2022 RMP Annual Meeting

Update on RMP PCB Studies

Jay Davis

San Francisco Estuary Institute

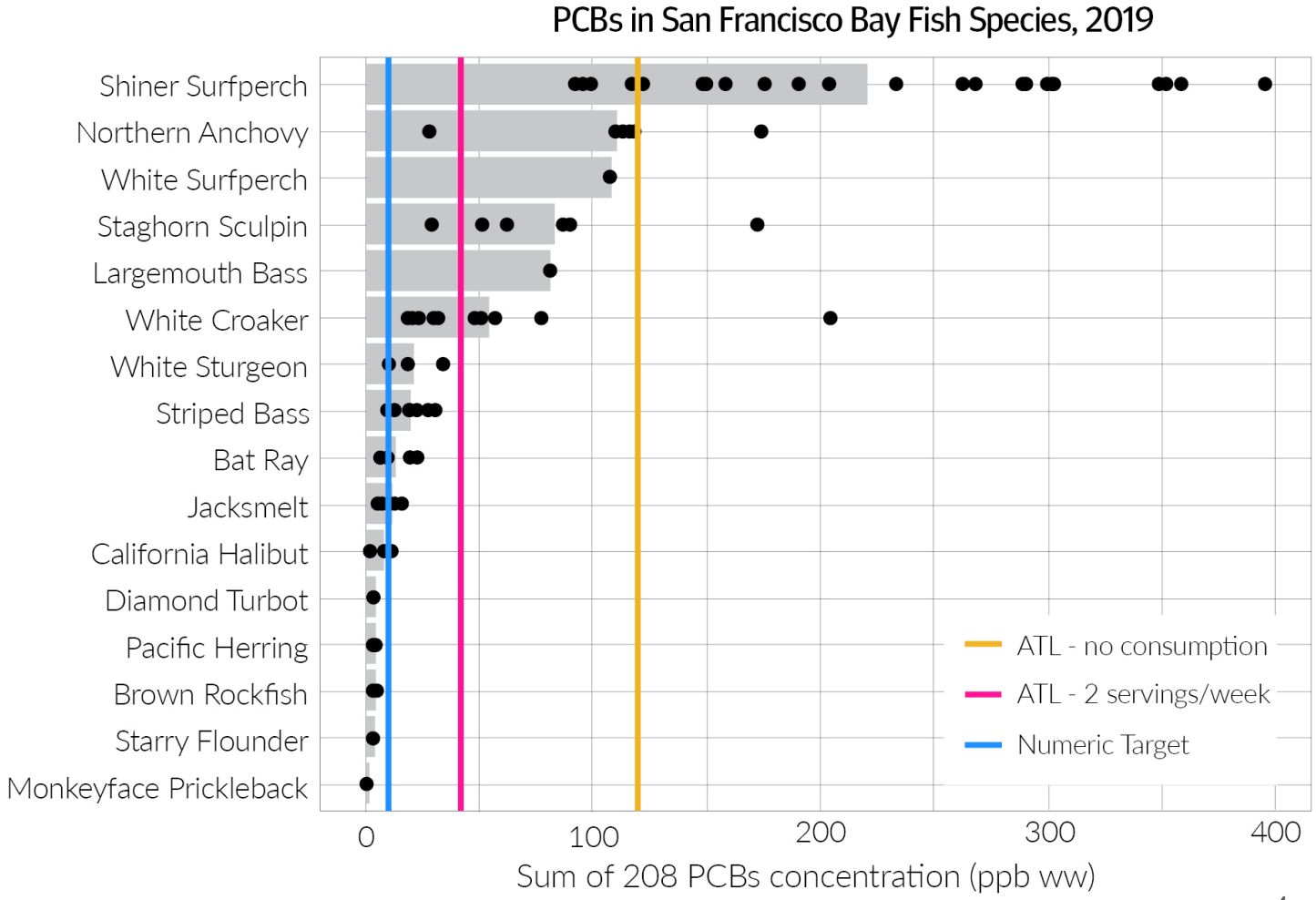
1966
FTA

2022

One of the Remaining Challenges: PCBs

This is the dataset that defines the problem

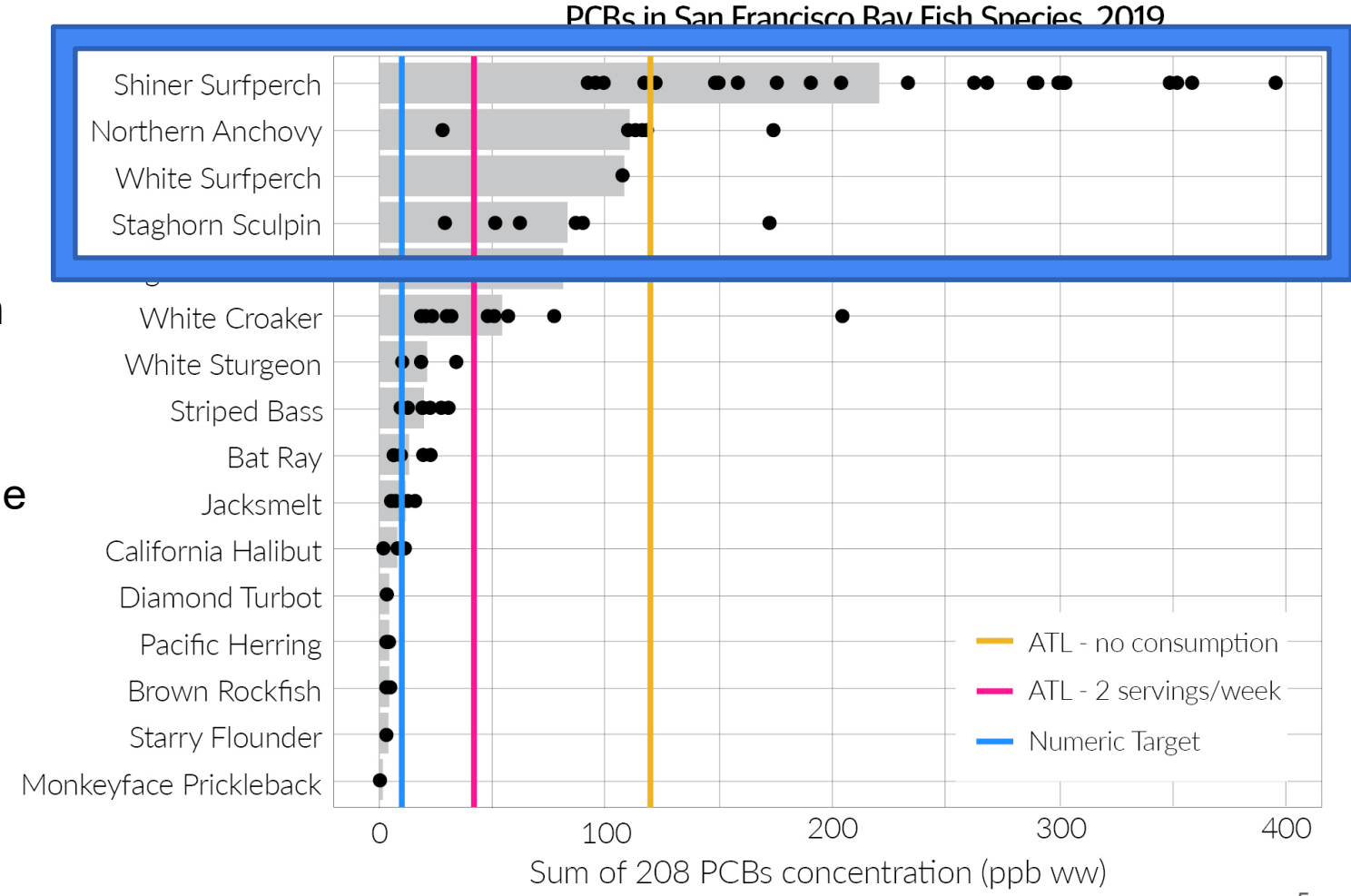
Many species have average concentrations well above thresholds



Understanding the Problem

Part A:
Localized margin contamination

- Very high levels
- More controllable

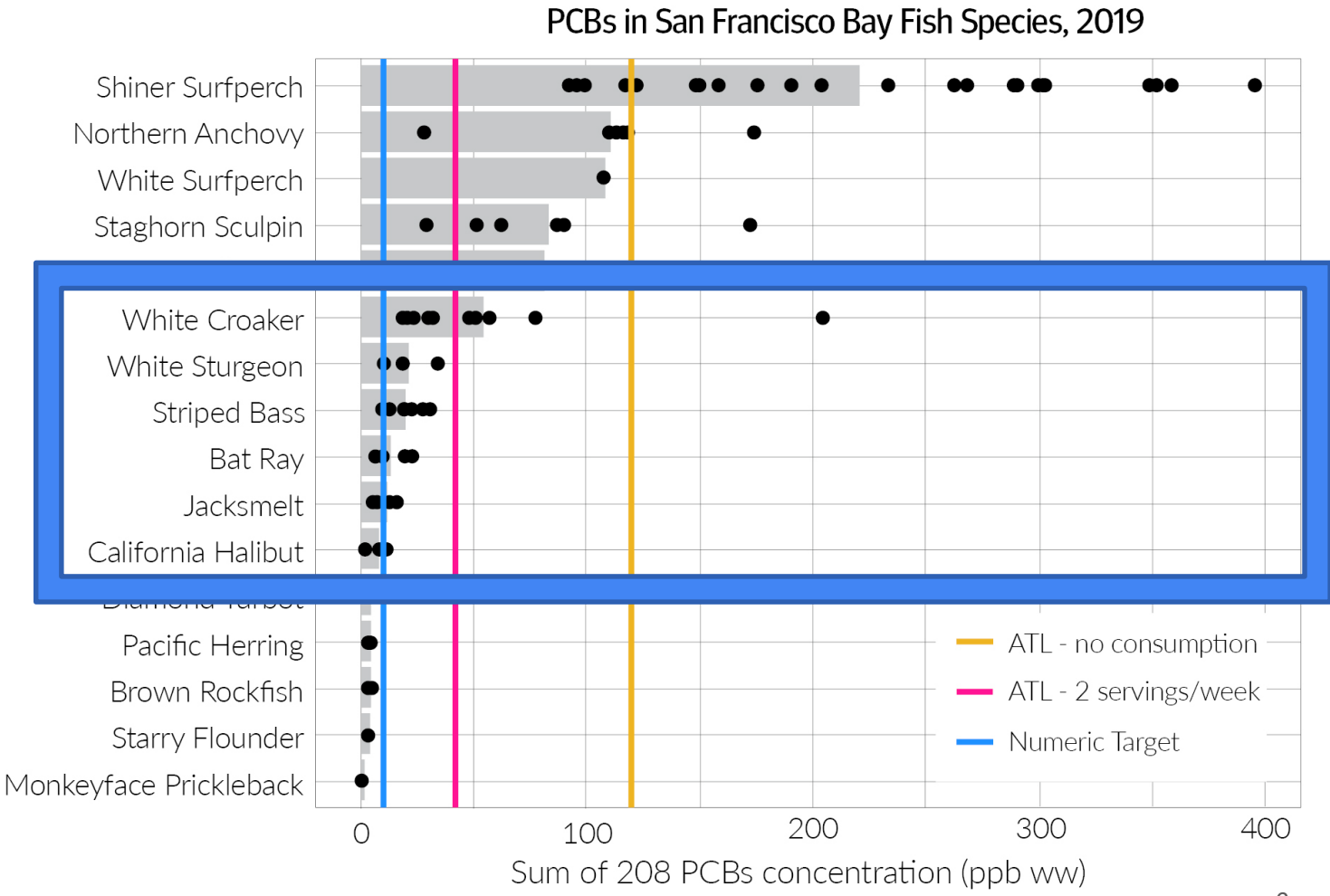


Understanding the Problem

Part B:

Regional Bay contamination

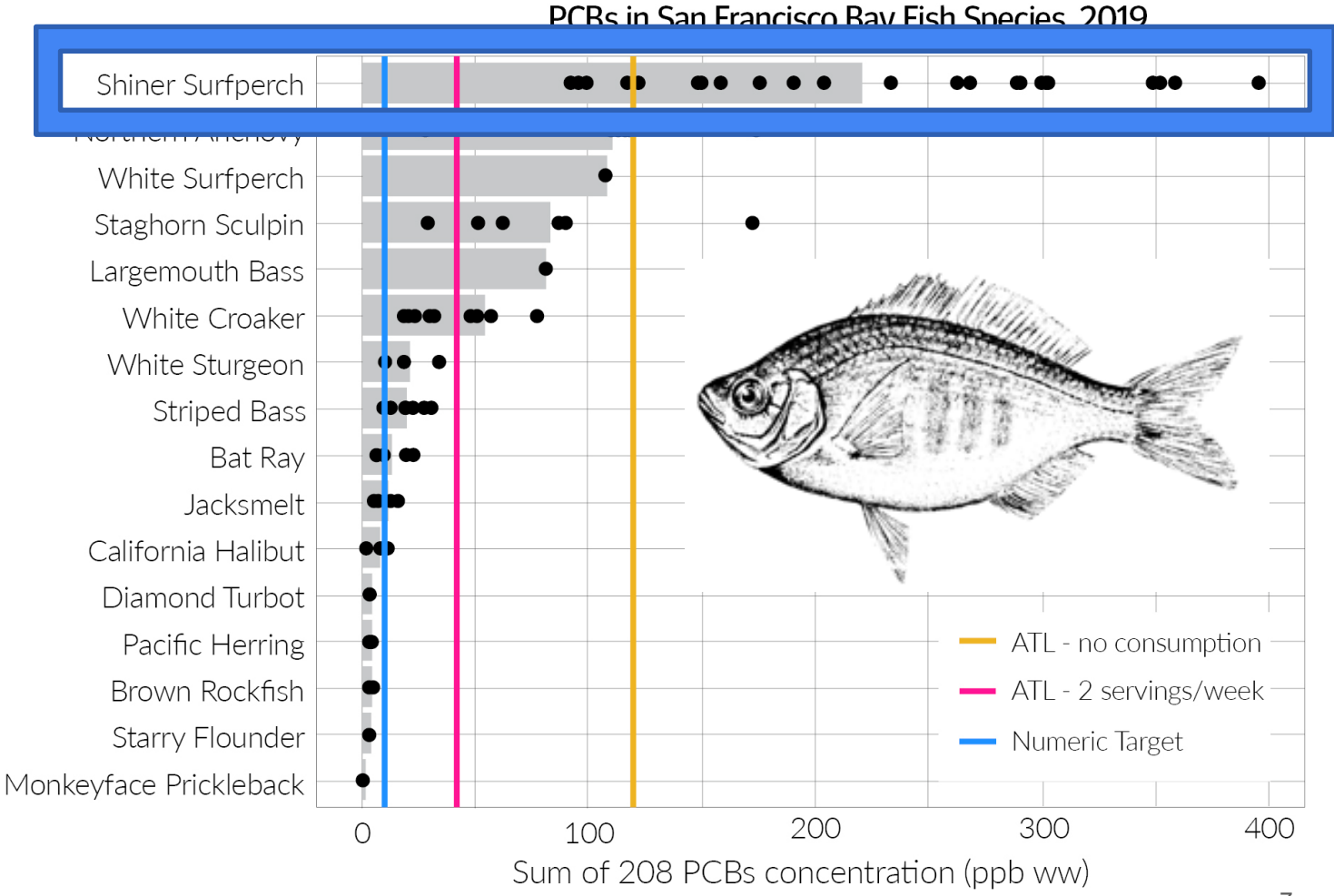
- Moderate levels
- Harder to control



Understanding the Problem

Part A:
Localized margin contamination

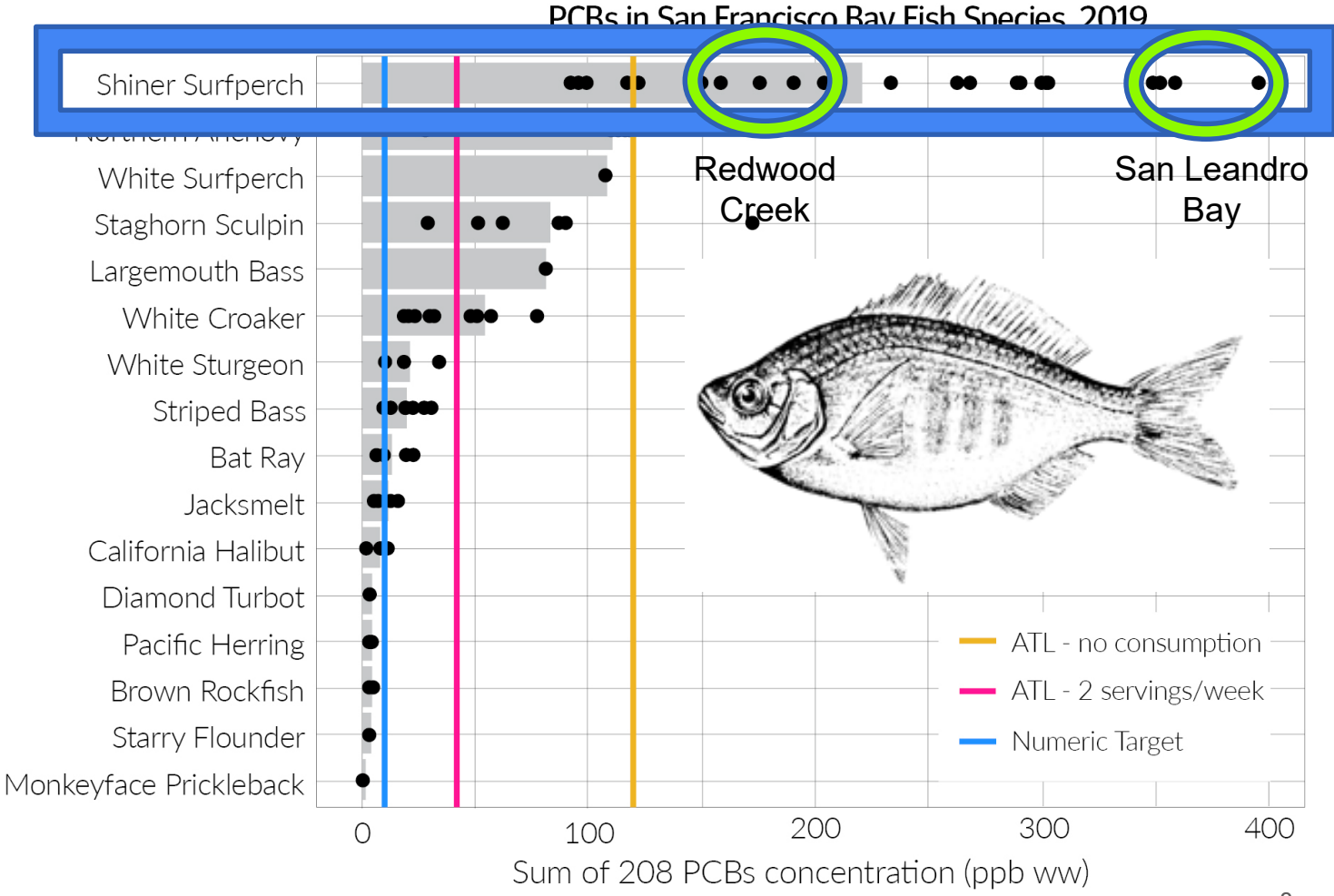
- Shiner surfperch

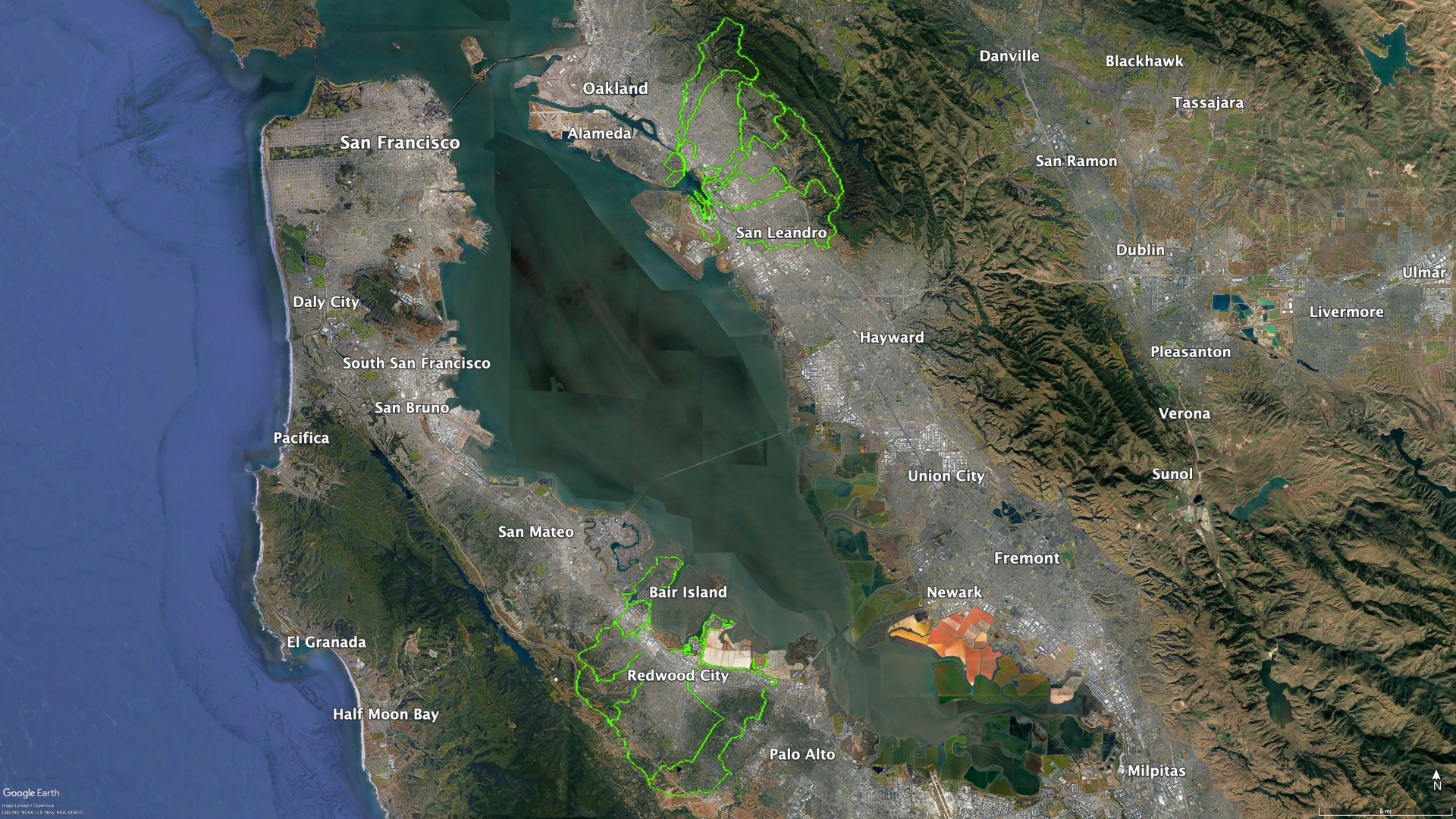


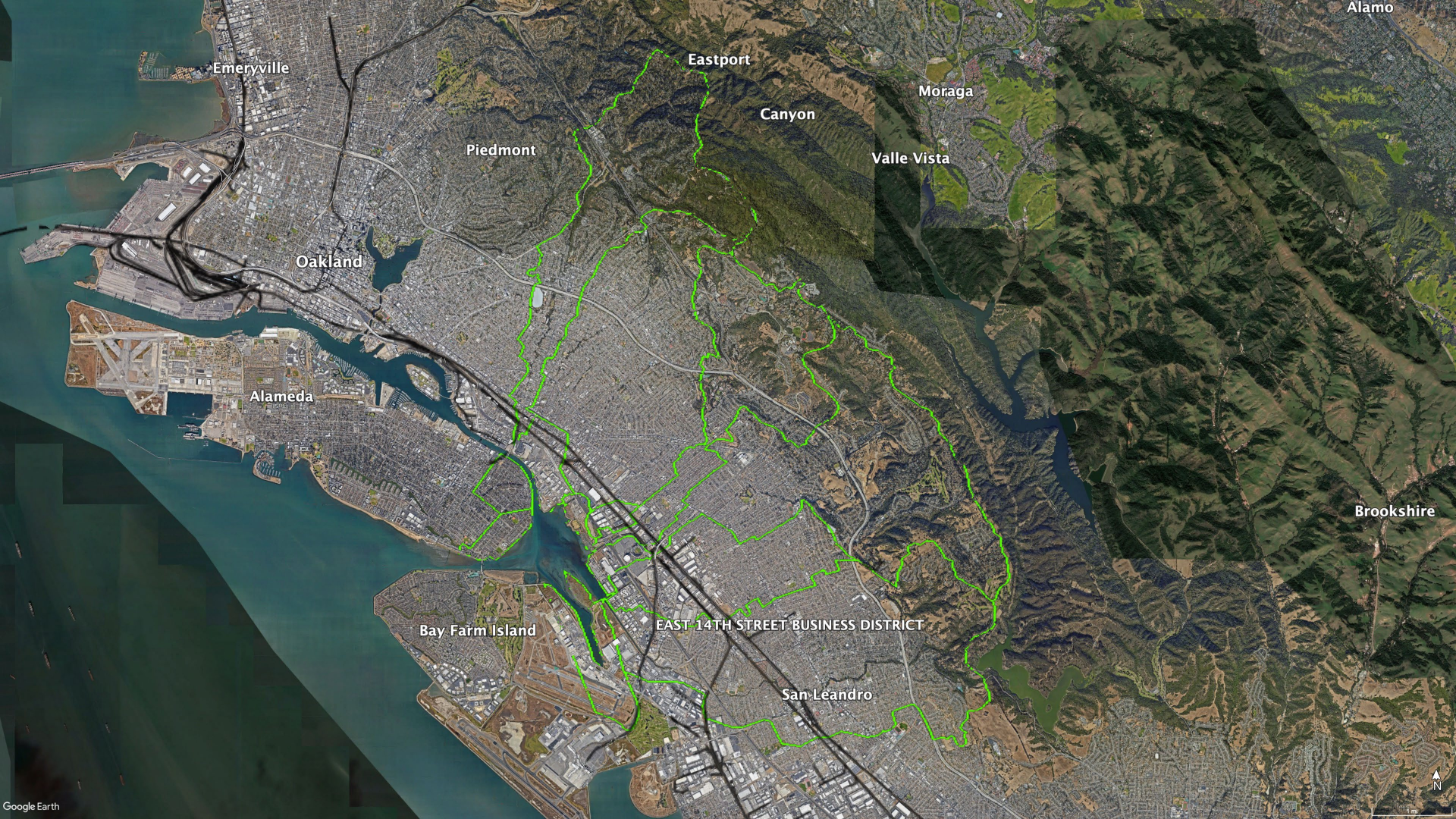
Understanding the Problem

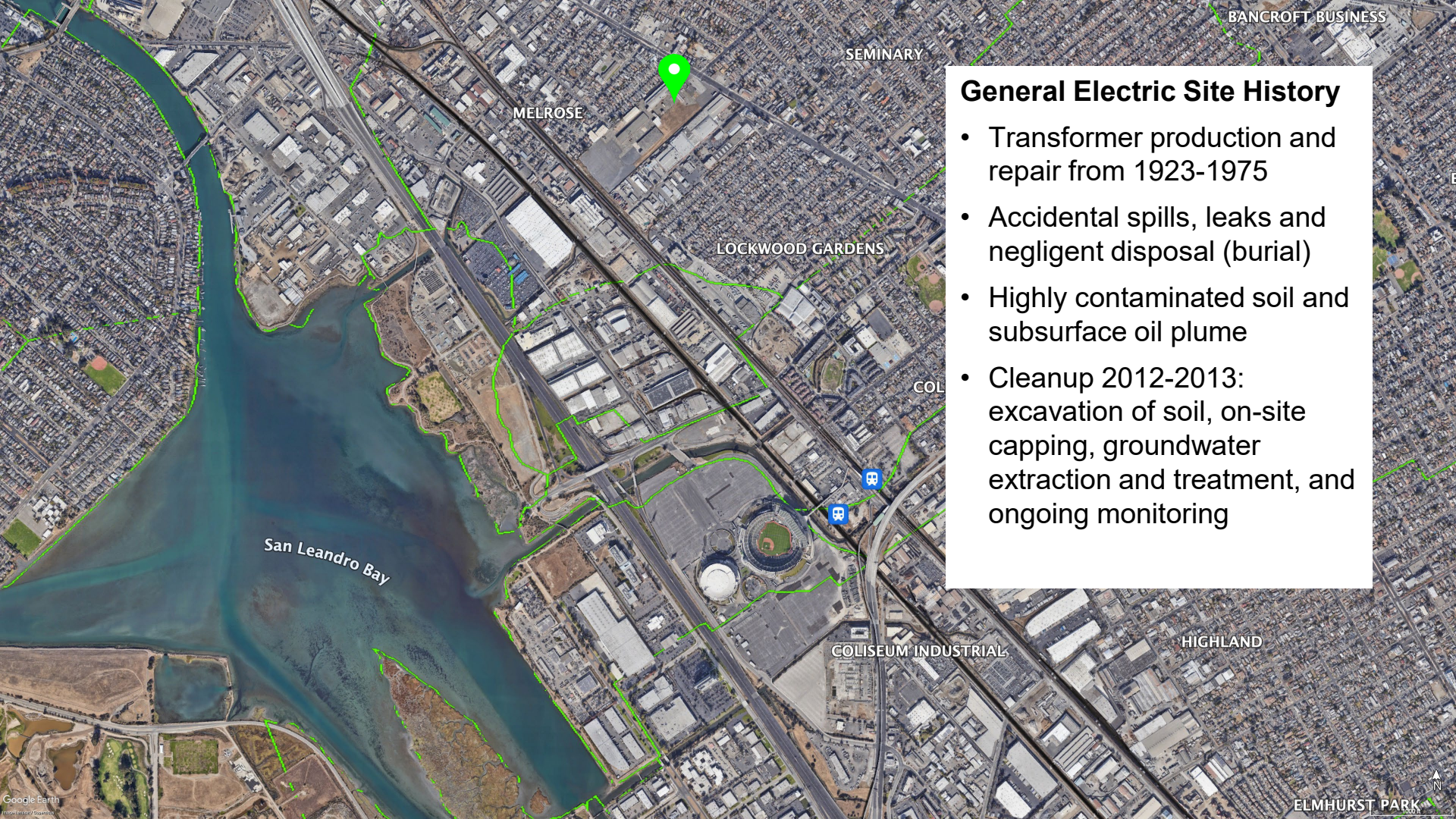
Part A: Localized margin contamination

- Shiner surfperch




Danville
Blackhawk
Oakland
Tassajara
Alameda
San Francisco
San Ramon
San Leandro
Dublin
Ulmar
Daly City
Livermore
Hayward
Pleasanton
South San Francisco
San Bruno
Verona
Pacifica
Union City
Sunol
San Mateo
Fremont
Bair Island
Newark
El Granada
Redwood City
Half Moon Bay
Palo Alto
Milpitas
Google Earth
N
6 mi


Alamo
Emeryville
Eastport
Moraga
Canyon
Piedmont
Valle Vista
Oakland
Alameda
Brookshire
Bay Farm Island
EAST 14TH STREET BUSINESS DISTRICT
San Leandro
Google Earth

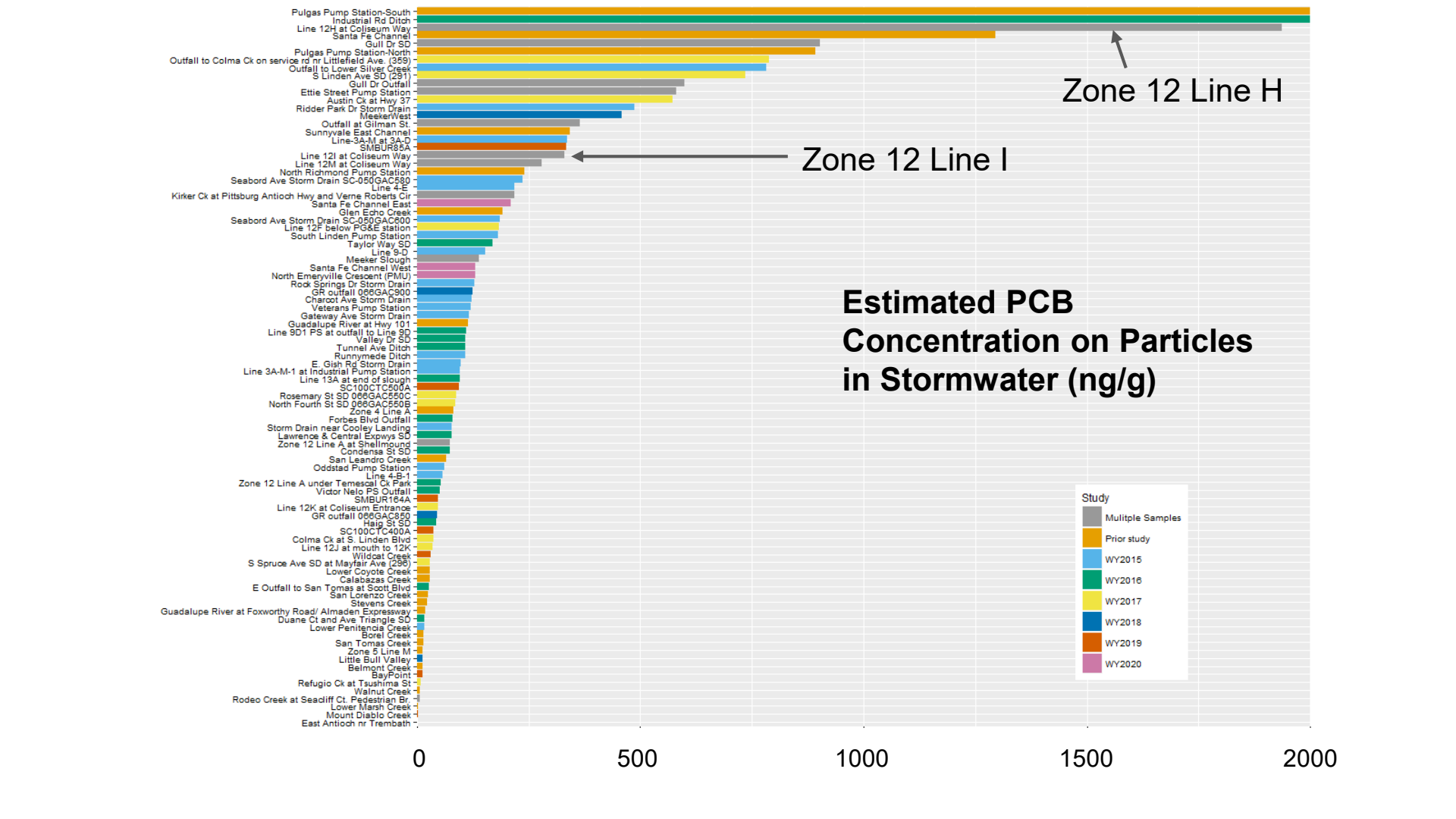


General Electric Site History

- Transformer production and repair from 1923-1975
- Accidental spills, leaks and negligent disposal (burial)
- Highly contaminated soil and subsurface oil plume
- Cleanup 2012-2013: excavation of soil, on-site capping, groundwater extraction and treatment, and ongoing monitoring

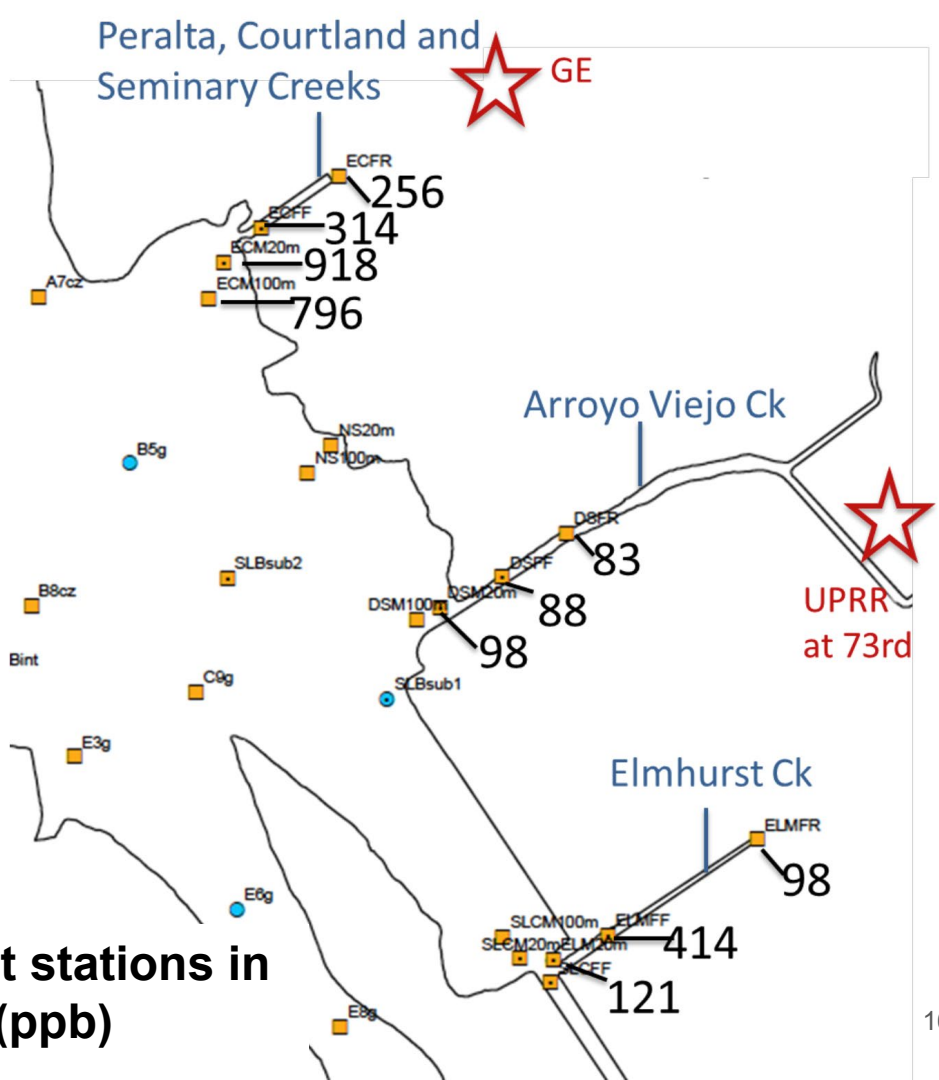
Stormwater (RMP)
Zone 12, Line H
2017: 2,601 ng/g
2020: 1,271 ng/g
BANCROFT BUSINESS
SEMINARY
MELROSE
HAVENSCOURT
HEGENBERGER
LOCKWOOD GARDENS
ARROYO VIEJO
COLISEUM
FITCHBURG
WOODLAND
San Leandro Bay
COLISEUM INDUSTRIAL
HIGHLAND
ELMHURST PARK
Google Earth

Stormwater (RMP)
Zone 12, Line I
2017: 398 ng/g
2020: 263 ng/g
BANCROFT BUSINESS
SEMINARY
MELROSE
HAVENSCOURT
HEGENBERGER
ARROYO VIEJO
COLISEUM
FITCHBURG
WOODLAND
San Leandro Bay
COLISEUM INDUSTRIAL
HIGHLAND
ELMHURST PARK
Google Earth


Pulgas Pump Station-South
Industrial Rd Ditch
Line 12H at Coliseum Way
Santa Fe Channel
Gull Dr SD
Pulgas Pump Station-North
Outfall to Colma Ck on service rd nr Littlefield Ave. (359)
Outfall to Lower Silver Creek
S Linden Ave SD (291)
Gull Dr Outfall
Ettie Street Pump Station
Austin Ck at Hwy 37
Ridder Park Dr Storm Drain
MeekerWest
Outfall at Gilman St.
Sunnyvale East Channel
Line-3A-M at 3A-D
SMBUR95A
Line 12I at Coliseum Way
Line 12M at Coliseum Way
North Richmond Pump Station
Seabord Ave Storm Drain SC-050GAC580
Line 4-E
Kirker Ck at Pittsburg Antioch Hwy and Verne Roberts Cir
Santa Fe Channel East
Glen Echo Creek
Seabord Ave Storm Drain SC-050GAC600
Line 12F below PG&E station
South Linden Pump Station
Taylor Way SD
Line 9-D
Meeker Slough
Santa Fe Channel West
North Emeryville Crescent (PMU)
Rock Springs Dr Storm Drain
GR outfall 066GAC900
Charcot Ave Storm Drain
Veterans Pump Station
Gateway Ave Storm Drain
Guadalupe River at Hwy 101
Line 9D1 PS at outfall to Line 9D
Valley Dr SD
Tunnel Ave Ditch
Runnymede Ditch
E. Gish Rd Storm Drain
Line 3A-M-1 at Industrial Pump Station
Line 13A at end of slough
SC100CTC500A
Rosemary St SD 066GAC550C
North Fourth St SD 066GAC550B
Zone 4 Line A
Forbes Blvd Outfall
Storm Drain near Cooley Landing
Lawrence & Central Expwys SD
Zone 12 Line A at Shellmound
Condensa St SD
San Leandro Creek
Oddstad Pump Station
Line 4-B-1
Zone 12 Line A under Temescal Ck Park
Victor Nelo PS Outfall
SMBUR164A
Line 12K at Coliseum Entrance
GR outfall 066GAC850
Haig St SD
SC100CTC400A
Colma Ck at S. Linden Blvd
Line 12J at mouth to 12K
Wildcat Creek
S Spruce Ave SD at Mayfair Ave (296)
Lower Coyote Creek
Calabazas Creek
E Outfall to San Tomas at Scott Blvd
San Lorenzo Creek
Stevens Creek
Guadalupe River at Foxworthy Road/ Almaden Expressway
Duane Ct and Ave Triangle SD
Lower Penitencia Creek
Borel Creek
San Tomas Creek
Zone 5 Line M
Little Bull Valley
Belmont Creek
BayPoint
Refugio Ck at Tsushima St
Walnut Creek
Rodeo Creek at Seacliff Ct. Pedestrian Br.
Lower Marsh Creek
Mount Diablo Creek
East Antioch nr Trembath
Zone 12 Line H
Zone 12 Line I
Estimated PCB Concentration on Particles in Stormwater (ng/g)
Study
Mulitple Samples
Prior study
WY2015
WY2016
WY2017
WY2018
WY2019
WY2020
0
500
1000
1500
2000

Union Pacific Railroad Site

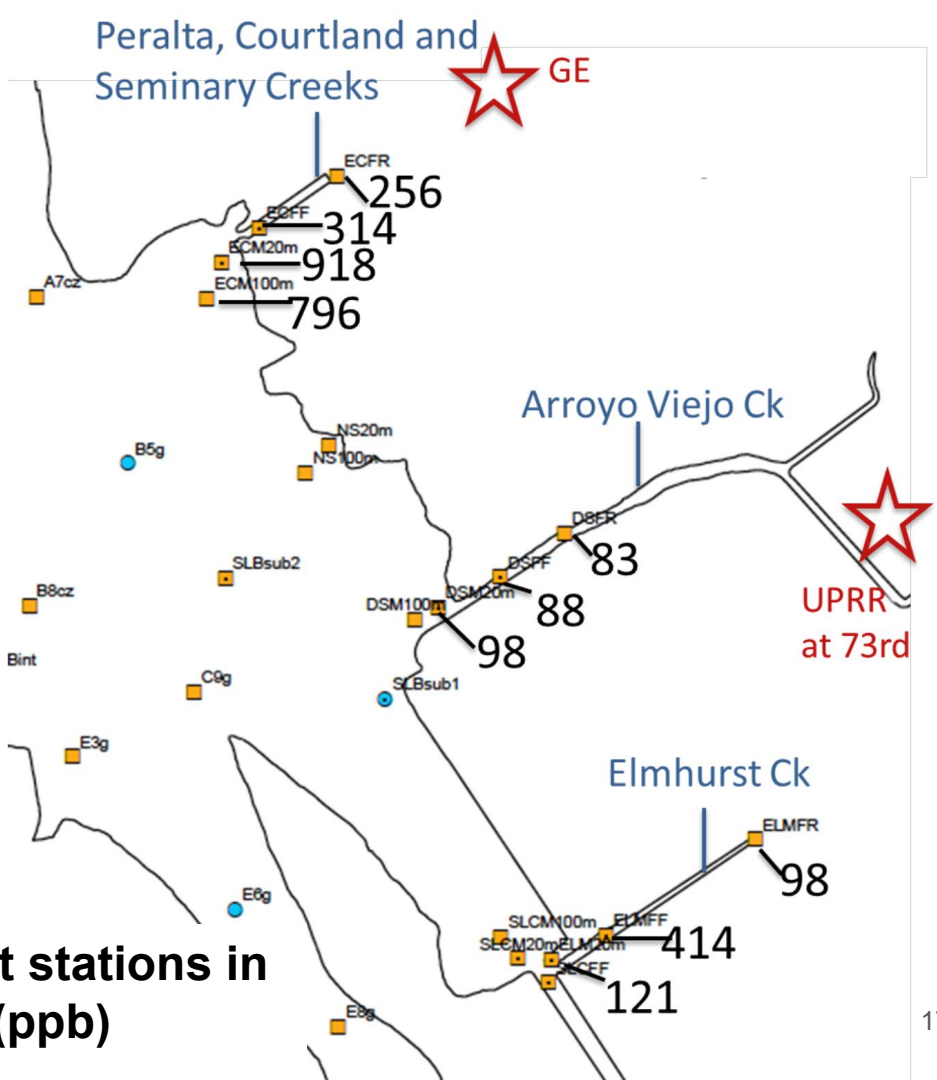
- Also very high soil and sediment PCBs
- Cleanup has been in planning for several years



Sediment PCBs at select stations in San Leandro Bay, 2016 (ppb)

Real-world complexities demand a data-driven approach

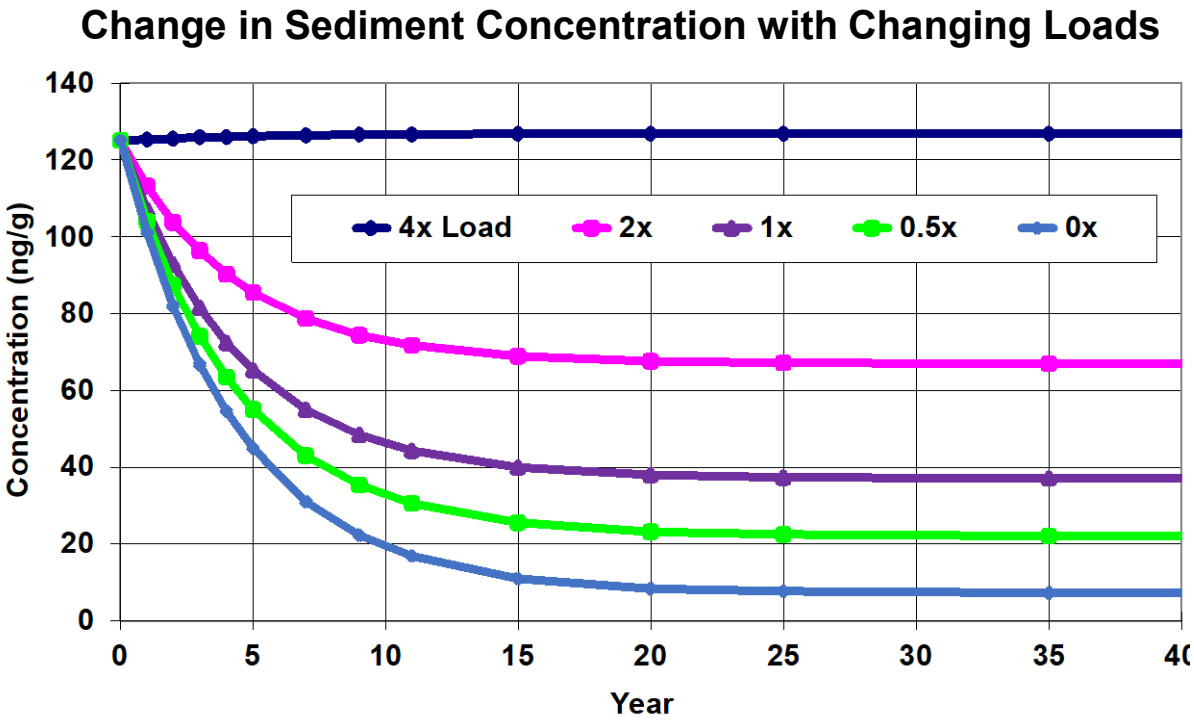
- Straightforward expectations may be wrong
- Cleanup actions may not work as expected



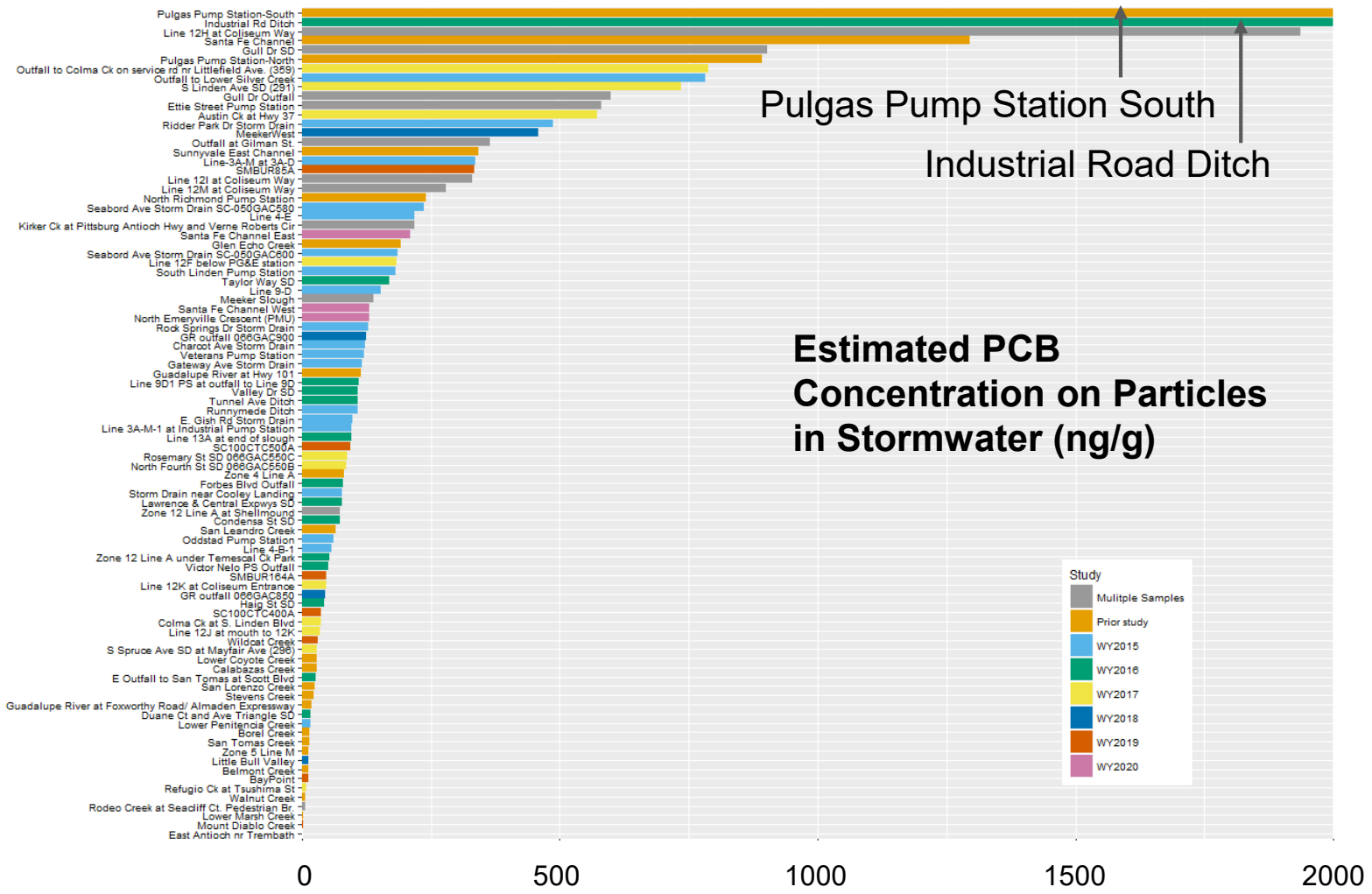
Sediment PCBs at select stations in San Leandro Bay, 2016 (ppb)

Simple Mass Budget Model for San Leandro Bay

- PMUs will vary
- Fish will follow sediment
- Suggests inputs are continuing
- Reducing watershed inputs would greatly accelerate recovery
- High uncertainty



Loads shown as multiples of estimated current stormwater load


Pulgas Pump Station South
Industrial Road Ditch
Estimated PCB Concentration on Particles in Stormwater (ng/g)
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WY2020
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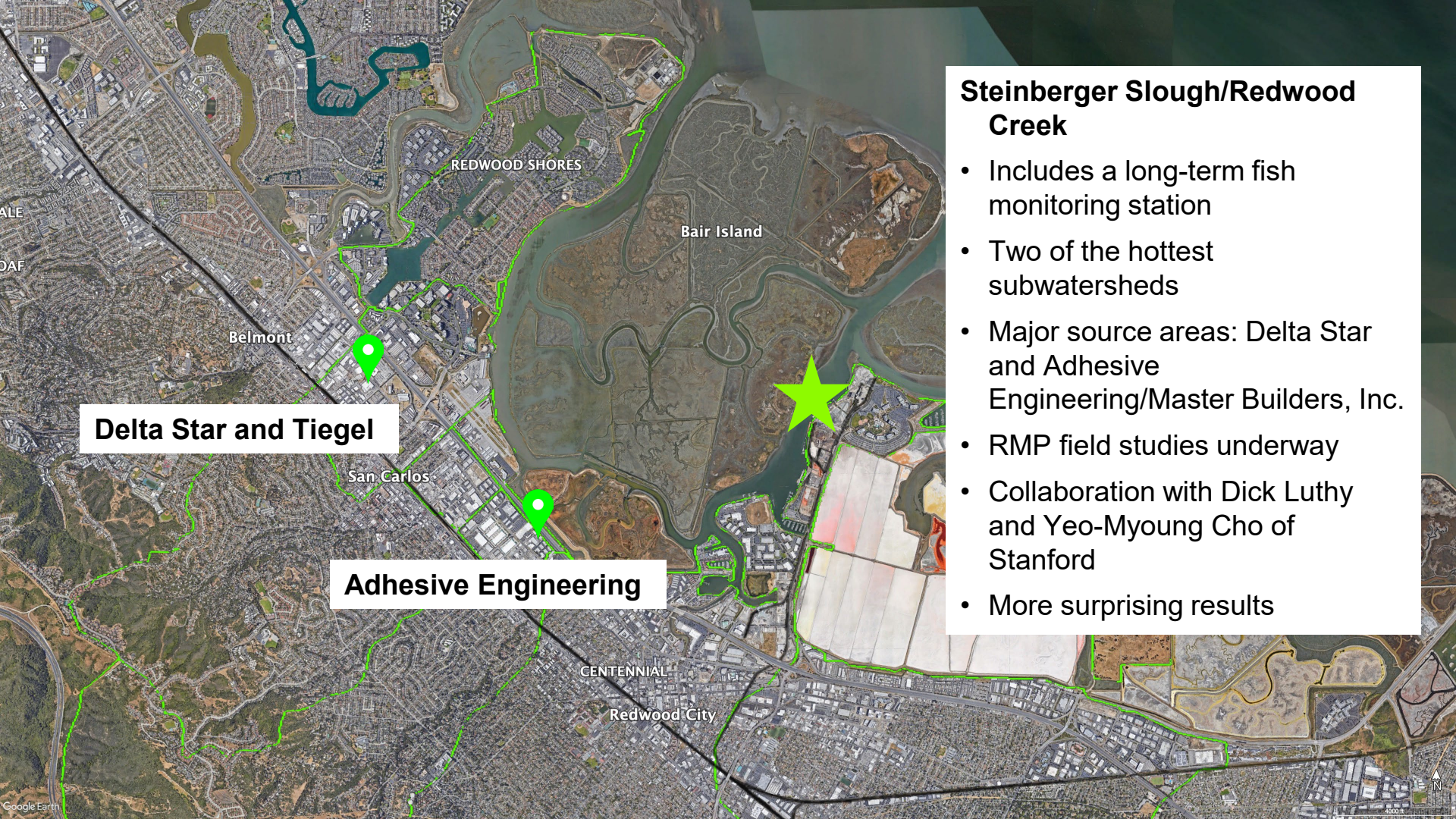


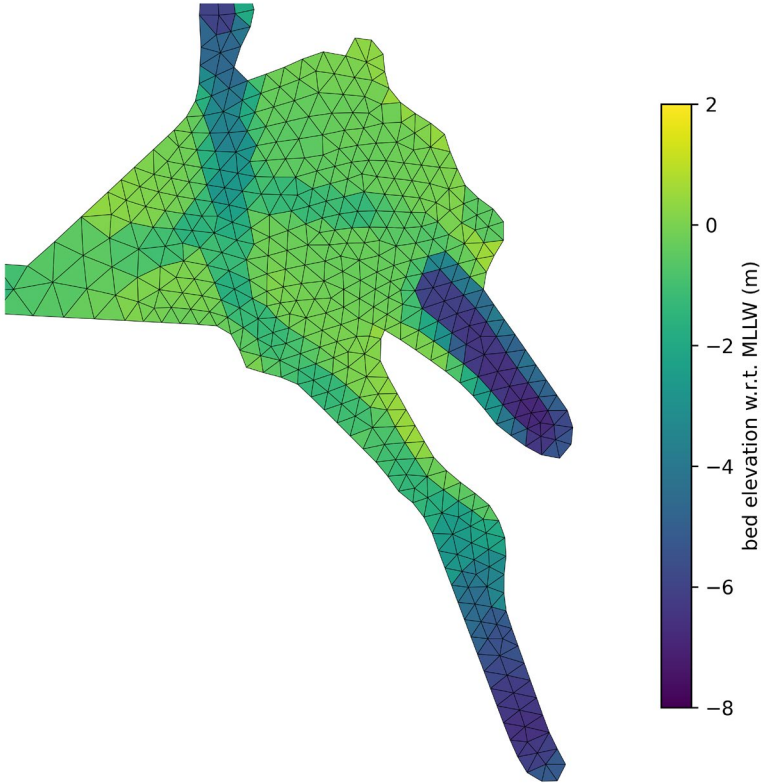
Steinberger Slough/Redwood Creek

- Includes a long-term fish monitoring station
- Two of the hottest subwatersheds
- Major source areas: Delta Star and Adhesive Engineering/Master Builders, Inc.
- RMP field studies underway
- Collaboration with Dick Luthy and Yeo-Myoung Cho of Stanford
- More surprising results

Science Needs

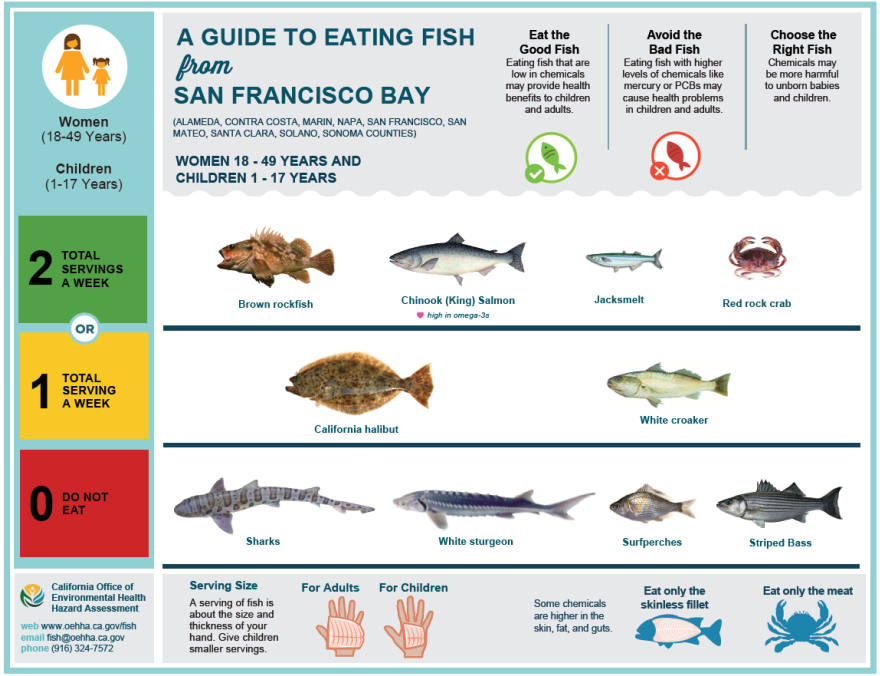
- Adequate **monitoring**
  - Establish baselines
  - Identify most important sources
  - Support modeling
  - Track improvement
- More robust fate **modeling** for SLB, SS/RC, other margin areas, and the whole Bay
- The RMP (PCB Workgroup) has been laying the groundwork to meet these needs

Model Grid for San Leandro Bay



RMP Take-home Messages for PCBs

- We're not there yet
- Margin areas have the worst contamination, and greatest potential for improvement
- Low-hanging fruit appears to be present
  - I showed just some examples
- Expect the unexpected in the field – management needs to be data-driven
- Monitoring and modeling are needed



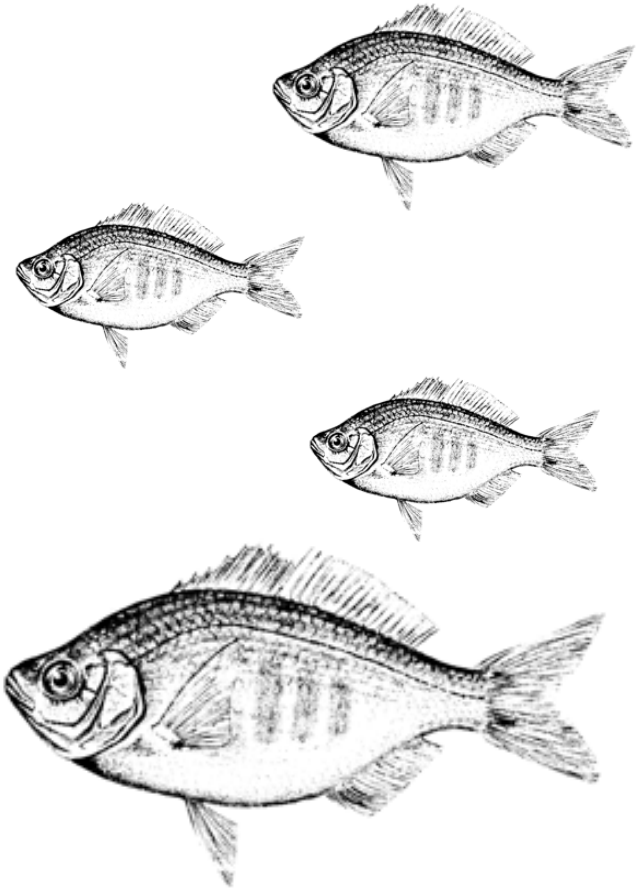
Acknowledgements

Co-Investigators

- Don Yee
- Alicia Gilbreath
- Lester McKee
- Diana Lin
- Yeo-Myoung Cho
- Dick Luthy
- Craig Jones
- Marco Sigala

RMP PCB Workgroup

- Setenay Frucht
- Frank Gobas
- Jon Konnan
- Ned Black
- Luisa Valiela
- Bridgette DeShields
- Bryan Frueh
- + the investigators



More Information

San Leandro Bay Conceptual Model Report

- https://www.sfei.org/documents/conceptual-model-support-pcb-management-and-monitoring-san-leandro-bay-priority-margin-1

Steinberger Slough/Redwood Creek Conceptual Model Report

- https://www.sfei.org/documents/conceptual-model-support-pcb-management-and-monitoring-steinberger-sloughredwood-creek

Emeryville Crescent Conceptual Model Report

- https://www.sfei.org/documents/conceptual-model-support-pcb-management-and-monitoring-emeryville-crscent-priority-margin

PCBs in Shiner Surfperch in Priority Margin Areas

- https://www.sfei.org/documents/pcbs-shiner-surfperch-priority-margin-areas-san-francisco-bay

Me

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RMP

- sfei.org/rmp

My son's band's (Hot Flash Heat Wave) next show

- www.20thstreetblockparty.com