

**Assessment of  
Water Quality During  
Wet Weather in  
Areas of Special Biological  
Significance**

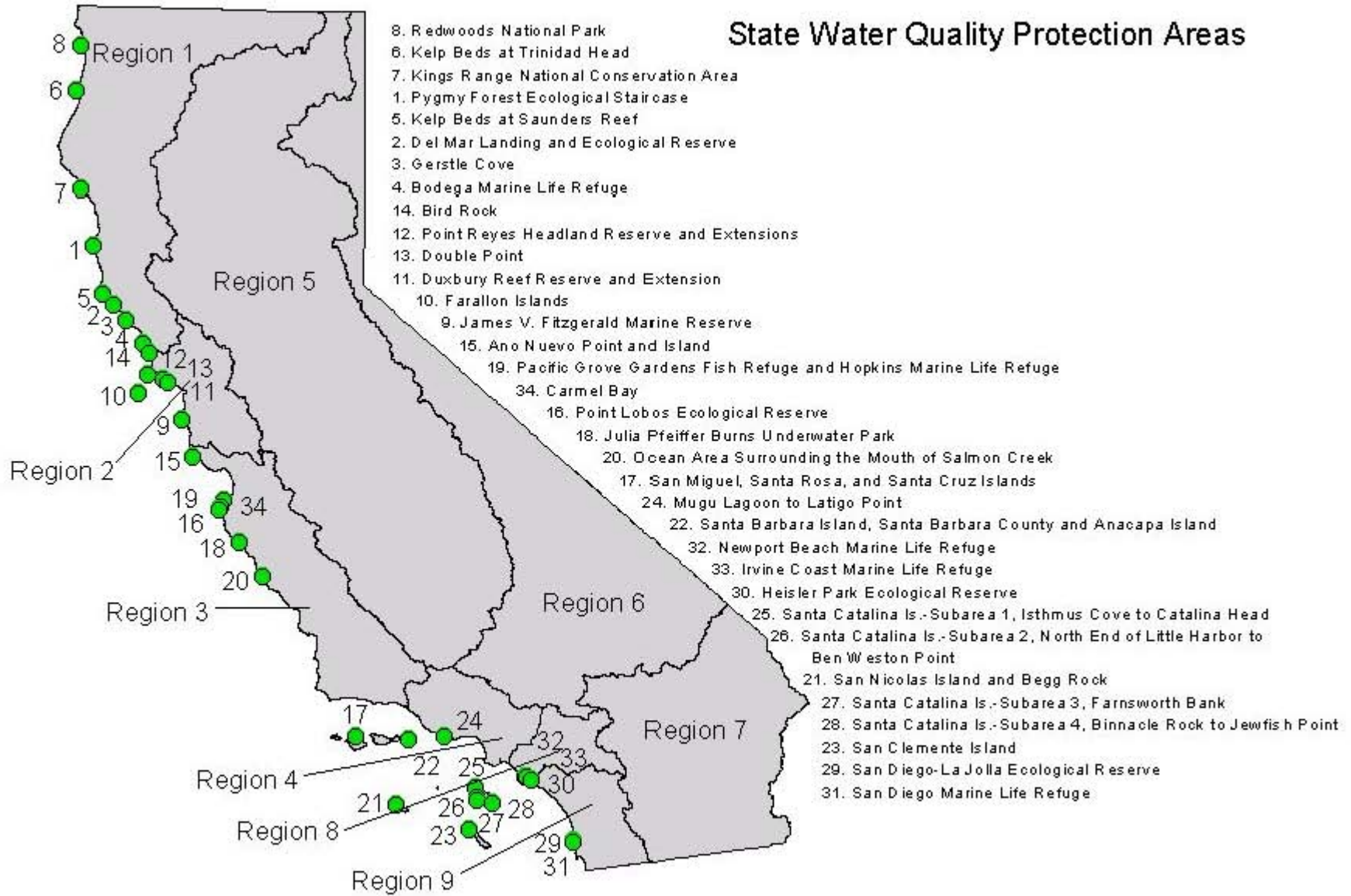
Ken Schiff

[www.sccwrp.org](http://www.sccwrp.org)

# Areas of Special Biological Significance (ASBS)?

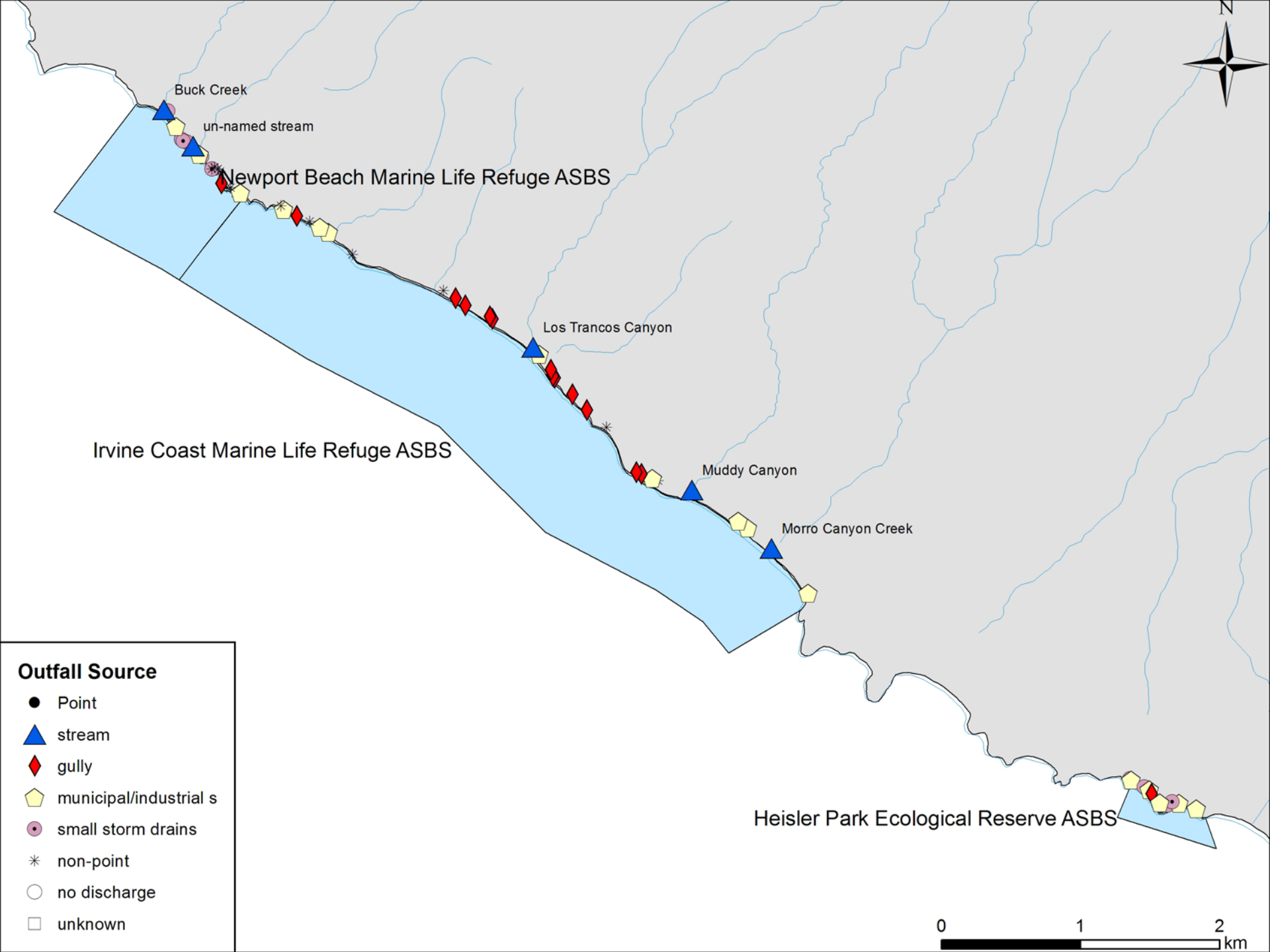
- Water quality protected areas
  - Designated in the California Ocean Plan
- 34 designated ASBS statewide
  - Nearly a third of the coastline (including islands)
- Established by the SWRCB in the mid-1970s

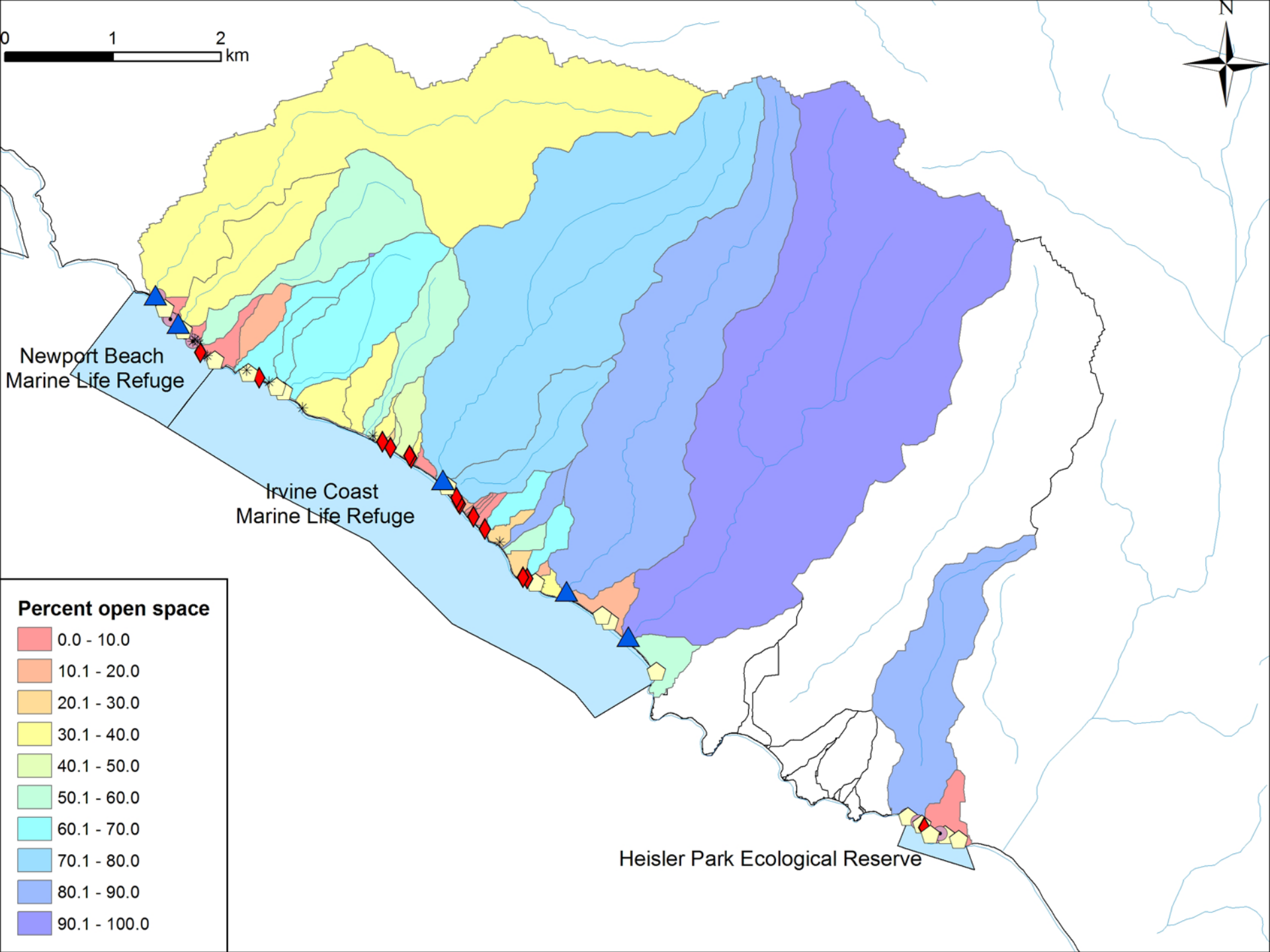
# State Water Quality Protection Areas



# Not Your Usual State Regulation

- “No discharge of waste”
- “Maintenance of natural water quality”
- Despite stringent requirements, nearly 1700 discharges identified in ASBS statewide





# Motivation!

- SWRCB needs an assessment of alterations in ASBS water quality
- Large scale monitoring is the preferred approach
  - Regional reference condition
  - Context for assessing impact
- **What is the extent of impact in ASBS with and without discharges?**

# Extent of Impact Design

- Emphasis on receiving water
  - All samples collected from the ocean
- Wet weather focused
  - One sample prestorm and another post storm
- Measure a long list of constituents
  - General, nutrients, metals, organics
  - Toxicity
- Randomly selected receiving water sites
  - Discharge shoreline < 500m from an outfall
  - Nondischarge shoreline > 500m



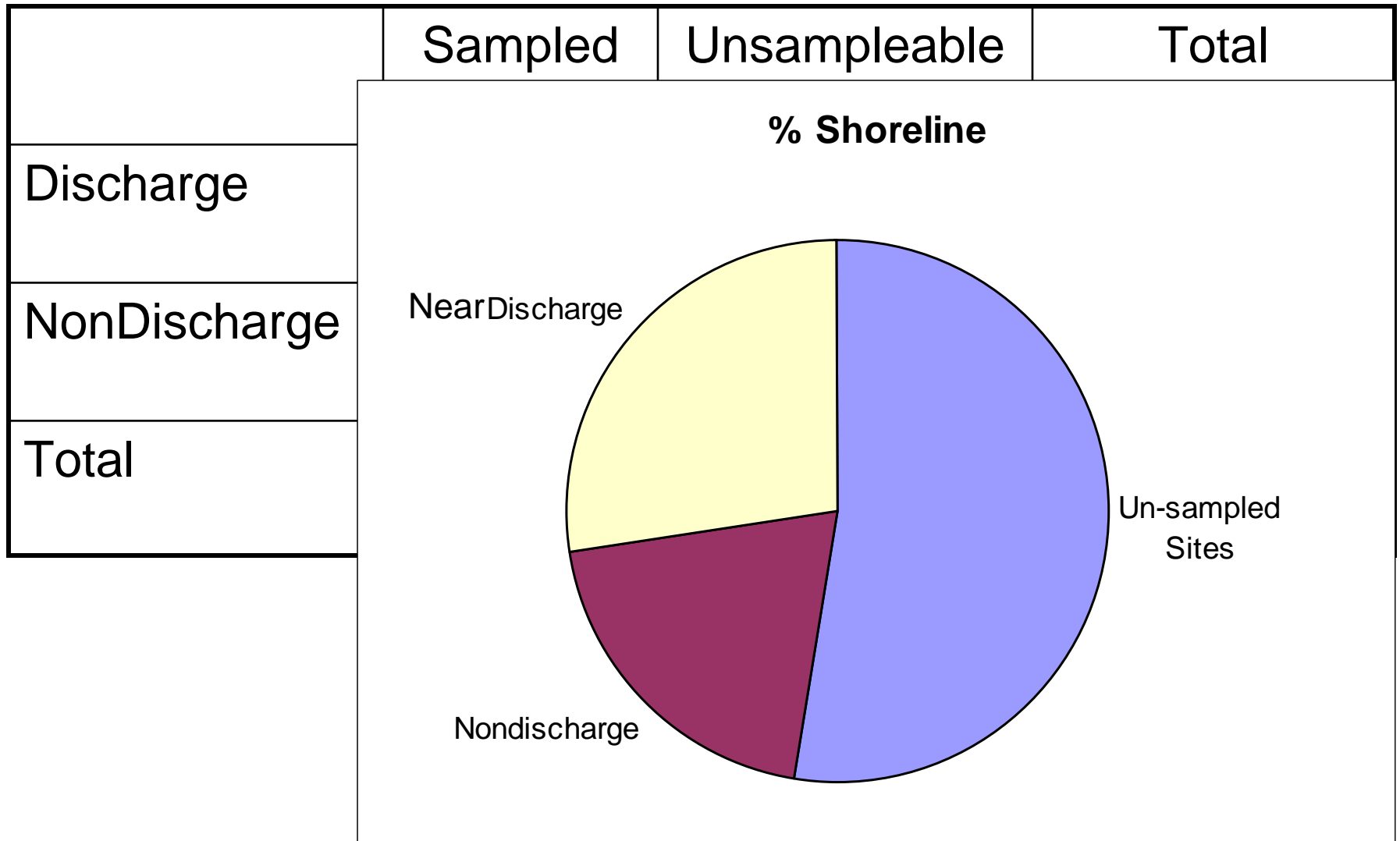
# Map of Sampling Sites

- Break to Google Earth

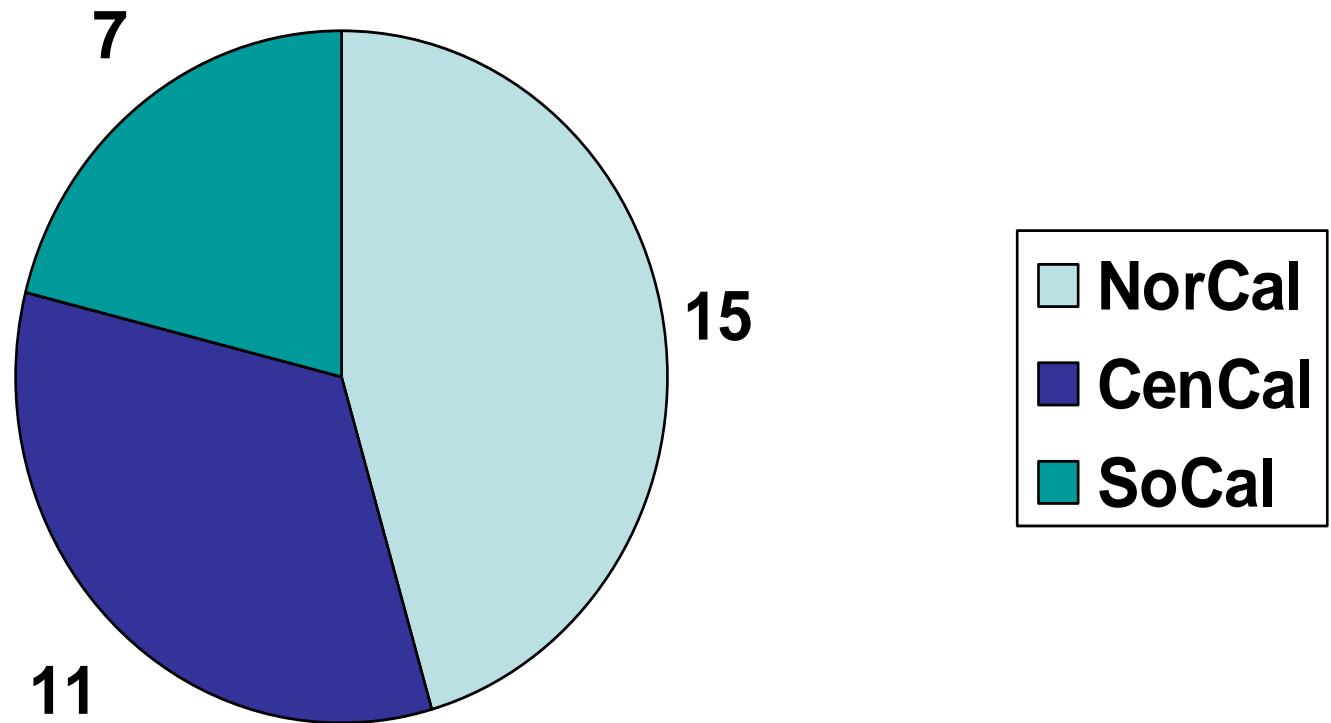
# Results Road Map

- Sampling success
- Discharge vs Nondischarge
- Comparison to existing Water Quality Standards
- Prestorm vs Post storm

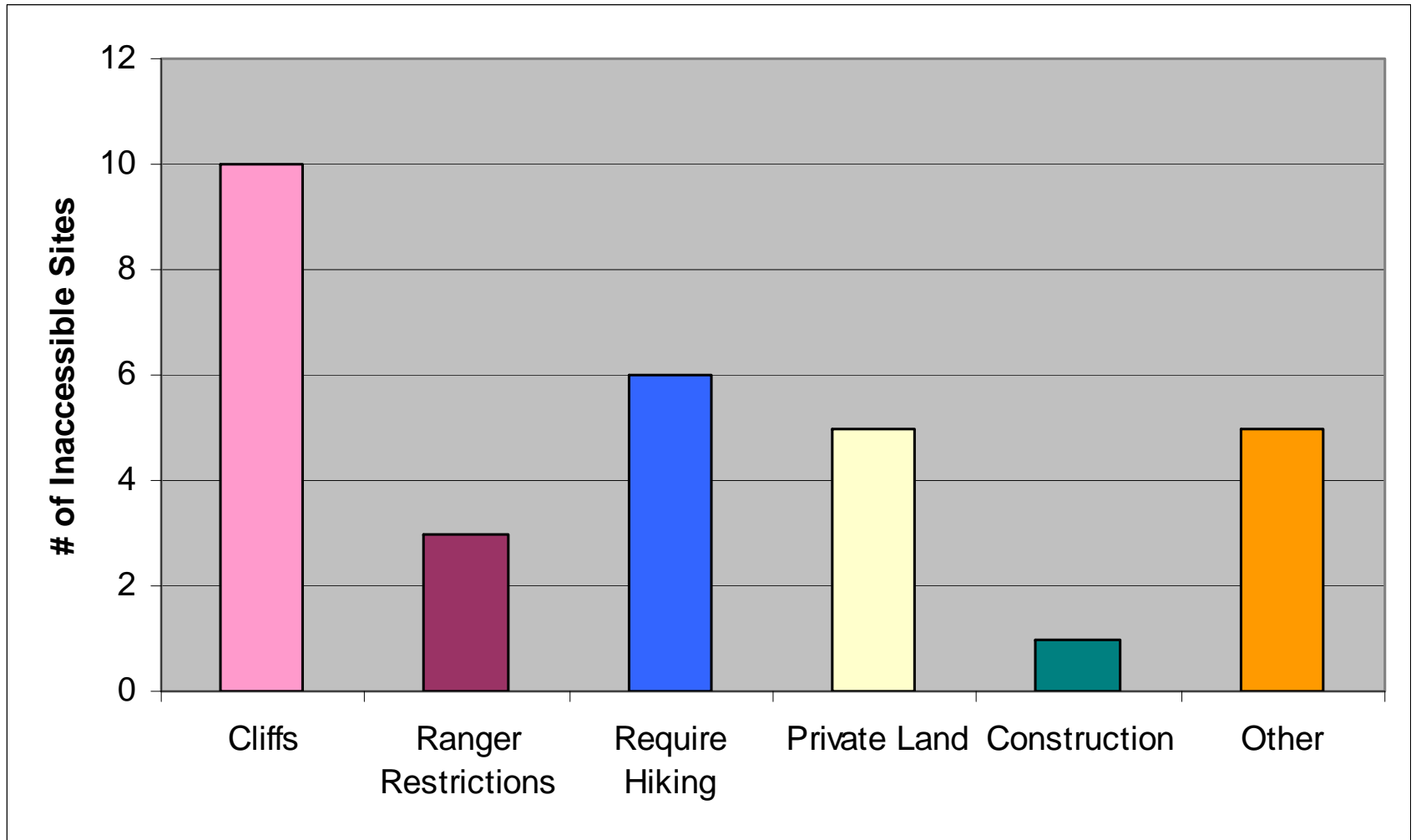
# Summary of Shoreline Sampling Success *2008-09 Wet Season*



# Spatial Distribution of Sampled Sites



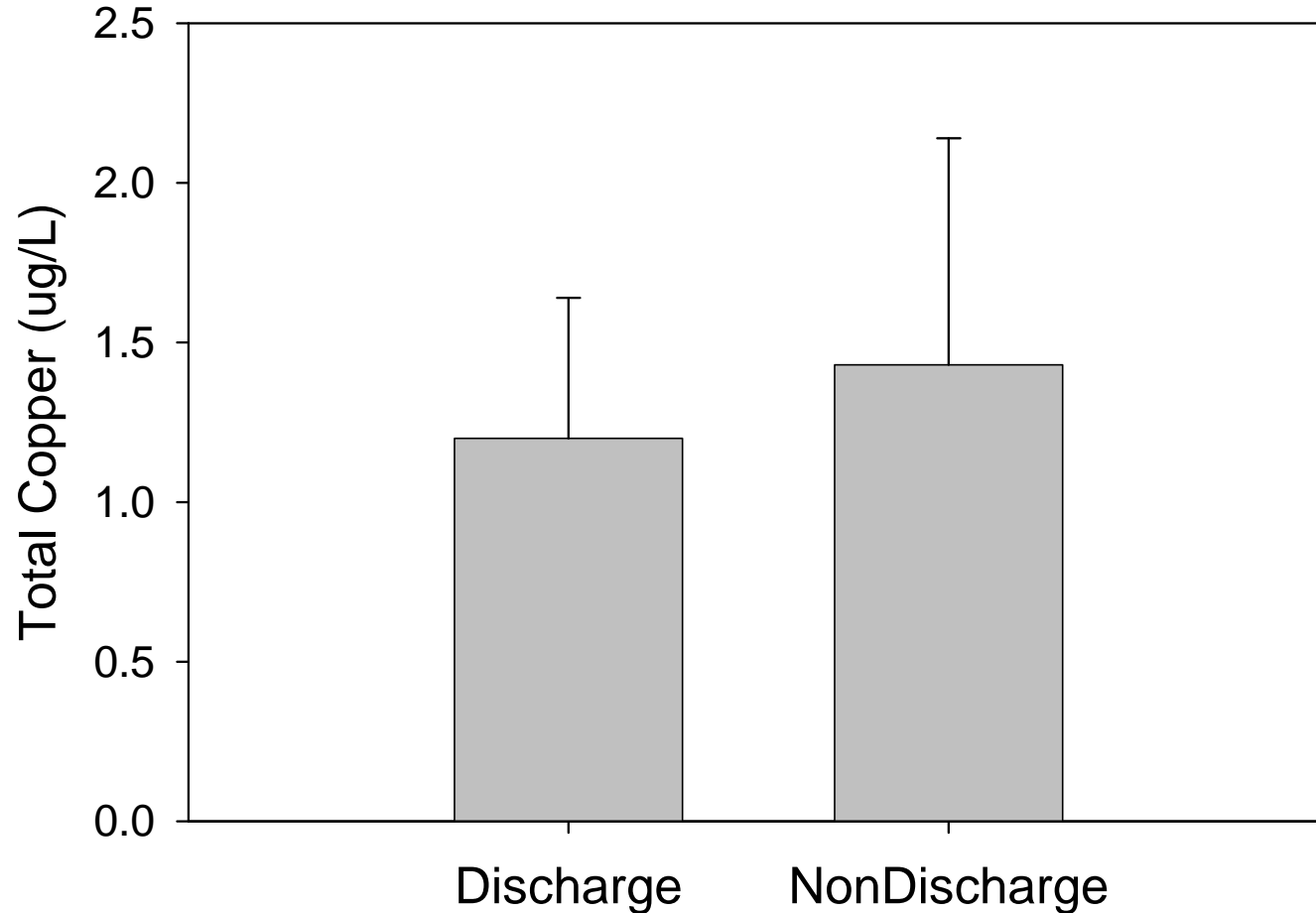
# Reasons for Unsampled Sites



# Results Road Map

- Sampling success
- Discharge vs Nondischarge
- Comparison to existing Water Quality Standards
- Prestorm vs Post storm

# Shoreline Weighted Mean ( $\pm$ 95% CI)



# Shoreline Weighted Mean ( $\pm$ 95% CI)

Parameter	Near Discharge	NonDischarge
TSS (mg/L)	95 (76)	78 (52)
Ammonia (ug/L)	9.2 (9.3)	3.9 (7.8)
Nitrate+Nitrite (ug/L)	120 (57)	140 (100)
Total P (ug/L)	69 (30)	190 (96)
Chromium (ug/L)	2.6 (1.0)	2.2 (0.8)
Copper (ug/L)	1.2 (0.4)	1.4 (0.7)
Lead (ug/L)	0.50 (0.13)	0.60 (0.50)
Nickel (ug/L)	2.9 (1.0)	2.9 (0.9)
Zinc (ug/L)	4.6 (3.0)	1.1 (1.2)
Total PAH (ng/L)	15 (5)	38 (34)
Total PCB (ng/L)	ND	ND
Total DDT (ng/L)	ND	ND



# 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	--	--	--

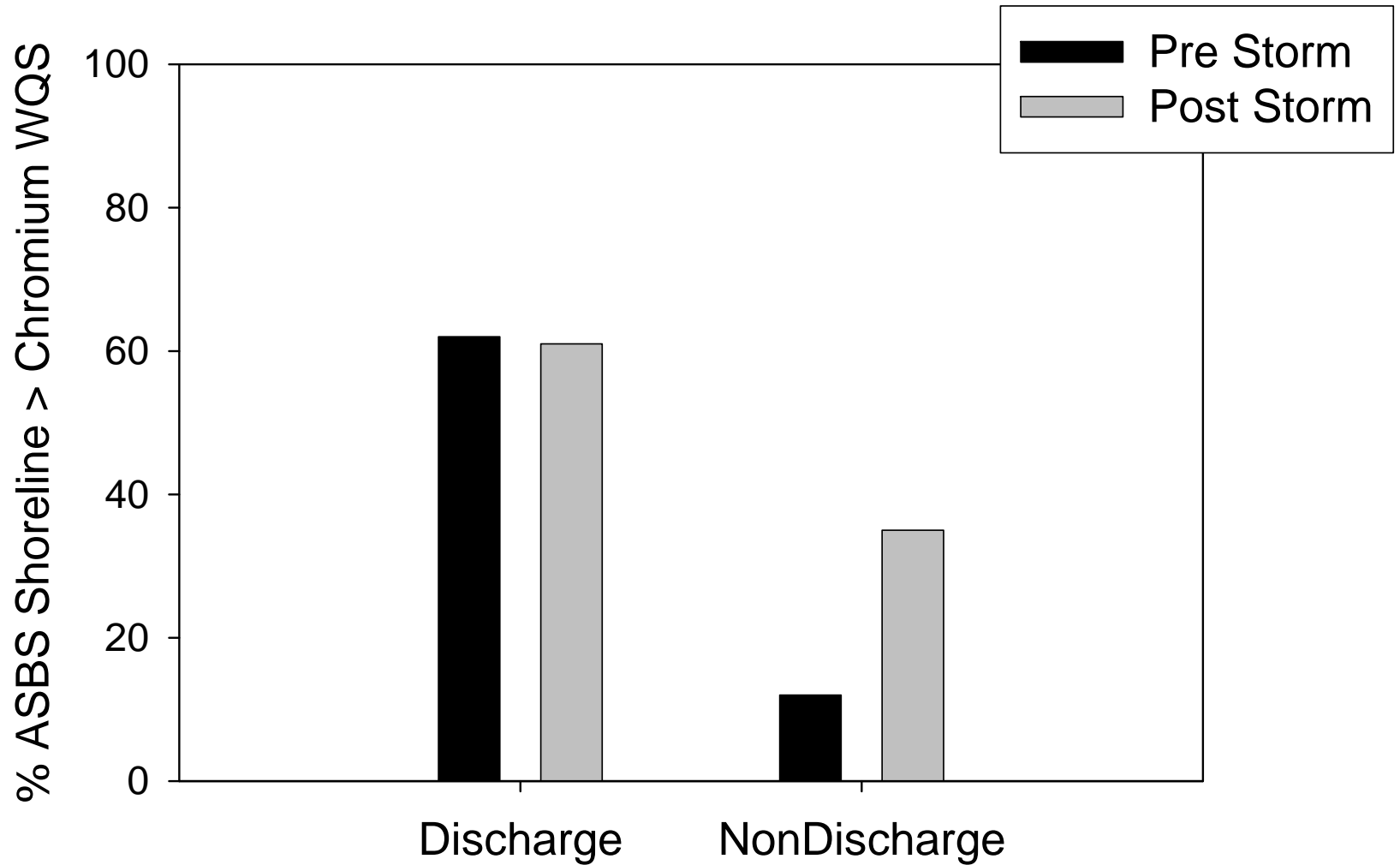
-- no shoreline exceeds WQS

\* 30 d average for organics

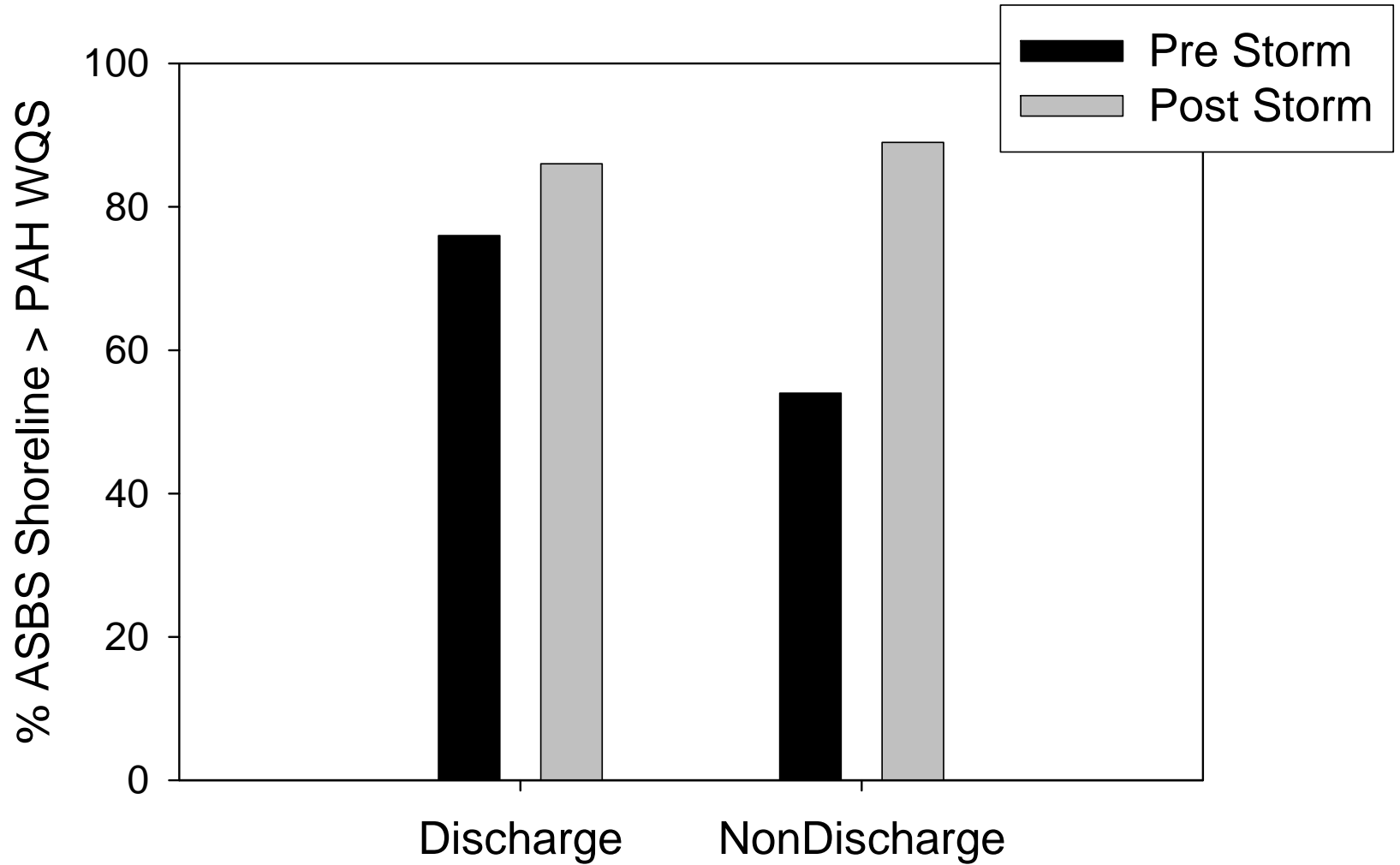
# COMPARISON TO OCEAN PLAN WATER QUALITY STANDARDS

	WQS	% Shoreline > WQS		
		All ASBS	Near Discharge	NonDischarge
Ammonia-N	0.8 mg/L	--	--	--
Arsenic	8 ug/L	1.6	2.7	--
Cadmium	1 ug/L	2.1	3.6	--
Chromium	2 ug/L	50	61	35
Copper	3 ug/L	6.9	4.8	9.8
Lead	2 ug/L	4.8	--	11.5
Nickel	5 ug/L	15	24	3
Silver	0.7 ug/L	--	--	--
Zinc	20 ug/L	3.8	6.5	--
HCH-lindanes	8.0 ng/L	--	--	--
Chlordane	0.023 ng/L	--	--	--
DDTs	0.17 ng/L	--	--	--
Dieldrin	0.04 ng/L	--	--	--
PAHs	8.8 ng/L	87	85	89
PCBs	0.019 ng/L	--	--	--

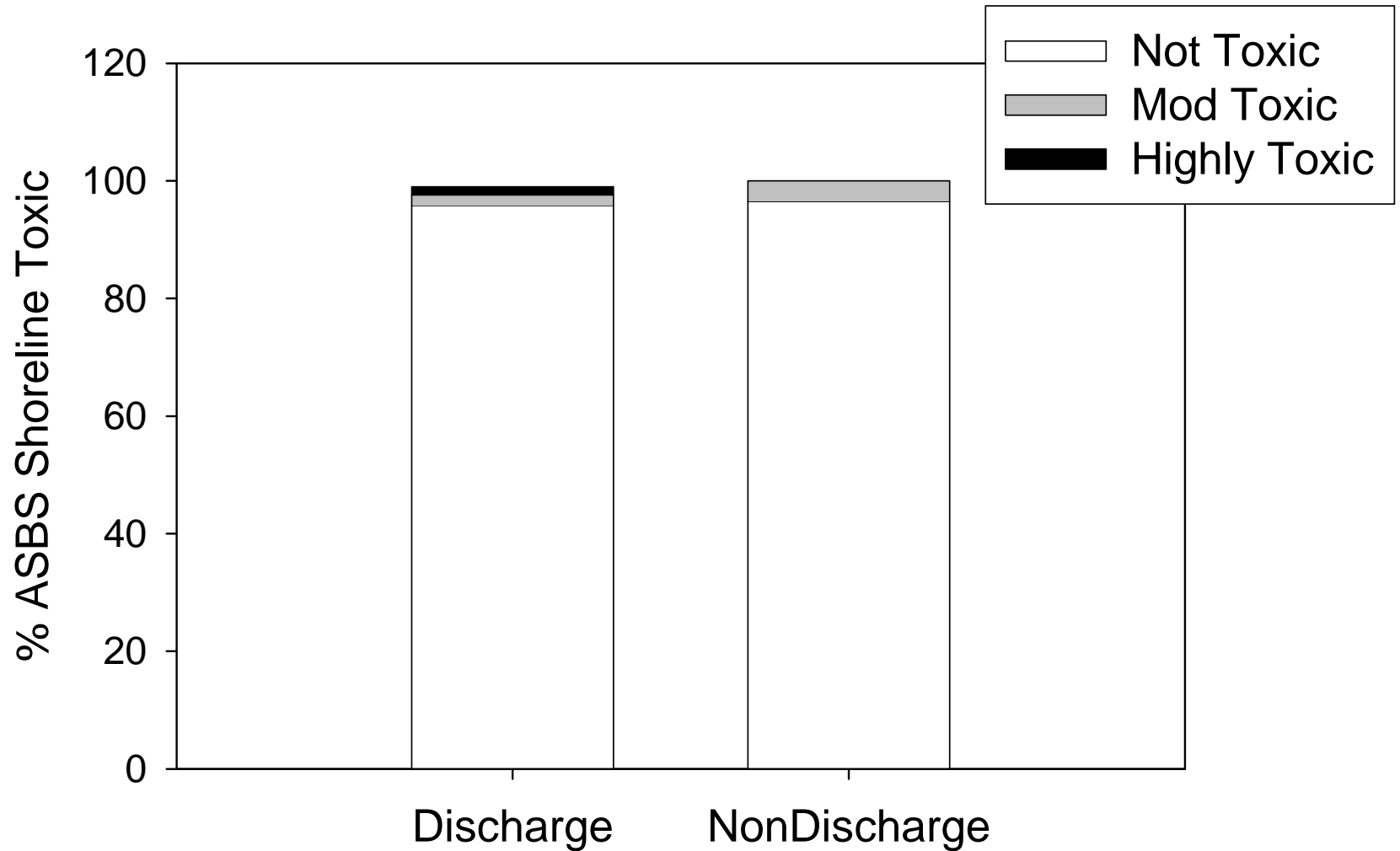
# Exceedence of the Chromium Water Quality Standard



# Exceedence of the PAH Water Quality Standard



# Extent of Sea Urchin Toxicity



# Summary of Monitoring

- Water quality in ASBS statewide following wet weather looks pretty good
  - Only Cr and PAH exceeded WQS in significant amounts
- Concentrations were generally low
  - Little signal of discharge
- Most sites were not toxic
  - Less than 5% of the ASBS shoreline indicated effects

# On Deck ..... Actual Biology

- These are Areas of Special **Biological** Significance
- Community assemblages in multiple habitats
  - Rocky subtidal habitat
  - Rocky intertidal habitat
- Evaluate potential for ecological risk
  - Bioaccumulation in mussels