

Santa Ana Riverwalk

Santa Ana Sucker Conservation Team Meeting

September 9, 2019



Conservation Team

Watershed-wide, Inter-agency Collaboration

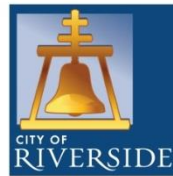
Riverwalk:

- 13-year dataset on SAS Habitat Availability
- Volunteer Driven
- Many agencies and other entities participate
- Provides crucial long-term data on important habitat variables for Santa Ana Sucker



Partner Agencies

Thanks to the members of the Santa Ana Sucker Conservation Team:



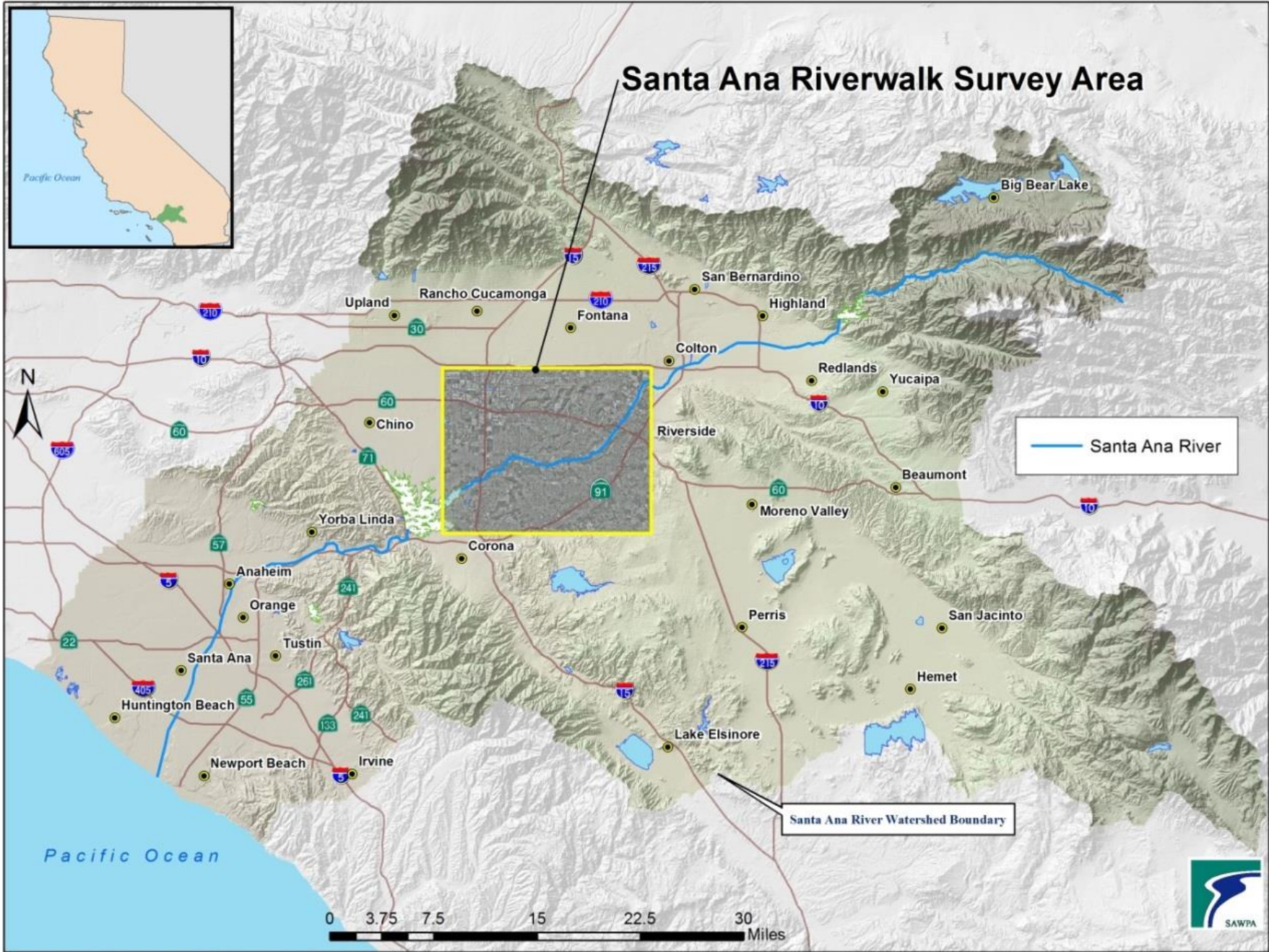
City of Arts & Innovation



Thanks to our Riverwalk Partners in planning the survey:

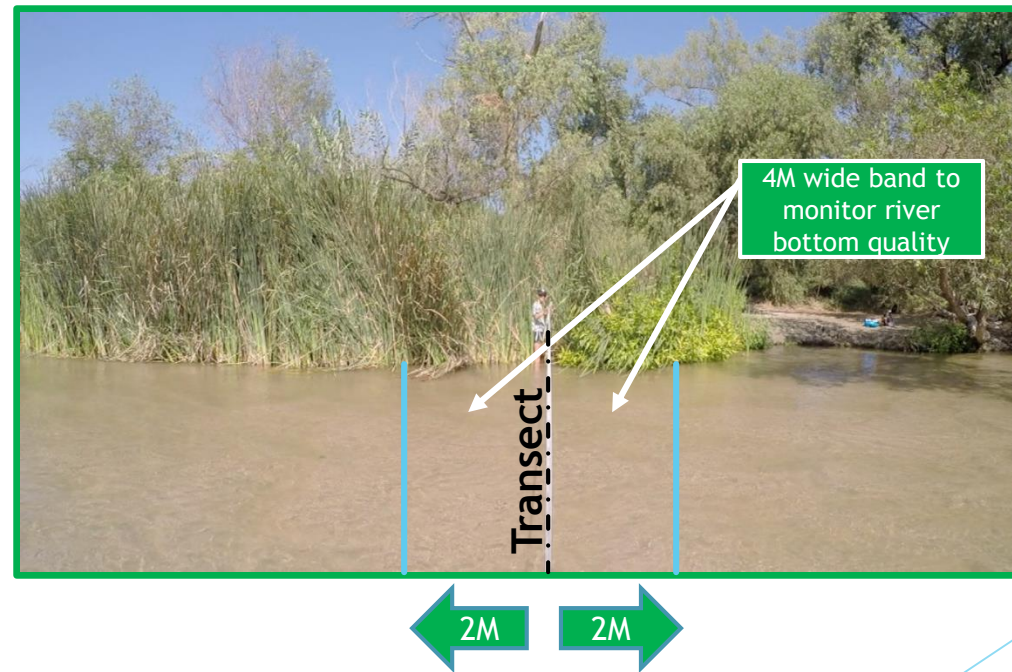


And thanks to all the volunteers who joined us on **October 18, 2018** for the latest Riverwalk survey.



Field Data Collection

- ▶ The area within the band is then surveyed by visually identifying what type of material makes up the river bottom:
 - ▶ Mud/Silt
 - ▶ Sand
 - ▶ Gravel
 - ▶ Cobble
 - ▶ Boulder



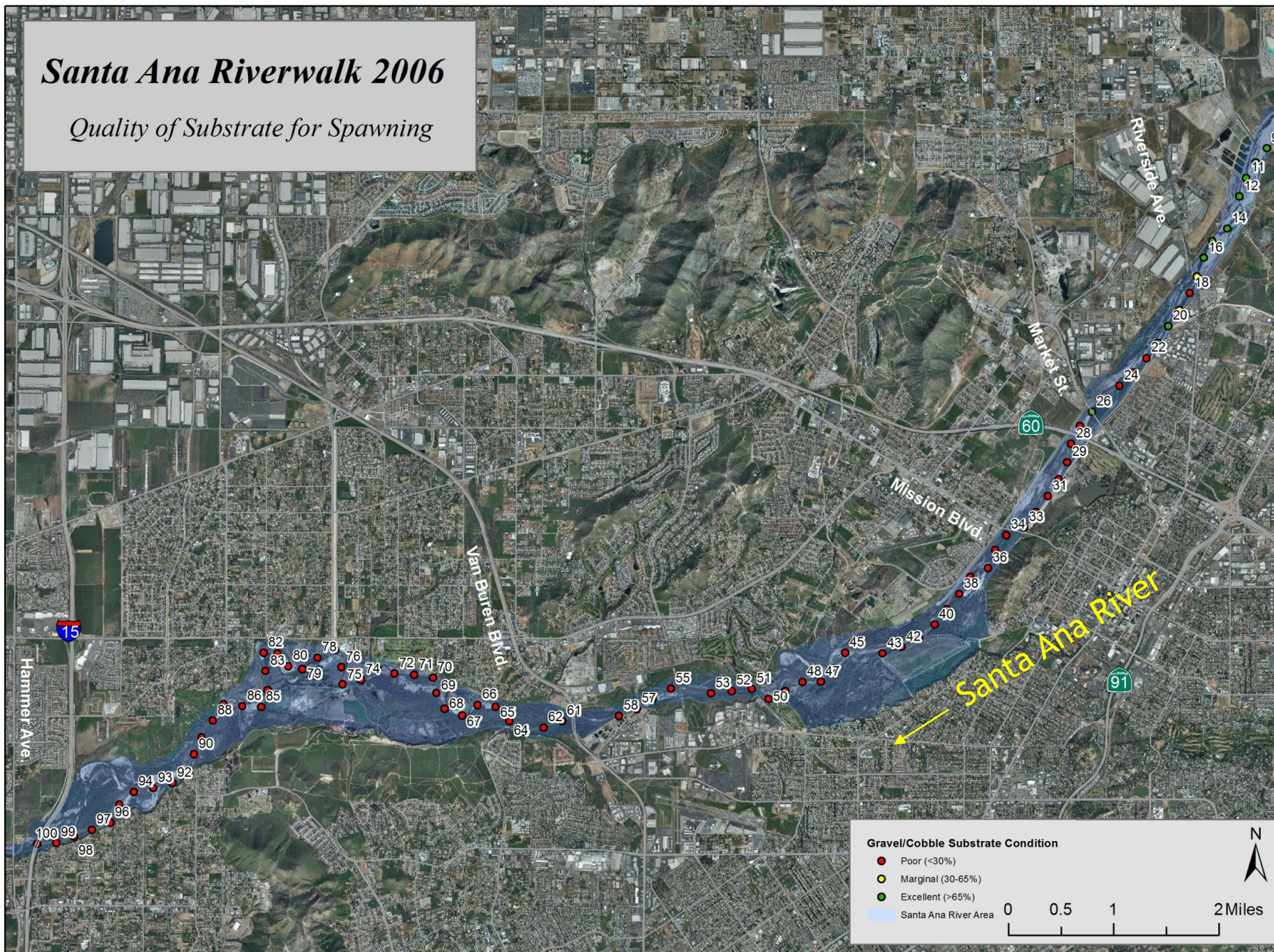
Reading the Riverwalk Maps

For information sharing purposes, the quality of the river bottom (substrate) is generalized in this Atlas in the following categories:

- ▶ Poor: 30% or less of the transects substrate is gravel/cobble.
- ▶ Marginal: 31% to 65% of the transects substrate is gravel/cobble.
- ▶ Excellent: More than 65% of the transects substrate is gravel/cobble.

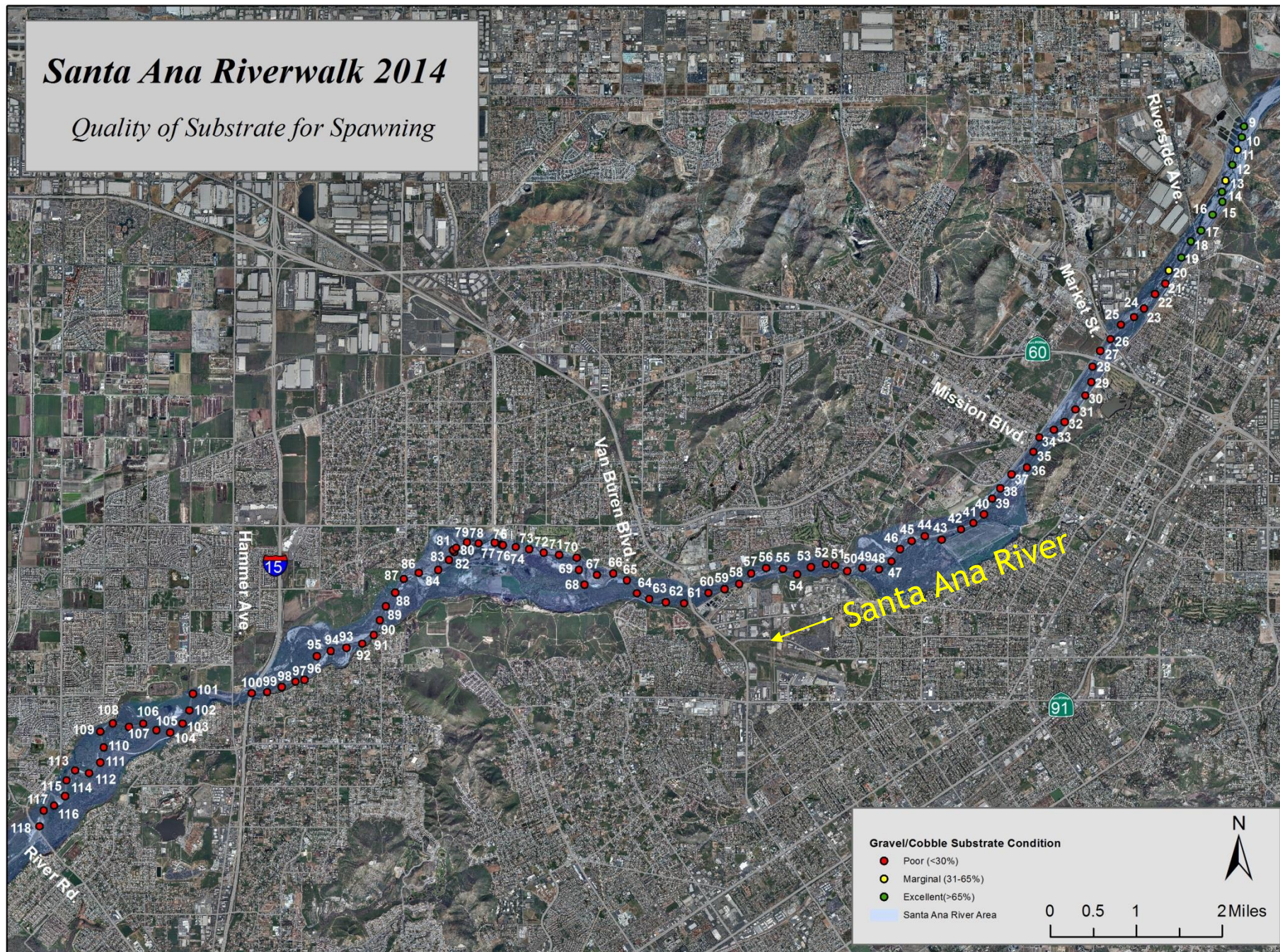
Santa Ana Riverwalk 2006

Quality of Substrate for Spawning



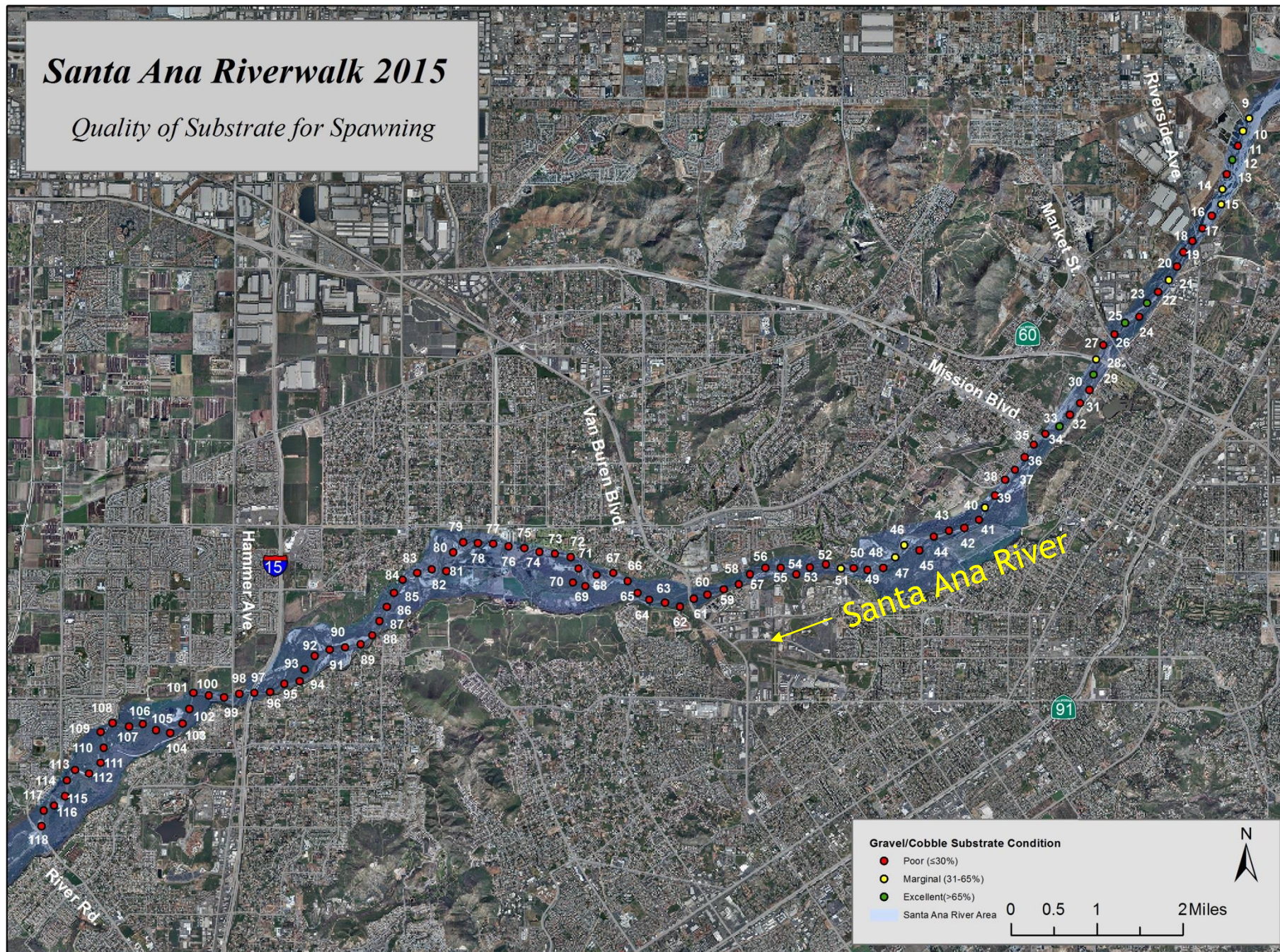
Santa Ana Riverwalk 2014

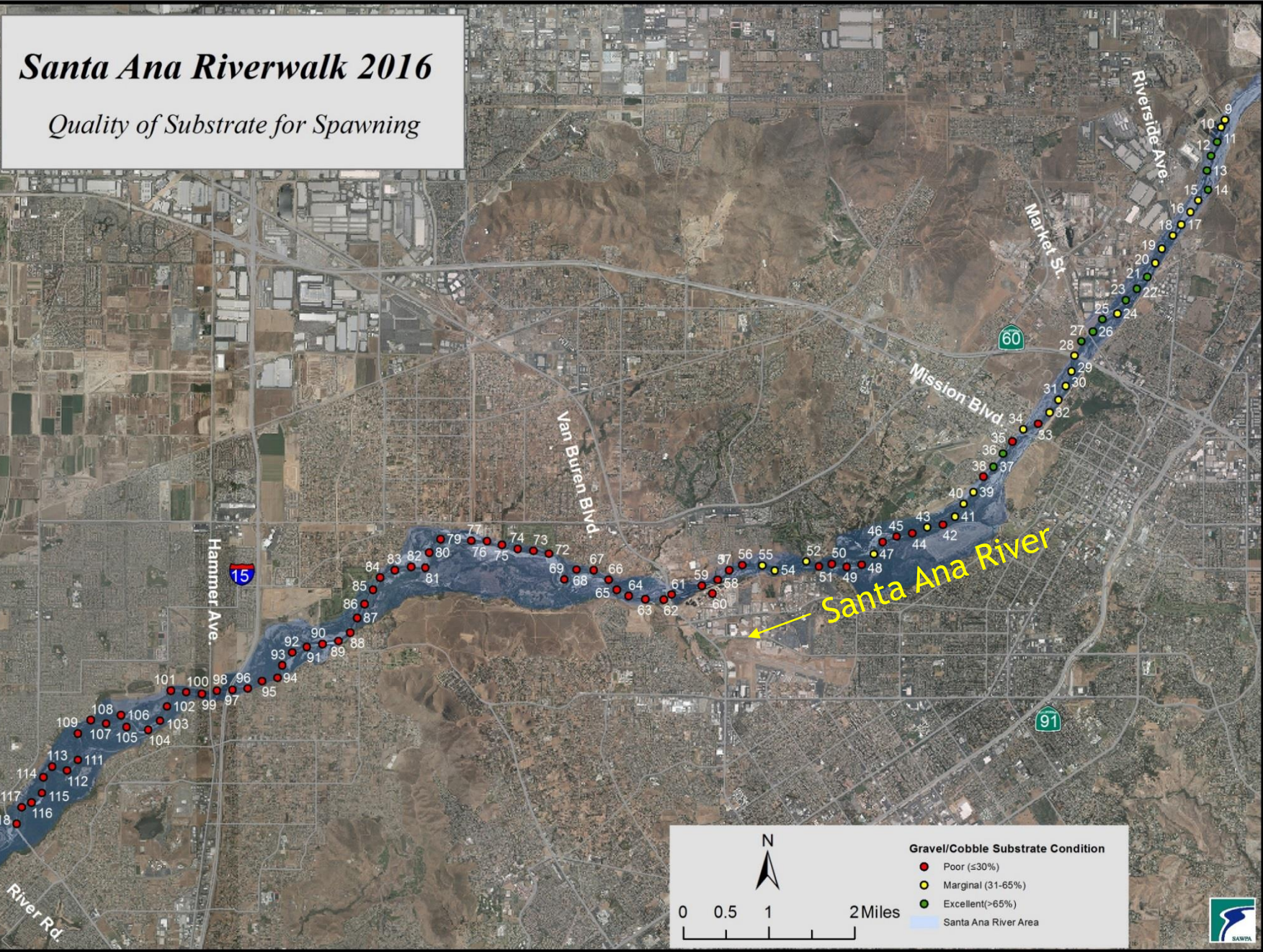
Quality of Substrate for Spawning



Santa Ana Riverwalk 2015

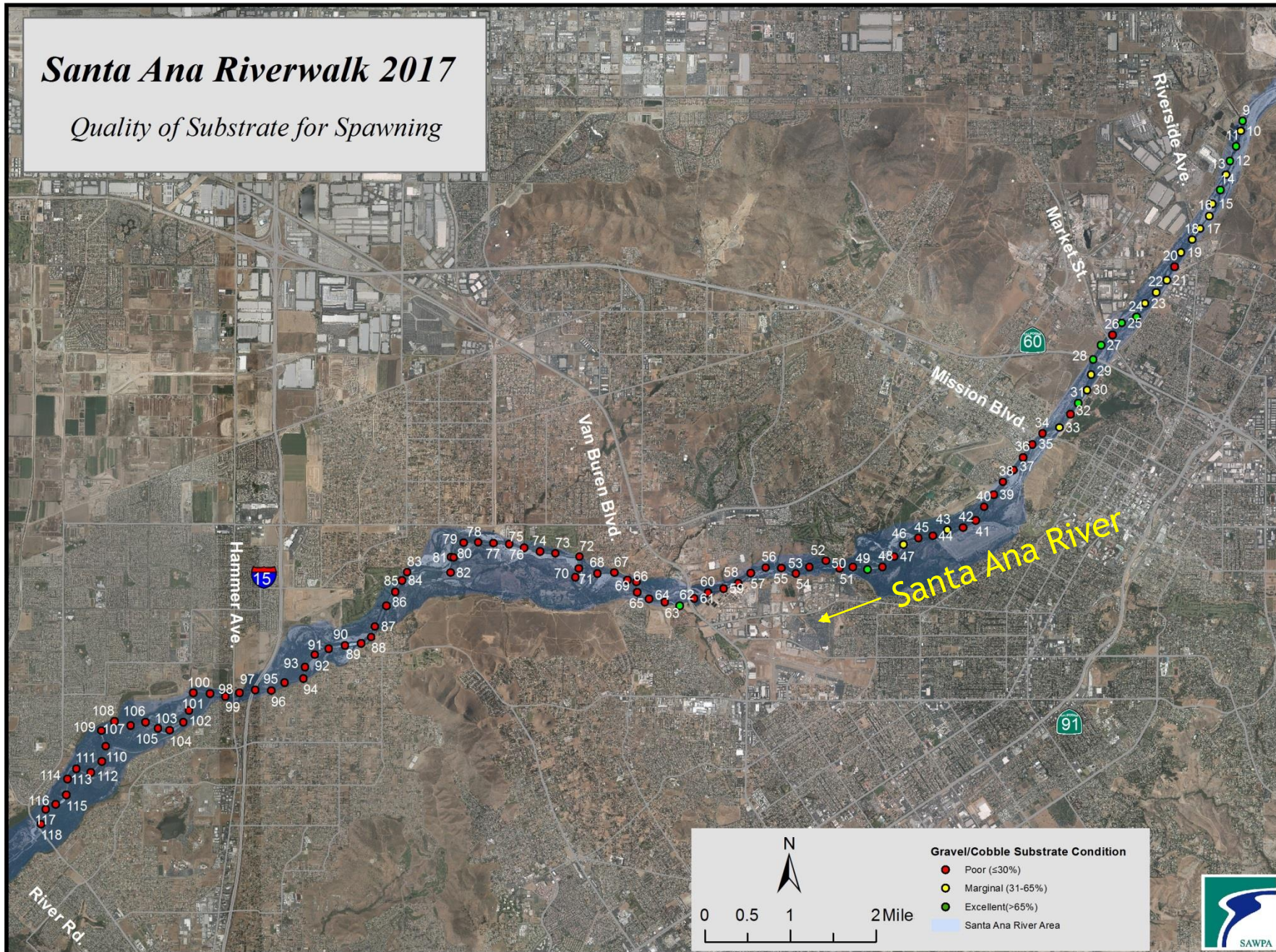
Quality of Substrate for Spawning





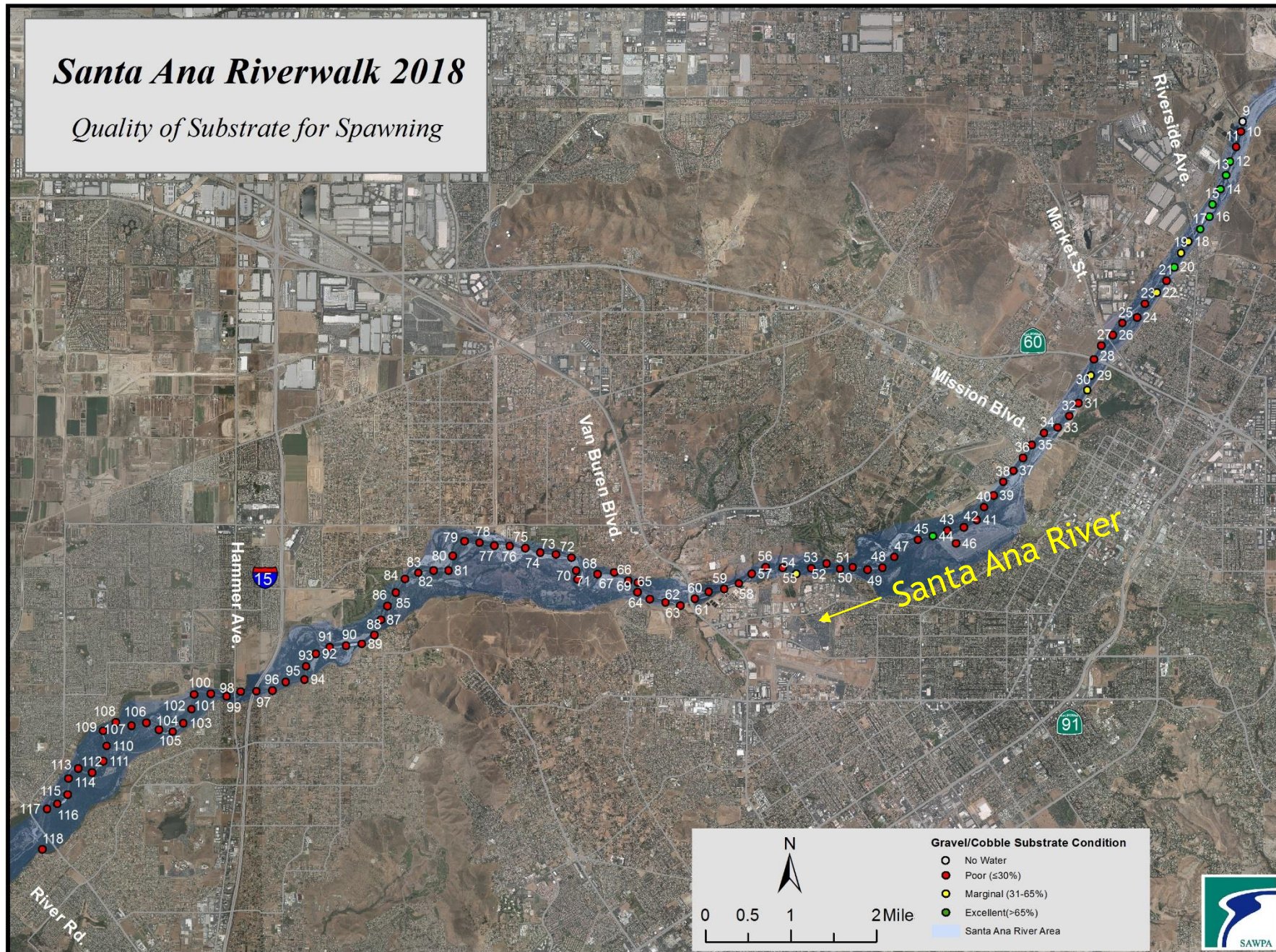
Santa Ana Riverwalk 2017

Quality of Substrate for Spawning

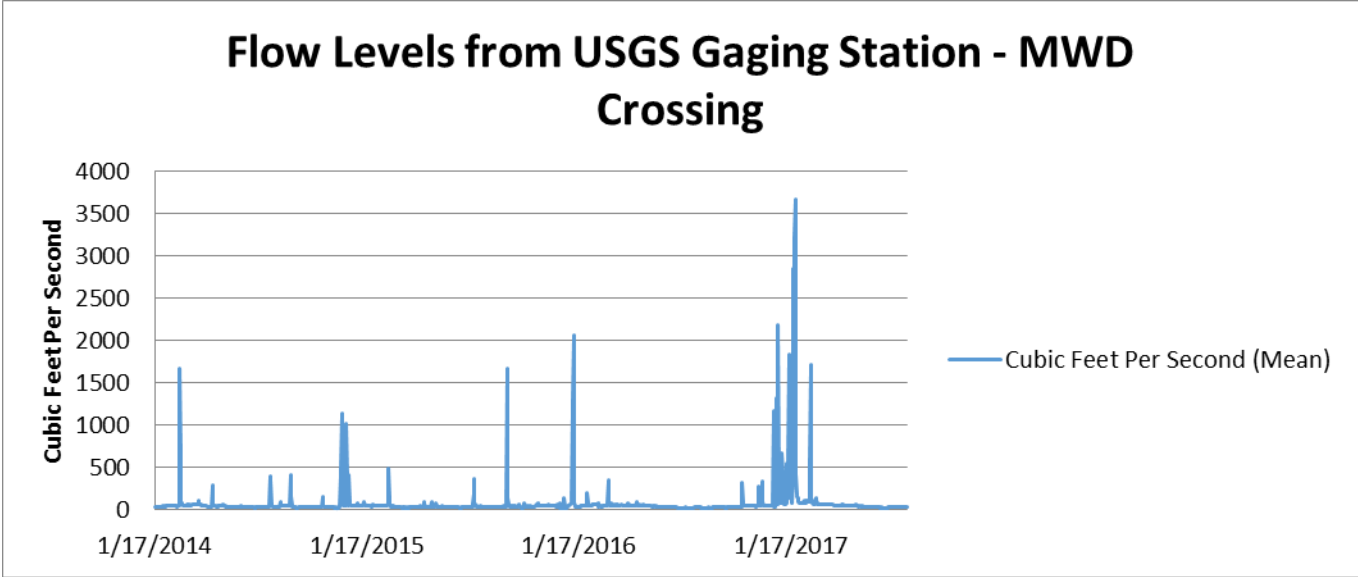


Santa Ana Riverwalk 2018

Quality of Substrate for Spawning



Riverwalk Data and Surface Water Flow

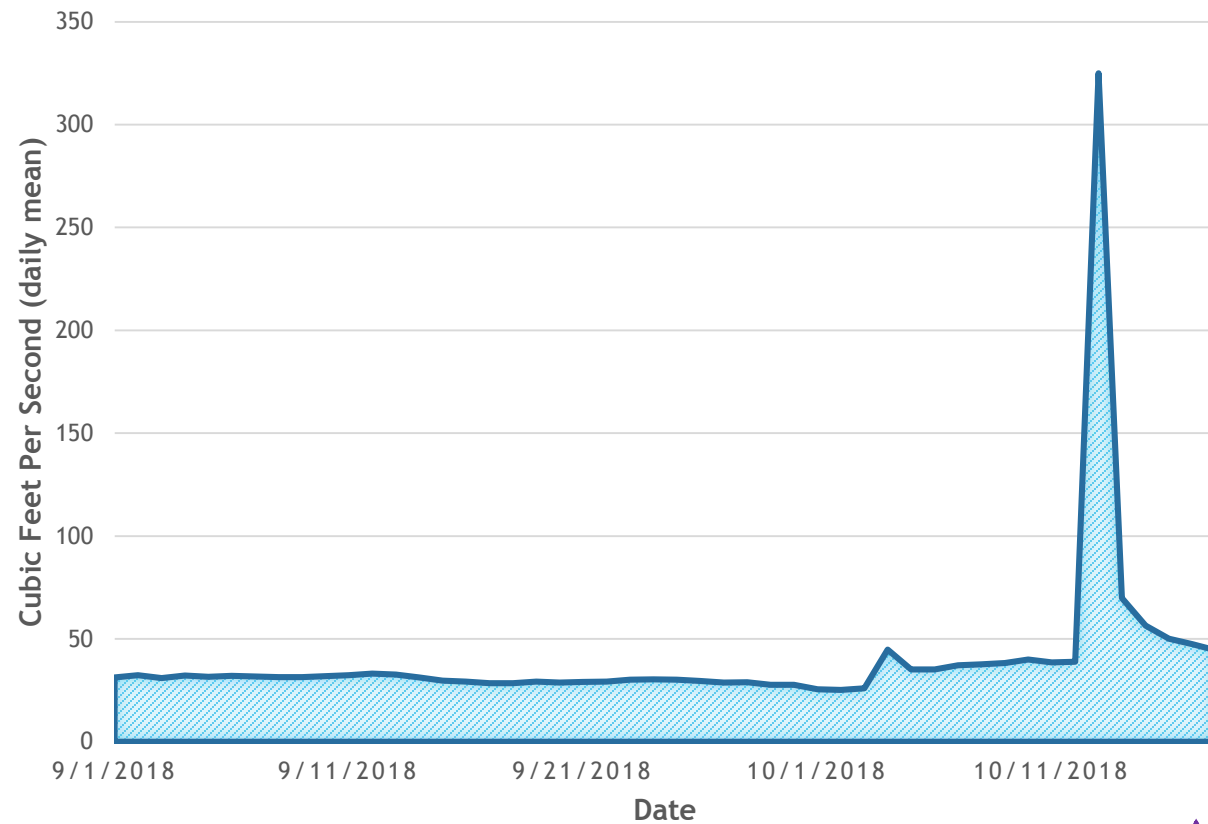


Governor declares drought ↑

2016 Riverwalk ↑

2017 Riverwalk ↑

Fall 2018 Streamflow at USGS MWD Crossing Gaging Station

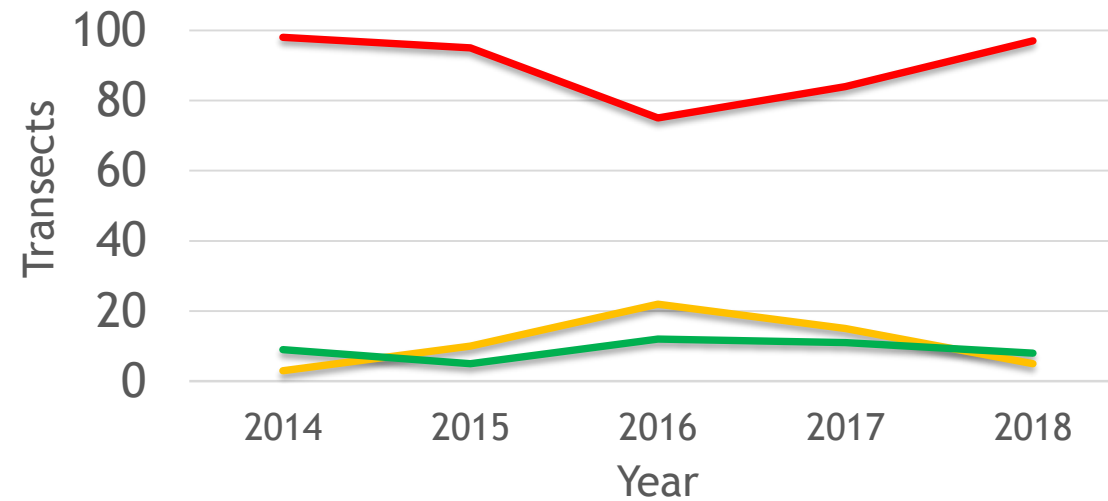


↑
2018 Riverwalk

Summary of Recent Riverwalk Substrate Data

Using the categories described on the preceding pages, the distribution of the last five years of Riverwalk are shown in the following figure.

On average from 2014 to 2018, 82% of the 110 transects are categorized as having poor quality substrate.



— Poor — Marginal — Good

Total amount of transects: 110

Final Project Presentation: Santa Ana Sucker Habitat Protection & Beneficial Use Enhancement Project



Conservation Team

Santa Ana Sucker Conservation Team Meeting

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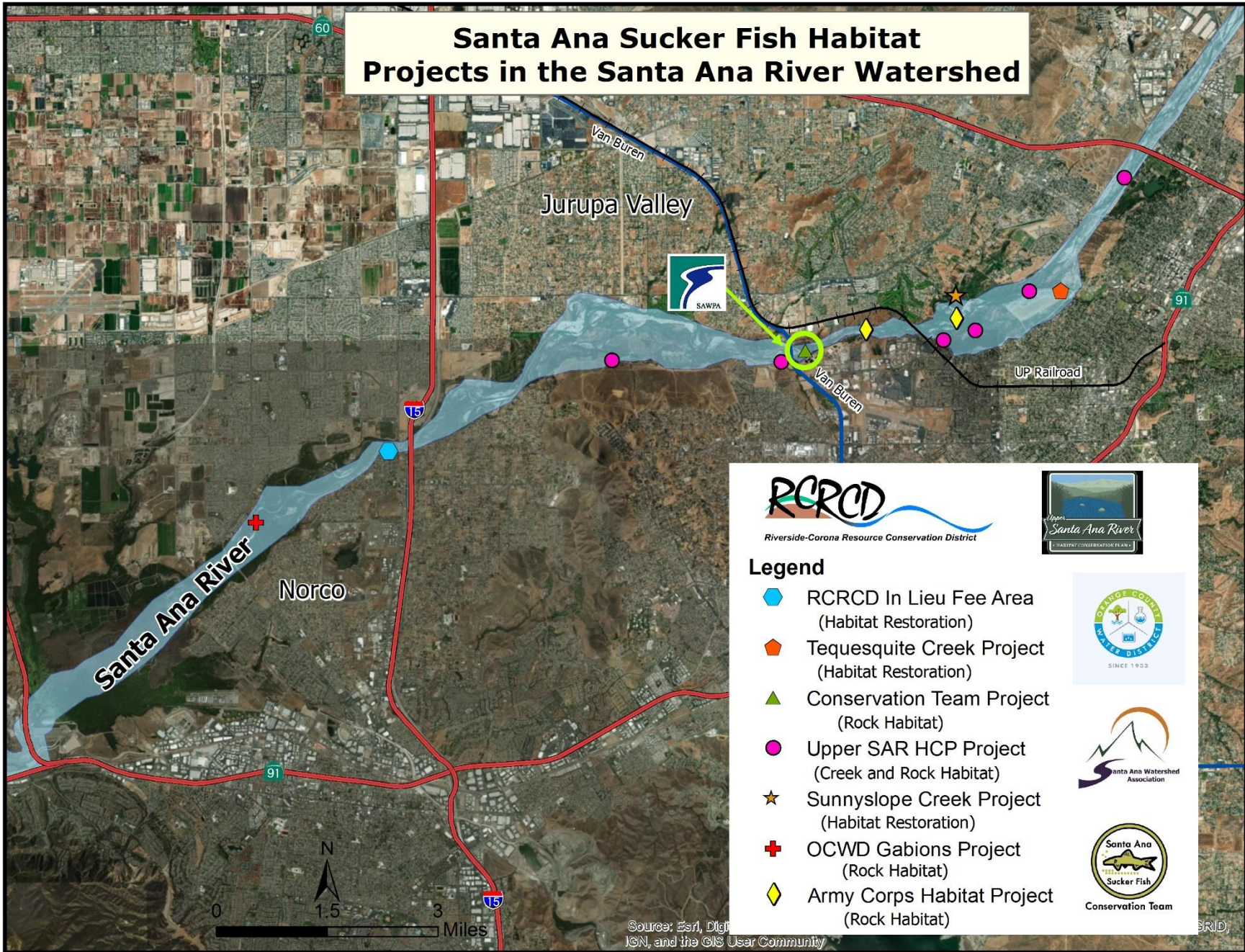
A Team Effort

- ▶ SAWPA and the Team were able to complete the Santa Ana Sucker Habitat Protection and Beneficial Use Enhancement Project (Project) with the active involvement from staff from the following partners:
 - ▶ OCWD (Project Partner),
 - ▶ U.S. Fish and Wildlife Service,
 - ▶ San Bernardino Valley Municipal Water District,
 - ▶ Santa Ana Regional Water Quality Control Board,
 - ▶ Riverside County Regional Park and Open-Space District,
 - ▶ City of Riverside, and
 - ▶ U.S. Army Corps of Engineers.



Conservation Team

Santa Ana Sucker Fish Habitat Projects in the Santa Ana River Watershed



Habitat Structure's Evaluated by Team



Conservation Team

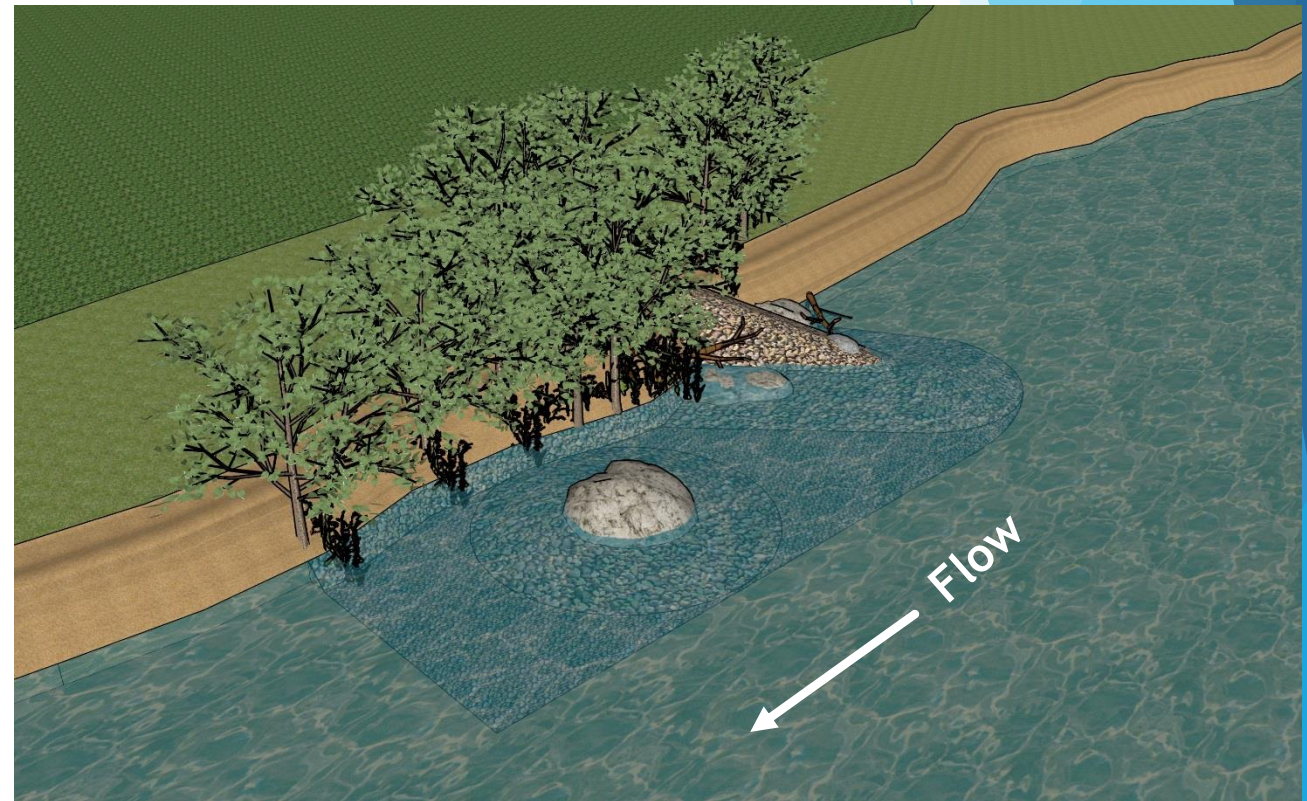
Habitat Structure	Description	Construction Cost Estimate
#1 Partially Submerged Groin	Rock groin protruding from river bank into active low flow channel. Groin taper from high at bank edge to subsurface in channel	\$136,600
#2 Open Water Runner	A structure in or near the center of the low flow channel with longitudinal edges and an upstream flow collector	\$157,600
#3 Elevated Invert	A riverbank structure within an existing deep pool area with bed load exclusion capabilities	\$167,900
#4 Invert Cross Runner	Relatively narrow rock structure placed across the width of a channel section, at an elevation slightly above the existing river channel invert	\$214,500
#5 Boulder Array	Larger boulders (> 4') placed within the low flow channel along with placement of smaller boulders & cobbles in high velocity areas	Cost Not Specifically Evaluated
#6 Constricted Channel	Improvements to both riverbanks and the channel invert to construct a durable river section with defined hydraulic and sediment transport properties	Cost Not Specifically Evaluated



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Partially Submerged Groin Design

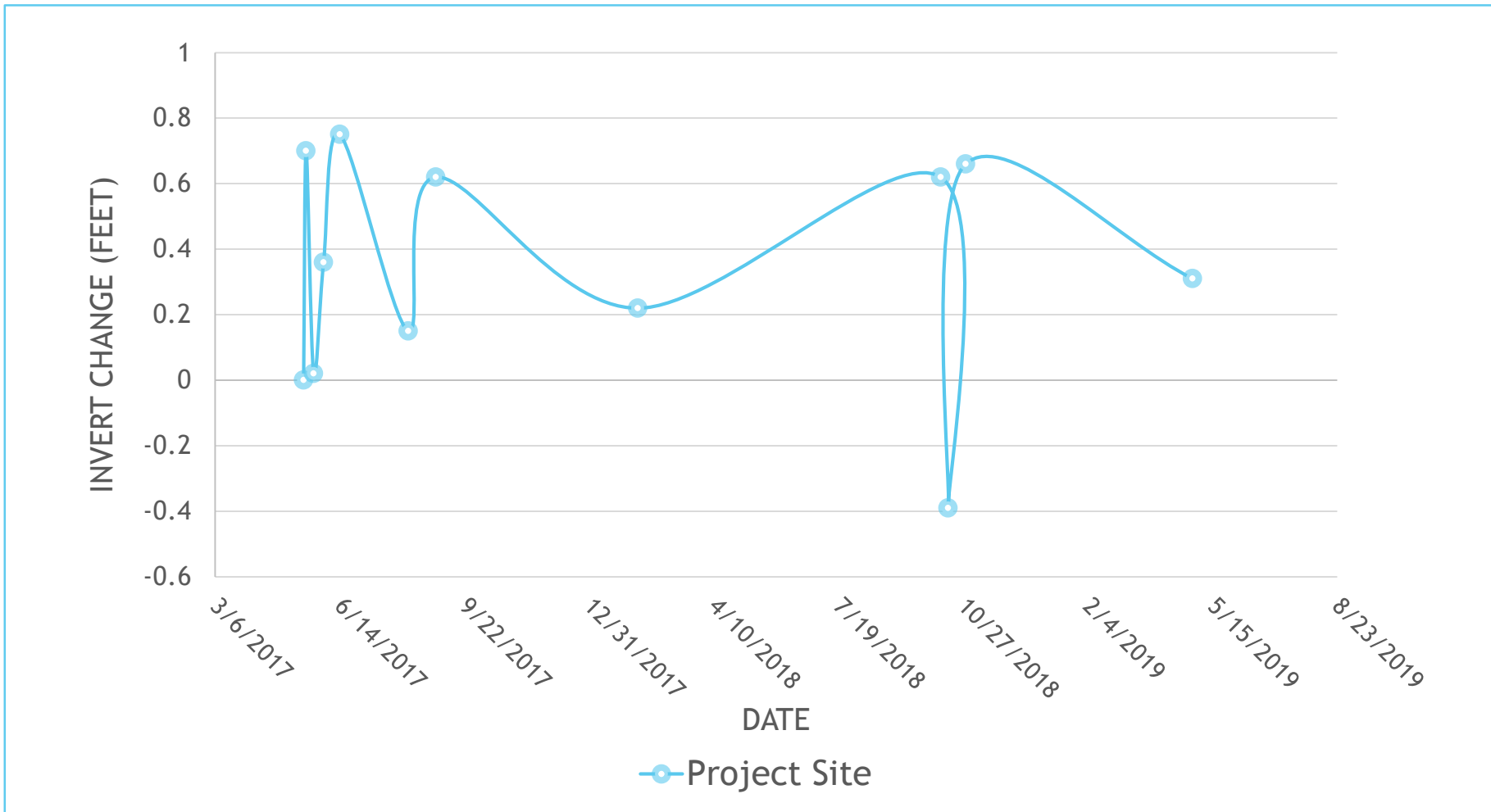
- ▶ Groin tapered to function in range of water (and substrate) elevations
- ▶ End of groin to split stream into two so it flows past each side of the downstream boulder
- ▶ Visible rocks would be supported by a sub-surface base of rip rap (2 feet deep)
- ▶ Designed for 30 to 2,500 cubic feet per second river flows



Low-Flow Channel Invert Elevation Change



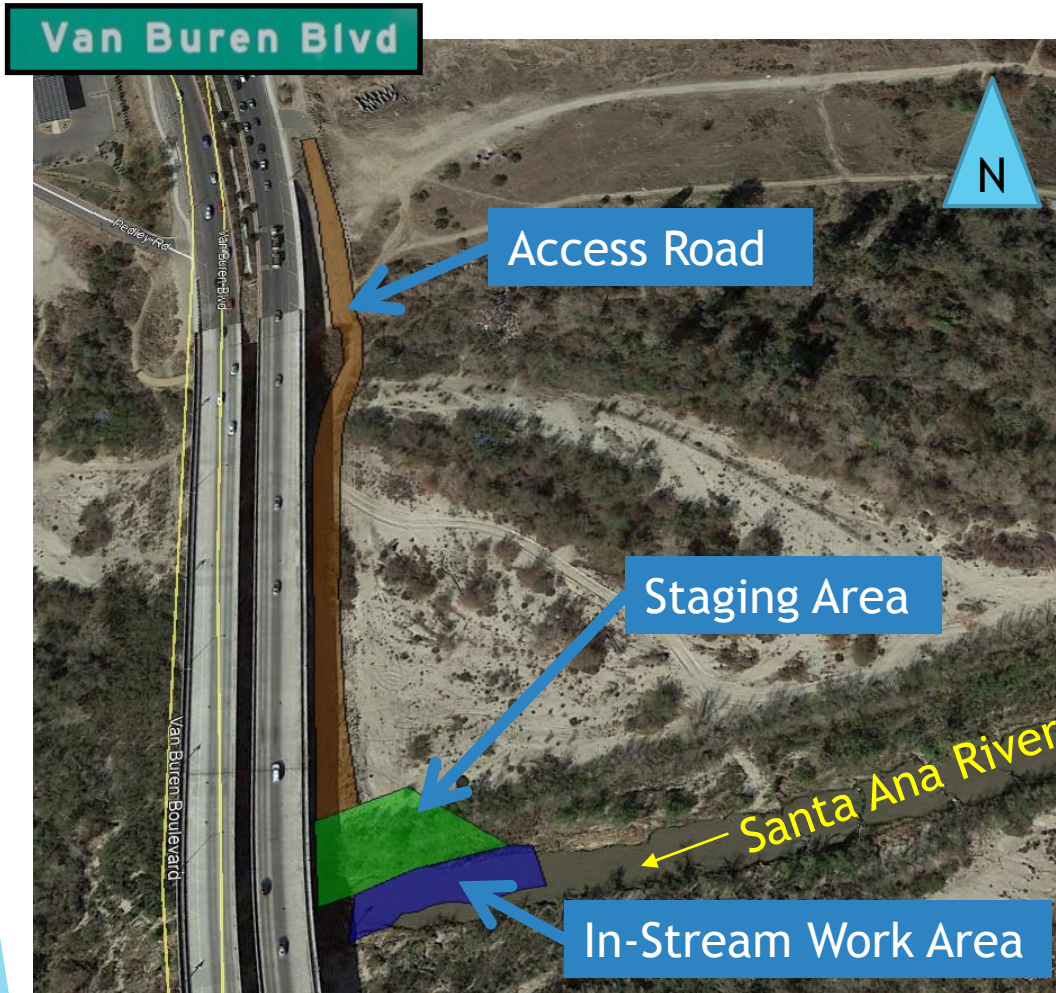
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Partially Submerged Groin Construction



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Construction

- ❑ Approved budget of \$118K
- ❑ Actual costs of \$80K
- ❑ Three-week schedule

Site Characteristics

- ❑ Existing increasing slope, between 0.2 and 0.8 percent
- ❑ Existing access road
- ❑ Flows exceeded 2,500 cfs 11 times over the 17 preceding years



Construction Schedule



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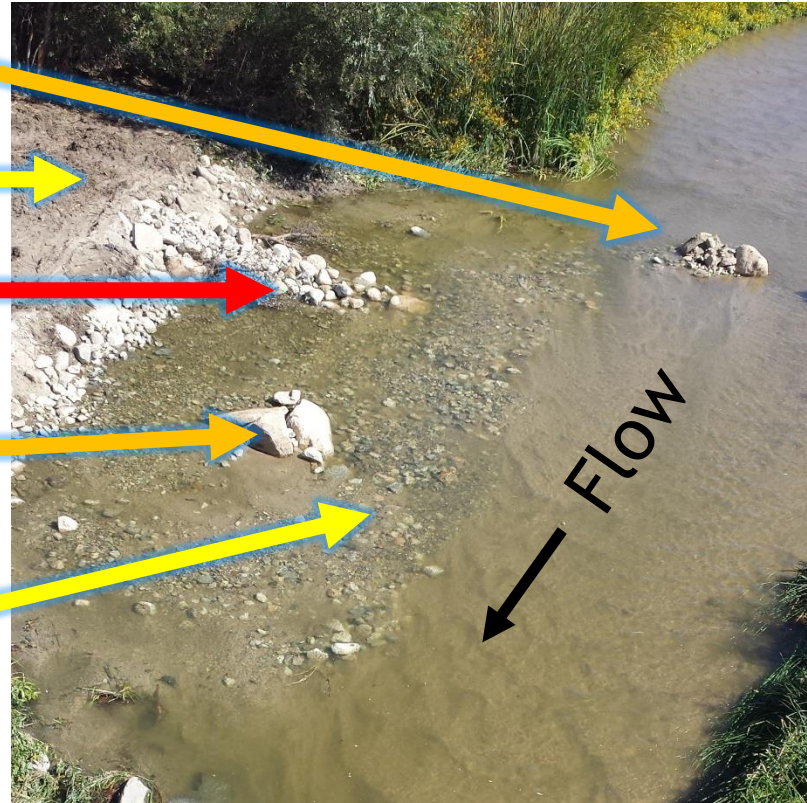
Dates (2018)	Description
September 26	Trash and invasive species removal in Project area
October 3 - 4	Vegetation removal along access road and bank for heavy equipment
October 8	Grading of the access road to allow access of heavy equipment to the low-flow channel
October 9 - 10	Rock delivery to the Project staging area
October 10 - 12	Berm creation and placement of rock into protected area in the low-flow channel
October 12 - 15	Final rock placement and grading of the staging area
October 24	Replanting native vegetation (0.30 acre) adjacent to work area to mitigate project impacts

Partially Submerged Groin Post-Construction



Conservation Team

- Upstream Boulder Cluster
- Cleared Vegetation
- Groin
- Downstream Boulder Cluster
- Cobble



Gaging the Project's Success - Parameters Measured

- ▶ Low-flow channel invert elevation,*
- ▶ Streamflow,*
- ▶ Bedload,*
- ▶ Channel width,*
- ▶ Maximum depth,*
- ▶ Depth at banks,*
- ▶ River substrate composition,**
- ▶ Riparian vegetation canopy cover over the transect,**
- ▶ Dissolved oxygen, temperature and water appearance,*
- ▶ Fish count,** and
- ▶ Documentation of gravel/sand bars.**



Those parameters marked with * were measured along a transect line drawn from bank to bank in the low flow channel. Those marked with ** were measured within a transect band with a longitudinal length that was 50 feet upstream and 50 feet downstream of the transect line.

Project and Control Site Monitoring



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Project Site: Pre-Project - 06/26/2018



Conservation Team

Project Site: Pre-Project - 9/19/2018



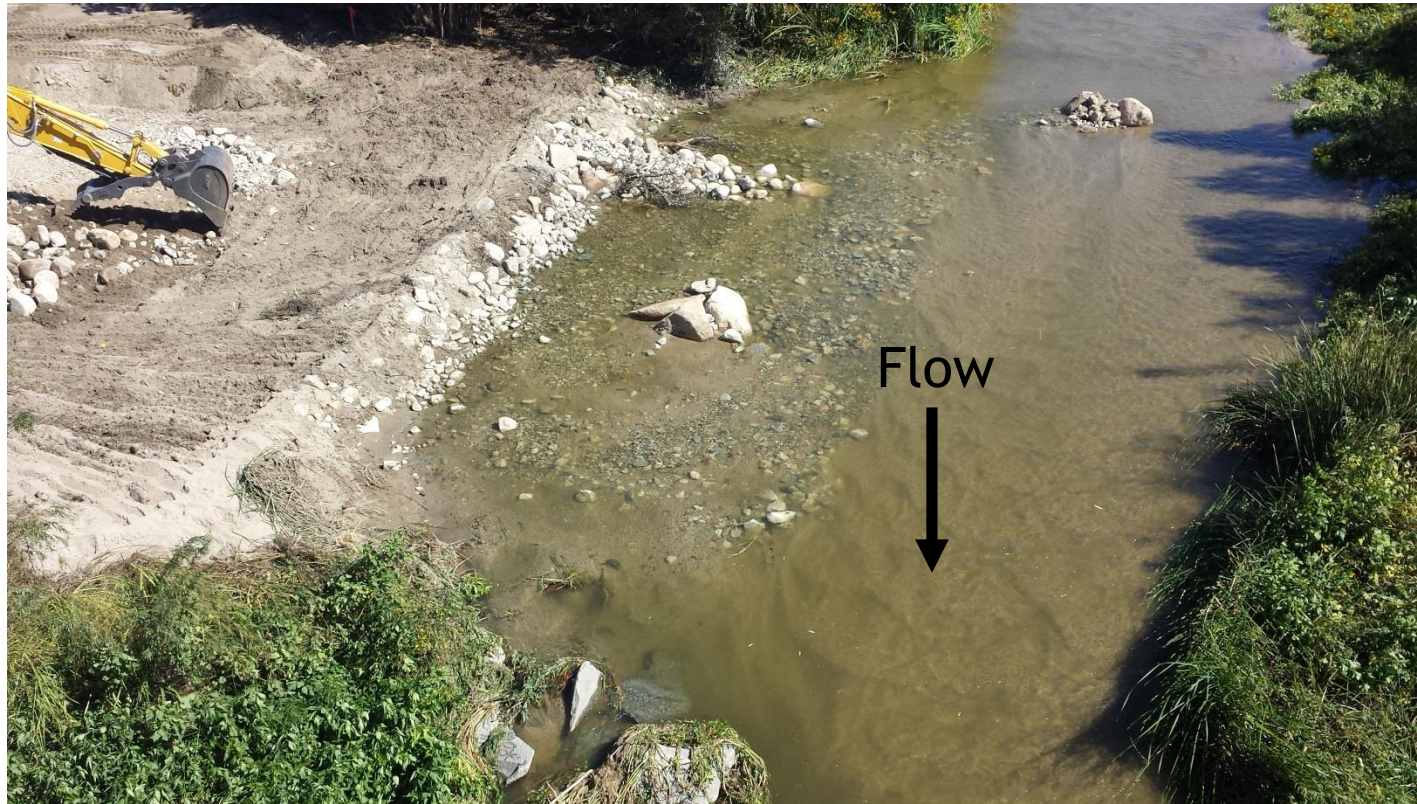
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Post-Project - 10/15/2018



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Post-Project - 10/24/2018

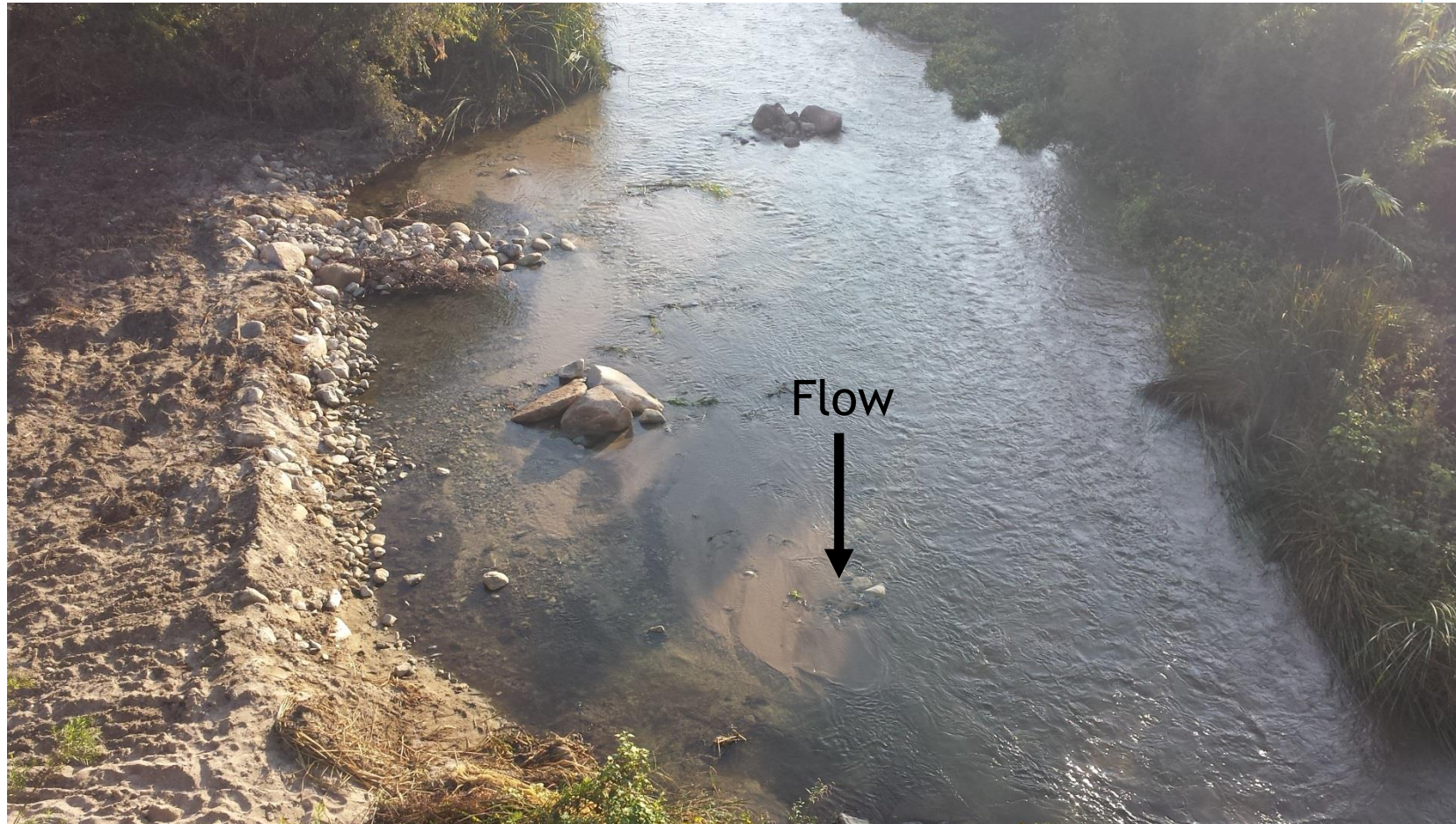


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Post-Project - 10/24/2018



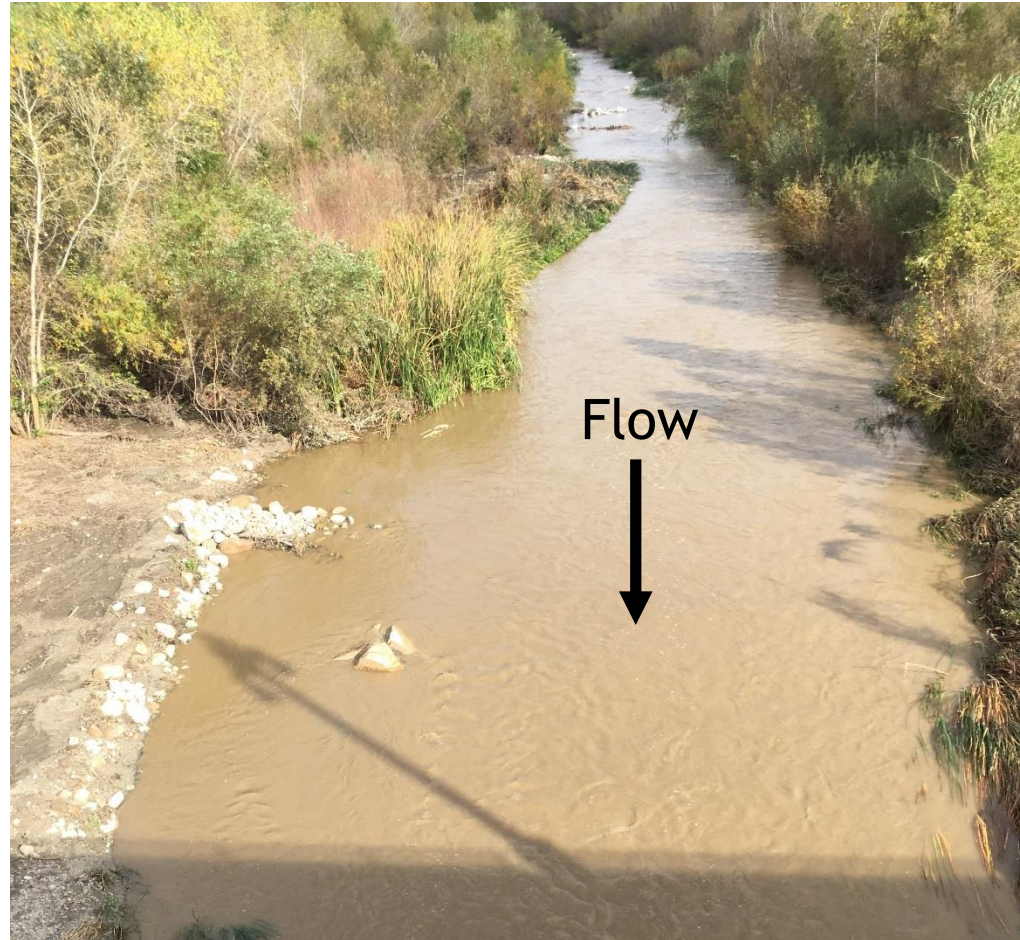
Conservation Team



Post-Project - 11/30/2018



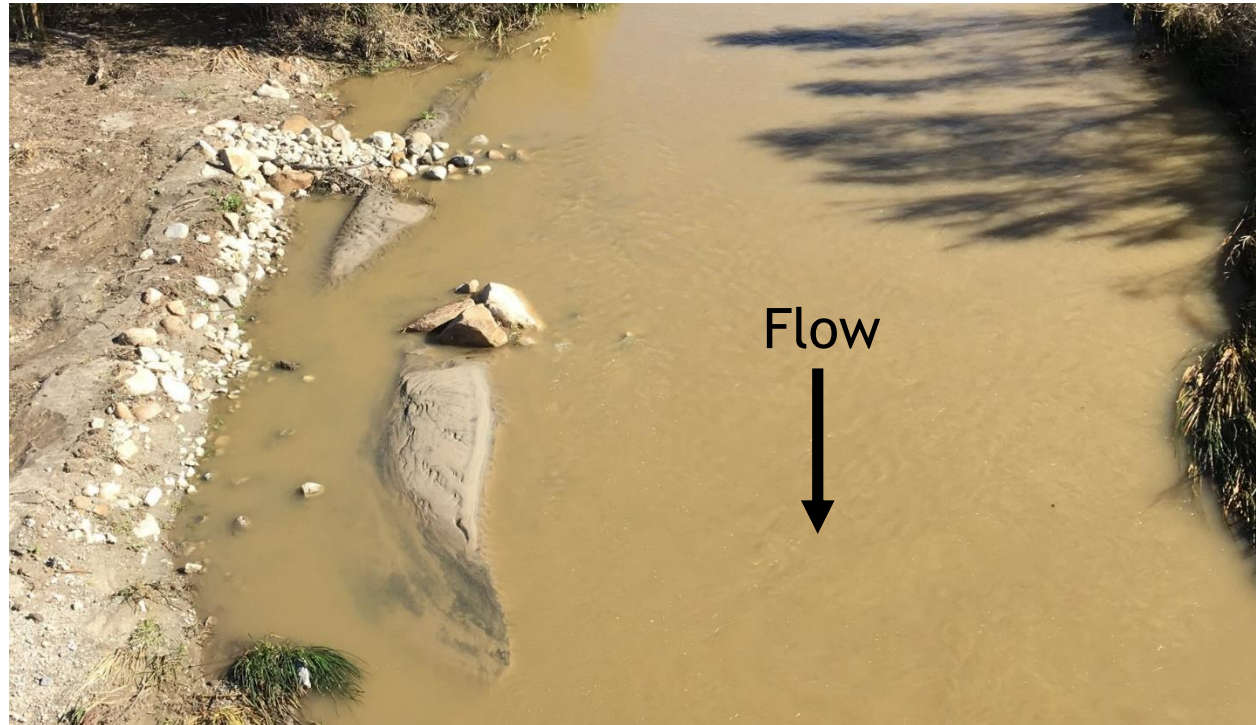
Conservation Team



Post-Project - 12/12/2018



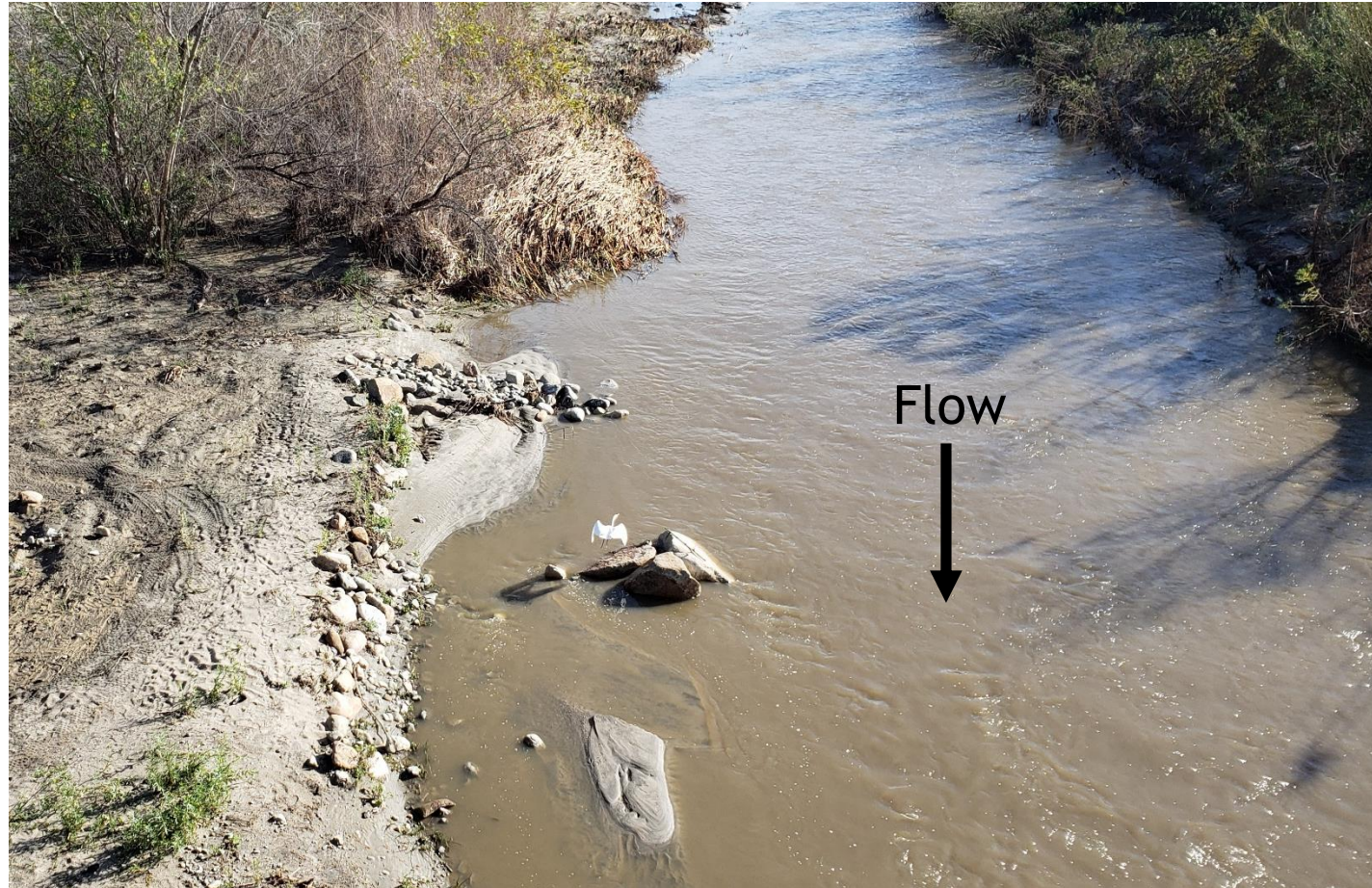
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Post-Project - 2/1/2019



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Post-Project - 4/29/2019



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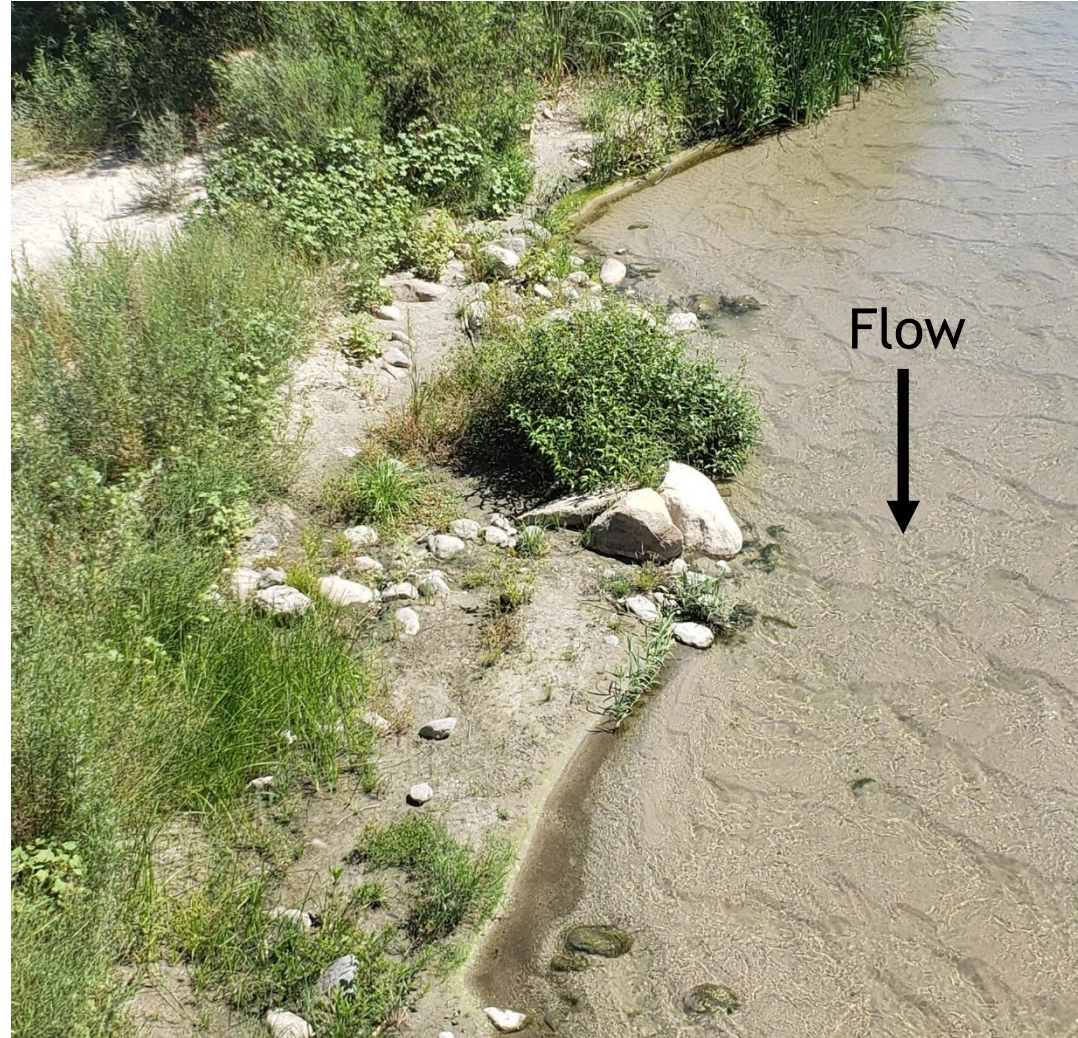


Post-Project - 8/27/2019



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Post-Project - 8/27/2019



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Comparison of Two Winters: 2017-18 and 2018-19

MWD Crossings Gaging Stating

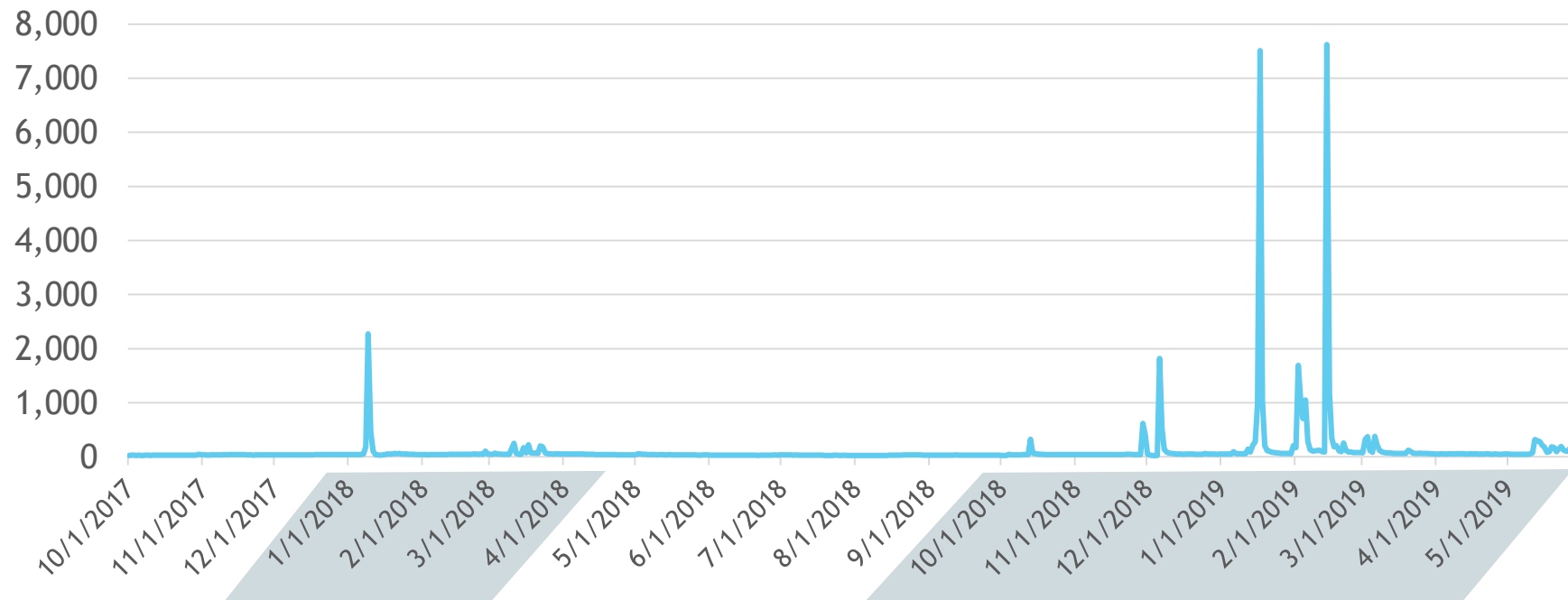


San Bernardino Valley Municipal
Water District



USGS - Cooperative Matching Funds

Streamflow (Cubic Feet Per Second - Daily Mean)



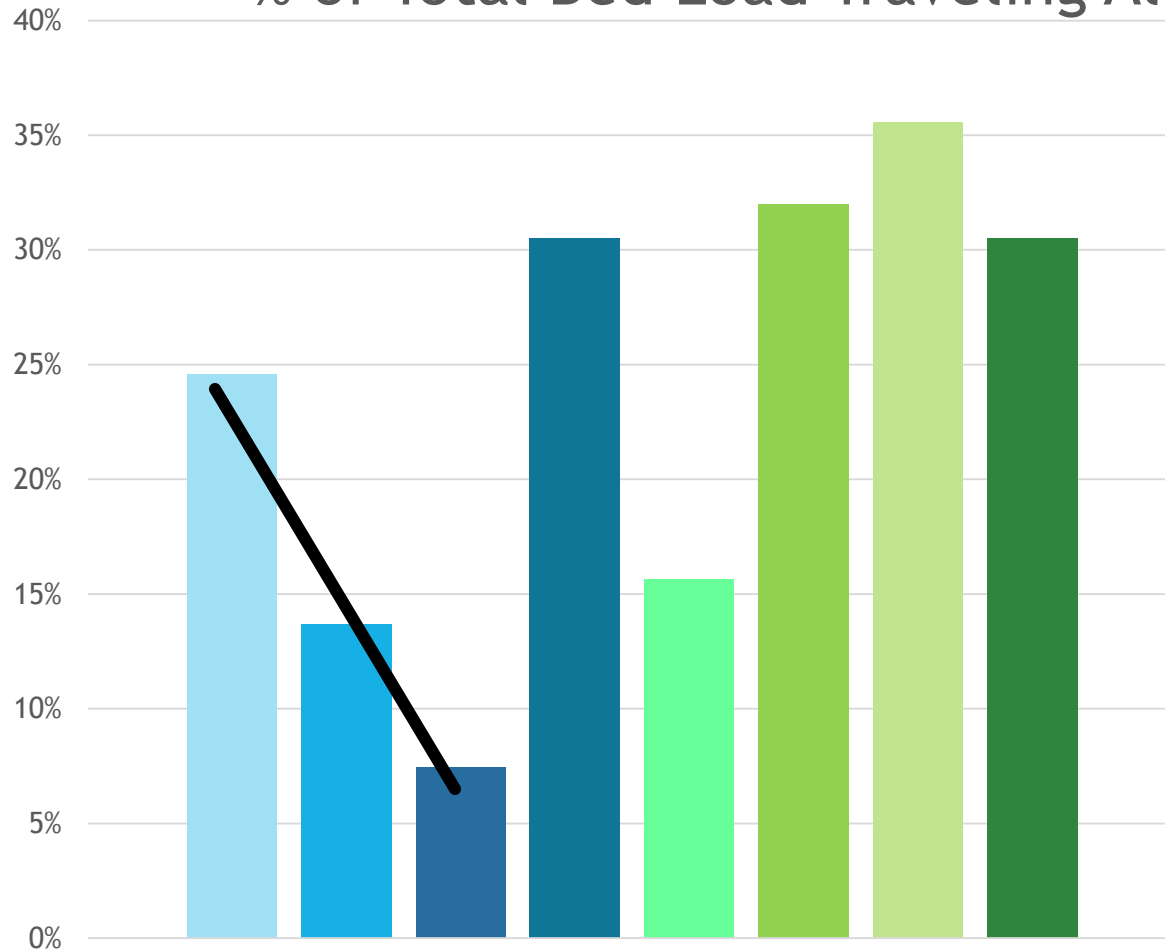
Storm season:



% of Total Bed Load Traveling Along Right Bank



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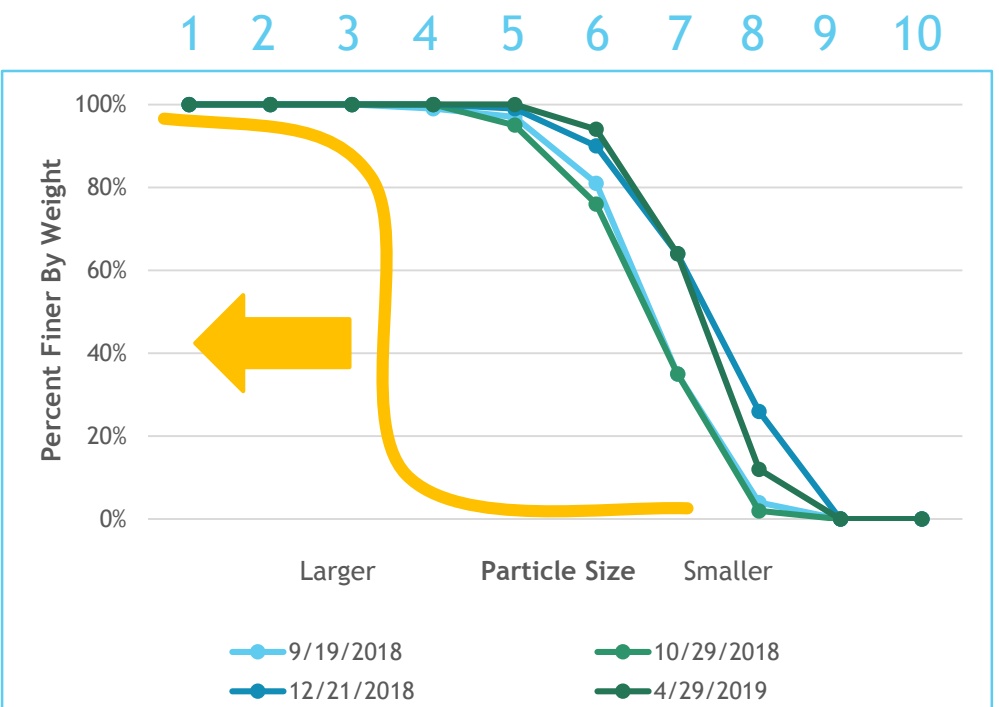
% of Total Bed Load

- Project Site Baseline Right Bank 9/19/2018
- Project Site Post 1 Right Bank 10/29/2018
- Project Site Post 2 Right Bank 12/21/2018
- Project Site Post 3 Right Bank 4/29/2019
- Control Site Baseline Right Bank 9/21/2018
- Control Site Post 1 Right Bank 10/29/2018
- Control Site Post 2 Right Bank 12/21/2018
- Control Site Post 3 Right Bank 4/29/2019

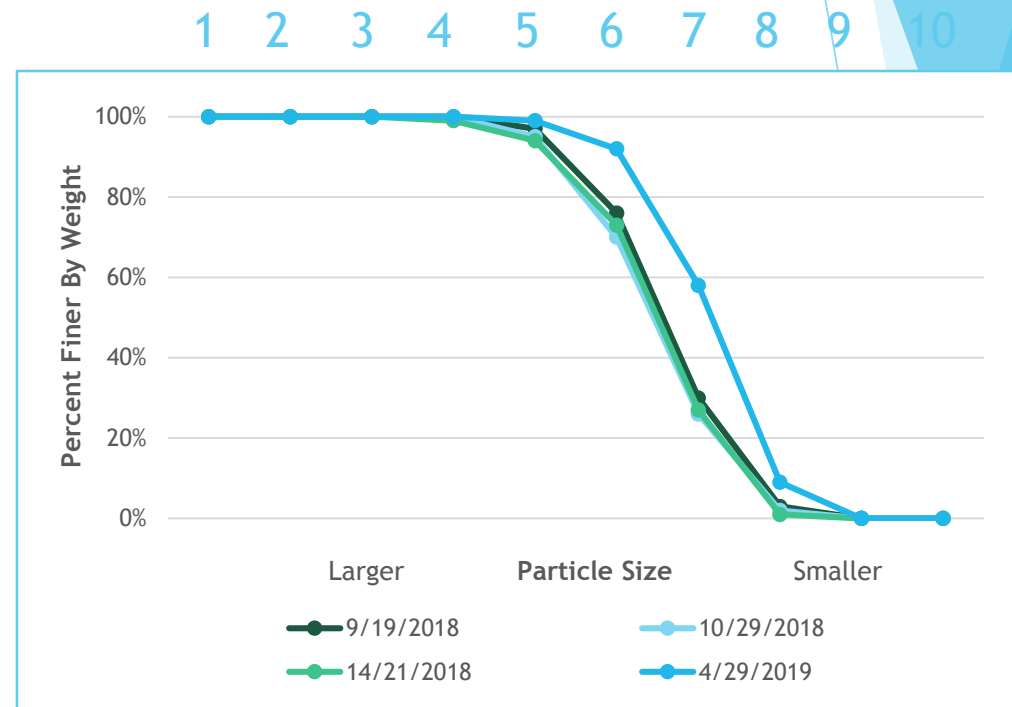


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Bed Load Particle Size at Right Bank



Project



Control

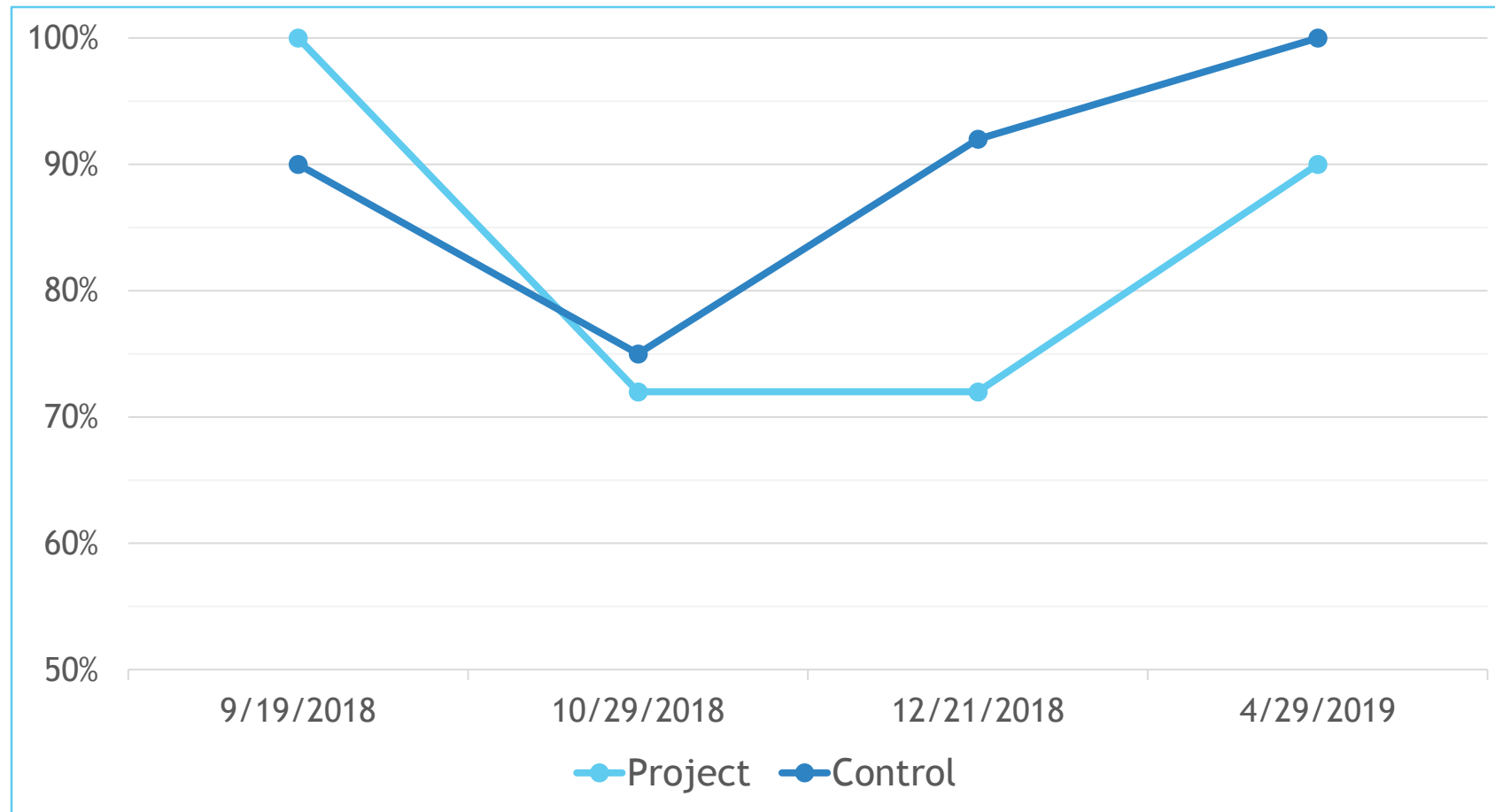
Note: Project Installed: 10/15/2018

Gradation 5: Coarse Sand (2.36 mm or No.8); **Gradation 6:** Medium Sand (1.18 mm or No.16); **Gradation 7:** Medium Sand (0.6 mm or No.30); **Gradation 8:** Fine Sand (0.3 mm or No.50)

Substrate Data - Percent Sand



Conservation Team



Fish Count Data



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Sampling Date	Fish (Common Name)	Project	Control
9/19/2018	Santa Ana Sucker	0	2
	Western Mosquitofish	35	12
	Fathead Minnow	0	2
	Arroyo Chub	0	7
10/29/2018	Santa Ana Sucker	3	1
	Western Mosquitofish	1	0
12/21/2018	Santa Ana Sucker	2	0
	Western Mosquitofish	1	0
4/29/2019	Western Mosquitofish	183	129
	Arroyo Chub	20	0
	Bullfrog Tadpole	0	1
Native Fish Count (Totals)		25	10
Non-Native Fish Count (Totals)		220	144

Lessons Learned - Project Construction Phase



Conservation Team

- ▶ It was difficult to receive a competitive bid for construction;
- ▶ Security guards were needed nightly during the construction phase; and
- ▶ Project implementation moved rapidly once access to the in-stream work area was established.

Lessons Learned - Project Monitoring



Conservation Team

- ▶ The structure performed as designed up to its 2,500 cfs threshold.
- ▶ The monitoring by Scheevel Engineering concludes that there are two major options for modifying instream rock habitat structures if the goal is to increase their effectiveness following high flow events:
 - ▶ Artificially increase the instream grade of the project's reach to quickly move deposited sand off the habitat structure; and
 - ▶ Install a complimentary structure across the width of the low-flow channel and/or on the opposite bank to control the hydraulics entering and exiting the reach as well as control the low flow channel invert elevation.

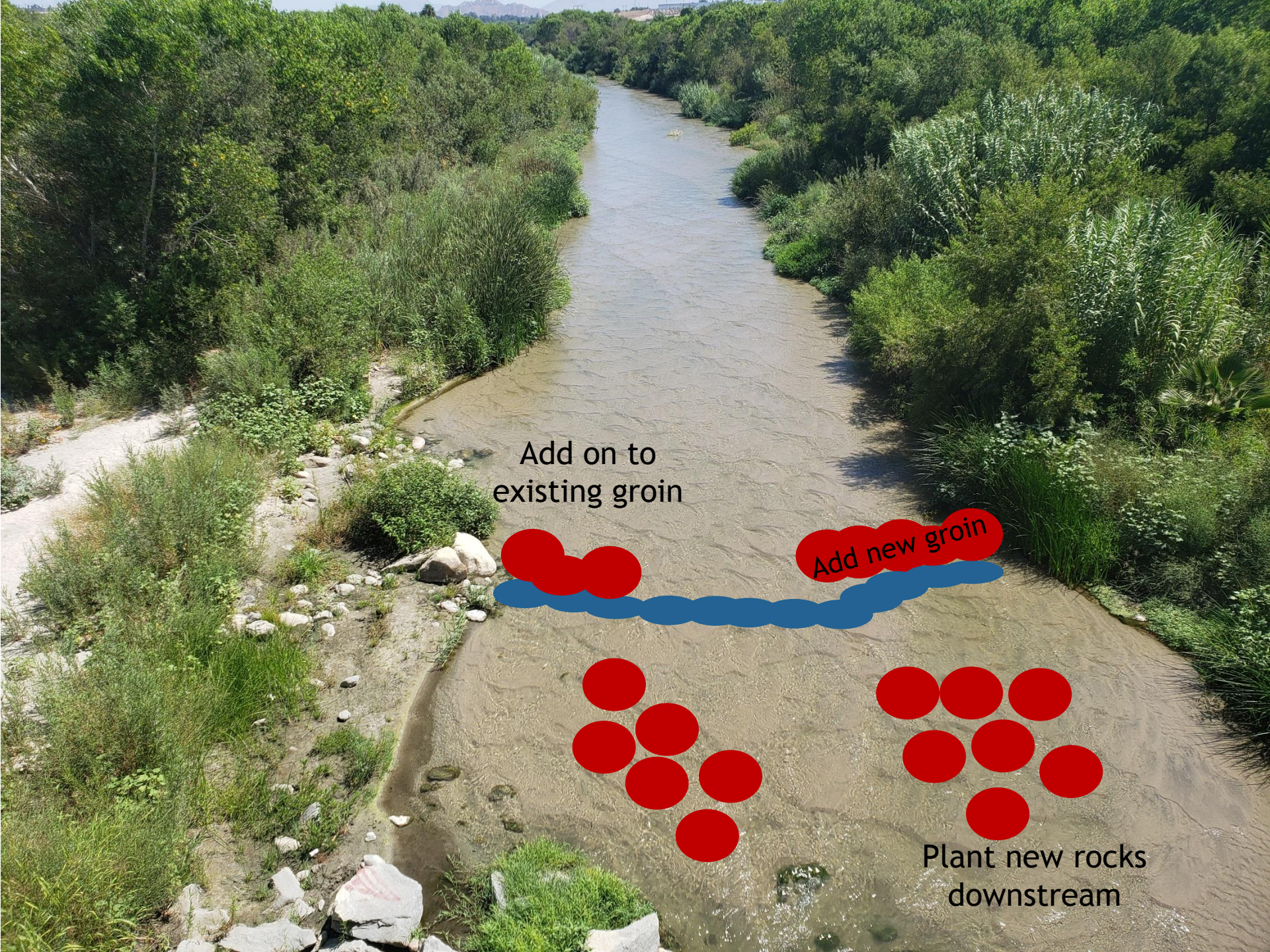
Next Steps

- ▶ Use existing funds to remove sandbars, extend groin by hand, and remove vegetation affecting the structure.
- ▶ Maintain the re-planted vegetation in the Project area to mitigate for the 0.3 acres of riparian vegetation that was cleared.
- ▶ Investigate the placement of an additional groin and downstream boulders (2' to 3')



Conservation Team





Add on to existing groin

Add new groin

Plant new rocks downstream

Questions



Conservation Team