

US EPA ARCHIVE DOCUMENT

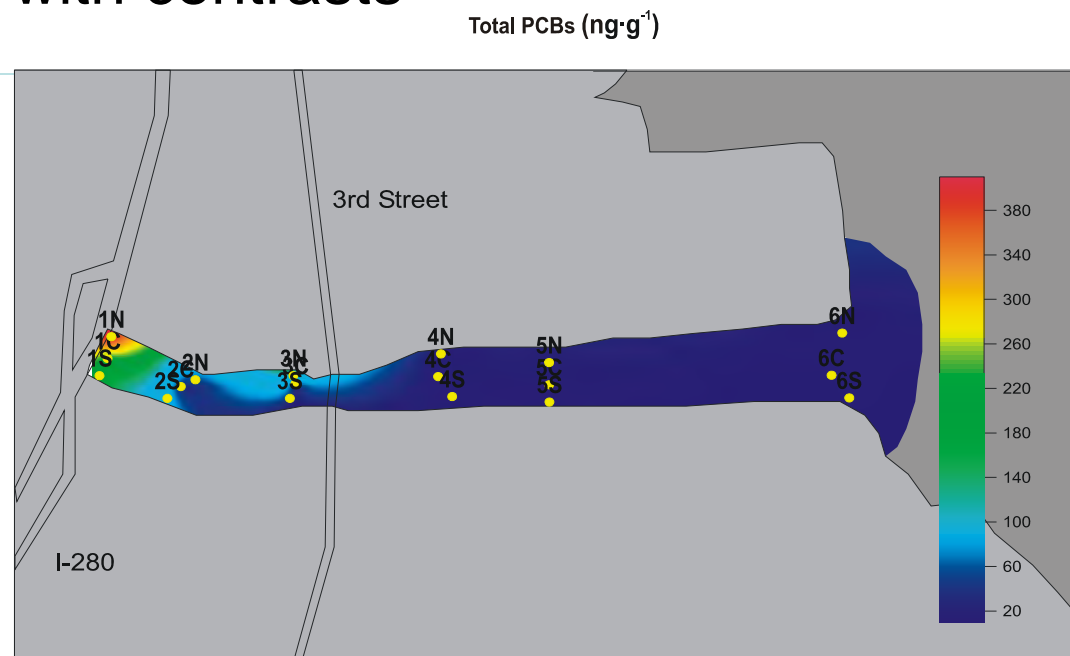
Source Identification and Delineation

- Tracer and gradient studies
- Forensic laboratory methods for PCBs, PAHs, and metals
- Overview of statistical and non-statistical source ID methods

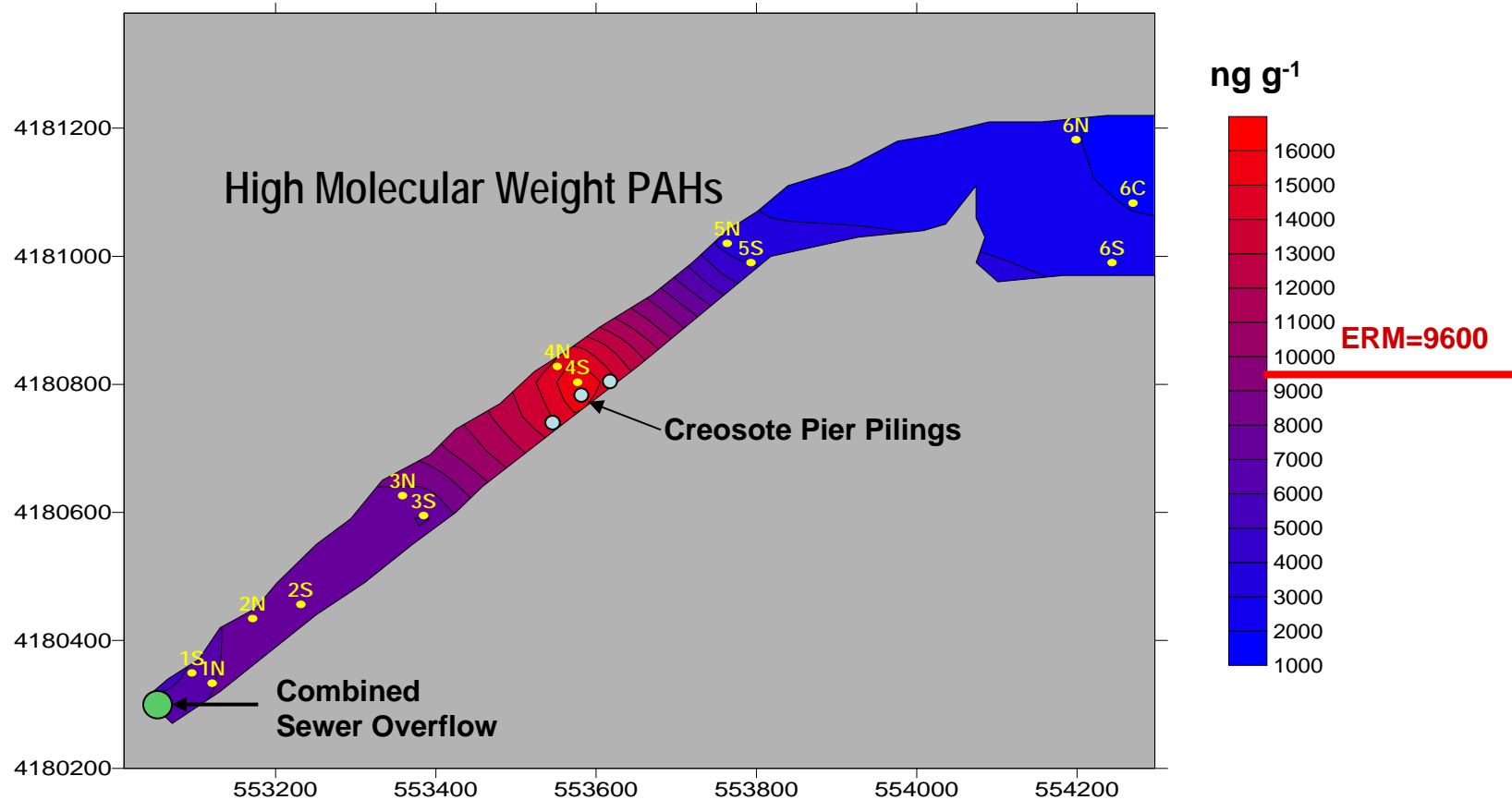
Source ID and Delineation

Tracer and gradient studies

- Dye studies, chemical tracers (e.g., LABs, organo-tins, chemical ratios)
- Spatial contouring (e.g., kriging, probability densities)
- Statistical regression methods (e.g., linear, logistic); ANOVA with contrasts



Gradient Analysis in a Boat Channel



- Results from an EPA & State Agency study indicated that the entire channel was “toxic” due to high PAH sediment concentrations (>9600 ppb)
- CSO was the presumed source of PAHs
- Simple gradient analysis (contour plot & statistical tests) indicated another source

Source ID and Delineation

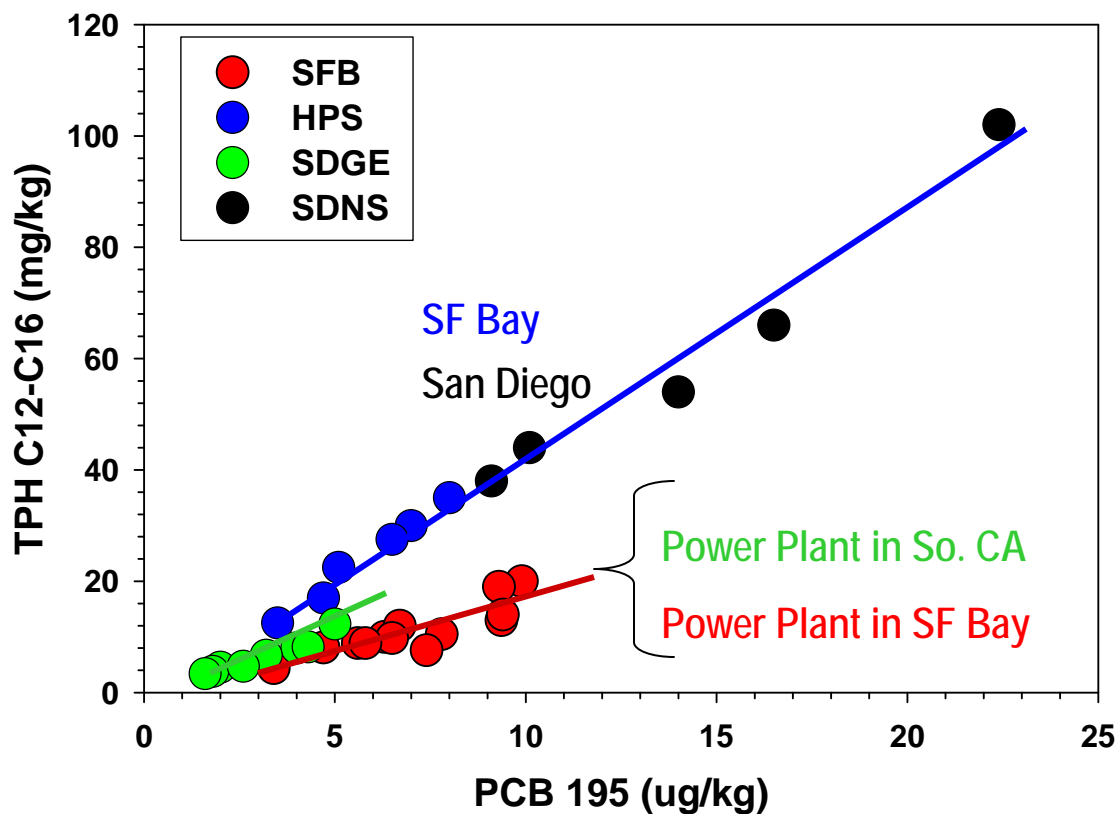
Forensic laboratory methods for PCBs, PAHs, and metals

- Address potential matrix interferences from salt, TOC, humic material, lipids
- Usually non-CLP to obtain lower detection limits, greater certainty in identifying target analytes
- PCBs: NOAA congener method, GC/MS with SIM
- PAHs: Modified EPA 8270; GC/MS with SIM, 41-46 analytes
- TPH: Modified EPA 8015; GC/FID; nC_6 - nC_{44} with isoprenoids
- Metals: EPA 6020 (for most); ICP with MS

Source ID and Delineation

Statistical Methods

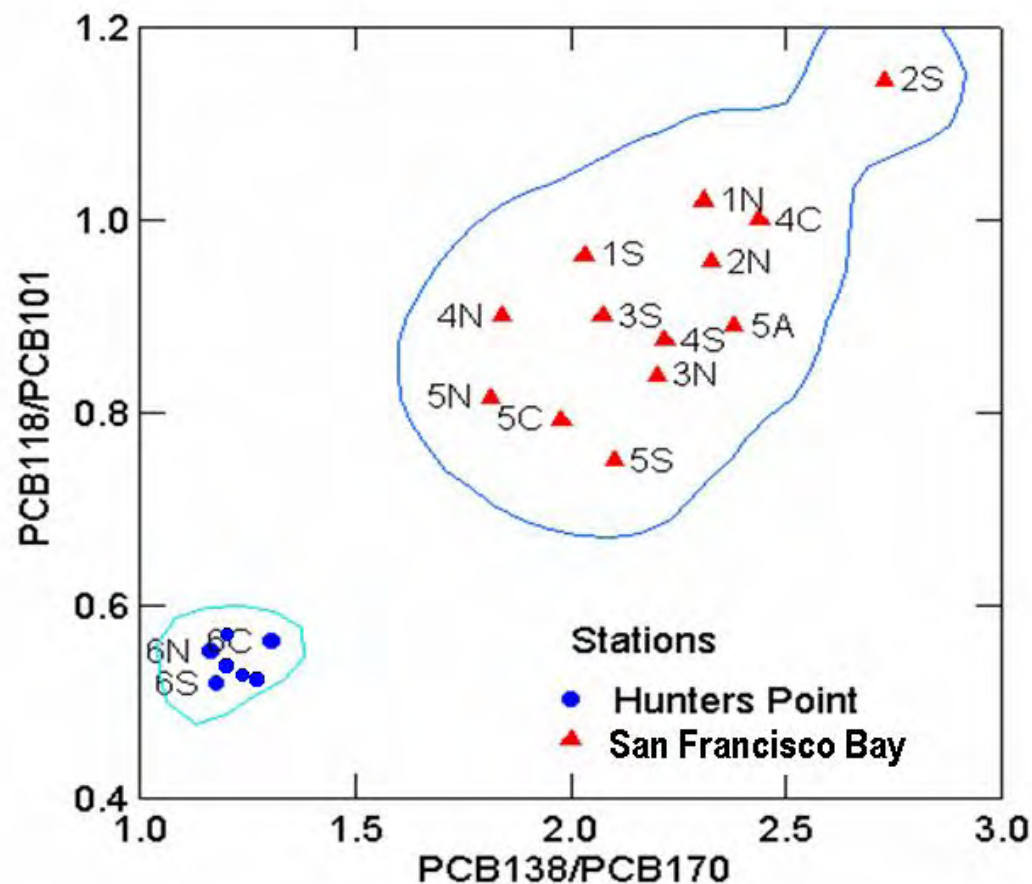
- Statistical regression methods (e.g., linear, logistic)
- Source ID using selected PCB & carrier oil analytes



Source ID and Delineation

Non-Statistical Methods

- Double Ratio Plots – indicates degree of weathering and PCB source



Source ID and Delineation

Statistical Methods

- Multivariate techniques (PCA, discriminant analysis)
- PCA results for N. Island NAS showing sources of PAHs

