Draft
Riverwalk Atlas

Santa Ana Sucker Conservation Team

Credit: Brittany App Photography

August 2024

**A map-based summary of Santa Ana River habitat surveys conducted annually from 2006-2023.**

Provided by the

Santa Ana Sucker Conservation Team

SAWPA

Atlas Contributors

The following members of the Santa Ana Sucker Conservation Team developed this Atlas: Orange County Water District, the City of Riverside, and the Santa Ana Watershed Project Authority.

Thanks to numerous volunteers who joined us for the 2023 Riverwalk. Thanks to them, the Team was able to compile the field survey results that are represented in this document.
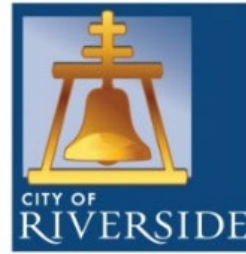
About the Riverwalk

The Santa Ana River Watershed includes a mixture of urban, suburban, and rural areas that border the Pacific Ocean, small creeks and the region's central waterway, the Santa Ana River.

The water agencies and municipalities that provide water to these areas have partnered with regulatory agencies, conservation organizations, and other entities to conduct an annual fish habitat survey within the Santa Ana River with a focus on one of the region's federally listed threatened endemic aquatic species, the Santa Ana sucker, *Catostomus santaanae*.
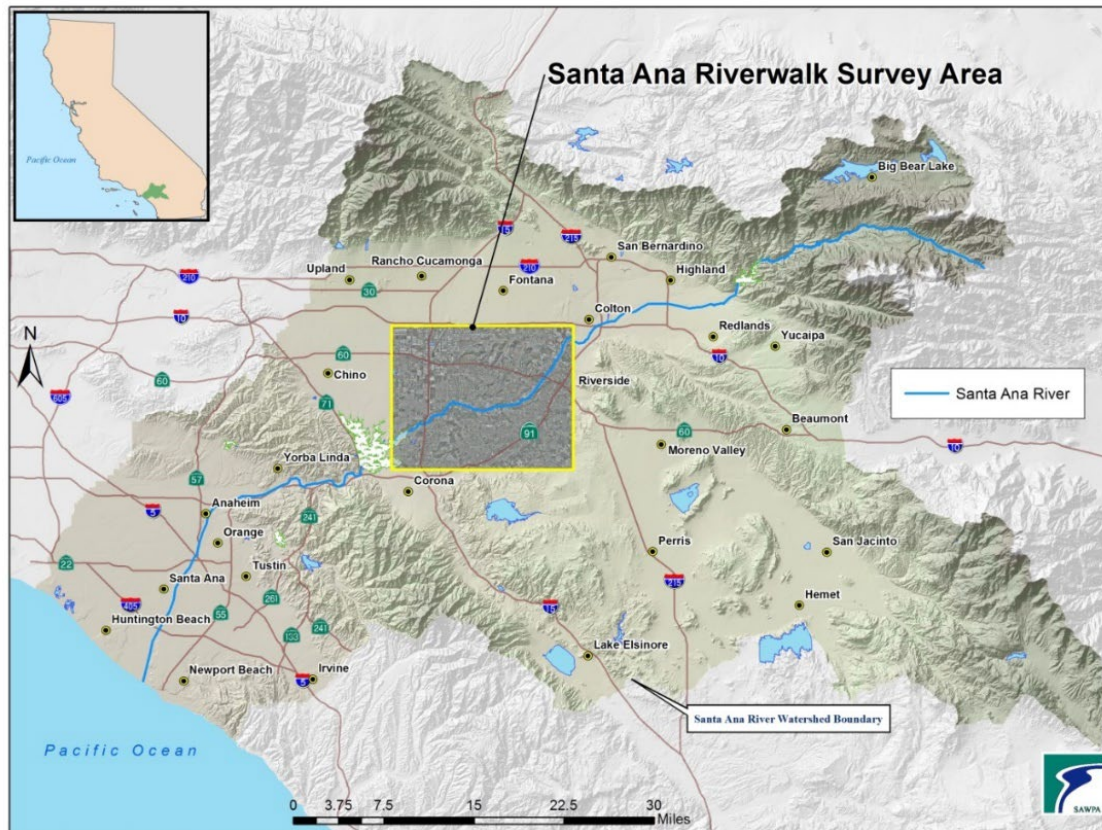

Credit: Brett Mills

Santa Ana Sucker

The **Santa Ana Sucker Conservation Team**, a partnership of agencies and municipalities, organizes the Riverwalk each year.

Location of the Riverwalk

The Riverwalk is an aquatic habitat survey and takes place on an 18 mile stretch of the Santa Ana River in California in fall of each year (the most recent being October 26, 2023). The river is in the Santa Ana River Watershed which covers an area from the Orange County oceanfront to the San Bernardino Mountains.

About the Santa Ana Sucker

The Santa Ana sucker is primarily a bottom feeder. A river bottom with a mixture of sand, cobble and gravel is ideal for the algae that the fish feeds on. Spawning can also take place over cobble and gravel riffles.

Credit: Brett Mills

Recent Conditions on the River

**Figure 1: Recent Monthly Streamflow Mean at MWD Crossing and E Street USGS Gaging Stations**
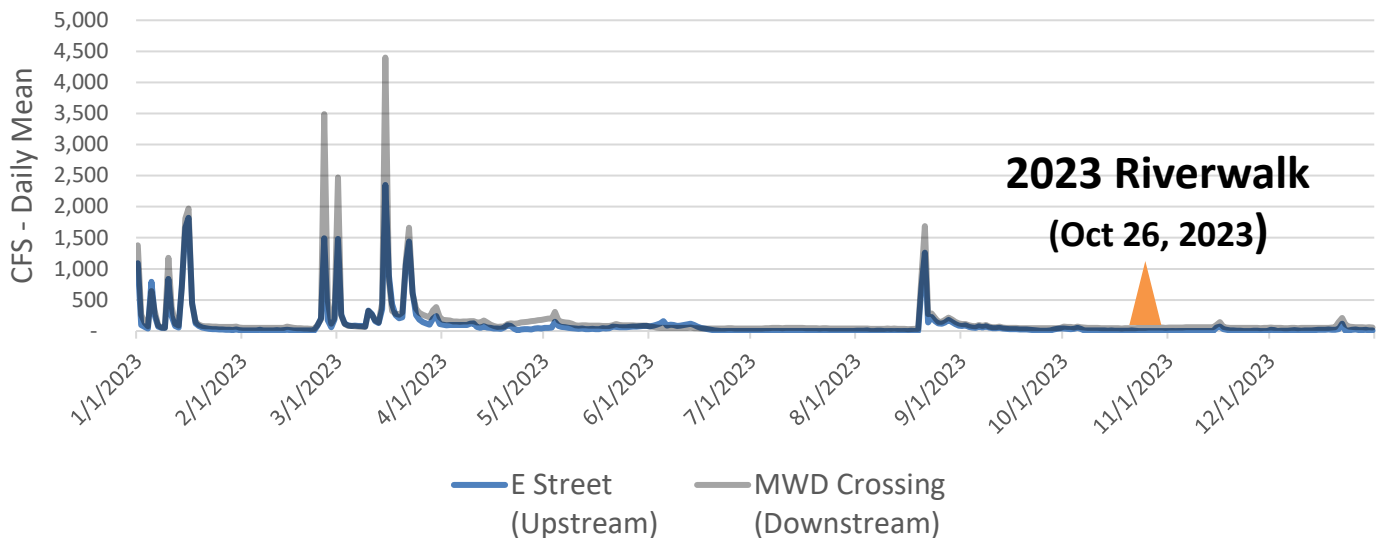
Streamflow in 2023 for two US Geological Survey (USGS) gaging stations along the upper Santa Ana River are shown above. Streamflow followed a largely common pattern of a Mediterranean climate of a mild summer and wet winter.

More precipitation was seen across the watershed in 2023 compared to recent years, and there was a unique storm event on August 20 and 21, known as Tropical Storm Hillary, which saw 2.5 inches of precipitation recorded in the City of San Bernardino on those two days*.

The amount of precipitation was higher than years past likely due to several atmospheric rivers that affected Southern California in early 2023.

Figure 2: Recent Precipitation Across the Watershed
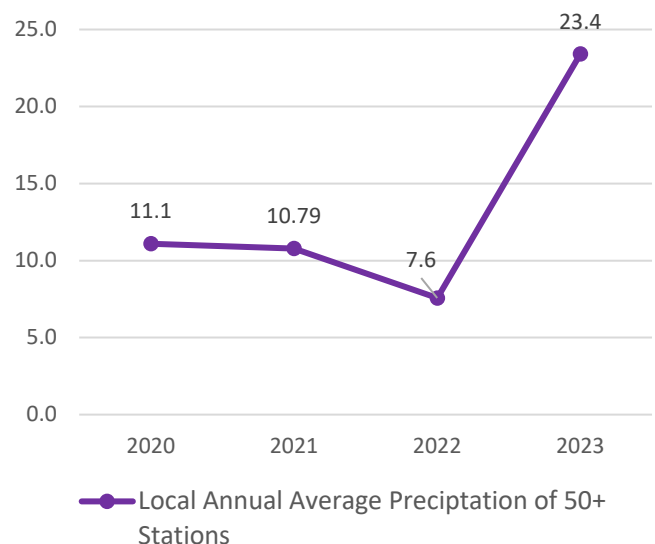
*Precipitation data recorded at Gilbert Street USGS Precip Gage.

Collecting Riverwalk Data in the Field

- Each year, approximately 40 to 50 volunteers collect data at various field points in the River which they locate with a GPS unit.

- At each field point a transect line is drawn from bank to bank. To identify the area to monitor, a 4-meter-wide band is centered at the transect.

4 meter (M) wide band to monitor river bottom quality

Transect

2M   2M
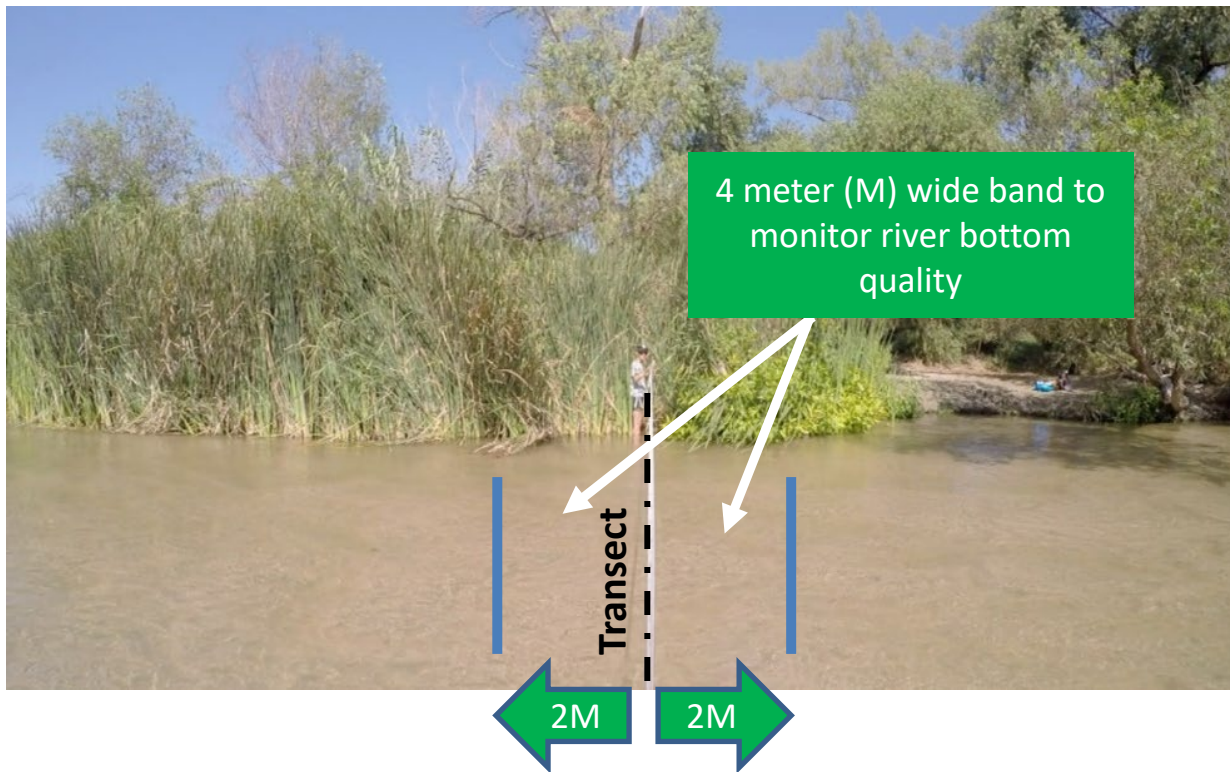
The area within the band is then surveyed by visually identifying what type of material makes up the river bottom:

- Mud/Silt
- Sand
- Gravel
- Cobble
- Boulder

How to Read the Riverwalk Ratings

The total number of transects surveyed each year are labeled with a unique designating number (1 through 122) that represent a pre-assigned location on the River. The 122 transect points are pre-assigned so the Team can compare trends at each point over time.

For 2023, there were 77 transects that were sampled. The upper transects above the Rialto channel did not have surface water and thus were not sampled. And the furthest downstream transects near River Road* were not sampled due to the number of available volunteers.

For information sharing purposes, the quality of the river bottom (substrate) is generalized in this Atlas in the following categories:
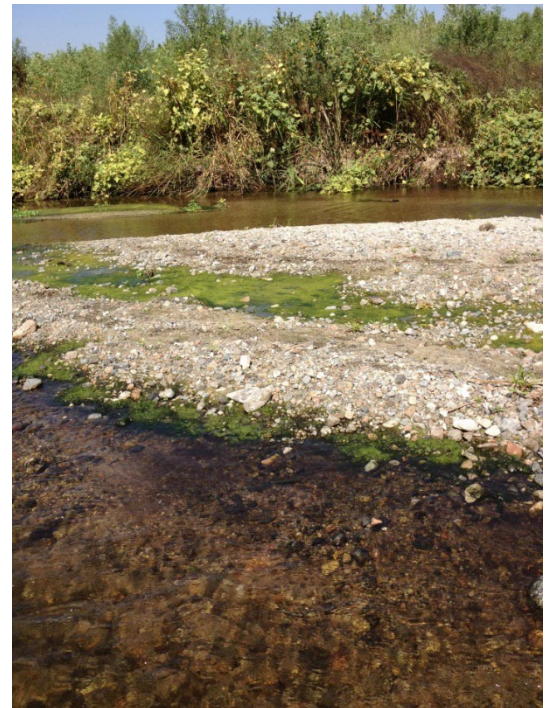
Riverwalk Rating	Formula for Rating	Rating Threshold
Poor	Sum of gravel, cobble and boulder	≤30%
Marginal		>30% to <65%
Good		≥65%

For example, if the sum of gravel, cobble and boulder is 29% of the total substrate (and the remaining 71% is sand, and/or mud) the Riverwalk transect will receive a poor rating.

*These downstream transects have been generally been rated poor in each of the past Riverwalks.

Riverwalk Ratings By Year

Figure 3: Riverwalk Ratings and Average Precipitation
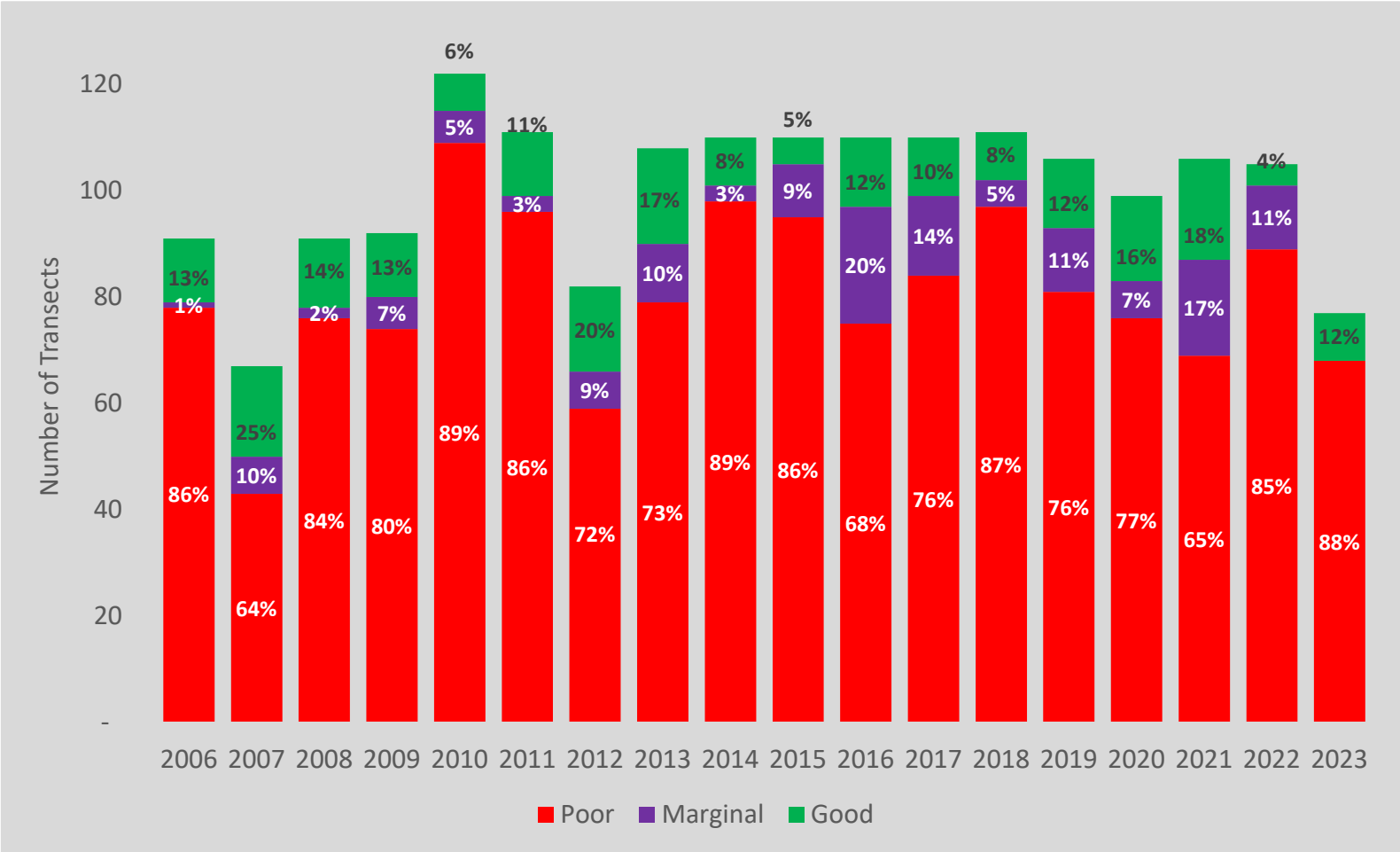
Using the definitions of "poor", "marginal", and "good" ratings as described on page 6, the trends of the past 15 years are shown in Figure 3.

Over the 18-year period shown, the average amount of poor transects is 80% of total transects (or 81 transects) and the average for good transects is 12% (or 12 transects).

Comparison to Mean Results

Figure 4: Riverwalk Ratings in Comparison to Mean Poor Transects
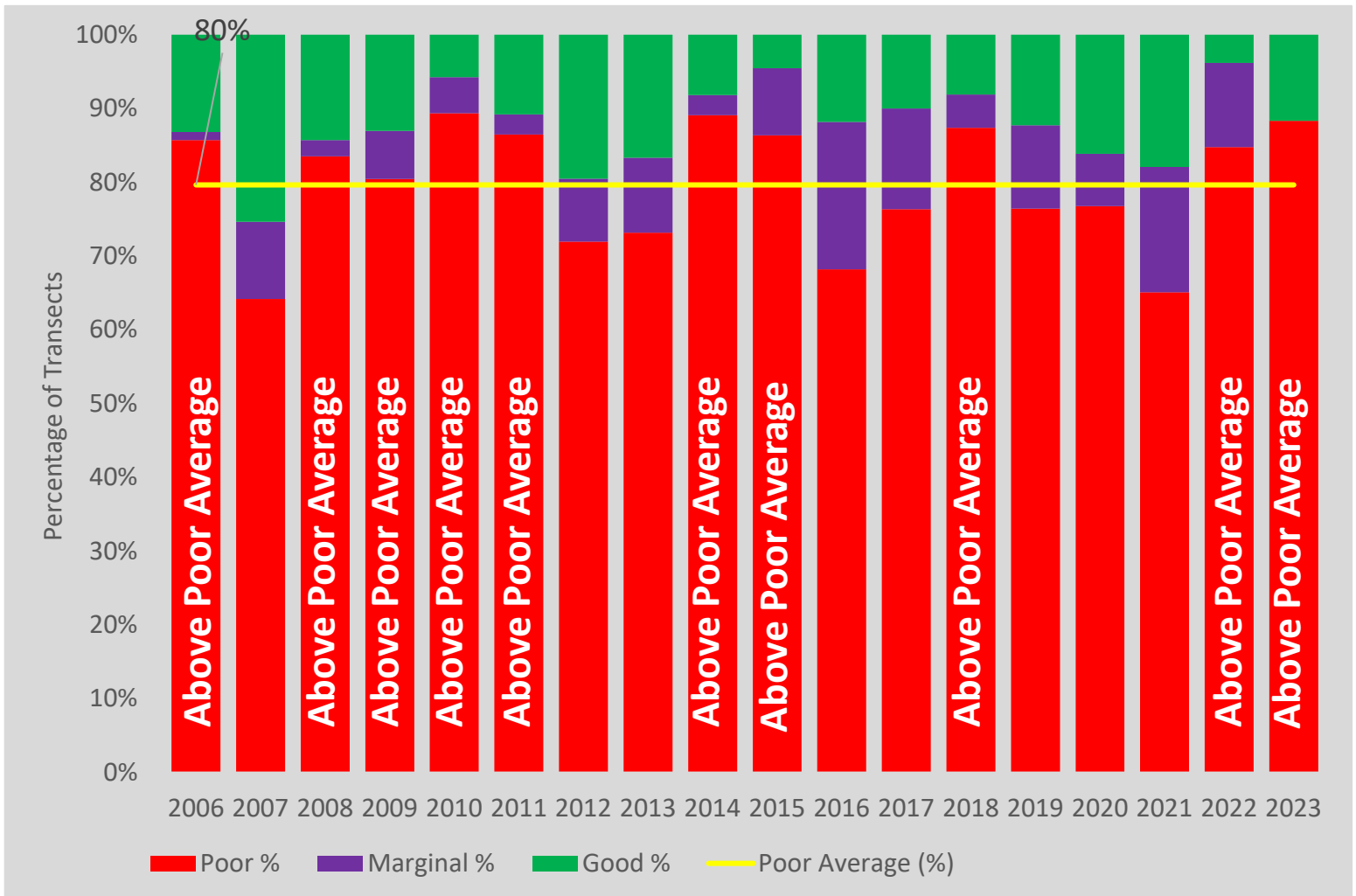
Figure 4 shows the Riverwalk years and which ones exceeded the mean "poor" rating of 80%. 10 (out of 18 years) have exceeded that mean with the latest being 2023. Over this same 18-year period, the amount of Riverwalk years with transects over the average "good" rating of 12% is 9 years, with 2021 being the latest of those years.

Riverwalk Ratings by Year and Location
(Shown in Maps)

Note: Much of the data is collected by trained volunteers. Each volunteer is trained in collecting Riverwalk data during the morning of the event. The ranking described above is for general information purposes and the results do not denote an explicit assessment of all substrate conditions of this 18 mile stretch of the Santa Ana River.

Santa Ana Riverwalk 2006

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚪ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2006 Riverwalk.

P:\Projects\Ian\Riverwalk_2006-2010Update\RiverwalkUpdate.aprx LoRiverwalk2006 SW-3290

Poor Average (2006 to 2023)	81
Poor	78
Marginal	1
Good	12
Total Transects This Year	91

Substrate Condition *
- Poor (≤30%)
- Marginal (31-65%)
- Excellent (≥65%)
- Data Not Recorded

Santa Ana Riverwalk 2007

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2007 Riverwalk.
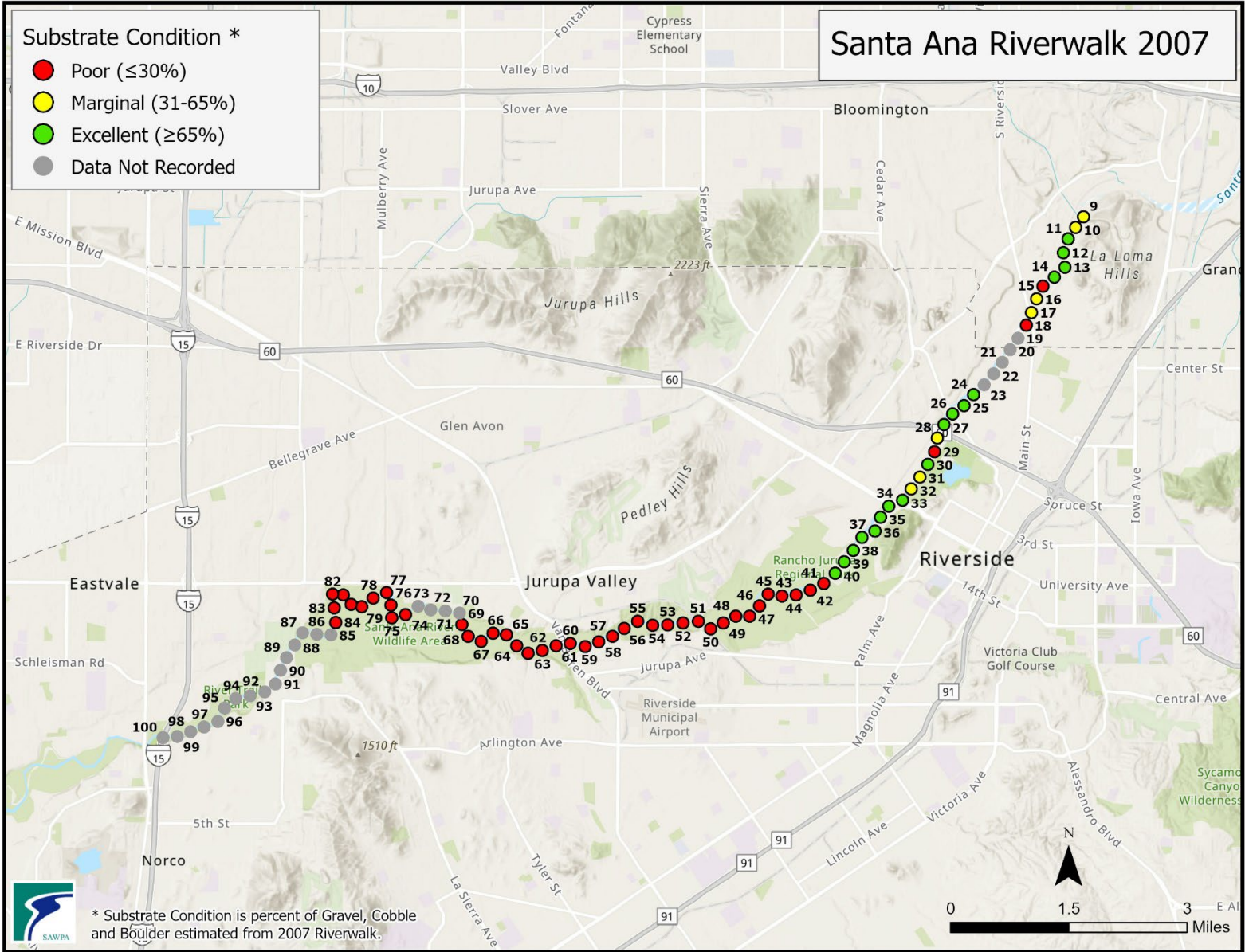
P:\Projects\Ian\Riverwalk_2006-2010Update\RiverwalkUpdate.aprx LoRiverwalk2007 SW-3291

Poor Average (2006 to 2023)	81
Poor	43
Marginal	7
Good	17
Total Transects This Year	67

Santa Ana Riverwalk 2008

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2008 Riverwalk.

P:\Projects\Ian\Riverwalk_2006-2010Update\RiverwalkUpdate.aprx LoRiverwalk2008 SW-3292

Poor Average (2006 to 2023)	81
Poor	76
Marginal	2
Good	13
Total Transects This Year	91

12

Santa Ana Riverwalk 2009

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2009 Riverwalk.

P:\Projects\Ian\Riverwalk_2006-2010Update\RiverwalkUpdate.aprx LoRiverwalk2009 SW-3293

Poor Average (2006 to 2023)	81
Poor	74
Marginal	6
Good	12
Total Transects This Year	92

Santa Ana Riverwalk 2010

Substrate Condition *
- ● Poor (≤30%)
- ● Marginal (31-65%)
- ● Excellent (≥65%)
- ● Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2009 Riverwalk.

P:\Projects\Ian\Riverwalk_2006-2010Update\RiverwalkUpdate.aprx LoRiverwalk2010 SW-3294

Poor Average (2006 to 2023)	81
Poor	109
Marginal	6
Good	7
Total Transects This Year	122

Santa Ana Riverwalk 2011

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2011 Riverwalk.

P:\Projects\Ian\Riverwalk_2011_2019Update\RiverwalkUpdate\RiverwalkUpdate.aprx LoRiverwalk2011 SW-3297

Poor Average (2006 to 2023)	81
Poor	96
Marginal	3
Good	12
Total Transects This Year	111

Santa Ana Riverwalk 2012

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2012 Riverwalk.
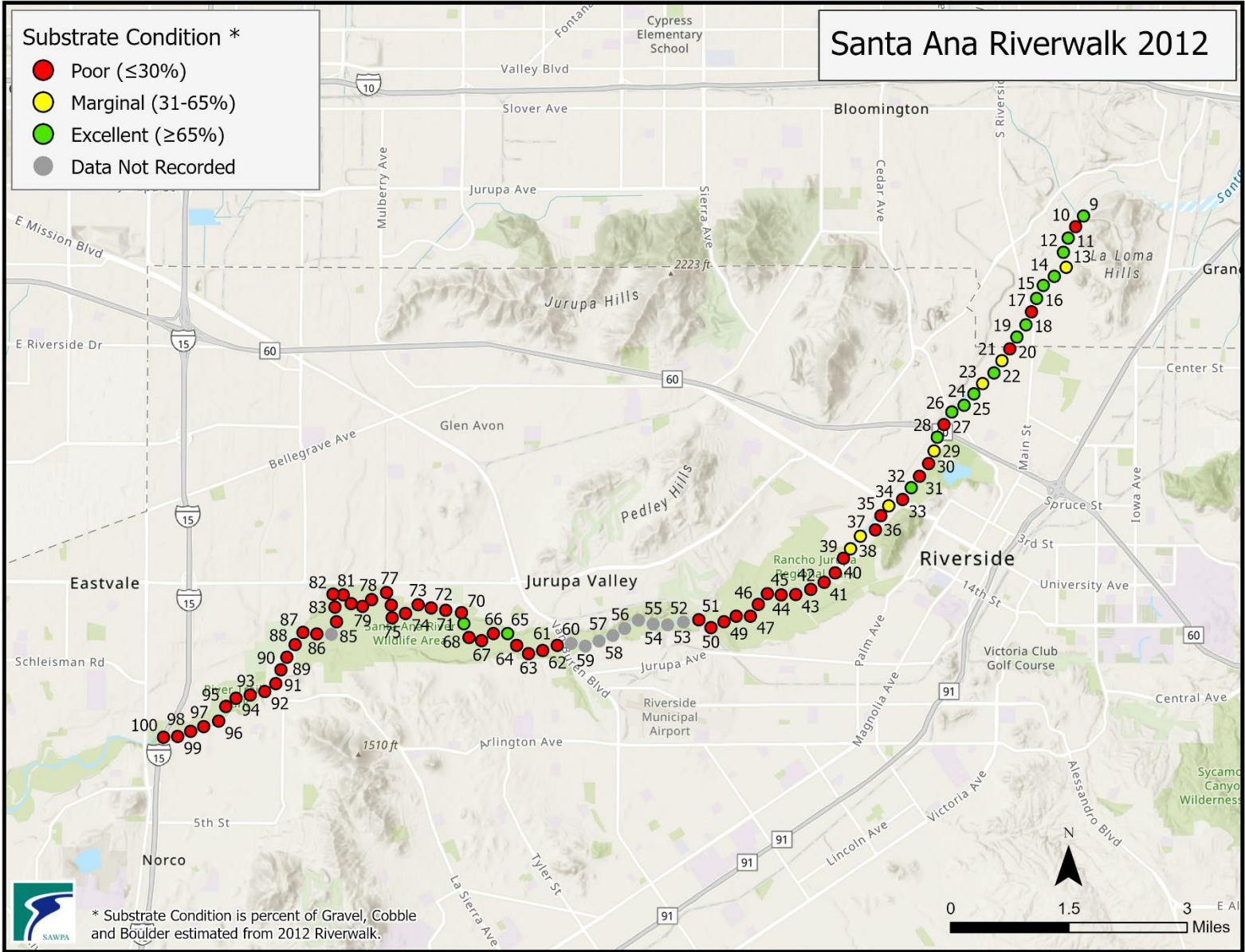
P:\Projects\Ian\Riverwalk_2011_2019Update\RiverwalkUpdate\RiverwalkUpdate.aprx LoRiverwalk2012 SW-3298

Poor Average (2006 to 2023)	81
Poor	59
Marginal	7
Good	16
Total Transects This Year	82

Santa Ana Riverwalk 2013

Substrate Condition *
- ● Poor (≤30%)
- ● Marginal (31-65%)
- ● Excellent (≥65%)
- ● Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2013 Riverwalk.

P:\Projects\Ian\Riverwalk_2011_2019Update\RiverwalkUpdate\RiverwalkUpdate.aprx LoRiverwalk2013 SW-3299

Poor Average (2006 to 2023)	81
Poor	79
Marginal	11
Good	18
Total Transects This Year	108

Santa Ana Riverwalk 2014

Substrate Condition *

- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2014 Riverwalk.

P:\Projects\Ian\Riverwalk_2011_2019Update\RiverwalkUpdate\RiverwalkUpdate.aprx LoRiverwalk2014 SW-3300

Poor Average (2006 to 2023)	81
Poor	98
Marginal	3
Good	9
Total Transects This Year	110

Santa Ana Riverwalk 2015

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2015 Riverwalk.

P:\Projects\Ian\Riverwalk_2011_2019Update\RiverwalkUpdate\RiverwalkUpdate.aprx LoRiverwalk2015 SW-3301

Poor Average (2006 to 2023)	81
Poor	95
Marginal	10
Good	5
Total Transects This Year	110

Santa Ana Riverwalk 2016

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚪ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2016 Riverwalk.

P:\Projects\Ian\Riverwalk_2011_2019Update\RiverwalkUpdate\RiverwalkUpdate.aprx LoRiverwalk2016 SW-3302

Poor Average (2006 to 2023)	81
Poor	75
Marginal	22
Good	13
Total Transects This Year	110

20

Santa Ana Riverwalk 2017

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2017 Riverwalk.

P:\Projects\Ian\Riverwalk_2011_2019Update\RiverwalkUpdate\RiverwalkUpdate.aprx LoRiverwalk2017 SW-3303

Poor Average (2006 to 2023)	81
Poor	84
Marginal	15
Good	11
Total Transects This Year	110

Santa Ana Riverwalk 2018

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚪ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2018 Riverwalk.

P:\Projects\Ian\Riverwalk_2011_2019Update\RiverwalkUpdate\RiverwalkUpdate.aprx LoRiverwalk2018 SW-3304

Poor Average (2006 to 2023)	81
Poor	97
Marginal	5
Good	9
Total Transects This Year	111

Santa Ana Riverwalk 2019

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2019 Riverwalk.

P:\Projects\Ian\Riverwalk_2011_2019Update\RiverwalkUpdate\RiverwalkUpdate.aprx LoRiverwalk2019 SW-3305

Poor Average (2006 to 2023)		81
Poor		81
Marginal		12
Good		13
Total Transects This Year		106

Santa Ana Riverwalk 2020

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2020 Riverwalk.

P:\projects\Ian\RiverWalk2020\RiverWalkMap2020.aprx LoRiverWalk2020 SW-3013

Poor Average (2006 to 2023)	81
Poor	76
Marginal	7
Good	16
Total Transects This Year	99

Santa Ana Riverwalk 2021

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2021 Riverwalk.

P:\projects\Ian\RiverWalk2021\Riverwalk2021Map\Riverwalk2021Map.aprx LoRiverwalk2021 SW-3109

Poor Average (2006 to 2023)	81
Poor	69
Marginal	18
Good	19
Total Transects This Year	106

Santa Ana Riverwalk 2022

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2022 Riverwalk.

P:\Projects\Ian\Riverwalk2022\Riverwalk2022Map\Riverwalk2022Map.aprx Layout SW-3295

Poor Average (2006 to 2023)		81
Poor		89
Marginal		12
Good		4
Total Transects This Year		105

Santa Ana Riverwalk 2023

Substrate Condition *
- 🔴 Poor (≤30%)
- 🟡 Marginal (31-65%)
- 🟢 Excellent (≥65%)
- ⚫ Data Not Recorded

* Substrate Condition is percent of Gravel, Cobble and Boulder estimated from 2023 Riverwalk.

P:\Projects\Ian\Riverwalk2023\Riverwalk2023Map\Riverwalk2023Map.aprx Layout SW-3296

Poor Average (2006 to 2023)		81
Poor		76
Marginal		5
Good		5
Total Transects This Year		86

Santa Ana Sucker Conservation Team

https://sawpa.gov/task-force/santa-ana-sucker-conservation-team/

Santa Ana Watershed Project Authority

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