First Flush Volunteers Do It In the Dark

National Water Quality Monitoring Conference

May 9, 2006

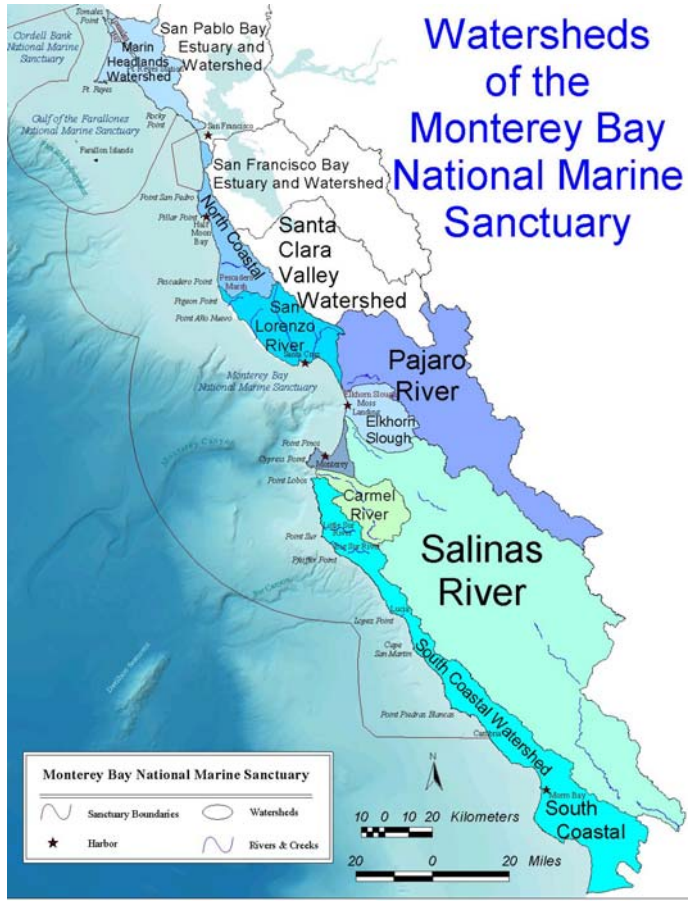
Bridget Hoover, Monterey Bay Sanctuary Citizen Watershed Monitoring Network Coordinator

Presentation Overview

- Background on the Monterey Bay National Marine Sanctuary
- History of First Flush event
- Logistics/Implementation
- First Flush Results
- Follow up actions
- Uses of the data

Monterey Bay National Marine Sanctuary

- Established in 1992 as the largest of 13 National Marine Sanctuaries
  - 5,300 sq. miles of water and 350 miles of coast
  - sandy beaches
  - kelp forests
  - largest under water canyon on the west coast
  - 345 species of fish
  - 94 species of sea birds
  - 33 species of marine mammals



It’s a Team Effort

- Monterey Bay Sanctuary Citizen Watershed Monitoring Network was formed in 1998
- Coastal Watershed Council is a Santa Cruz non-profit running citizen based water quality monitoring programs since 1996.
- Started Urban Watch program with the Sanctuary in 1997 in city of Monterey and has since expanded to 5 cities.
- Incorporated First Flush into program in all Urban Watch cities in 2000.

First Flush

- FF is the first major rain of the season
- Teams are trained and assigned sites in September
- Phone tree established
- On Call until first storm

First Flush Parameters

- Field Measurements:
  - H_20 temperature
  - transparency
  - conductivity
  - pH
  - visual observations
- Lab Analysis:
  - *E. coli*
  - nitrate, orthophosphate
  - TSS/TDS
  - metals (Zn, Cu, Pb)
  - hardness ($CaCO_3$)
  - Oil and Grease
  - Polynuclear Aromatic Hydrocarbons

FF Parameters

Dry Run

- Provides practice for volunteers
- Get to see their site in daylight
- Provides info on what is flowing during the dry season

Criteria to Mobilize

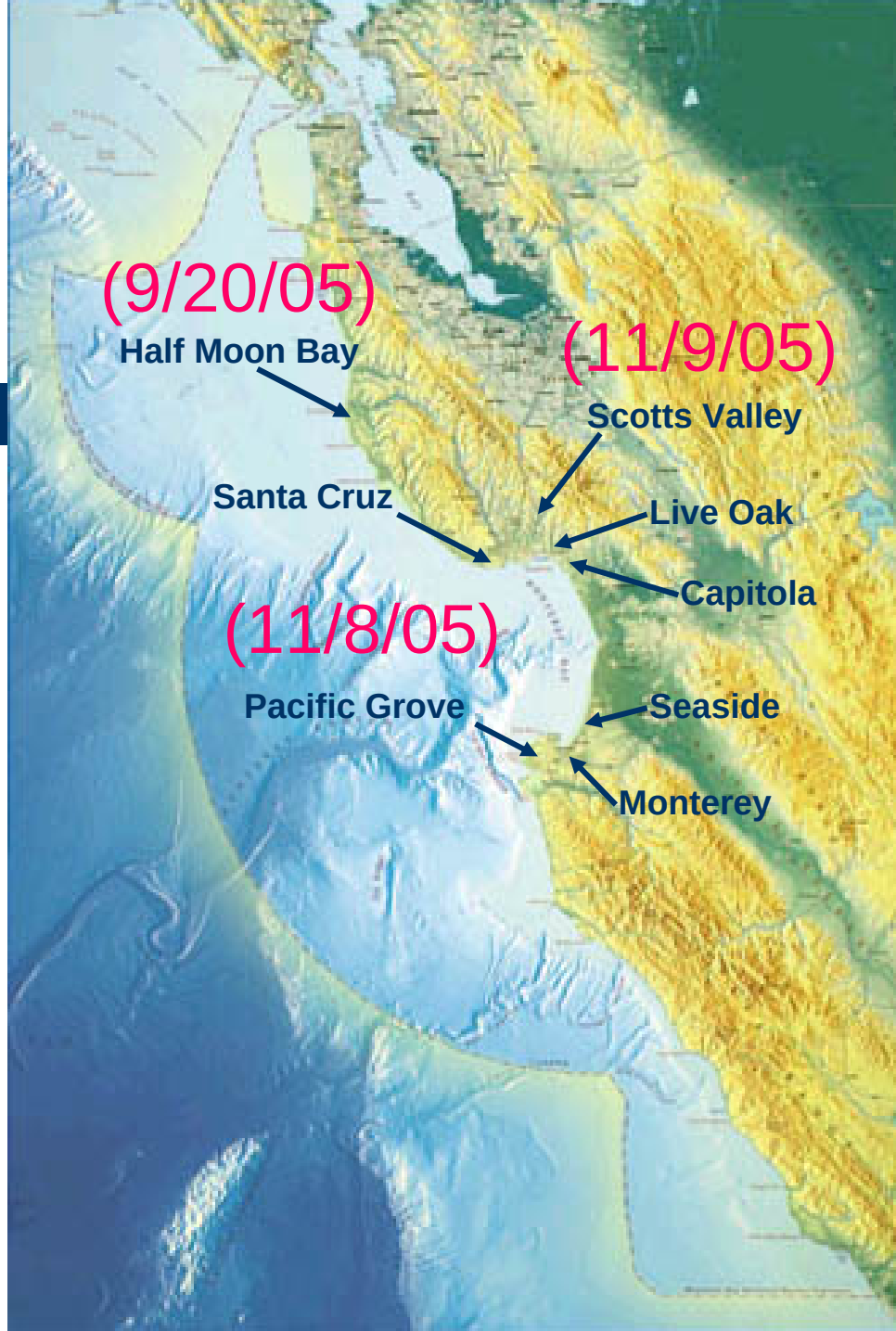
- Sheeting rain on the roads and flow in the gutters
- Radar shows more rain coming, >0.10 inches
- Conductivity in the discharge less than 1000 μS and dropping

Logistics

- Green, yellow, red alerts for weather
- Team leads are informed of volunteer's schedule
- Mobilize – phone tree
- Teams meet at site
- Sample 3 time series
- Return samples and equipment to coordinator

FF 2005

- 6th Annual Event
- 8 cities
- 32 storm drain outfalls
- 83 volunteers



Iluw#Ioxvk#5338#Fkhfndw#

#

Whdp#Ohdghu=## # # # # # #

Exfnhw#Frqwhqw#

#

- Fdserdug#zlwk##
  - Gdwd#vkhhw##
  - Gdwd#vkhhw#lqvwuxfwlrqv##
  - Dw#wkh#Vlwh#Iqvwuxfwlrqv#
  - Gluhfwlrqv#wr#prqlwrulqj#vlwhv#
  - Skrqh#wuhh#
- Wkhuprphwhu+v,### # # IG#&bbbbbbbbbbbbbbbbb#
- SK#vwulsv### # # # # IG#&bbbbbbbbbbbbbbbbb#
- Frqgxfwlylw|#phwhu## # # IG#&bbbbbbbbbbbbbbbbb#
- Wudqvsduhqf|#wxeh## # # IG#&bbbbbbbbbbbbbbbbb#
- Erwoh#ri#glwwlohg#zdwhu#+GL,#
- Joryhv#+V/#P#dqg#O,#
- Shqflov/#shq/#vkdusln#
- Vhwv#ri#oderudwru|#vdpsoh#erwohv#
- Sdshu#wrzhov#
- Sodvwlf#fxsv##
- Zkluosdn#edjv#
- Wudvk#edj#

#

Rwkhu#jhdu=##udlqjhdu/#udlq#errw/#frrohu#zlwk#frog#sdfn/#
iodvkdjkw/#fdphud/#vdpsdqj#exfnhw/#ursh#

#

Zhdwkhu#zhevlwhv=#

zzz1dffxzhdwkhu1frp#

zzz1lqwhodfdvw1frp#

Monterey Bay National Marine Sanctuary

First Flush

Field Data Sheet

Date:

City		**Arrival Time**	
Station ID		**Departure Time**	

Time Rain Began		**Station Name**	

Team Members

1	4
2	5
3	6

Detailed description of weather conditions (drizzle, rain, wind, visibility, cloud cover, darkness, etc.):

Field Measurements:

Time Bucket Filled ___:___ am / pm

Instrument ID:	Person taking Measurement	Parameter	Measurement	Replicate
		H20 Temp	F or C	F or C
		pH		
		Conductivity	□S	□S
		Transparency	cm	cm

Notes (include any observations from back side, ie. types of trash, biological observations, etc.

Changes Over Time **Station ID**

			(answer **yes** or **no** to the observations below)					**FLOW (cm)**		
Time	**Conductivity (♦S)**	**Murkiness**	**Rain**	**Trash**	**Sewage**	**Oil Sheen**	**Bubbles/ Scum**	**Velocity (gpm)**	**Depth (cm)**	**Width (cm)**

Sample collection for one time series:

Sample ID	**Time**	**Collected by:**	**Container Type**
			clear 100 ml - bacteria
			sq. white plastic 250 ml - metals
			sq. white plastic 1 L - nutrients/TDS,TSS
			amber glass bottle

Duplicates or Blanks collected: Yes or No

Sample Custody:

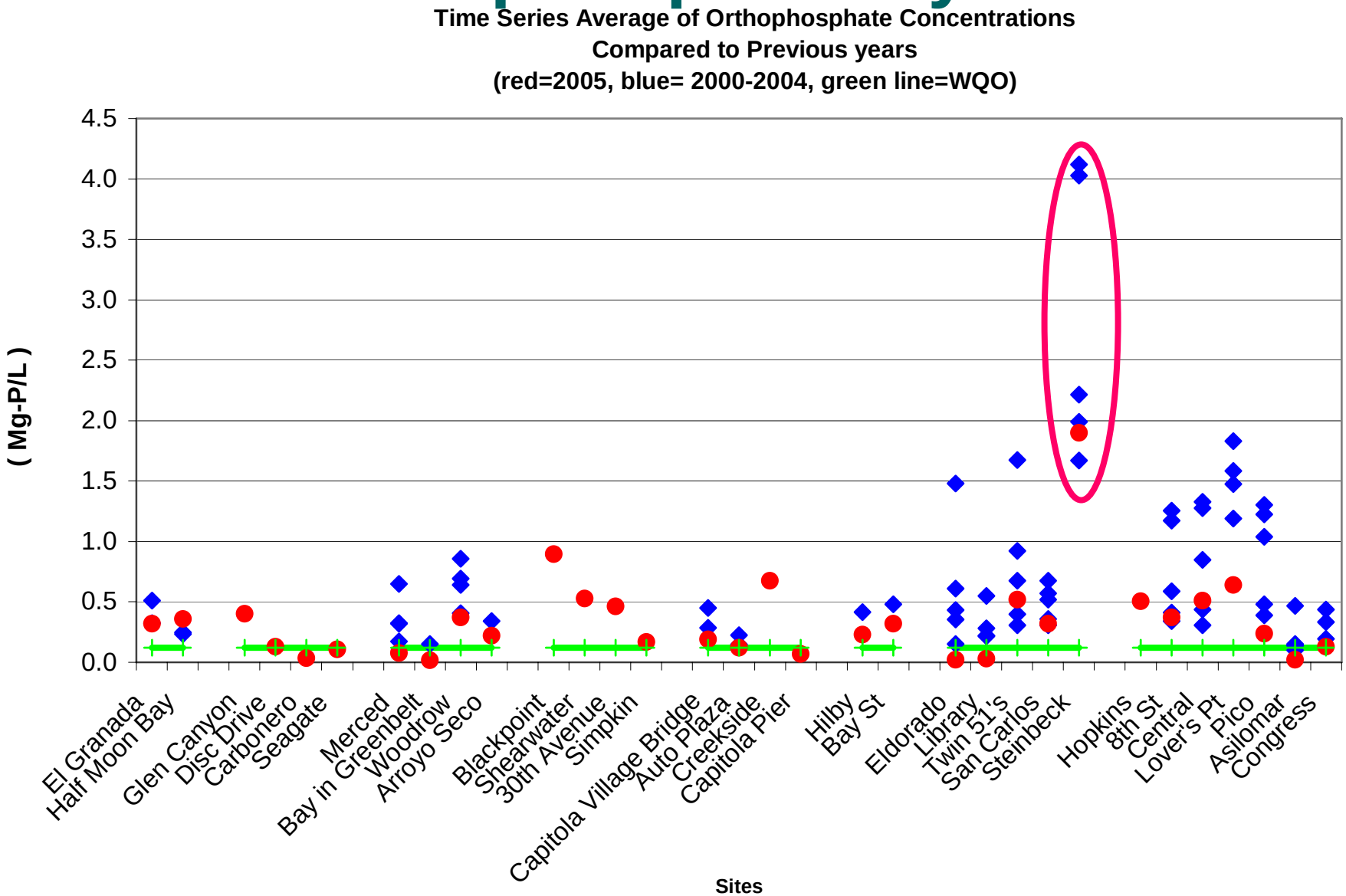
Relinquished By: **Date /Time** **Received By:** **Date/Time**

- Samples and equipment are returned to the office

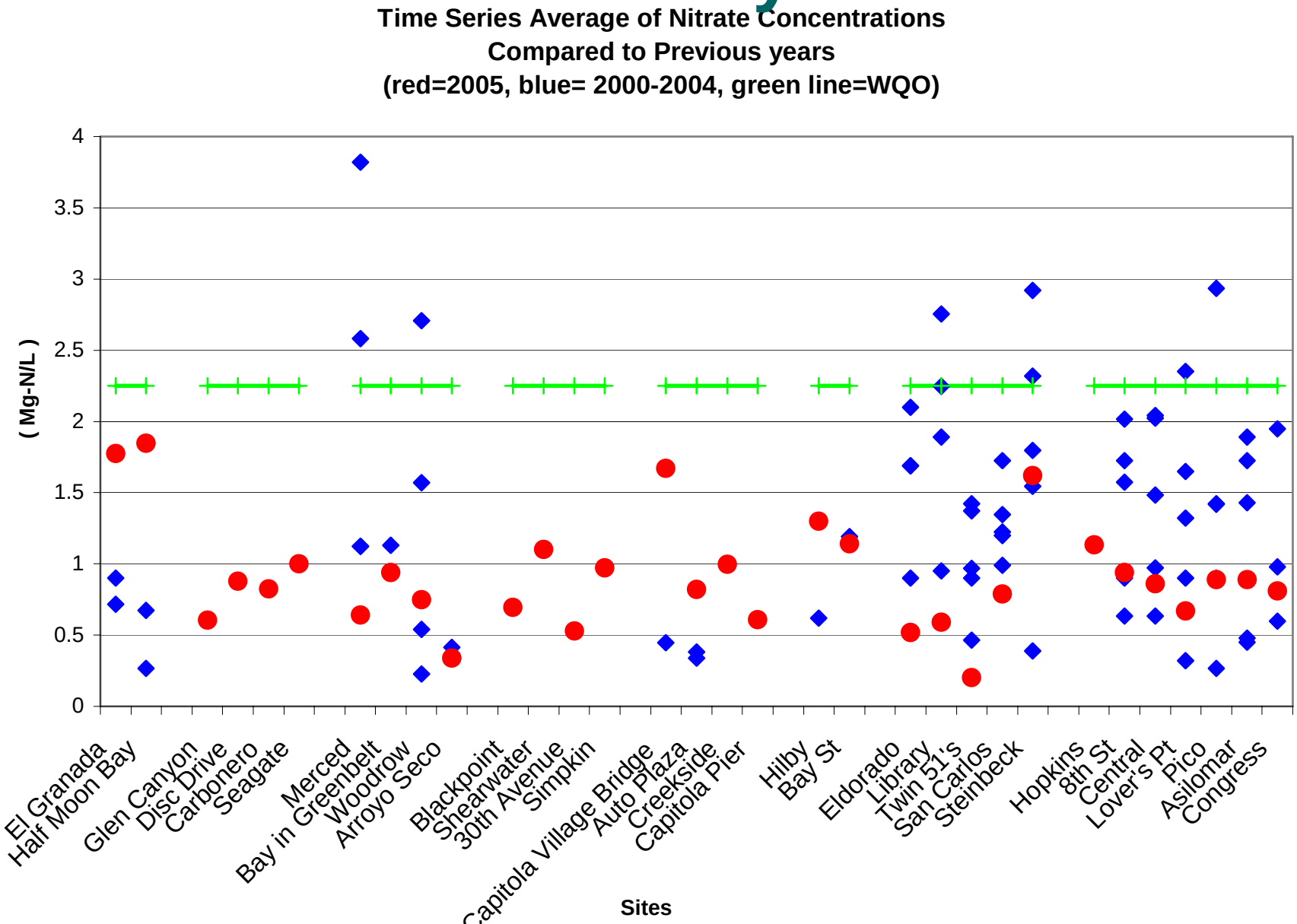
First Flush Results

- Orthophosphate
- Nitrate
- *E. coli*
- Copper
- Zinc

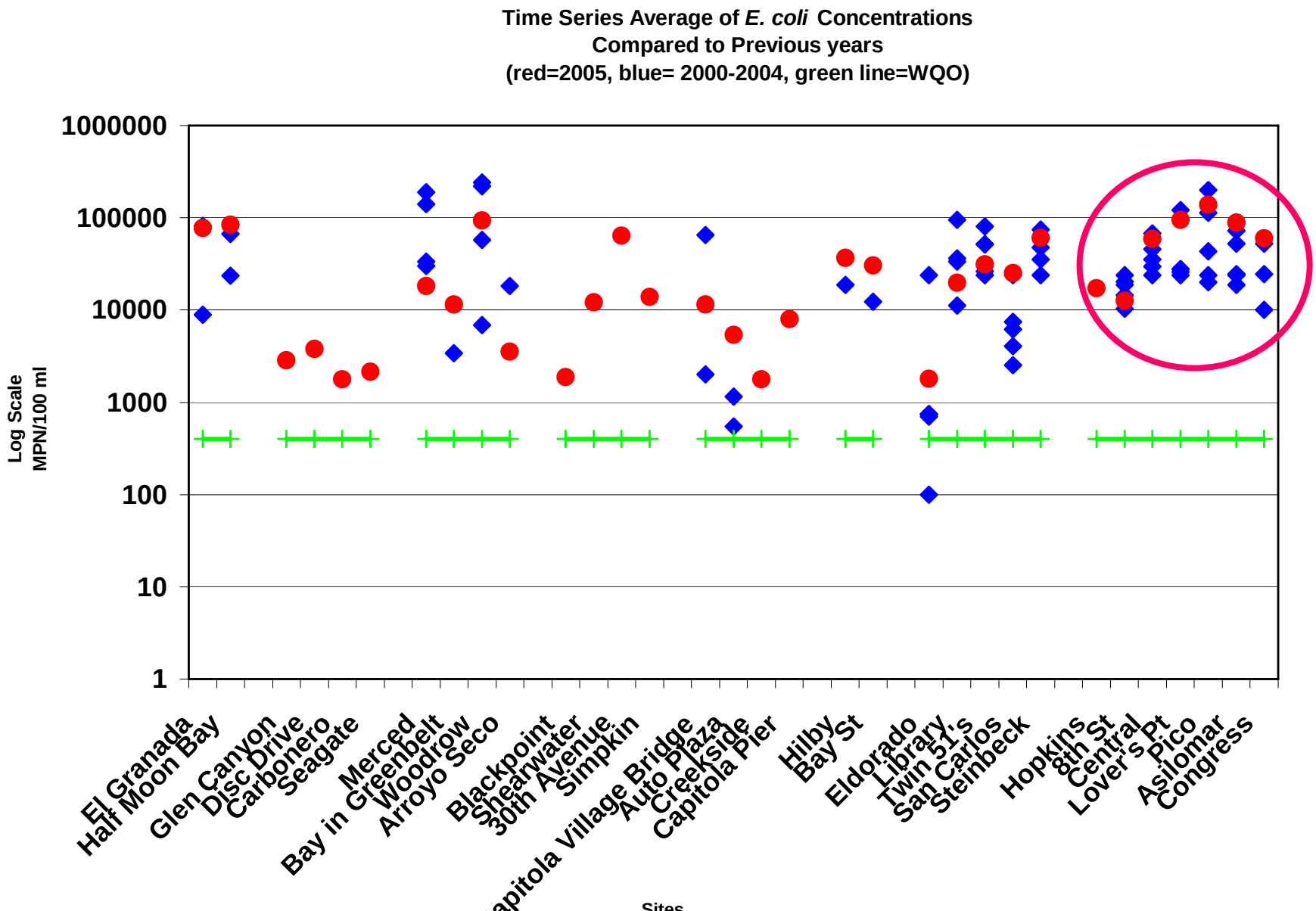
First Flush Average Concentrations of Orthophosphate by Year



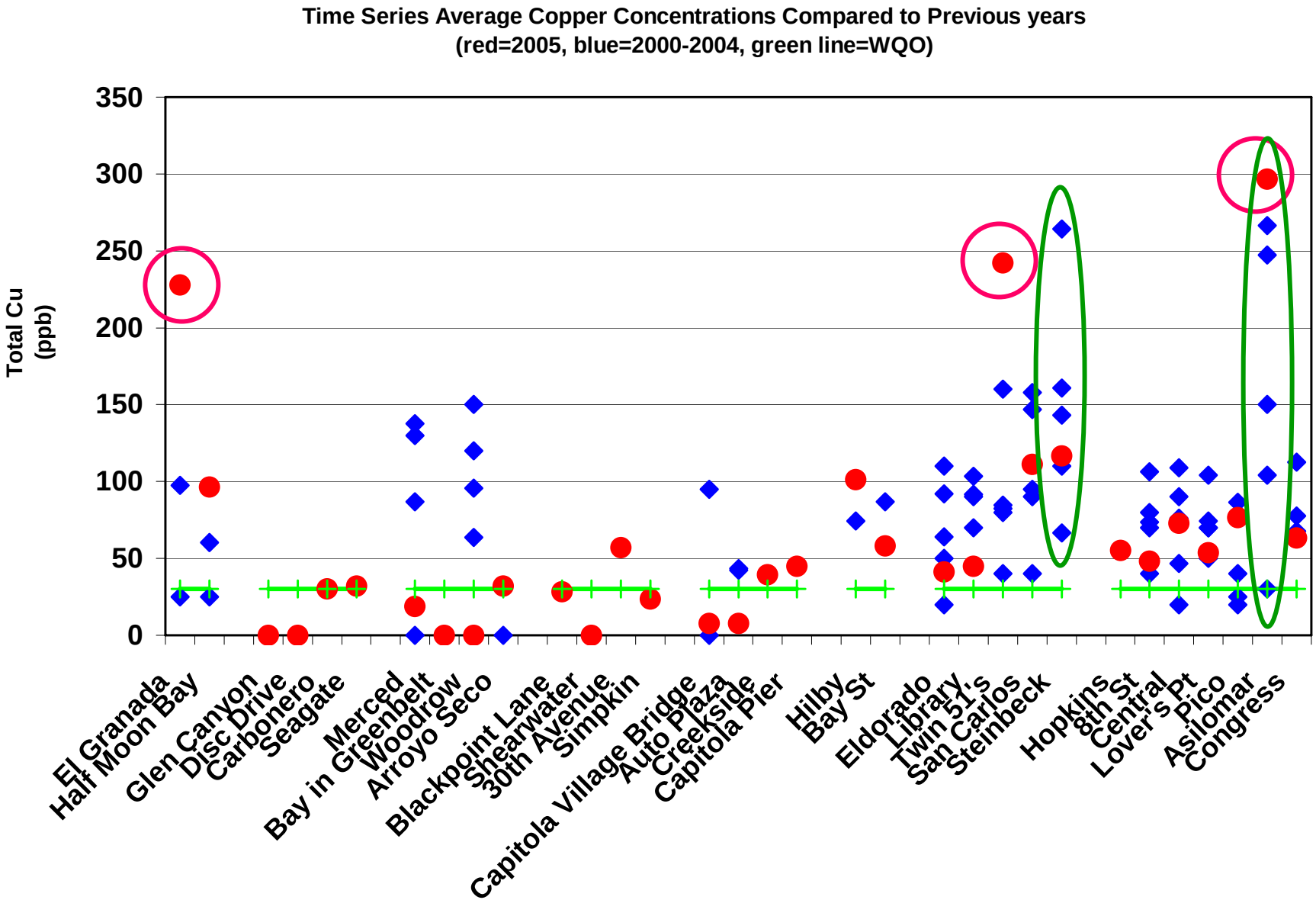
First Flush Average Concentrations of Nitrate by Year



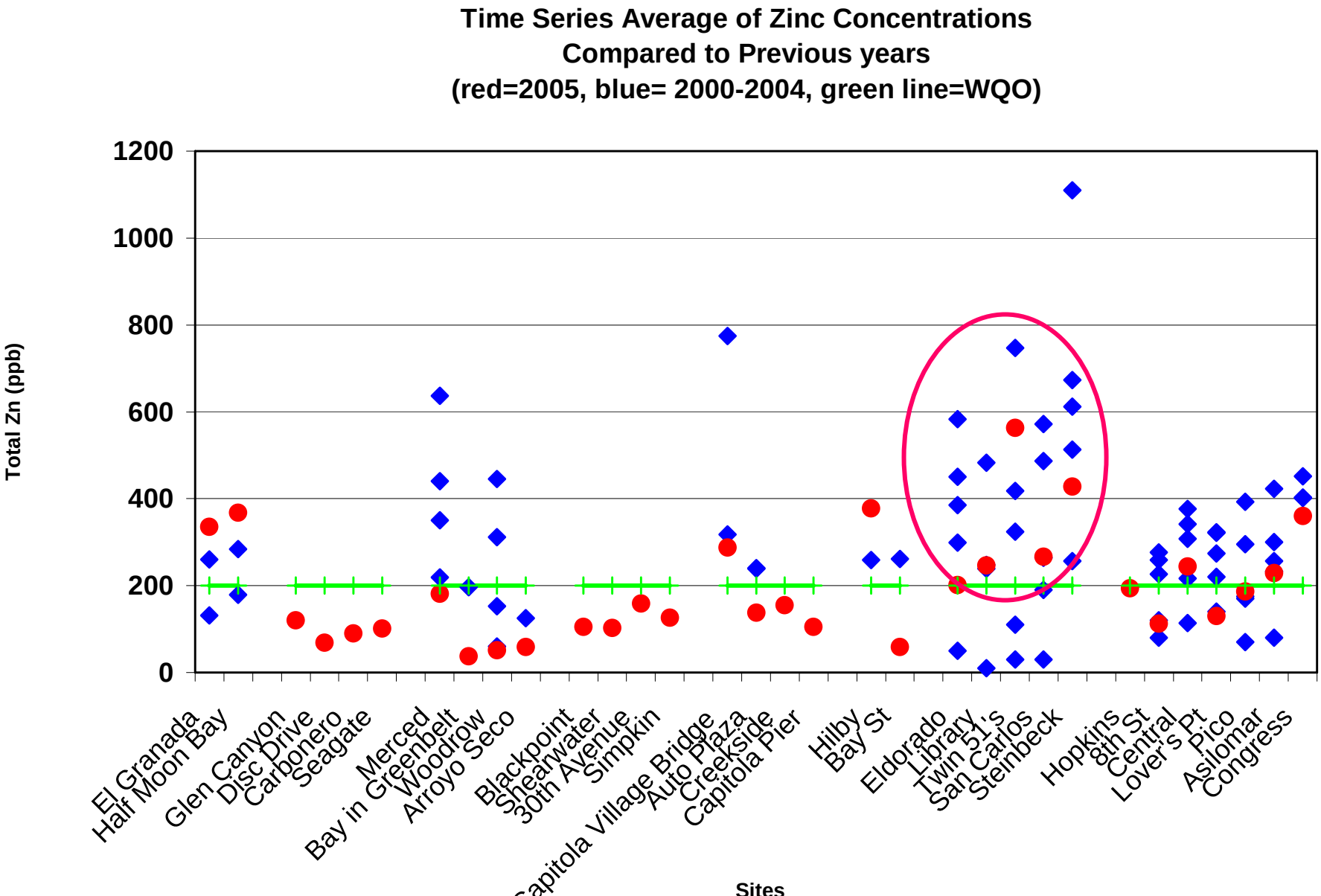
First Flush Average Concentrations of *E. coli* by Year



First Flush Average Concentrations of Copper by Year



First Flush Average Concentrations of Zinc by Year



Follow Up Actions

- Steinbeck Plaza Copper Study
- Funded by SIMoN, City of Monterey, and the CDA
- Source tracking for copper and zinc
- UC Davis Marine Pollution Studies lab will conduct plume toxicity studies

Uses of the Data

- Used by the cities to determine which best management practices (BMPs) are most appropriate.
- Results are used to prioritize infrastructure improvements and target educational programs
- Used to secure additional funding for upstream monitoring and grant proposals.
- Programs like FF are now required in some Phase I and Phase II Storm Water Discharge Permits issued by the CA CC Regional Water Quality Control Board
- Reports are available online at www.montereybay.noaa.gov/monitoringnetwork/events.html

And We Do Have Fun…

Thank You!

Contact Info:

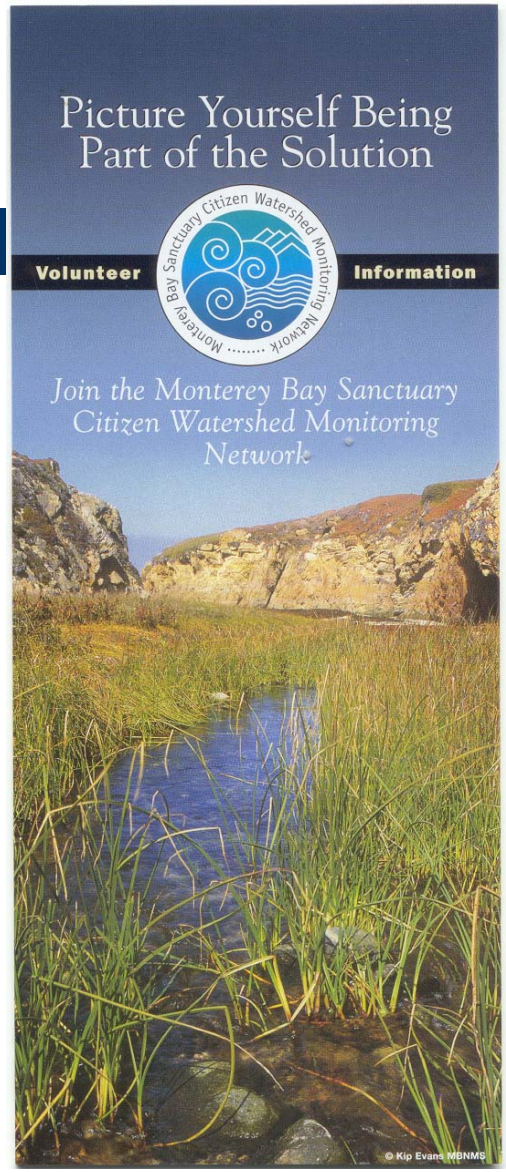
Bridget Hoover

(831) 883-9303

bhoover@monitoringnetwork.org

Tamara Doan

Coastal Watershed Council

(831) 464-2900

tcdoan@coastalws.org