ASBS Monitoring Results and Findings of the Natural Water Quality Committee

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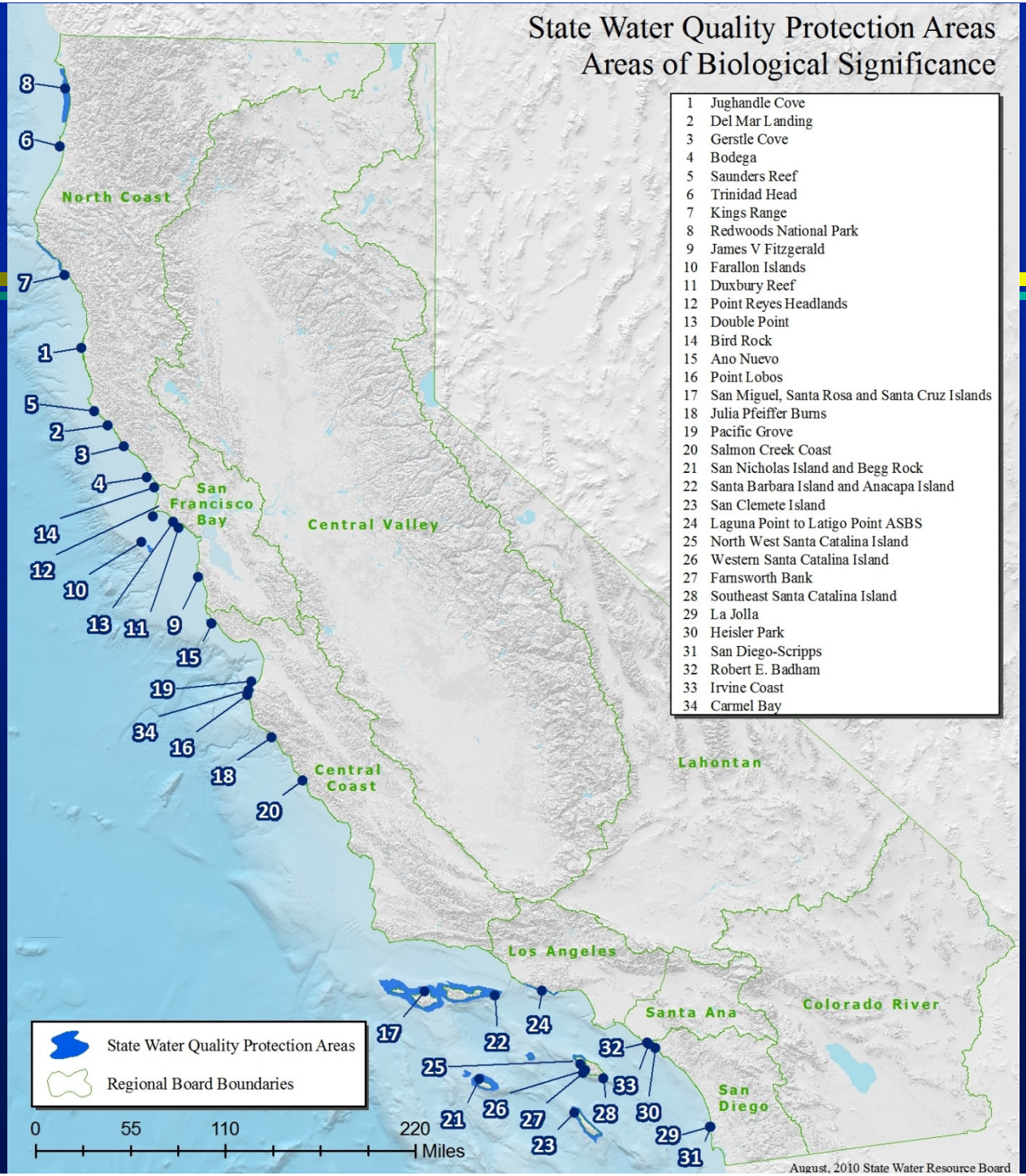
September 21, 2010



Areas of Special Biological Significance

34 ASBS designated in 1974-75

Ocean Plan: prohibits the discharge of waste to maintain natural water quality

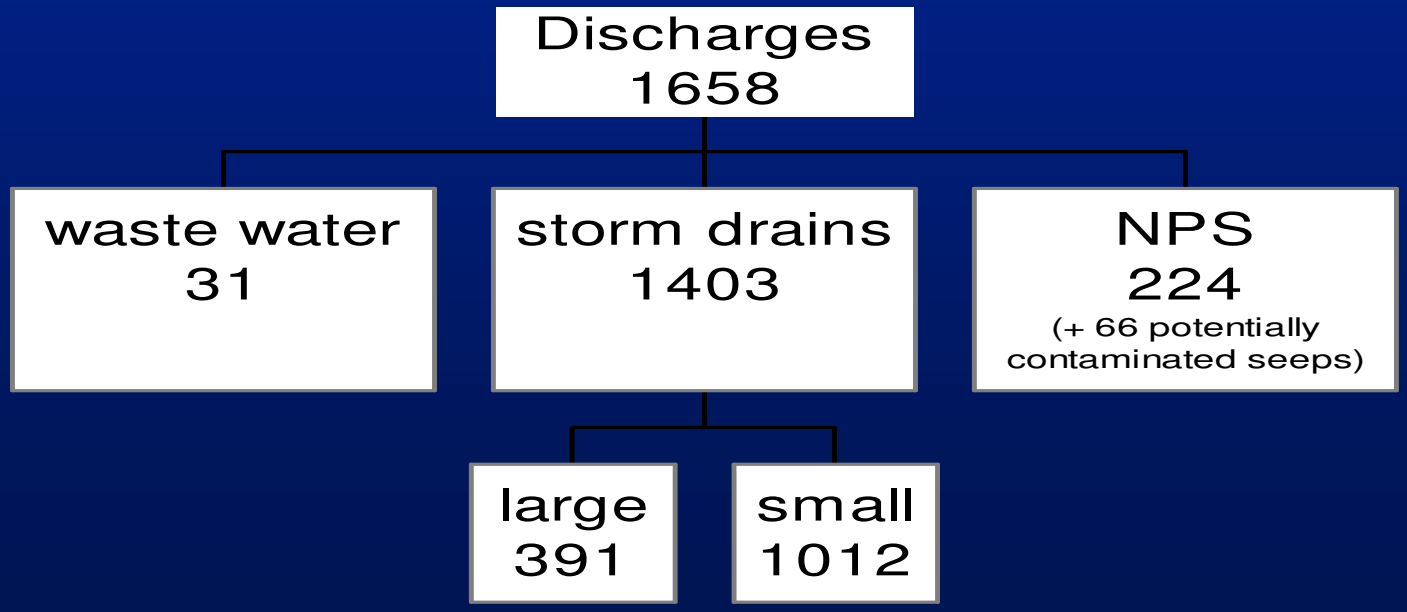
Public Resources Code: special protections for marine life

SCCWRP Survey:

Discharges of Waste Found

2003

Statewide ASBS/SWQPA Discharges



Strategy to Address Discharges into ASBS

- Special Protections for water quality – discharges limited by special terms and conditions
- Individual Exceptions: Marine laboratories and aquariums
  - Three adopted since 2004:
    - UCSIO, USC WMSC, UC BML
  - Three in progress, scheduled for early 2010
    - Hopkins, Monterey Bay Aquarium, HSU Telonicher Lab
- General Exception
  - Permitted Storm water
  - Non-point sources
  - Military operations

General Exception Process "Draft Special Protections"

- Total of 27 applicants
- CEQA initiated with Notice of Preparation (NOP) and preliminary draft
- Public Comments received
- Draft EIR in progress, target date for release October 2010

Draft Special Protections
- Summary of Conditions -

- Cessation of non-storm water runoff, with only certain exceptions
  - fire fighting
  - foundation drains
  - basement pump-outs
  - hillside dewatering
- Maintenance of natural water quality within ASBS receiving water during precipitation events
- Monitoring water quality and marine aquatic life in ASBS to ensure the protection of beneficial uses over time

Natural Water Quality Committee

- State Board Res 2004-0052, ASBS exception for Scripps Institution of Oceanography, mandated a scientific advisory body
- Goal of the Committee was to help define "natural water quality"
- Committee contract (SCCWRP) ended in 2009

Members of the Natural Water Quality Committee

- Dr. Burton Jones (Univ of Southern California)
- Dr. Steven Murray (Cal State Univ Fullerton)
- Dr. Andrew Dickson (Scripps Institution of Oceanography)
- Richard Gossett (CRG Marine Laboratories)
- Kenneth Schiff (Southern Calif Coastal Water Research Project)
- Dominic Gregorio (State Water Resources Control Board)
- Bruce Posthumus (San Diego Regional Water Quality Control Board)

ASBS Collaborative Monitoring

- SWAMP funding for ASBS monitoring
  - Pilot Reference Study
  - Statewide Probabalistic Water Quality
  - Coordination of Regional Monitoring
- Southern CA Bight 08 Regional Monitoring
  - Funded by stakeholders
- Peer Review by NWQ Committee

Summary of Findings:

Natural Water Quality Committee

Definition of Natural Water Quality

That water quality (based on selected physical, chemical and biological characteristics) that is required to sustain marine ecosystems, and which is without apparent human influence, *i.e.*, an absence of significant amounts of:

- man-made constituents (*e.g.,* DDT),
- other chemical (*e.g.,* trace metals), physical (temperature/thermal pollution, sediment burial) and biological (*e.g.*, bacteria) constituents at concentrations that have been elevated due to man's activities above those resulting from the naturally occurring processes that affect the area in question, and
- non-indigenous biota (*e.g.,* invasive algal bloom species) that have been introduced either deliberately or accidentally by man

Limitations of Natural Water Quality

- There is a significant amount of natural variation
- Faced with the reality that most of the world's oceans are no longer "pristine" (Halpern et al. 2008)
- Natural Water Quality must satisfy these criteria:
  - Definable reference areas that approximate natural conditions
  - Any detectable human influence must not hinder marine life

The Three Questions

1. Are water quality objectives and permit limits being met?
   - Specific to Scripps Institution of Oceanography (SIO)

2. Are there biological impacts to species or communities?
   - Single ASBS to regional scale

3. What would ambient water quality be if the discharges were not present?
   - Regional to statewide scale

Our Answers

1. On the whole, the SIO is meeting water quality objectives and permit limitations

2. It is too soon to tell if there are impacts of waste discharge to marine species and communities
   - But promising work has begun

3. It is practical to quantitatively define ambient water quality without (or with minimal) waste discharges

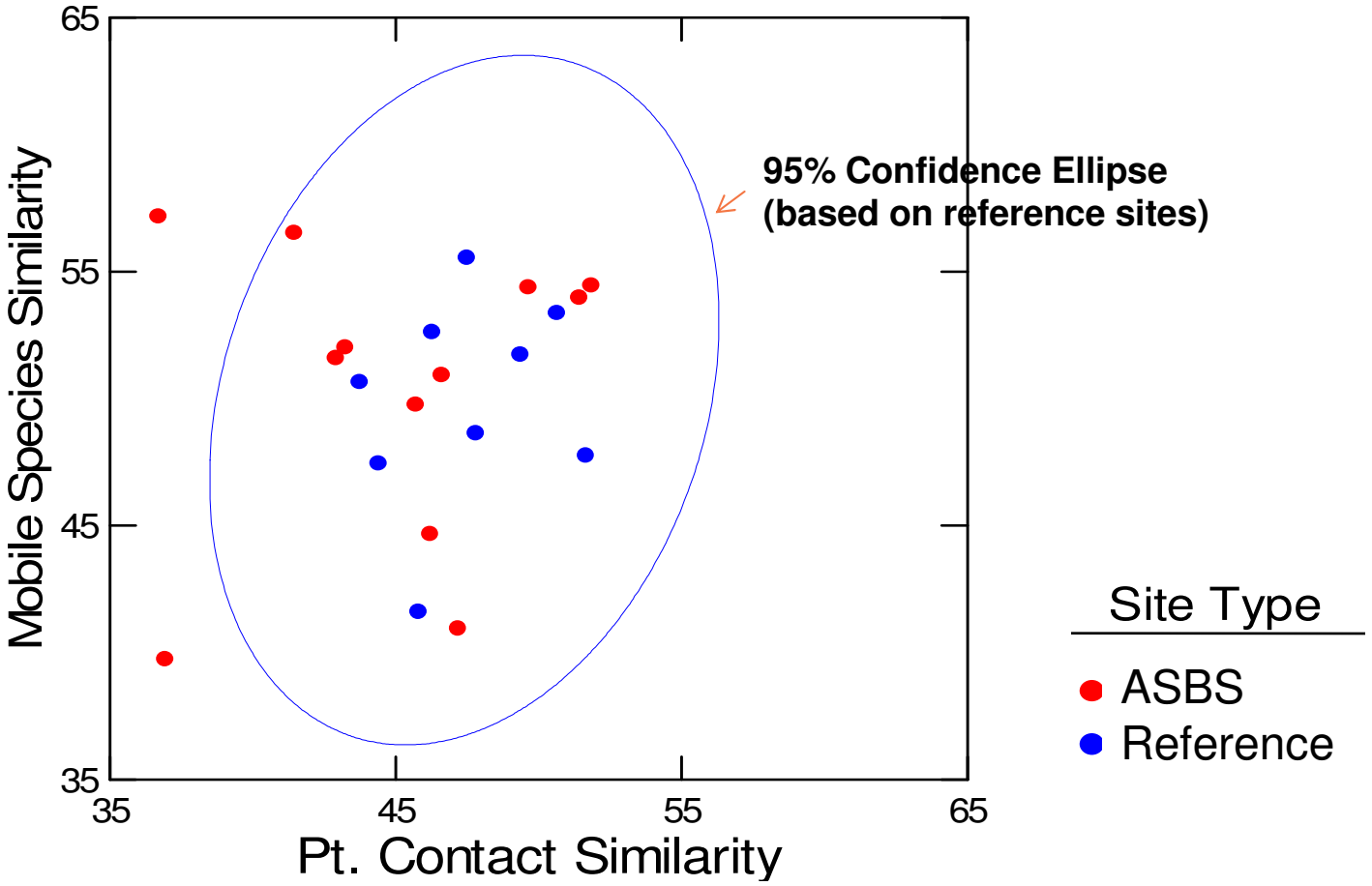
Question 1: SIO Discharges

- Reasonable potential analysis indicated many constituents in SIO discharges were not a risk to the ASBS
- Exceedences of the Ocean Plan occurred more frequently for stormwater than waste seawater
  - Metals (copper), PAH, chronic toxicity
- Certain constituents exceeded permit limits, but were likely not a result of SIO
  - Widely disbursed constituents (Dioxins)
  - Issues with methodology (residual chlorine, acute toxicity)

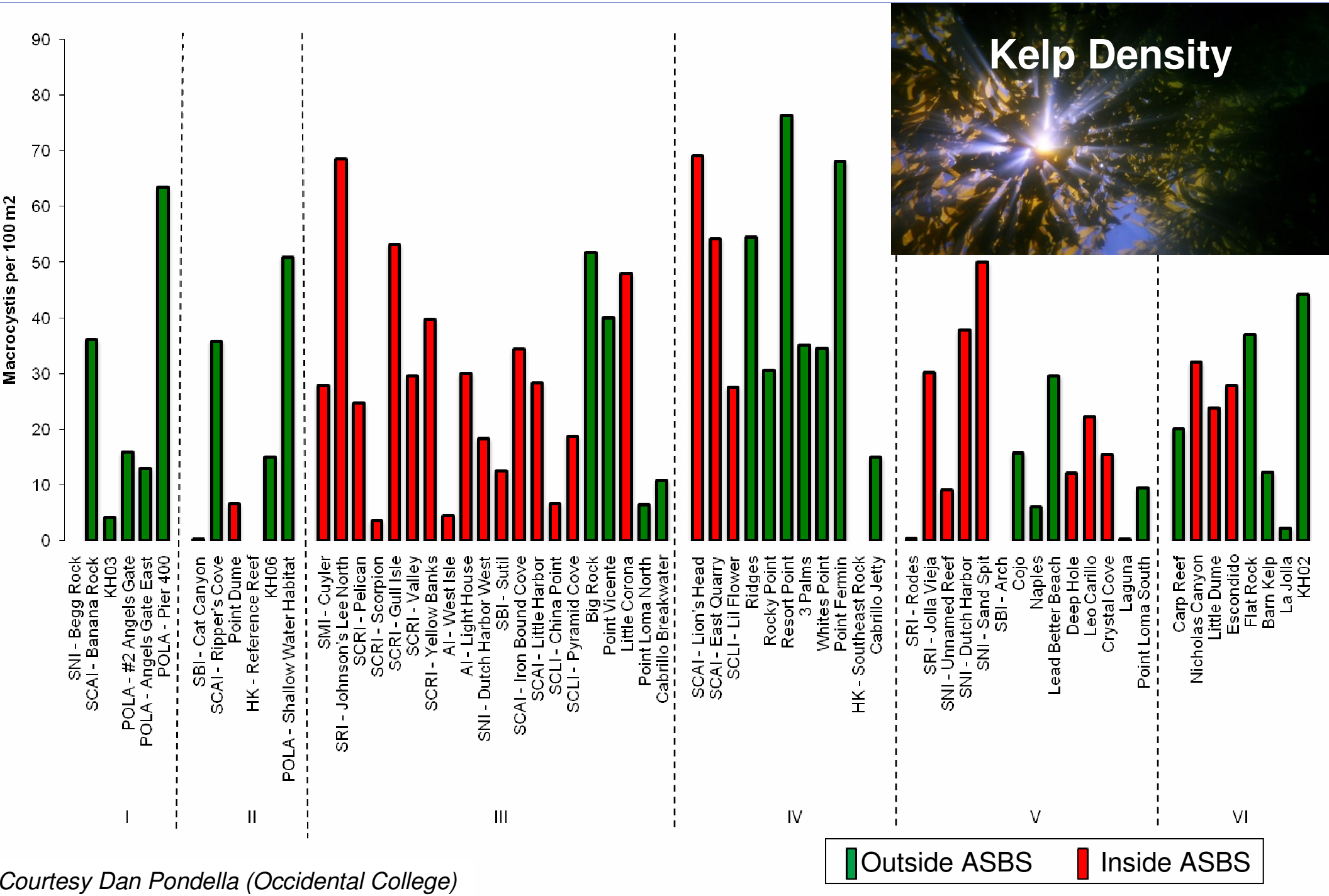
Question 2: Biological Impacts

- SIO and 13 other ASBS stakeholders in southern California initiated a collaborative monitoring program
  - Diversity surveys of rocky intertidal and rocky subtidal habitats
- Preliminary intertidal results indicate potential differences between reference sites and sites in ASBS
  - Effect of water quality?
- Preliminary subtidal results still being assessed
  - Unprecedented survey of rocky reefs inside and outside of ASBS is also applicable to MPA monitoring

Similarity of Community Assemblages (mobile and sedentary species)



Courtesy Pete Raimondi (UC Santa Cruz)



Courtesy Dan Pondella (Occidental College)

Question 3: Ambient Water Quality

- Two separate, but linked monitoring efforts
  - Statewide probabilistic survey, So Cal targeted survey
- ASBS water quality is generally good statewide following storm events
  - Both near and distant from direct discharges
- Background concentrations of very few constituents exceeds Ocean Plan objectives
  - Have anthropogenic and natural sources

COMPARISON TO OCEAN PLAN WATER QUALITY STANDARDS

	% Shoreline Miles > WQS		
	6 Mo Median*	Daily Max	Instant Max
Ammonia-N	--	--	--
Arsenic	1.6	--	--
Cadmium	2.1	--	--
Chromium	50	1.6	--
Copper	6.9	--	--
Lead	4.8	--	--
Nickel	15	--	--
Silver	--	--	--
Zinc	3.8	--	--
HCH-lindanes	--	--	--
Chlordane	--	--	--
DDTs	--	--	--
Dieldrin	--	--	--
PAHs	87	--	--
PCBs	--	--	--

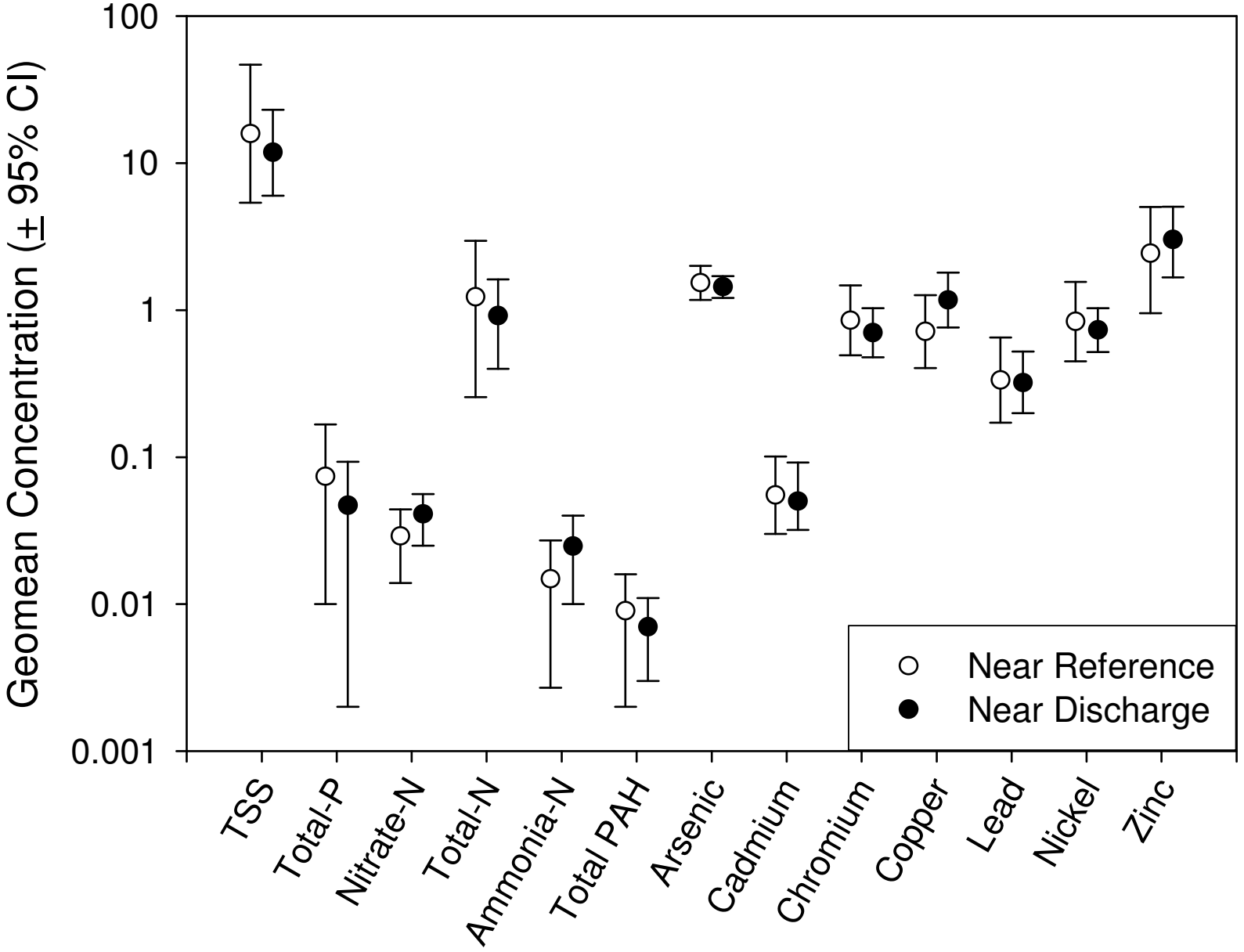
-- no shoreline exceeds
*** 30 d ave for organics**

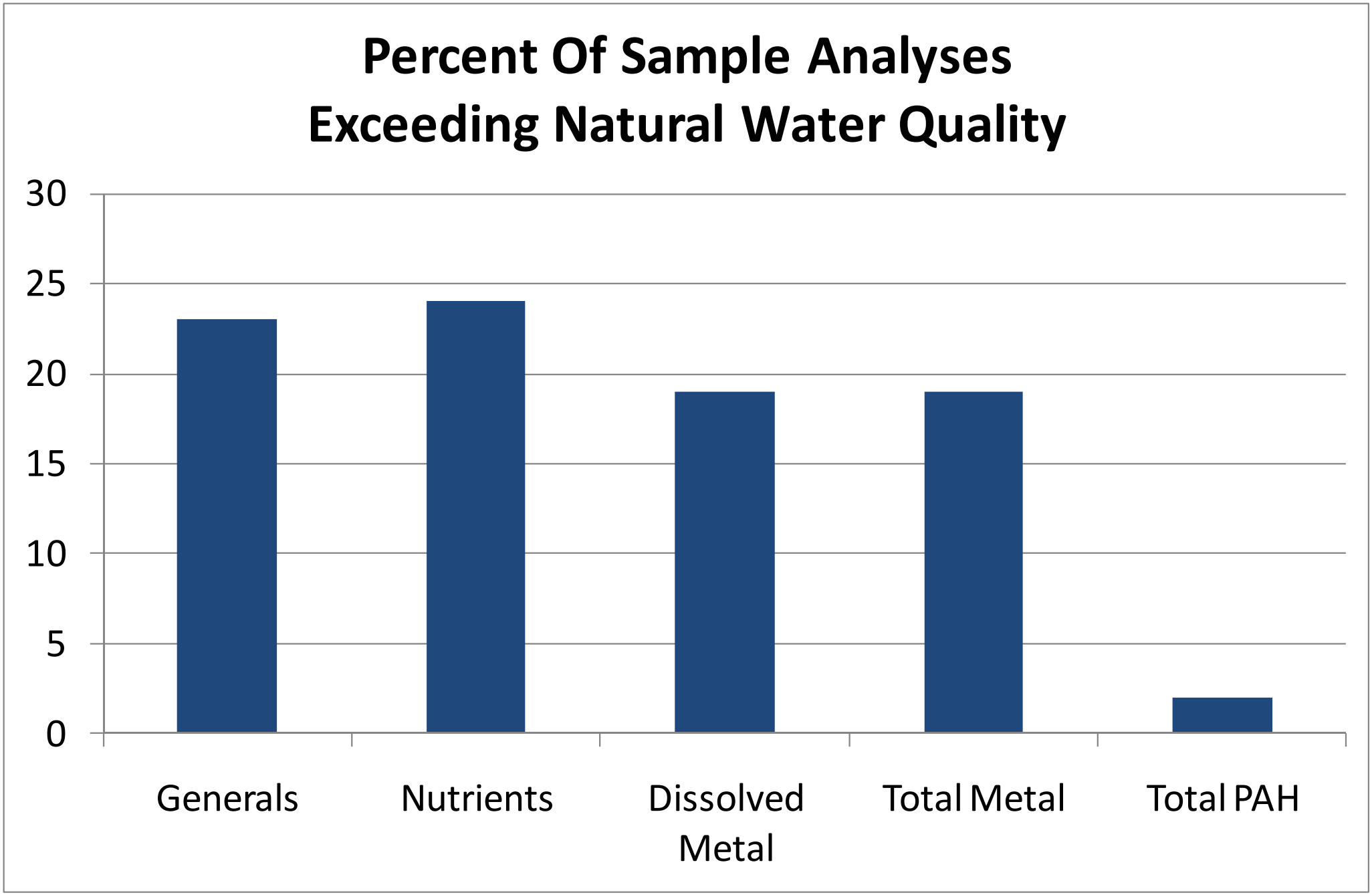
Question 3: Ambient Water Quality

- Two separate, but linked efforts
  - Statewide probabilistic survey, So Cal targeted survey
- Identified and agreed upon reference sites in southern California
  - Ocean concentrations near ASBS discharges were similar to reference drainages
- There were some problematic constituents
  - Individual ASBS issues

Southern Cal Post-Storm Receiving Waters

Reference vs. Discharge



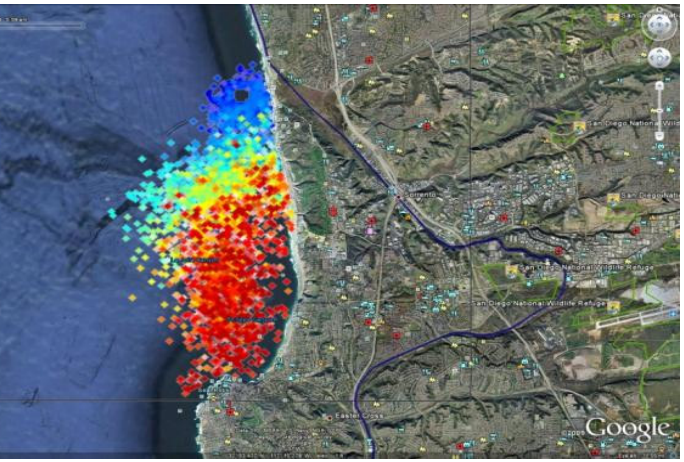

Percent Of Sample Analyses
Exceeding Natural Water Quality
30
25
20
15
10
5
0
Generals
Nutrients
Dissolved Metal
Total Metal
Total PAH

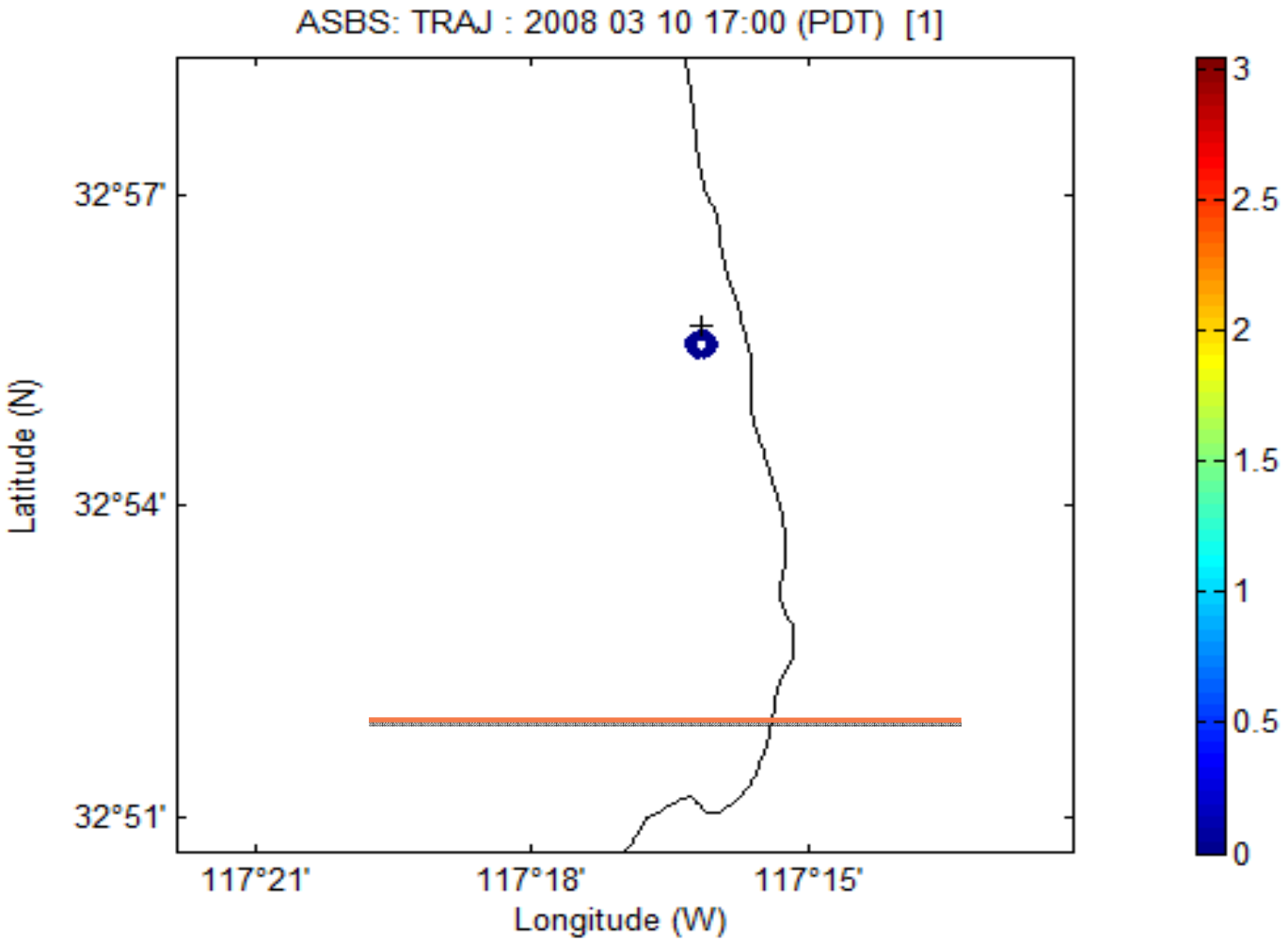
NWQC Recommendations

- Additional data to quantitatively define reference would be useful
  - Central and Northern California
- Refine indicator list to be monitored
  - Opportunities for adaptive monitoring
- Improvements should be made to the Ocean Plan
  - Table C
- Regulators need to identify strategies to account for shifting baselines

HF radar surface currents used to compute trajectories from Los Penasquitos river inlet.

(*5-day discharge example courtesy SCCOOS*)





In Summary

- Water quality following storms in ASBS is generally good
  - But there are certain constituents and locations that are a concern
- It is possible to define Natural Water Quality with a reference approach
- Biological monitoring is feasible
  - initial focus on rocky intertidal
- Distant sources (i.e., large watersheds) may have more impact on water quality than many direct storm drains