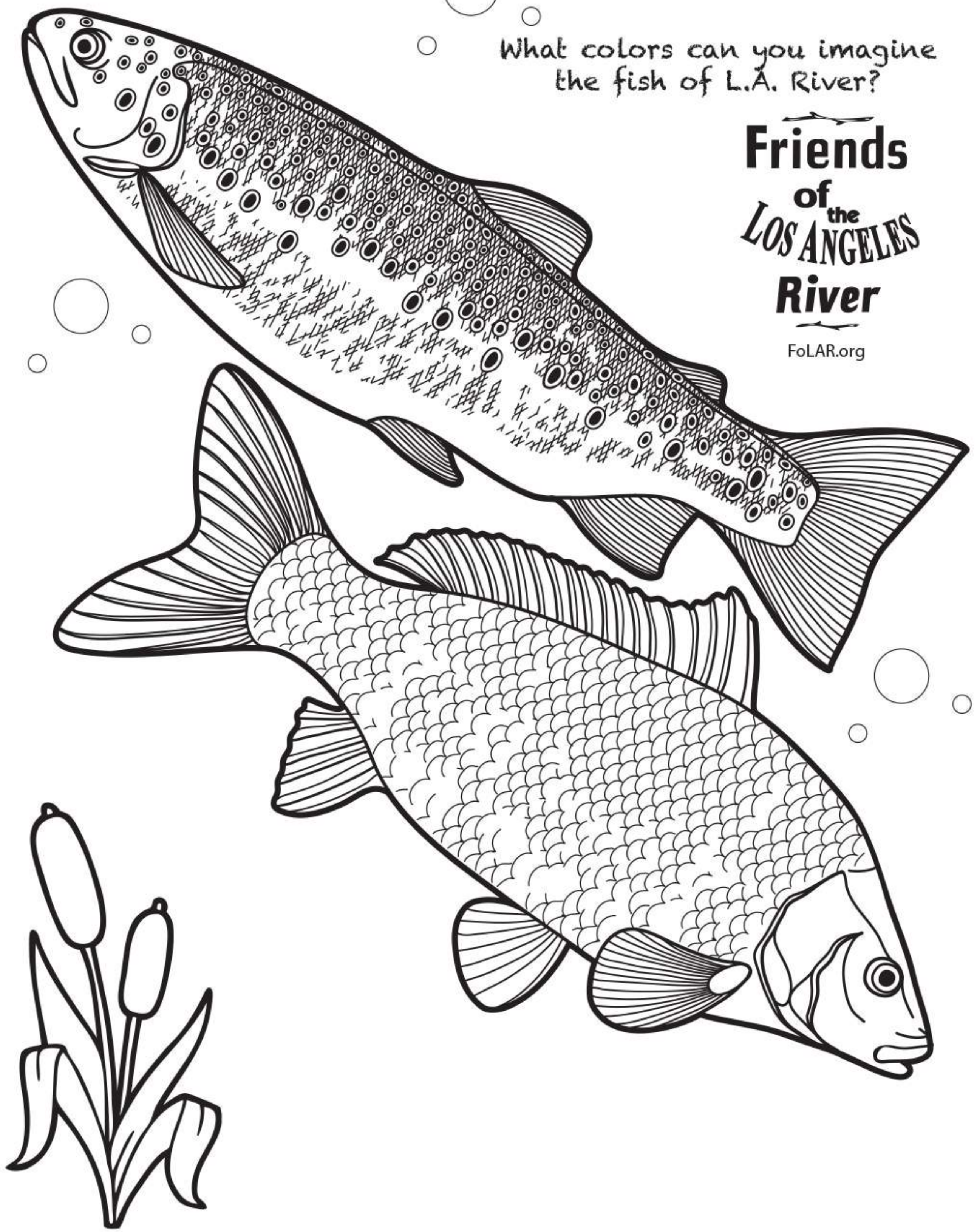
Watershed Wonders – Teachers Resource Guide (2007) by FoLAR

State of the River 2 – The Fish Study (2008) by FoLAR

A Trash Biography (2011) by FoLAR

The Los Angeles River – State of the Watershed Report (2012) by Council for Watershed Health

Los Angeles River Ecosystem Restoration Integrated Feasibility Report (2013)
by US Army Corps of Engineers, Los Angeles District



What colors can you imagine the fish of L.A. River?

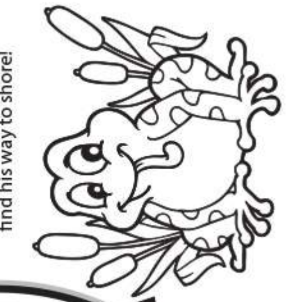
Friends of the LOS ANGELES River

FoLAR.org

✂ CUT ALONG THE DOTTED LINE.

Take home a "FISHY" Activity for the kids! by Miranda Robin
Miranda holds a Masters Degree in Early Childhood Education from Loyola Marymount University.

✂ CUT ALONG THE DOTTED LINE.



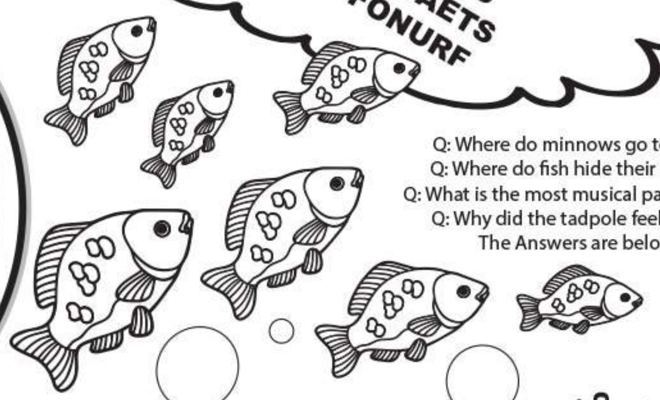
l.a. river is ... a-maze-ing!

Help this kayaker find his way to shore!

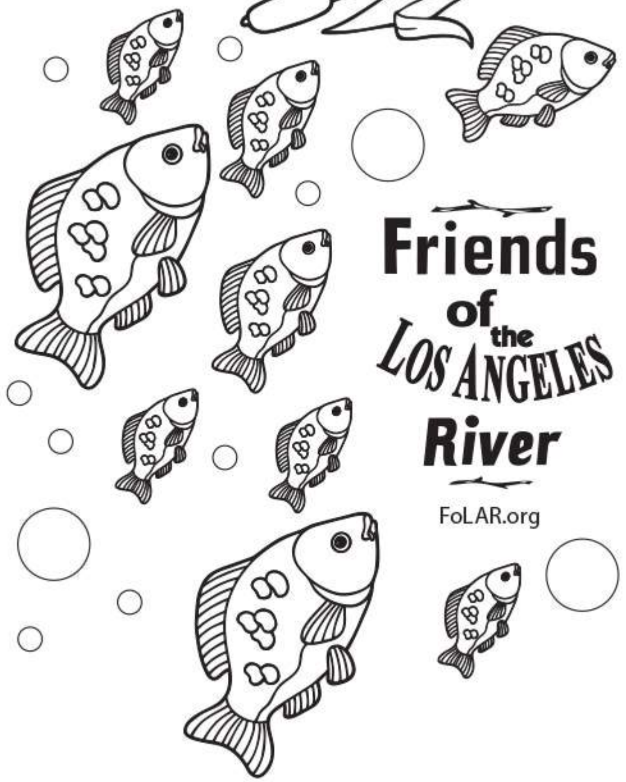
Can you unscramble these river words?

BANKS
WATER
ESTUARY
RUNOFF
CONCRETE
FISH

NOCERCTE
SIFH
RTAWE
KNBAS
RYUAETS
FONURF



Q: Where do minnows go to learn?
Q: Where do fish hide their money?
Q: What is the most musical part of a fish?
Q: Why did the tadpole feel lonely?
The Answers are below!



Friends of the LOS ANGELES River

FoLAR.org

How many River Words Can You Find?

B	D	S	Q	J	B	N	W	F	X	S	B	P	A	E
D	O	R	P	A	D	W	A	T	E	R	O	H	M	S
O	W	E	O	K	H	S	T	O	U	R	U	C	Q	T
W	N	S	H	B	M	C	E	M	O	O	S	F	M	U
S	S	F	M	A	I	F	R	I	E	N	D	S	G	A
X	T	R	U	N	O	F	F	O	H	N	E	S	H	R
R	R	O	H	K	F	K	A	Y	A	K	R	F	B	Y
L	E	G	J	S	J	S	L	O	S	R	Y	I	I	O
I	A	A	U	T	H	S	L	T	B	H	A	S	K	I
R	M	L	D	B	X	W	A	T	E	R	S	H	E	D
O	L	E	Q	U	Z	F	H	X	M	I	X	P	P	K
C	O	N	C	R	E	T	E	N	Z	V	I	H	A	Z
K	O	C	P	E	C	H	A	N	N	E	L	J	T	A
S	M	D	V	Q	S	G	W	B	I	R	D	M	H	L
K	P	O	L	L	U	T	I	O	N	A	E	F	Q	G
P	H	O	T	O	G	R	A	P	H	S	N	X	O	V

FISH
BIRD
FROG
BANKS
RIVER
WATER
ROCKS
KAYAK
TOUR
FRIENDS
RUNOFF
ESTUARY
CHANNEL
WATERFALL
WATERSHED
BIKE PATH
POLLUTION
DOWNSTREAM
PHOTOGRAPHS
CONCRETE

ANSWERS: 1. In a school of fish. 2. In a river bank. 3. The scales. 4. Because he was newt to the area.

Our Sponsors

THANK YOU TO OUR SPONSORS, PARTNERS, AND COLLABORATORS

RESOURCE CONSERVATION DISTRICT OF THE SANTA MONICA MOUNTAINS

www.rcdsmm.org

UC CE University of California Agriculture and Natural Resources Cooperative Extension

AQUARIUM OF THE PACIFIC®

A non-profit institution

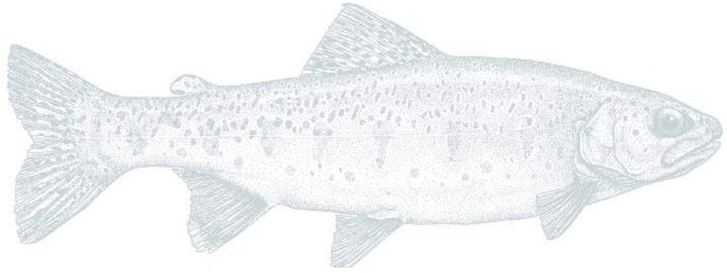
TROUT UNLIMITED

Protect, Reconnect, Restore, Sustain

"We all live downstream"

COUNCIL FOR WATERSHED HEALTH

patagonia



FOLAR

www.folar.org 323.223.0585

570 W. Ave. 26 Suite 250 . Los Angeles, CA 90065

Printed on recycled paper with soy ink.