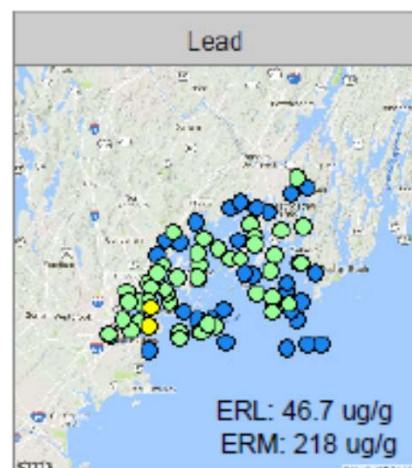
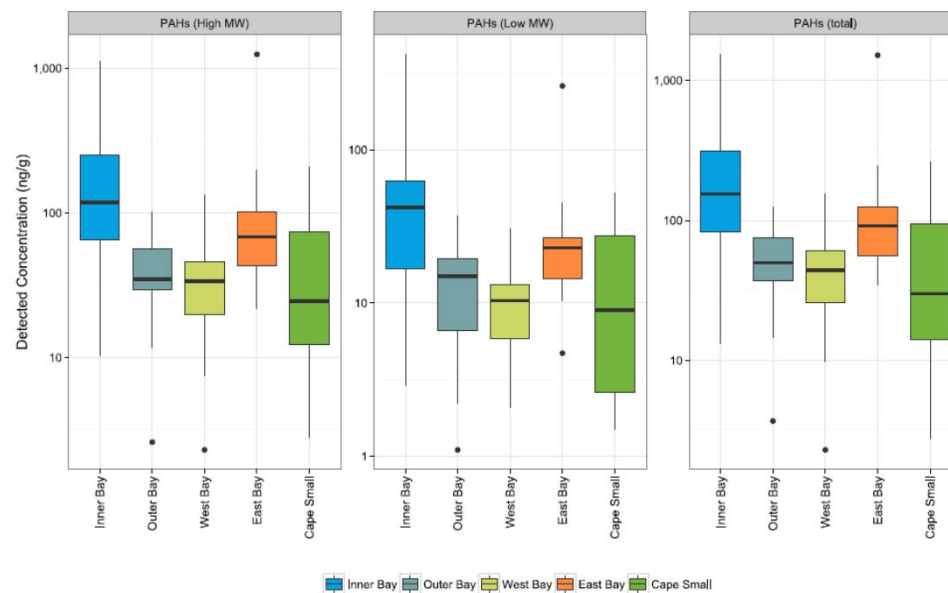


# DATA ANALYSIS

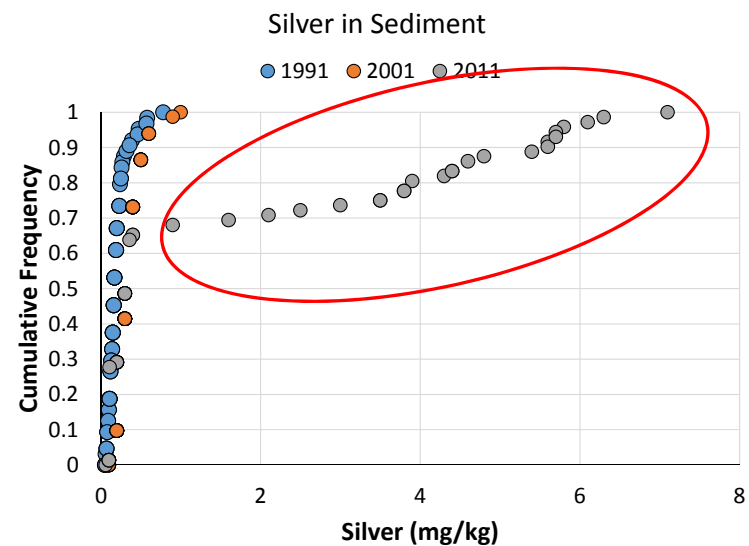
- Integrate data, calculate sums
- Calculate summary statistics (baywide and by region)
  - Focusing on detects
- Plot data (box and whiskers and maps)



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

# DATA ANALYSIS

- Integrate data, calculate sums
- Calculate summary statistics (baywide and by region)
  - Focusing on detects
- Plot data (box and whiskers and maps)
- Exploratory analysis (identify data issues)



# DATA ANALYSIS

- Integrate data, calculate sums
- Calculate summary statistics (baywide and by region)
  - Focusing on detects
- Plot data (box and whiskers and maps)
- Exploratory analysis (identify data issues)
- Comparison to screening values

**Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments<sup>1</sup>**

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Tallahassee, Florida 32399, USA

ABSTRACT / Matching biological and chemical data were compiled from numerous modeling, laboratory, and field studies performed in marine and estuarine sediments. Using these data, two guideline values (an effects range-low and an effects range-median) were determined for nine trace metals, total PCBs, two pesticides, 13 polynuclear aromatic hydrocarbons (PAHs), and three classes of PAHs. The two values defined concentration ranges that were: (1) rarely, (2) occasionally, or (3) frequently associated with adverse effects. The values generally agreed within a factor of 3 or less with those developed with the same methods applied to other data and to those developed with other effects-based methods. The incidence of adverse effects was quantified within each of the three concentration ranges as the number of cases in which effects were observed divided by the total number of observations. The incidence of effects increased markedly with increasing concentrations of all of the individual PAHs, the three classes of PAHs, and most of the trace metals. Relatively poor relationships were observed between the incidence of effects and the concentrations of mercury, nickel, total PCB, total DDT and p,p'-DDE. Based upon this evaluation, the approach provided reliable guidelines for use in sediment quality assessments. This method is being used as a basis for developing National sediment quality guidelines for Canada and informal, sediment quality guidelines for Florida.

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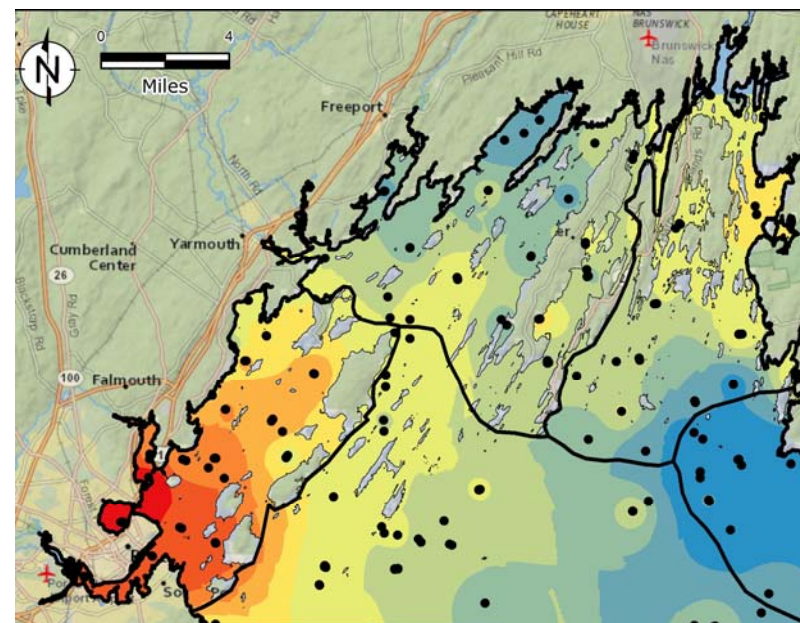
Adverse effects in [aquatic organisms](#) (invertebrates and fish)

**Effects Range Low (ERL):** Concentration at which effects rarely observed

**Effects Range Median (ERM):** Concentration above which effects are frequently observed

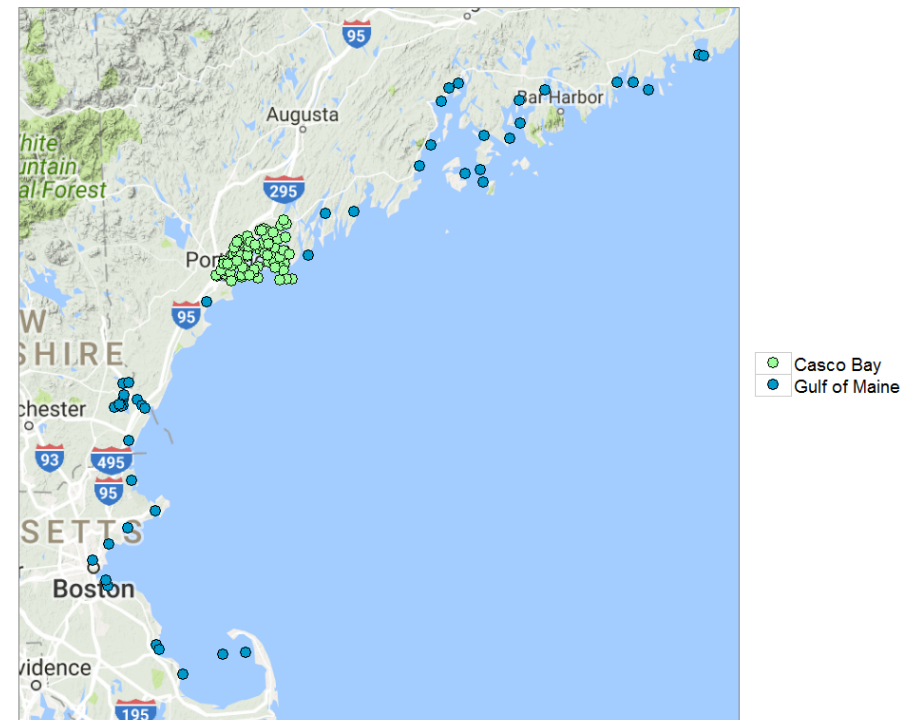
# DATA ANALYSIS

- Integrate data, calculate sums
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  - Focusing on detects
- Plot data (box and whiskers and maps)
- Exploratory analysis (identify data issues)
- Comparison to screening values
- Statistical analysis (by region and time)
- Geospatial analysis to illustrate notable trends

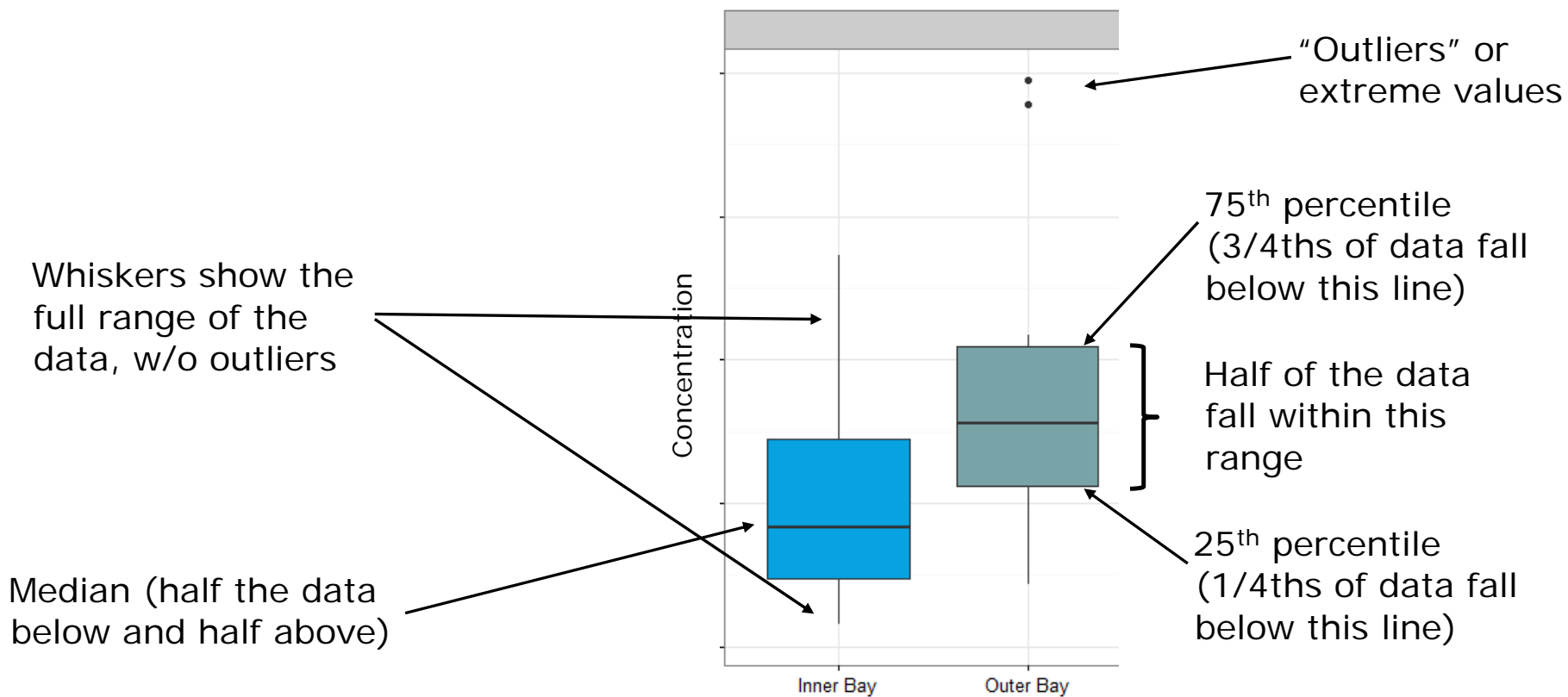


# DATA ANALYSIS

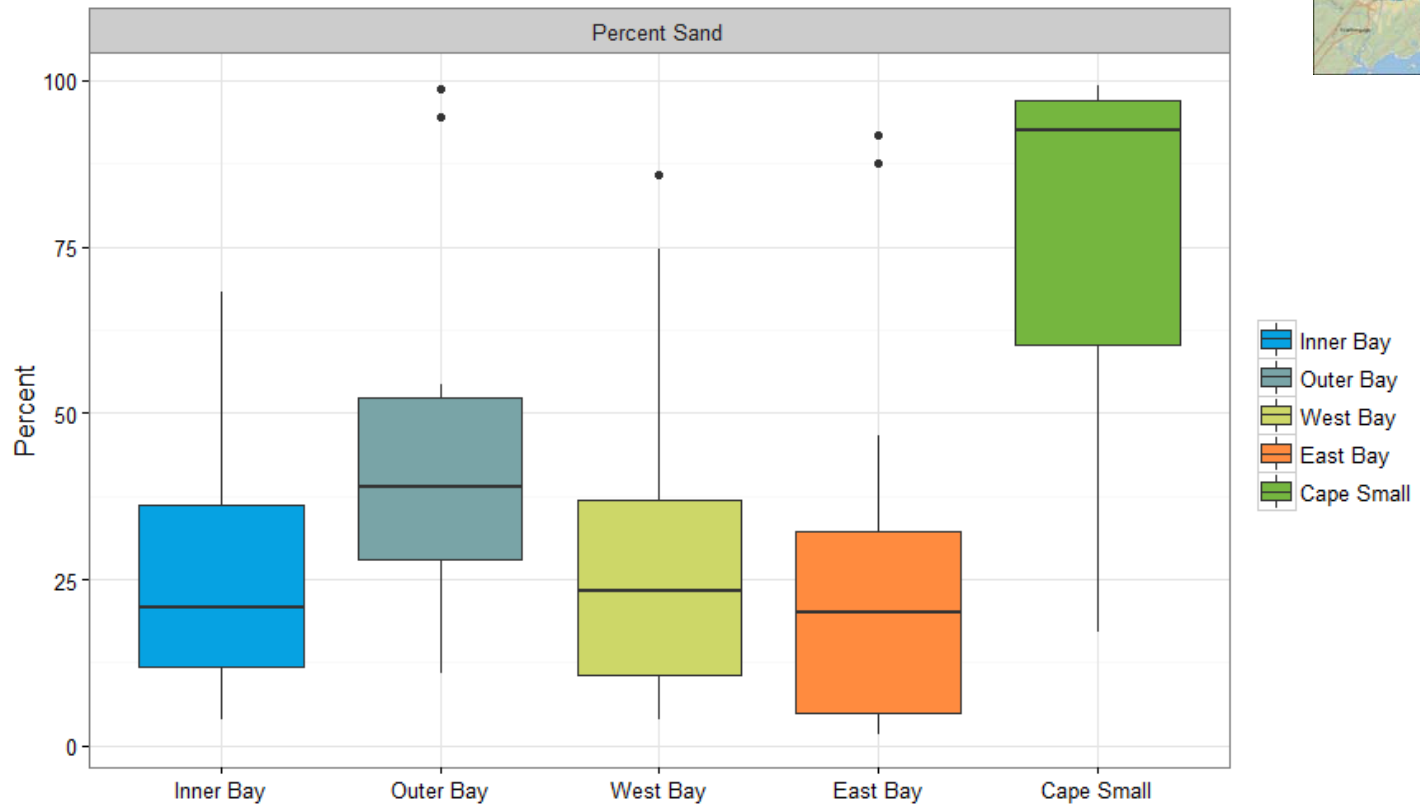
- Integrate data, calculate sums
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- Plot data (box and whiskers and maps)
- Exploratory analysis (identify data issues)
- Comparison to screening values
- Statistical analysis (by region and time)
- Geospatial analysis to illustrate notable trends
- Comparison to rest of Gulf of Maine



# RESULTS: 2010-2011 DATA BOX PLOTS

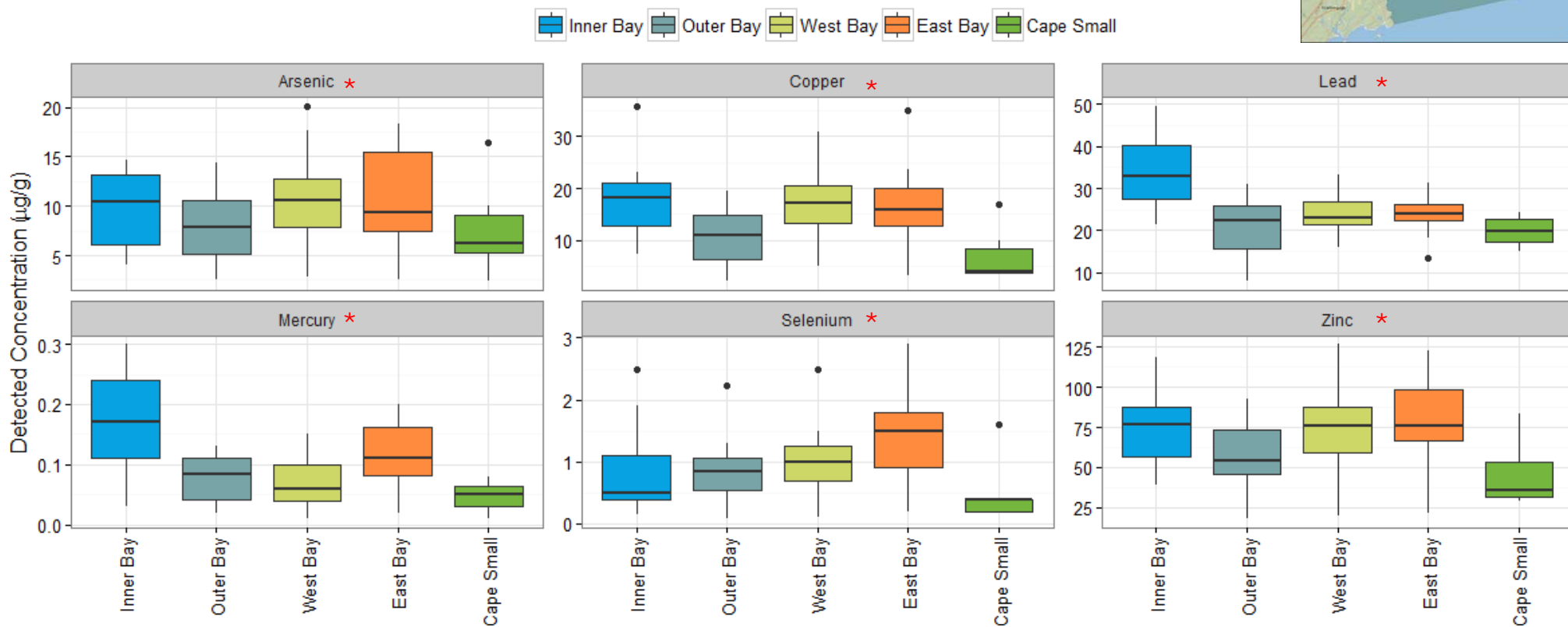


# RESULTS: 2010-2011 DATA SEDIMENT GRAIN SIZE



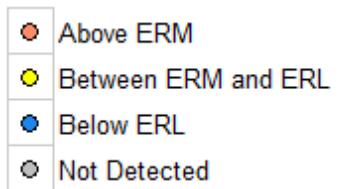
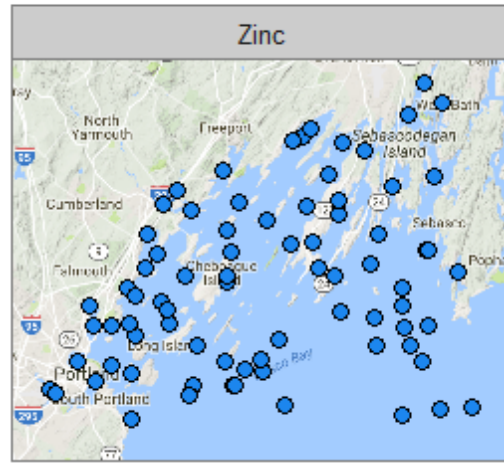
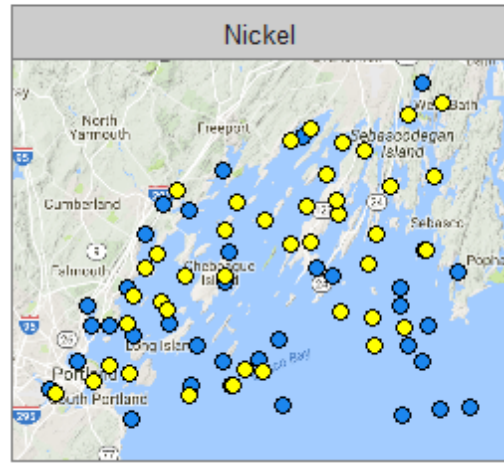
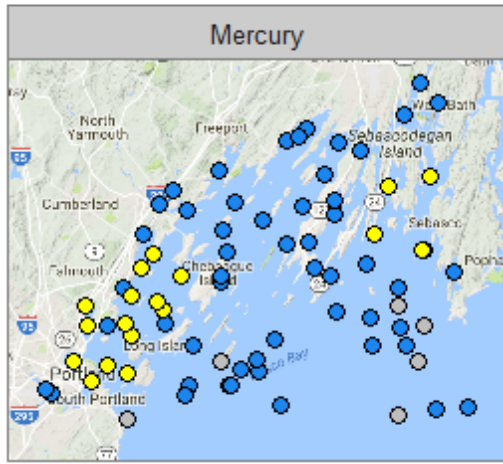
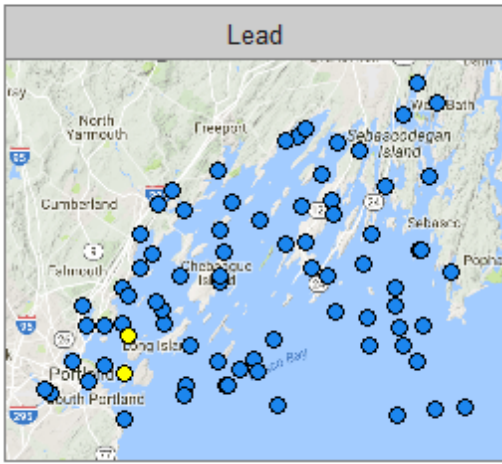
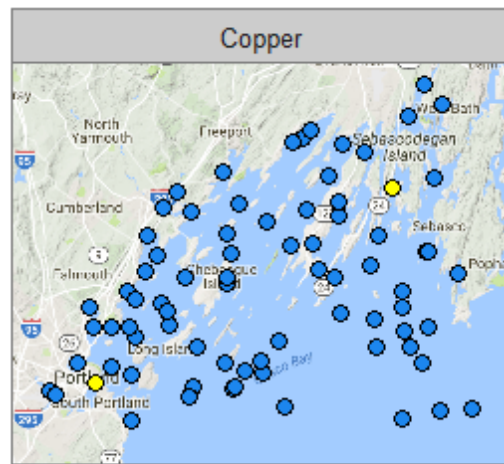
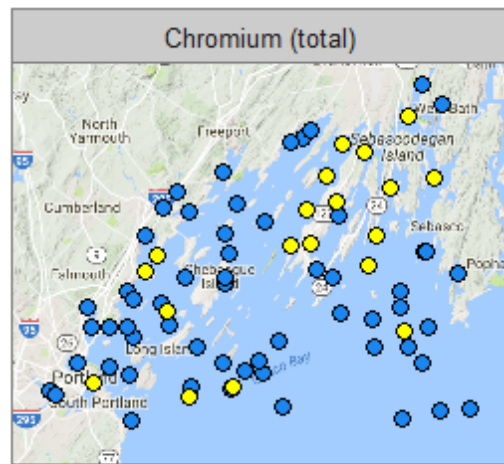
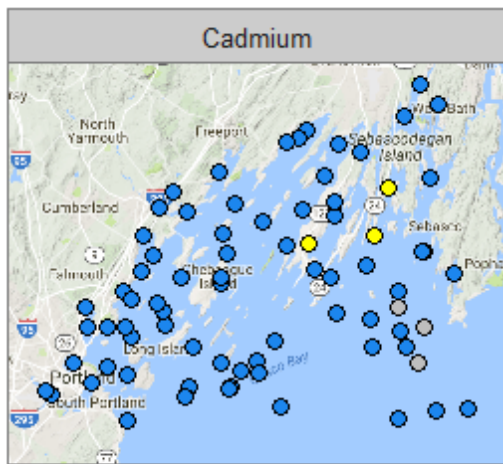
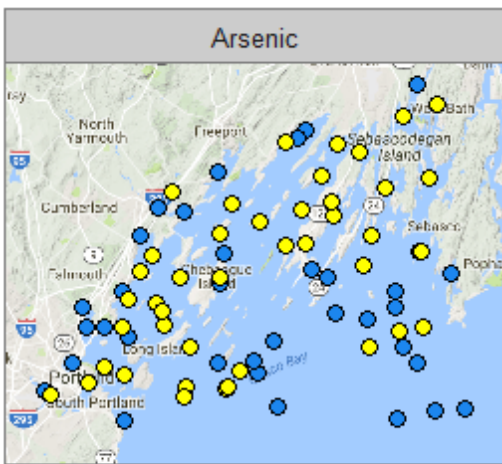
# RESULTS: 2010-2011 DATA

## EXAMPLE METALS



\*: statistically significant differences between regions



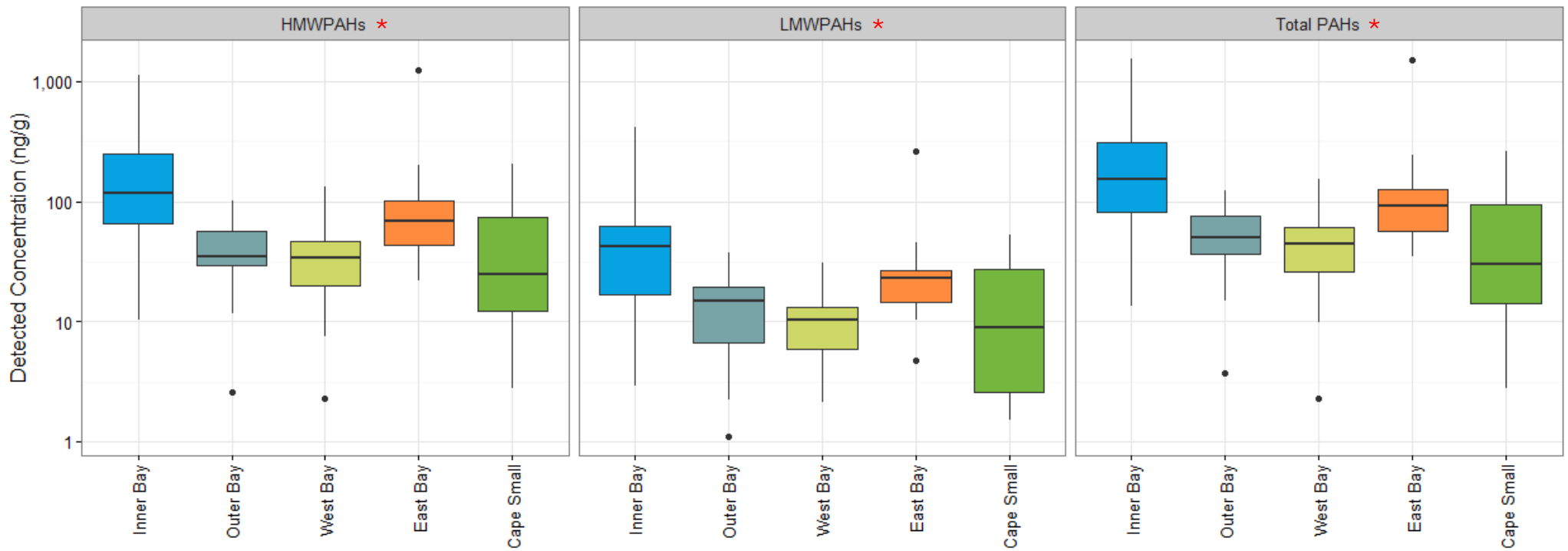


# RESULTS: 2010-2011 DATA

## PAHS

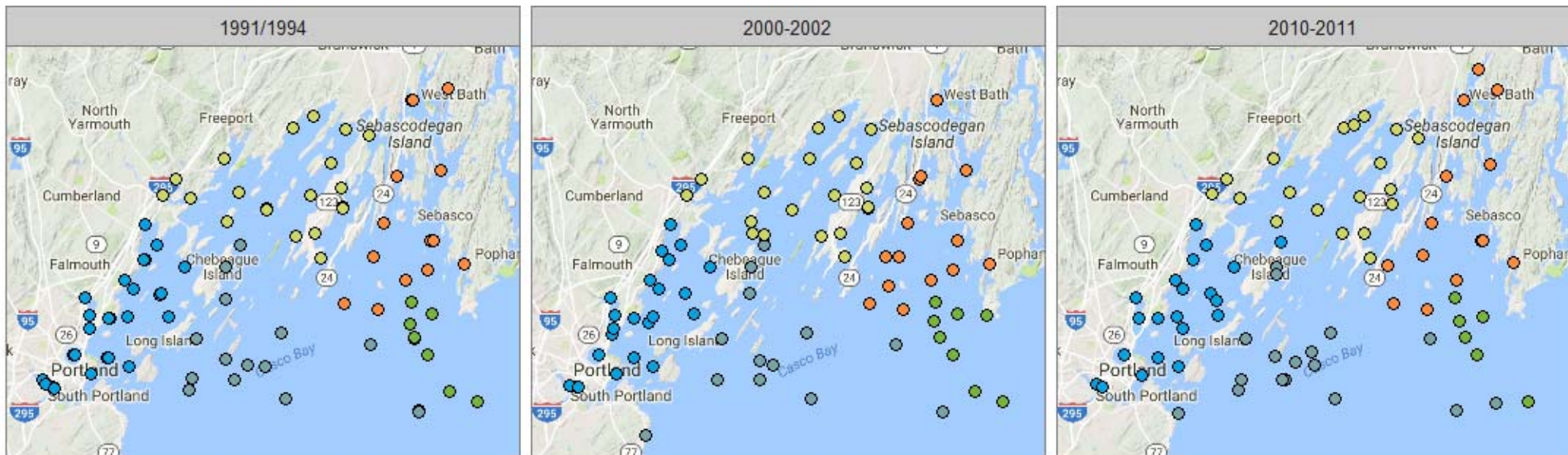


■ Inner Bay 
 ■ Outer Bay 
 ■ West Bay 
 ■ East Bay 
 ■ Cape Small



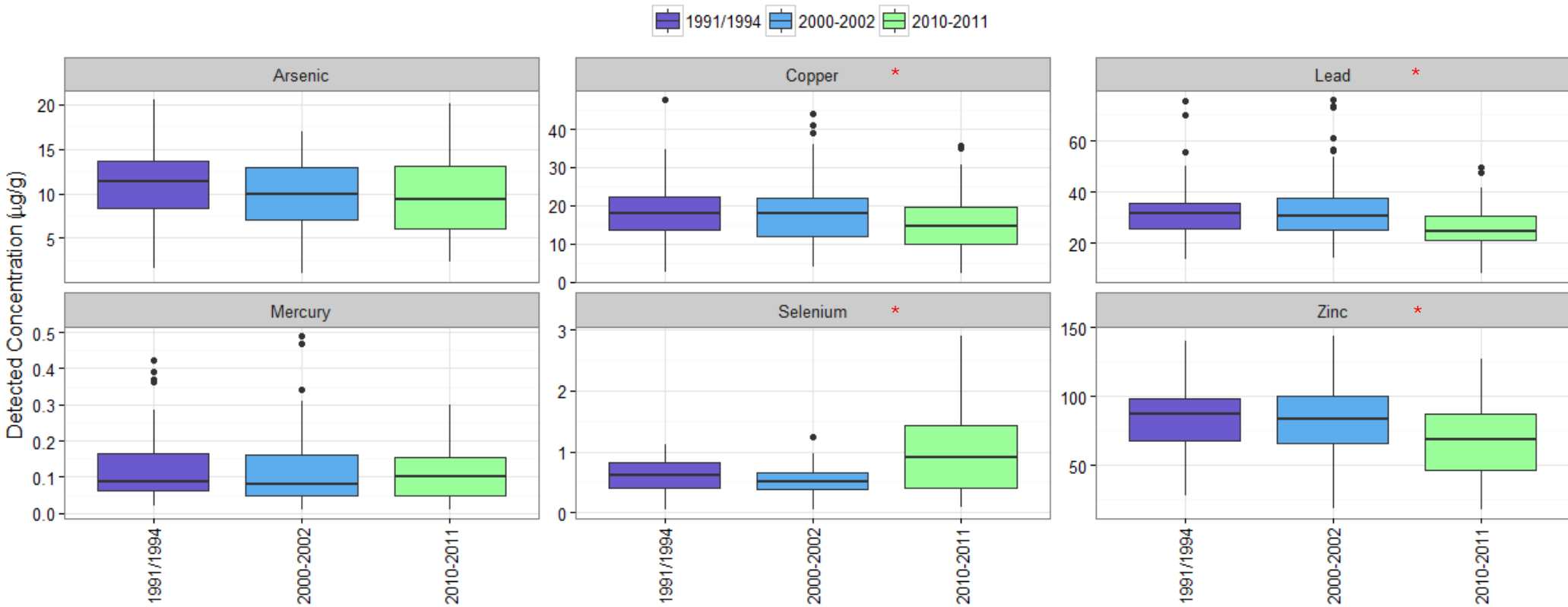
\*: statistically significant differences between regions

# RESULTS: 1991-2011 CASCO BAY



Inner Bay Outer Bay West Bay East Bay Cape Small

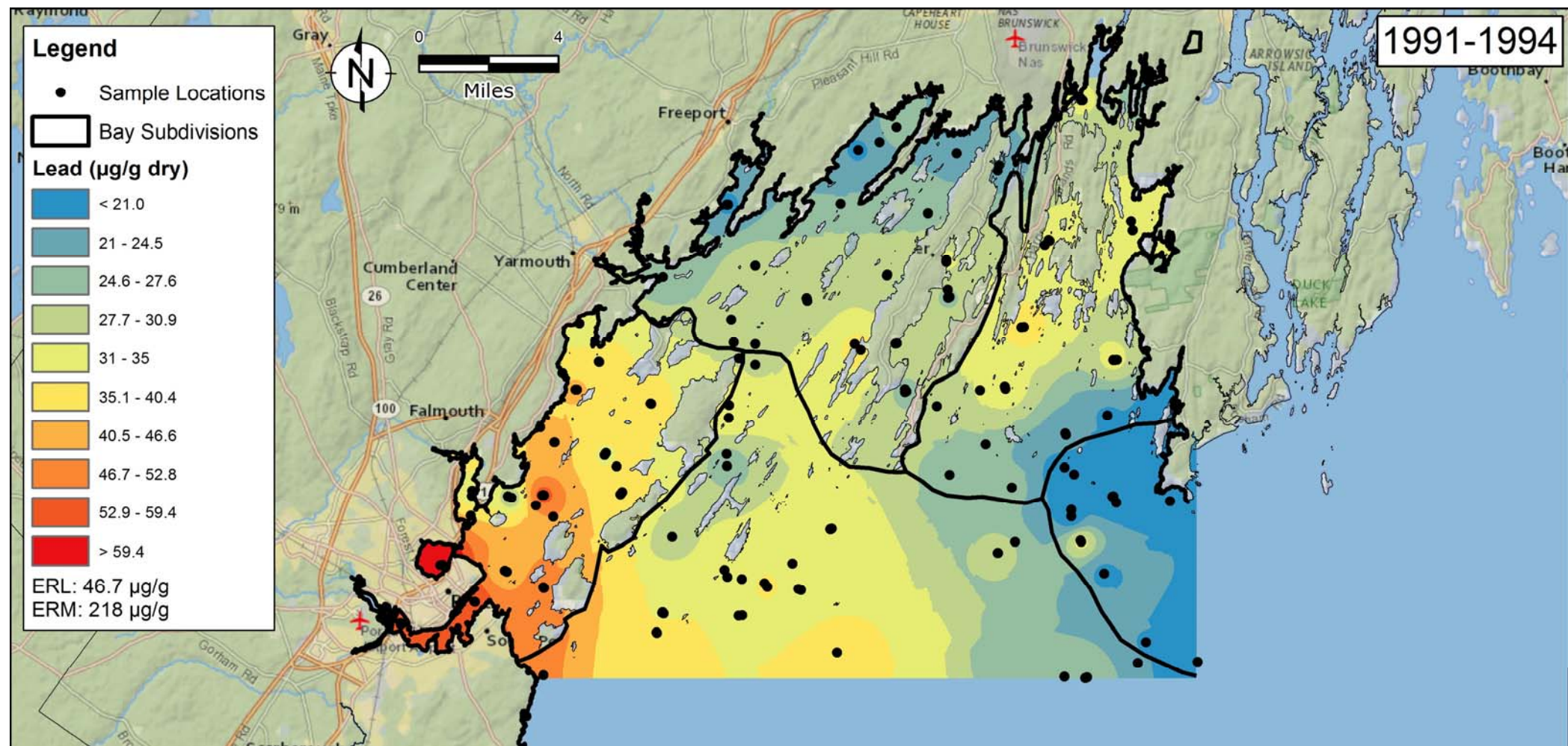
# RESULTS: 1991-2011 CASCO BAY METALS



\*: statistically significant trend in concentration by time



# LEAD IN CASCO BAY, 1991-2011





# LEAD IN CASCO BAY, 1991-2011

