

From Trickle to Flood

Measuring Pollutant Loads to Margin Areas and the Bay

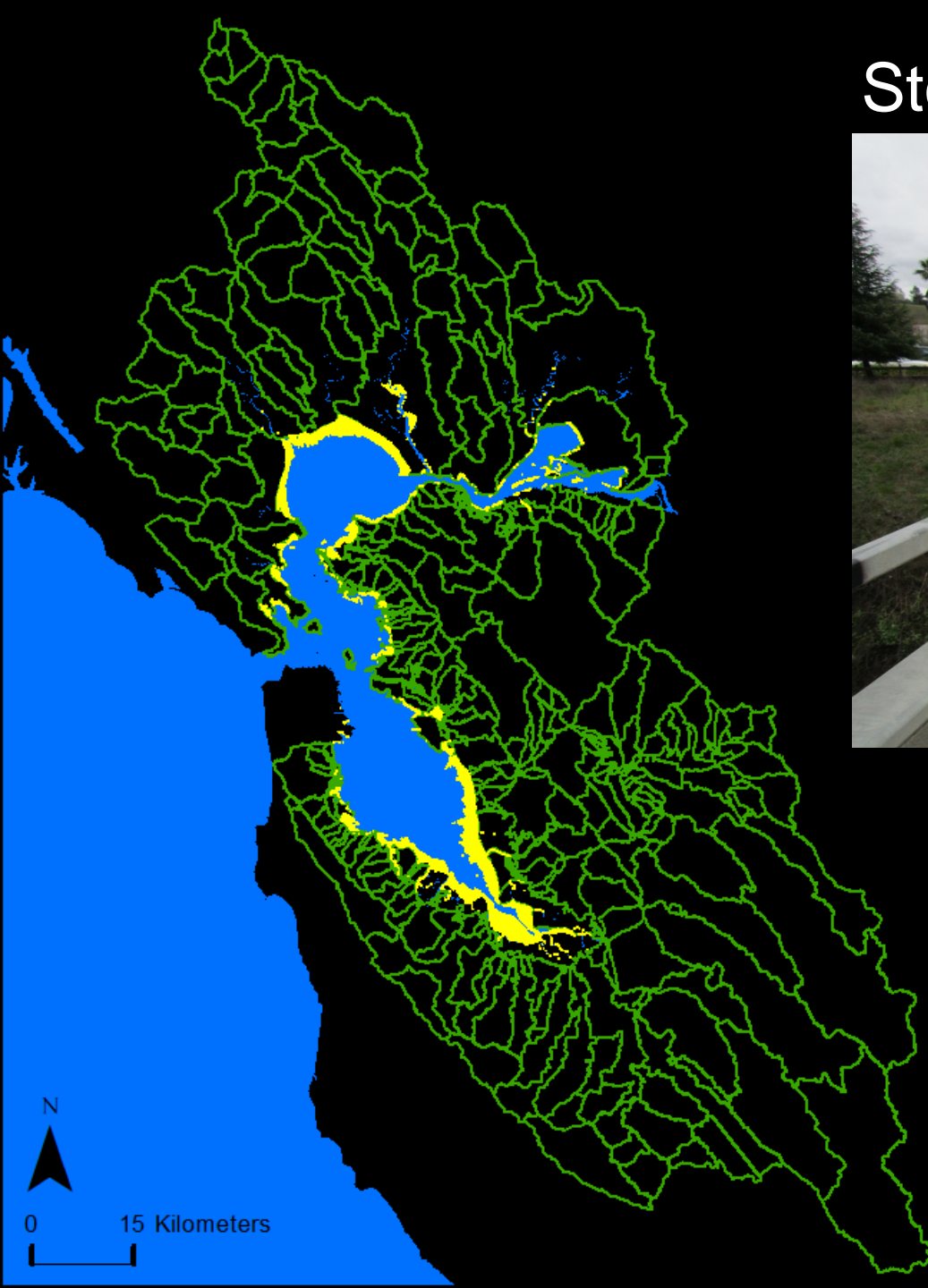
Alicia Gilbreath

Jennifer Hunt, Sarah Pearce,
Ila Shimabuku, Don Yee and Lester McKee



2017

Stormwater Monitoring



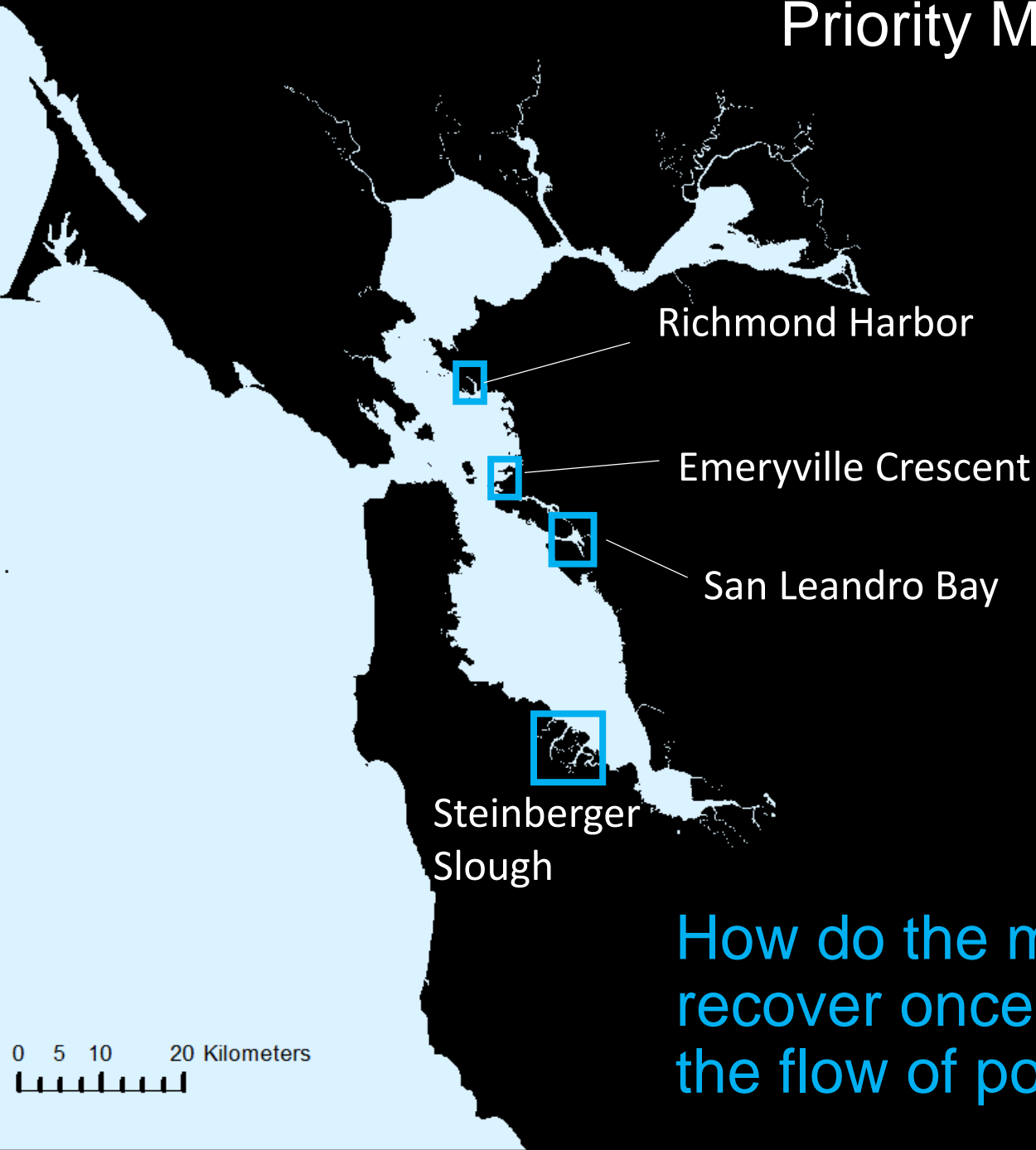
Two stories, two very different approaches, in sampling key watershed inputs to the margins in Water Year 2017

Story 1:

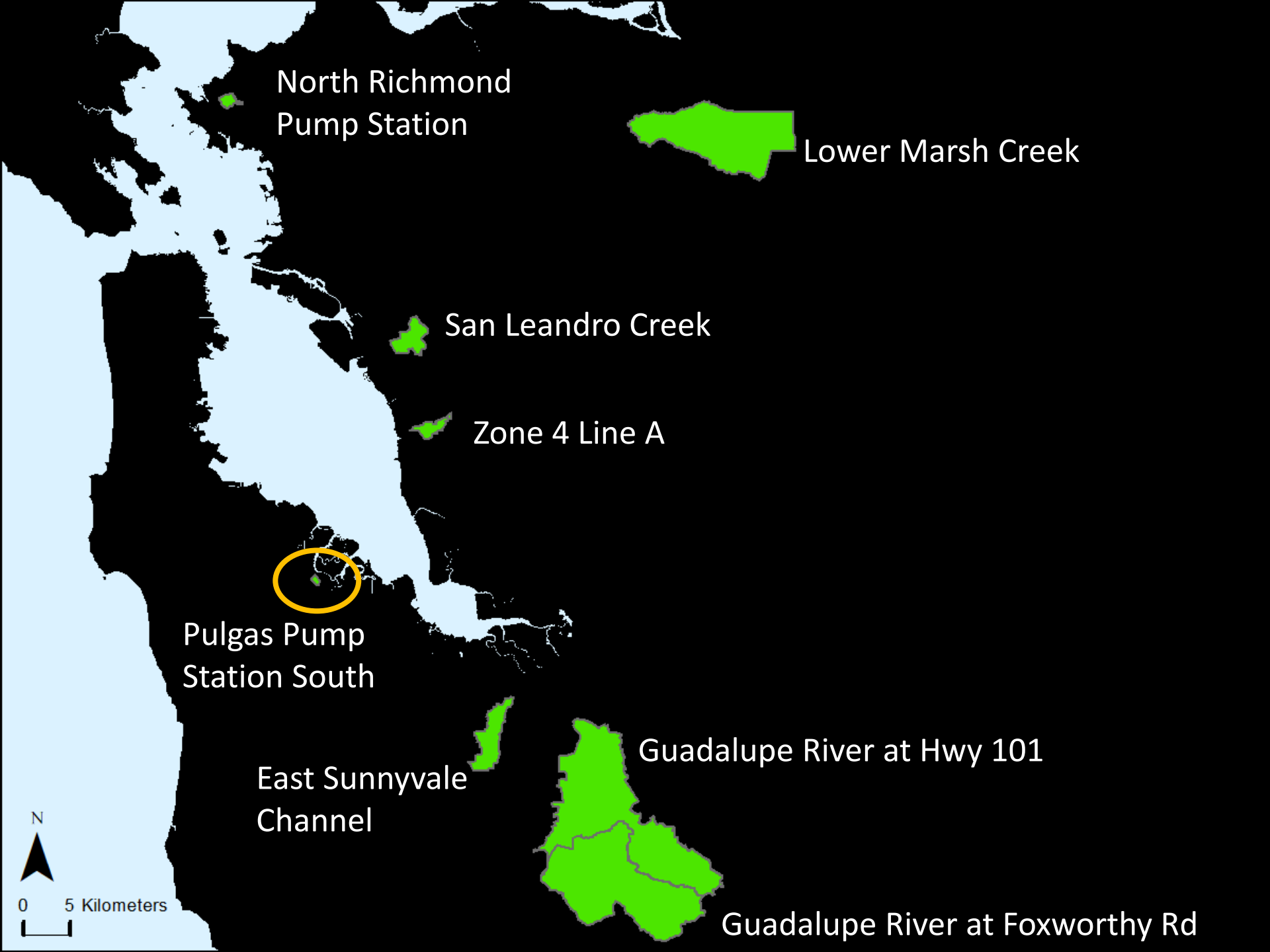
Measuring PCB concentrations in the watersheds draining to San Leandro Bay



Priority Margin Units (PMUs)



How do the margin areas recover once we reduce or stop the flow of pollutants into them?



North Richmond
Pump Station

Lower Marsh Creek

San Leandro Creek

Zone 4 Line A

Pulgas Pump
Station South

East Sunnyvale
Channel

Guadalupe River at Hwy 101

Guadalupe River at Foxworthy Rd

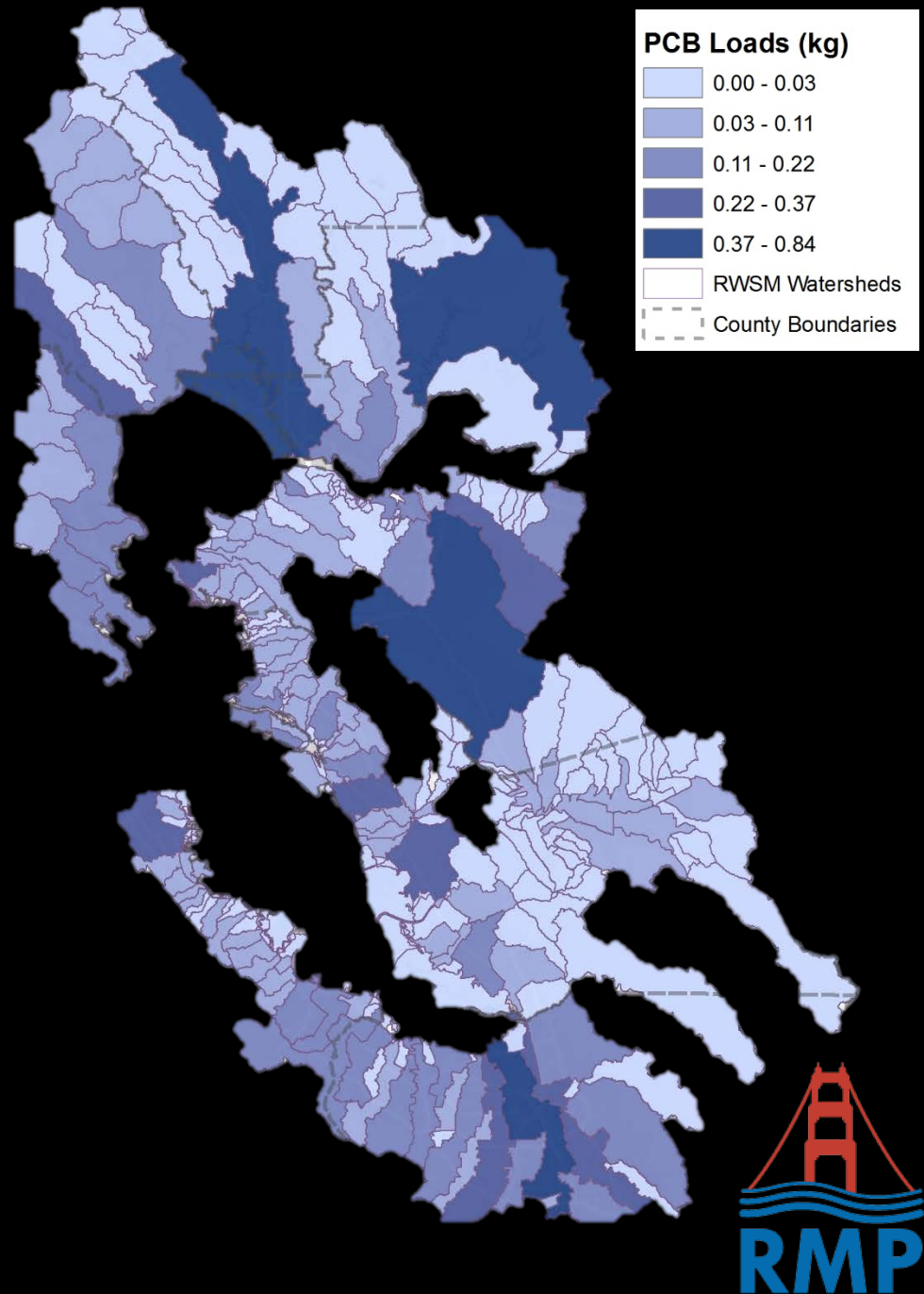
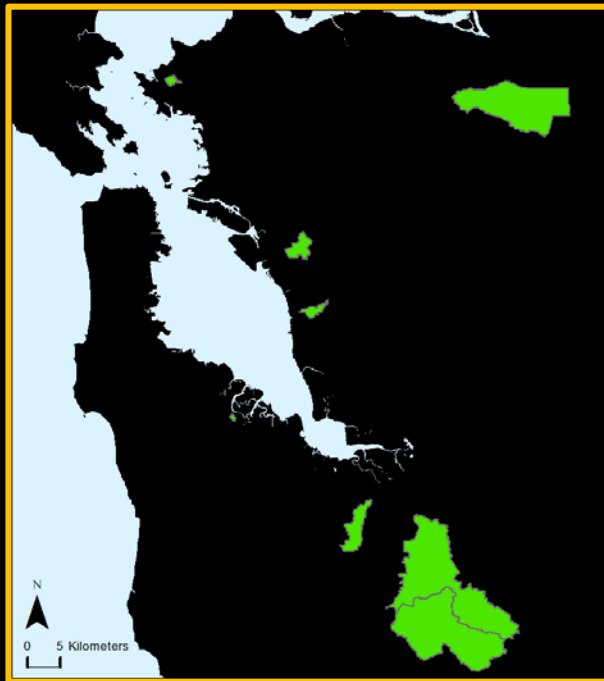
N



0 5 Kilometers



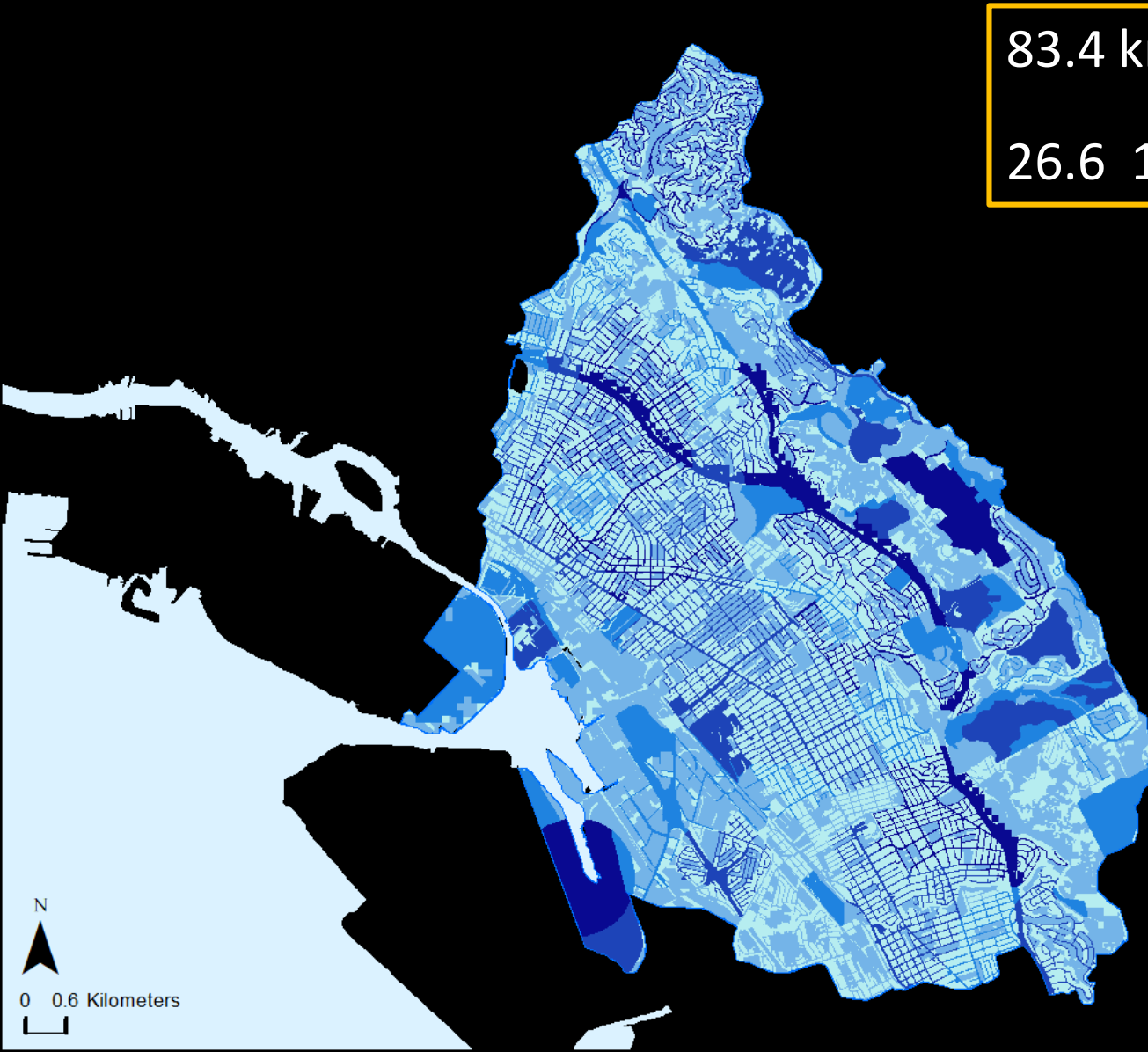
Regional Watershed Spreadsheet Model (RWSM)



Based on outputs of the RWSM, estimates of annual flow...

83.4 km²

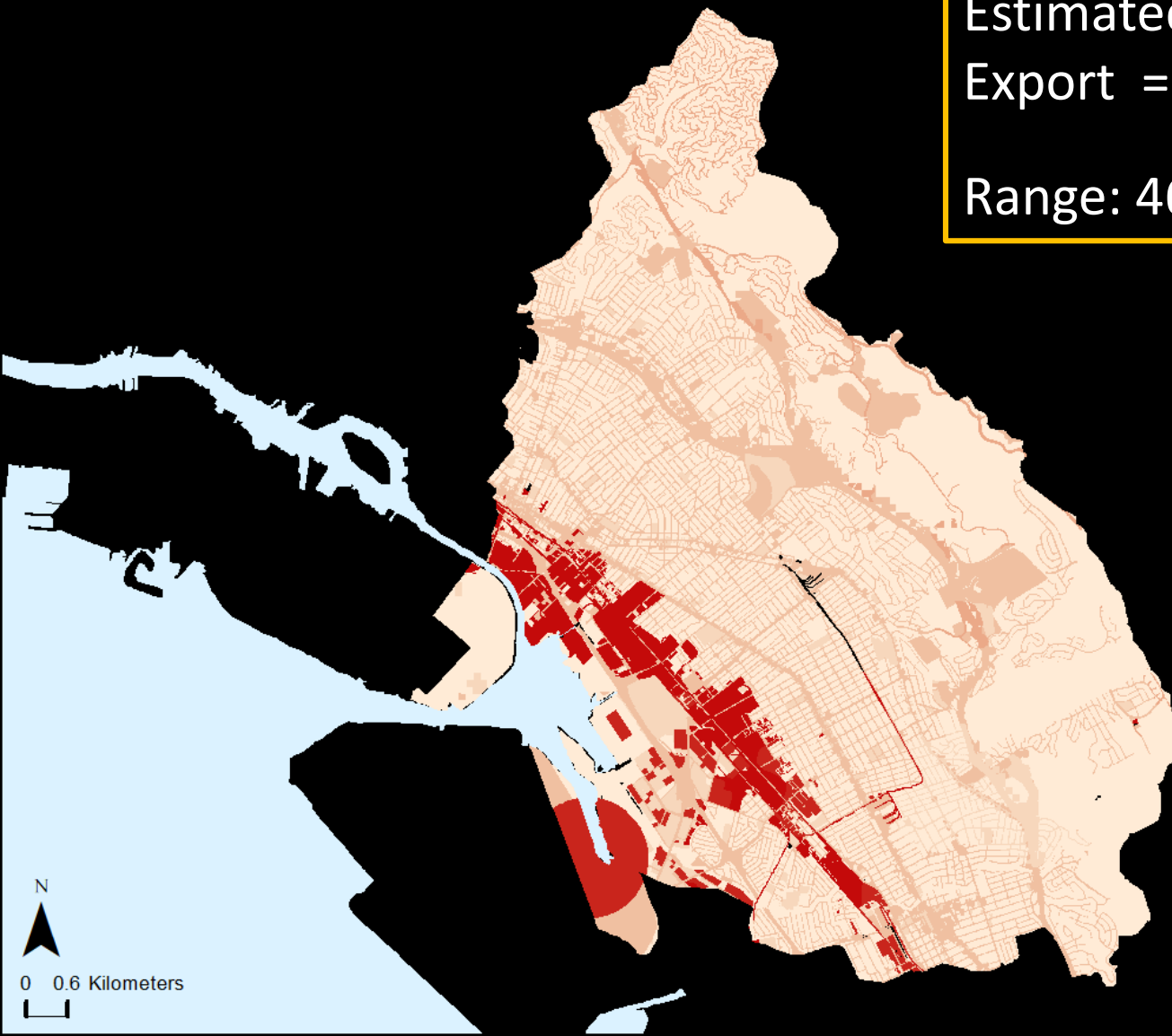
26.6 10⁶ m³ annual flow



Based on outputs of the RWSM, estimates of PCB loads & yields...

Estimated Annual PCB Load
Export = 986 g

Range: 462 – 1,747 g



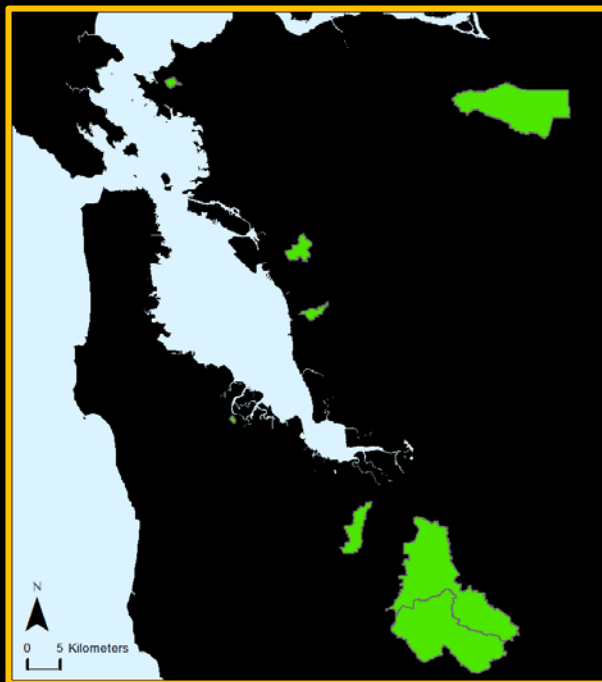
Based on settling studies completed for the Prop 13 BMP analysis ...

Sample/site	PCB (ng/L)	%<25um incl. dissolved	%25-75 um	%>75 um
Z4-201	17	73	13	14
Z4-203	30	49	23	28
Z4-204	23	46	21	33
Z4-205	29	38	31	31
RS-1003	38	28	26	46
RS-1004	17	51	16	33
Range	17 - 38	28 - 73 %	13 - 31%	14 - 46%
Average	26	48%	22%	31%

(Yee and McKee, 2010)



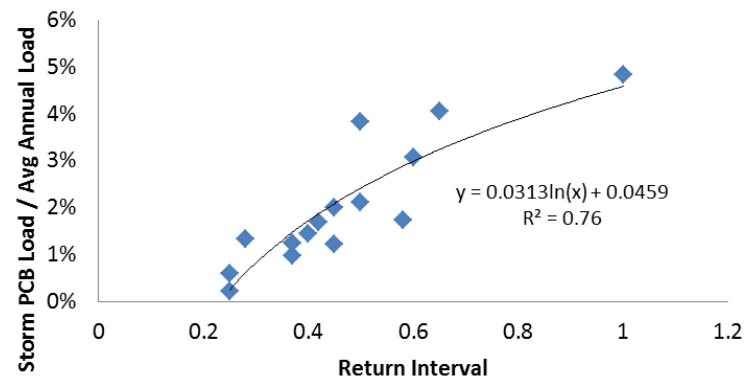
Based on recurrence interval analysis in similar, but well-sampled, watersheds...



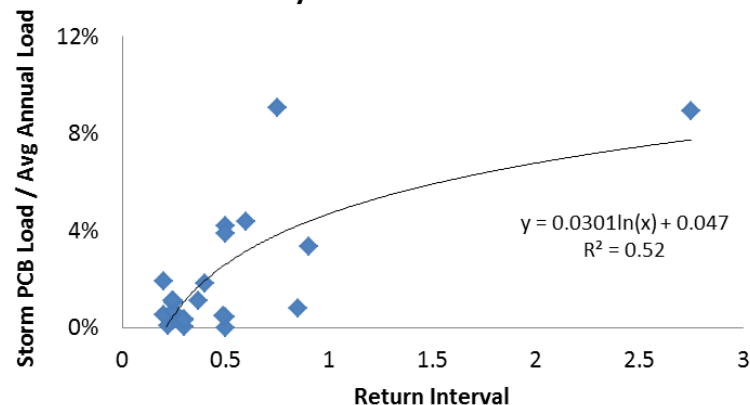
Estimated loads during different sized storm events:

Storms smaller than 1:1 year event and dry season = 86% of long term load

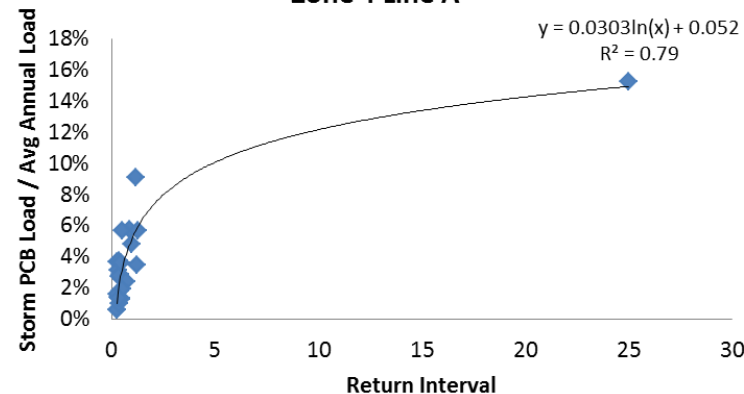
North Richmond Pump Station



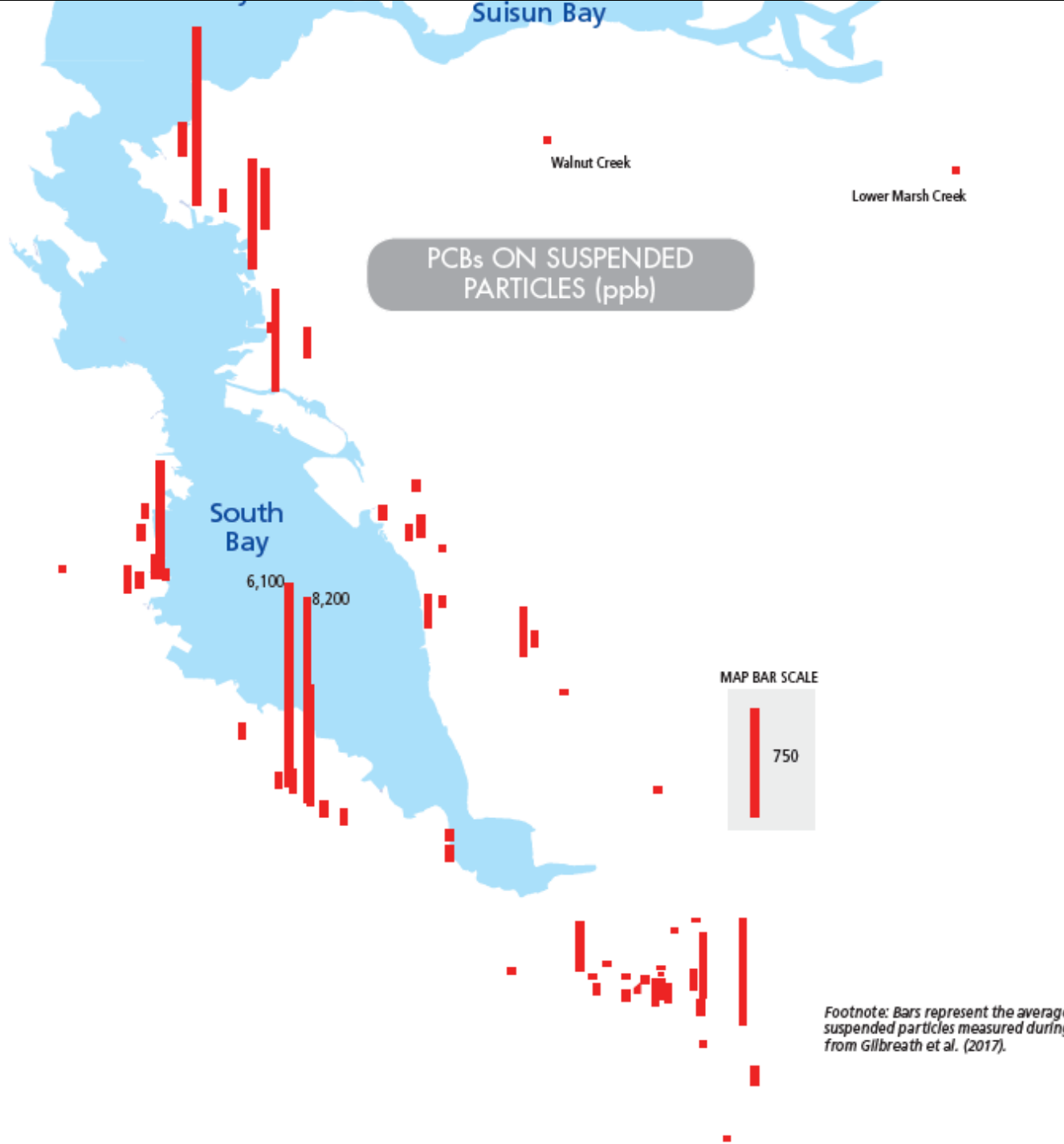
Sunnyvale East Channel



Zone 4 Line A







Footnote: Bars represent the average suspended particles measured during from Gilbreath et al. (2017).





PCB
concentrations
in ng/g (ng/L)

184
(21)

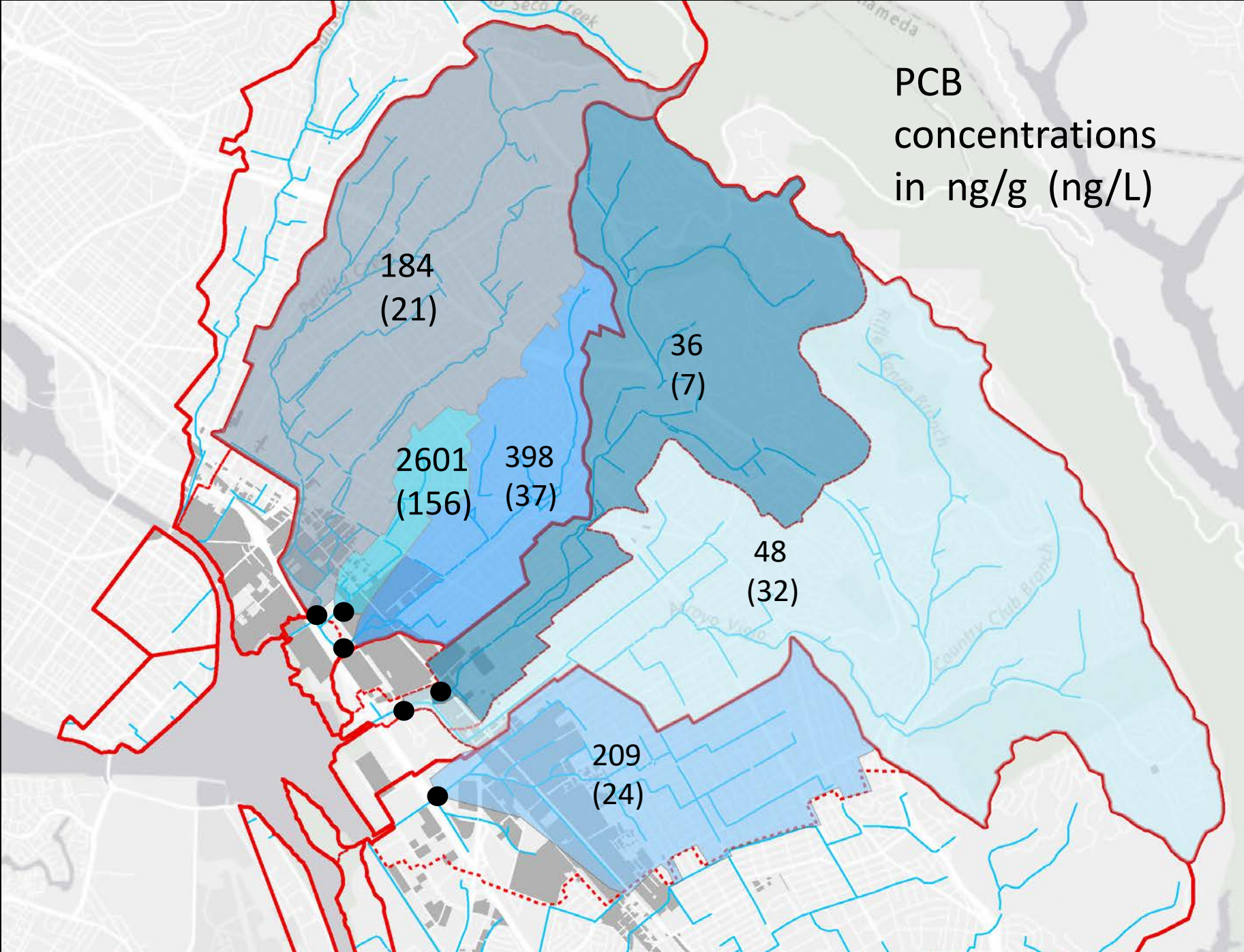
36
(7)

2601
(156)

398
(37)

48
(32)

209
(24)



Two stories, two very different approaches, in sampling key watershed inputs to the margins in Water Year 2017

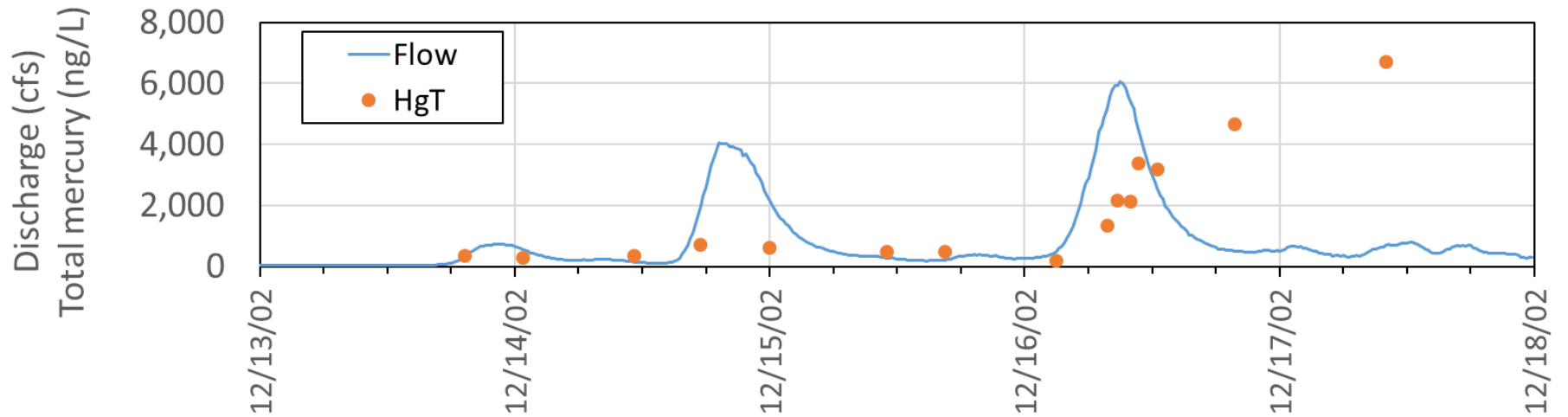
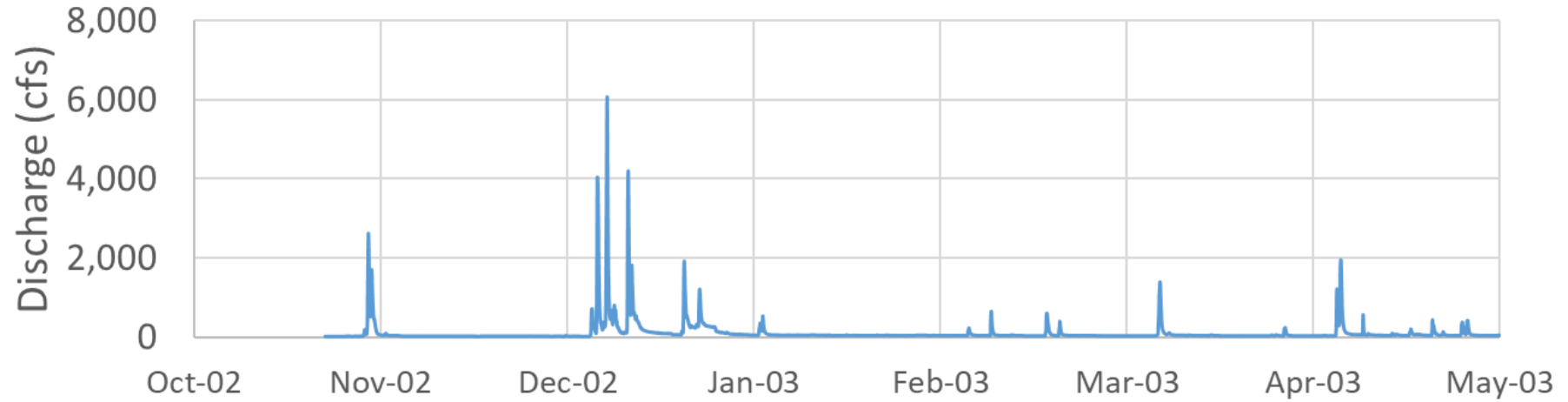
Story 2:

Measuring Hg loads from the Guadalupe River into the Lower South Bay

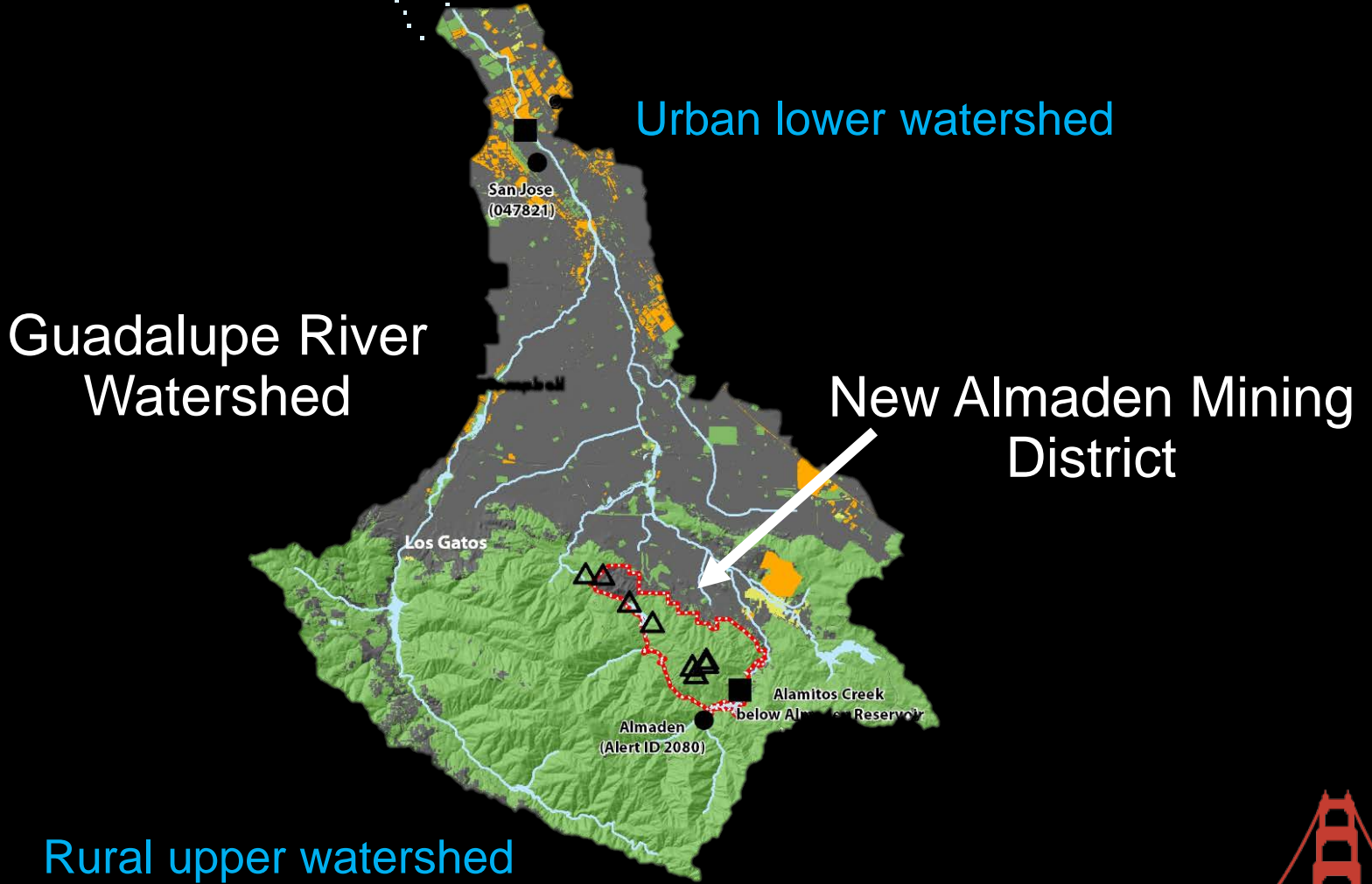


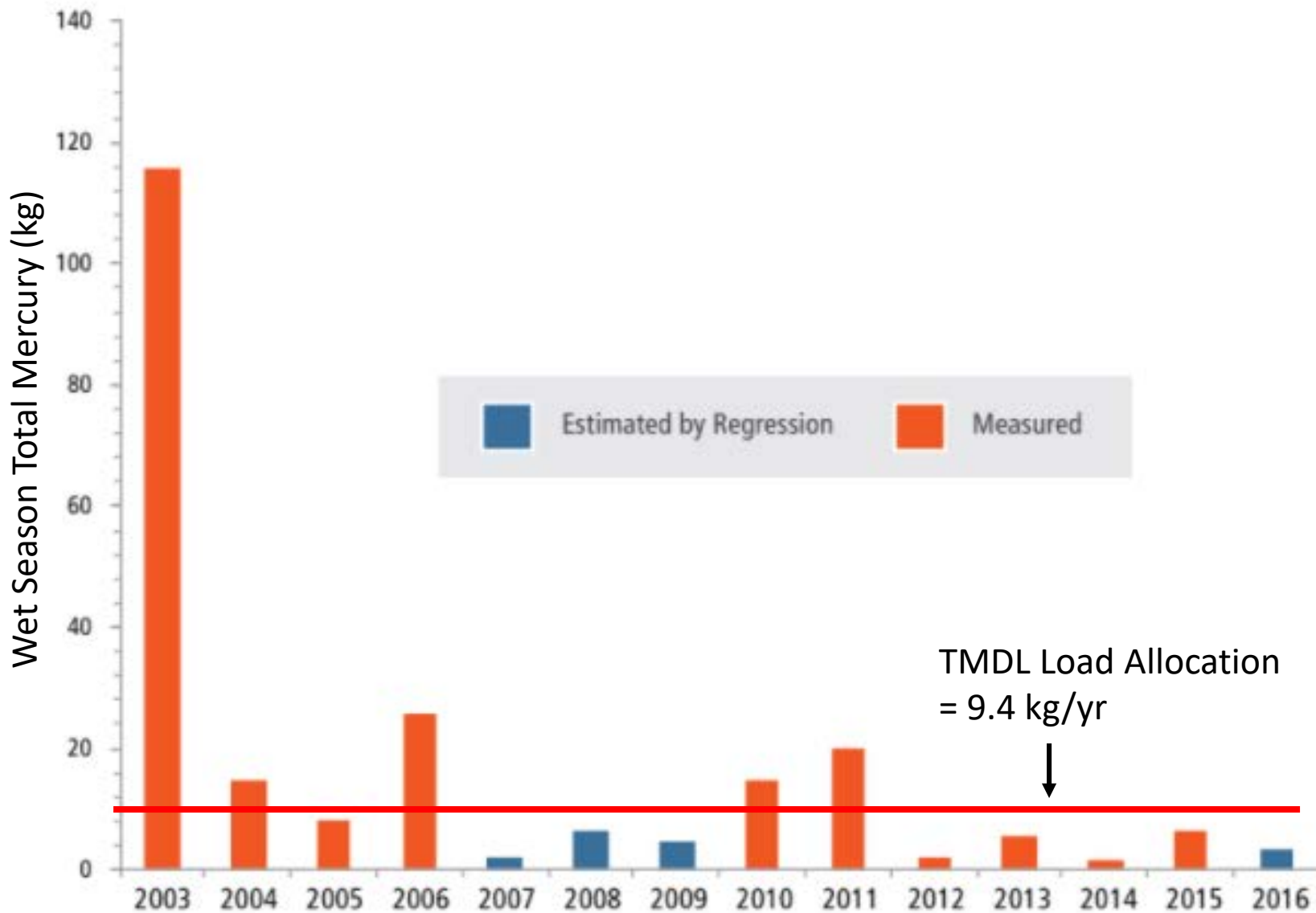
Water Year 2003

(Oct 1 2002 – Sept 30 2003)



Lower South Bay



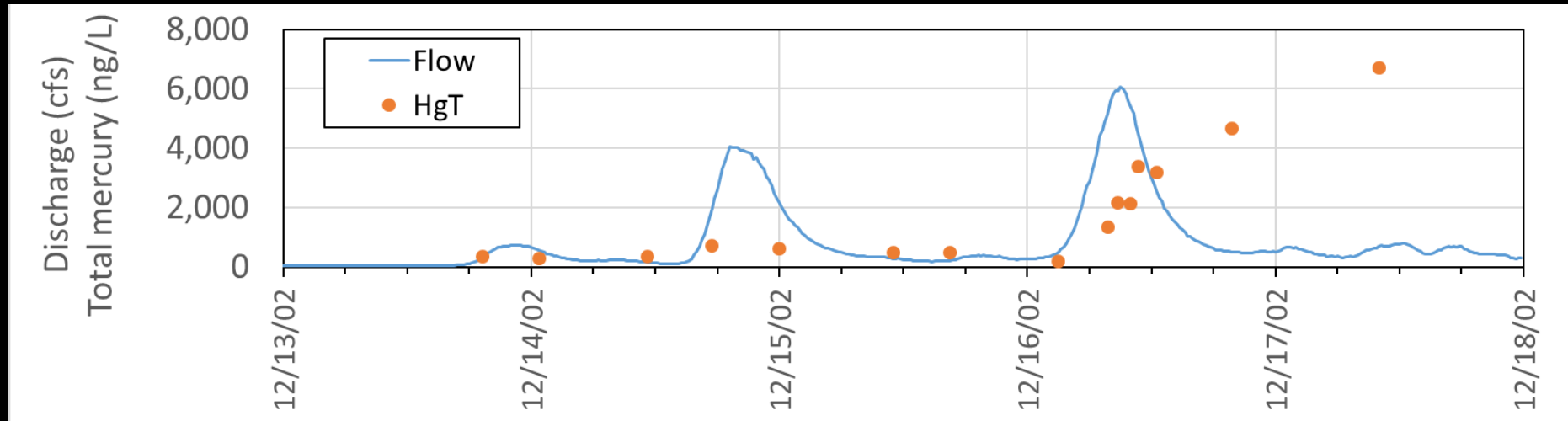


Proposed Mobilization Criteria:

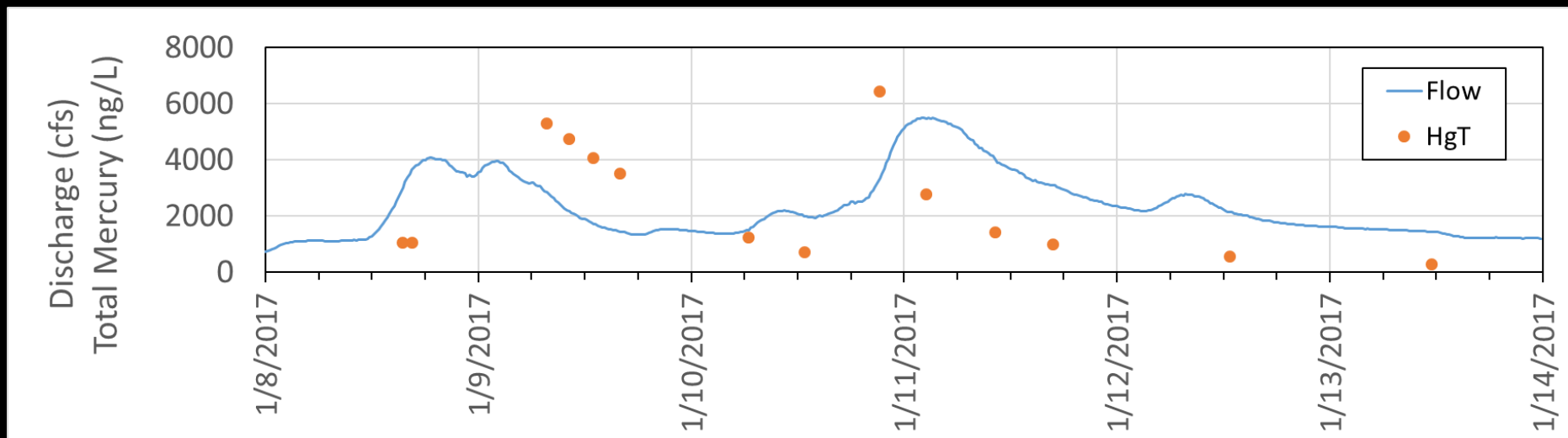
- Almaden Reservoir 80% full
- 7-10 inches of antecedent rainfall season to date
- Increased baseflow conditions at the Hwy 101 gauge associated with previous storms
- A rain forecast of 6-12 inches in the Santa Cruz mountains.



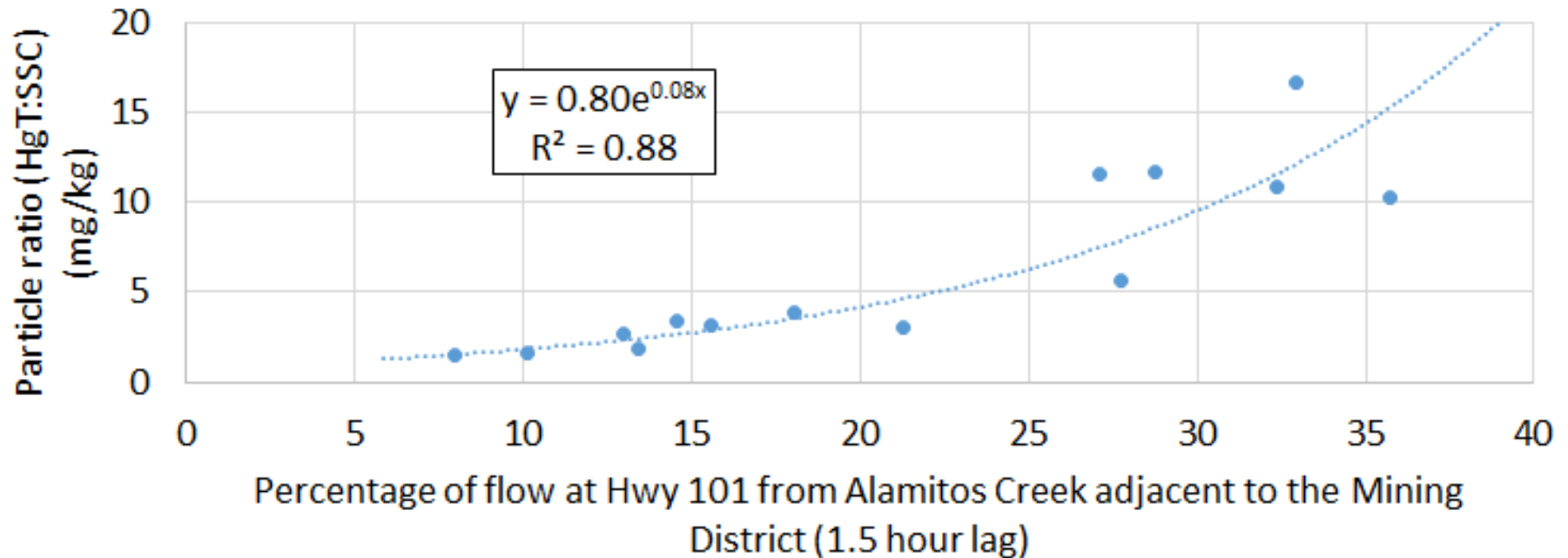
WY 2003 storm



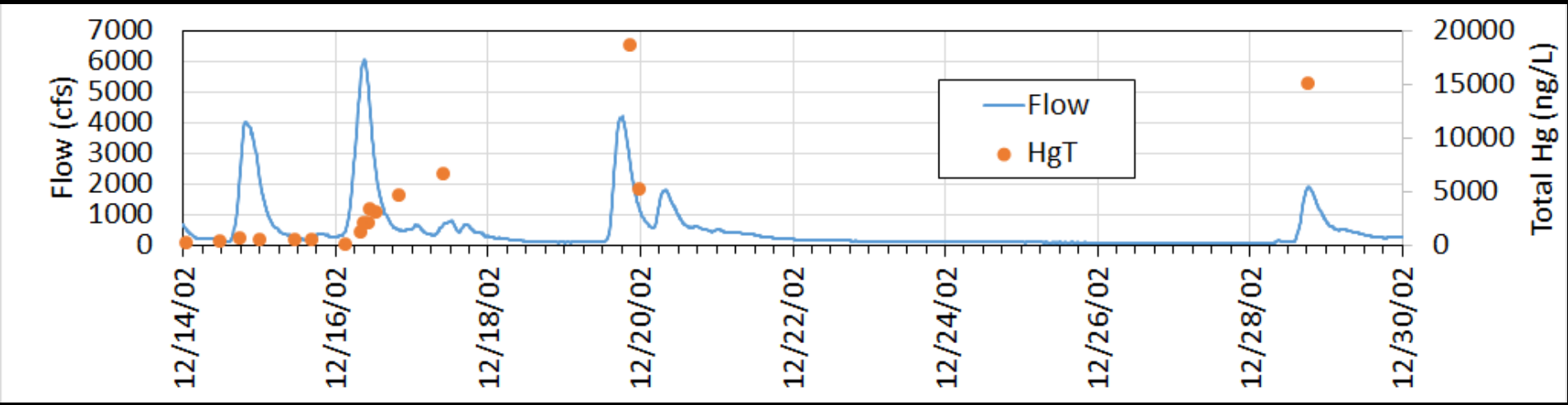
WY 2017 storm



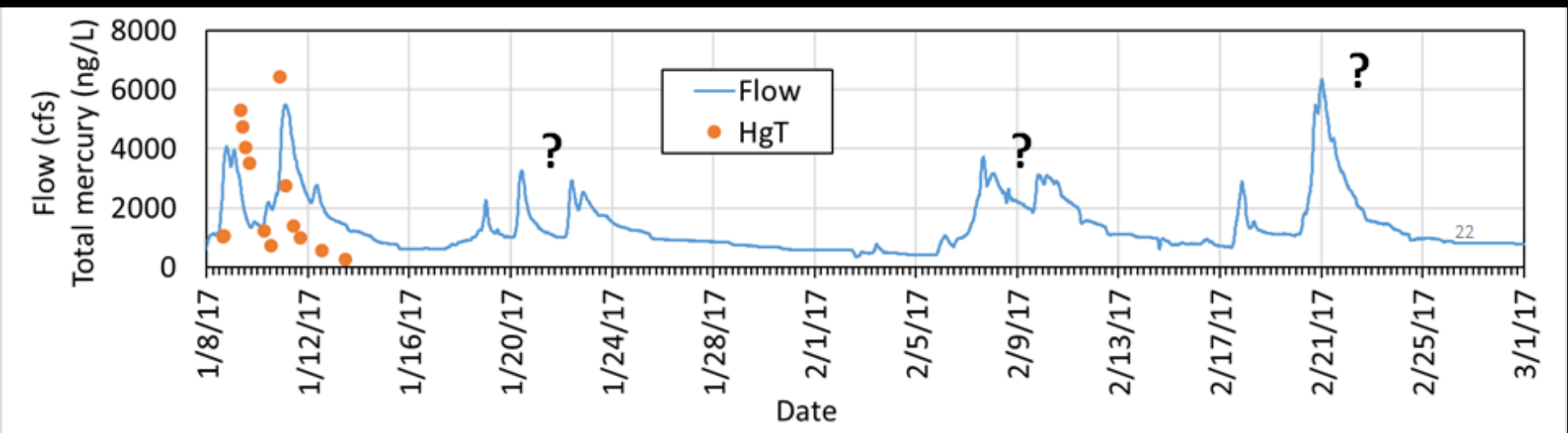
Proportion of flow from the mining district explains 88% of variability in concentrations.

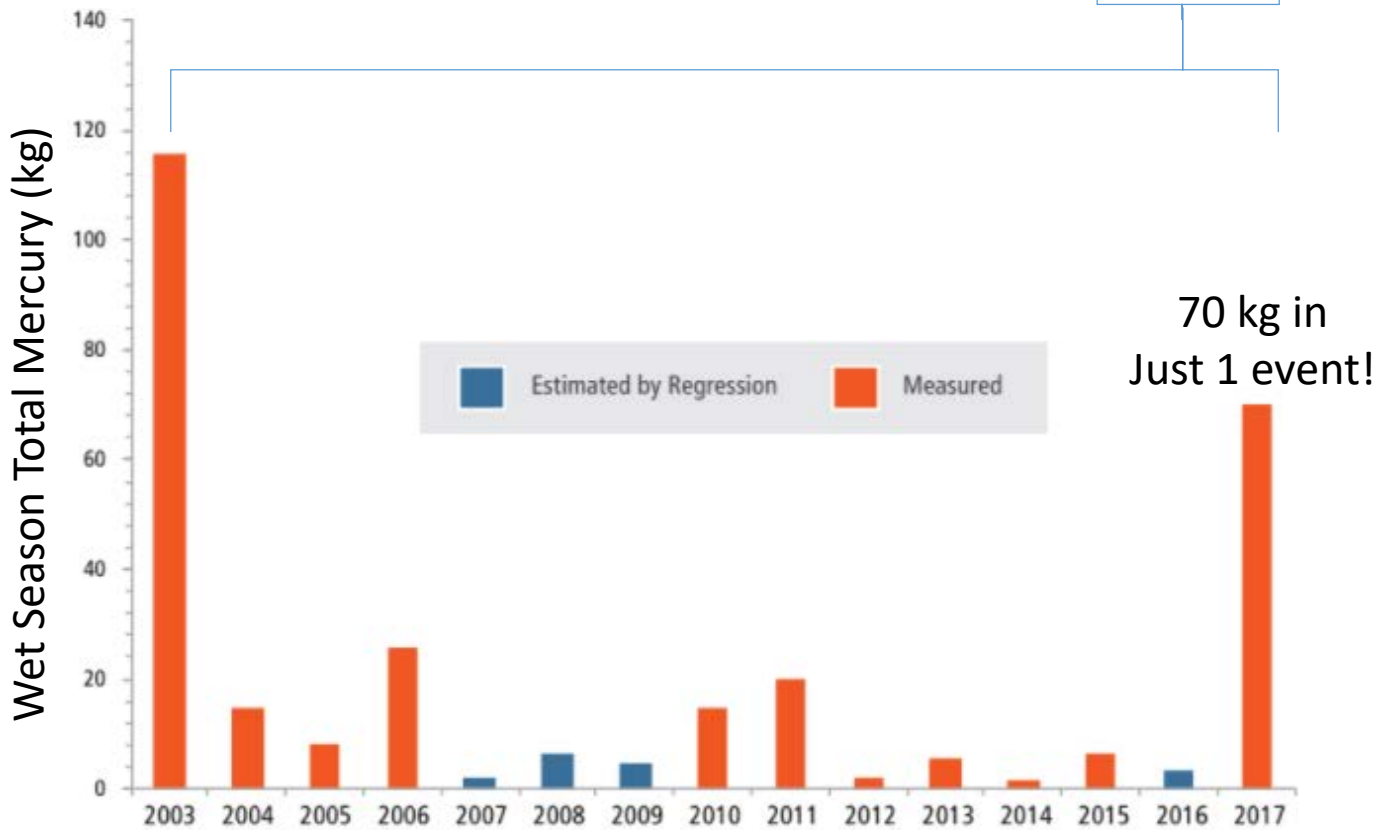
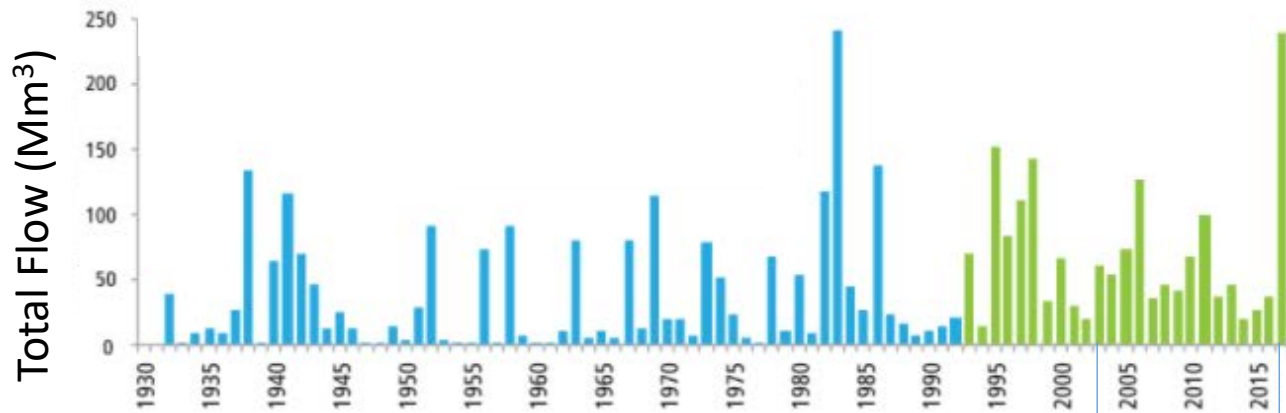


WY 2003



WY 2017







Many years feel like this...



Once in a while, we get this...

The RMP is ready to go!

