

How are state and local agencies using bioassessment data?

Moving beyond assessment!

SWAMP Symposium

June 29, 2016

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We have tools!



Benthic macroinvertebrates

- CSCI (statewide)



Benthic diatoms and soft algae

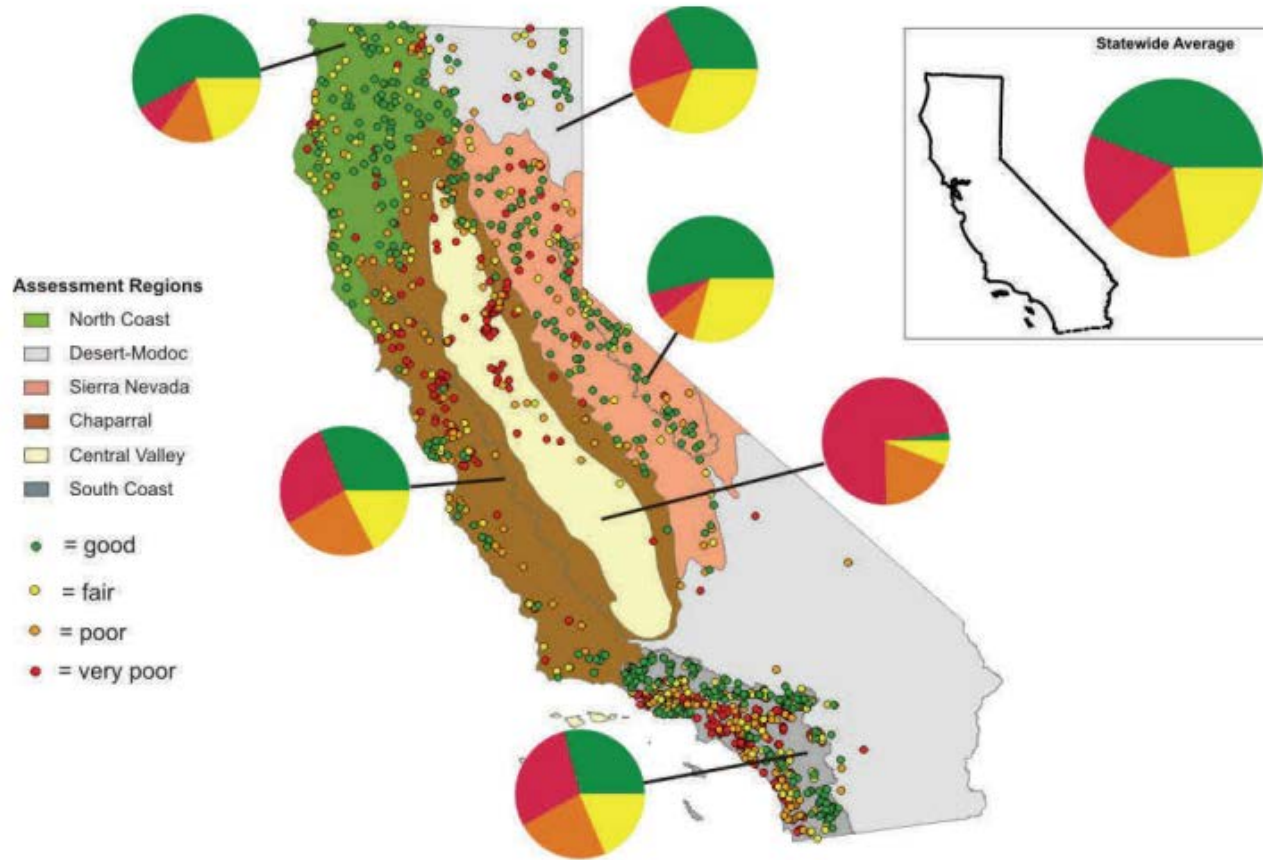
- D18, S2, H20 (southern and central California)



Riparian condition

- CRAM (statewide)

We have *lots* of data!



How are we using them?

Bioassessment supports a wide variety of WB programs

How are the WB, RBs, and other agencies using bioassessment data?

General goals

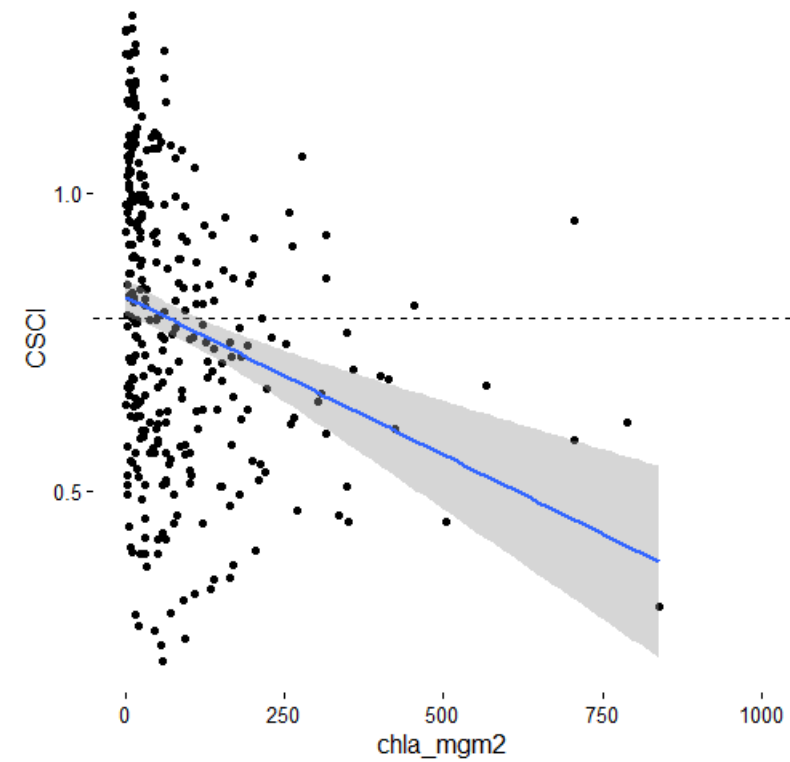
- Characterization (statewide and regional)
- Prioritization for protection
- Causal assessment
- Prioritization for management intervention
- Supporting policy development
- Project evaluations/site-specific compliance

Current programs

- NPDES
- Stormwater
- 303d/TMDL
- 401/404
- Ag waivers
- Timber
- Water rights

Supporting a bio-integrity and nutrient policy

- Nutrient numeric endpoints based on algal biomass and bug/algal index scores



Characterization: Regional Stream Surveys

Achieves many goals

- Permit compliance
- Stakeholder engagement and dialogue
- Integration with statewide assessments
- Data engines for all other objectives

Several prominent examples:

- Coop. Ag. Monitoring Program (Central Coast)
- Stormwater Monitoring Coalition (SoCal)
- Regional Monitoring Coalition (Bay Area)



SMC Stream survey began in 2009

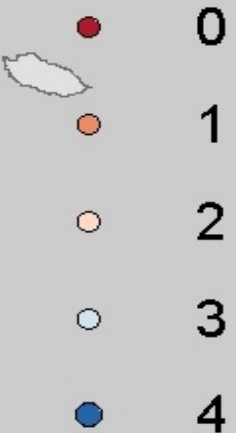
Key questions:

1. What is the condition of perennial, wadeable streams in Southern California
2. What stressors are associated with poor condition?
3. Are conditions changing over time?

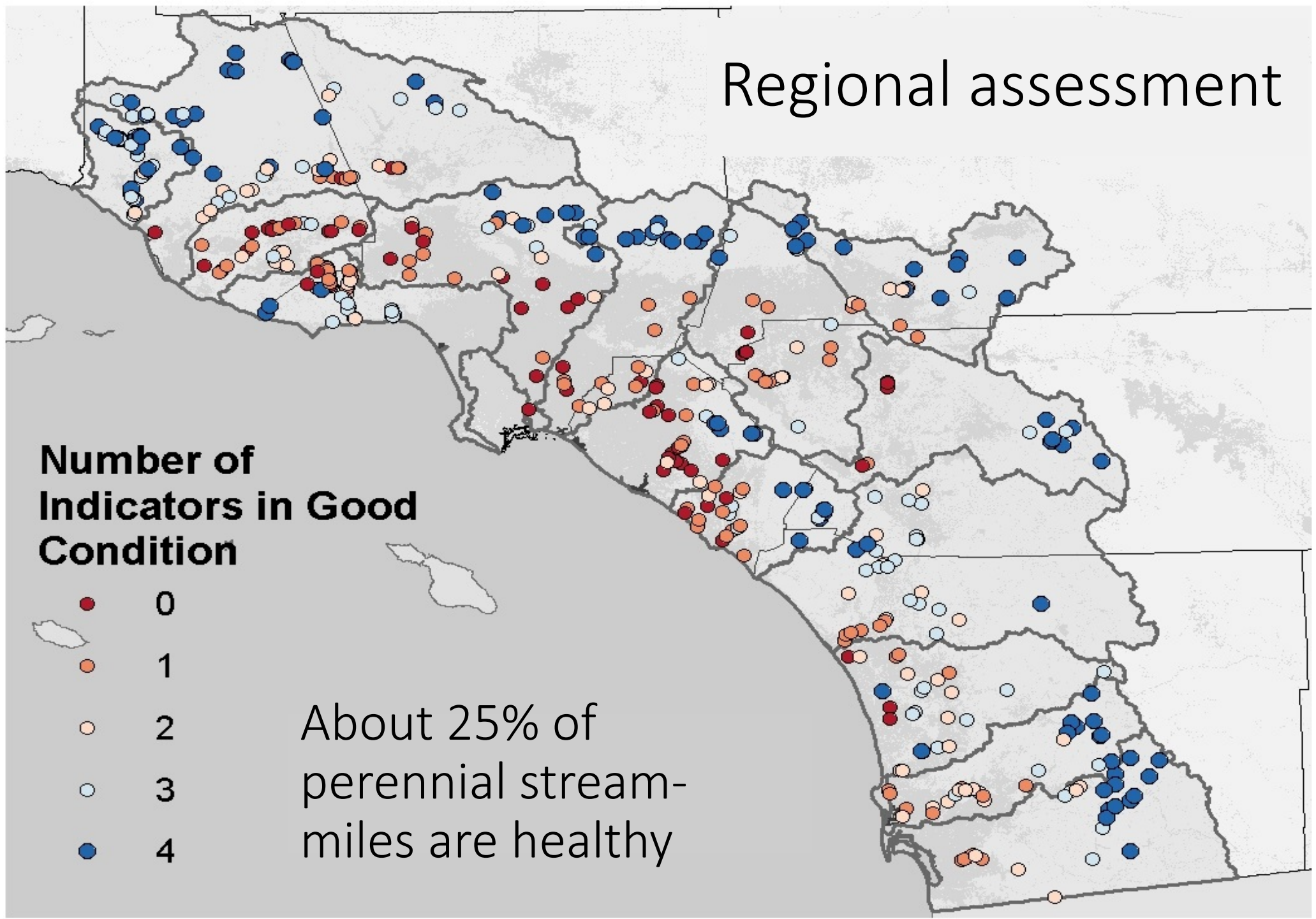


Regional assessment

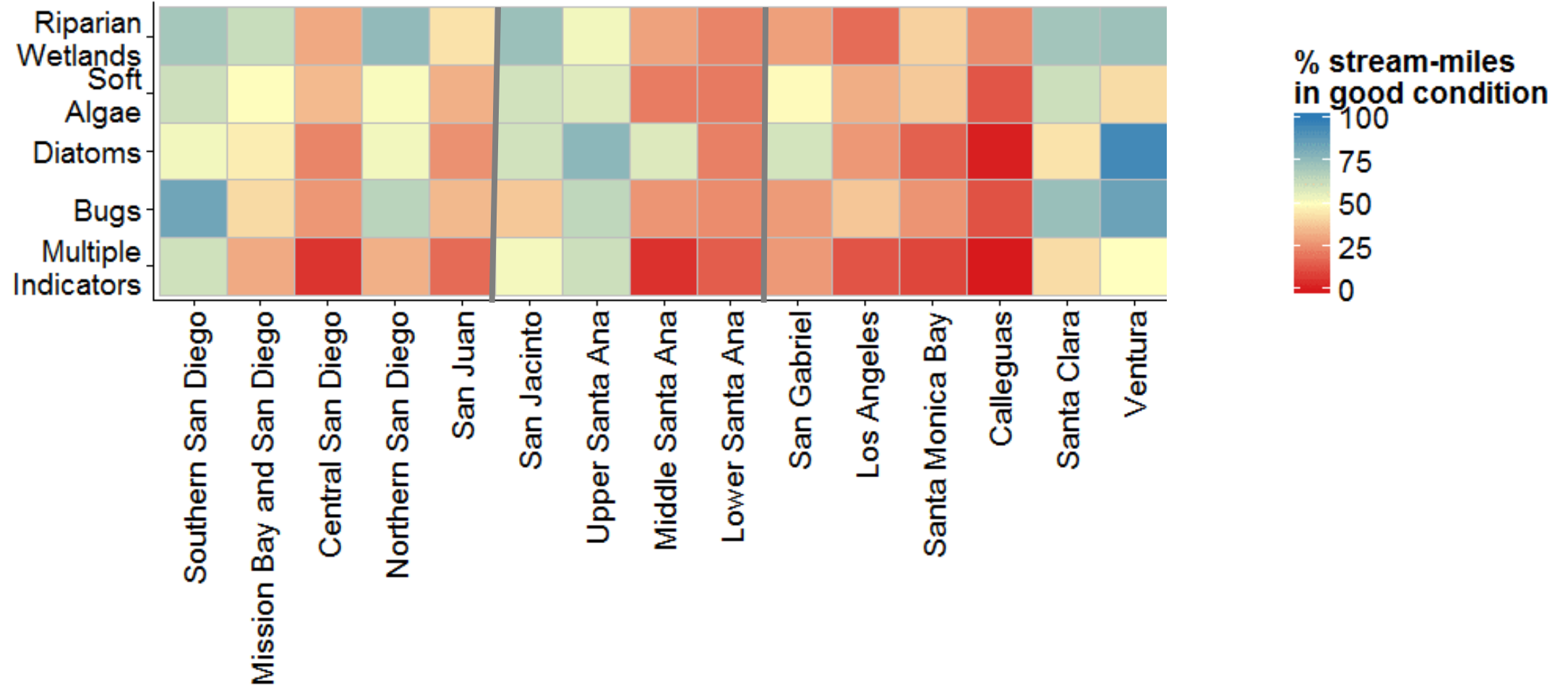
Number of Indicators in Good Condition



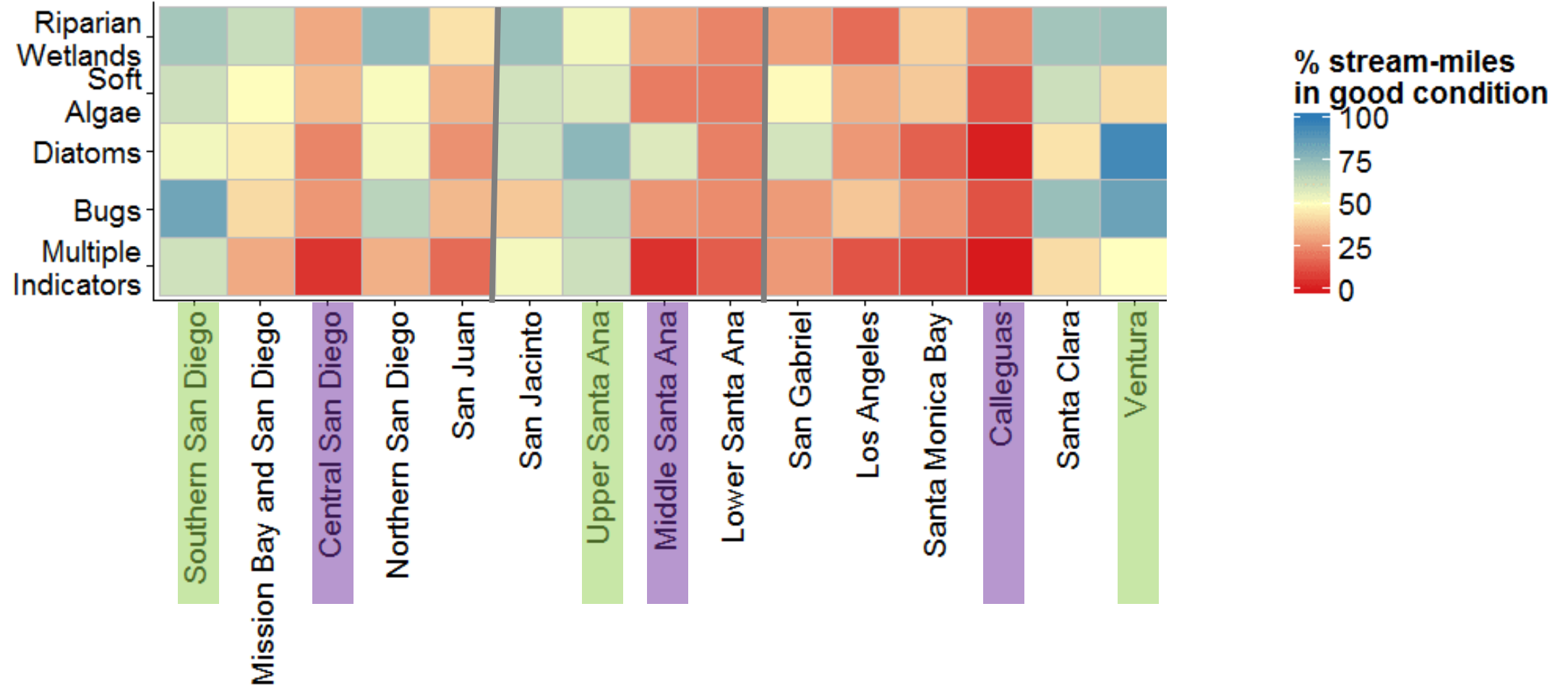
About 25% of perennial stream-miles are healthy



Prioritizing watersheds



Prioritizing watersheds



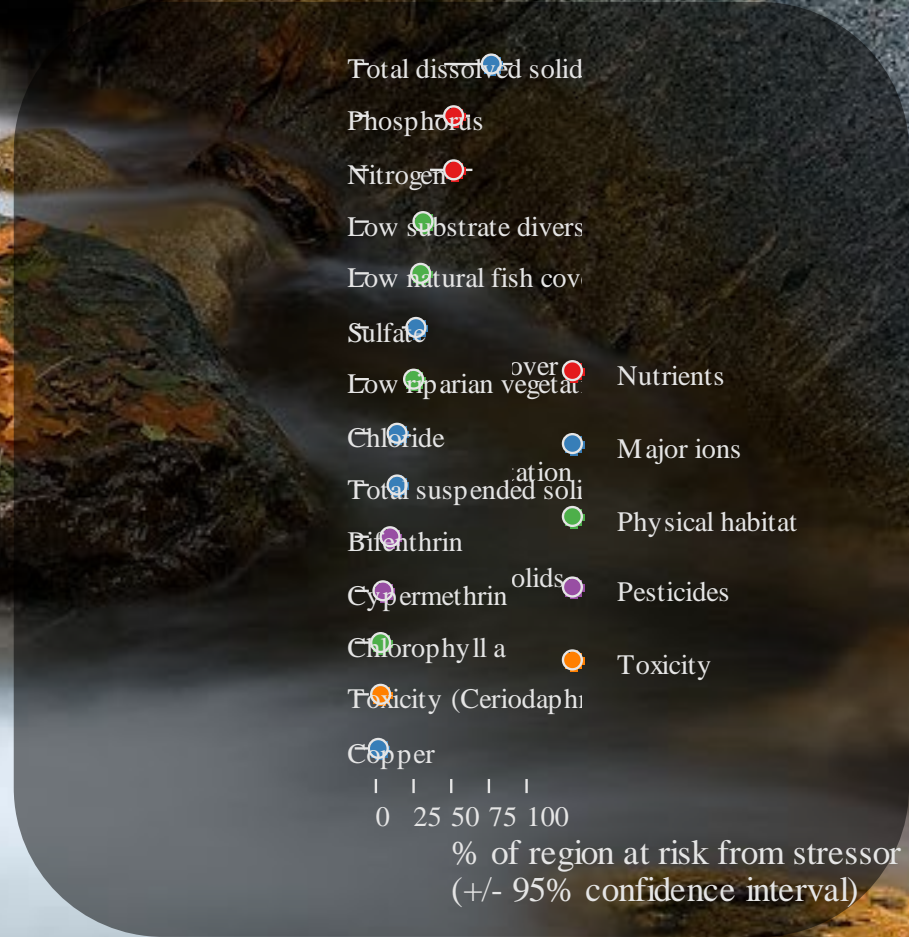
Prioritizing stressors

Widespread and strongly linked to biological condition

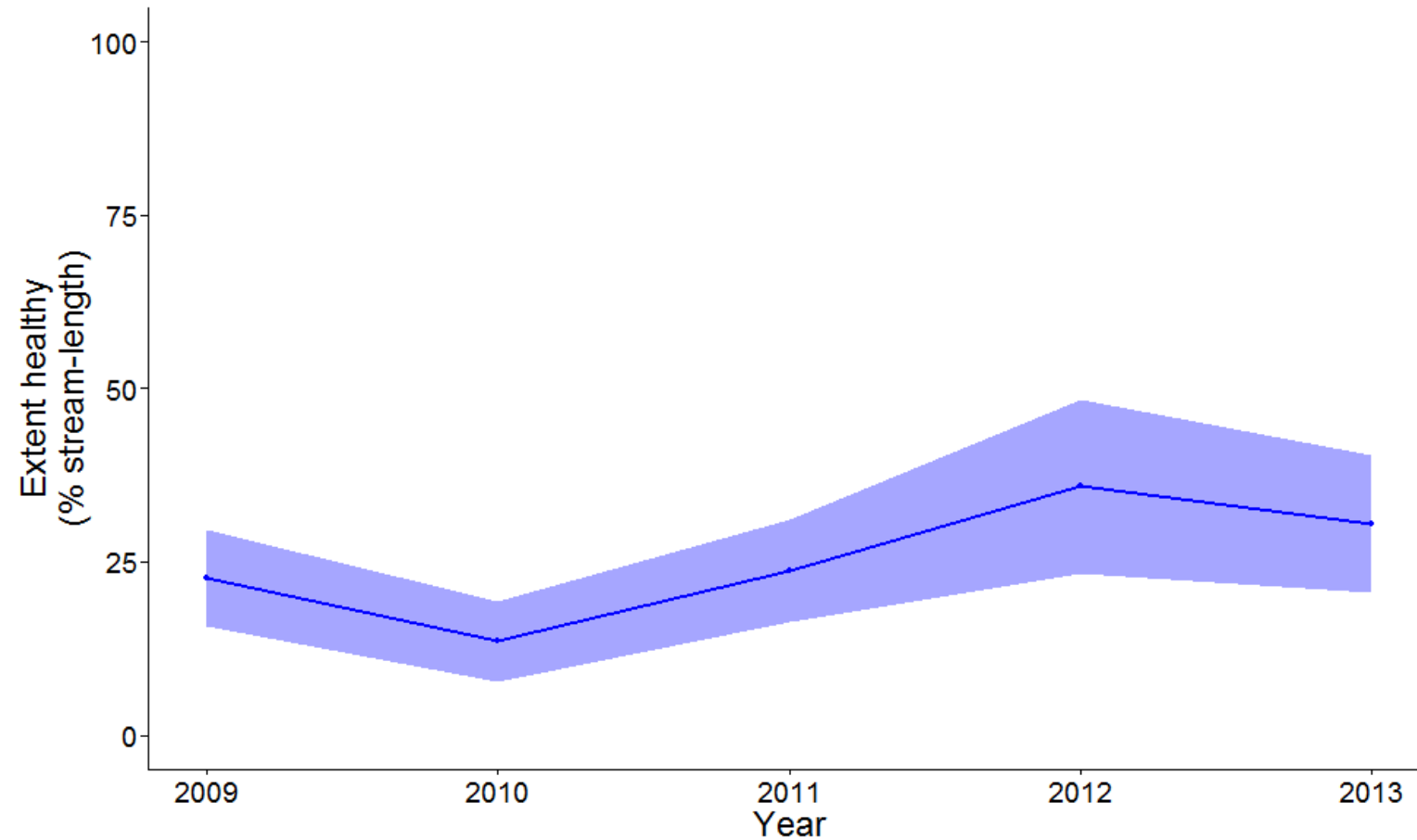
- Nutrients
- Major ions
- Degraded habitat

Rare, or weakly linked

- Metals
- Pyrethroids
- Toxicity



Trends: Evaluating overall success



Outreach and communication

Recent publications available on SCCWRP website:

- 5-year synthesis report
- 2-page fact sheet for a general audience

Upcoming report:

- Biological conditions of engineered channels



A REGIONAL APPROACH TO EVALUATING THE BIOLOGICAL CONDITION OF SOUTHERN CALIFORNIA'S WADEABLE STREAMS

2009-2013: THE FIRST FIVE YEARS OF THE STORMWATER MONITORING COALITION'S REGIONAL MONITORING PROGRAM

OVERVIEW

In 2009, the Southern California Stormwater Monitoring Coalition embarked on an ambitious effort to evaluate the biological condition of 4,300 miles of wadeable streams in the region's coastal watersheds. Over the ensuing five years, the coalition's participating agencies conducted extensive survey and sampling work at more than 500 randomly selected sites encompassing 15 major watersheds in California's South Coast region. Monitoring efforts that had historically been done with minimal coordination were unified around a cohesive, shared vision for the first time, generating high-quality data sets that have painted a powerful picture of regional stream condition. The SAC survey is a regional enhancement of the statewide Periodic Stream Assessment.

KEY FINDINGS

25% of the region's wadeable stream-miles are in good biological condition, including:

- 60% of stream-miles in open-space
- 9% in agricultural areas
- 2% in urban areas

The Regional Monitoring Program stream survey, which began in 2009, significantly increased the number of stream miles sampled in the region.

HIGH PRIORITY STRESSORS ON WADEABLE STREAMS

Stressors affecting more than 25% of stream-miles:

- Nutrients (Nitrogen and Phosphorus)
- Physical habitat degradation
- Sulfates
- Total dissolved solids

Stressors affecting 10% to 25% of stream-miles:

- Chloride
- Total suspended solids
- pH

PROGRAM BENEFITS AND IMPACTS

- **Relevant to managers:** Comprehensive data sets inform decisions about priorities and resource allocation, and identify opportunities for causal assessment follow-up studies.
- **Cost-effective:** Each participant realizes approximately 10 times the data value relative to costs.
- **More influential:** Regional collaborations provide more data to inform statewide policymaking, and highlight local concerns.
- **Conversation-altering:** Provides a starting point for developing innovative management strategies that consider and go beyond water chemistry.

NO APPARENT TRENDS

Although there was some year-over-year variability, the survey did not find a change in the health of the streams over the five-year sampling period, from 2009 to 2013. Urban streams tended to be in consistently poor biological condition, whereas open-space and agricultural streams tended to experience greater year-to-year variability.

A NEW SURVEY UNDERWAY

The success of the SAC's Regional Monitoring Program has paved the way for a second round of the program, which began in spring 2015. The first five-year survey will serve as a baseline for defining trends over time.

The second cycle includes nonperennial streams, a critical habitat that makes up more than half of the region's stream-miles, and will seek to clarify the linkage between stressors and biotic integrity.

STORMWATER MONITORING COALITION MEMBERS

County of Los Angeles Department of Public Works, County of Orange Public Works, County of San Diego Department of Public Works, Riverside County Flood Control and Water Conservation District, San Bernardino County Flood Control District, Ventura County Watershed Protection District, City of Long Beach Public Works Department, City of Los Angeles Department of Public Works, California Regional Water Quality Control Board—Santa Ana Region, Los Angeles Regional and Inland Empire States Water Resources Control Board, California Department of Transportation, Southern California Coastal Water Research Project (SCCWRP), Collaborating organization: U.S. Environmental Protection Agency Office of Research and Development | www.sccwrp.org

DEVELOPED IN COLLABORATION WITH THE SURFACE WATER SWAMP

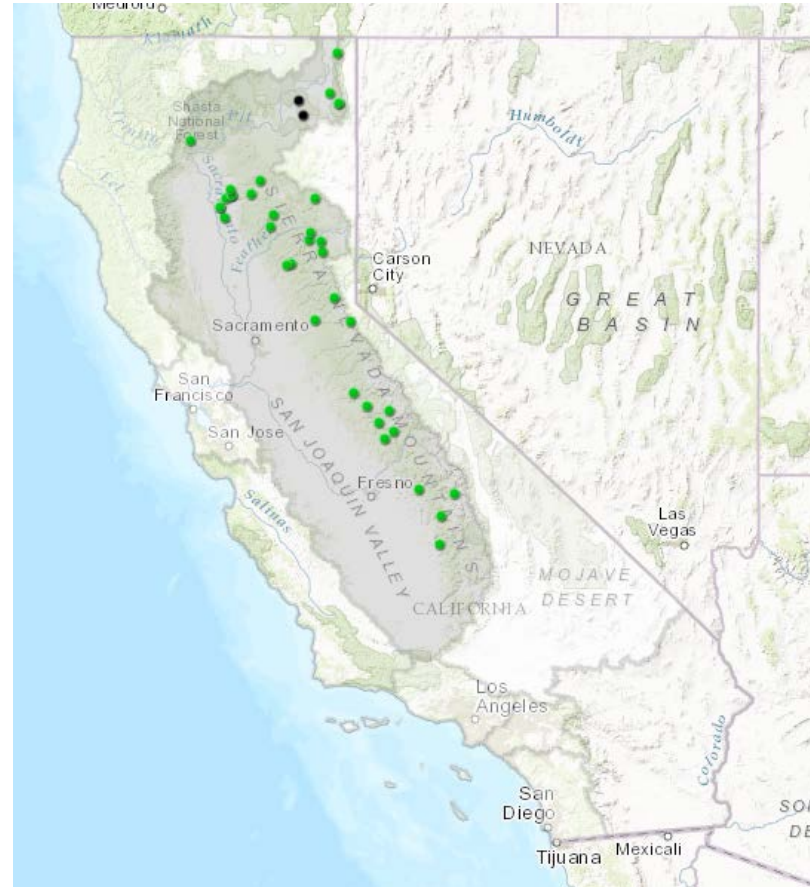
AMBIENT MONITORING PROGRAM

Protecting healthy streams: Category 1

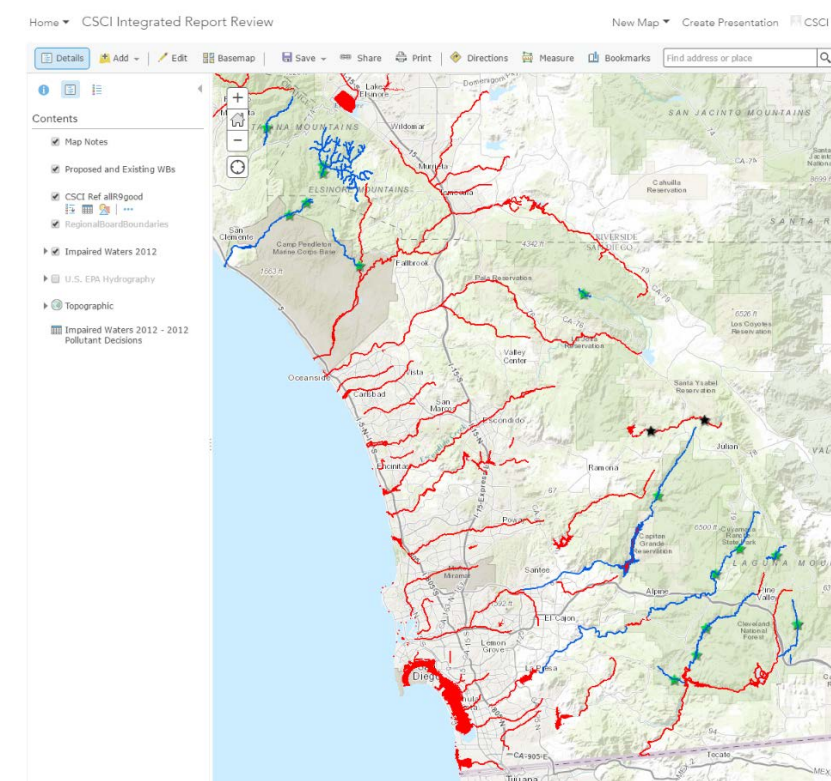
Region 3



Region 5



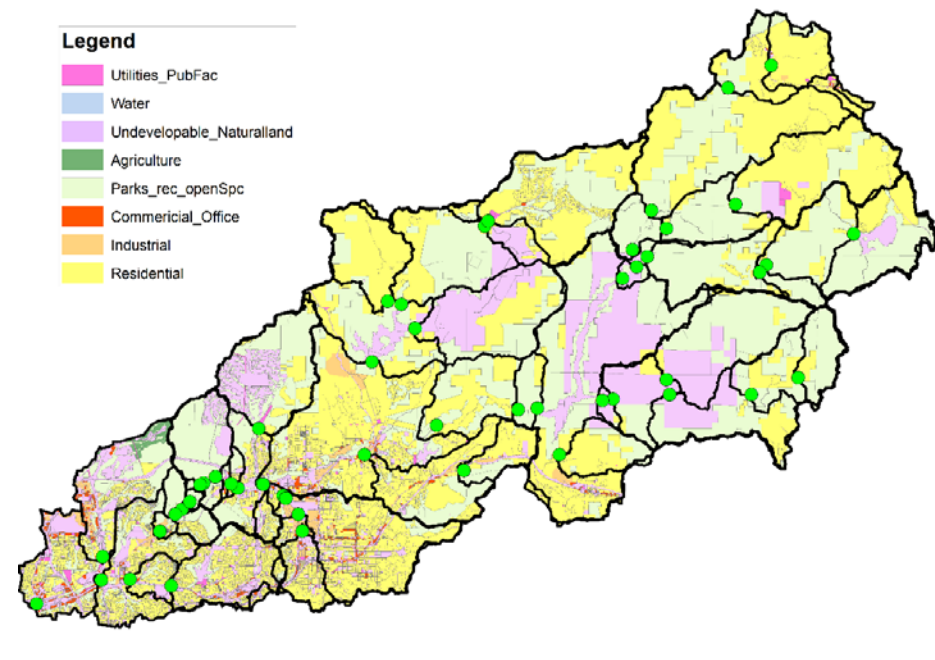
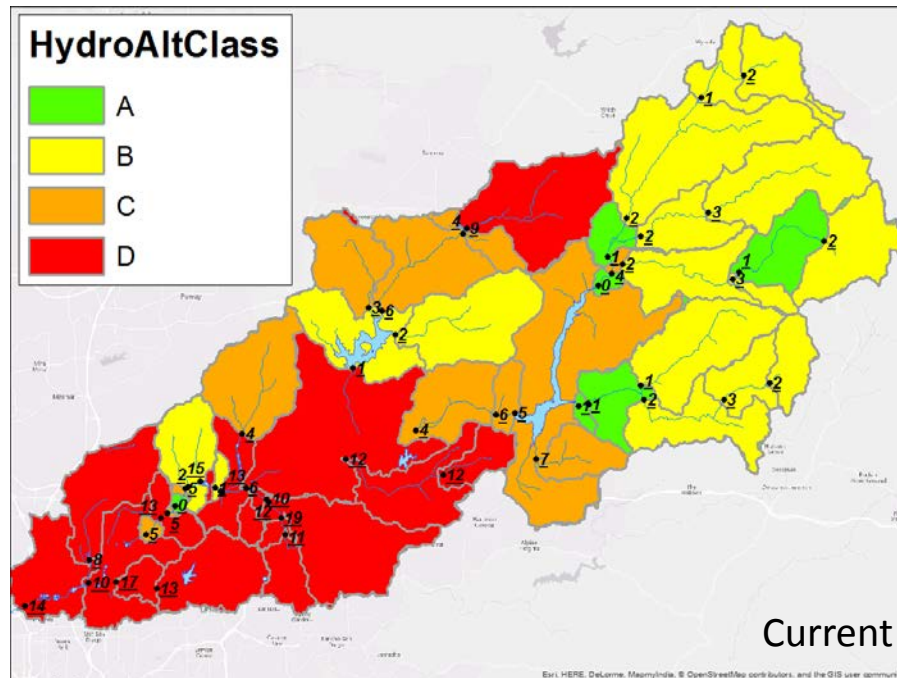
Region 9



Local source-water protection

City of San Diego: Biological thresholds for flow alteration

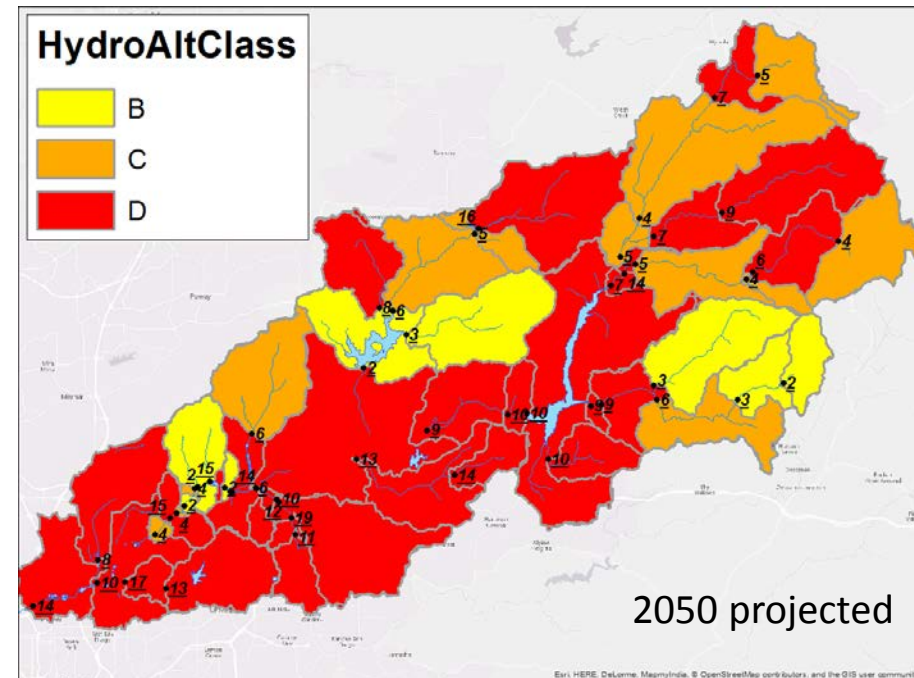
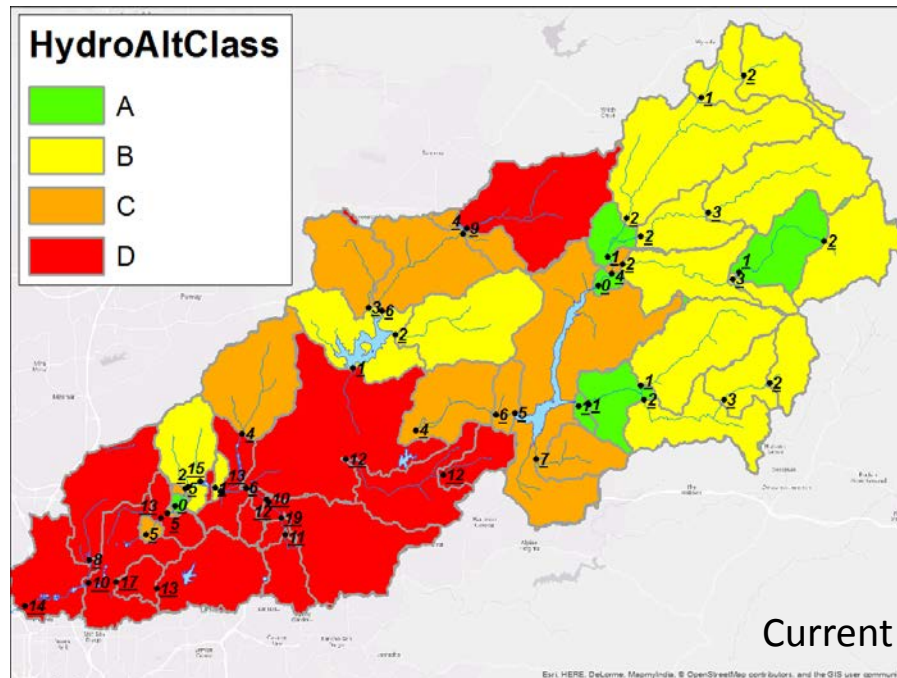
Identify watersheds vulnerable to flow alteration



Local source-water protection

City of San Diego: Biological thresholds for flow alteration

Identify watersheds vulnerable to flow alteration



Causal assessment

Initial case studies (Regions 1, 3, 4, and 9)

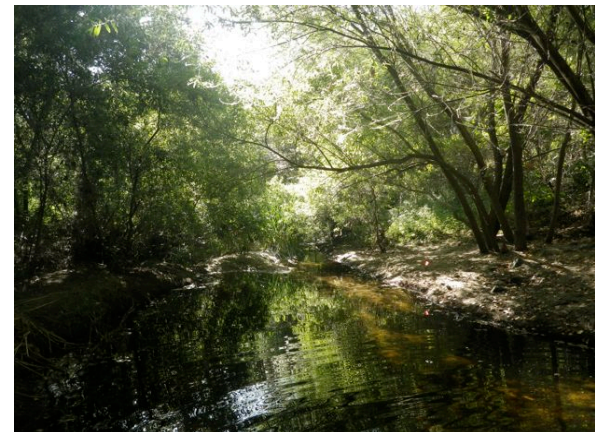
Region 8: A regional approach

- Triggered by low CSCI scores
- Diverse stressors explored with stakeholders
 - Sedimentation
 - Channel alteration
 - Pesticides
 - Nutrients
 - Temperature
 - Conductivity
- Evaluate relationship between CSCI components and stressors

Test sites



Comparator sites



Prioritizing management interventions: Supporting TMDLs

Region 2: Algae biomass, DO

Arroyo Las Positas

Region 3: Nutrients, sediment toxicity

Arroyo Grande

Chorro Creek

Regions 4 (EPA): Nutrients, sediment

Malibu Creek

Region 6: Sediment

Squaw Creek



Figure D-1. Sites with benthic macroinvertebrate data used in CSCI analysis

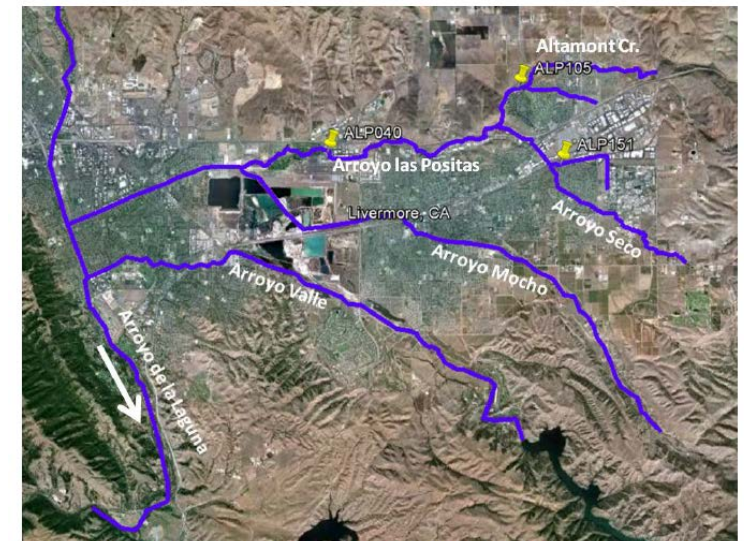
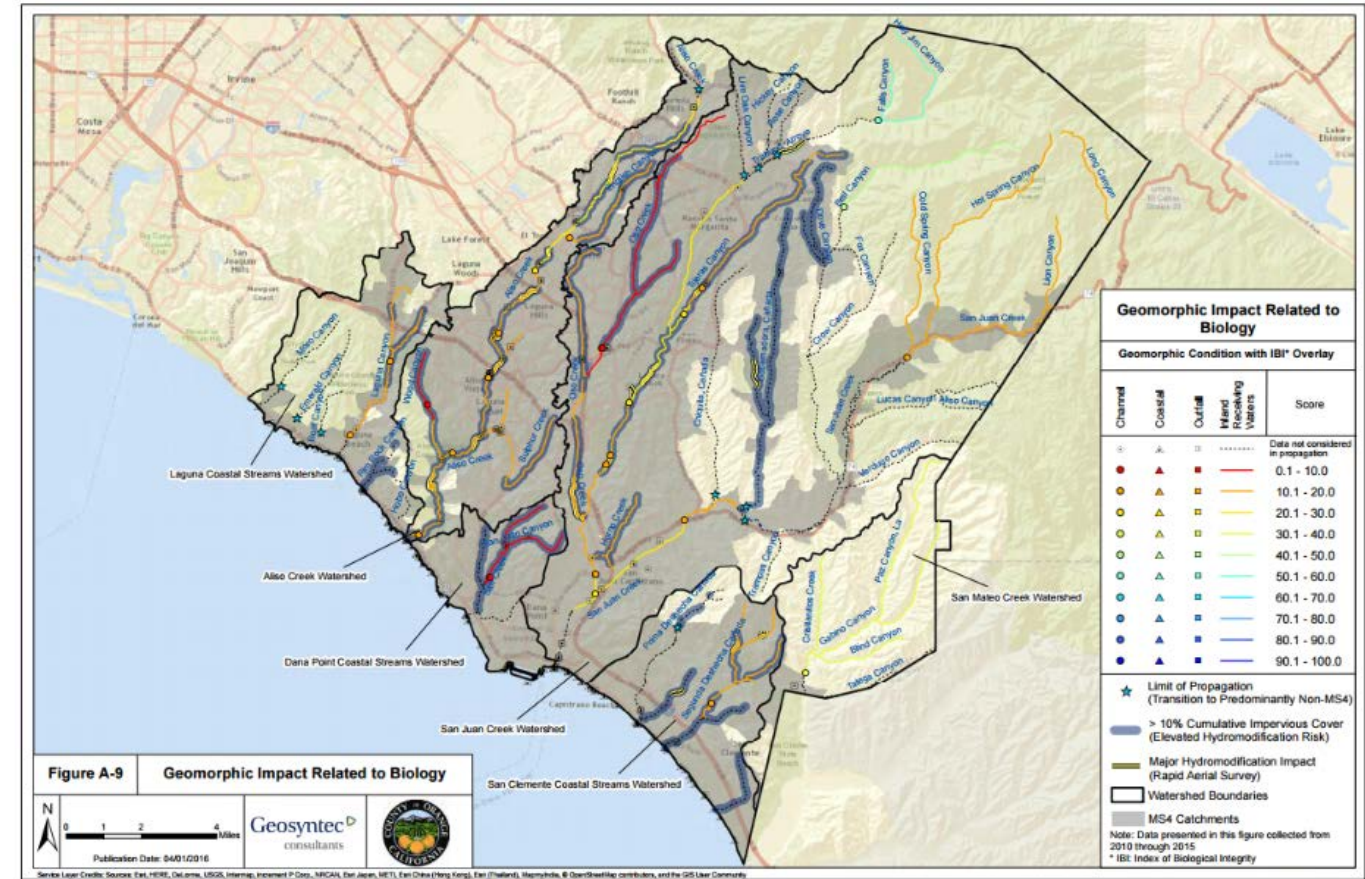


Figure 1: Map of the Arroyo Las Positas watershed and surrounding drainages. Background aerial photography image from Google Earth (imagery date: 10/29/2011). Blue lines indicate major streams. Yellow pins indicate study sites.

Local agency prioritizations

Orange County

- San Juan WQIP identifies priority problems based on bioassessment scores
- Follow up with causal assessments



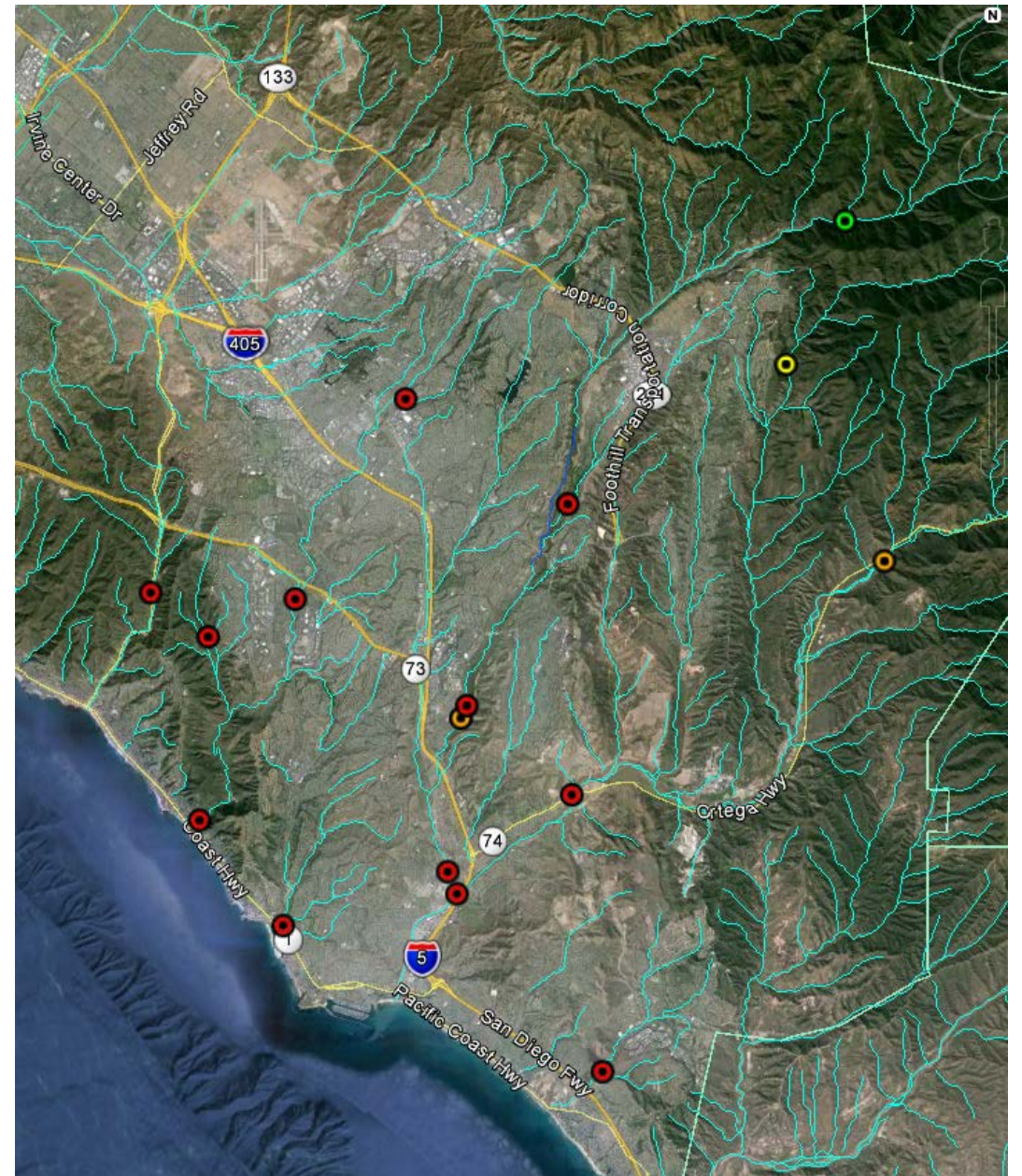
Objectives for bug and/or algal indices

Regions 4 and 9

- CSCI to set biological objectives

Region 9:

- CSCI will be a numeric interpretation of a narrative objective in the basin plan
- Algae may be part of site-specific assessments
- 28 streams proposed for listed for benthic community effects, using CSCI. (Many already have toxicity listings.)

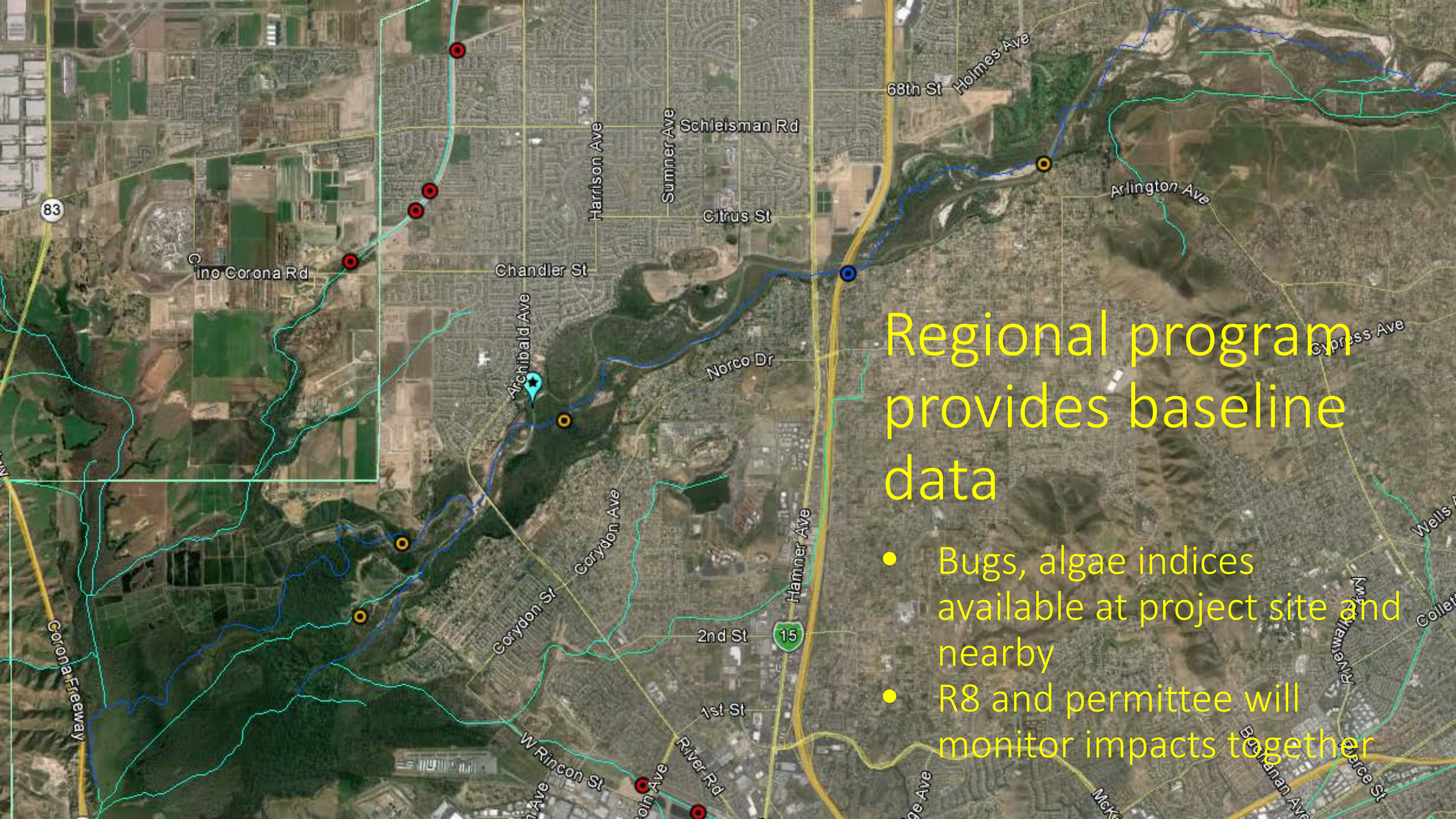


Project evaluation: 401 certifications

Habitat manipulations to help Santa Ana suckers adapt to increased water reclamation

- Gabions maintain scouring velocities, despite reduced discharge
- Should support a coarse streambed favored by suckers, prevent smothering by fines
- What are the impacts of a fish habitat improvement project?





Regional program provides baseline data

- Bugs, algae indices available at project site and nearby
- R8 and permittee will monitor impacts together

401 certification: San Diego region

Dam removals in San Juan watershed

- Direct measure of quality improvements/impacts.
- Use regional for baseline. Post-project sampling by permittee.
- Basis for future compensatory mitigation.



Dam removals in upper San Juan watershed

What hinders the use of bioassessment data?

Major needs

- More tools (e.g., statewide algal index, phab index)
- Better data aggregation from partners
- Easier data access/trainings
- Visualization and interpretation support
- Better coordination of sampling efforts
- More guidance for permits

Bioassessment supports a wide variety of programs

- Vision of biologically-informed resource management widely shared across agencies
- Diverse applications under exploration
- Case studies needed to share successes and lessons learned

Thank you!



New directions

- Condition of intermittent streams
- Better trend detection through site revisits
- New indicators of interest:
 - Hydromodification
 - Bioassay screening and CECs
 - Sediment chemistry and toxicity
 - Invasive species
 - Channel engineering
- Exploring expansions
 - Ephemeral rivers
 - Depressional wetlands

Aryl Hydrocarbon receptor activity

