

2016

Sediment Contamination Study of Casco Bay part 1, Ramboll Environ PowerPoint 2016

Ramboll Environ

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CLEARER THAN MUD

ASSESSMENT OF SEDIMENT IN

CASCO BAY (1991-2011)

CASCO BAY ESTUARY PARTNERSHIP
MANAGEMENT COMMITTEE MEETING



SEDIMENT ASSESSMENT OF CASCO BAY (1991-2011)
SEPTEMBER 14, 2016

AGENDA

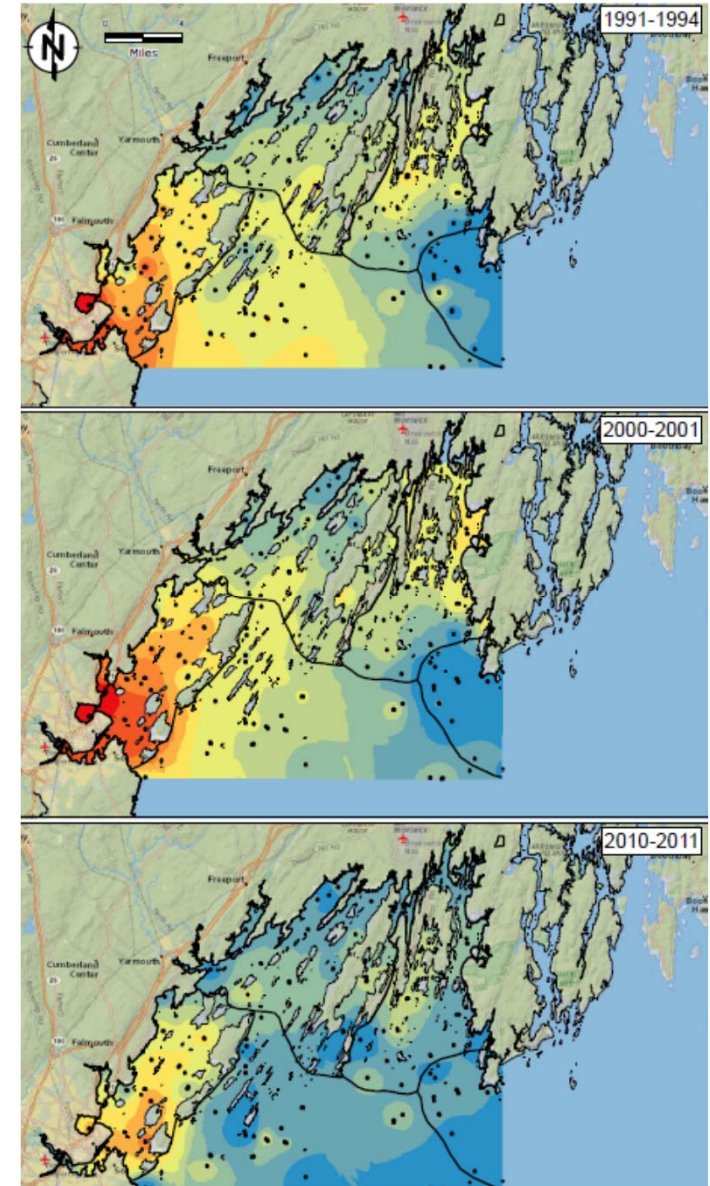
- Report objectives
- Overview
 - Why does mud matter?
 - History of sediment sampling
- Methodology
- Results
 - 2010-2011 sediment data review
 - 1991-2011 data trends
 - Regional comparisons
- Summary and conclusions



RESULTS: SNEAK PEEK

Good news for Casco Bay

- Almost without exception, concentrations of chemicals of concern in surface sediments were lower in 2010-2011 than in previous sampling events.
 - Notable exceptions: mercury, selenium



REPORT OBJECTIVES

- Document current status of chemical concentrations in Casco Bay sediments
- Compare to sediment screening values
- Evaluate trends
 - Within areas of Casco Bay
 - Over time
- Regional context (i.e., Gulf of Maine)
- Identify appropriate future studies, if any



WHY DOES MUD MATTER?

- Integrates sources from the entire watershed
 - Ultimate downstream sink
- Historical record
- Pathway into the food chain
 - Ecological exposure
 - Human exposure

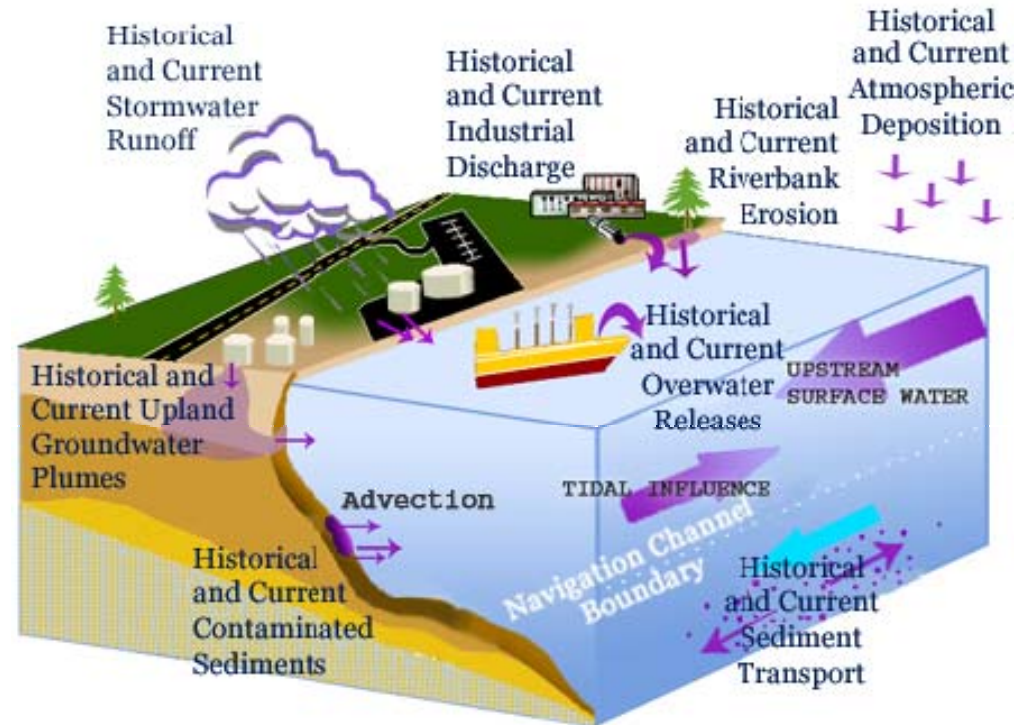
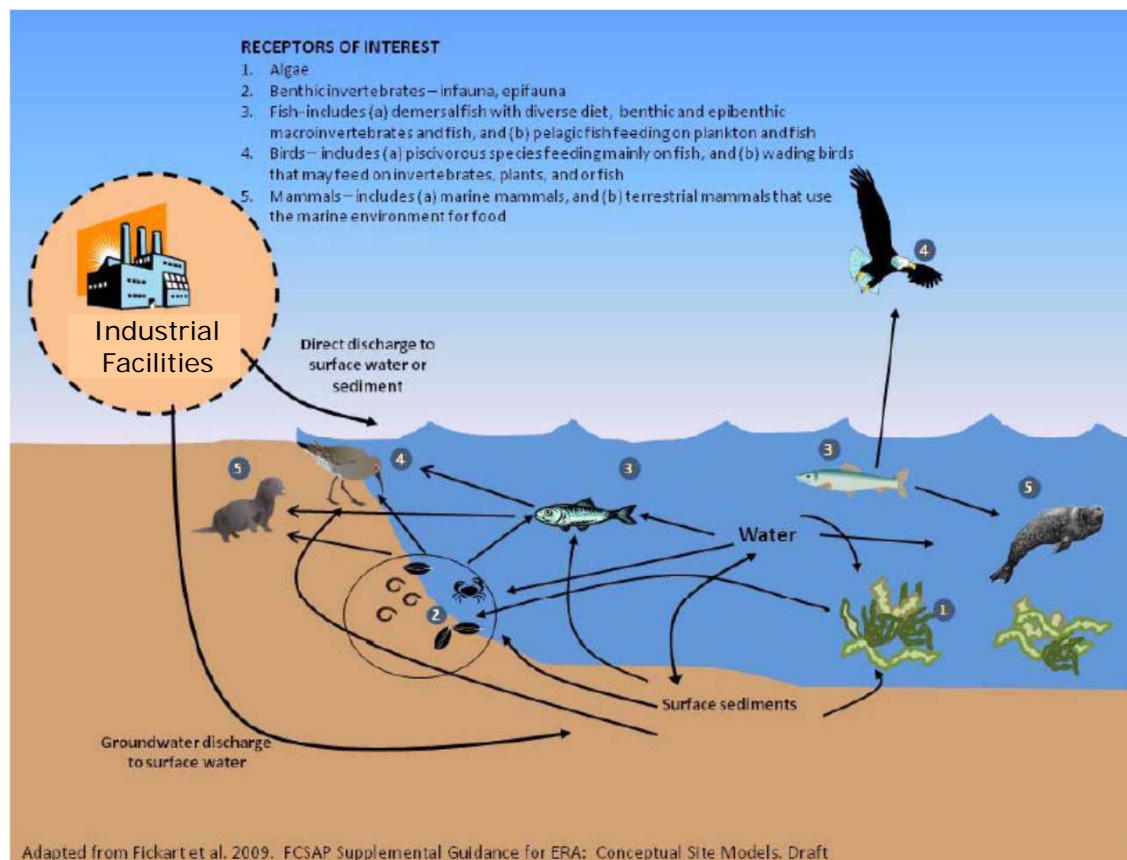


Image credit: USEPA

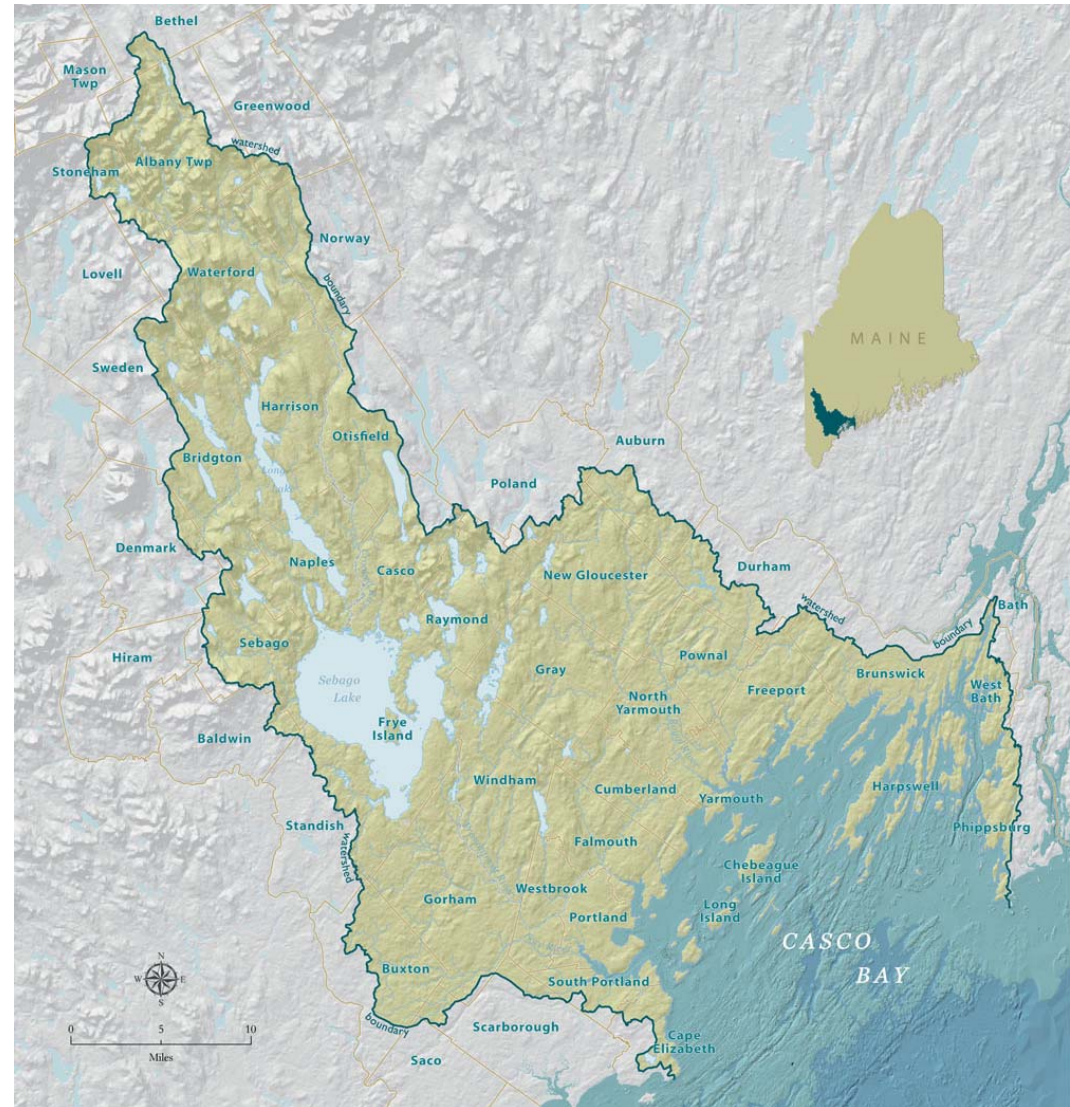
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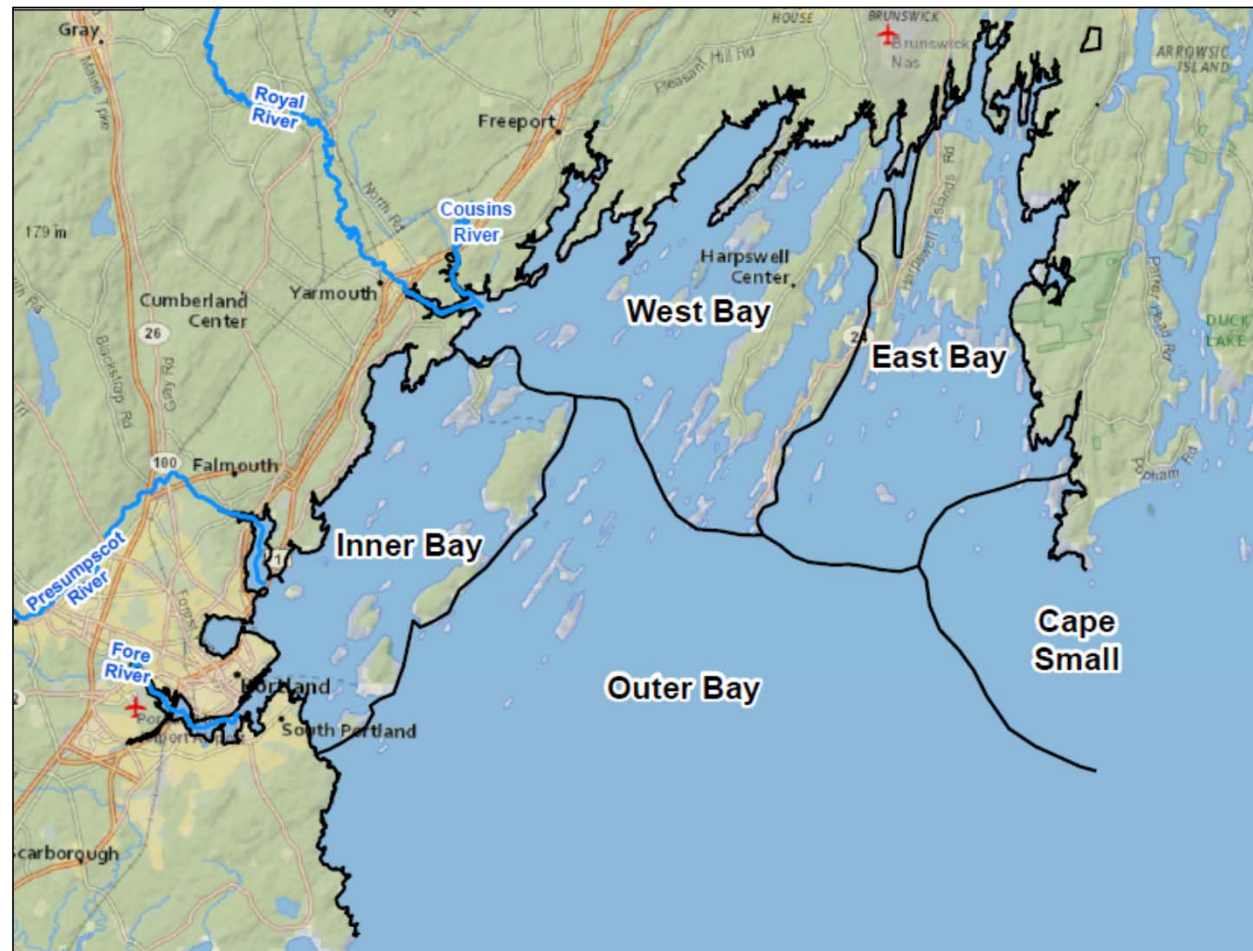
SETTING

- Basin – < 1,000 square miles
- Population - ~250,000 people
- Bay - ~200 square miles
 - Shoreline – 575 linear miles
 - 785 islands



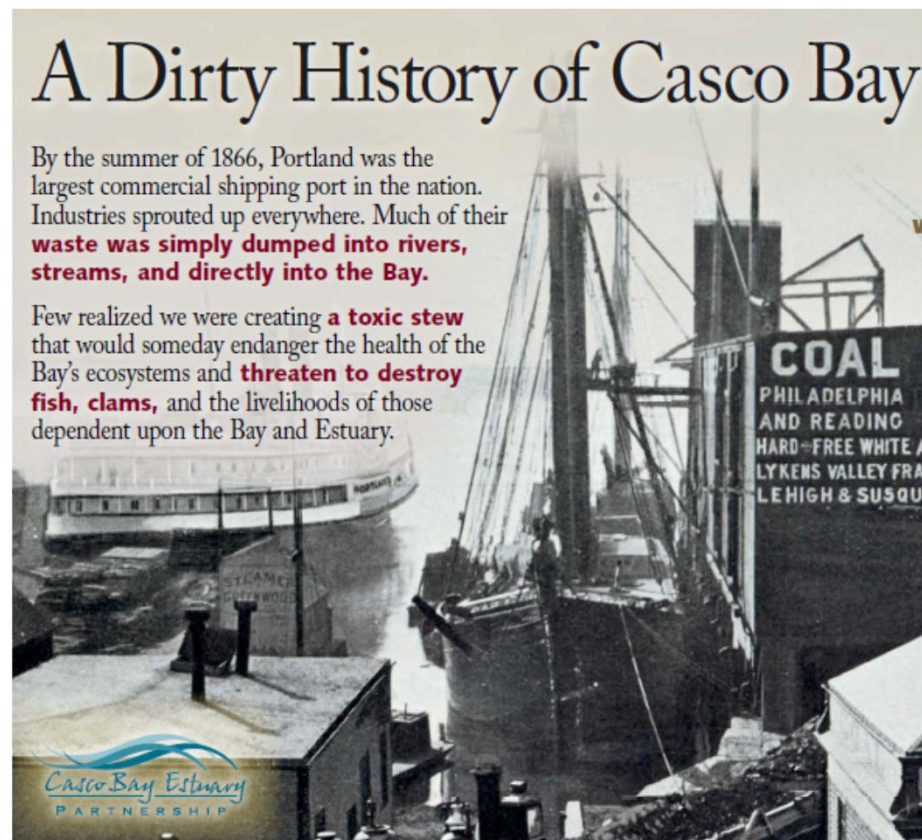
SETTING

- Inner Bay: Portland, SoPo, Presumpscot River, Fore River, Back Cove
- Outer Bay: Connection to Gulf of Maine
- West Bay: Yarmouth, Freeport, Harpswell, Royal River, Cousins River, Harraseeket River
- East Bay: Brunswick, New Meadows River, Quahog Bay
- Cape Small: Lower Kennebec River discharge



SOURCES OF CHEMICALS TO CASCO BAY

- Historical
 - Manufactured Gas Plants – PAHs, organics
 - Foundaries – metals
 - Shipyards – organotins, metals
 - Tanneries – metals
 - Rail yards – PAHs, metals, organics
 - Paint factories – metals
 - Various industries – PCBs, mercury, pesticides, dioxins and furans
- Ongoing
 - Wastewater – nutrients, metals, etc.
 - Combustion – PAHs, dioxins and furans
 - Stormwater – metals, PAHs, pesticides...



SEDIMENT ASSESSMENT OF CASCO BAY (1991-2011)
SEPTEMBER 14, 2016

HISTORY OF SEDIMENT SAMPLING IN CASCO BAY

1991/1994 sediment sampling

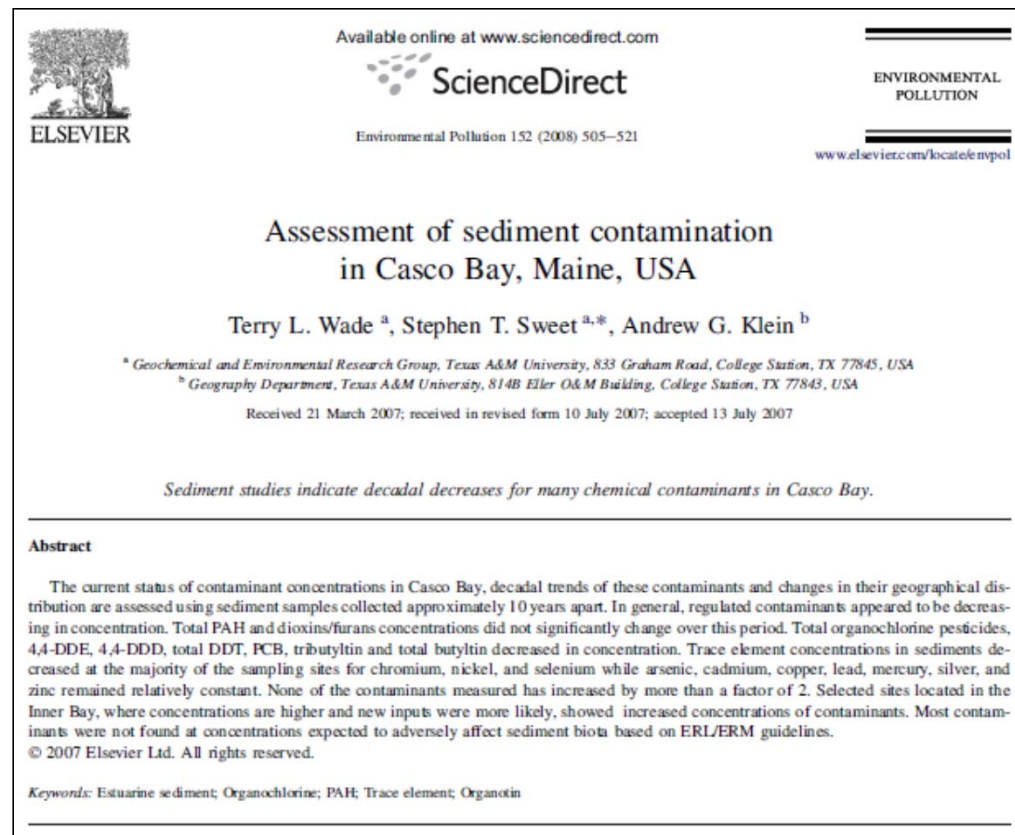
- PAHs are most widespread chemicals of concern in Casco Bay
 - Most prevalent near Portland
 - Concentrations exceed screening values
- Concentrations of metals, pesticides, and PCBs are below screening values



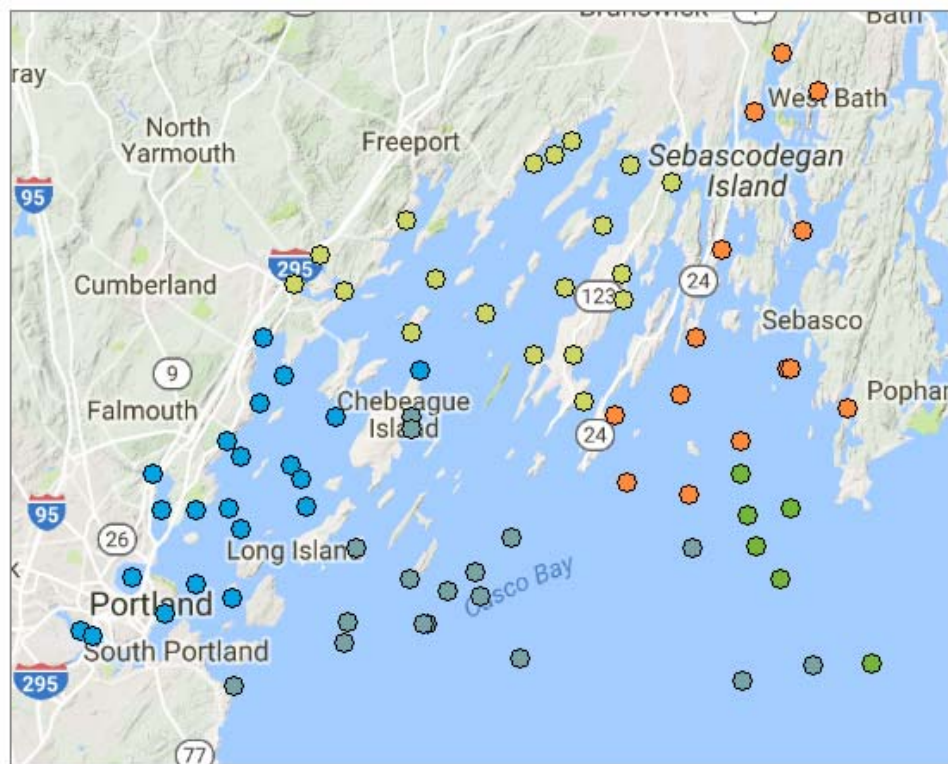
HISTORY OF SEDIMENT SAMPLING IN CASCO BAY

Comparison of 1991/1994 with 2000-2002 sediment data

- “Regulated chemicals tend to be decreasing” throughout the bay
 - Pesticides, PCBs, some metals
- PAHs and dioxins and furans not changing
 - Nor are select metals
- Concentrations of PAHs and metals increased locally (i.e., Portland)
- Most chemicals below screening values

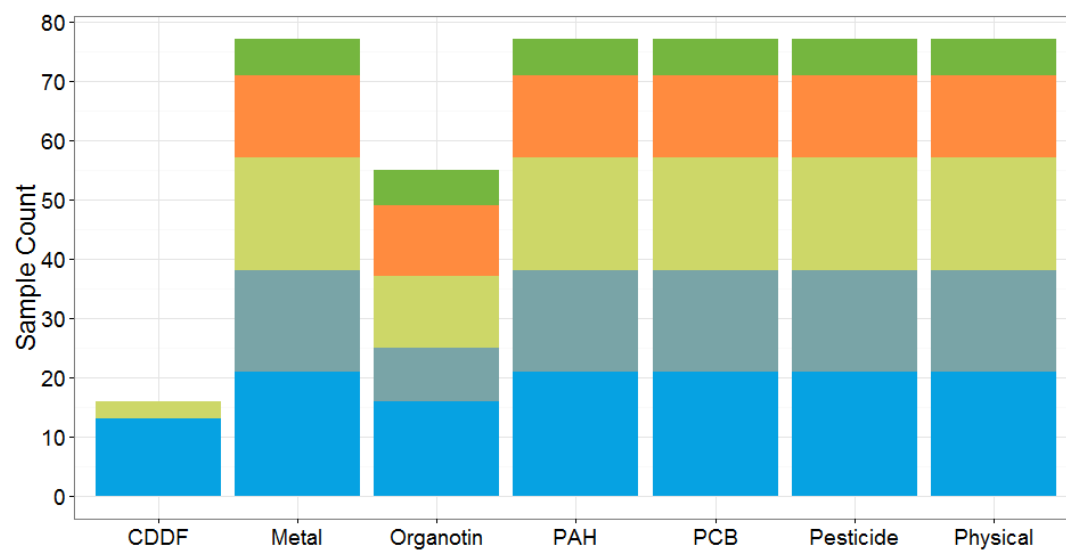


METHODOLOGY



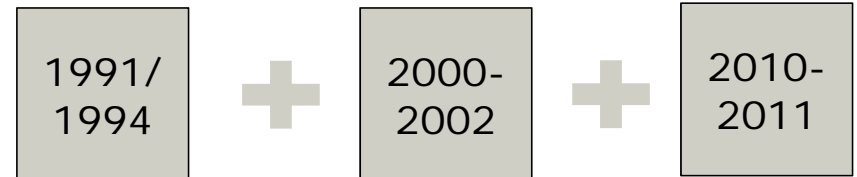
● Inner Bay
 ● Outer Bay
 ● West Bay
 ● East Bay
 ● Cape Small

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DATA ANALYSIS

- Integrate data, calculate sums



	benzo(a)anthracene
	benzo(a)pyrene
	chrysene
	dibenz(a,h)anthracene
	flouranthene
+	pyrene
<hr/>	
High molecular weight PAHs	

DATA ANALYSIS

- Integrate data, calculate sums
- Calculate summary statistics (baywide and by region)
 - Focusing on detects

Group	Analyte	Units	Frequency of Detection			Minimum Detected Concentration	Median Detected Concentration	Average Detected Concentration	Maximum Detected Concentration	Standard Deviation of Detected Concentration
Inorganic	Aluminum	µg/g dry	77	/	77	6700	47000	50000	90000	19000