



The State of
The San Diego River

2016



What Does This Report Tell Us?

This Report is our response to one of our most commonly received questions:

“Is the River healthy?”

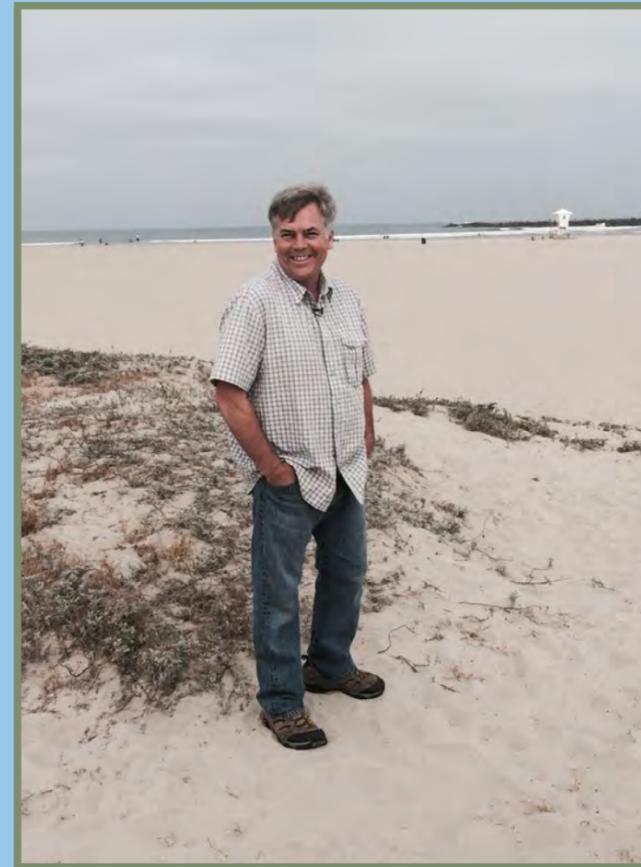
This is a difficult question to answer. The San Diego River is a large and complex natural system with many factors affecting its overall health and vitality. It is also a very important question, and the answer has impacts on the important role the River plays in sustaining wildlife, supporting recreation, and providing water for a thirsty region. There are many challenges and threats to the River’s health, each of which must be monitored to help us answer this question.

Each year, The San Diego River Park Foundation mobilizes volunteers to collect data to inform this report. This data is related to trash, invasive nonnative plants and water quality. Because these impacts are most often associated with urban influence, this report focuses on data for the Lower San Diego River.

The San Diego River Park Foundation compiles and interprets this data into letter grades for each data point and each segment of the Lower River. These segments are then grouped into ten Sections, defined by similar geography and land use. These letter grades form an annual Report Card that provides a tool for determining good watershed management.

The State of the River Report is designed to present a snapshot of the condition of the River and has been the guiding force behind The San Diego River Park Foundation’s award-winning Healthy River, Healthy Communities program. The data used for the Report Card establishes the action plan for restoring and improving the San Diego River in the coming year.

Read on to learn more about the data collection, factors that affect the health of the River and what the data tell us this year.



A Message From

Rob Hutsel,
President and CEO



This report is written to be a snapshot in time of the health of our historic San Diego River, and we use trash, invasive plants and water quality to inform this report.

This year, we have surpassed the milestone of over 2 million pounds of trash removed from the River, and over 210,000 pounds will have been removed just in 2016 by the time the year is through. While we are in awe of the power of our volunteers to remove this trash, we continue to be saddened by these shocking quantities of trash in the riverbed.

The data collected by these citizen science programs not only facilitates our clean-up program working to remove this trash, it gives us powerful data as we strive to work toward long-term solutions to these problems.

It is a difficult thing to return to the same sites, time and time again, to remove trash from areas that were once clean. And yet, this dedicated effort is critical to preserving ecological function of sensitive areas, and this persistence is already paying off. We have seen the recovery of areas that were a perpetual thorn in our side and now are consistently clean.

We would not be able to work toward these long term goals, alongside landowners and land managers, without this data or without the promise of dedicated volunteers rolling up their sleeves and telling through their actions that we will not stand for the River being trashed.

We invite you to learn more about the health of the San Diego River and how you might be able to join with us as we work for a clean and healthy River!

Sincerely,

Rob Hutsel

Using Indicators To Determine Health

The State of the San Diego River is influenced by many different factors. Each indicator we have selected is a tool to measure of health of the River. Together, these indicators point to the condition of the entire Lower River.

Using these indicators and a letter grade system allows us to provide an easy-to-understand, concise evaluation of a very complex issue, determine general trends and compare variances over time.



Trash:

Encompasses four of the most common categories, defined by source: encampments, litter, stormwater debris and dumping. The higher the trash volume per acre, the lower the grade.

Invasive Plants:

Incorporates the canopy coverage of target terrestrial invasive non-native species: giant reed, Brazilian pepper tree, pampas grass, eucalyptus, Mexican fan palm, Canary Island date palm, castor bean and tamarisk, as well as aquatic species like water primrose and water lettuce. High total canopy coverage means a low grade.



Water Quality:

Integrates aggregate data of four key water quality parameters (temperature, pH, specific conductivity and dissolved oxygen combined with stream discharge) into an index value. Low index values mean a low grade.



Temperature:

How hot or cold the water is



Conductivity:

Ability of the water to pass an electrical current, directly related to the concentration of ions in the water (used as a measurement of dissolved solids, like salts)



Flow:

How much water is moving past a cross-sectional area at a given time



Dissolved Oxygen:

How much oxygen is dissolved or carried in the water

Where Does The Data Come From?

Citizen science is research conducted by nonprofessional and/or amateur scientists, under the guidance of scientists and using scientific protocols. The data provided by citizen scientists through the River Park Foundation's programs is valuable and extensive, allowing us to create and advance a work plan to promptly address issues. Data is collected by volunteers through these three programs:



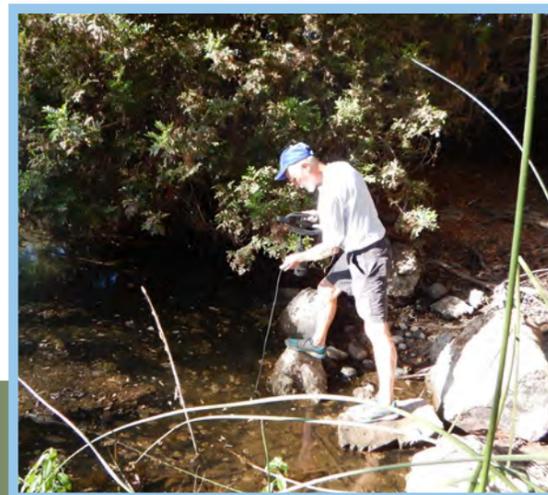
RiverBlitz:

Volunteer teams are led by a trained captain and collect data using GPS technology, digital cameras and data forms (such as the sample below). Comprehensive surveys are conducted in April and October since 2008. Volunteers record data on invasive plants, trash, and site condition. Data included in this report was collected by volunteers during our October 2016 RiverBlitz surveys.

Waypoint	Invasive ID (ID #)	Canopy Cover (square ft)	Diameter (Inches)	Comments
13	5	42	2 ft	Partially burned, 50ft off N. side of trail
14	5	60	1 ft	west side of trail in the marsh

RiverWatch:

Volunteer teams collect water quality data using an electronic sonde, field forms and nutrient test kits. RiverWatch monitoring follows strict protocols (QA/QC procedures). Data used in this report was collected by volunteers during monthly RiverWatch water quality monitoring for Water Year 2016 (October 2015-September 2016).



To view complete data on trash, invasive plants, and water quality, please visit our Online Information Center: www.sandiegoriver.org/online_info_center.html

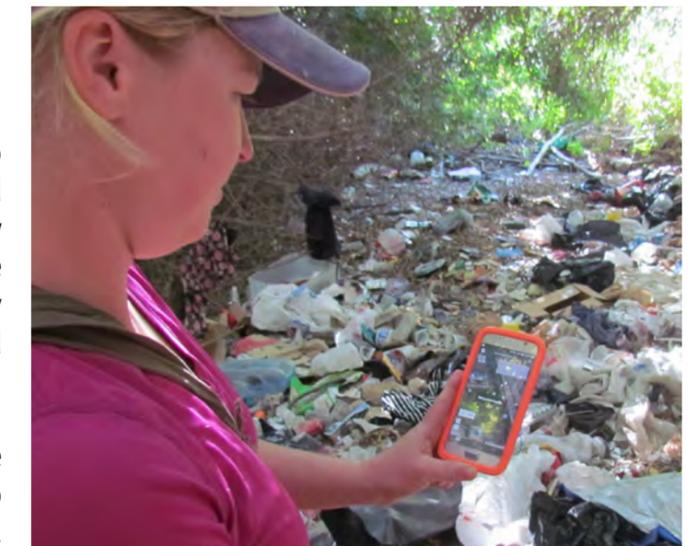
Cell Phones and Data Collection Improvements

In 2016, our team developed a new custom app to allow volunteers to collect survey information with any data enabled smart phone. This app will allow us to increase efficiency and accuracy of data collection and processing,

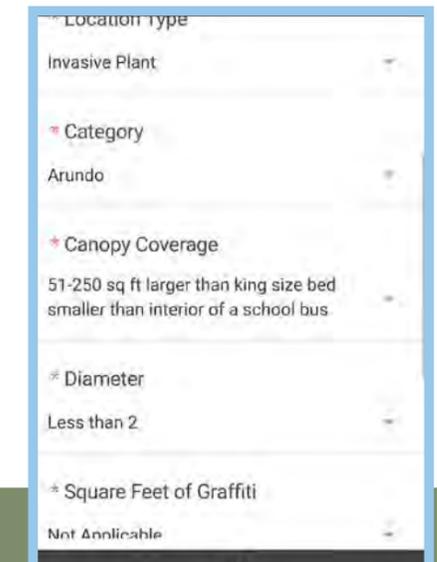
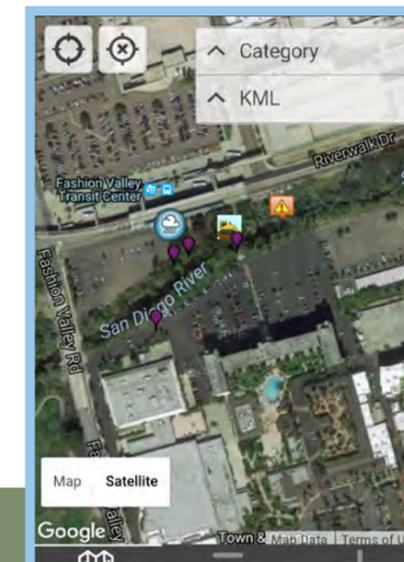
facilitate real-time data updates, and promote volunteer engagement. The free app is called Mapper, and it allows volunteers to capture images and location as well as record specific data parameters with just a few clicks.

River Assessment Field Team:

The River Assessment Field Team is a new group of volunteers that visit locations in the riverbed on a weekly basis to update data by adding new trash sites and remove data points that have been successfully cleaned. This team greatly increases the accuracy of our trash maps and supports our clean-up teams.



Volunteers are needed for the citizen science teams! Contact volunteer@sandiegoriver.org to learn more about the teams and their schedules.



To see for yourself visit: www.immappler.com/sdriverblitz OR www.immappler.com/sandiego16

Trash:

Major Progress and Major Challenges



Report:

In 2016, the overall trash grade for the Lower San Diego River remained a C. However, significant progress made by the River Park Foundation's clean-up program was reflected in that for the first time ever, 52% of the river is in the A range or contains less than one bag of trash per acre. Areas of the river within the City of Santee are in the cleanest condition we have documented, with 75% falling into the A grade category.

Unfortunately, three Sections in Mission Valley (3- 5) contained 90% of all trash identified during the October 2016 RiverBlitz. These sections also had the highest number of active and inactive homeless encampments. Trash associated with encampments continues to be the highest source by volume for the entire lower San Diego River and has increased in proportion overall by 15% since last year from 74% to 89%.

Trash Grades By Section



SECTIONS	1	2	3	4	5	6	7	8	9	10
Size (acres)	312	52	153	104	61	87	53	171	60	48
Trash quantity (pounds)	420	2,835	38,430	84,665	43,890	---	11,725	2,765	---	---
Trash density (pounds/acre)	1.35	54.52	251.18	814.09	719.51	0.00	221.23	16.17	0.00	0.00
Cumulative Grade	A	C	C	F	D	A	D	B	A	A

Quick Facts:

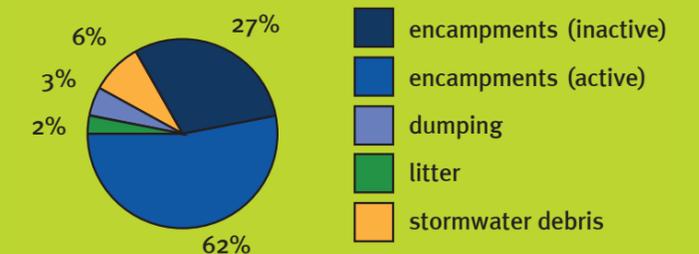
- The average trash site identified this year contained 20 bags of trash.
- An average encampment trash site consisted of nearly 30 bags of trash while an average litter, stormwater or dumping site contained less than 6 bags worth of trash.
- Section 4 in Mission Valley holds the highest number of encampments (21) and largest amount of trash (84,665 pounds).

Grade:



Trash Sources:

Identifying the source of trash issues along the River is a critical component of working towards long-term solutions. Sourcing gives us critical information to advocate to policymakers to allocate resources for addressing significant issues impacting the health of the River. This year, homelessness in the riverbed is the largest contributor of trash accounting for 89% of total volume, or 164,990 pounds of trash.



Water Quality: Continued Impairments



H₂O Report:

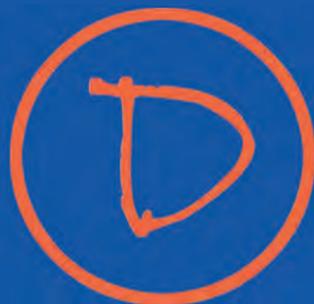
Typically, water quality in the lower part of the San Diego River can vary during the year, ranging from Poor (which is an F grade) during drier summer months up to Excellent (A grade) during wetter winter months. This year saw very little change in water quality compared to last year with winter months showing a slight improvement and summer months showing a slight decline since 2015. While the overall

quality of the river remains at a D grade, this year marks the river's second poorest water quality year since monitoring began in 2004 (Water Year 2014 was the poorest on record with an F grade). Our data indicate that these changes are likely attributed to below normal rainfall, above normal water temperatures, and continued rapid growth and decomposition of invasive aquatic plants.

Quick Facts:

- This is the fifth consecutive year of below normal rainfall and stream flow.
- Section 8 (which includes much of the segments in the City of Santee) continued to show the lowest water quality remaining at an F grade.
- The average dissolved oxygen concentration in 2016 was 4.9 mg/L. This level does not meet the standard set to protect the survival and well being of plants and wildlife.

Grade:



Invasive Plants: Growth and Expansion



Report:

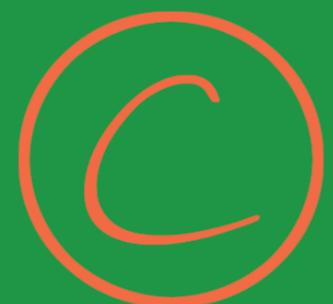
Invasive non-native plant coverage is a factor of both the number of invasive plants and the canopy coverage of those plants. This year, invasive plant coverage increased primarily due to the growth of canopies and to a lesser extent, expansion of populations. Four of the ten sections dropped by one letter grade. The overall invasive non-native plant grade also declined from a B to a C in 2016. The good news is that a 52-acre invasive removal

project will soon begin that will eliminate 60+% of invasive coverage on the most densely infested section of the river in east Mission Valley. Continued regrowth and reestablishment in previously treated areas significantly added to declining grades. Seed sources in tributaries and on private properties as well as seed and root regrowth from previously restored areas demonstrates the need for increased funding for long-term coordination and treatment.

Quick Facts:

- Castor bean was the most prevalent species encountered, found at 25% of all sites.
- The addition of aquatic invasives in 2016 resulted in increased coverage in all areas but most drastically in Section 8 (central and eastern Santee), reducing the grade by one letter to a D.
- Occurrences of eupatory, an early detection rapid response species, now extends from Alvarado Creek west to Fashion Valley.

Grade:



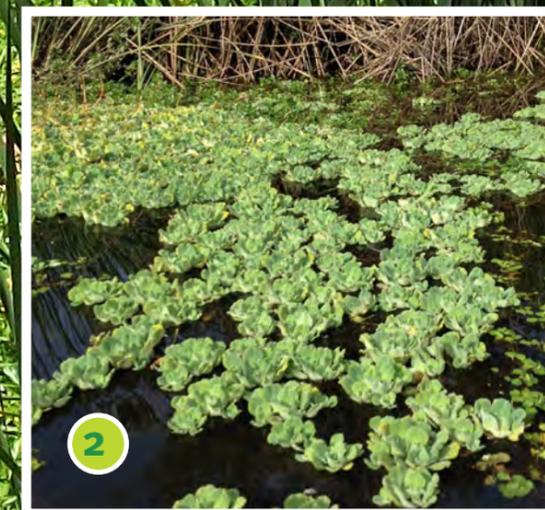
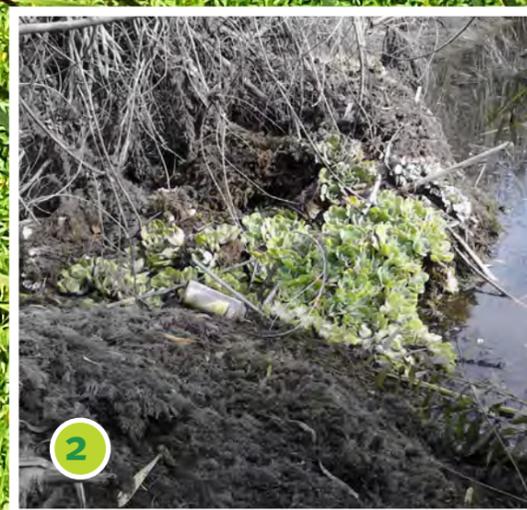
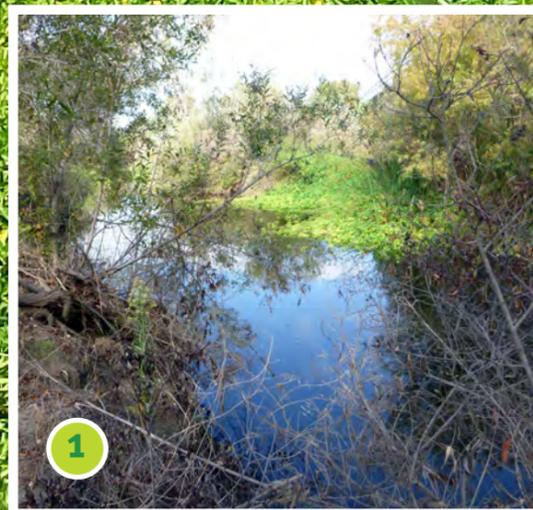
Invasive Non-Native Aquatic Plants

Starting this year, aquatic invasive non-native plants are incorporated into the invasive plant grade. By incorporating aquatic plants, we can provide a more complete assessment of the severity of invasive plant infestation for the lower San Diego River.

1 **Water Primrose** (*Ludwigia sp.*) is a noxious weed native to Central and South America that has been described as “competitive, persistent and pernicious.” This invasive non-native plant was first documented in our watershed in 1986, but the frequency and magnitude of distribution has increased greatly over the past decade.

Ludwigia thrives in slow-moving water with shallow banks, which describes many of the old sand mining ponds within the San Diego River. This species is an issue across lower watershed. In Mission Valley, the weed was present in 57% of the survey area. In Santee, just between Mast Park and Cuyamaca Street, there are 1.5 acres of surface water covered with this difficult to remove, difficult to control plant. Ludwigia grows in mats that cover the water surface with extensive root systems below the surface. These mats provide habitat for mosquito breeding, reduce available habitat for water fowl and fish, impede water movement and reduce dissolved oxygen levels. The reduction in oxygen and increased plant decomposition also contributes to odor problems along the river.

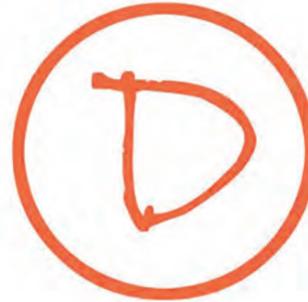
2 **Water Lettuce** (*Pistia stratiotes*) is an aggressive grower and new threat. While the origin of water lettuce is in debate it is not native to the western United States. First documented in the watershed in 2011 and identification confirmed in 2014, this plant, closely resembling a floating head of lettuce has started to spread. Dense mats are seasonally present in central Mission Valley and in the river near Fashion Valley Mall. A small number of plants have also been seen at Mast Park in Santee. The plant most likely entered the river from an aquarium or ornamental pond but it is easily spread through flood events, fishing or boating equipment. Its growth habits present similar threats as Ludwigia, promoting mosquito breeding, reducing oxygen levels and impairing flow.



The Overall Grade

For the River in 2016

For the water year ending September 2016, the San Diego River received an overall grade of D, or **POOR**.



Breakdown Of Grades By Section

SECTIONS	1	2	3	4	5	6	7	8	9	10	2015 Grade	Overall Grade
Trash	A	C	C	F	D	A	D	B	A	A	C	C
Water Quality		C	D	D	F	C	D	F			D	D
Invasive Non-Native Plants	A	D	B	F	F	A	B	D	A	A	B	C
Cumulative Grade	A	D	C	F	F	B	D	D	A	A	C	D

Grading Criteria By Indicator

Narrative	Grade	Invasive Percent Cover	Trash Bags Per Acre	Water Quality Index
Excellent	A	< 2%	< 1	> 75
Good	B	2.0 - 2.9%	1.0 - 1.9	50 - 74.9
Fair	C	3.0 - 3.9%	2.0 - 2.9	36 - 49.9
Poor	D	4.0 - 4.9%	3.0 - 3.9	25 - 35.9
Very Poor	F	> 5%	> 4	> 25

These grades are a planning tool that allows us to educate the public, landowners, stakeholders and policymakers to help to address these issues and ultimately, to improve this grade over time.



So... Is The River Healthy?

The preceding pages explained a breakdown of the methods and data points we use to present this evaluation of the current health of the San Diego River. Of course, the River is more than just water, and when we consider its health, we should also consider the entire ecosystem that depends upon the River.

The most simple answer to the question of whether the River is healthy is no. By evaluating trash, invasive plants, and water quality, the overall grade for this year's Report Card is D (or poor).

The impacts of more than half a million people living in its watershed, the area that drains into the River, are significant. Some areas of the

River are in great shape, and while we have seen marked improvements in some segments over the last decade, many of the urban sections suffer.

Trash, water quality and invasive non-native plants tell part of the story of the River's health. There are other indicators too, such as bacteria levels, contaminant levels in fish tissue, benthic invertebrate community health and more. Additional community-based monitoring can supplement public agency programs and help inform and engage citizens. There is a need to expand these programs to reach urban tributaries of the River to identify sources of the problems, to increase management of some areas, and to continue cleaning the River until long-term solutions can be found.

What Can We Do?

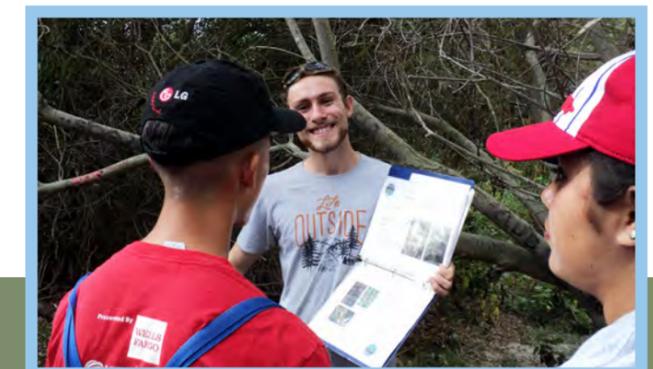
Community involvement is critical to ensuring the River has a strong and powerful voice demanding a better future!

In order to affect change, the River Park Foundation is dedicated to engaging community leaders, policymakers, scientists, agencies, researchers and the public to work hand in hand to advance the goals for improving the River's health.

How do we get the overall grade to an A? Additional funding, research and resources are needed.

Join us as a volunteer, as a researcher, as an advocate or as a donor to help achieve this vision for the River and community.

Contact us to learn more about how you can get involved! Learn more: www.sandiegoriver.org.



OUR THANKS TO:

All volunteers who participated in the RiverWatch, RiverBlitz and River Assessment Field Team programs!

Project Leadership:

The San Diego River Park Foundation
Thanks to report author Shannon Quigley-Raymond and to John Kennedy for authoring the water quality report.

RiverWatch leadership:

Conrad Brennen, Mark Dreiling, John Kennedy, George Liddle, Paul Nguyen, Bob Stafford, Gary Strawn, Tom Younghusband

Technical Advisory Committee:

- Brittany Jenner, Applications Engineer, Xylem
- Martin Offenhauer, Senior Envr. Scientist, Trevet
- Gary Strawn, Volunteer Leader, RiverWatch

RiverBlitz Leaders:

Abel Alba, Alexander Walsh, David Loveland, Everett Neuman, Jakob Daoust, Kenneth Santos, Machenna Peasley, Martin Offenhauer, Matt Wosje, Roberto Marquez, Tess Plant-Thomas, Tom Godfrey

PROGRAM SPONSORS:

Our thanks to the many sponsors of our Healthy River, Healthy Communities Program who enable us to conduct the RiverBlitz surveys and the RiverWatch water quality monitoring, including:

QUALCOMM FOUNDATION



The San Diego River Park Foundation is a 501(c)3 nonprofit dedicated to creating a better future for the historic San Diego River.

To learn more or to get involved:
www.sandiegoriver.org