Draft

Riverwalk Atlas

Credit: Brittany App Photography

An atlas-based summary of Santa Ana River habitat surveys conducted annually from 2006-2019.

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 the approximately 40 volunteers who joined us on November 7, 2019 for the latest 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.

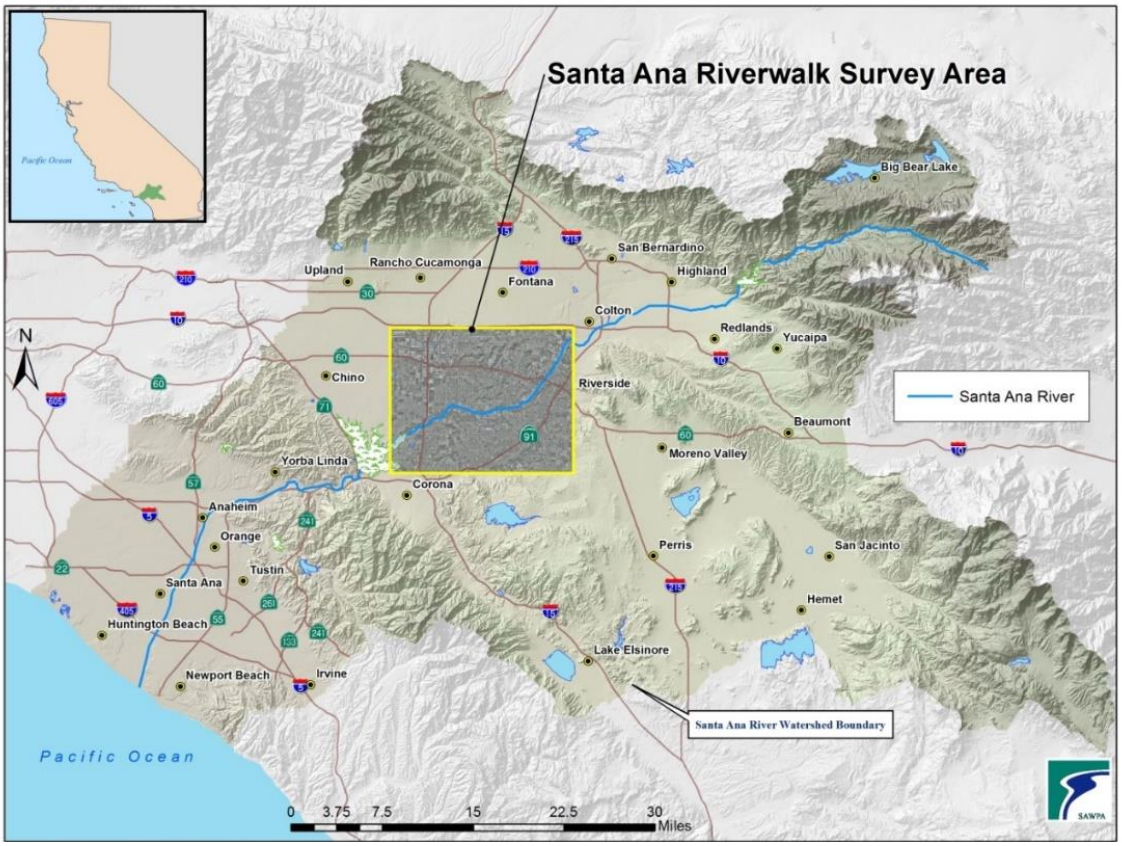
The water agencies and municipalities that provide water to these areas have partnered with regulatory agencies, conservation organizations and other entities to conduct an annual fish habitat survey within the Santa Ana River with a focus on one of the region's federally listed threatened endemic aquatic 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. The river is in the Santa Ana River Watershed which covers an area from the Orange County oceanfront to the San Bernardino Mountains.

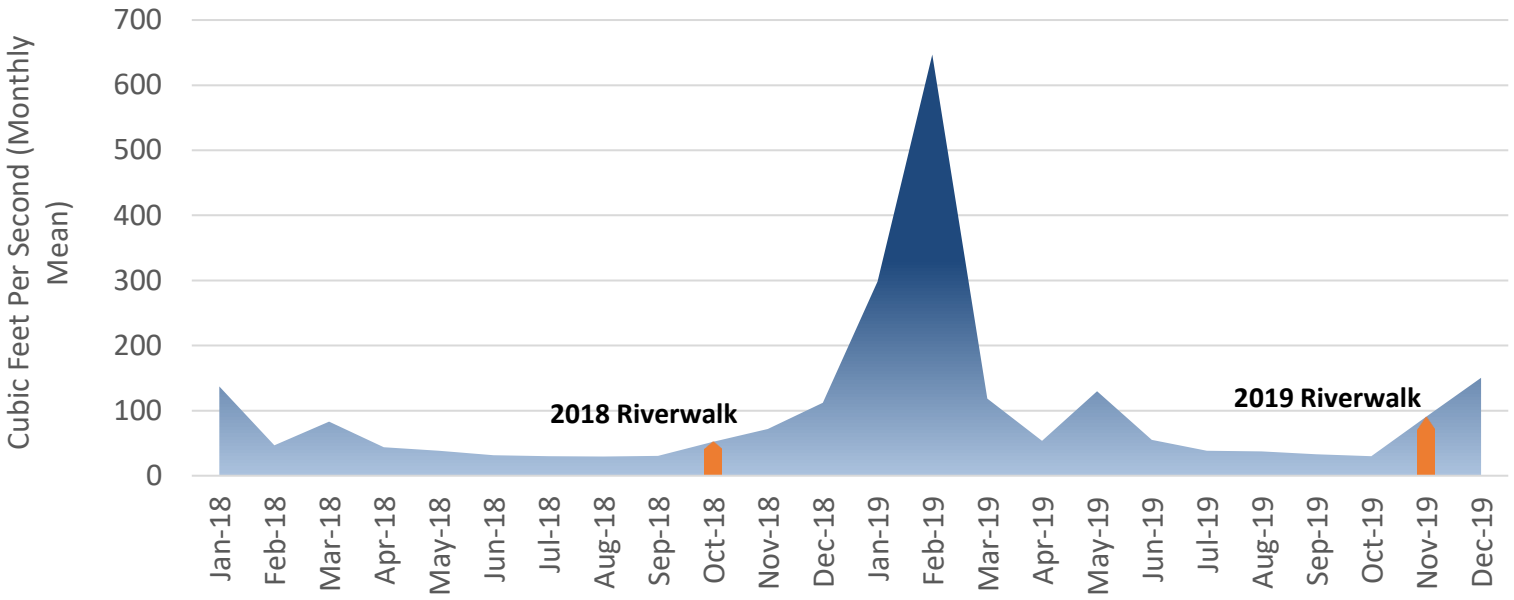
About the Santa Ana Sucker

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 Stream Gage

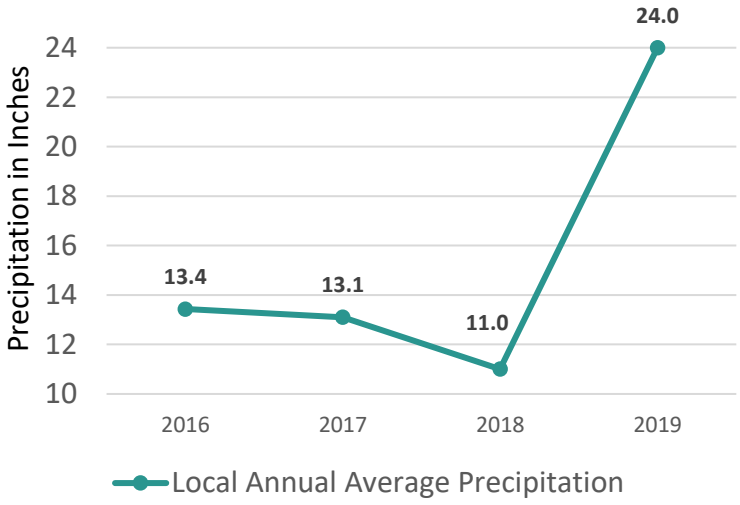


Note: Just the past two calendar years are shown so fluctuations in streamflow data are easily visible in Figure 1.

For context, the streamflow conditions in the Santa Ana River for calendar years 2018 and 2019 followed the typical pattern of a Mediterranean climate of a mild summer and wet winter.

Precipitation rates (as an annual average of +50 stations in the watershed) were 11 inches in 2018 and 24 inches in 2019. The average of the past 8 years is 12.2 inches.

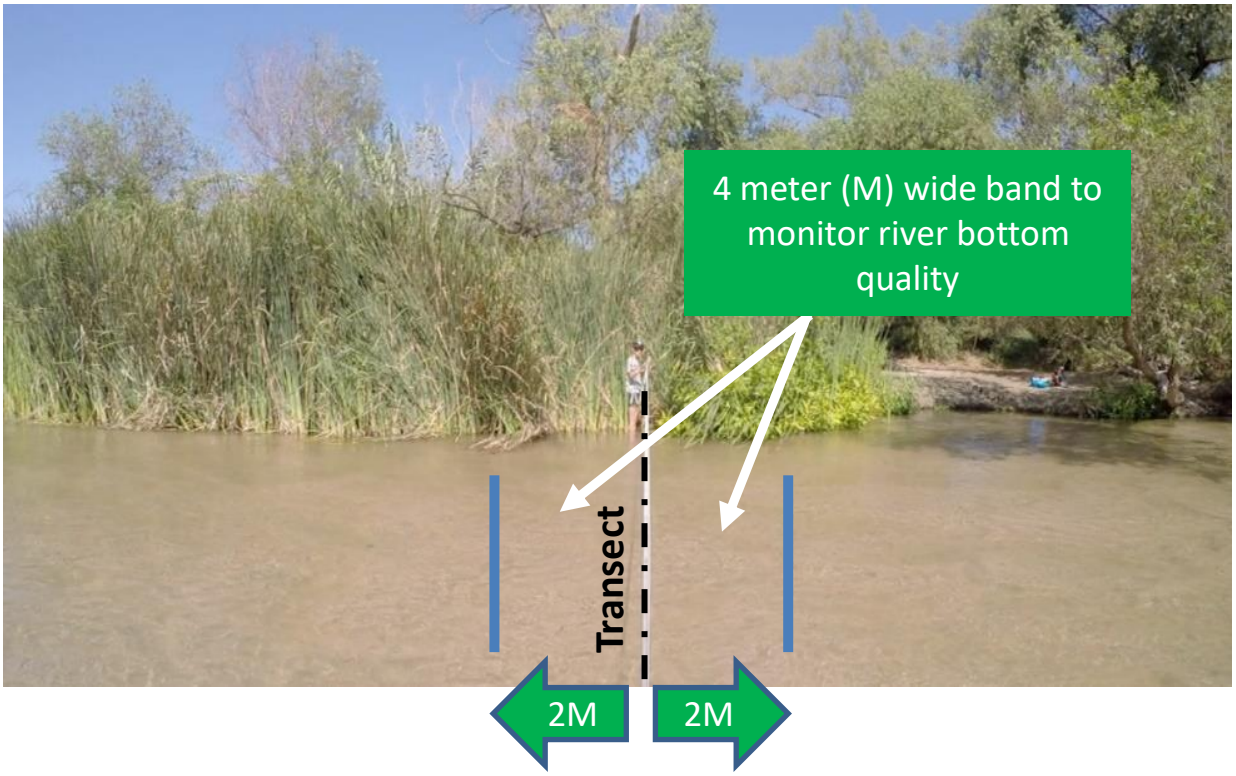
Figure 2: Recent Precipitation Across the Watershed



Collecting Riverwalk Data in the Field

- Each year, approximately 50 volunteers collect data at over 100 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.

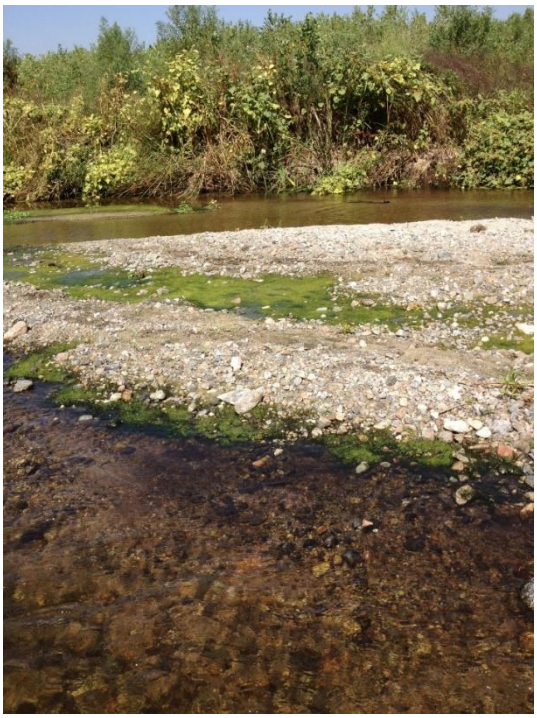


The area within the band is then surveyed by visually identifying what type of material makes up the river bottom:

- 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 we can compare trends at each point over time.



For 2019, there were 106 transects that were able to be sampled as they had flowing water. There are a total of 122 transects, but often a handful are not sampled each year because they lack flowing water.

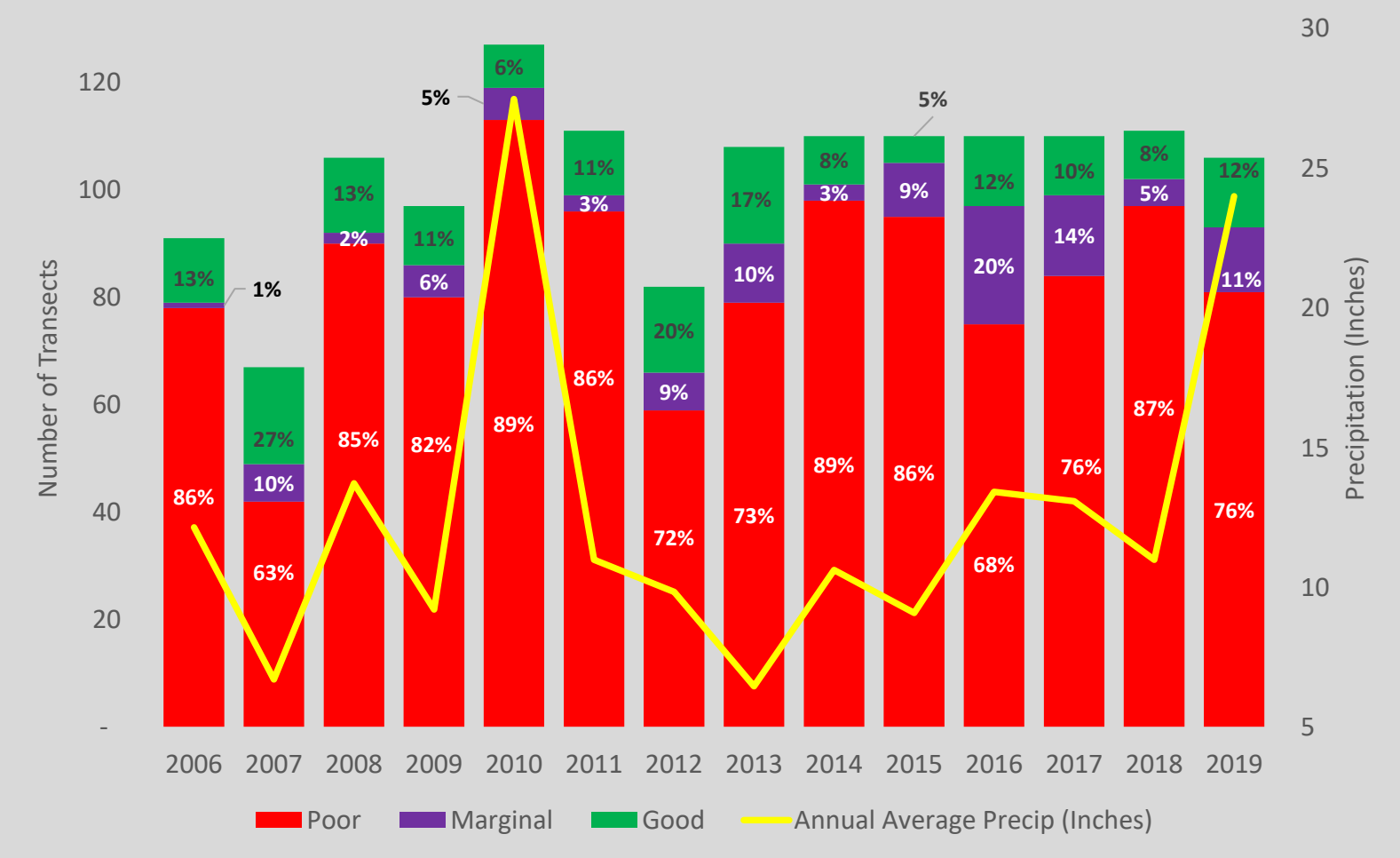
For information sharing purposes, the quality of the river bottom (substrate) is generalized in this Atlas in the following categories:

- **Poor:** 30% or less of the transects substrate is gravel/cobble.
- **Marginal:** Anything greater than 30% to anything less than 65% of the transects substrate is gravel/cobble.
- **Excellent:** 65% or more of the transects substrate is gravel/cobble.

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.

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 14 years are shown in Figure 3.

Over the 14-year period shown, the average amount of poor transects is 80% of total transects (or 83 transects) and the average for good transects is 12% (or 12 transects).

2019 results were relatively close to these averages. This is informative as the annual average precipitation rate for 2019 (24 inches) was above the average of the 2006 to 2019 period (12.2 inches). Although it is important to note the bulk of the higher flows in the River in 2019 occurred five months earlier (January through May shown in Figure 1).

DRAFT for the years 2006 through 2010 (SAWPA still doing QA/QC on those years).

Comparison to Mean Results

Figure 4: Riverwalk Ratings in Comparison to Mean Poor Transects

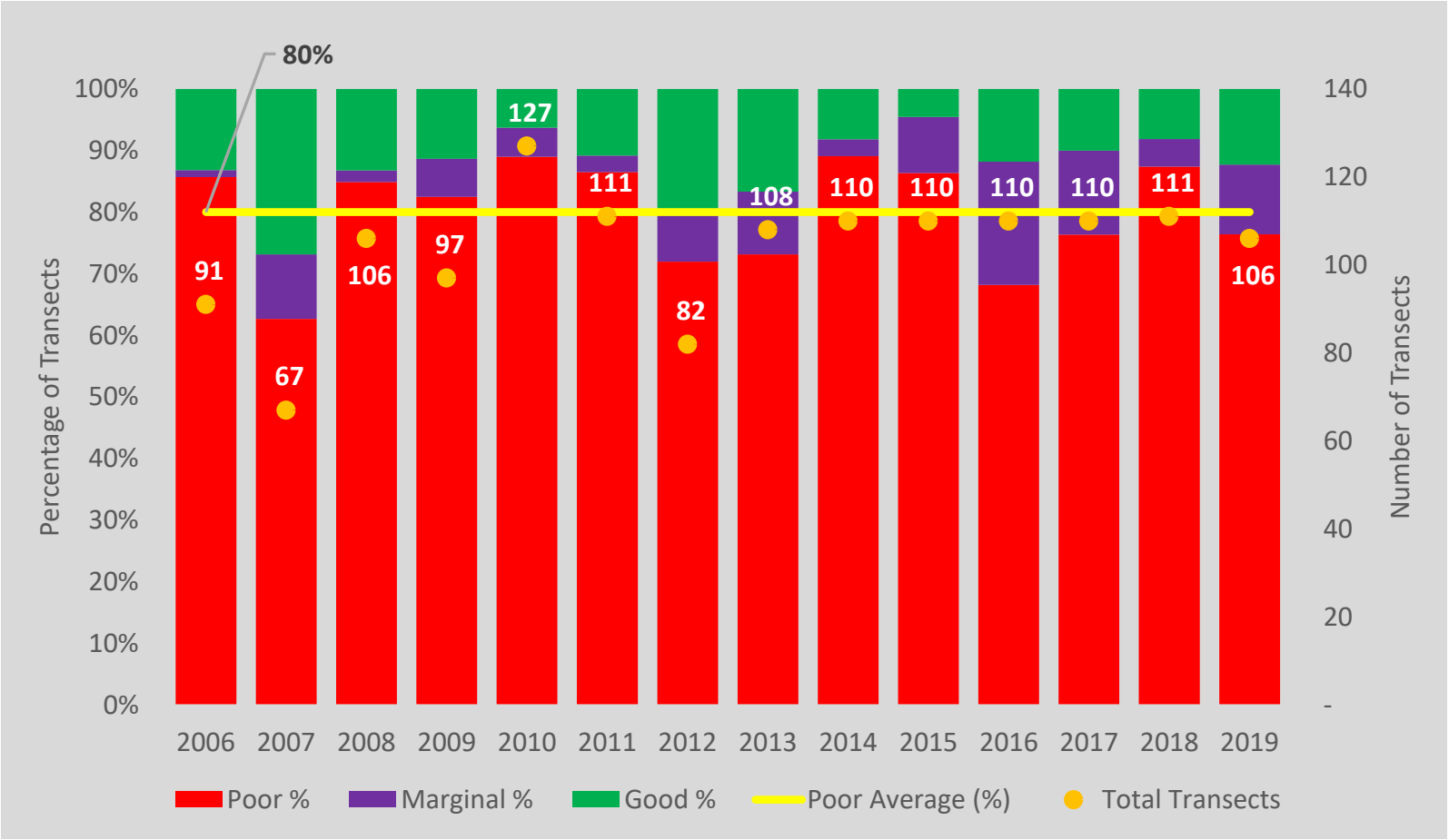
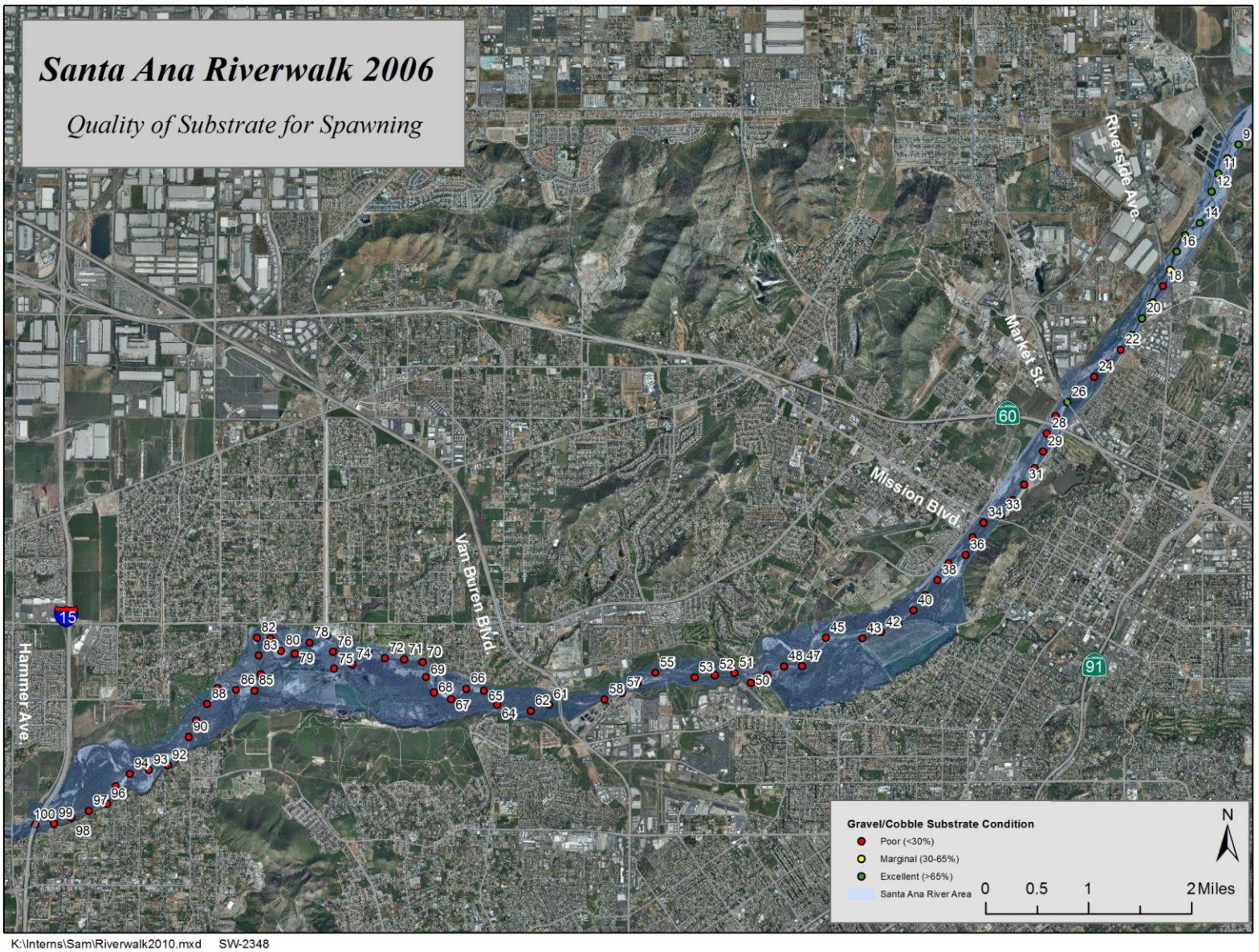


Figure 4 shows the Riverwalk years and which ones exceeded the mean "poor" rating of 80%. Eight years (out of 14 years) have exceeded that mean with the latest being 2018. Over this same 14-year period, the amount of Riverwalk years with transects over the average "good" rating of 12% is 7 years, with 2019 being the latest of those years.

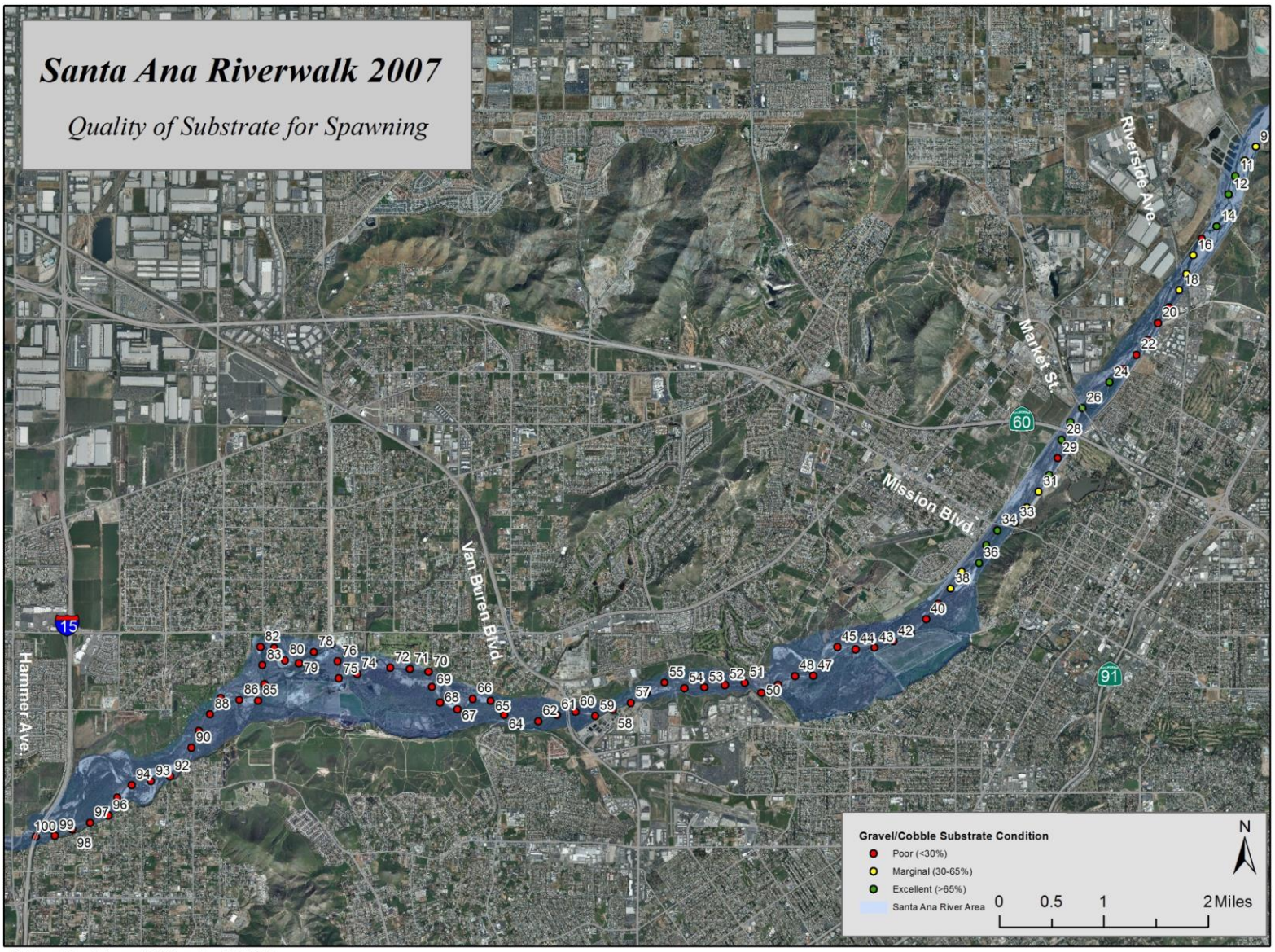
Note that the amount of transects (highlighted in orange on the second vertical axis) can vary each year, which affects the amount of transects in each rating category and thus the averages.

DRAFT for 2006 through 2010 (SAWPA still doing QA/QC on those years). 2010 has 122 transects (127 showing up due to multiple channels)

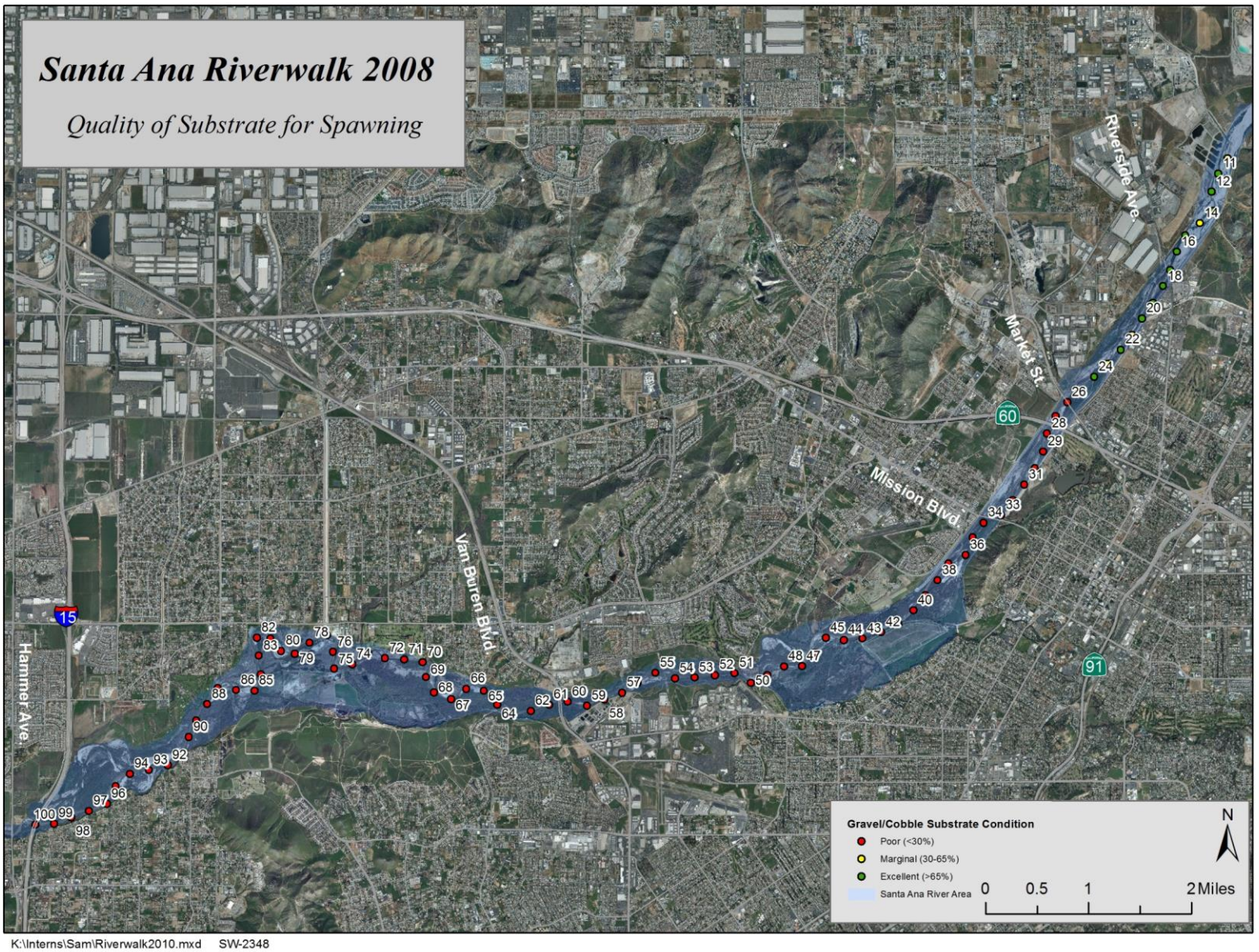
Riverwalk Ratings by Year and Location (Shown in Maps)



DRAFT for 2006 through 2010 (SAWPA still doing QA/QC on those years).



DRAFT for 2006 through 2010 (SAWPA still doing QA/QC on those years).



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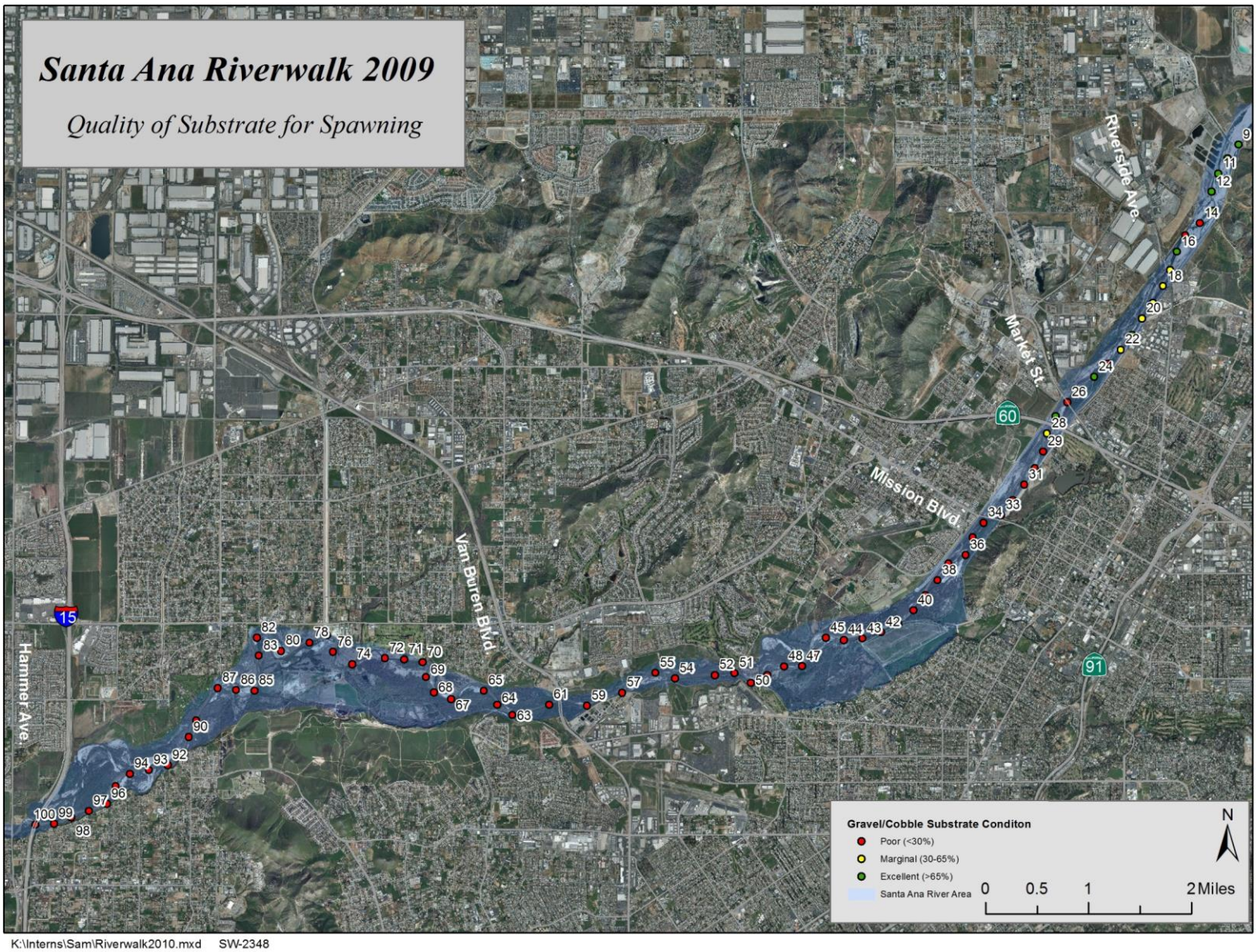
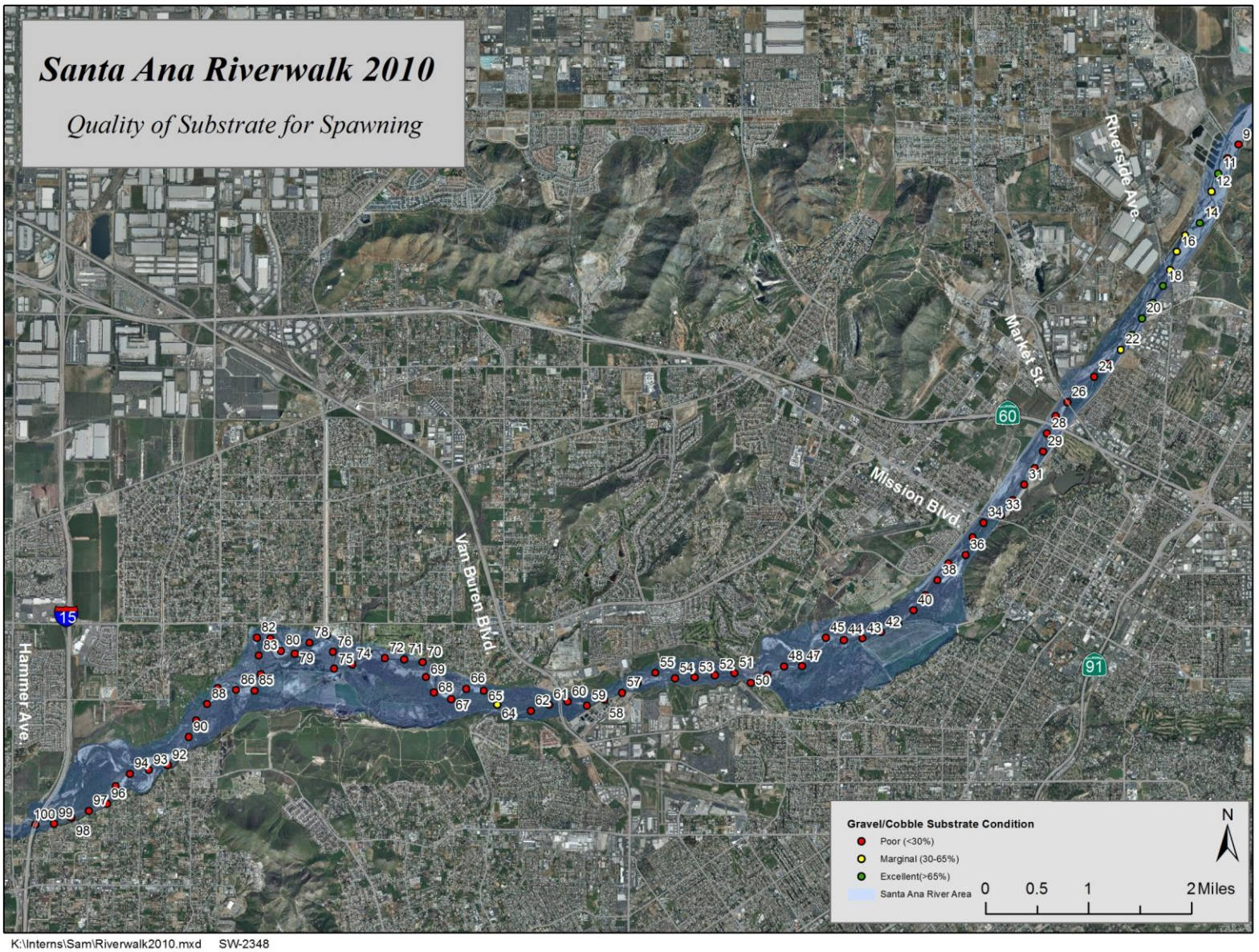
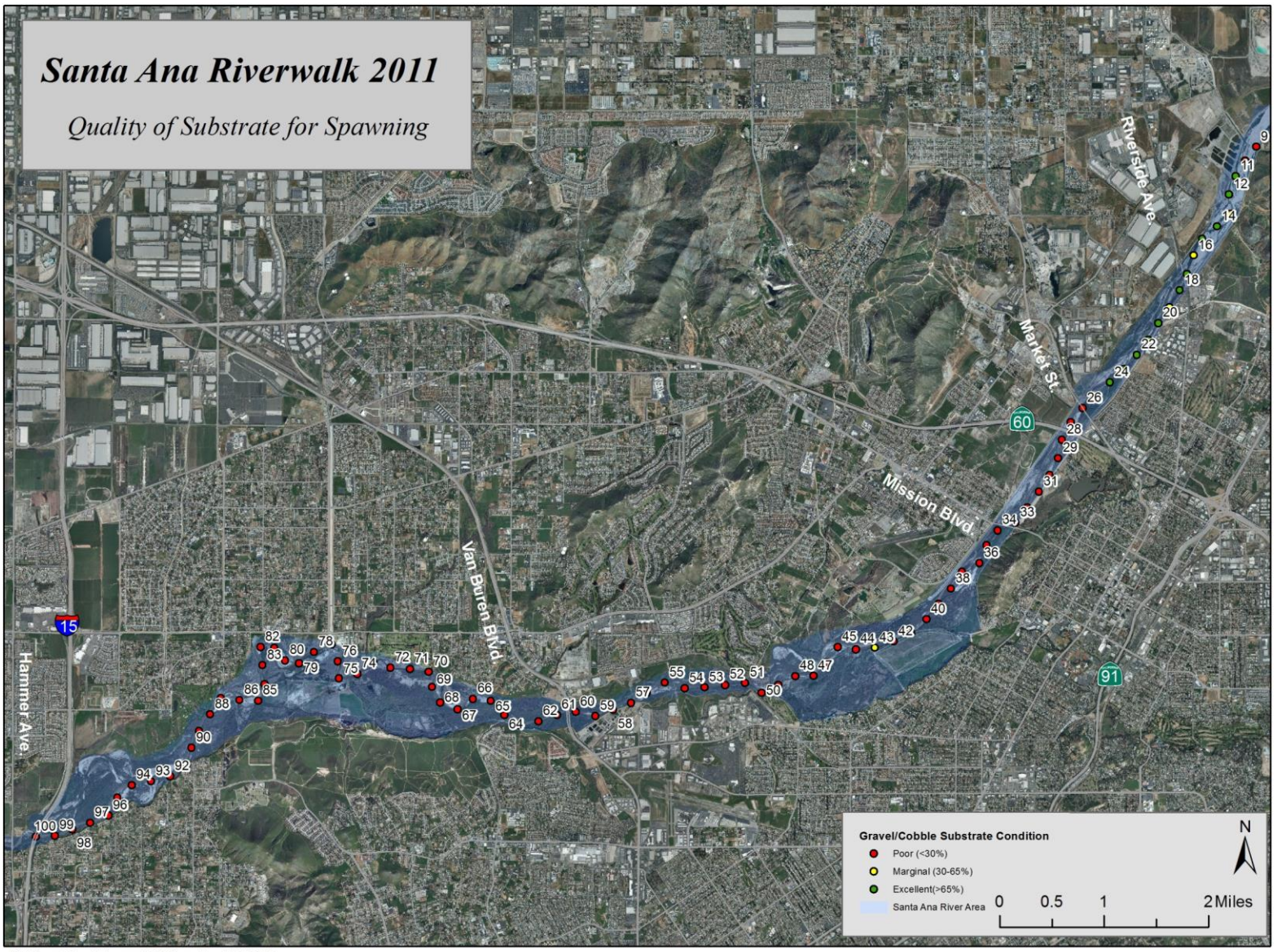
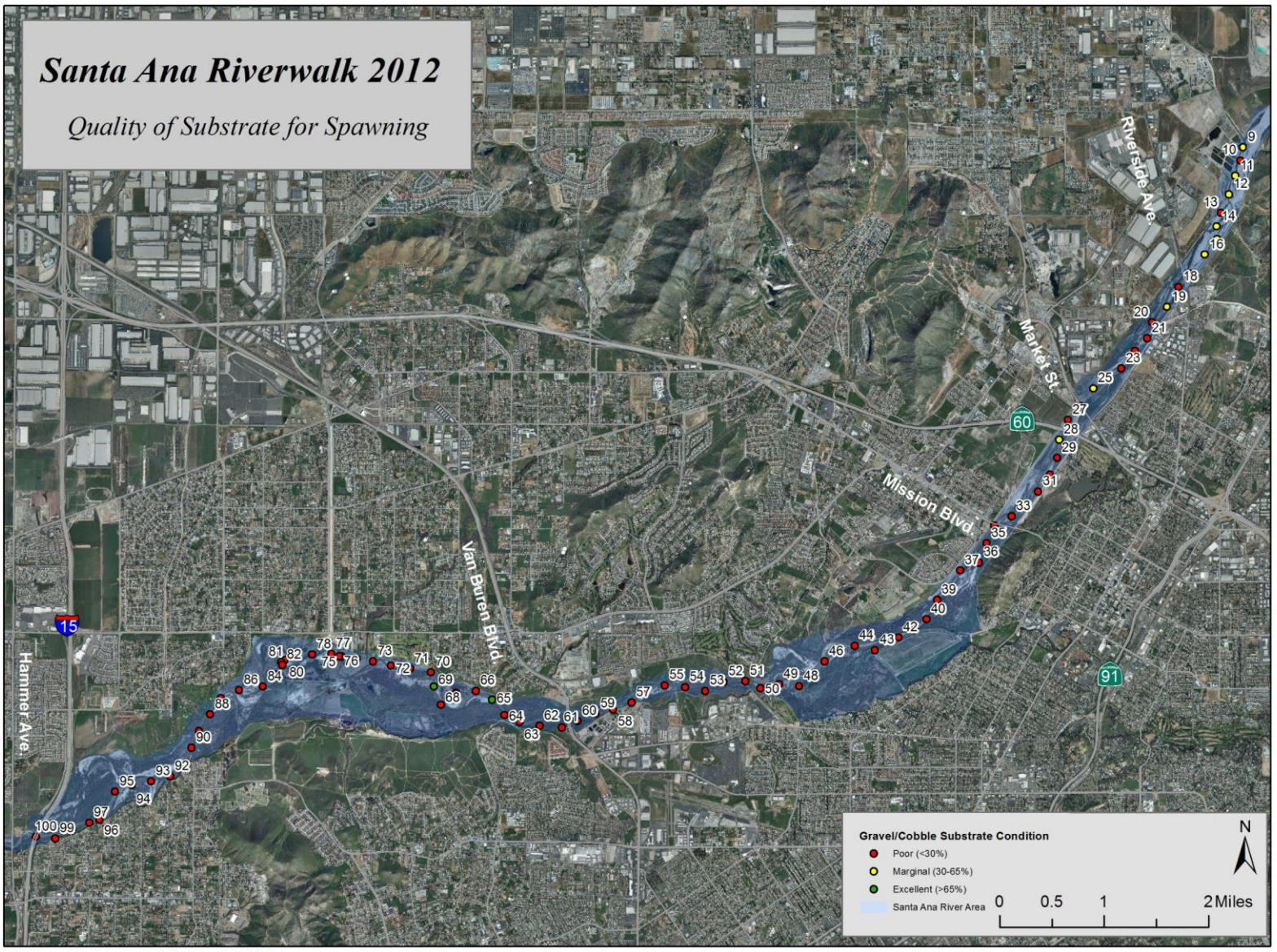


DRAFT for 2006 through 2010 (SAWPA still doing QA/QC on those years).



DRAFT for 2006 through 2010 (SAWPA still doing QA/QC on those years).


Santa Ana Riverwalk 2011
Quality of Substrate for Spawning
Riverside Ave.
Market St.
Mission Blvd.
Van Buren Blvd.
Hammer Ave.
15
60
91
Gravel/Cobble Substrate Condition
Poor (<30%)
Marginal (30-65%)
Excellent(>65%)
Santa Ana River Area
0 0.5 1 2 Miles
N
K:\Interns\Sam\Riverwalk2010.mxd SW-2348


Santa Ana Riverwalk 2012
Quality of Substrate for Spawning
Riverside Ave.
Market St.
Mission Blvd.
Van Buren Blvd.
Hammer Ave.
15
60
91
Gravel/Cobble Substrate Condition
Poor (<30%)
Marginal (30-65%)
Excellent (>65%)
Santa Ana River Area
N
0 0.5 1 2 Miles
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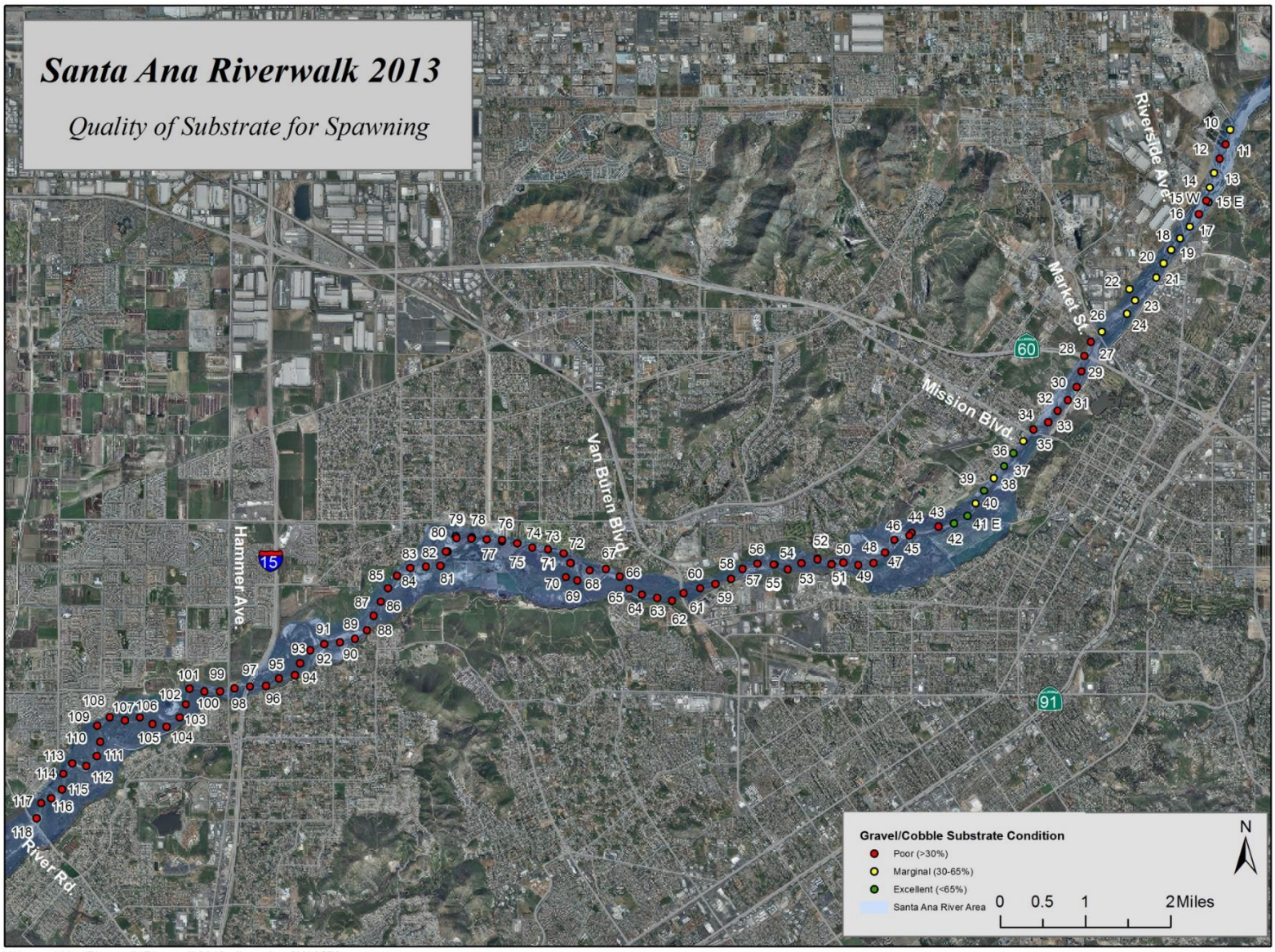
Santa Ana Riverwalk 2013
Quality of Substrate for Spawning
Riverside Ave.
Market St.
Mission Blvd.
Van Buren Blvd.
Hammer Ave.
River Rd.
15
60
91
Gravel/Cobble Substrate Condition
Poor (>30%)
Marginal (30-65%)
Excellent (<65%)
Santa Ana River Area
0 0.5 1 2 Miles
N
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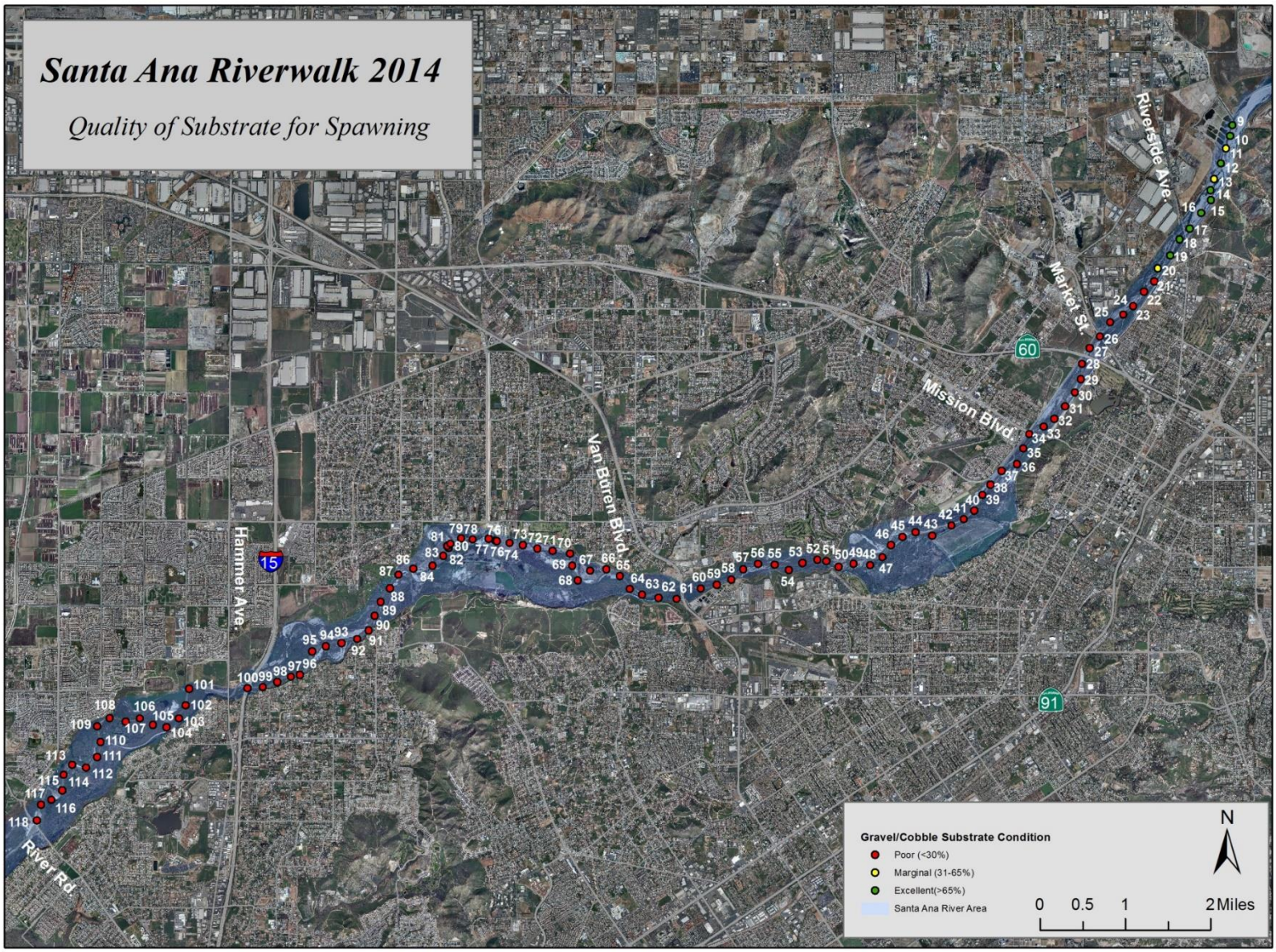
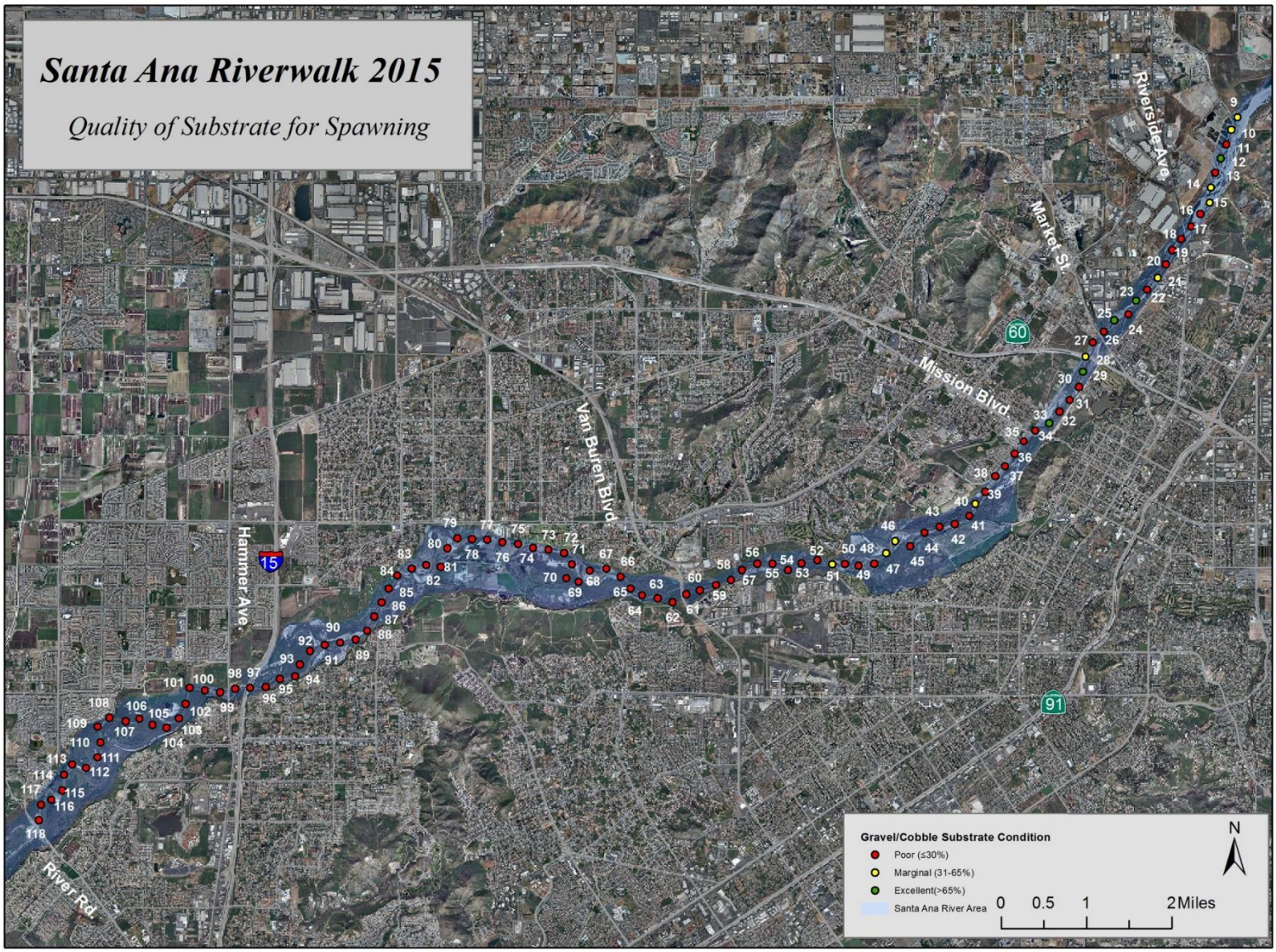

Santa Ana Riverwalk 2014
Quality of Substrate for Spawning
Riverside Ave.
Market St.
Mission Blvd.
Van Buren Blvd.
Hammer Ave.
River Rd.
60
91
15
Gravel/Cobble Substrate Condition
Poor (<30%)
Marginal (31-65%)
Excellent(>65%)
Santa Ana River Area
N
0 0.5 1 2 Miles



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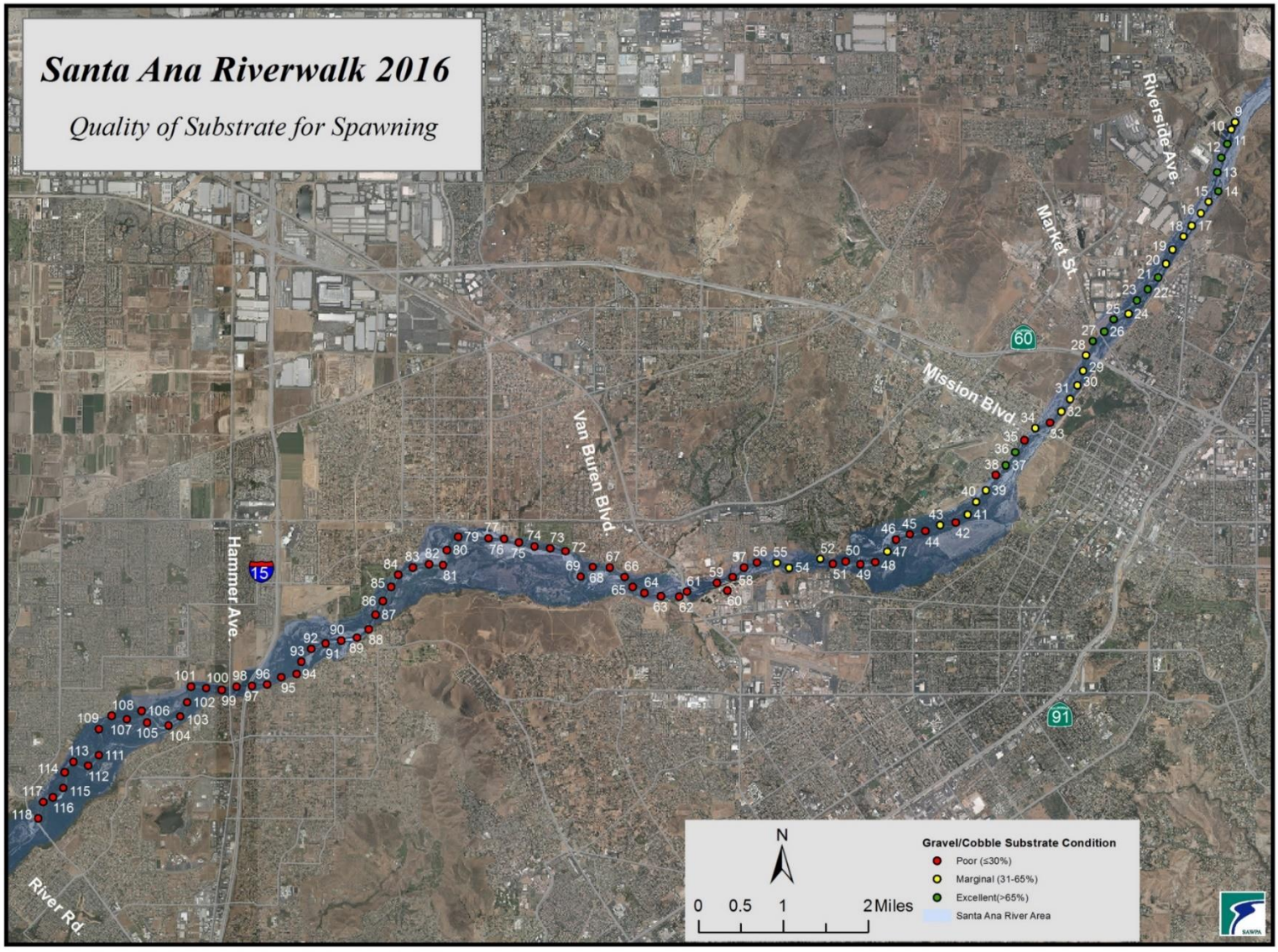

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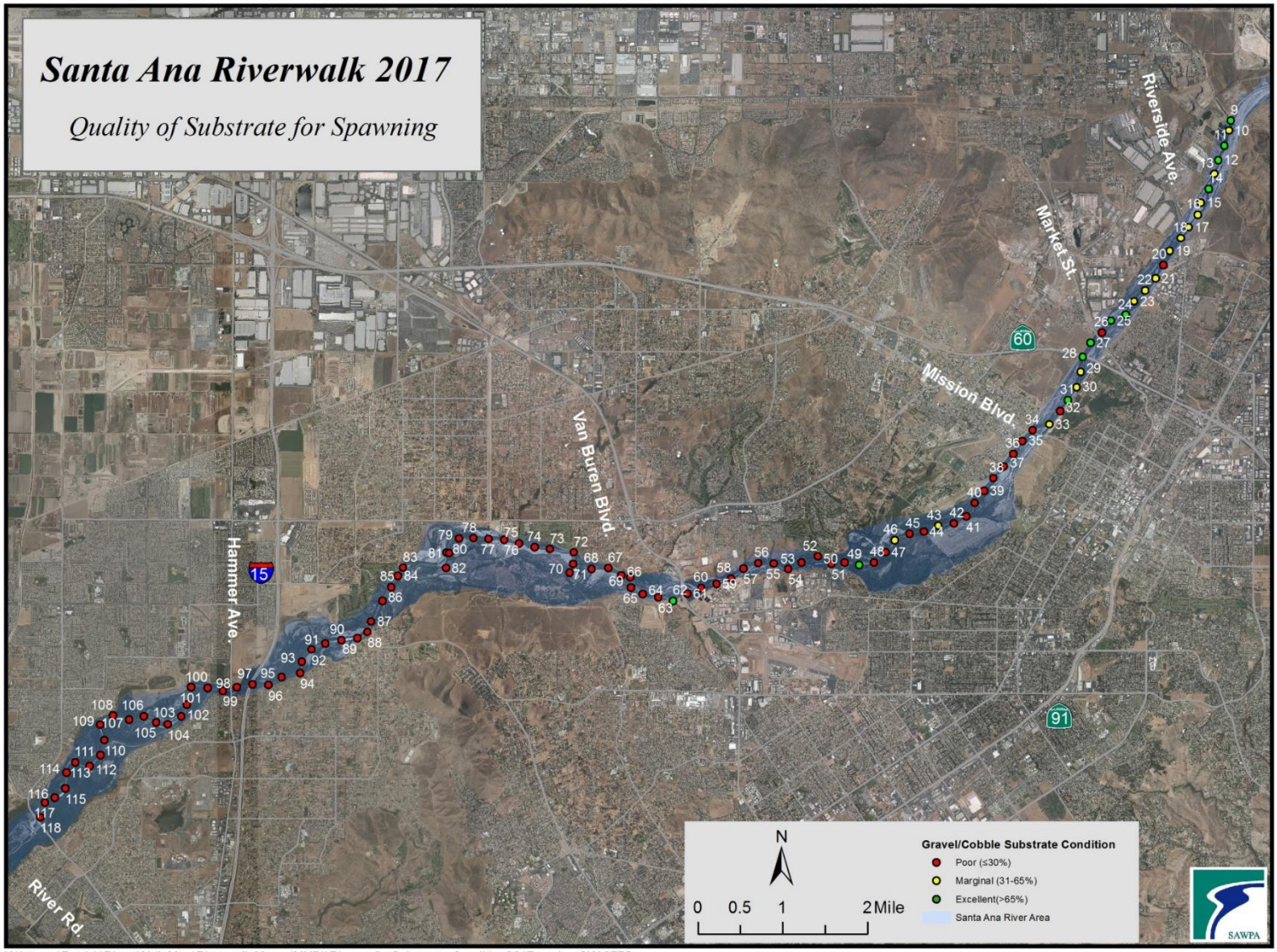

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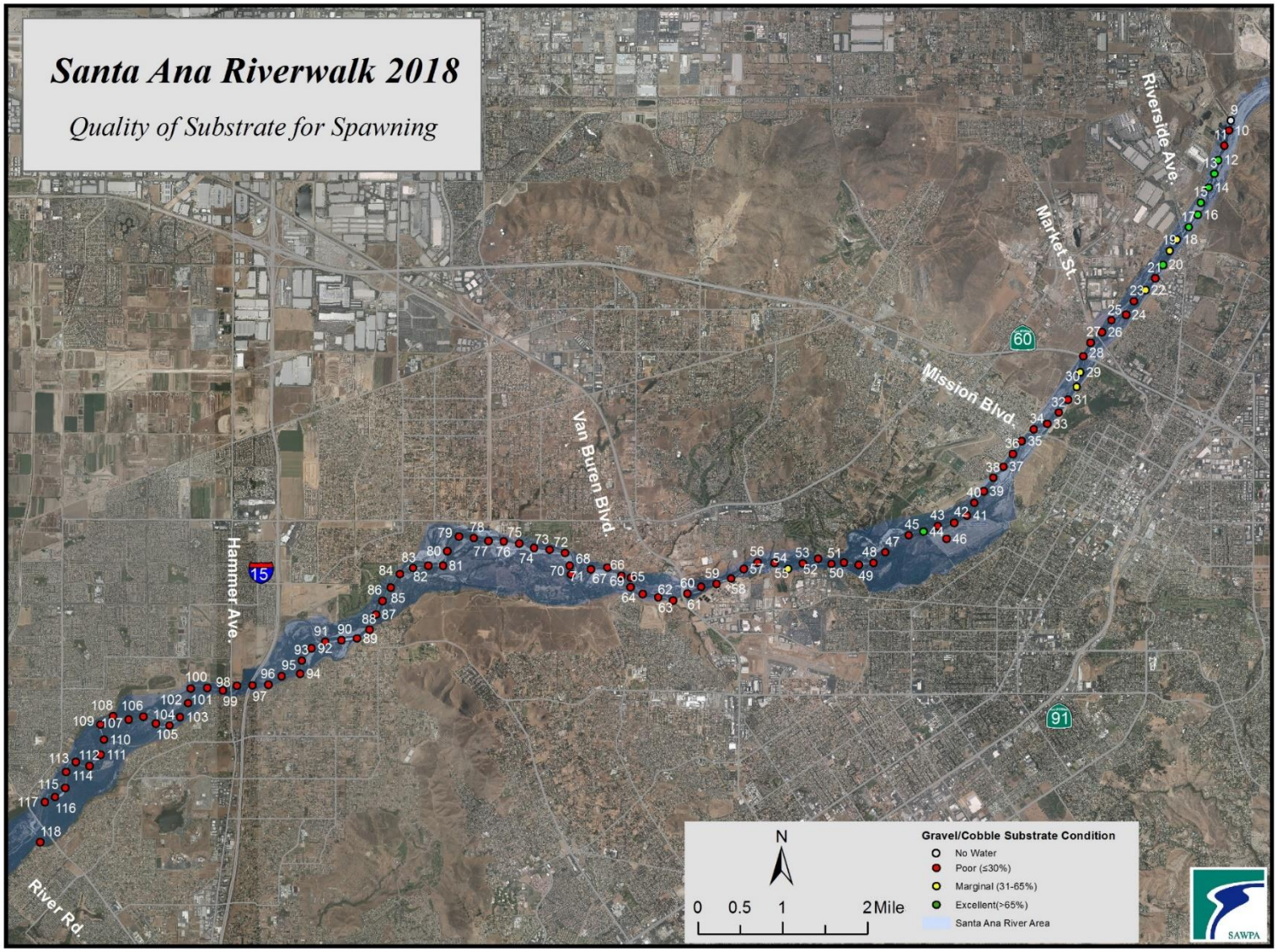

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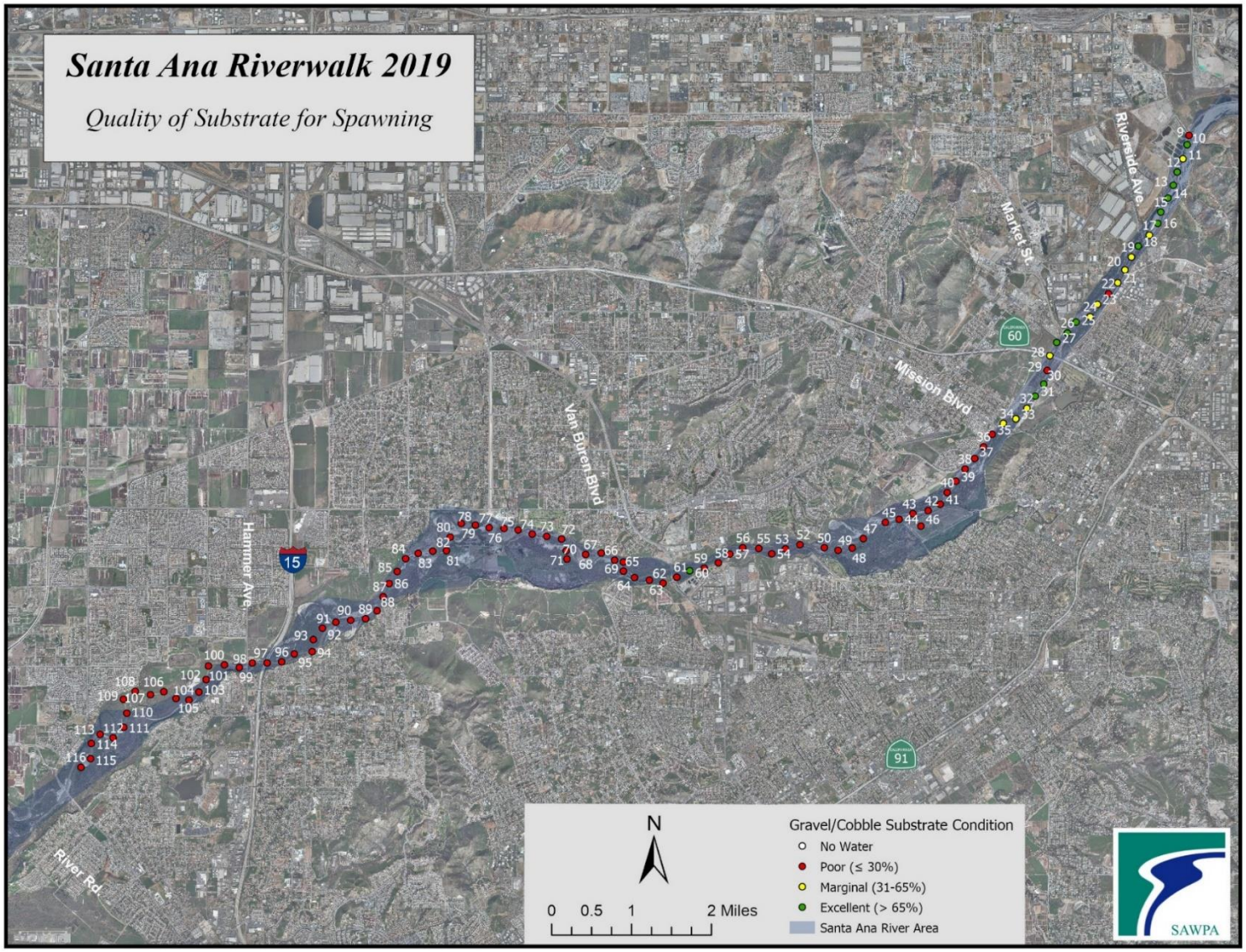
Santa Ana Riverwalk 2019
Quality of Substrate for Spawning
Riverside Ave
Market St.
Mission Blvd
Van Buren Blvd
Hammer Ave
River Rd
15
60
91
N
0 0.5 1 2 Miles
Gravel/Cobble Substrate Condition
No Water
Poor (≤ 30%)
Marginal (31-65%)
Excellent (> 65%)
Santa Ana River Area
SAWPA

Ideas for Further Analysis of Riverwalk Data

Although there are many important considerations affecting habitat such as timing and duration of flows, high flows have the potential to import sand and silt into the River system, which could cover portions of the existing substrate composition.

To truly correlate sucker habitat and flows, further analysis will be needed that compares sucker habitat conditions to volume, timing, duration, magnitude and variability of flows in the River.

Appendix: Results In Table Format

Table 1: Transect Ratings and Precipitation (As Represented in Figure 3)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Annual Average Precip (Inches)	12.2	6.7	13.7	9.2	27.5	11.0	9.9	6.5	10.6	9.1	13.4	13.1	11.0	24.0
Poor (Transects #)	78	42	90	80	113	96	59	79	98	95	75	84	97	81
Marginal (Transects #)	1	7	2	6	6	3	7	11	3	10	22	15	5	12
Good (Transects #)	12	18	14	11	8	12	16	18	9	5	13	11	9	13
Total Transects	**91**	**67**	**106**	**97**	**127**	**111**	**82**	**108**	**110**	**110**	**110**	**110**	**111**	**106**

Table 2: Mean Ratings and Precipitation of Period 2006 to 2019

	Percentage	Numeric
Precipitation Average (Inches)	NA	12.7
Poor Average (Transect #)	80%	83
Marginal Average (Transect #)	8%	8
Good Average (Transect #)	12%	12

To receive a complete copy of the Excel-based Riverwalk data, please contact Ian Achimore at iachimore@sawpa.org

Santa Ana Sucker Conservation Team

https://sawpa.org/task-forces/santa-ana-sucker-conservation-team/

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