



Compsopogon coeruleus
in the Santa Ana River

Kai Palenscar
May 15, 2014

Photo credits: Christine Medak, Kai Palenscar and Ayoola Folarin (USFWS) unless otherwise noted.



Outline

- RIX Exotic Fish Shocking Event
 - Algae Discovery (Feb. 13, 2014)
 - Algae Identification (Feb. 20, 2014)
- Algae Ecology and Range
- Riverwalk Data
- River Snorkel Survey (Feb. 25, 2014)
- Threats to Sucker
- Current Conditions
- Next Steps

February 13, 2014

17 Non-native fish removed:
2 largemouth bass
14 black bullhead catfish
1 green sunfish



Algae first noted as potentially problematic during non-native fish removal at the RIX discharge pool.

In attendance USFWS, USFS, CDFW, RCRC, SBVMWD, SBMWD, and RIX personnel

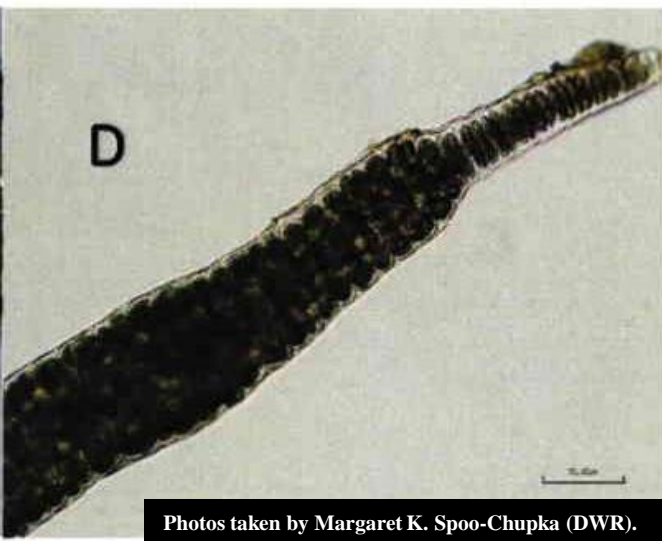
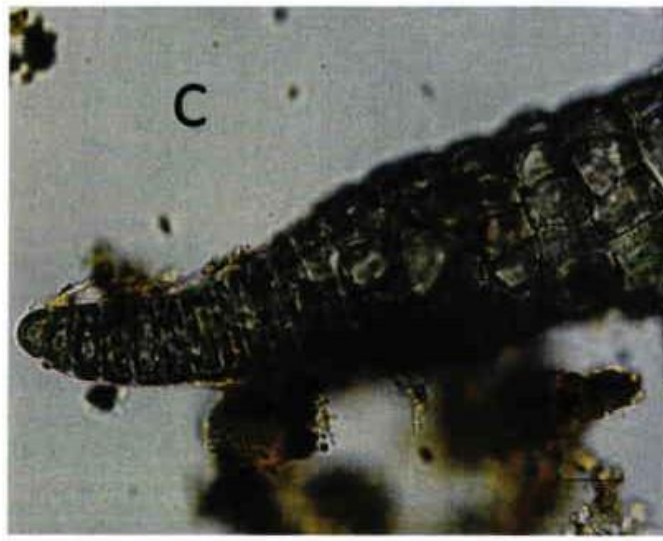
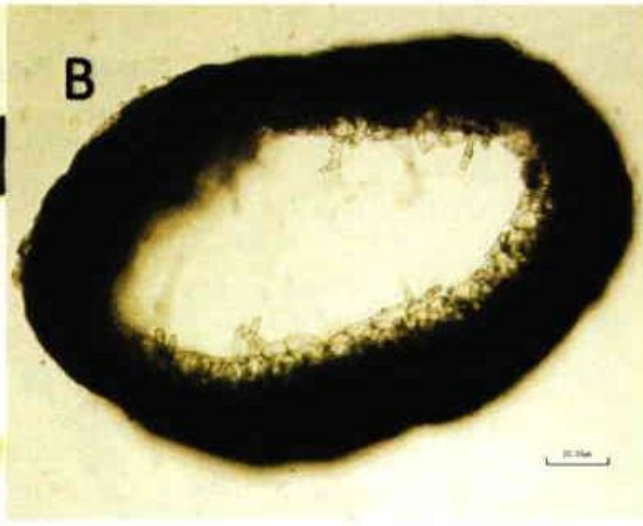
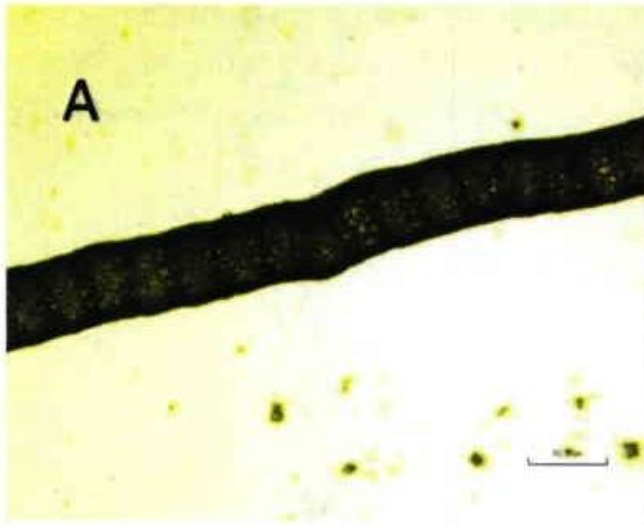
Algae collected from RIX discharge pool
Feb. 13, 2014 – dark brown/black and filamentous



Downstream of discharge pool Feb. 25, 2014

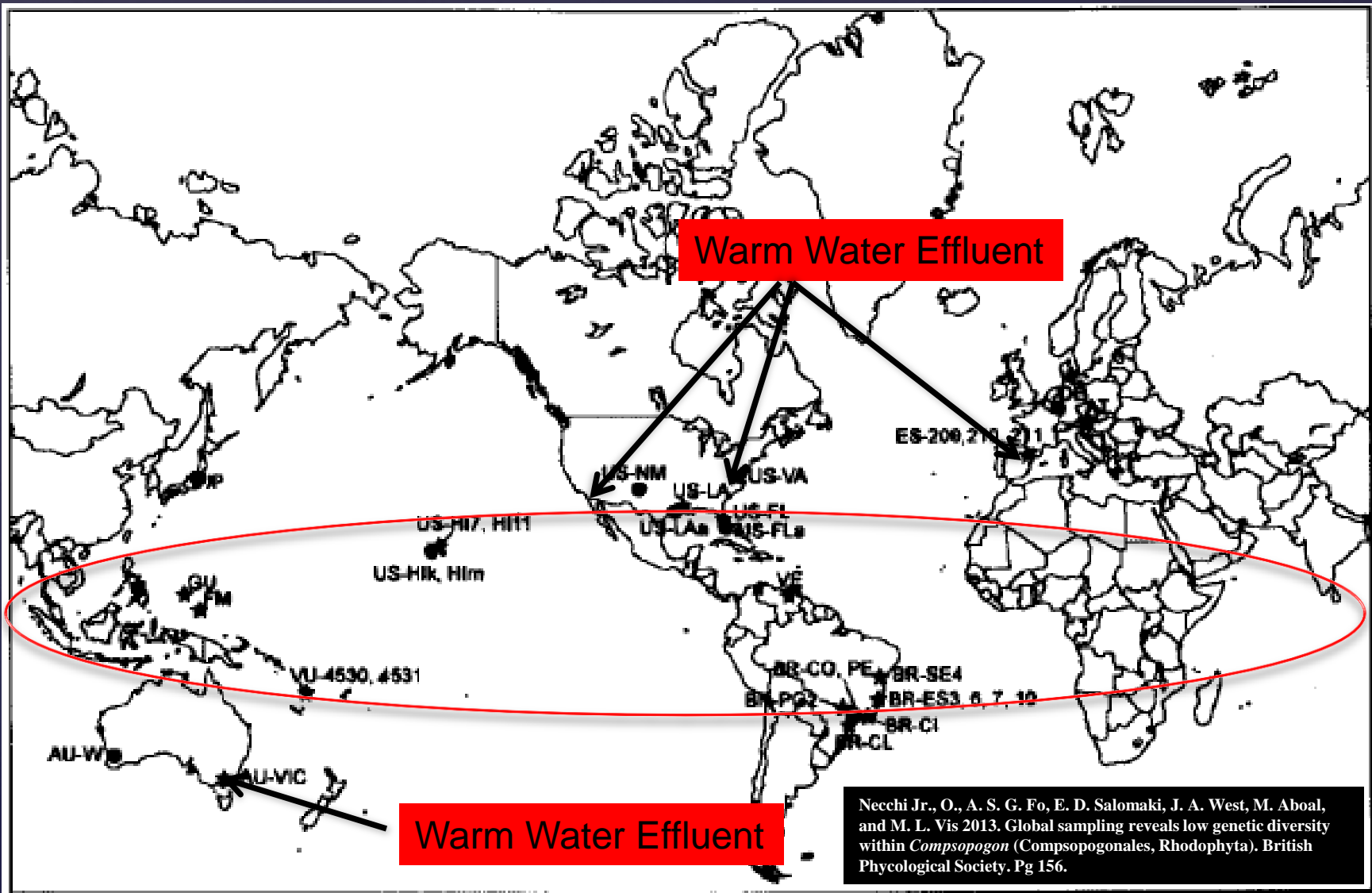


Algae: *Compsopogon coeruleus* a freshwater red algae
Confirmed by MWD/DWR (Feb. 20, 2014) and Dr. Robert Sheath,
Compsopogon expert, CSU San Marcos (Mar. 5, 2014)



Photos taken by Margaret K. Spoo-Chupka (DWR).

Global Range – Cosmopolitan (Tropical – Subtropical Climates) North America, South America, Europe, Asia, Australasia and Oceania

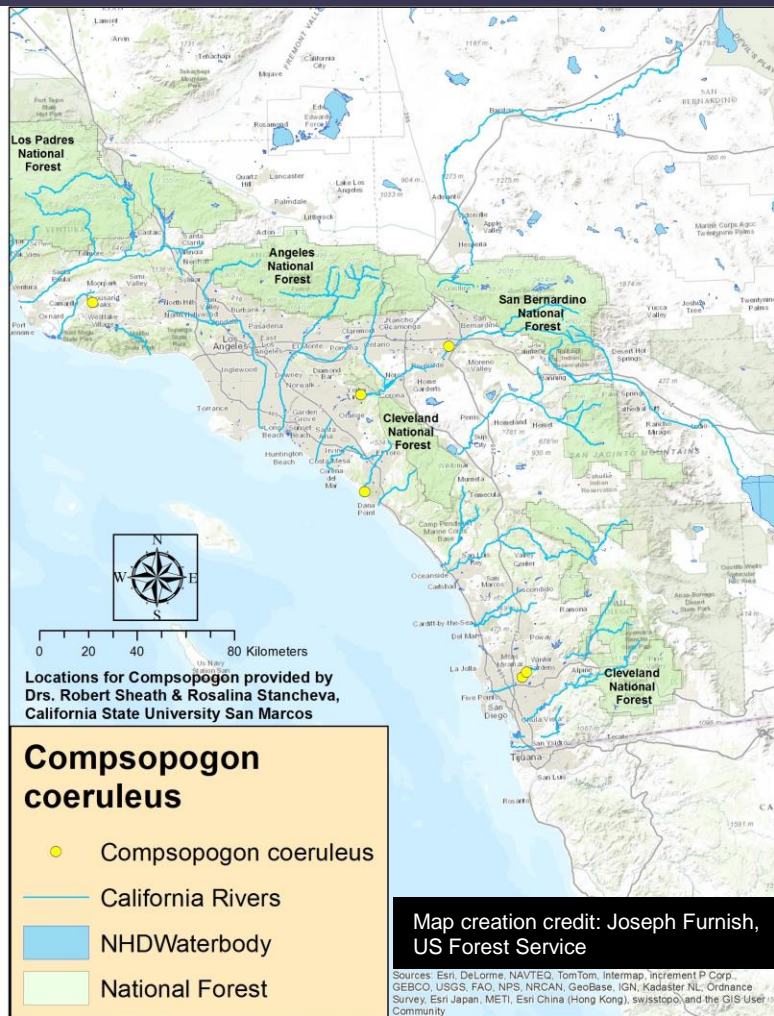


Warm Water Effluent

Warm Water Effluent

Necchi Jr., O., A. S. G. Fo, E. D. Salomaki, J. A. West, M. Aboal, and M. L. Vis 2013. Global sampling reveals low genetic diversity within *Compsopogon* (Compsopogonales, Rhodophyta). British Phycological Society. Pg 156.

Known Range of *Composopogon* in California



Preferred Habitat (Necchi *et al* 2013)

Aquarium

- Epiphytic Pest

Wildland

- Clear Water
- Rapid Velocity
- Hard Substrate
- Water Temp.
 - Mean 70°F (20°C)
 - Min. 56°F (12°C)
- pH
 - usually alkaline >7.5
- Specific Conductivity
 - Wide Range:
fresh to brackish water

RIX* Discharge

Rialto Channel



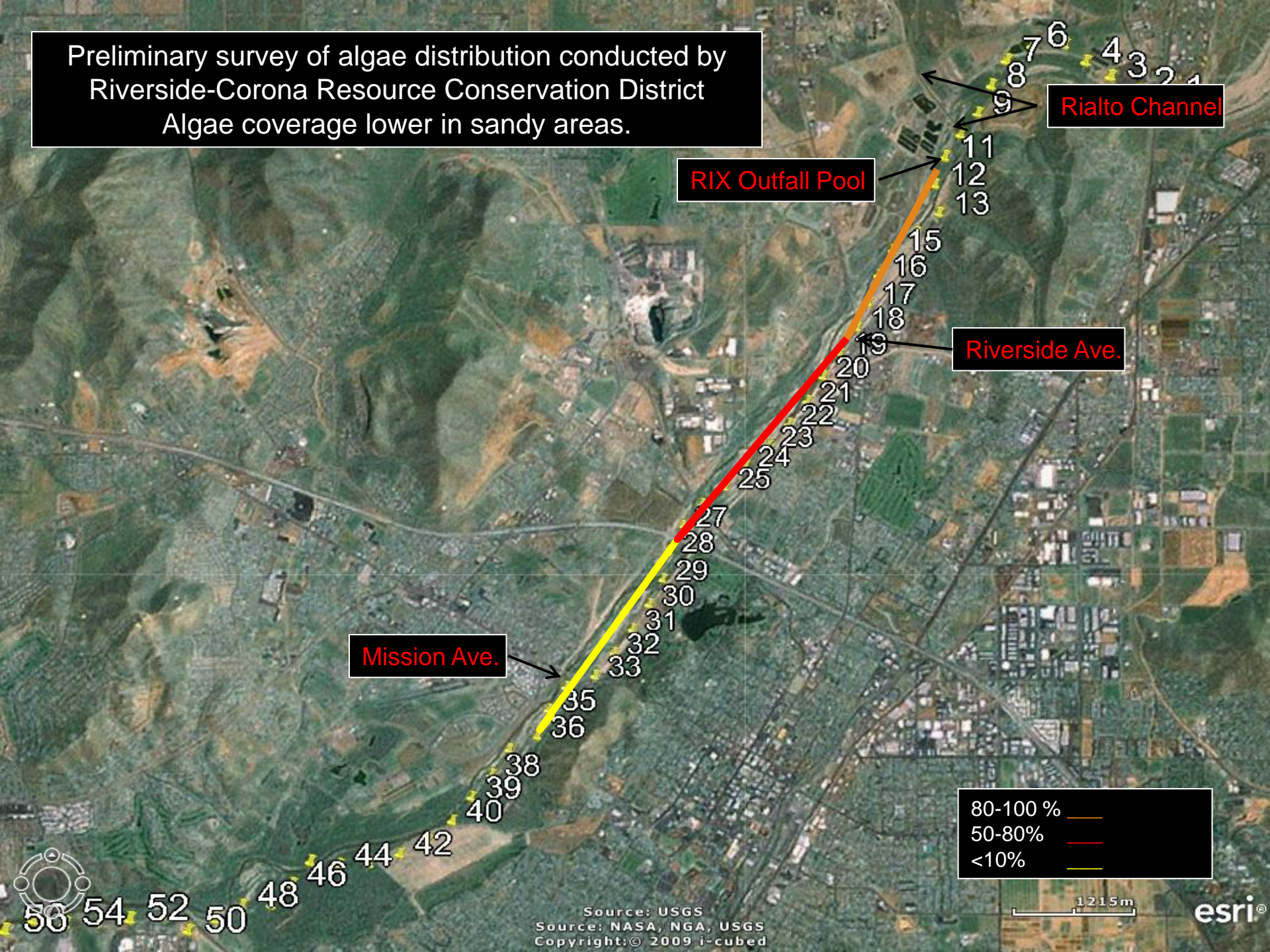
Algae Present

Algae Not Present

Algae Habitat = Sucker Habitat

*RIX – Rapid Infiltration and Extraction

Preliminary survey of algae distribution conducted by Riverside-Corona Resource Conservation District
Algae coverage lower in sandy areas.



Rialto Channel

RIX Outfall Pool

Riverside Ave.

Mission Ave.

80-100 %
50-80%
<10%

1215m

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Source: USGS
Source: NASA, NGA, USGS
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56 54 52 50 48 46 44 42

Pre-invasion – fall 2011



Post-invasion – Feb. 25, 2014



Santa Ana River Population of Santa Ana Sucker



Potential Range of the Santa Ana Sucker in the Santa Ana River (32 river miles)

La Cadena Bridge

Colton

Chino Hills

Prado Dam

Riverside

Weir Canyon Drop Structure

Current distribution much more limited.

Source: USGS

Source: NASA, NGA, USGS

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Com

5 km

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Riverwalk

- Annual volunteer event since 2006 to assess habitat conditions in the Santa Ana River for the sucker.
- Basic habitat data and photographs collected at 300 meter intervals from La Cadena Avenue to River Road Bridge:
 - Sediment type as percent cover
 - Depth
 - Canopy cover
- Santa Ana sucker habitat
 - Sections of river with rocky bottom (boulder/cobble/gravel) for foraging and spawning

Santa Ana Riverwalk 2011

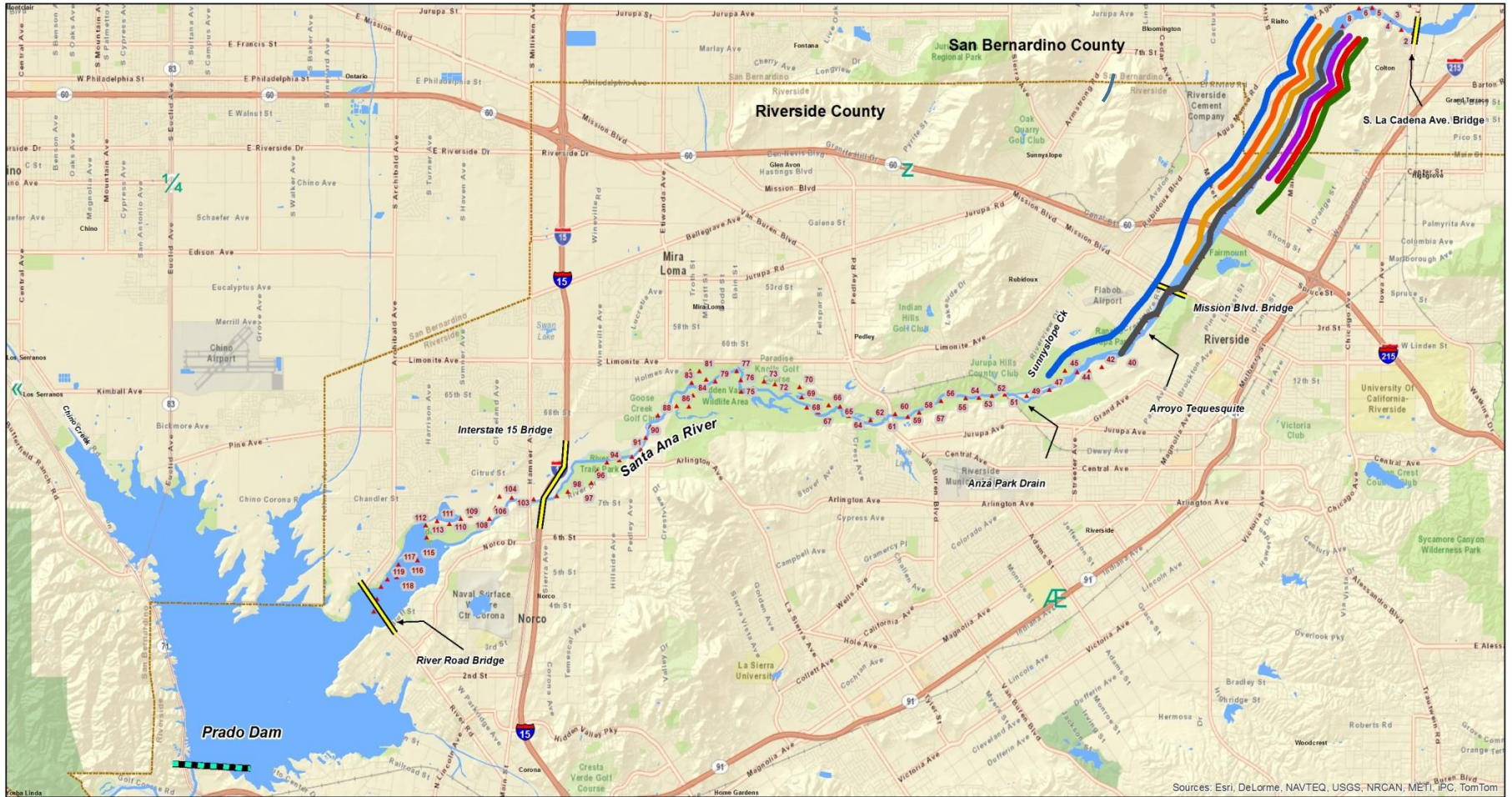
Quality of Substrate for Spawning



Sampling Locations: Data Prepared by SAWPA

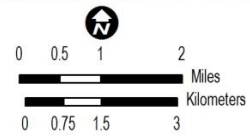


Figure 2. Santa Ana Sucker Suitable Habitat 2006-2012



Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, IPC, TomTom

PRODUCED BY GIS SERVICES
 CARLSBAD FIELD OFFICE
 GIS CONTACT: ED TURNER
 BIOLOGY CONTACT: CHRISTINE MEDAK
 MFP DATE: 03/26/12
 DATA SOURCE: USFWS, USGS, NHD, USFS, CaSL, Tote Atlas Shape
 IMAGE SOURCE: ESRI Online Image Basemap
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Actual survey pathway is displayed using 2007 data.
 Data for remaining survey years is presented along parallel pathways to allow for comparison among years.

The continuous reach of gravel/cobble/boulder ranged from 2.6 to 7.1 miles between 2006 and 2012.

Survey for Santa Ana Sucker

February 25, 2014

- Snorkel Survey
 - Riverside Ave. to RIX discharge pool
- Data
 - Underwater video/photos
 - Location of sucker and algae presence
- Results
 - Algae cover is 75-100 percent of river bottom
 - 135 Santa Ana sucker observed (80-150 mm)
 - Arroyo chub more common (adults and juveniles)



Survey Points for Snorkel Survey (Feb. 25, 2014):

Red = sucker occurrences

Blue = Riverwalk data point locations

Threats to the sucker in the Santa Ana River

Long-term viability is precarious due to the limited extent of suitable habitat

- Habitat is limited by
 - barriers, water availability and rocky substrate (cobble/gravel)
- Other threats
 - non-native aquatic species, off-road vehicles, water quality, hydrologic regime, water temperature (?), algae (?)
- Amount of suitable habitat
 - At time of listing - 32 mi. (defined by river barriers)
 - Actual - <7 mi. (defined by presence of rocky substrate)
 - Without algae - <½ mi. (majority = Rialto Channel)
- Algae is a new potential threat to Santa Ana sucker and its habitat that we need to further evaluate.

Current Conditions

Santa Ana River after rain event at Rialto Confluence March 1, 2014

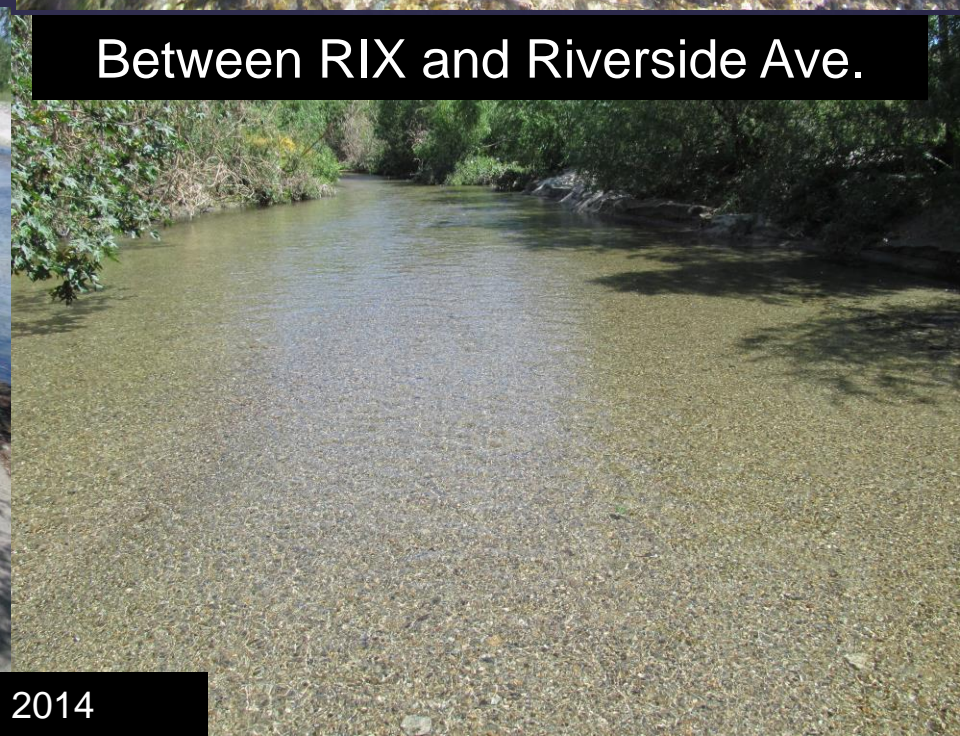


- Since February, three precipitation events have occurred
 - Algae density decreased with each rain event
- Regrowth appears to be rapid and is being tracked



Near RIX Discharge Location

Longest filament in photo is > 8 ft. long



Between RIX and Riverside Ave.

May 2, 2014

Photo Point Location 2014

Storm Event Feb. 28

Storm Event Apr. 2



February 19

March 13

April 3

Storm Event May 6



May 2

May 9

RIX – Confluence

Next Steps -What do we do now?

- Determine threat to the sucker
 - Survey river for presence and measure regrowth
 - Conduct trials at RCRCO – feeding/spawning
- Management
 - Containment to Santa Ana River
 - Control
 - Chemically (copper sulfate, chlorine, barley extract?)
 - Drying - Realign upper portion of the river and allow infested portion of the river to dry. Will desiccation eradicate this algae from the system? Available science suggests the answer is yes.
- Partners (not a fully inclusive list)
 - USFWS, USFS, USDA, USACE, CDFW, RWQCB, MWD, DWR, RWQCB, local cities, flood control, local water agencies (SBVMWD, SBVWCD, OCWD, SBMWD, and more), RC-RCD, SAWPA, and CSU San Marcos – Sheath Lab.