Integrated Regional Monitoring

• The State of the San Gabriel River Watershed (2005 – 2009)

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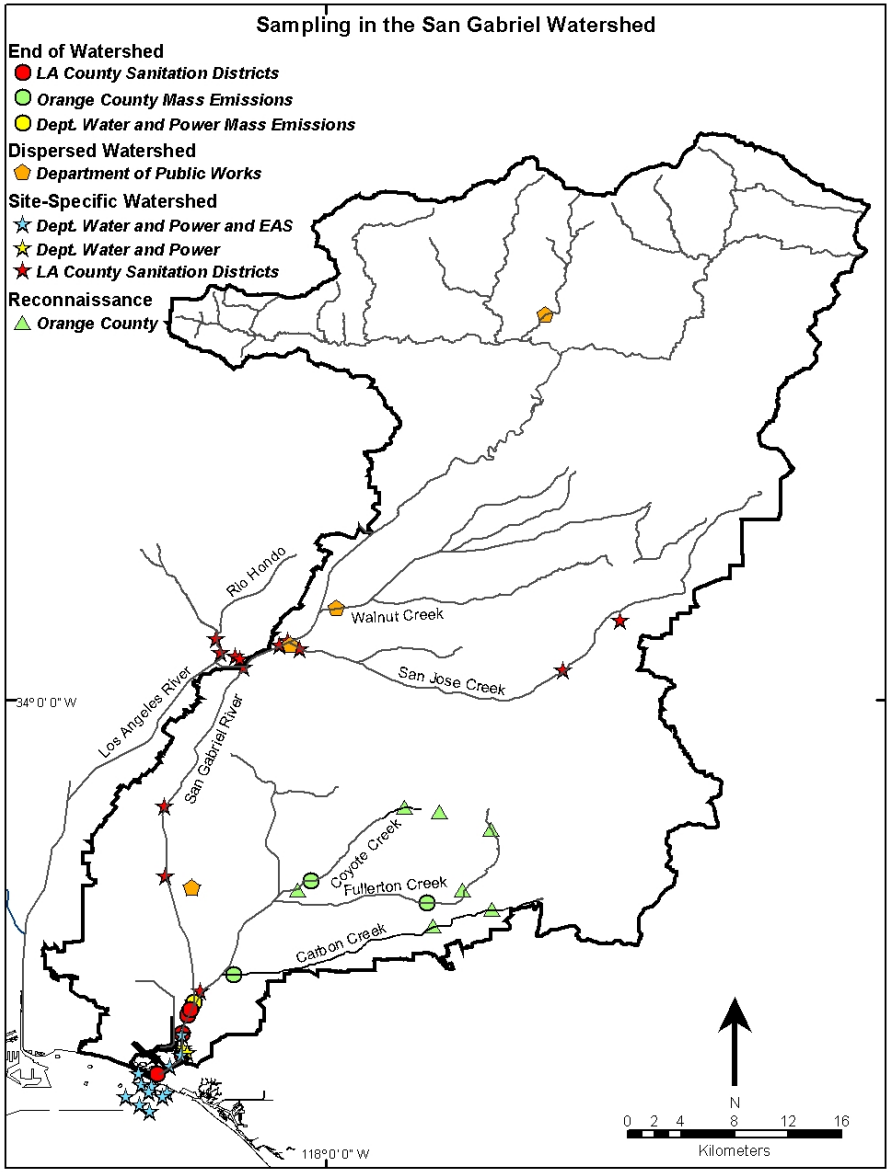
Council for Watershed Health

San Gabriel Watershed Example: Pre 2005



A lot of existing monitoring

- 6 agencies
- 3 citizen groups

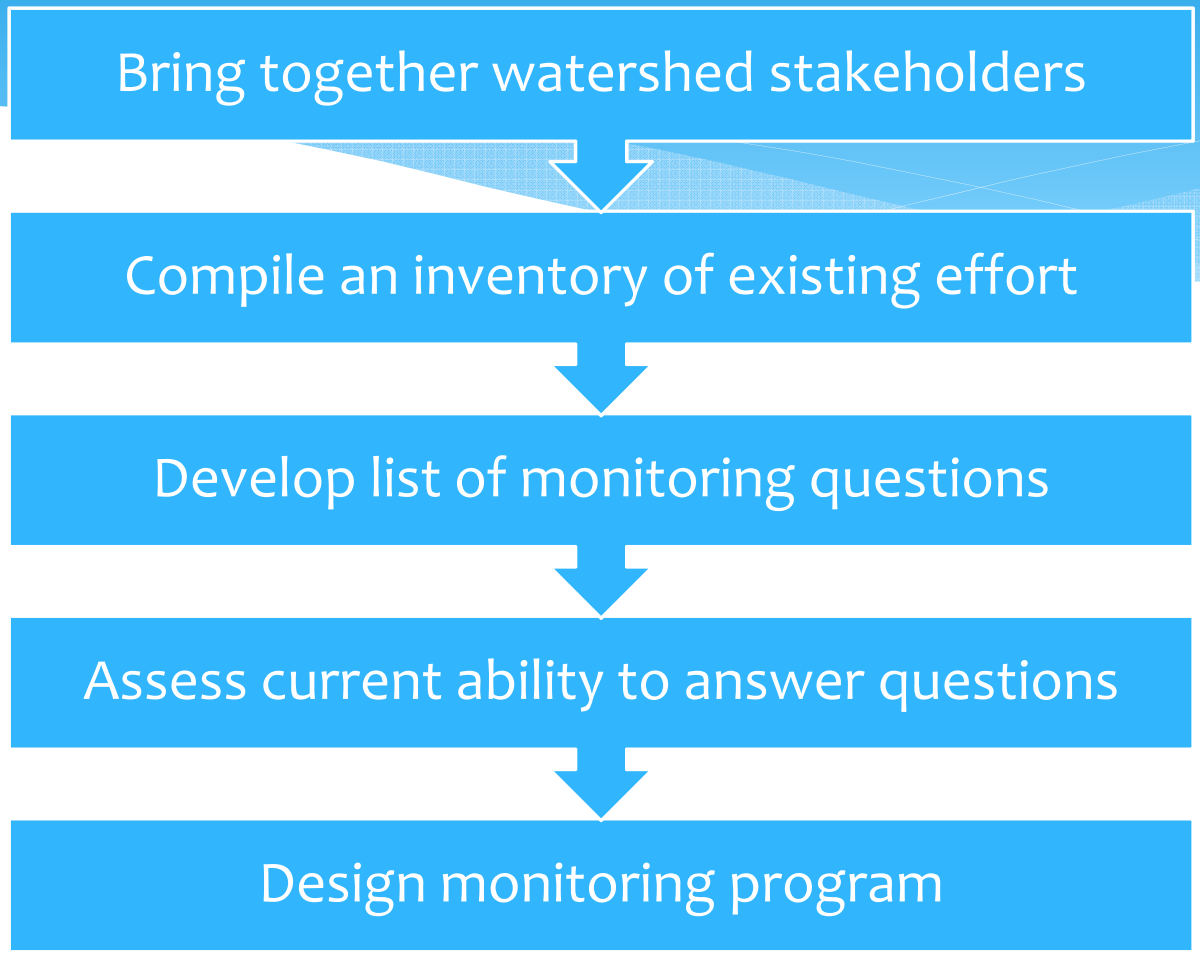
Programs not coordinated

- Limited data comparability
- Lack of coordination on constituents sampled
- No coordinated QA, IM, etc.

Inefficiencies

- Redundancies between monitoring programs
- Majority of the watershed not monitored

Integrated Regional Monitoring Approach



2005: SGRRMP

Program Partners

SANITATION DISTRICTS OF LOS ANGELES COUNTY

CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

CITY OF DOWNEY CALIFORNIA FOUNDED 1873 INCORPORATED 1956 FUTURE UNLIMITED

LA DWP Los Angeles Department of Water & Power

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

www.ocwatersheds.com
OC Watersheds Program
County of Orange

lacity.org

CITY OF BURBANK 100 1911-2011 A CENTENNIAL CELEBRATION

aquatic bioassay & consulting laboratories, inc

SCCWRP Established 1969

WESTON SOLUTIONS
an employee-owned company

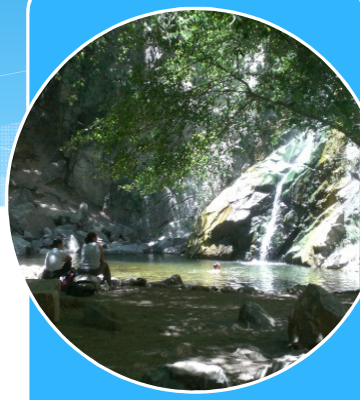
Monitoring Questions

1. What is the health of streams ?

2. How are conditions at areas of unique importance ?

3. Are regulated discharges meeting WQ objectives ?

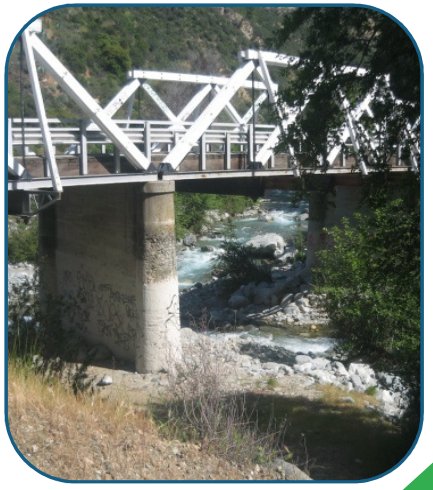
4. Is it safe to eat fish ?



5. Is it safe to swim?

State of the Watershed

Q 1 What is the health of streams ?



Probability-based design

Sites randomly allocated

Multiple indicators

Annual surveys

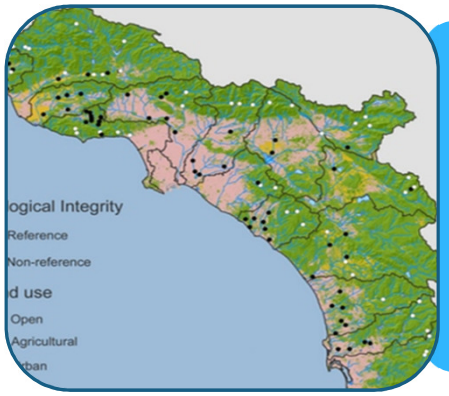
(May – July)

2005-present (SGRRMP)

Q 1 What is the health of streams ?

San Gabriel River

Regional Monitoring Program



SMC

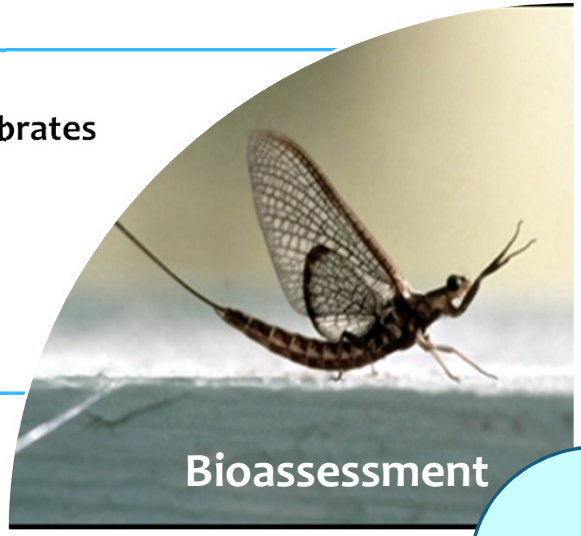
Regional Watershed Monitoring Program

SWRCB

Statewide Perennial Streams Assessment

Q 1 What is the health of streams ?

- Benthic Macroinvertebrates
- Benthic Algae



Bioassessment

- General Constituents
- Metals
- Nutrients
- Organics
- Indicator Bacteria

Water Chemistry

Condition?

Physical Habitat

Surveys: SWAMP and CADF&G
California Rapid Assessment Method (CRAM)

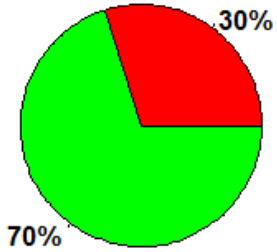
Toxicity

7-day Ceriodaphnia test

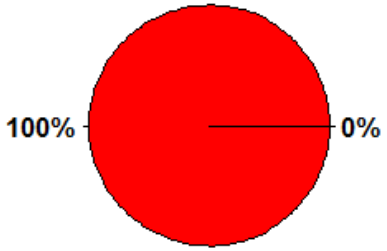
Q 1: Ambient stream conditions?

Biological Condition (n=69)

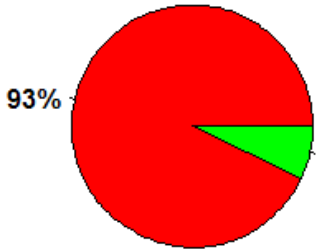
Upper Watershed

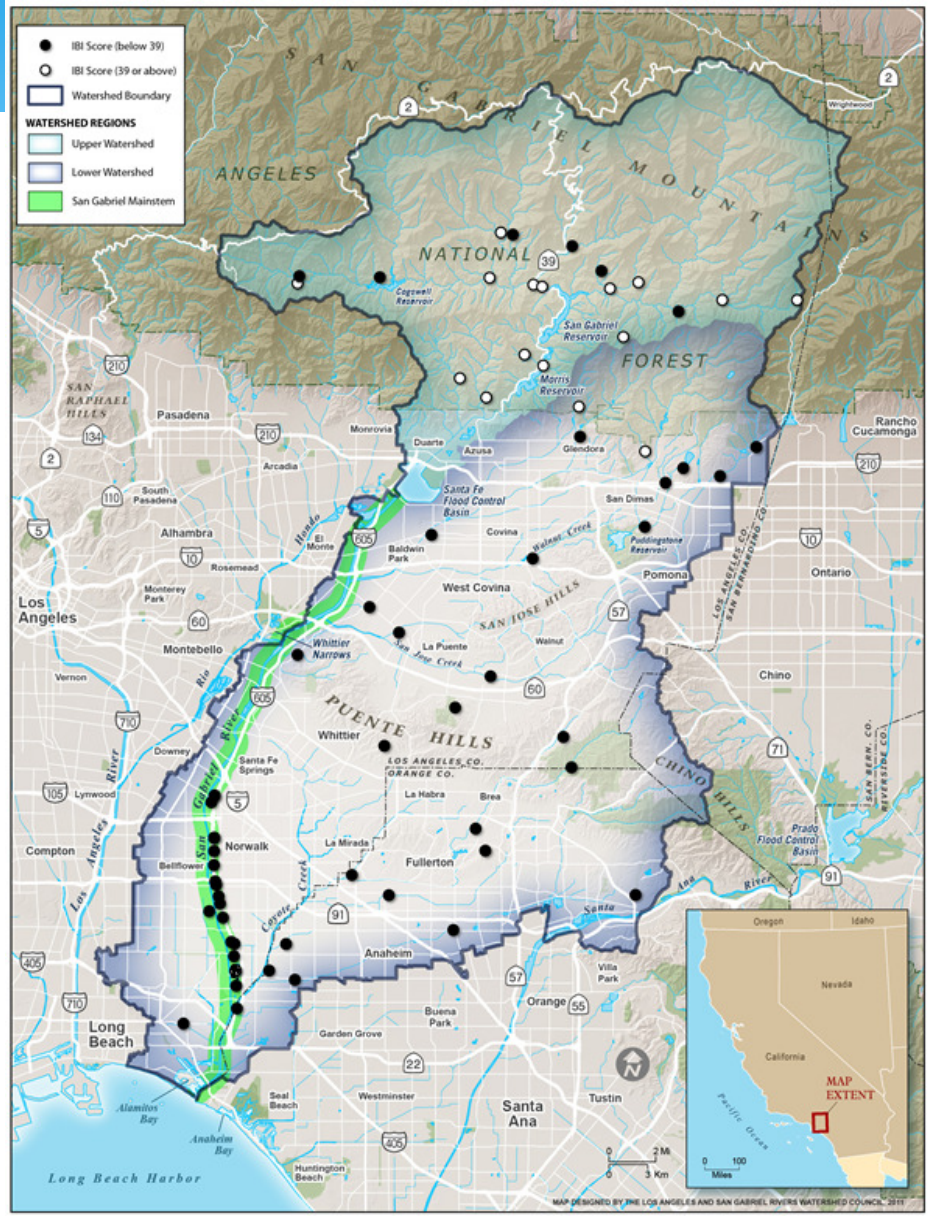


Mainstem

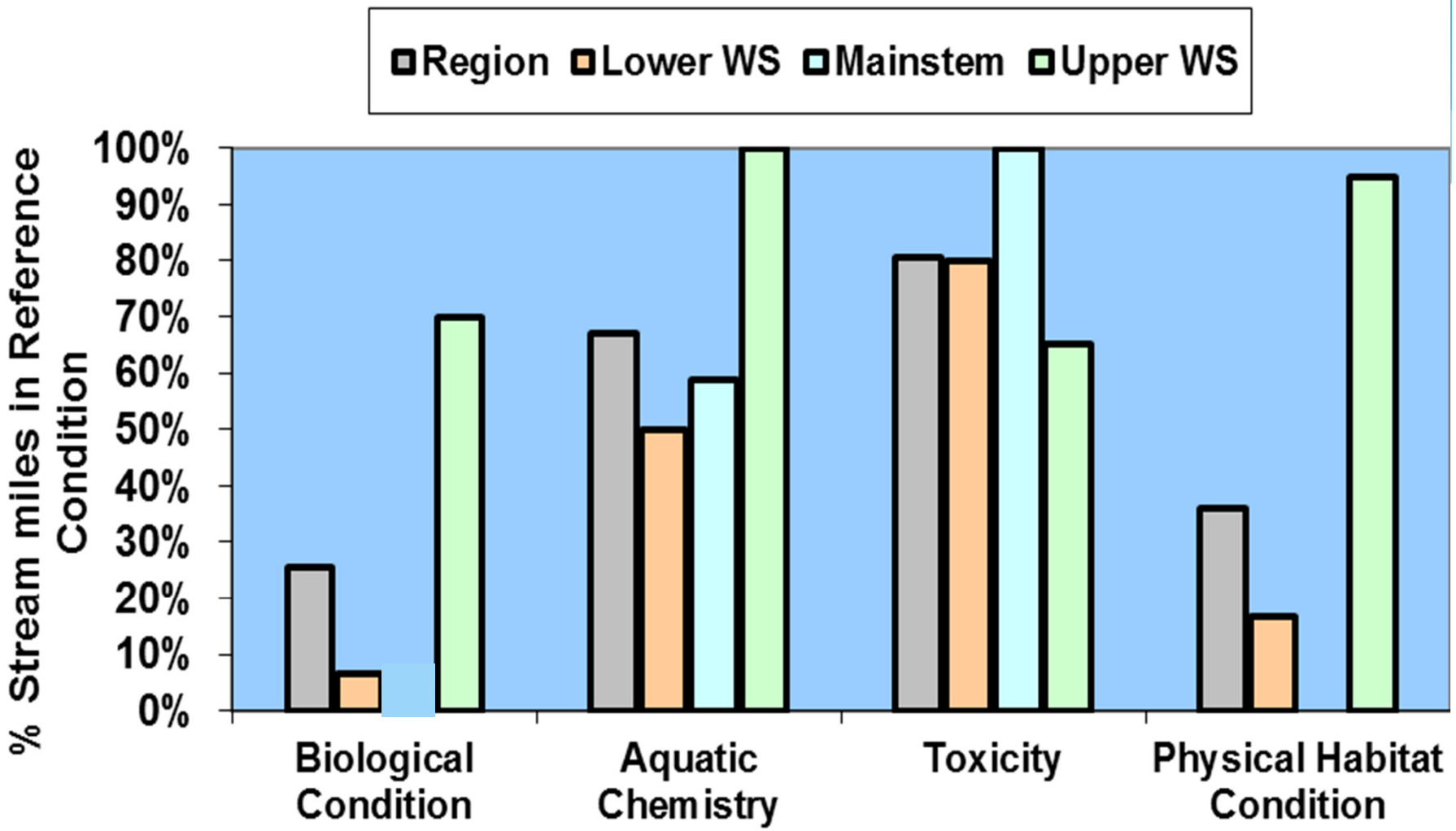


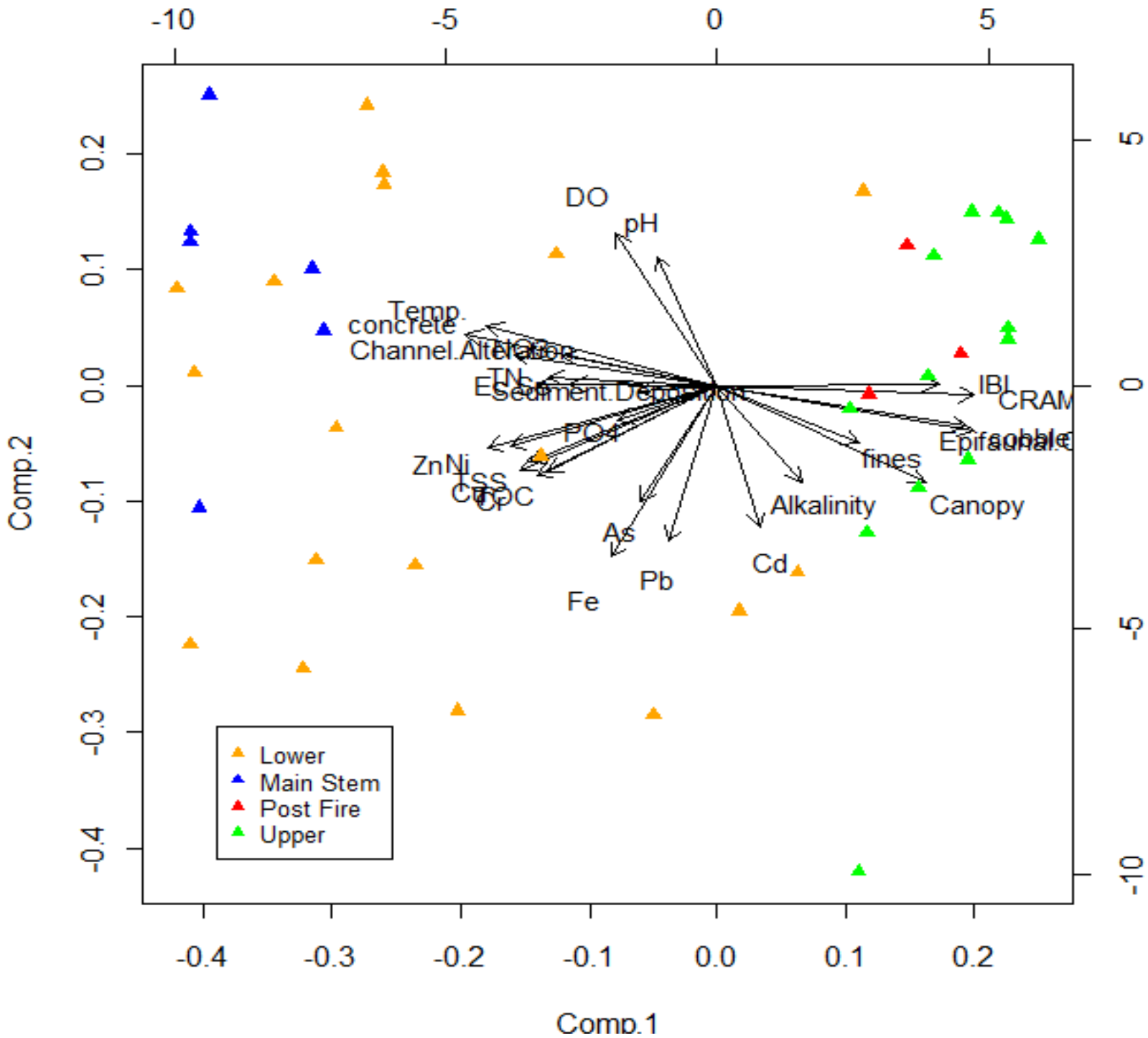
Lower Watershed





Q 1: Ambient stream conditions?




-10
-5
0
5
0.2
0.1
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-0.1
-0.2
-0.3
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Comp.2
DO
pH
Temp.
concrete
Channel.Alteration
TN
Sediment.Deposition
IBI
CRAM
PO4
ZnNi
TSS
Cu
OC
fines
Canopy
Alkalinity
As
Cd
Pb
Fe
Lower
Main Stem
Post Fire
Upper
-0.4
-0.3
-0.2
-0.1
0.0
0.1
0.2
Comp.1

Q 2 Trends at Unique Sites

Unique Habitats (CRAM)

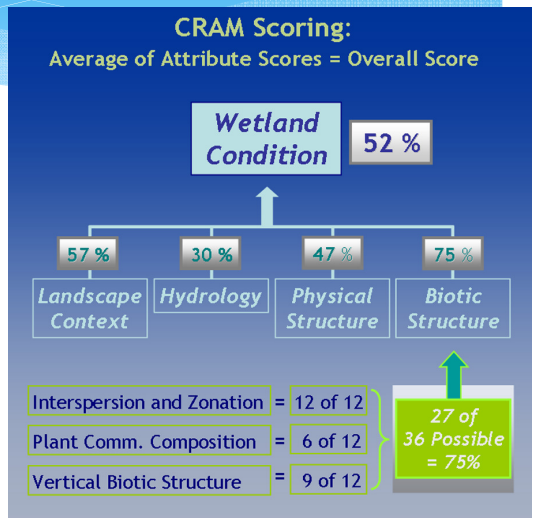
Sub- Watersheds (All indicators & bacteria)

Estuary

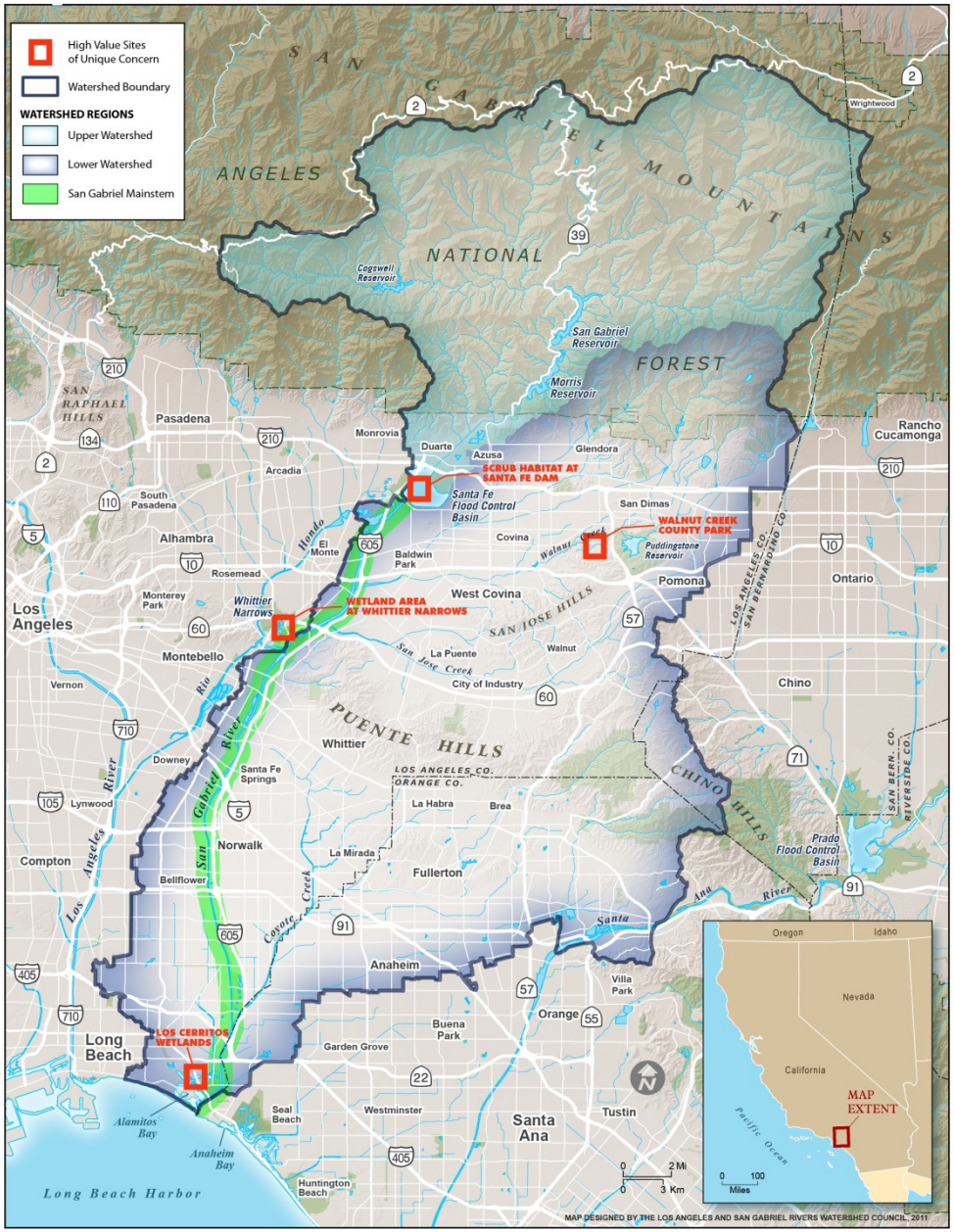
Sediment Chemistry

Sediment Toxicity

Biological Condition



Q 2: Trends at Unique sites?



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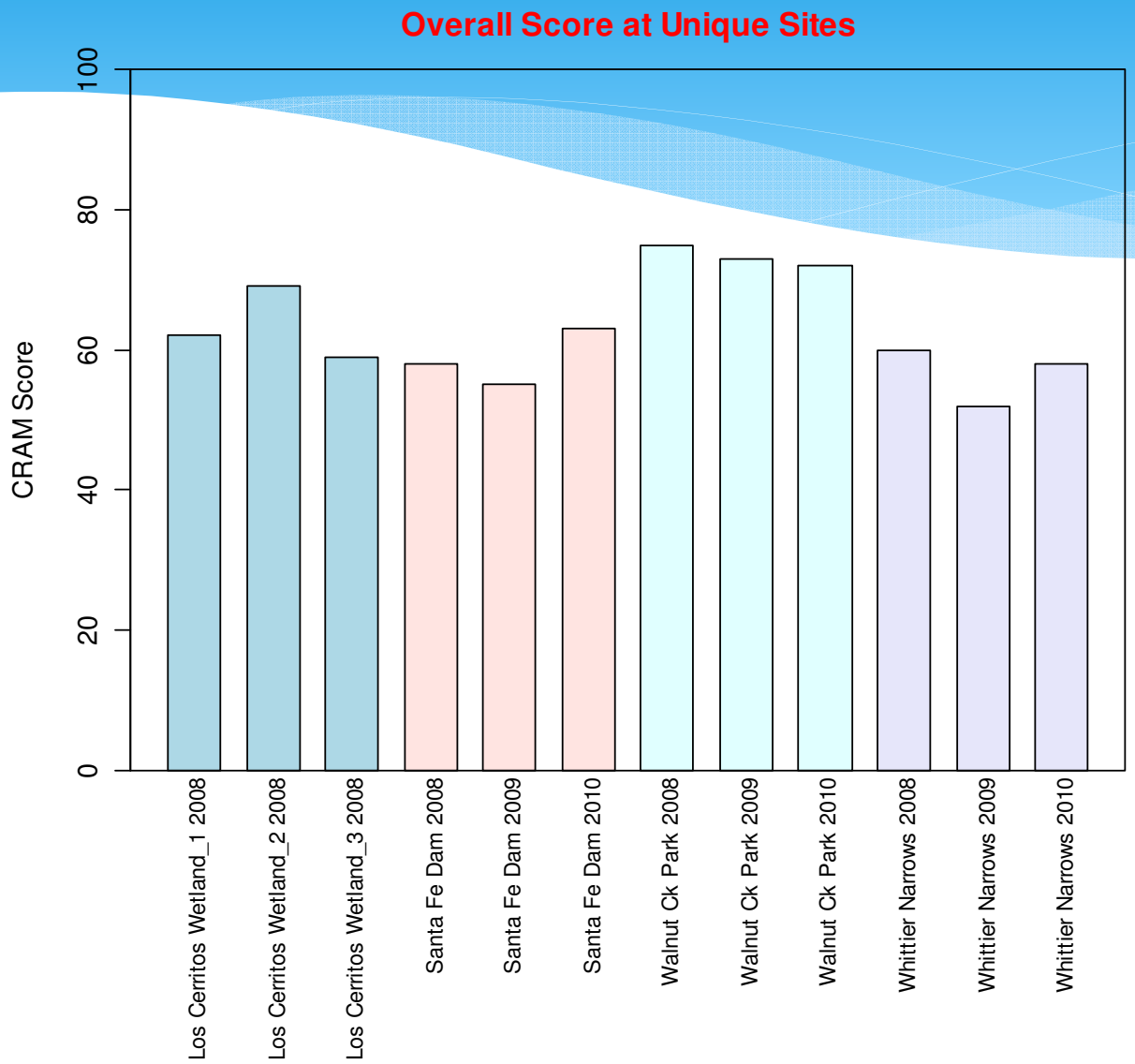
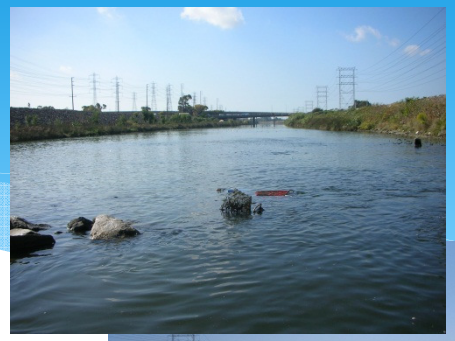
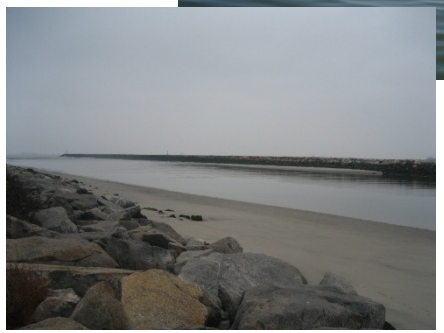
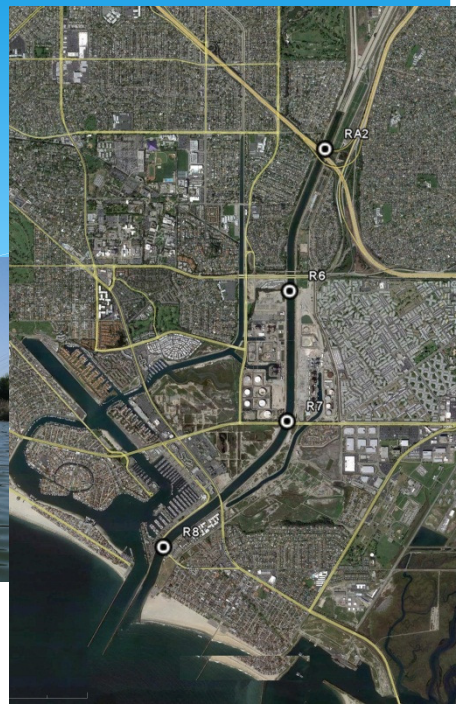


Q 2: Trends at Unique sites?

Estuary







SQO's:

MLE approach to assess exposure of organisms to sediment contamination

- Chemistry
- Toxicity
- Biological condition

2007 - 2009	R8	R7	R6
Chemistry Exposure	Mod Exp	Mod Exp	Mod Exp
Benthic Disturbance	Mod Dist	Low Dist	Mod Dist
Toxicity	Nontoxic	Low	Low
Site Assessment	Possibly Impacted	Possibly Impacted	Likely Impacted

Q 3 Are Regulated Discharges Meeting Water Quality Objectives

Compile Upstream/ Downstream Data
LACSD WRP's

Chemistry
Toxicity
Bioassessment

Pomona WRP

Whittier Narrows WRP

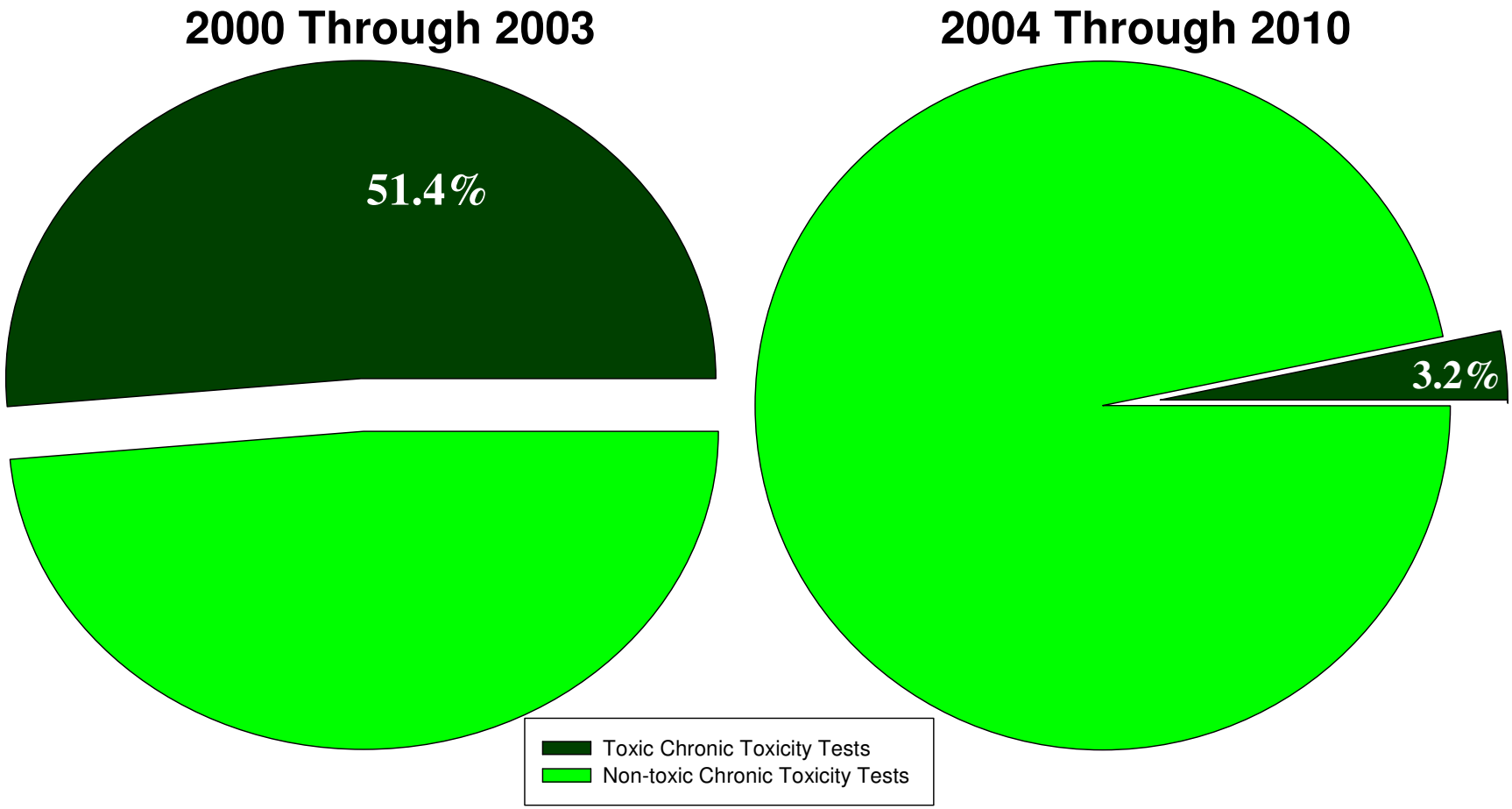
San Jose Creek WRP

Long beach WRP

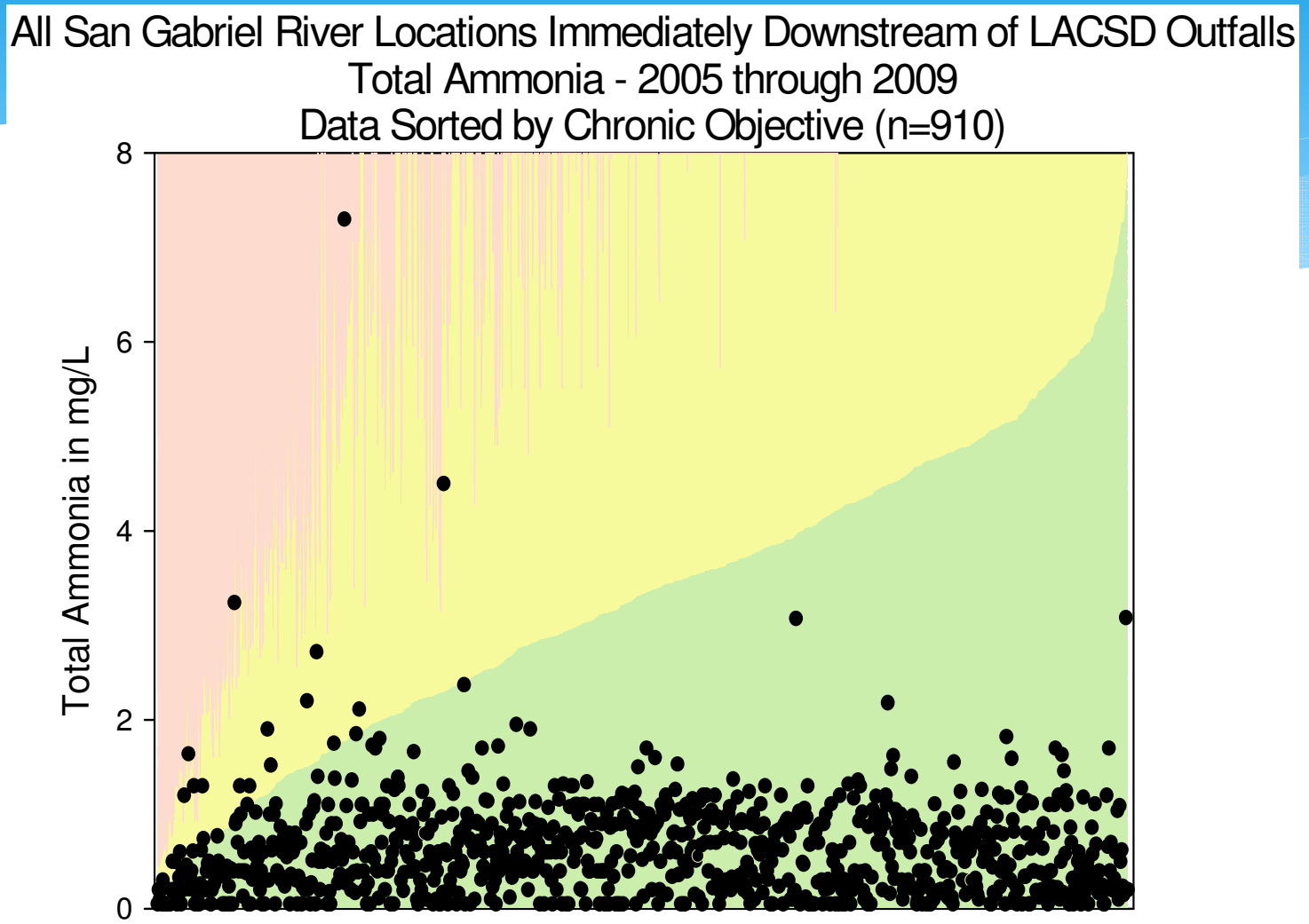
Los Coyotes WRP

Q 3: Downstream of Dischargers?
Final Effluent Chronic Toxicity Test Results

* San Jose Creek, Los Coyotes, and Long Beach WRP



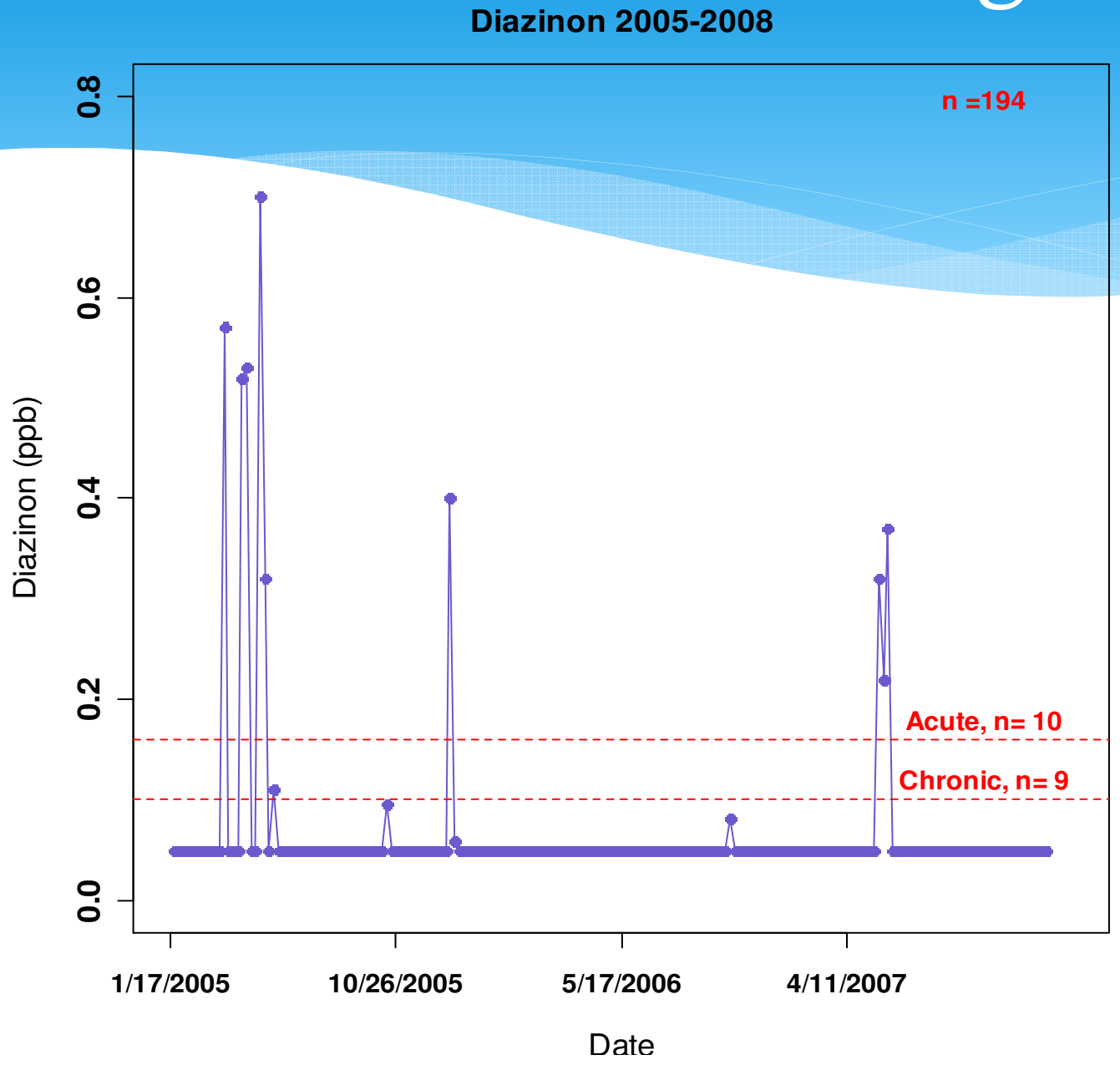
Q 3: Downstream of Dischargers?



2 of 910 Results exceeded the Acute WQO (0.2%)

30 of 910 Results exceeded the Chronic WQO (3.3%)

Q 3: Downstream of Dischargers?



Q 4 Safe to eat fish?

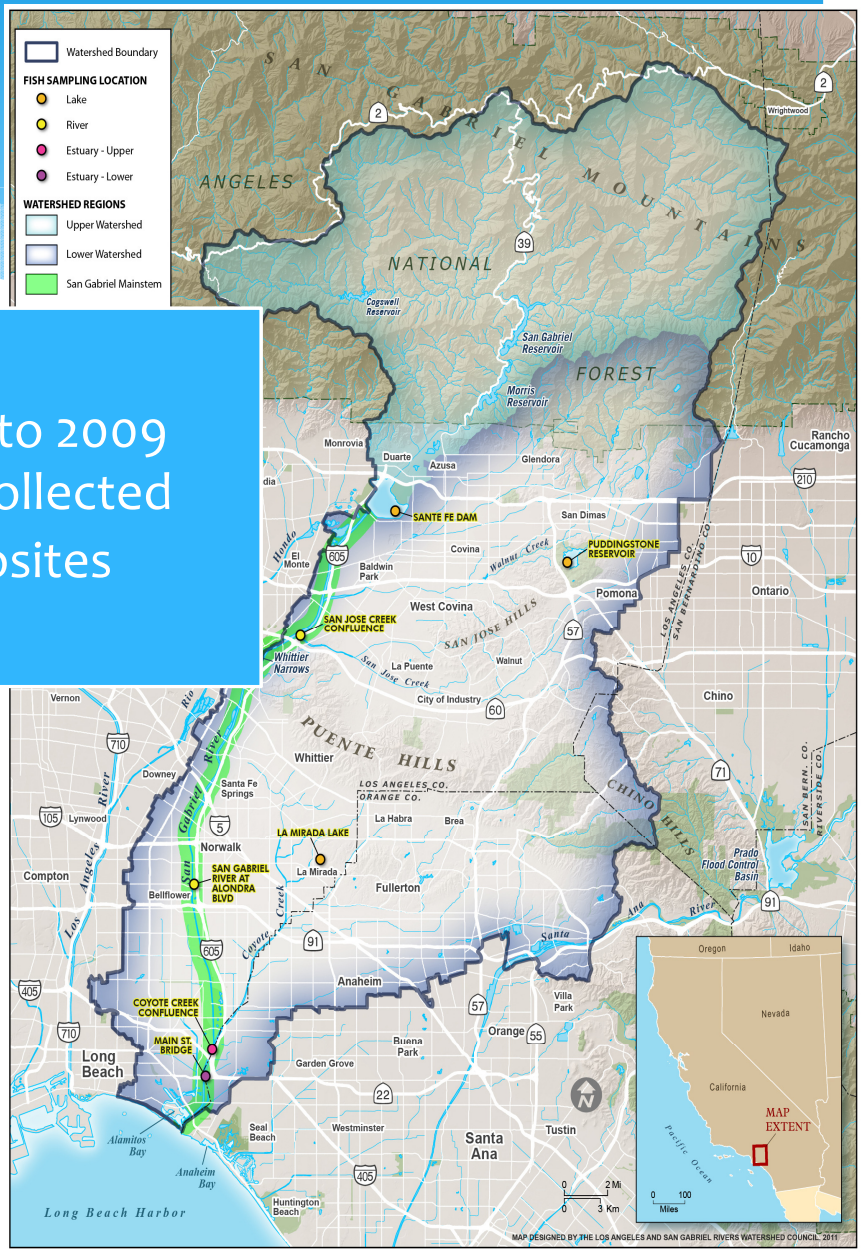
Popular fishing sites

resident fish sp.

(Hg, Se, DDT's & PCBs)

From 2006 to 2009

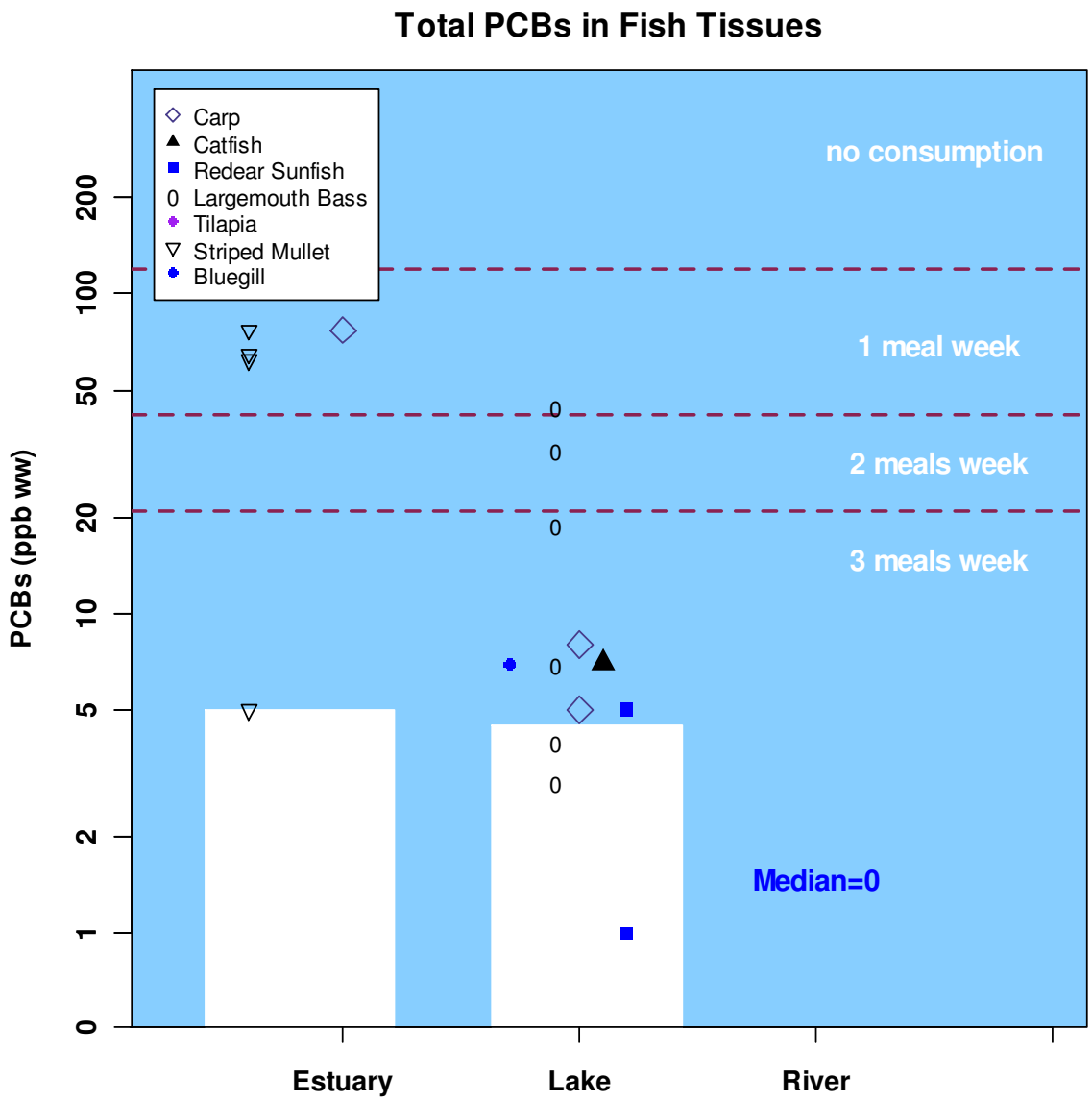
- 195 fish collected
- 33 composites



Q 4. Safe to eat fish?

- **One meal a week**
- Striped mullet (estuary)
- common carp (estuary)
- **One-two meals a week**
- Largemouth bass(lakes)

PCBs

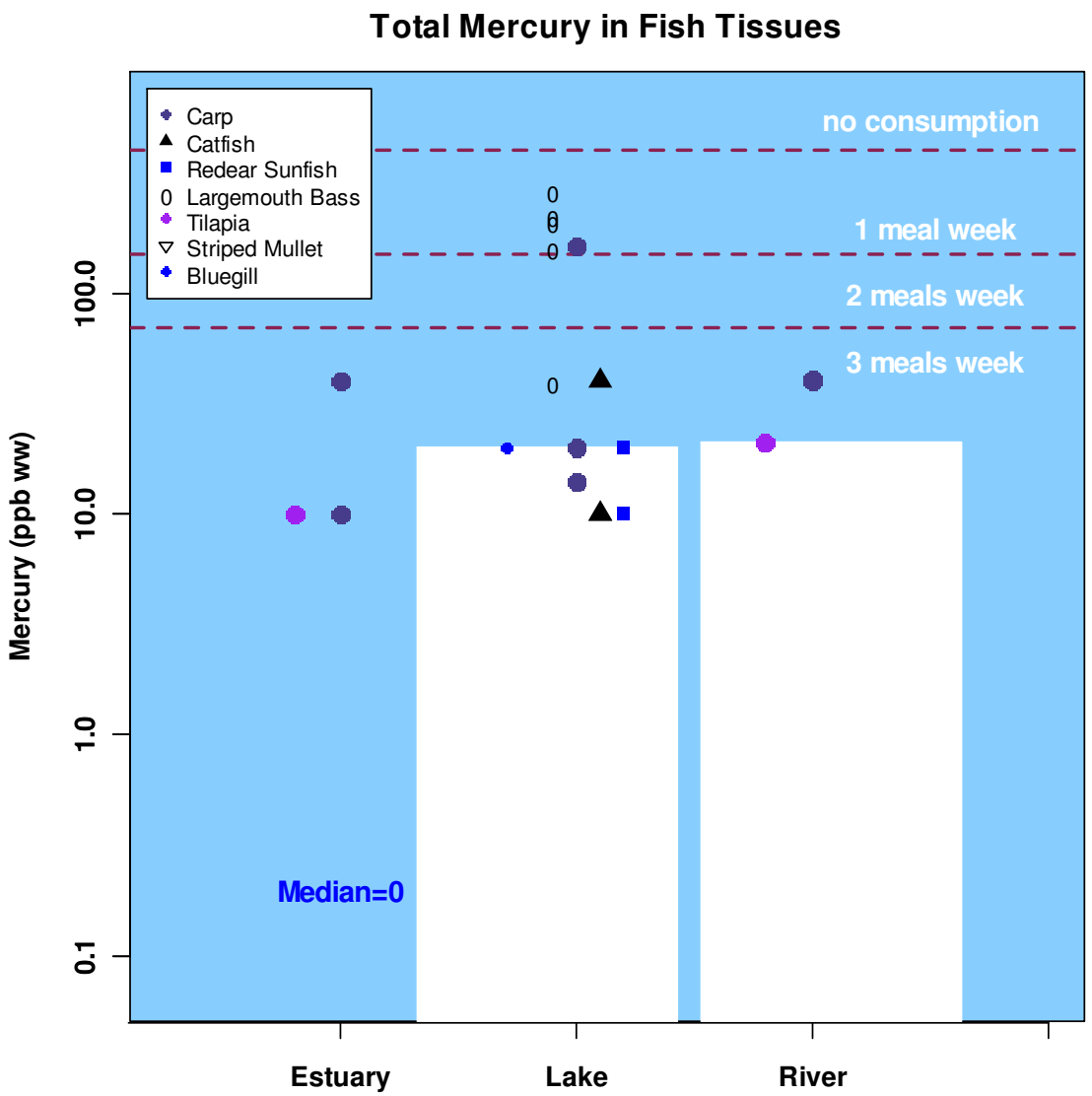


Q 4. Safe to eat fish?

One meal a week

- largemouth bass(lakes)
- common carp (lakes)

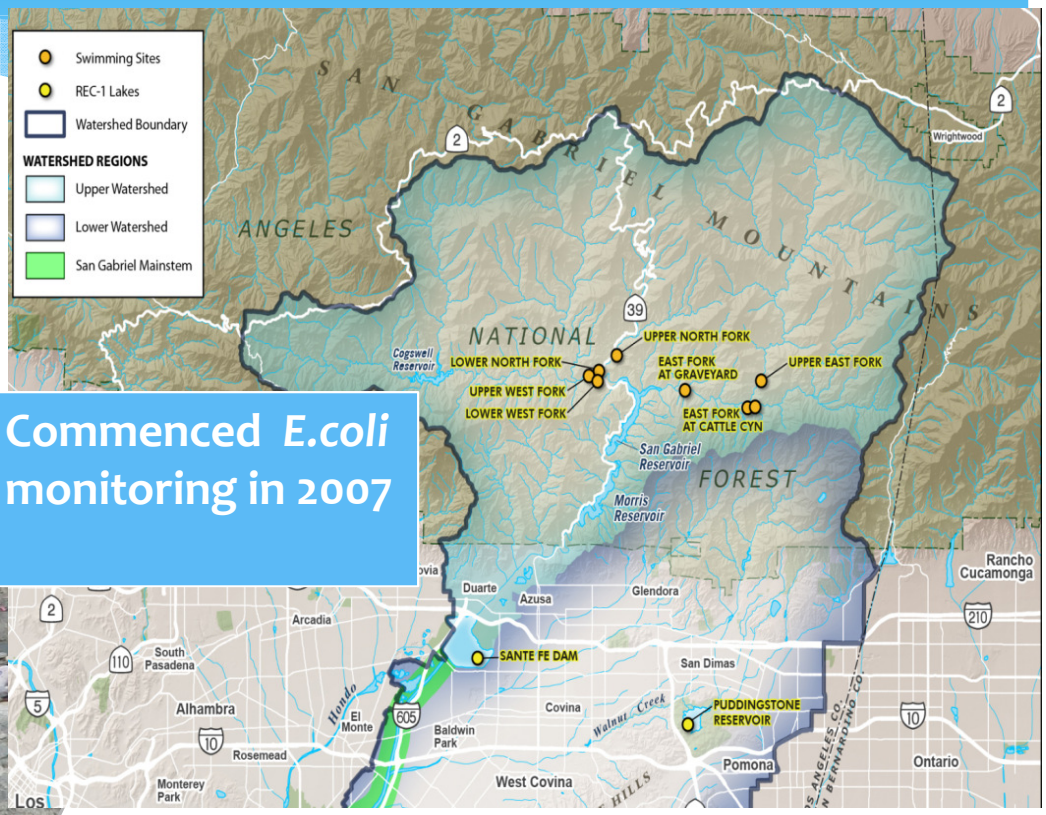
Mercury



Q 5 Safe to swim?

Popular Swimming sites

-Upper Watershed
-Puddingstone Lake
-Santa Fe Dam

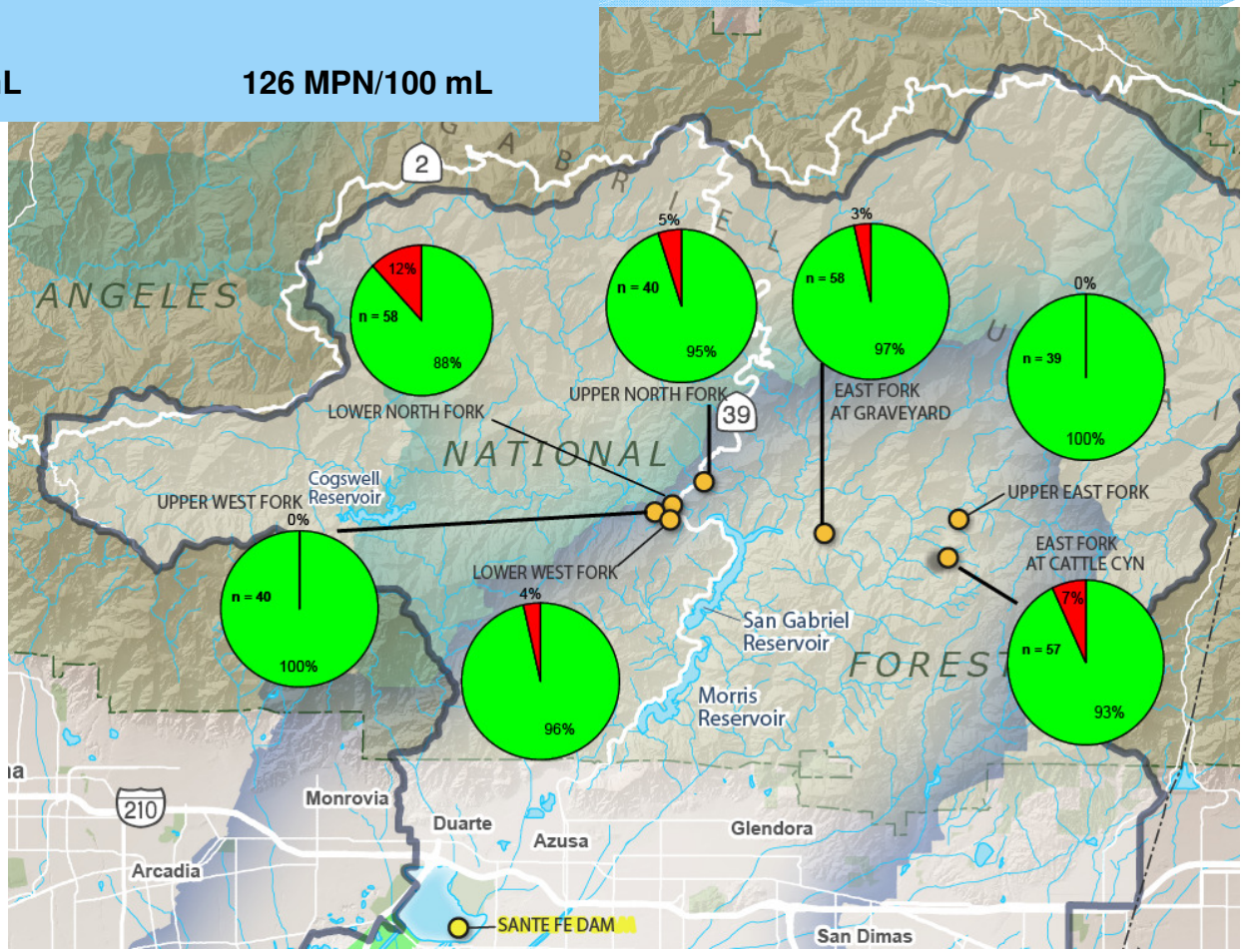


Commenced *E.coli* monitoring in 2007

Q 5. Safe to swim?

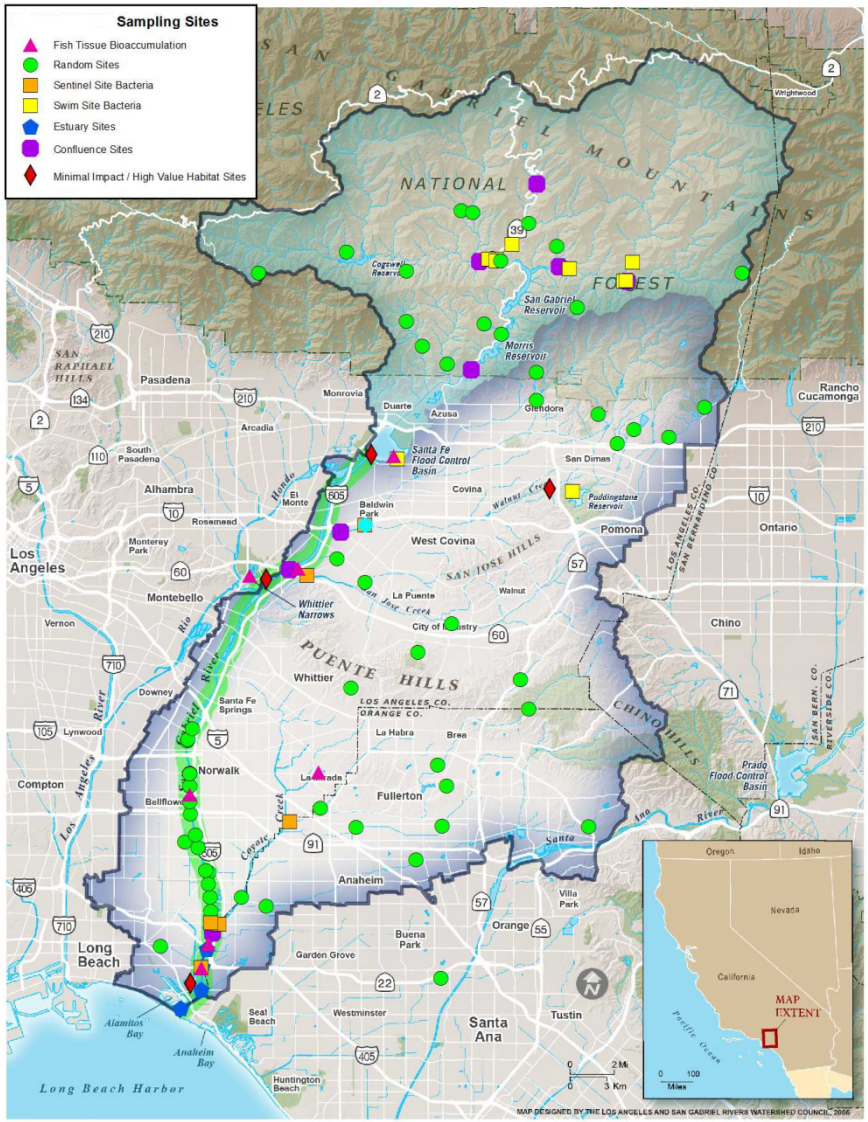
Indicator	Single Sample Standard	30 Day Geometric Mean
E. coli	235 MPN/100 mL	126 MPN/100 mL

Results were compared against State of CA REC-1 standards (AB411)



Summary of monitoring activities

SGRRMP 2010 Monitoring Sites (Q1-5)



Estimated Number of samples collected

Program	Years	Samples
SGRRMP	2005-2010	>515

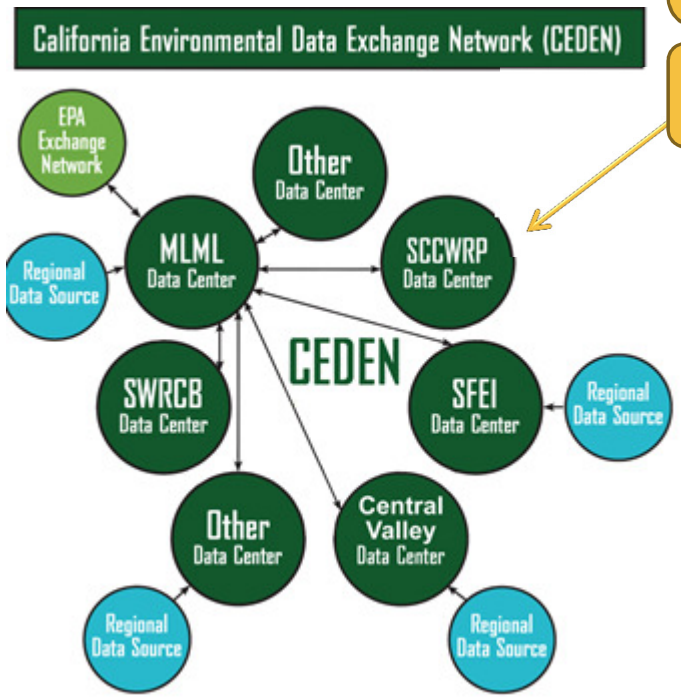
Many more analyses….

Data Management

Sampling/ Analysis

Data Received from Laboratory and Field

Data QA/QC



Data Analysis using the appropriate statistical analysis

- Temporal or spatial trends
- Relationships between measurement parameters
- Compare site statistics to water quality guidelines

Interpret data in relation to study objectives

Report on Findings

* Storage
* Retrieval

SGRRMP Portal

EcoLayers 2.0: Integrating Water Quality, Water Resources and Land Use

Ith of Your Watershed?

San Gabriel

Sites

All Sites | Bacteria Monitoring Data | Toxicity Monitoring Data | Bioaccumulation Monitori

Water Flows. Data Doesn't.

EcoLayers 2.0 is an enterprise-class hosted software services platform for content aggregation, analysis and integration of a stakeholder's activities across organizations, watersheds, jurisdictions and water bodies over any geographic scale.

EcoLayers 2.0 will help its users make better decisions and bridge the disconnects between:

- Departmental and information "silos" for planning, monitoring, operations and compliance
- A permittee and the multiple regulatory agencies and consultants it must interface with regularly
- Inter-dependent stakeholders who wish to pursue collaborative, integrated strategies to better meet their own goals and shared goals (e.g., TMDLs, shared water resources)
- Regulatory agencies, wastewater facilities, municipalities, watershed councils or NGOs and their served constituencies, particularly the public

The benefits are lower costs, lower regulatory risks, improved security and sustainable outcomes.

For more information, please contact:

EcoLayers, Inc.
Phone: +1 858 780 9415
Email: info@EcoLayers.com

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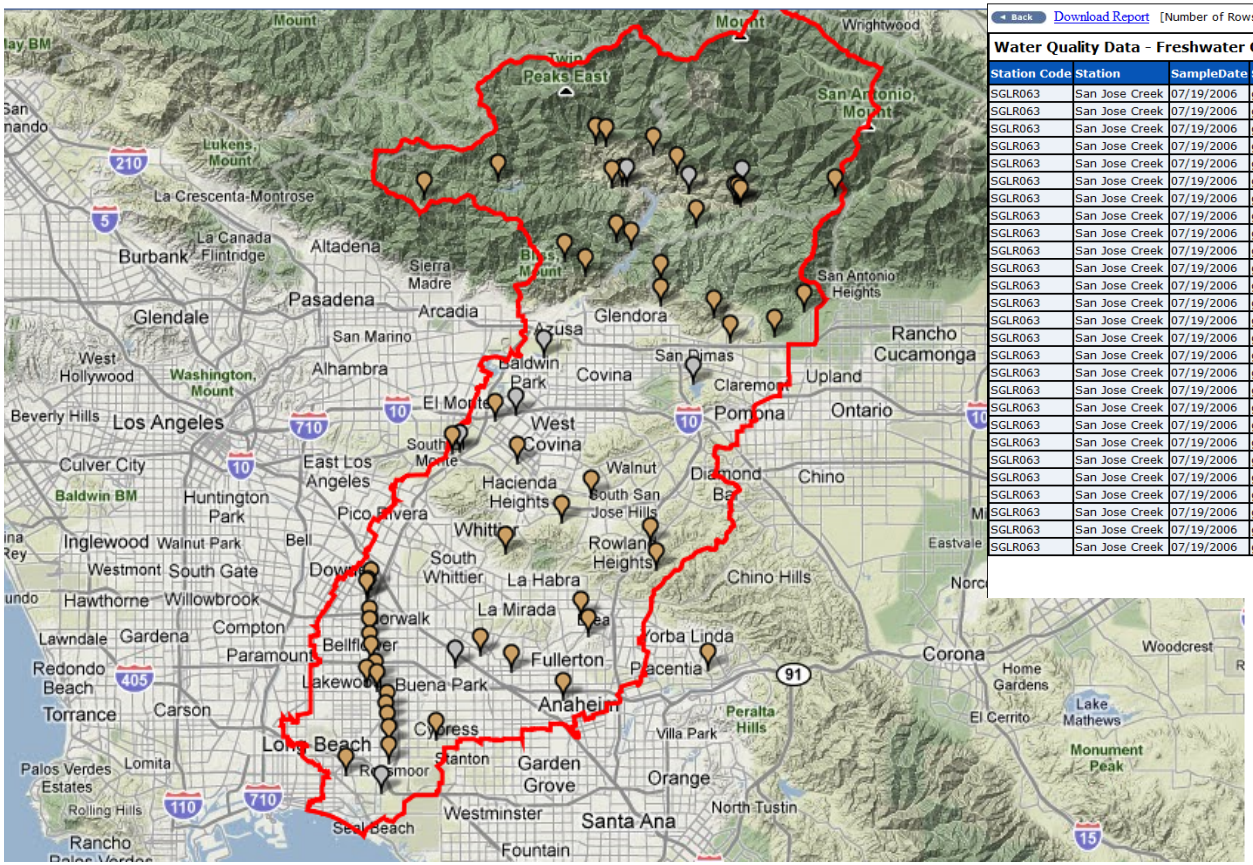
What is the Health of Your Watershed?



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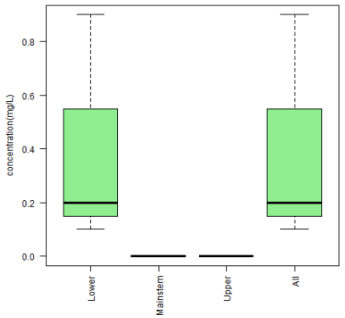
Water Quality Data - Freshwater Chemistry

Station Code	Station	SampleDate	Sample Type	Matrix	Method	Fraction	Analyte	Result	Unit	Basis
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 350.3	None	Ammonia as N	0.199	mg/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 451.1	Dissolved	Dissolved Organic Carbon	4.91	mg/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	SM 4110 B	None	Nitrate as N	3.54516129	mg/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	SM 4110 B	None	Nitrite as N	0.133913043	mg/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 150.1	None	pH	8.02	none	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 310.1	None	Total Alkalinity	160	mg/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 130.2	None	Total Hardness	450	mg/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 351.4	None	Total Kjeldahl Nitrogen	1.6	mg/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 415.1	Total	Total Organic Carbon	5.05	mg/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 365.3	None	Total Orthophosphate	0.08	mg/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 365.3	None	Total Phosphorus	0.067	mg/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Dissolved	Arsenic	2.01	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Total	Arsenic	2.1	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Dissolved	Cadmium	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Total	Cadmium	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Dissolved	Chromium	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Total	Chromium	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Dissolved	Cobalt	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Total	Cobalt	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Dissolved	Copper	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Total	Copper	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Dissolved	Lead	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Total	Lead	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Dissolved	Nickel	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Total	Nickel	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Dissolved	Selenium	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Total	Selenium	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Dissolved	Silver	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Total	Silver	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Dissolved	Zinc	0.05	ug/L	ww
SGLR063	San Jose Creek	07/19/2006	grab	samplewater	EPA 200.8	Total	Zinc	0.05	ug/L	ww

Title: Chemistry Box Chart Using R

Parameters: FractionName = Dissolved
AnalyteName = Cobalt



Summary

7 years of monitoring SGRRMP

Ambient assessment provides context for compliance monitoring

Multiple indicators provides more comprehensive assessment

- Ability to explore correlations and causative factors
- Address a range of questions for a variety of audiences

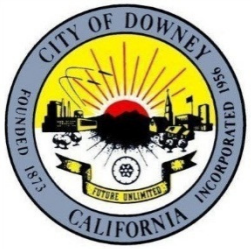
Shared data synthesis and interpretation

- Collaborative, "State of the Watershed" report
- Identification of "Special Studies"

Increased efficiency in monitoring and reporting

- Reduced redundancy in sampling
- Standardized methods
- Increase efficiency of data analysis and reporting

Acknowledgements



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