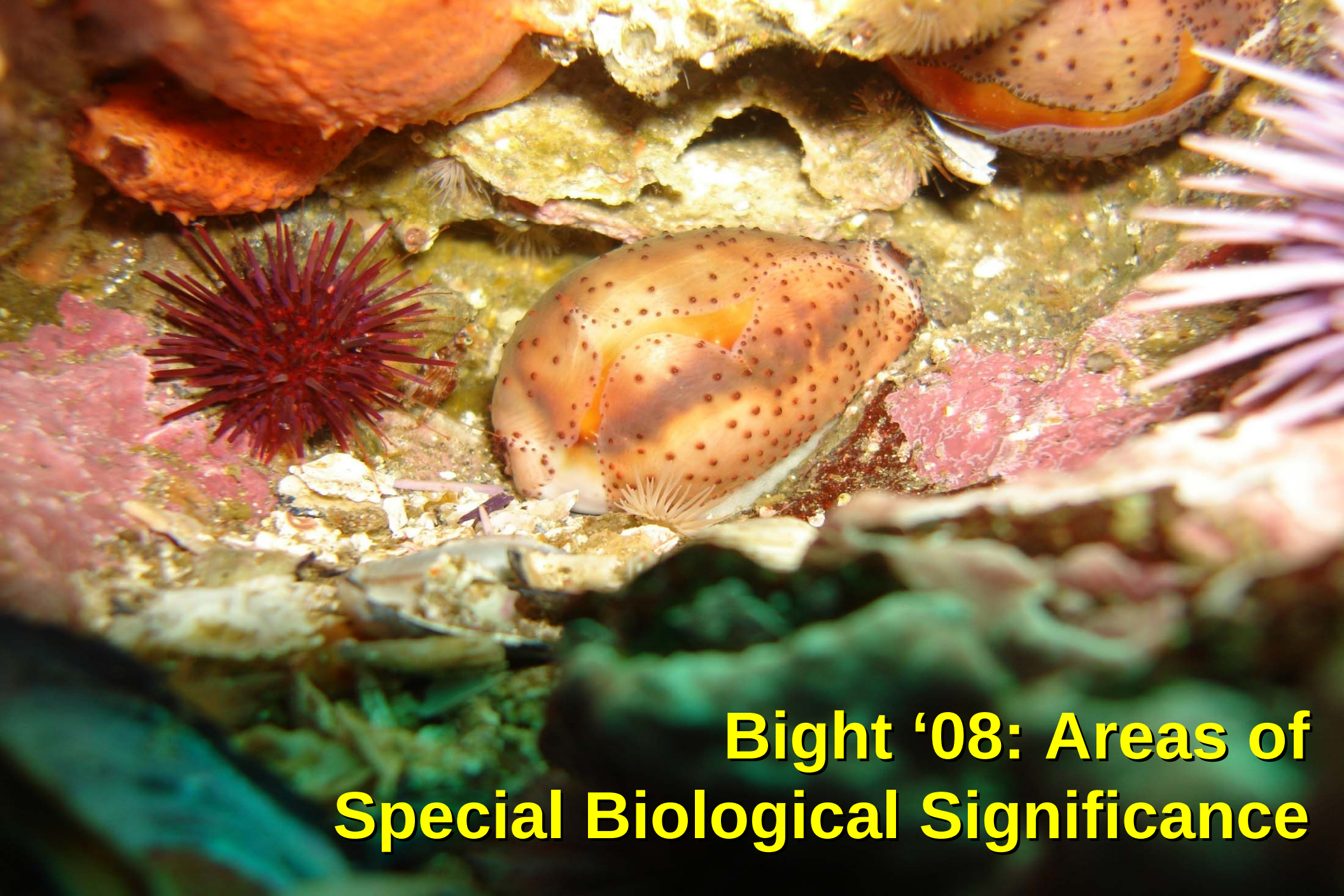


# Bight '08: Areas of Special Biological Significance

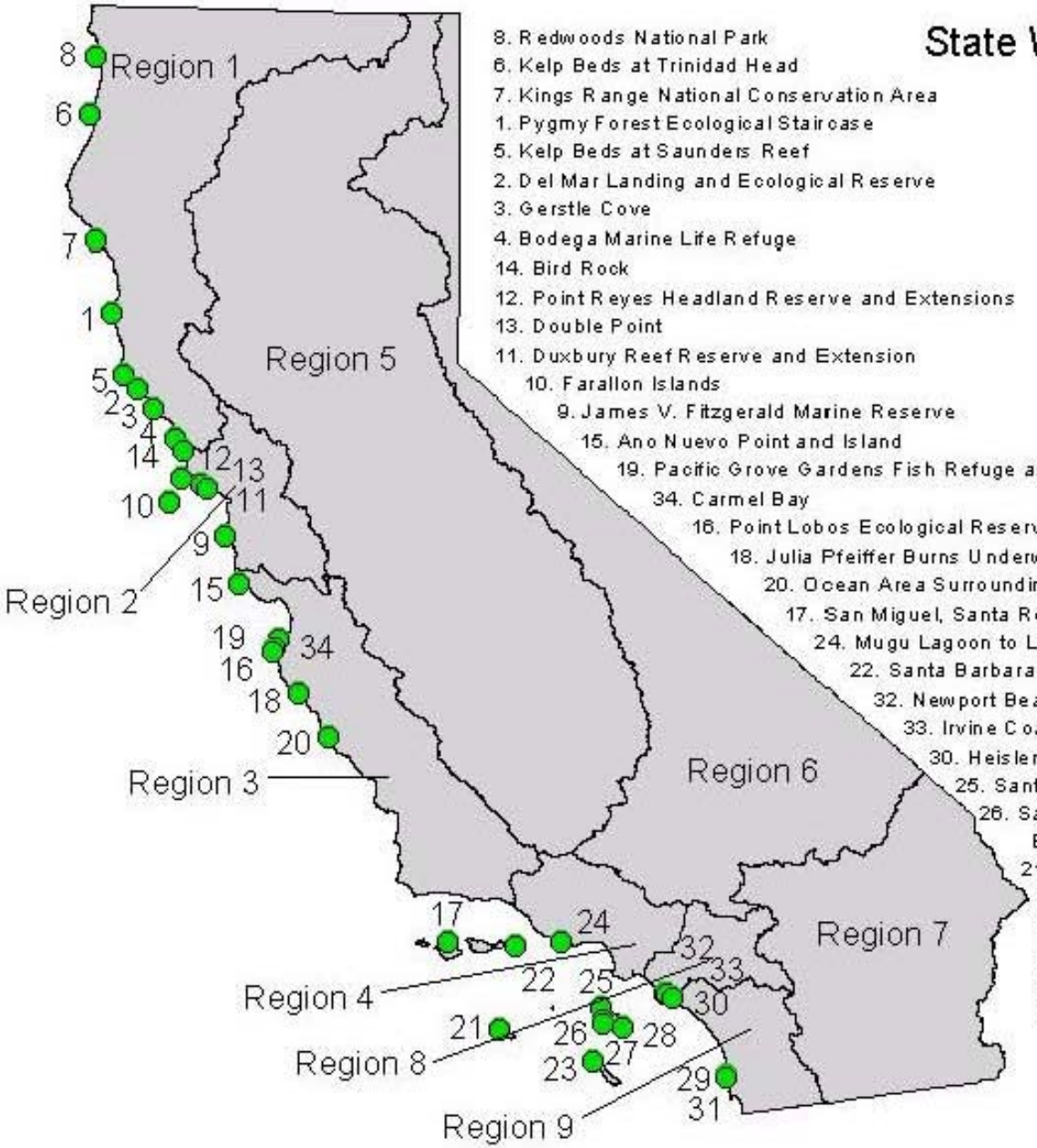
# There are Different Kinds of State Marine Protected Areas (MPAs)

- Marine conservation area
- Marine reserve
- Marine park
- Marine cultural preservation area
- Marine recreational managed area
- Water quality protected area

# Water Quality Protected Areas

- Called Areas of Special Biological Significance
  - 14 of 34 ASBS occur in So Cal
- Regulation different than typical NPDES permit
  - “No discharge of waste..maintenance of natural water quality”
- Most recent survey observed nearly 1,700 discharges
  - Almost all are storm drains

# State Water Quality Protection Areas

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5. Kelp Beds at Saunders Reef
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3. Gerstle Cove
4. Bodega Marine Life Refuge
14. Bird Rock
12. Point Reyes Headland Reserve and Extensions
13. Double Point
11. Duxbury Reef Reserve and Extension
10. Farallon Islands
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34. Carmel Bay
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18. Julia Pfeiffer Burns Underwater Park
20. Ocean Area Surrounding the Mouth of Salmon Creek
17. San Miguel, Santa Rosa, and Santa Cruz Islands
24. Mugu Lagoon to Latigo Point
22. Santa Barbara Island, Santa Barbara County and Anacapa Island
32. Newport Beach Marine Life Refuge
33. Irvine Coast Marine Life Refuge
30. Heisler Park Ecological Reserve
25. Santa Catalina Is.-Subarea 1, Isthmus Cove to Catalina Head
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21. San Nicolas Island and Begg Rock
27. Santa Catalina Is.-Subarea 3, Farnsworth Bank
28. Santa Catalina Is.-Subarea 4, Binnacle Rock to Jewfish Point
23. San Clemente Island
29. San Diego-La Jolla Ecological Reserve
31. San Diego Marine Life Refuge

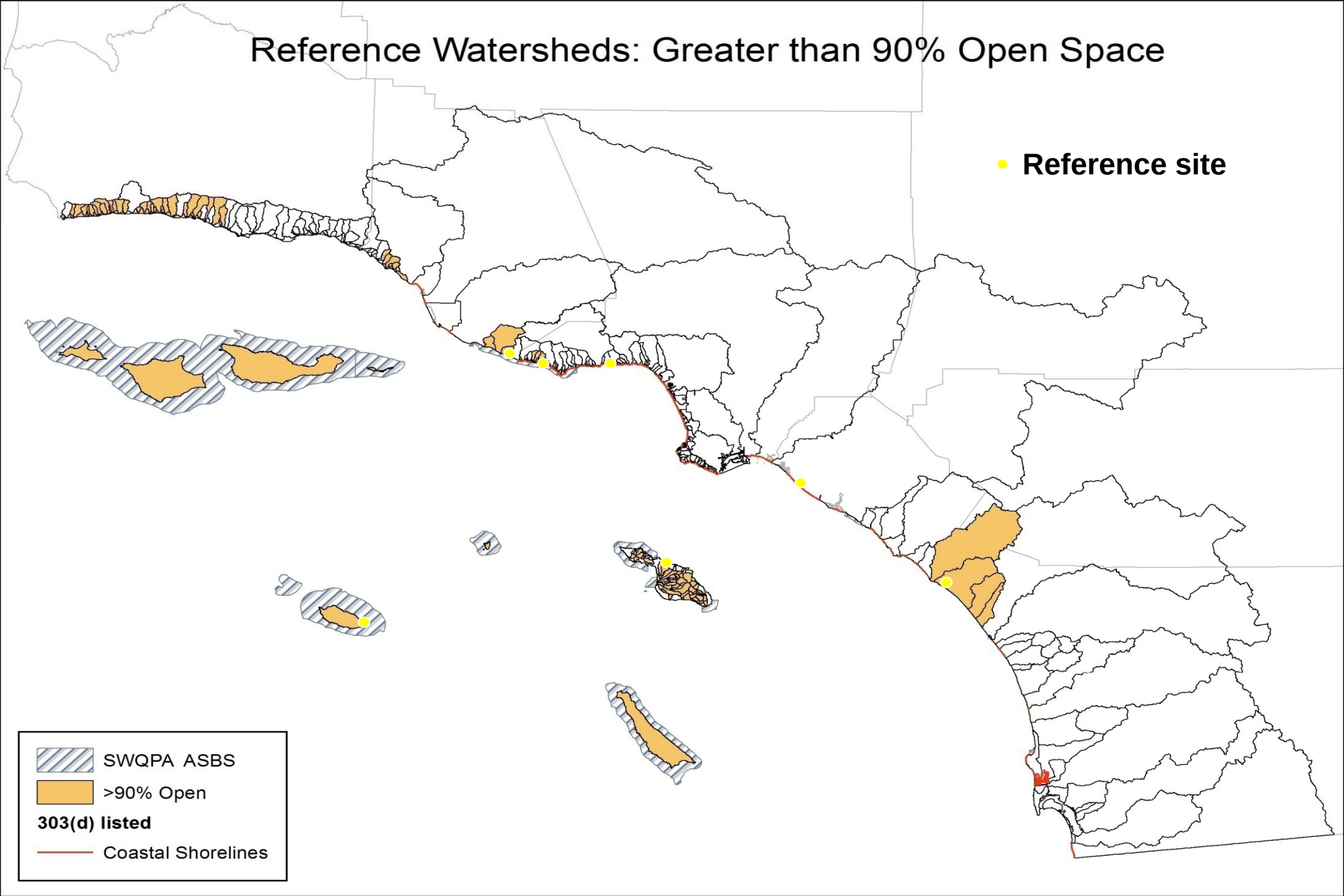
# Bight '08 ASBS Monitoring Questions

- What is the range of natural water quality at shoreline locations?
  - Develop natural water quality "limits"
- How does the range of natural water quality compare to ASBS sites?
  - Compare specific ASBS locations to natural water quality limits

# Targeted Design

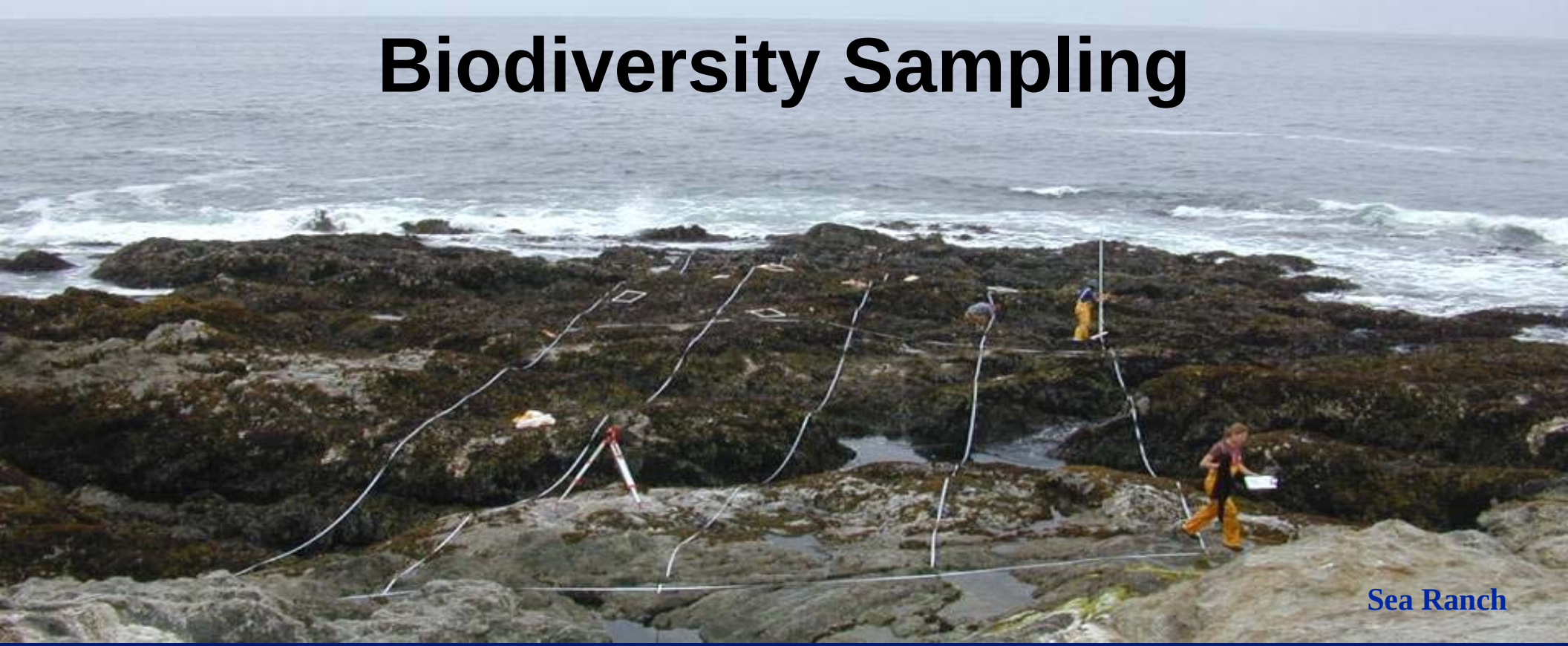
- **Chemistry and Toxicity was wet weather focused**
  - One sample pre-storm and another post-storm
  - Three storms per site
- **Biology was dry weather focused**
  - Standardized biodiversity surveys
- **Location specific site selection**
  - Reference sites
  - Discharge sites
  - Collected from the ocean immediately in front discharge

# Reference Watersheds: Greater than 90% Open Space



# Chemistry/Toxicity Sampling

# Biodiversity Sampling




- 30m horizontal transect parallel to shore
- 11 vertical transects perpendicular to shore
- Transects capture all major zones
- Identify and count all  mobile and non-mobile species

# Major Findings

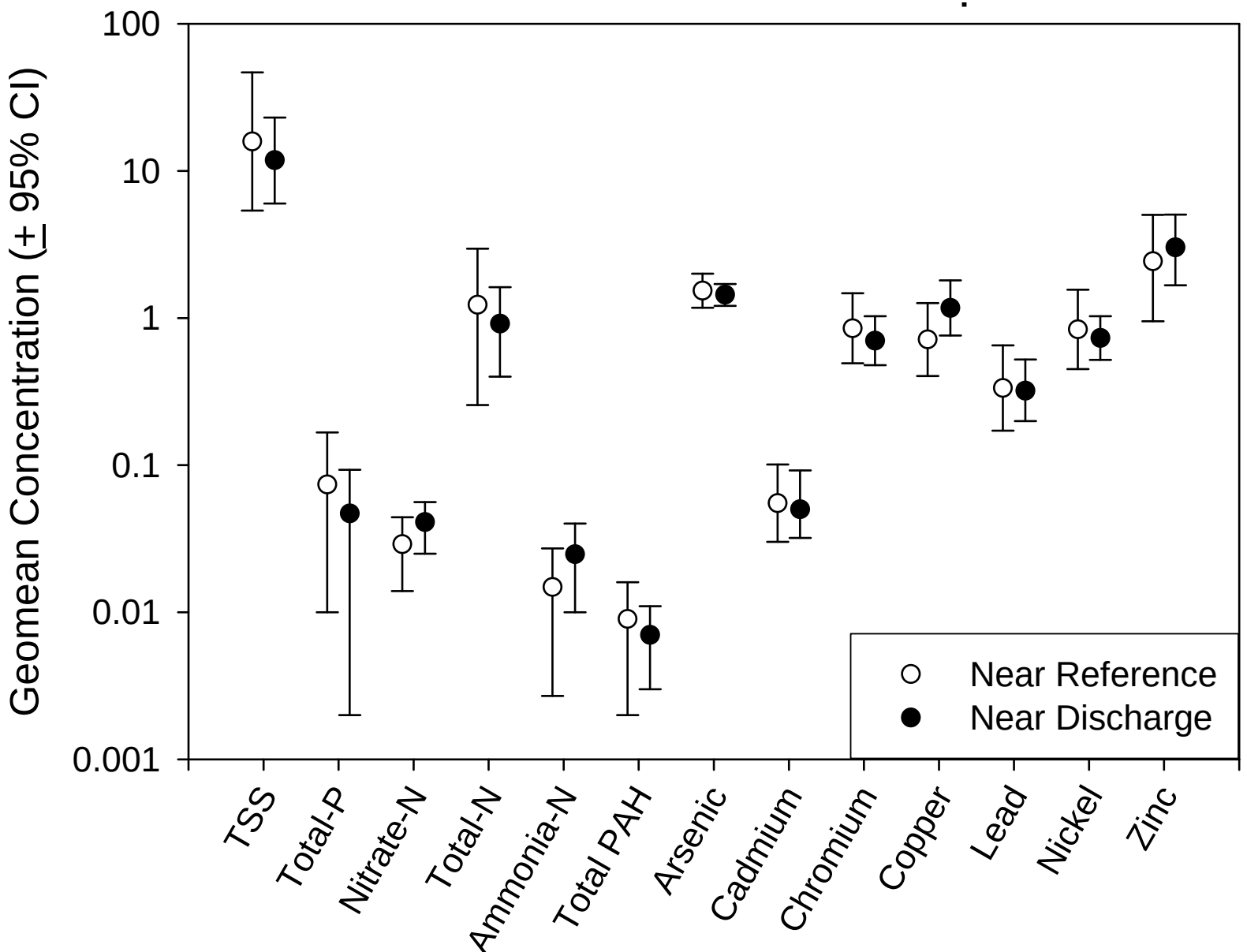
- **Developed numeric guidelines for Natural Water Quality**
  - **Reference site chemistry sometimes greater than the Ocean Plan**
- **Water quality near discharges was similar to reference sites**
  - Some isolated exceedences of the natural water quality guideline
- **Bight framework being utilized statewide**

# Reference Site Post-Storm Concentrations

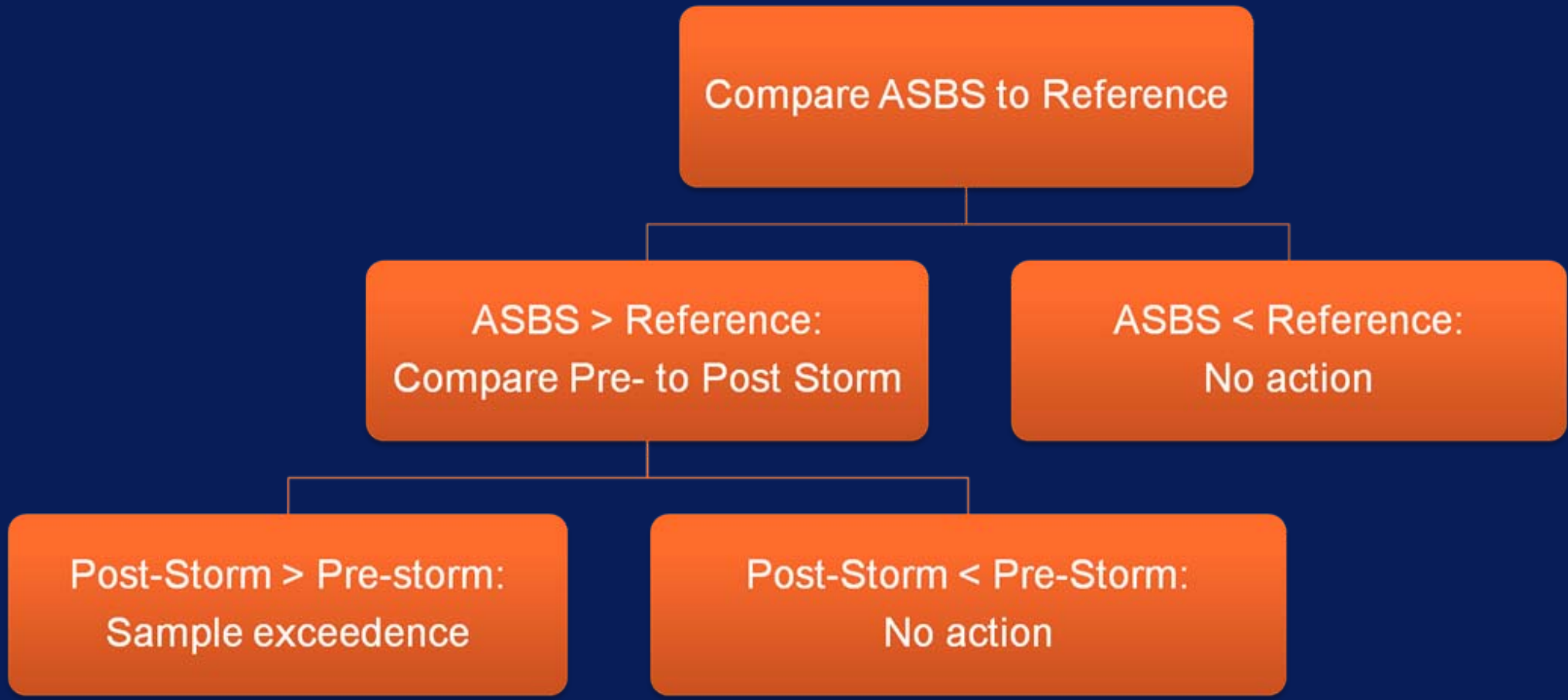
| | Units | Reference Maximum | Reference Mean | Ocean Plan Daily Max |
|---|---|---|---|---|
| Ammonia-N | mg/L | 0.05 | 0.01 | 2.4 |
| PAH | ng/L | 318 | 22 | 8.8 |
| Arsenic | ug/L | 5.0 | 1.8 | 32 |
| Cadmium | ug/L | 4.5 | 1.8 | 4 |
| Chromium | ug/L | 17 | 1.9 | 8 |
| Copper | ug/L | 6.1 | 1.1 | 12 |
| Lead | ug/L | 9.5 | 2.4 | 8 |
| Nickel | ug/L | 19 | 2.0 | 20 |
| Silver | ug/L | 6.0 | 0.7 | 2.8 |
| Zinc | ug/L | 29 | 5.2 | 80 |

# Comparison Of Post-Storm Receiving Waters

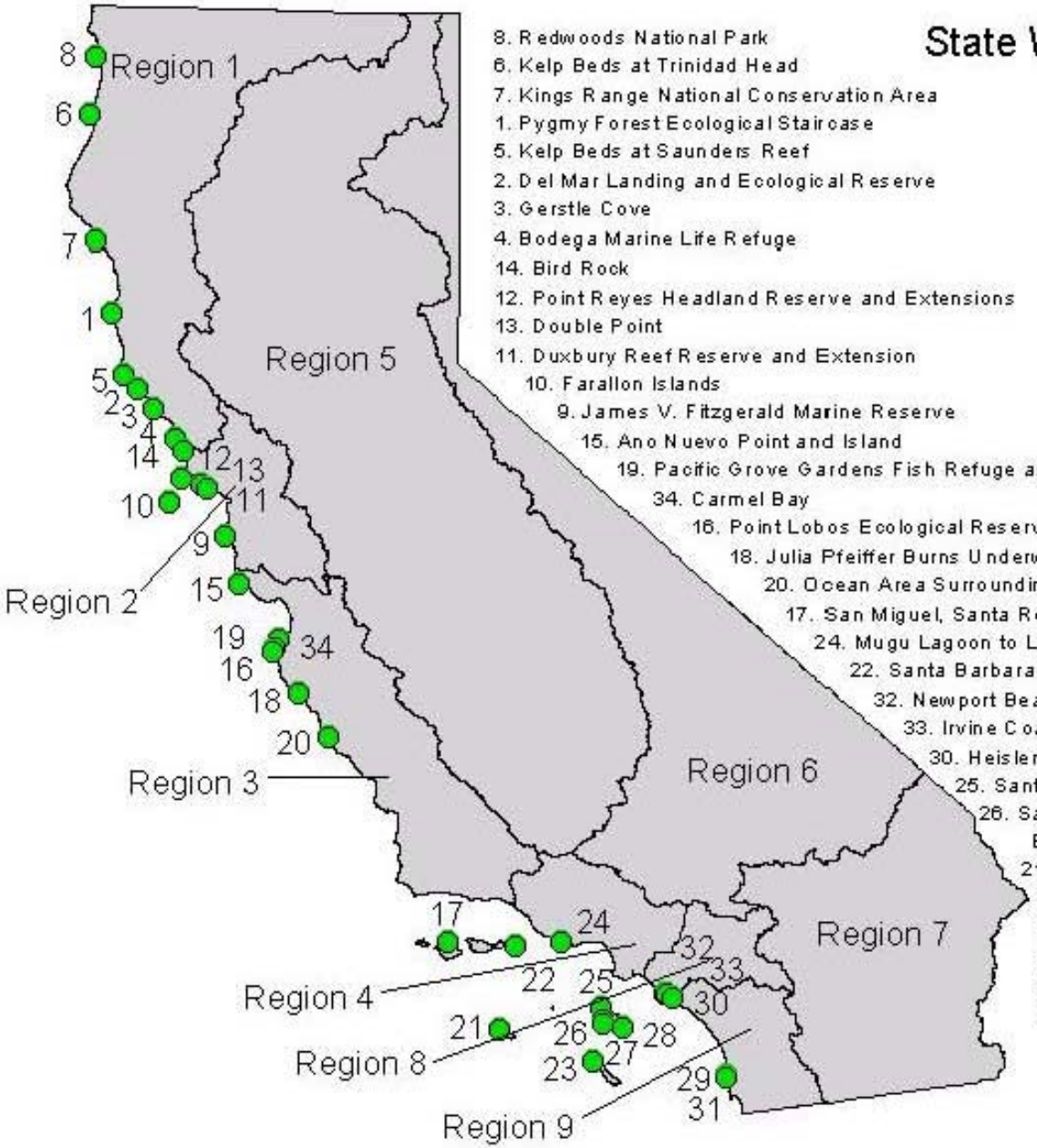
## *Reference vs. Discharge*



# Discharge Sample Evaluation Scheme



# State Water Quality Protection Areas

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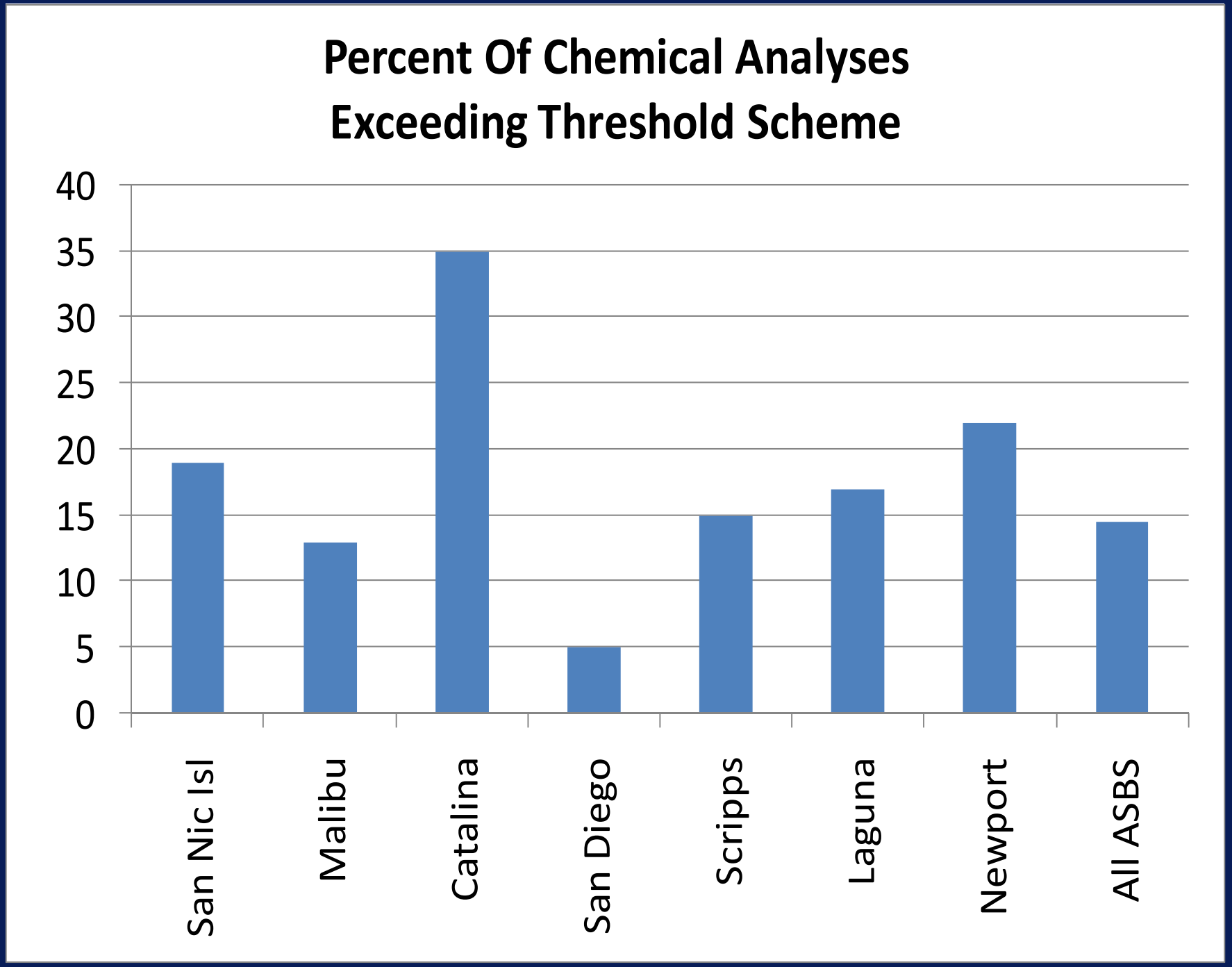
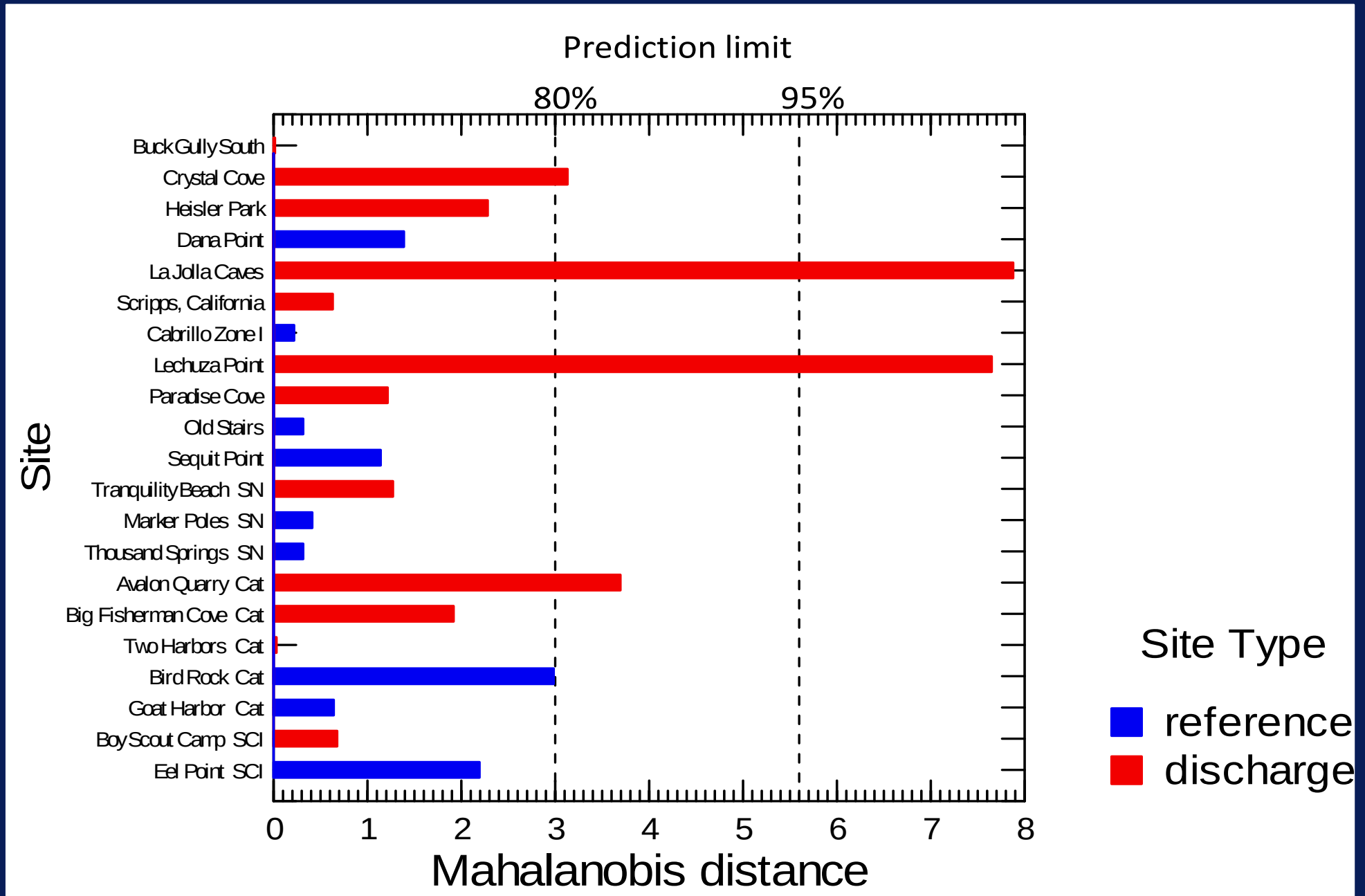
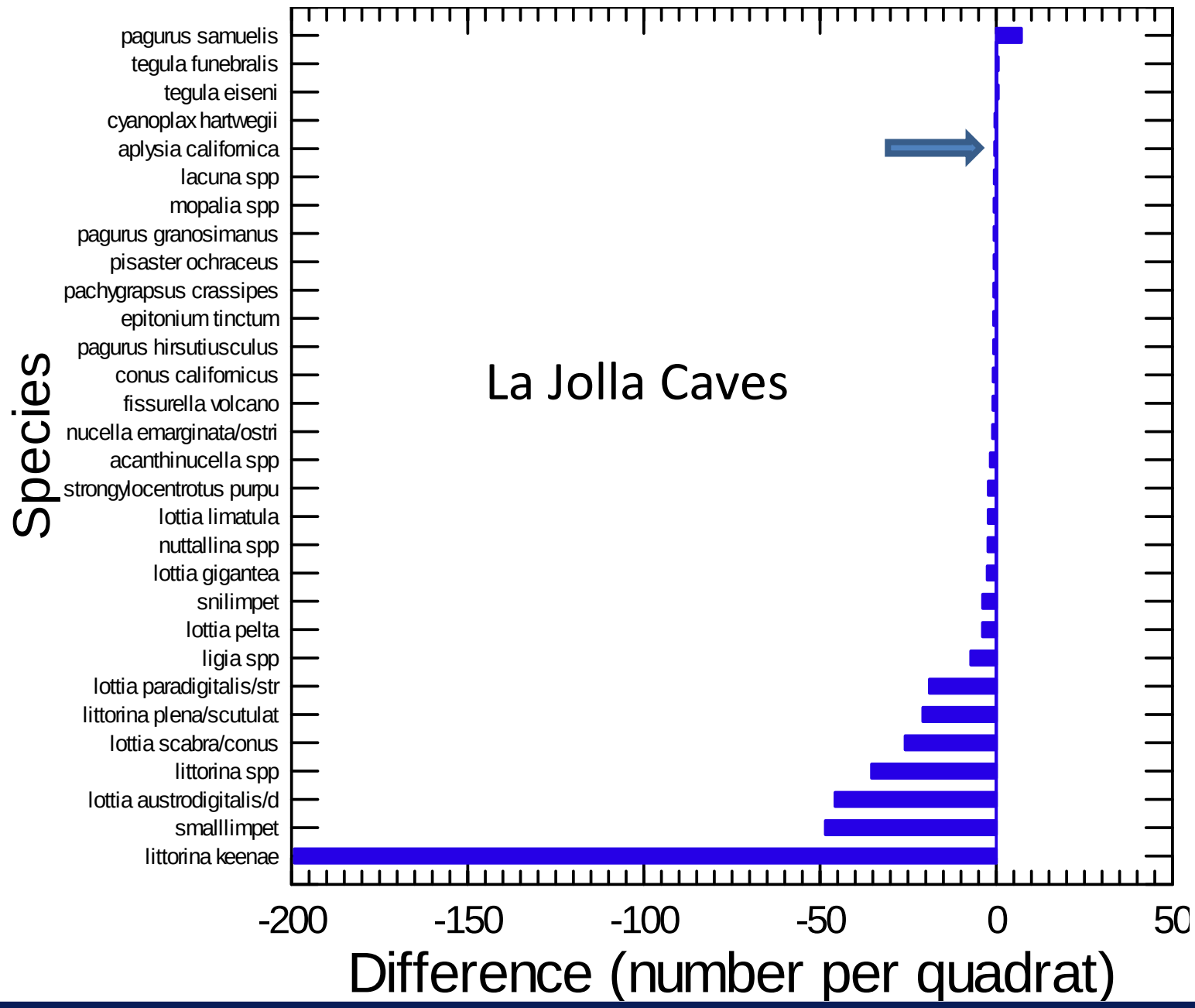

Percent Of Chemical Analyses
Exceeding Threshold Scheme
40
35
30
25
20
15
10
5
0
San Nic Isl
Malibu
Catalina
San Diego
Scripps
Laguna
Newport
All ASBS


Prediction limit
80%
95%
Buck Gully South
Crystal Cove
Heisler Park
Dana Point
La Jolla Caves
Scripps, California
Cabrillo Zone I
Lechuza Point
Paradise Cove
Old Stairs
Sequit Point
Tranquility Beach SN
Marker Poles SN
Thousand Springs SN
Avalon Quarry Cat
Big Fisherman Cove Cat
Two Harbors Cat
Bird Rock Cat
Goat Harbor Cat
Boy Scout Camp SCI
Eel Point SCI
Site
0
1
2
3
4
5
6
7
8
Mahalanobis distance
Site Type
reference
discharge

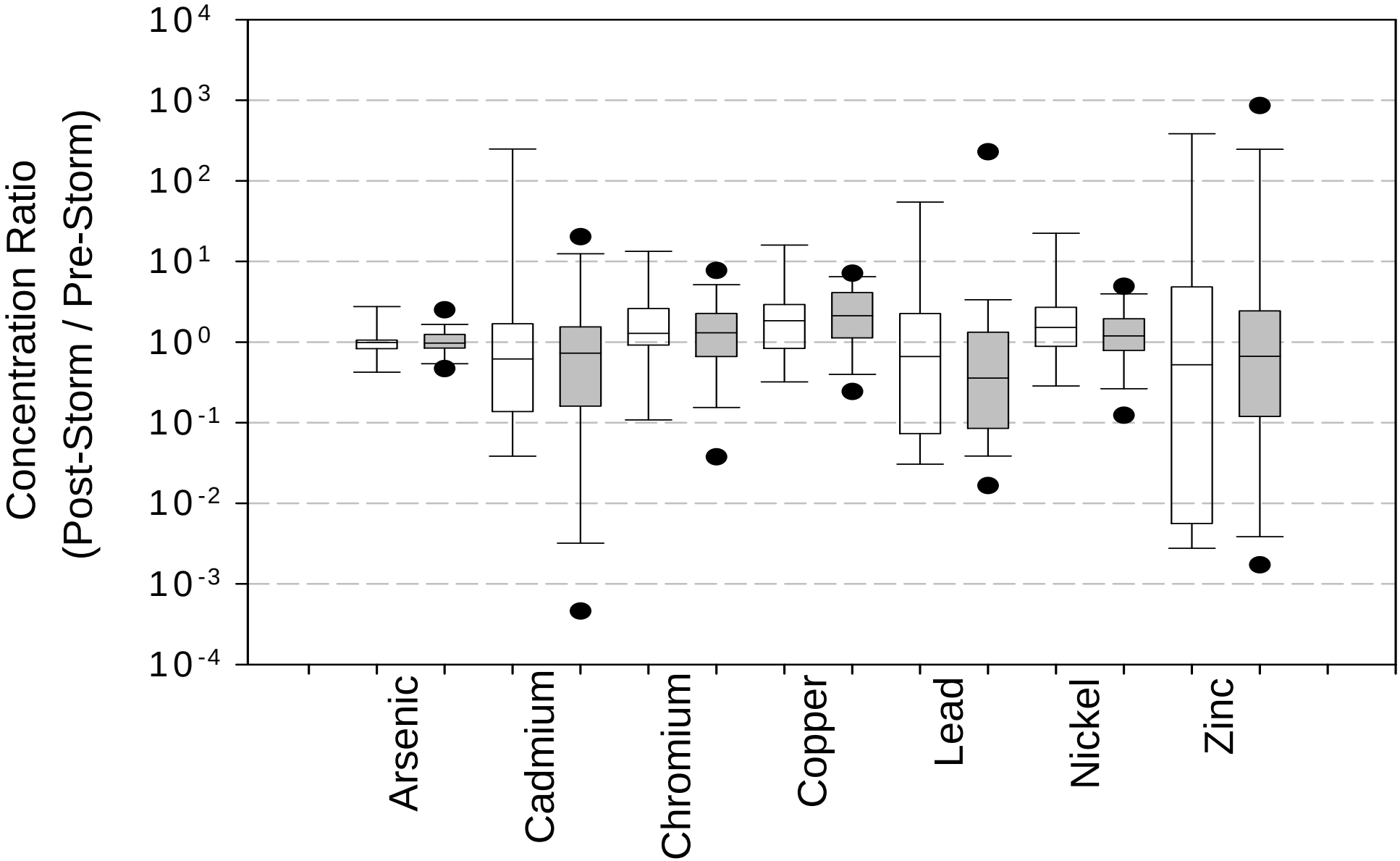

pagurus samuelis
tegula funebralis
tegula eiseni
cyanoplax hartwegii
aplysia californica
lacuna spp
mopalia spp
pagurus granosimanus
pisaster ochraceus
pachygrapsus crassipes
epitonium tinctum
pagurus hirsutiusculus
conus californicus
fissurella volcano
nucella emarginata/ostri
acanthinucella spp
strongylocentrotus purpu
lottia limatula
nuttallina spp
lottia gigantea
snilimpet
lottia pelta
ligia spp
lottia paradigitalis/str
littorina plena/scutulat
lottia scabra/conus
littorina spp
lottia austrodigitalis/d
smalllimpet
littorina keenae
Species
La Jolla Caves
-200
-150
-100
-50
0
50
Difference (number per quadrat)

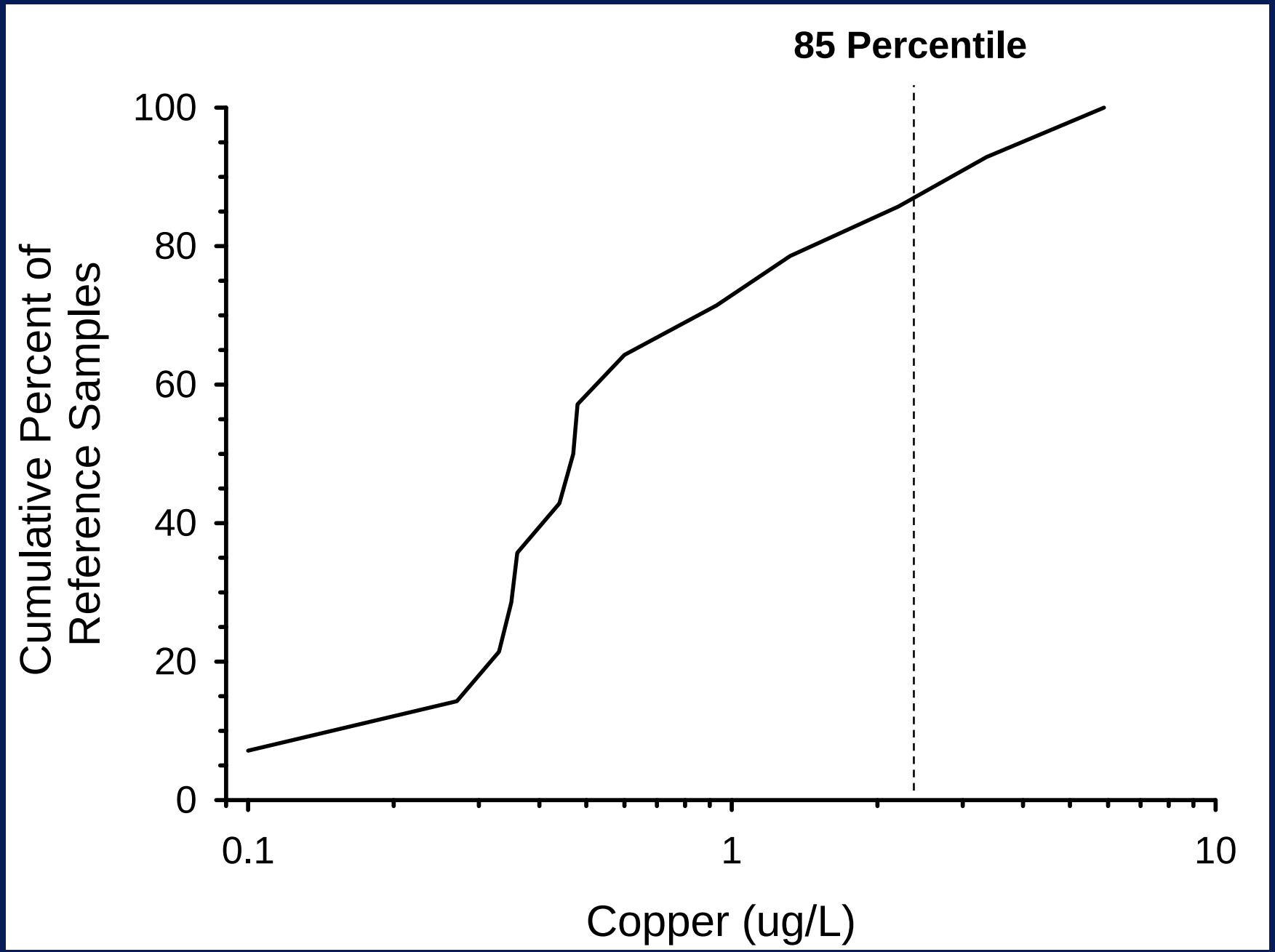
# Our Next Steps

- **Additional storm sampling**
  - Need a better characterization of reference
- **Examining fate and transport**
  - Linkage tool for effects
- **ASBS Stakeholders are not waiting for Bight ‘13**
  - Function of the SWRCB’s Special Exception process

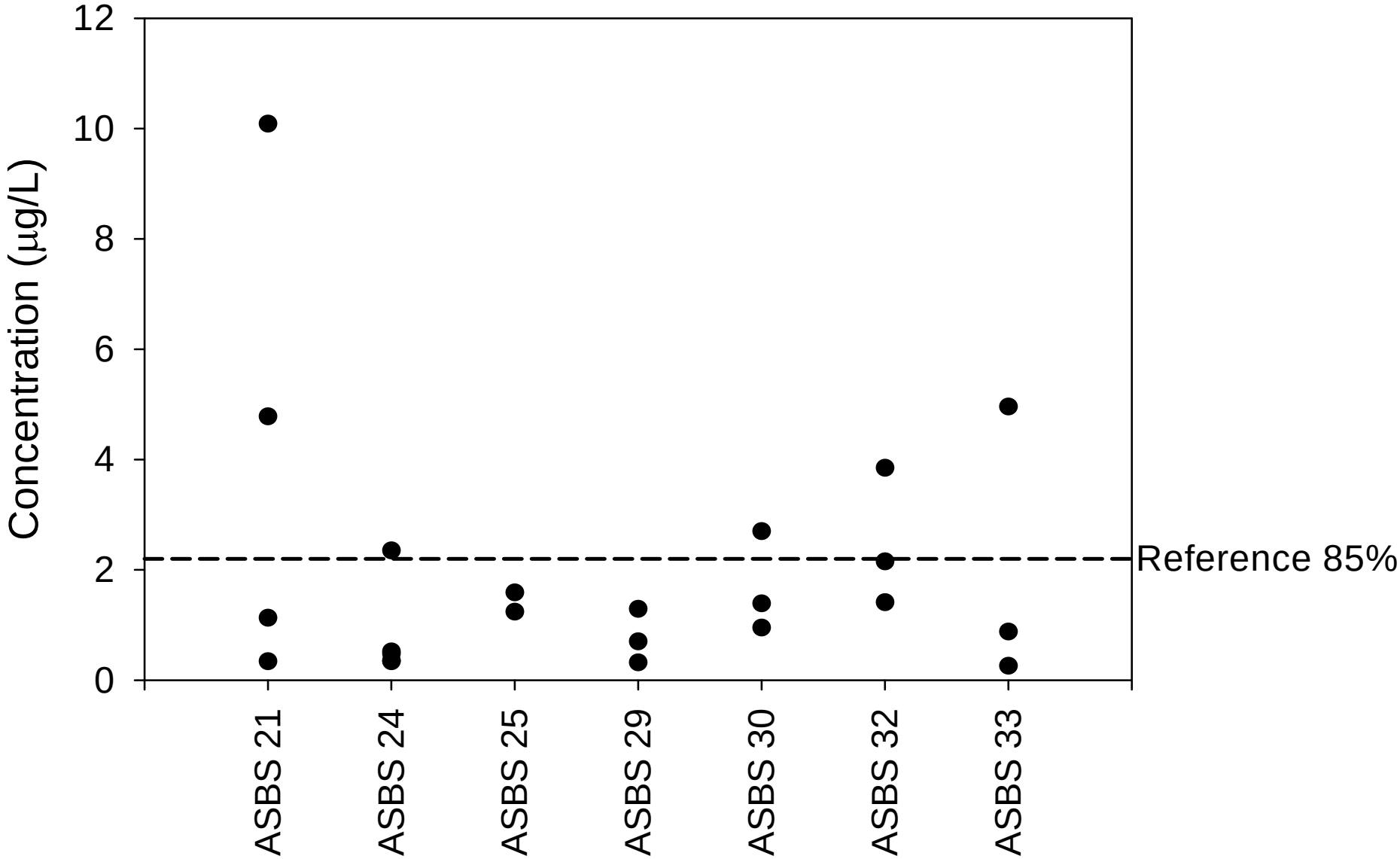
# Comparison Of Post- to Pre-Storm Receiving Waters

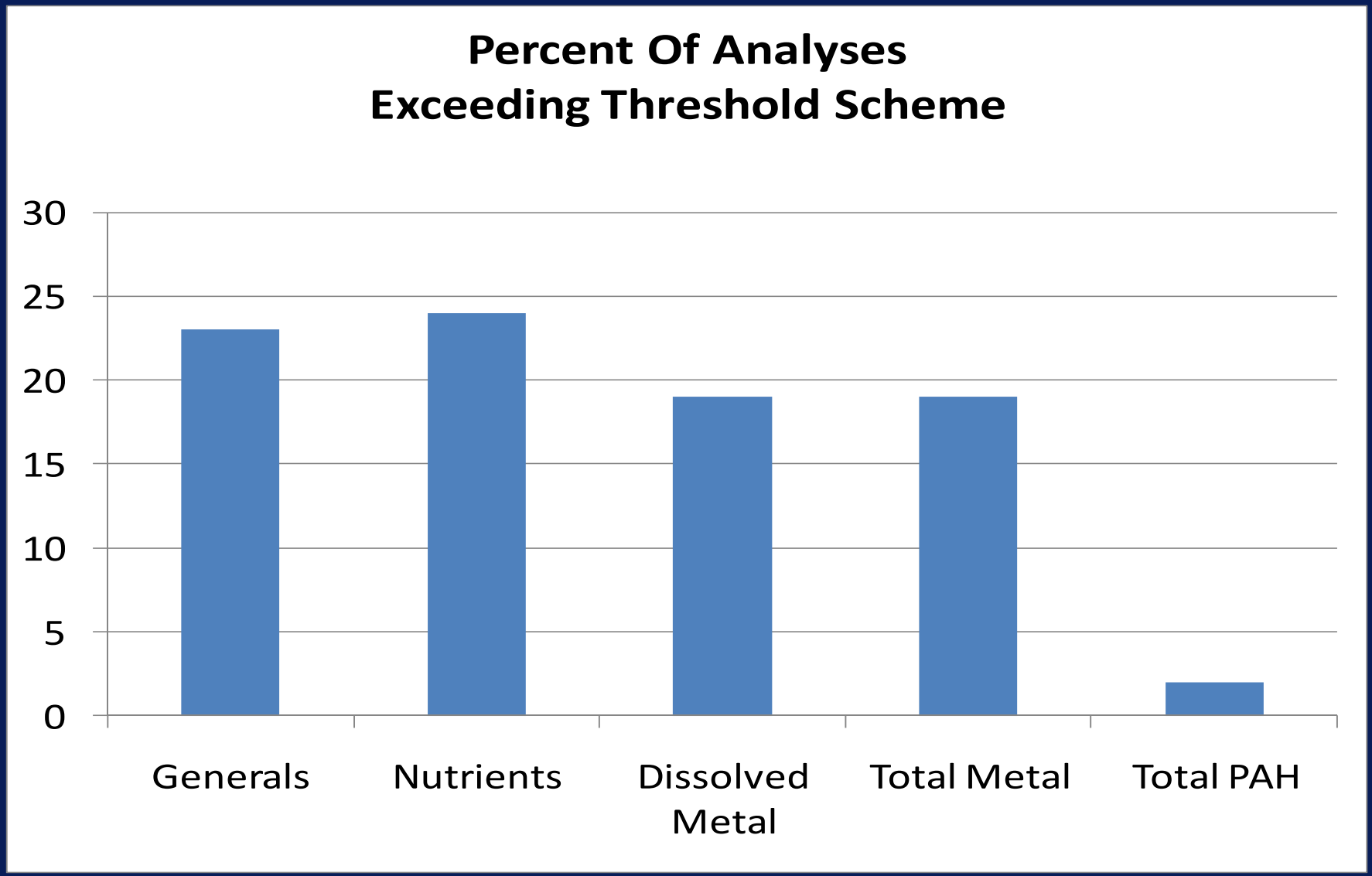
## *Reference (white) and Discharge (grey)*




85 Percentile
100
80
60
40
20
0
Cumulative Percent of Reference Samples
0.1
1
10
Copper (ug/L)

# Copper - Total




Percent Of Analyses
Exceeding Threshold Scheme
30
25
20
15
10
5
0
Generals
Nutrients
Dissolved Metal
Total Metal
Total PAH