

San Gabriel River Regional Monitoring Program

Assessing the Condition of Streams in the San Gabriel River Watershed (California): Integrating Multiple Indicators

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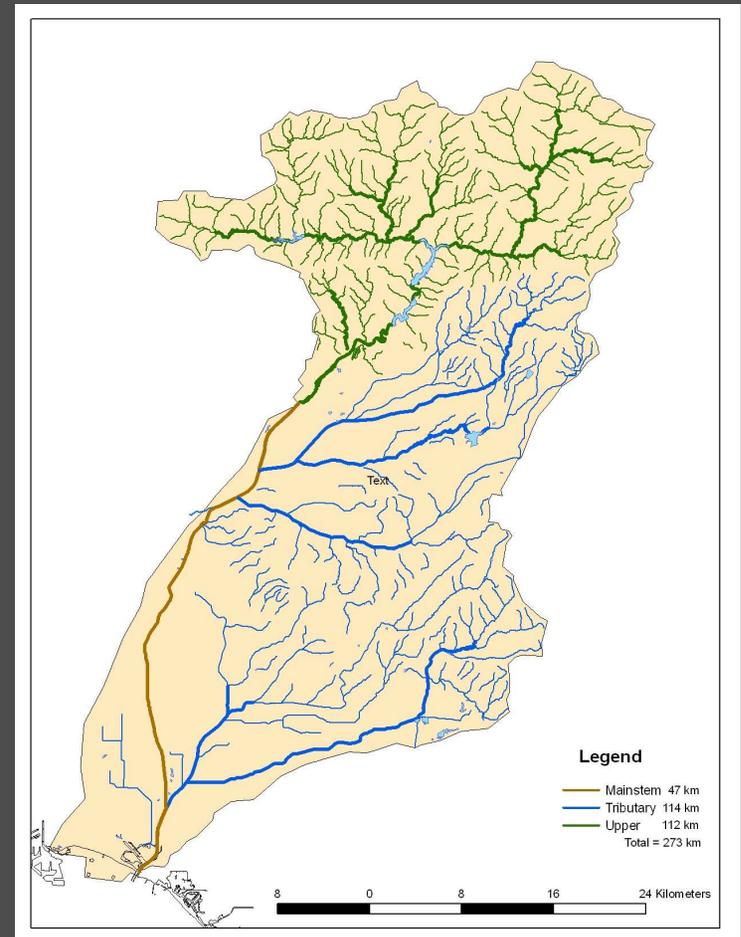
San Gabriel River Regional Monitoring Program Watershed Description

- Watershed description
 - 1,900 Km²
 - ~2 million people
 - 54% undeveloped;
all in the upper watershed

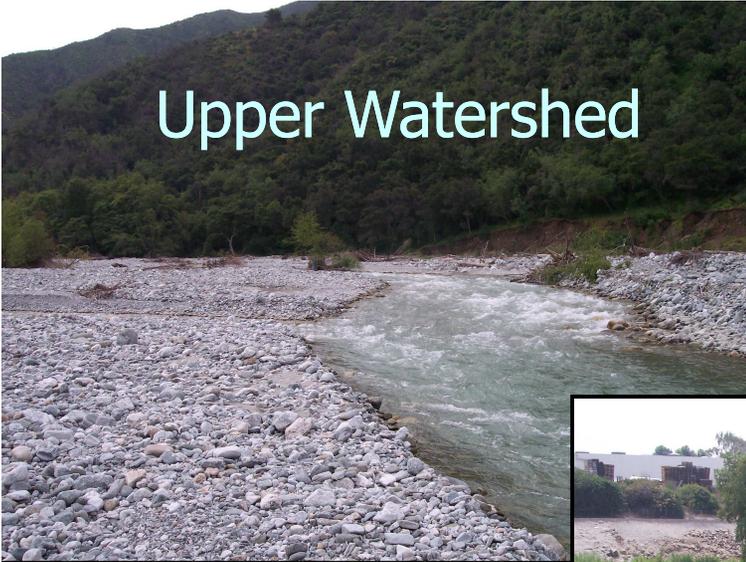


San Gabriel River Regional Monitoring Program Watershed Description

- Hydrology of upper and lower watershed are disconnected
- San Gabriel river discharges to ocean after passing through soft bottom estuary



Upper Watershed



Lower Watershed



Mainstem

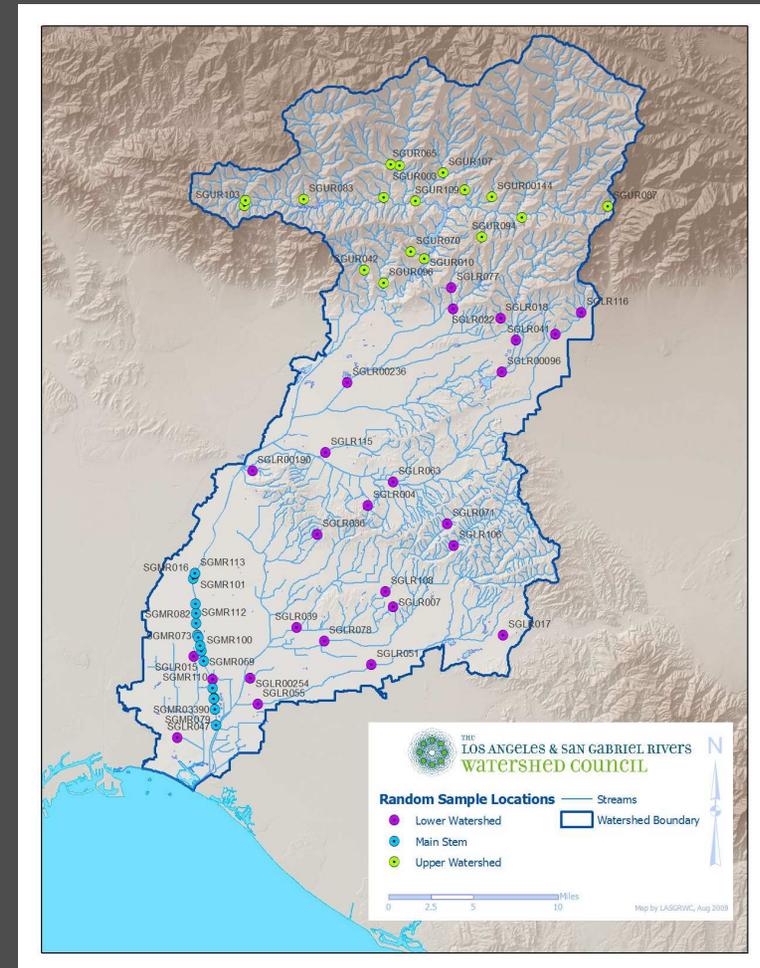


San Gabriel River Regional Monitoring Program Monitoring Questions

1. What is the health of streams in the watershed?
2. Are the conditions at areas of unique importance getting better or worse?
3. Are receiving waters near discharges meeting water quality objectives?
4. Are local fish safe to eat?
5. Is body-contact recreation safe?

San Gabriel River Regional Monitoring Program Monitoring Design

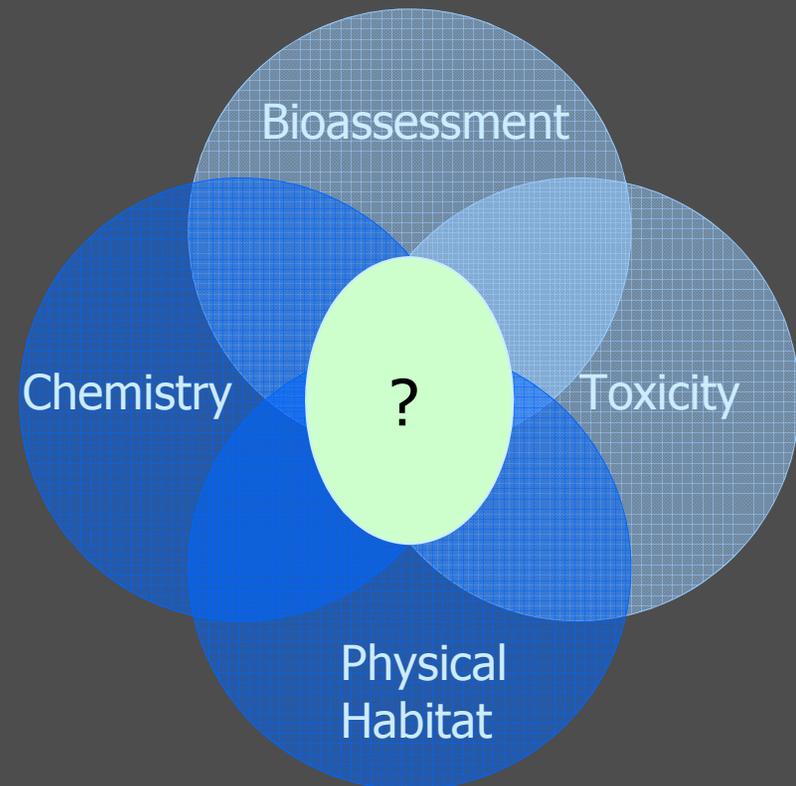
- Probability-based design
- Random allocation of sites
- 3 sub-regions
 - Upper watershed
 - Lower watershed
 - Mainstem
- Incorporated into State-wide SWAMP program (2009)
- Multiple indicators
- Annual surveys (May – July)
 - 2005 to 2009



San Gabriel River Regional Monitoring Program Indicators

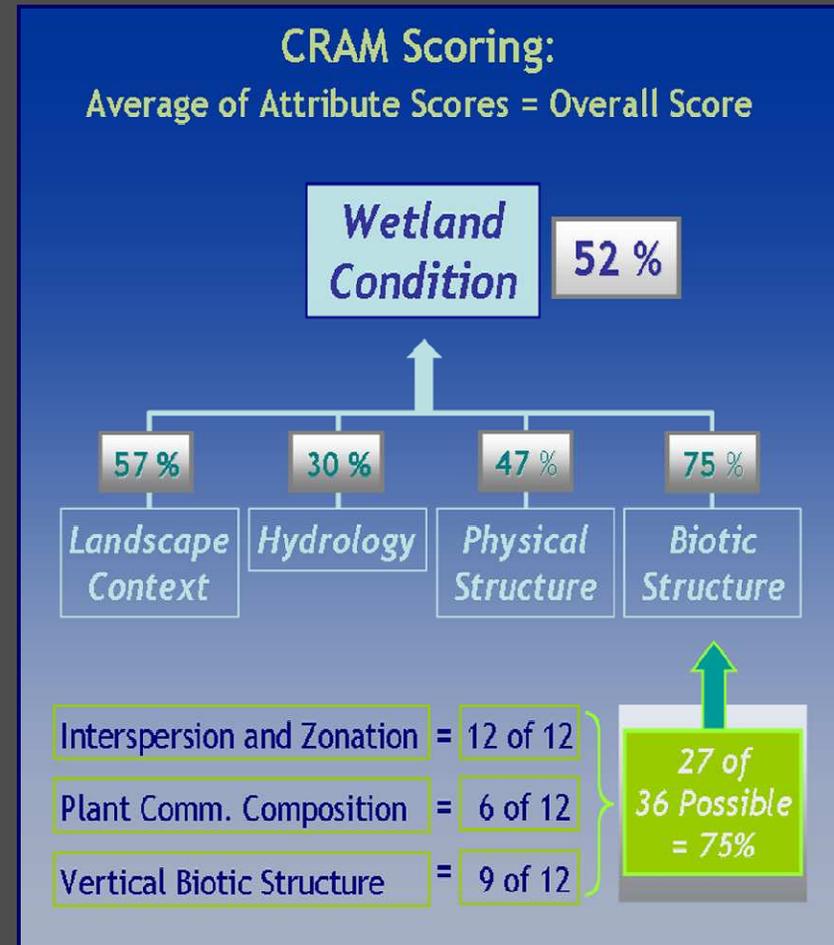


- Bioassessment
 - BMI
 - So CA Index of Biological Integrity (IBI)
- Water Chemistry
- Toxicity
 - 7 day Ceriodaphnia
- Physical habitat condition
 - SWAMP
 - CRAM



San Gabriel River Regional Monitoring Program Indicators

- CA Rapid Assessment Method (CRAM)



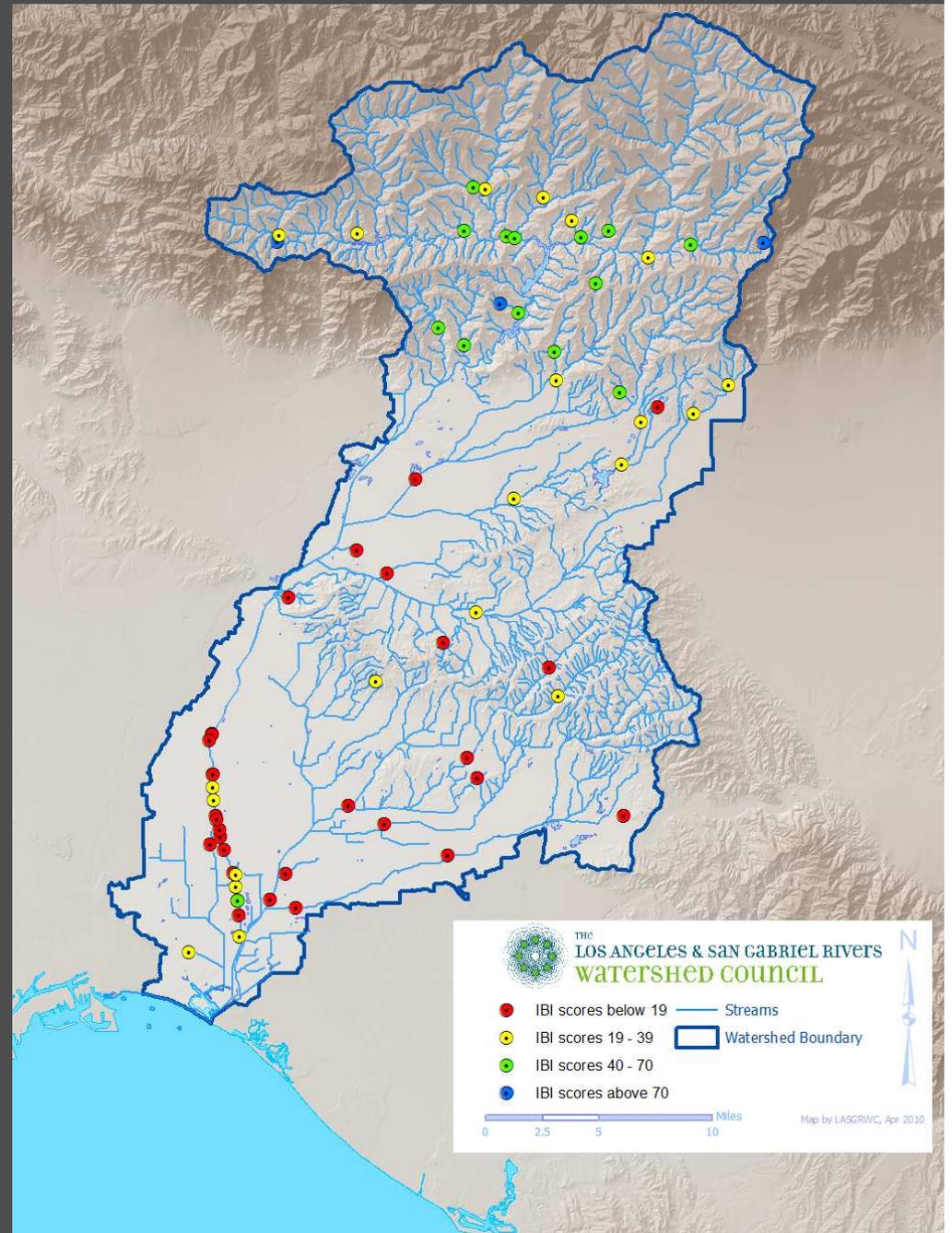
San Gabriel River Regional Monitoring Program Integration of Indicators



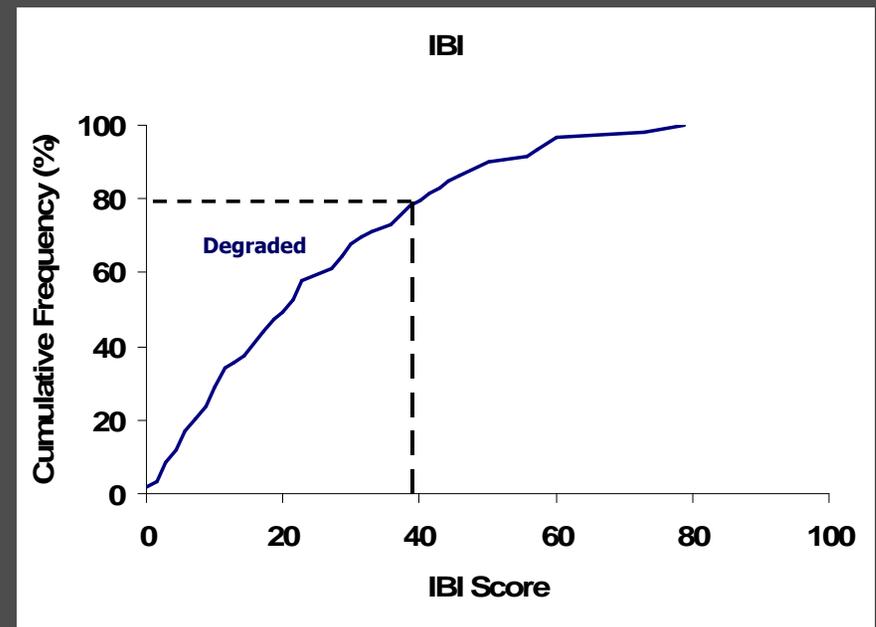
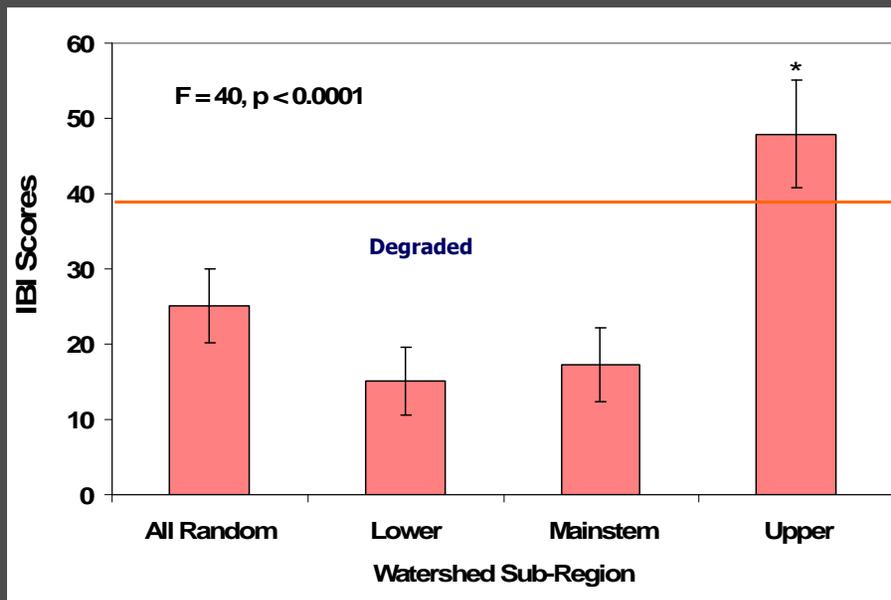
- Assess indicators one at a time
 - Map using regulatory or derived thresholds
 - Graph results across sub-regions
 - Use ambient watershed condition to determine the % of sites effected
 - Compare against water quality objectives
- Compare indicators against biological condition
 - Correlate analytes against IBI scores
- Use multivariate techniques to look for patterns in the biological and environmental datasets
 - Cluster analysis (Bray Curtis Similarity Index)
 - PCA

San Gabriel River Regional Monitoring Bioassessment

- Multimetric So CA IBI
 - EPT taxa
 - Predator taxa
 - Coleoptera taxa
 - % intolerant individuals
 - % tolerant taxa
 - % collectors
 - % non-insects
- Scores < 39 = degraded

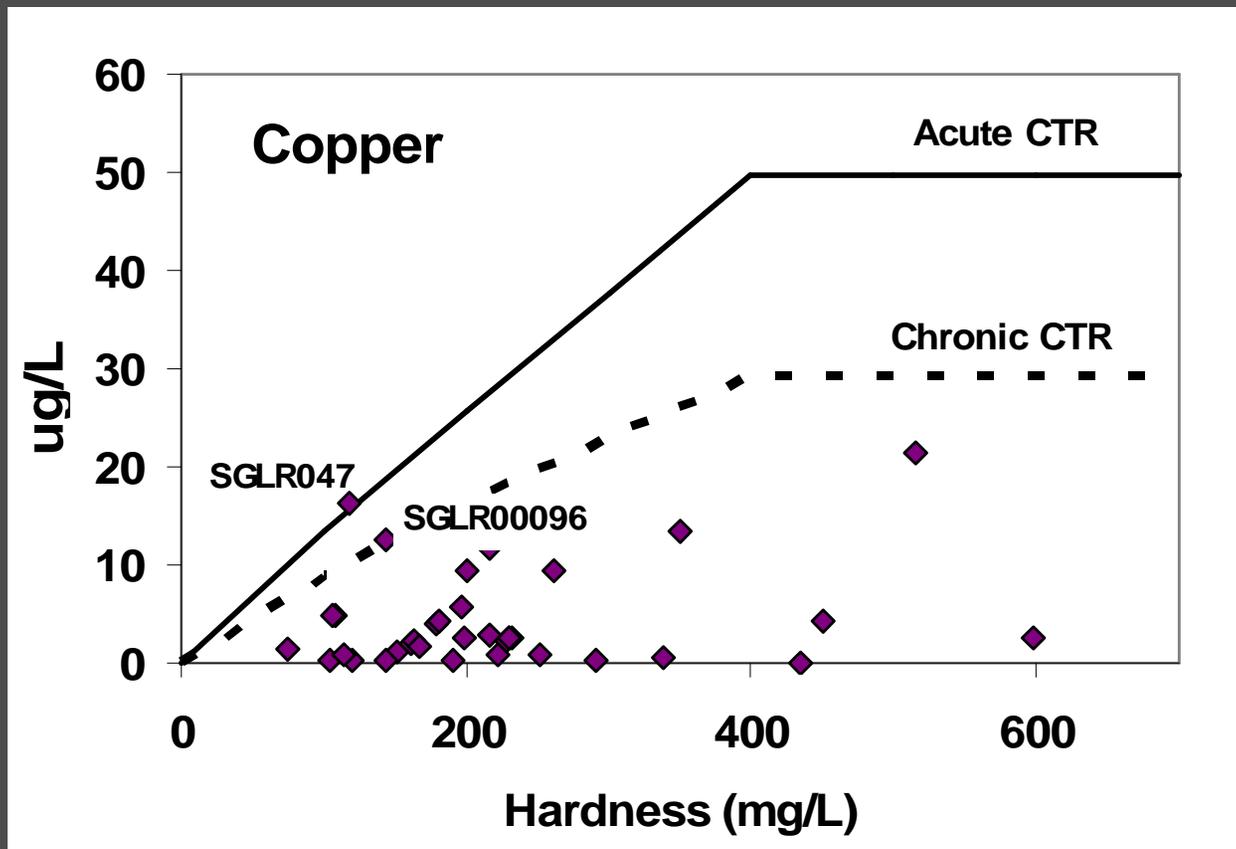


San Gabriel River Regional Monitoring Program Bioassessment

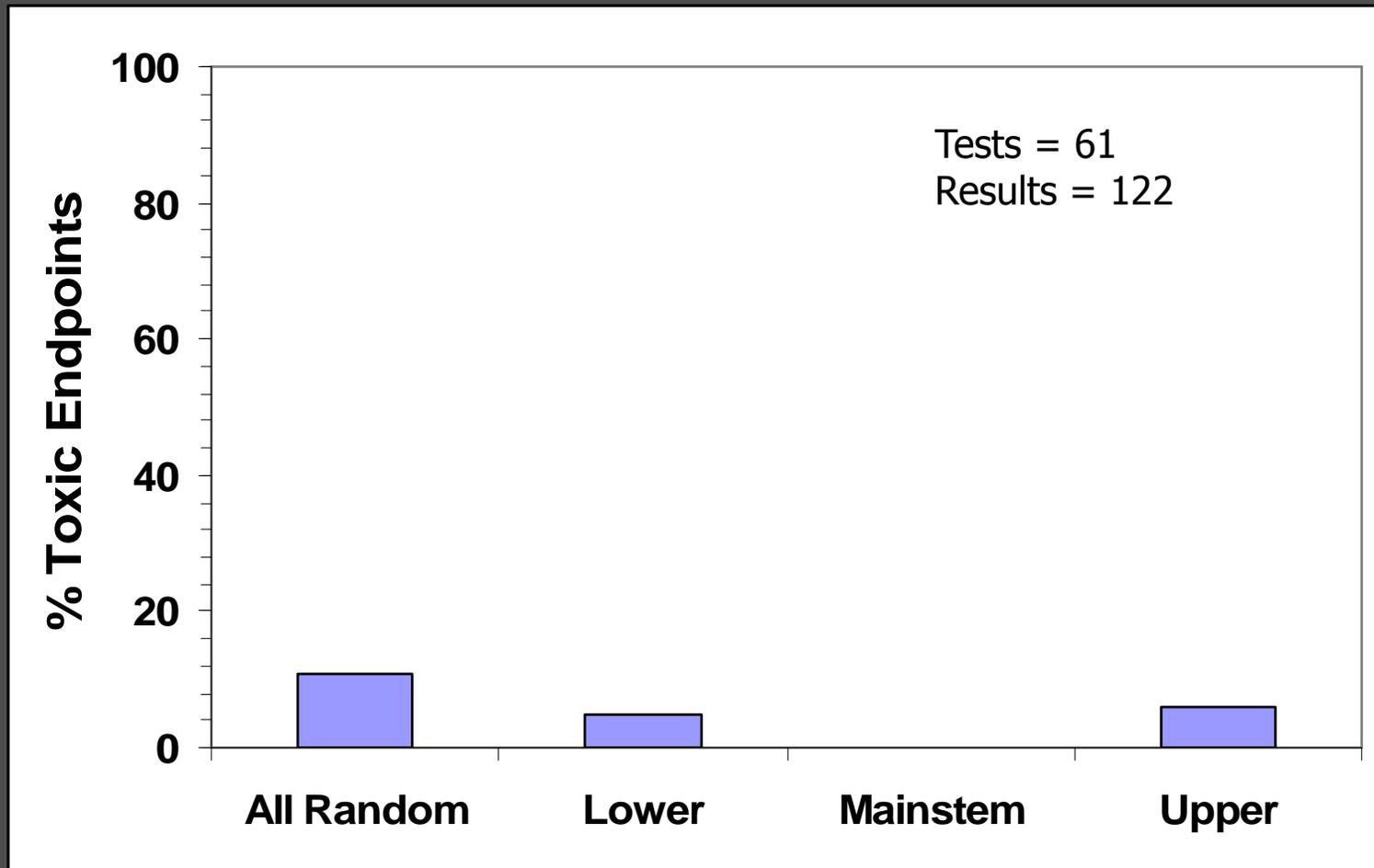


San Gabriel River Regional Monitoring Program Water Quality Objectives

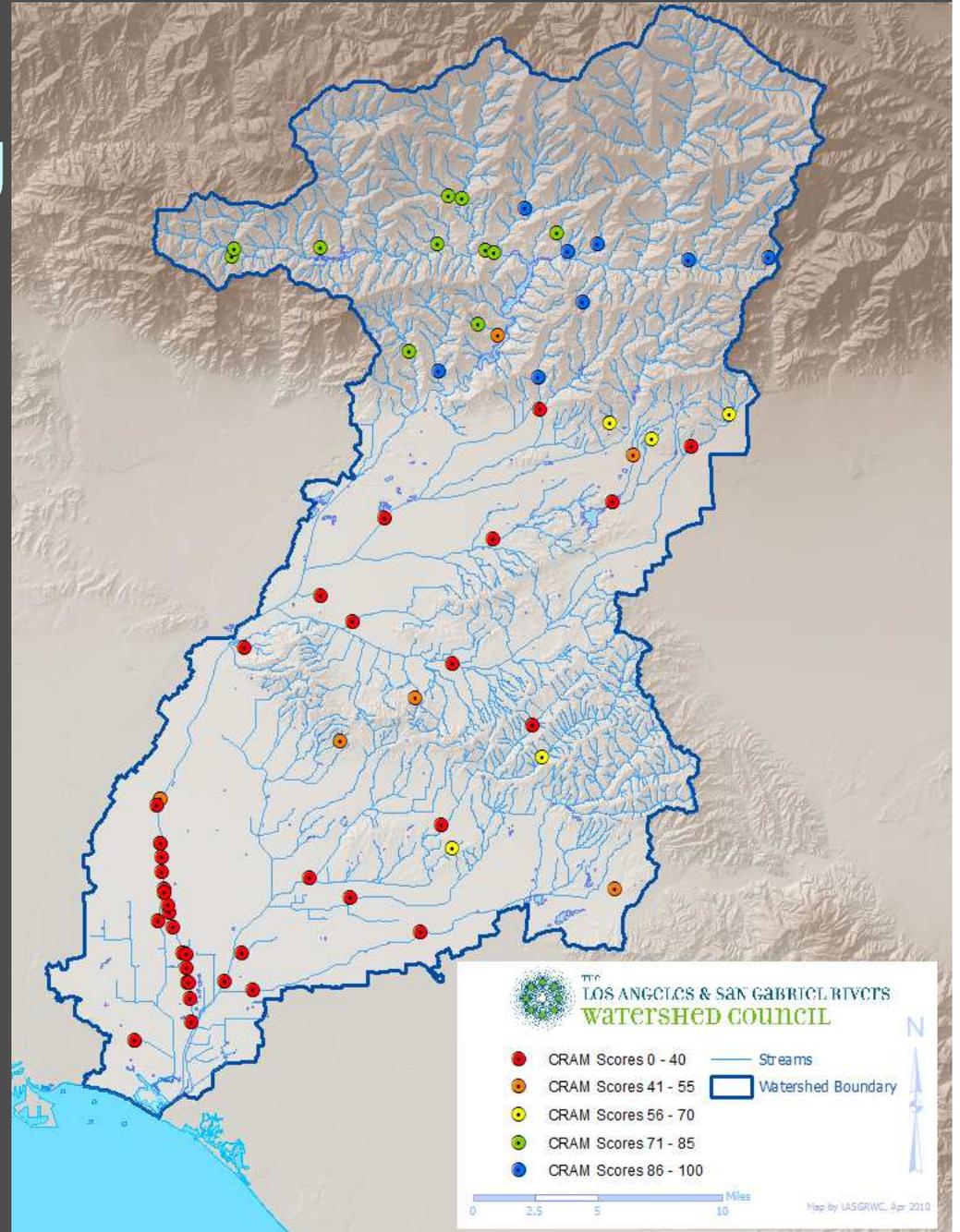
- CA Toxics Rule: hardness adjusted dissolved metals



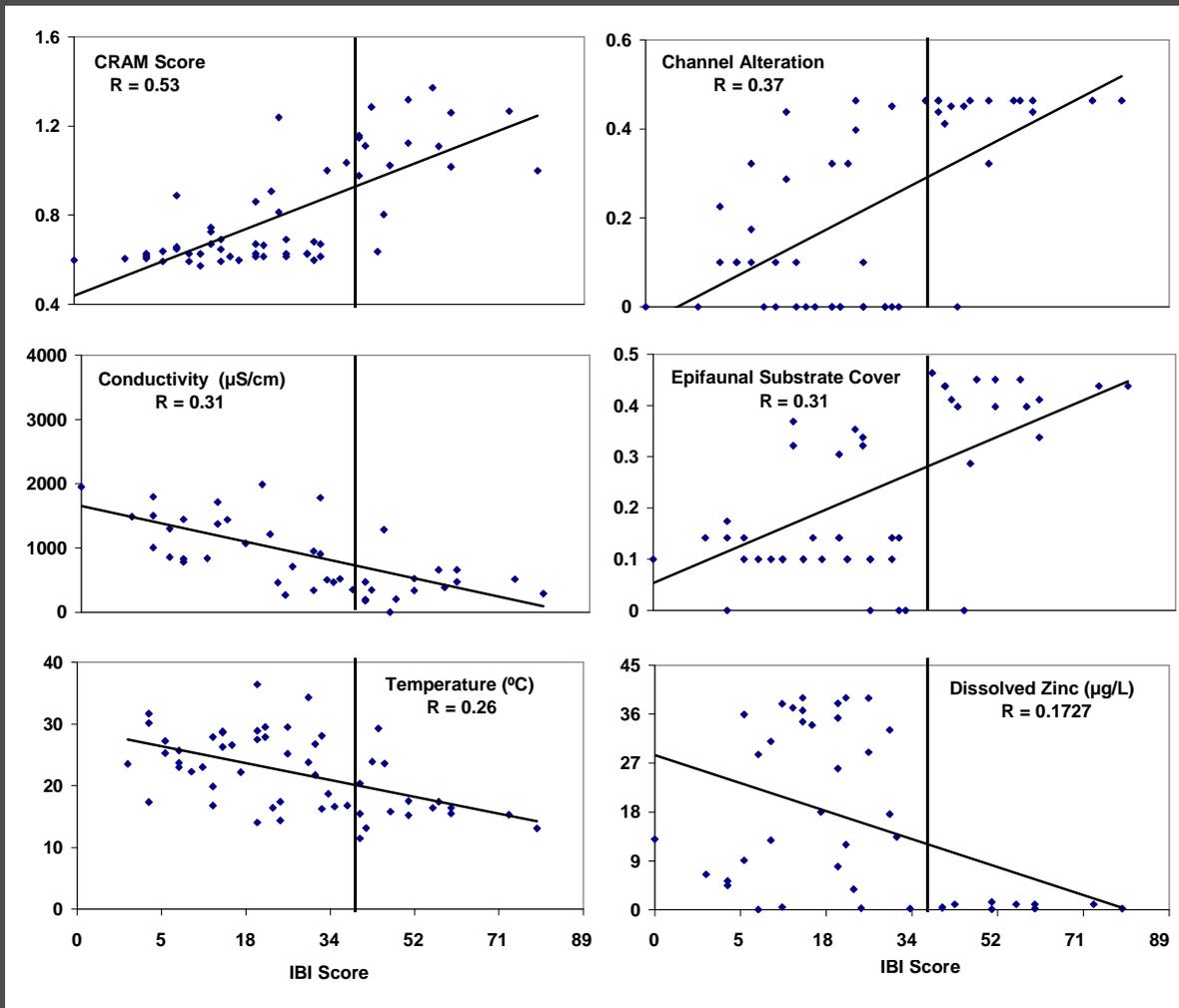
San Gabriel River Regional Monitoring Program Toxicity



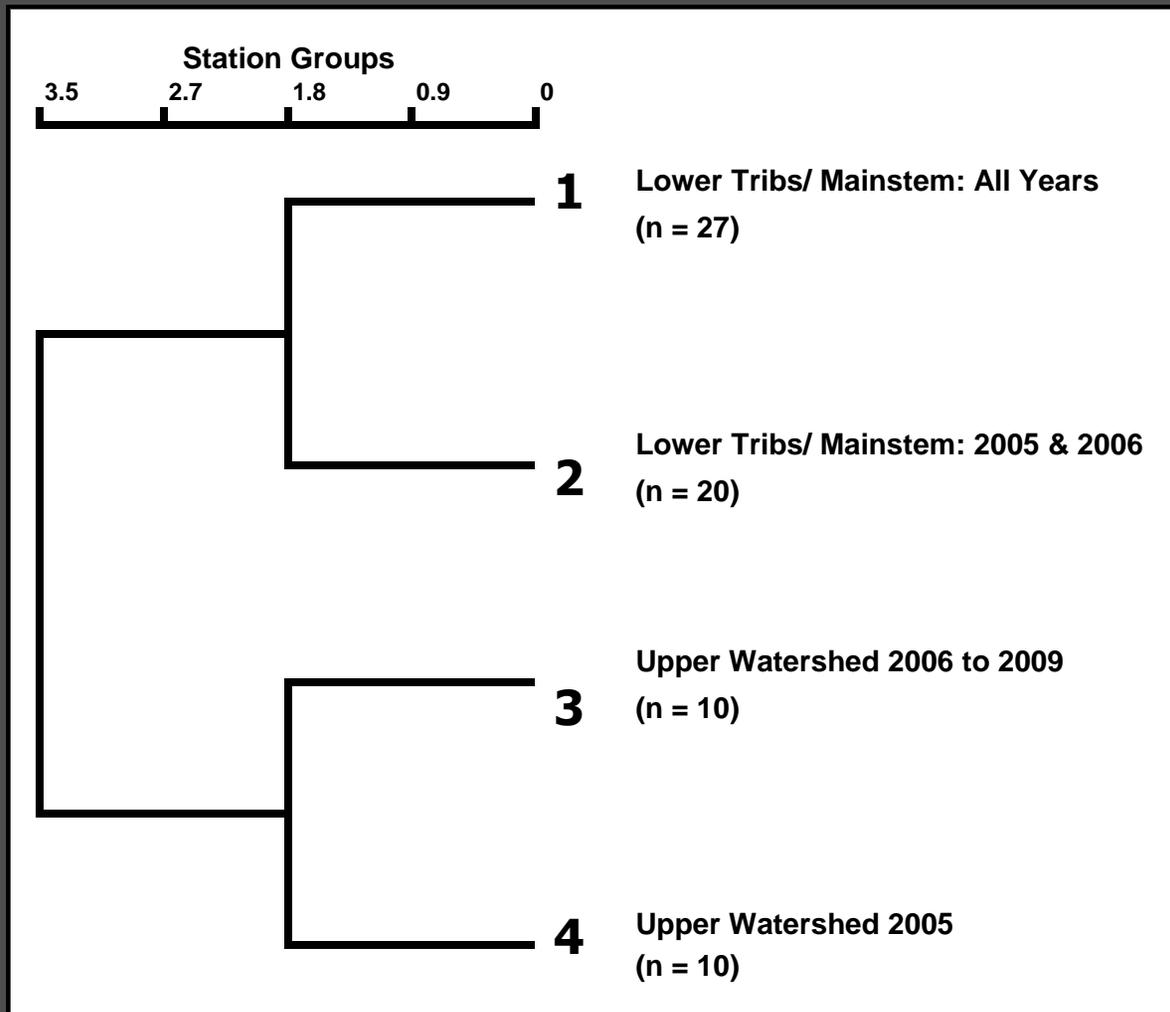
San Gabriel River Regional Monitoring Physical Condition (CRAM)



San Gabriel River Regional Monitoring Program Stressor Identification



San Gabriel River Regional Monitoring Program Stressor Identification

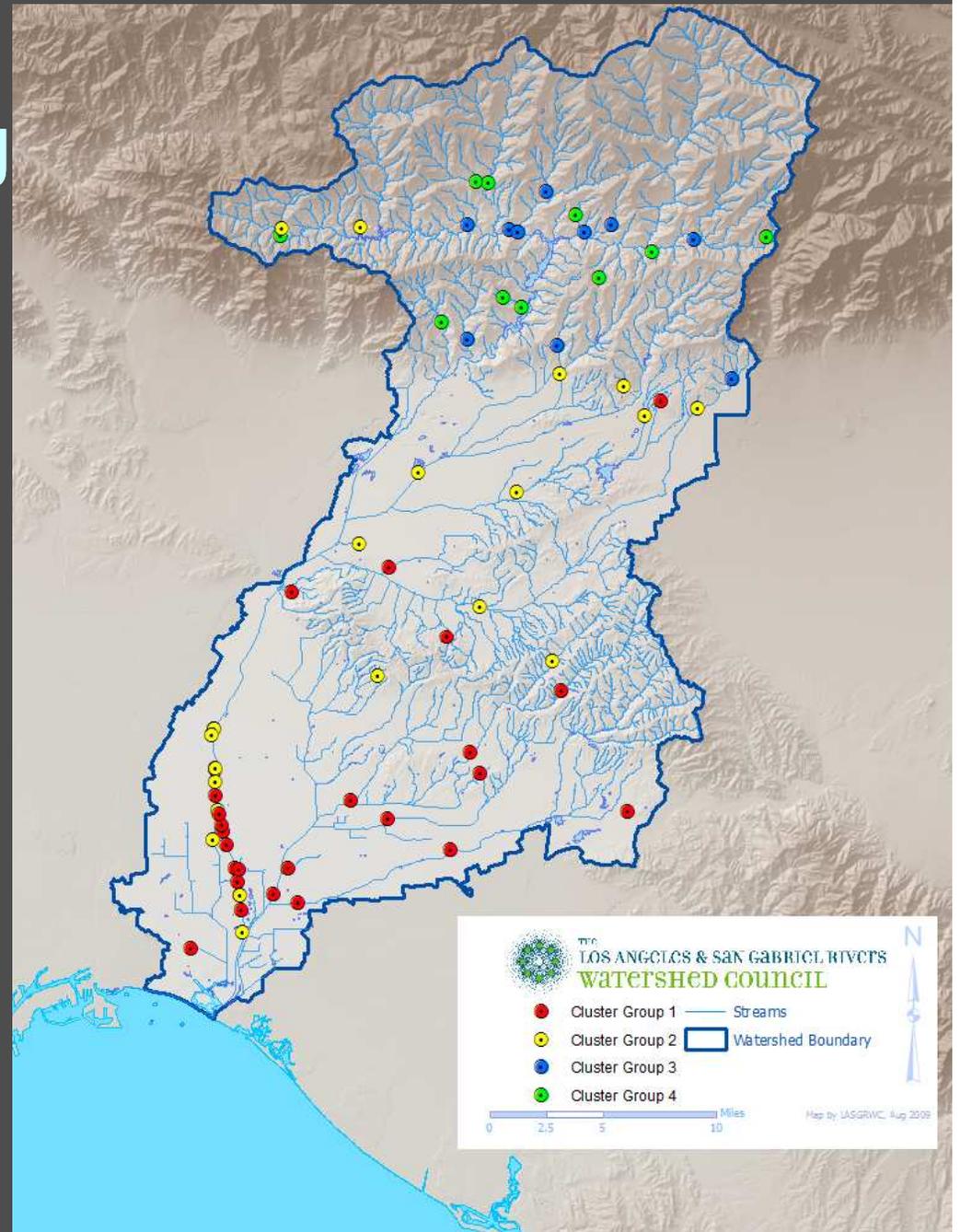


Lower watershed
Tolerant sp



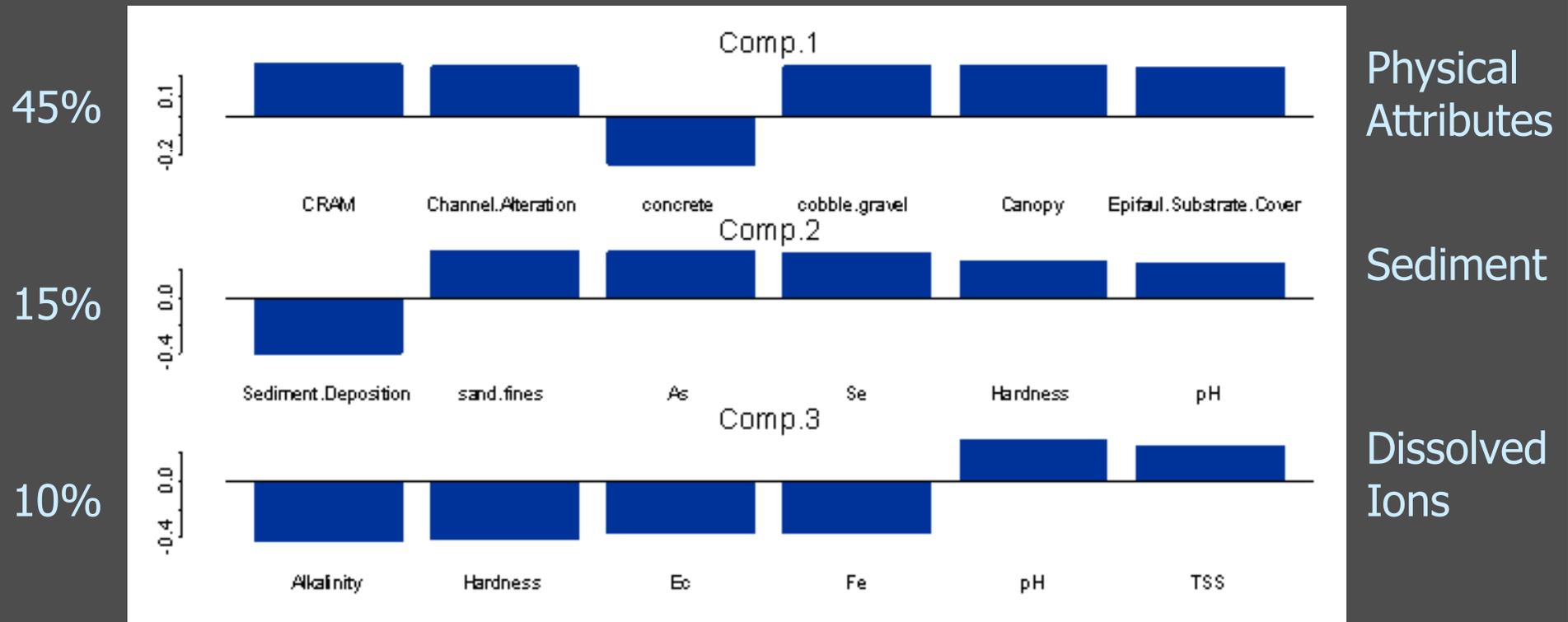
Upper watershed
Sensitive sp

San Gabriel River Regional Monitoring Stressor Identification

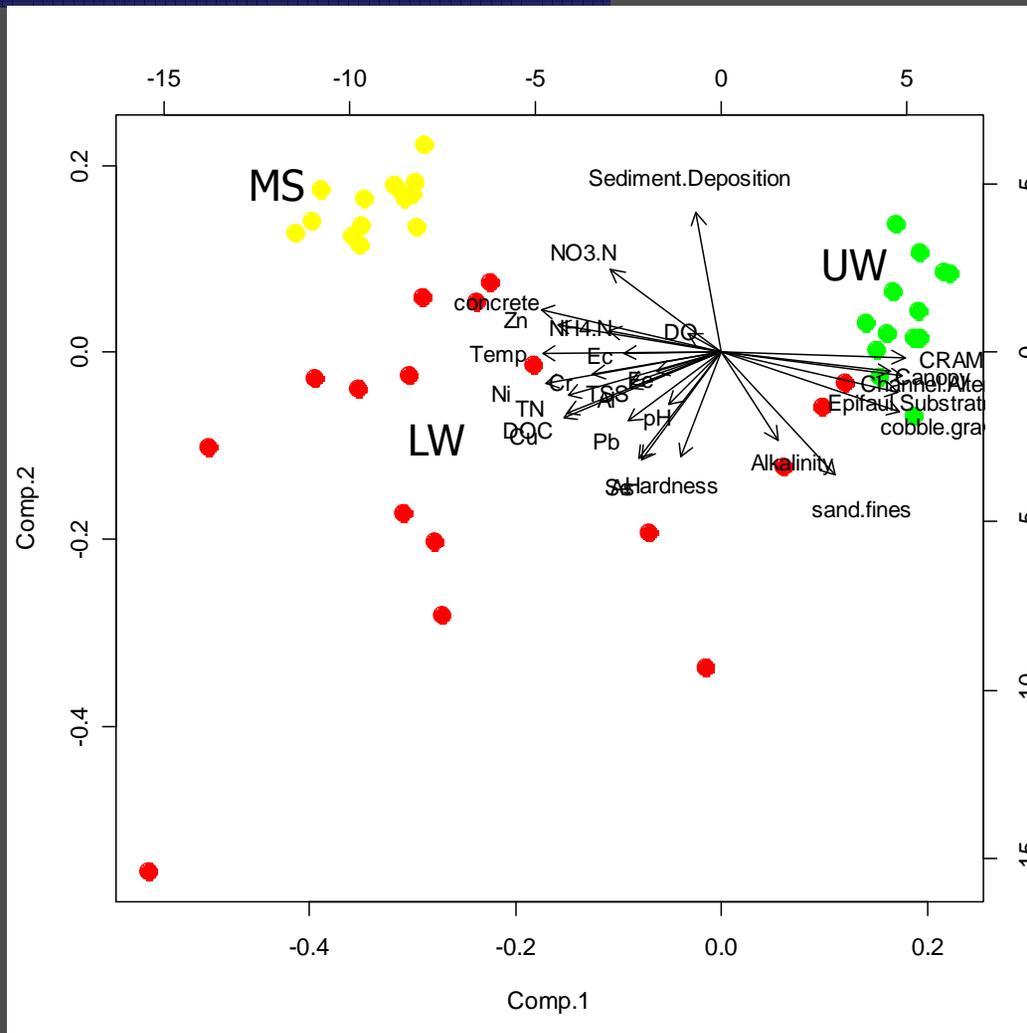


San Gabriel River Regional Monitoring Program Stressor Identification

- PCA Axes



San Gabriel River Regional Monitoring Program Stressor Identification



- Upper Watershed
 - CRAM
 - epifaunal substrate
 - % cobble
 - % canopy
 - channel alteration
- Lower Watershed
 - temperature
 - nickel
 - DOC
- Mainstem
 - concrete
 - nitrate
 - zinc

San Gabriel River Regional Monitoring Program Summary & Conclusions

- Condition of streams
 - Biological communities (BMIs) degraded; mostly in lower watershed
 - Very few exceedances of water quality standards
 - Few toxic endpoints
 - The biological condition is strongly associated with physical habitat conditions

San Gabriel River Regional Monitoring Program What's Next?

- State of the Watershed Report
- Addition of attached algae as biological indicator
- Comparison of SGR Watershed with other regions
- State of CA biological objectives

San Gabriel River Regional Monitoring Program Stakeholders

- AES (generating station)
- City of Downey
- Friends of the San Gabriel River
- LA & SG Rivers Watershed Council
- Los Angeles County Sanitation Districts
- Los Angeles County Department of Public Works
- Los Angeles Department of Water and Power
- Los Angeles Regional Water Quality Control Board
- Orange County Stormwater Program
- Rivers and Mountains Conservancy
- San Gabriel Mountains Regional Conservancy
- Santa Ana Regional Water Quality Control Board
- Southern CA Coastal Water Research Project
- US Army Corps of Engineers
- US EPA
- US Forest Service

San Gabriel River Regional Monitoring Program

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Questions?

