

# **PCB Concentrations in the Ambient Waters of the Delaware Estuary and Coastal Waters: Implications for TMDLs for PCBs**

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# Background

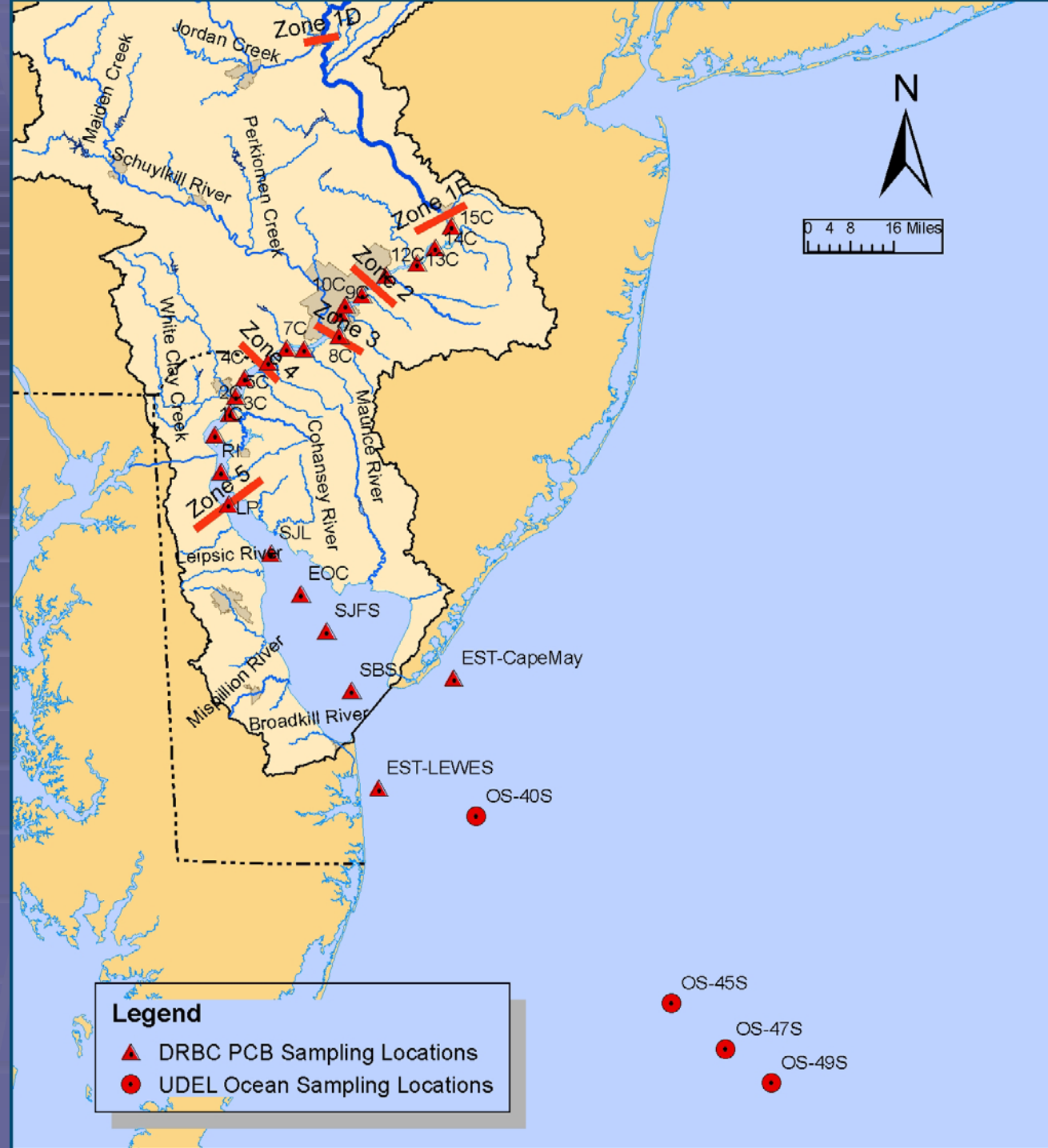
- ❑ Sampling surveys of the ambient waters of the Delaware Estuary have been conducted by the DRBC since September 2001 to provide data on dissolved and particulate PCB concentrations, solids and carbon for the development of TMDLs.
- ❑ In June 2006, two sampling cruises were conducted to provide data from Reedy Island at RM 55.1 to the mouth of Delaware Bay, at two sites off Cape May and Cape Henlopen, and on a transect from the mouth to the edge of the continental slope break (~2000 m).

# Background


- ❑ 18 liter whole water samples were collected using 10 liter Niskin bottles.
- ❑ In the lower tidal river, Delaware Bay and two coastal sites, samples were collected at 0.6 of the water depth at slack water.
- ❑ At the bay sites, samples were also collected at the surface.
- ❑ On the ocean transect, two to three discrete samples were collected at the surface and at varying depths. Deep samples were collected at 20, 50 and 800m. A mid-depth sample was also collected at Station 49 at 50m.



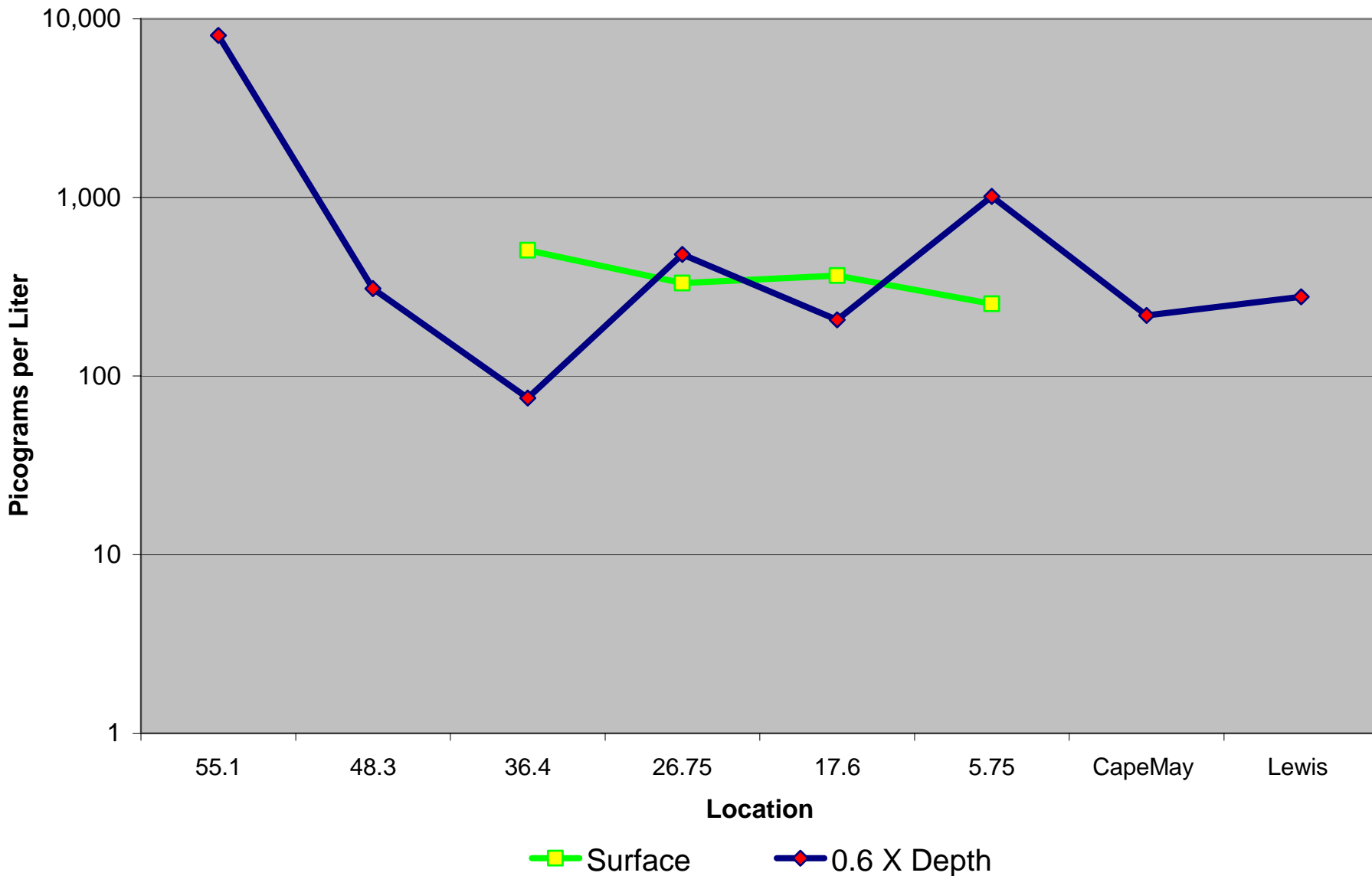
# Estuary and Ocean Sampling Sites



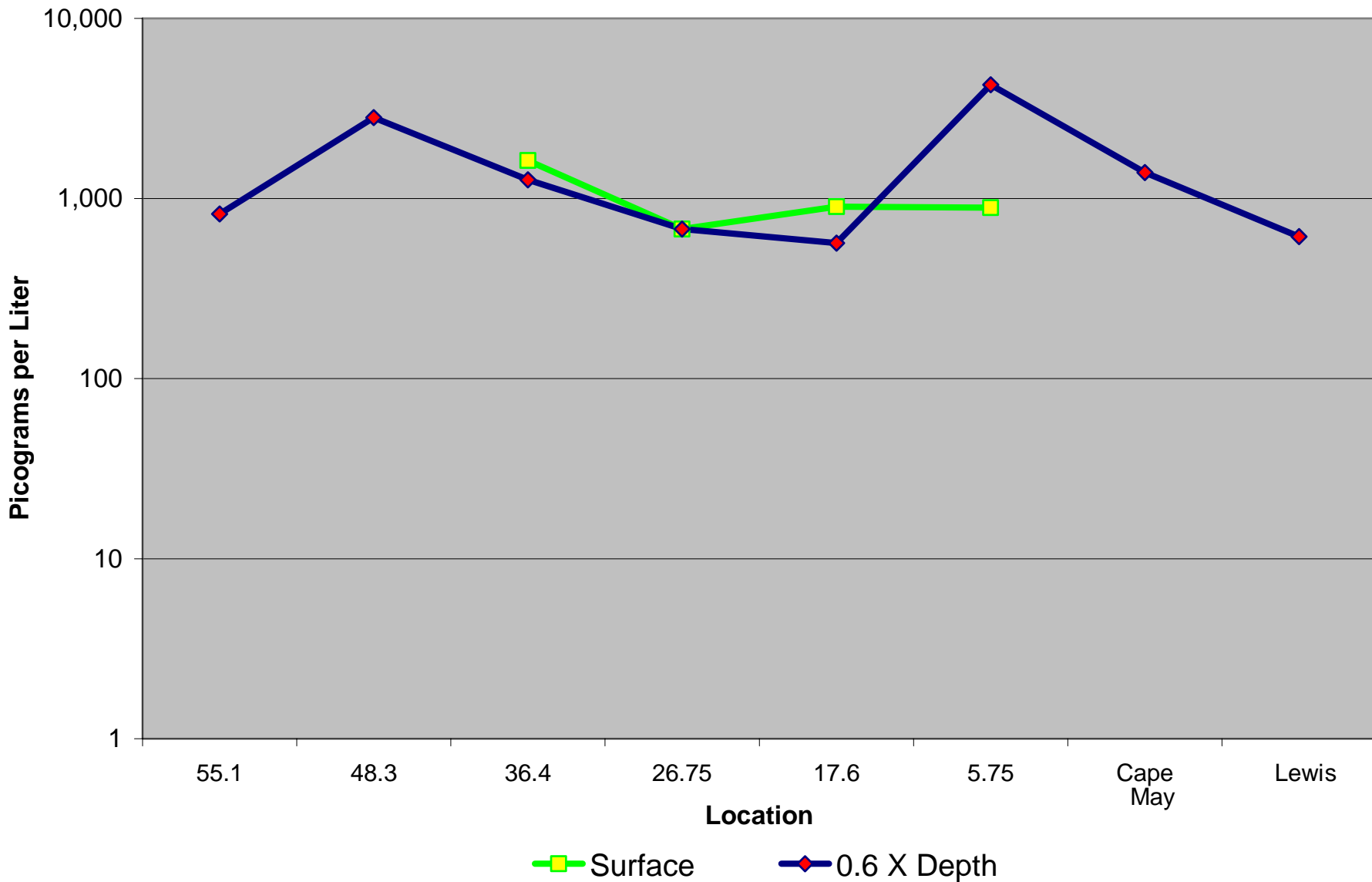
# Background

- ❑ In the lower tidal river and Delaware Bay, samples are collected at three locations on a transect across the navigation channel, and composited into stainless steel cylinders for shipment to a contract lab (Axys Analytical Services).
- ❑ Samples are analyzed for:
  - ✓ 209 PCB congeners using EPA Method 1668A.
  - ✓ Particulate PCBs - solids retained on 0.7  m glass fiber filter.
  - ✓ Dissolved PCBs - filtrate passed through XAD column followed by analysis of elutriate.

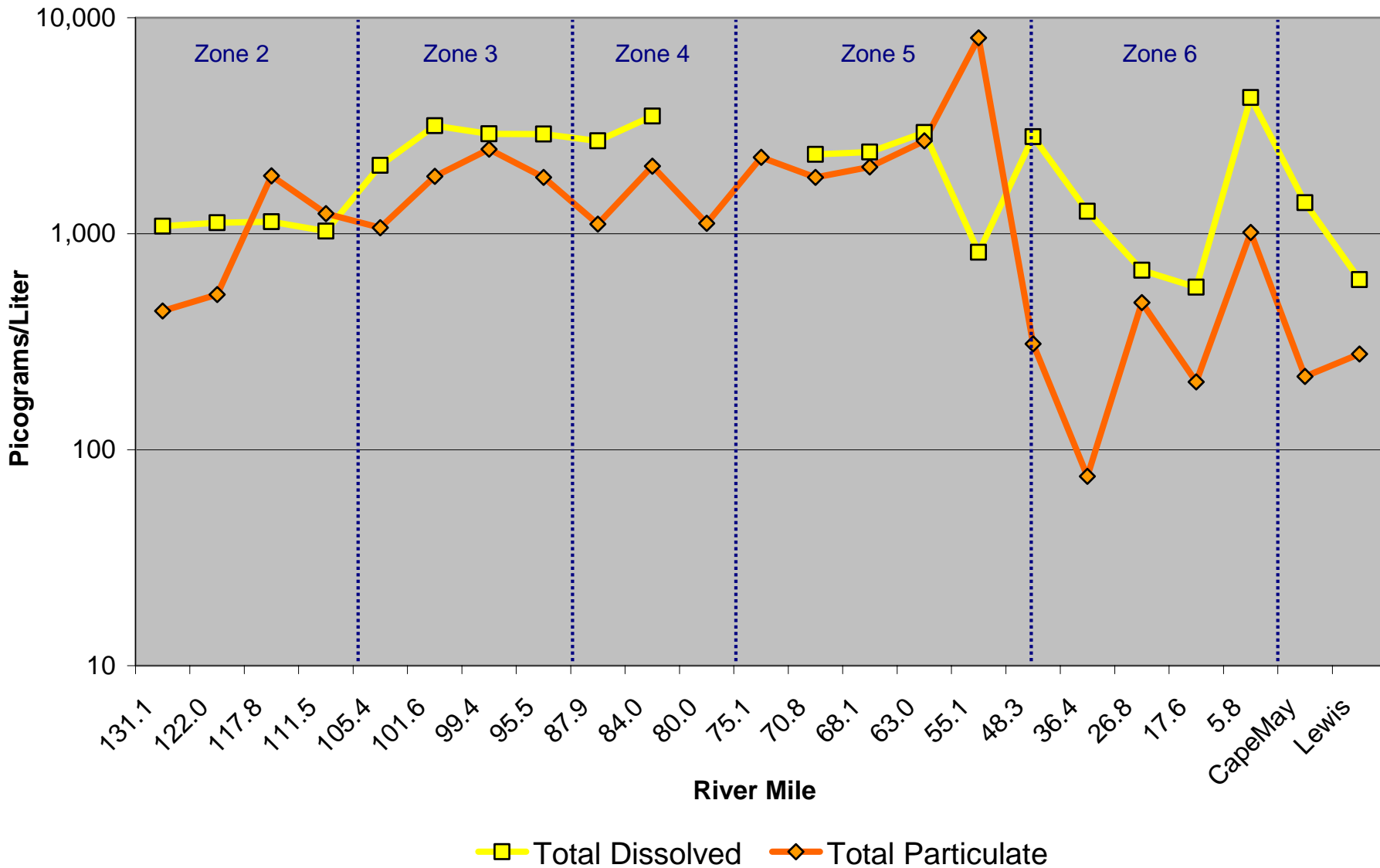
# Total Particulate PCB June 2006 Survey



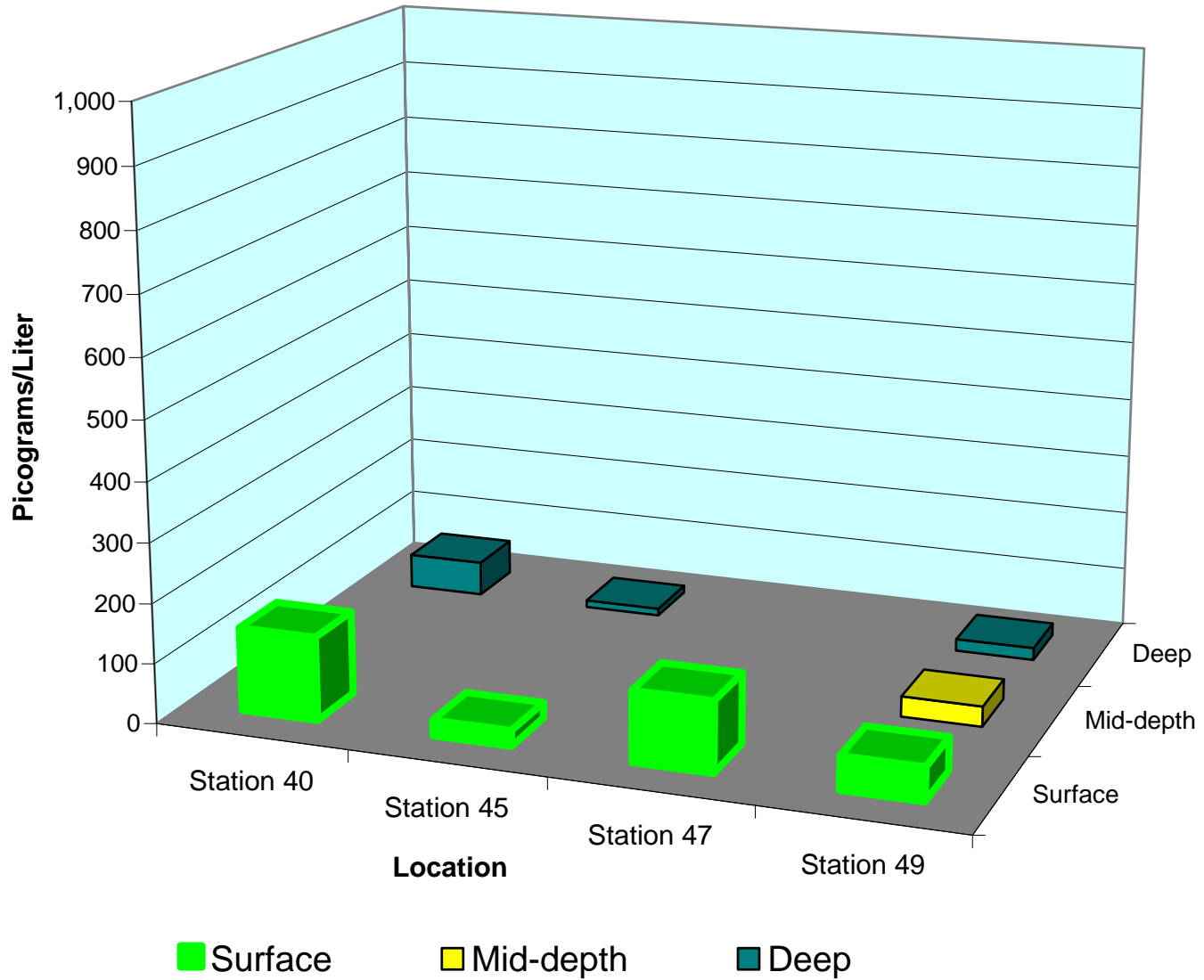
# Total Dissolved PCB June 2006 Survey



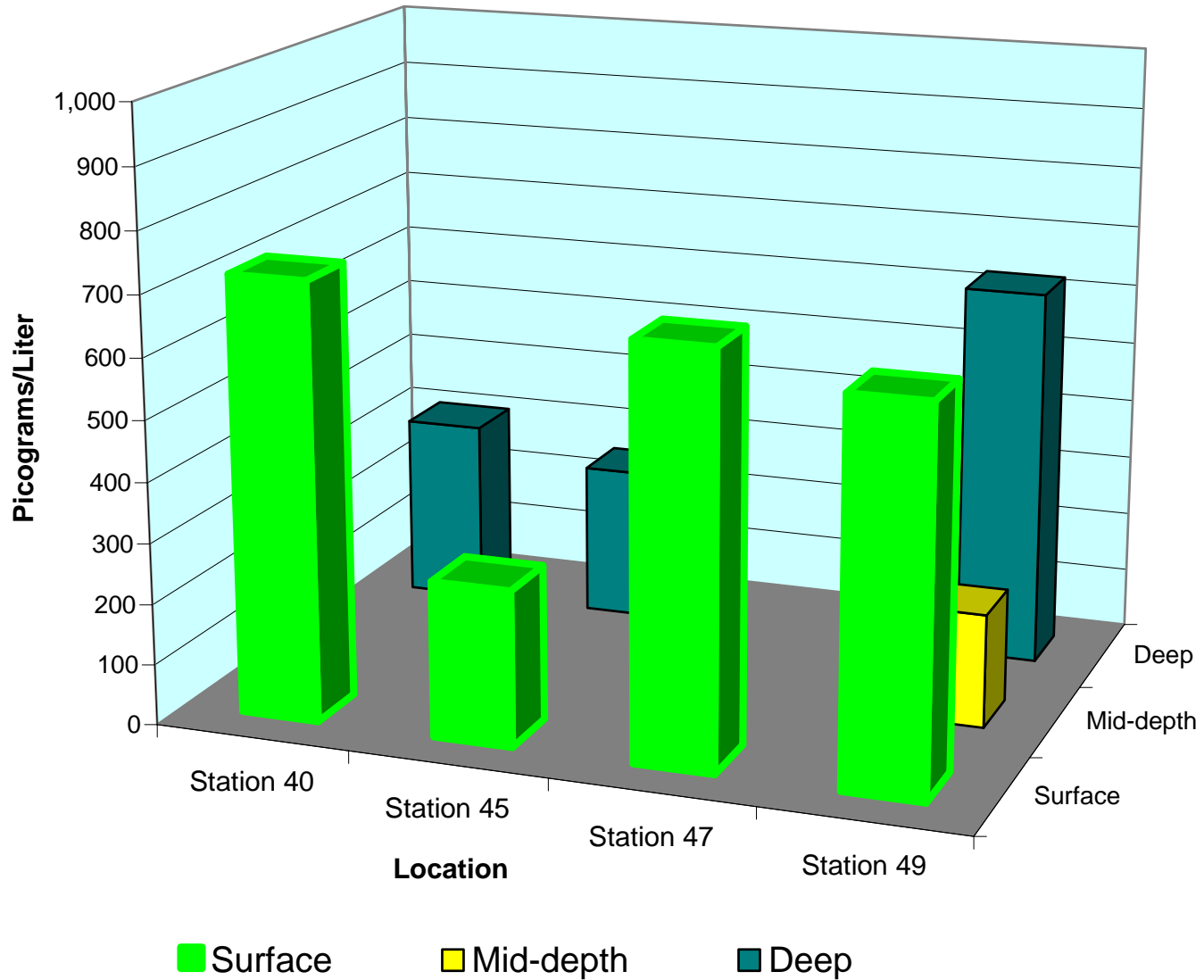
## Total PCB - Delaware River & Bay June 2002 & 2006 Surveys



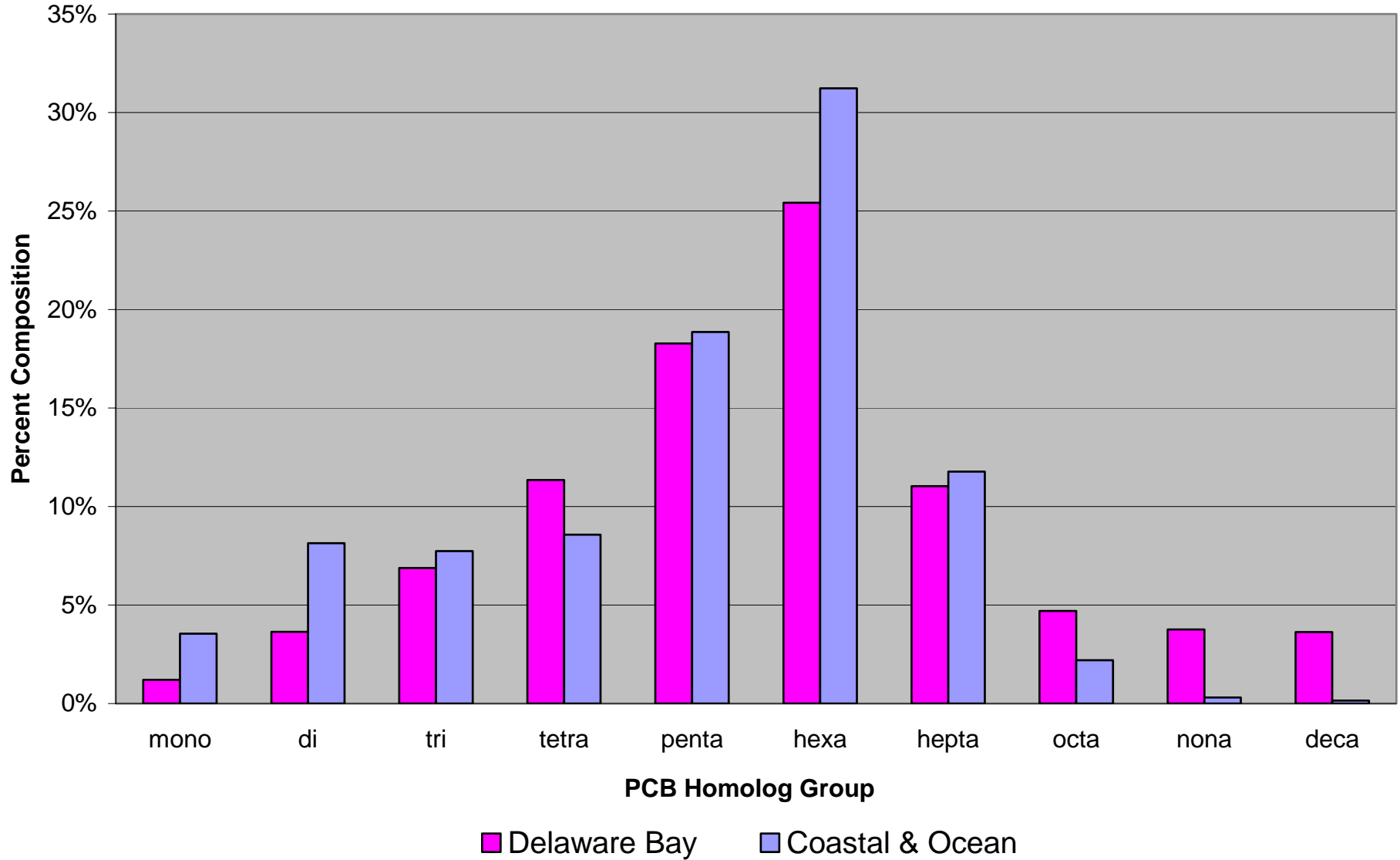
# Total Particulate PCB June 2006 Survey



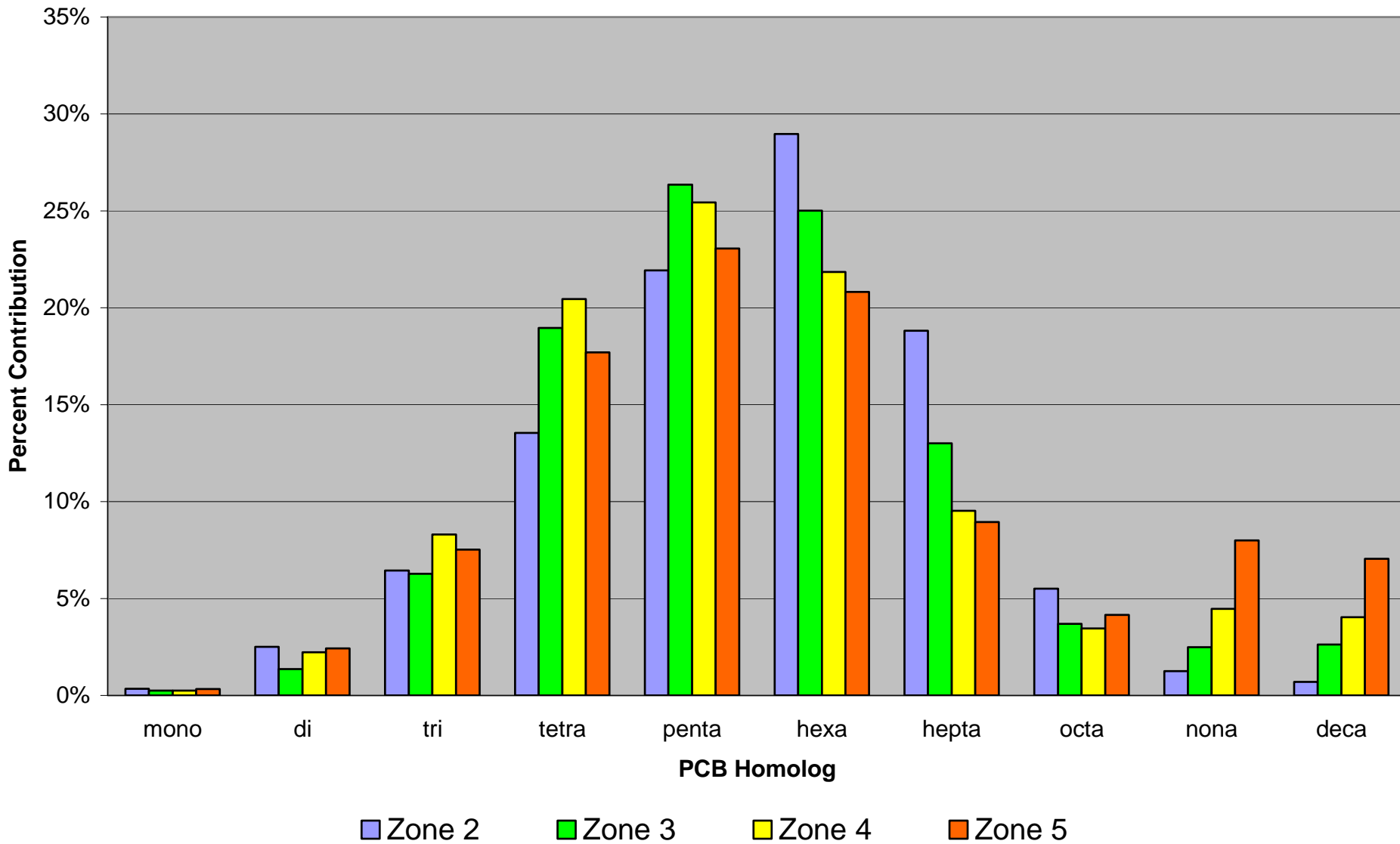
# Total Dissolved PCB June 2006 Survey



# PCB Homolog Distribution June 2006 Survey



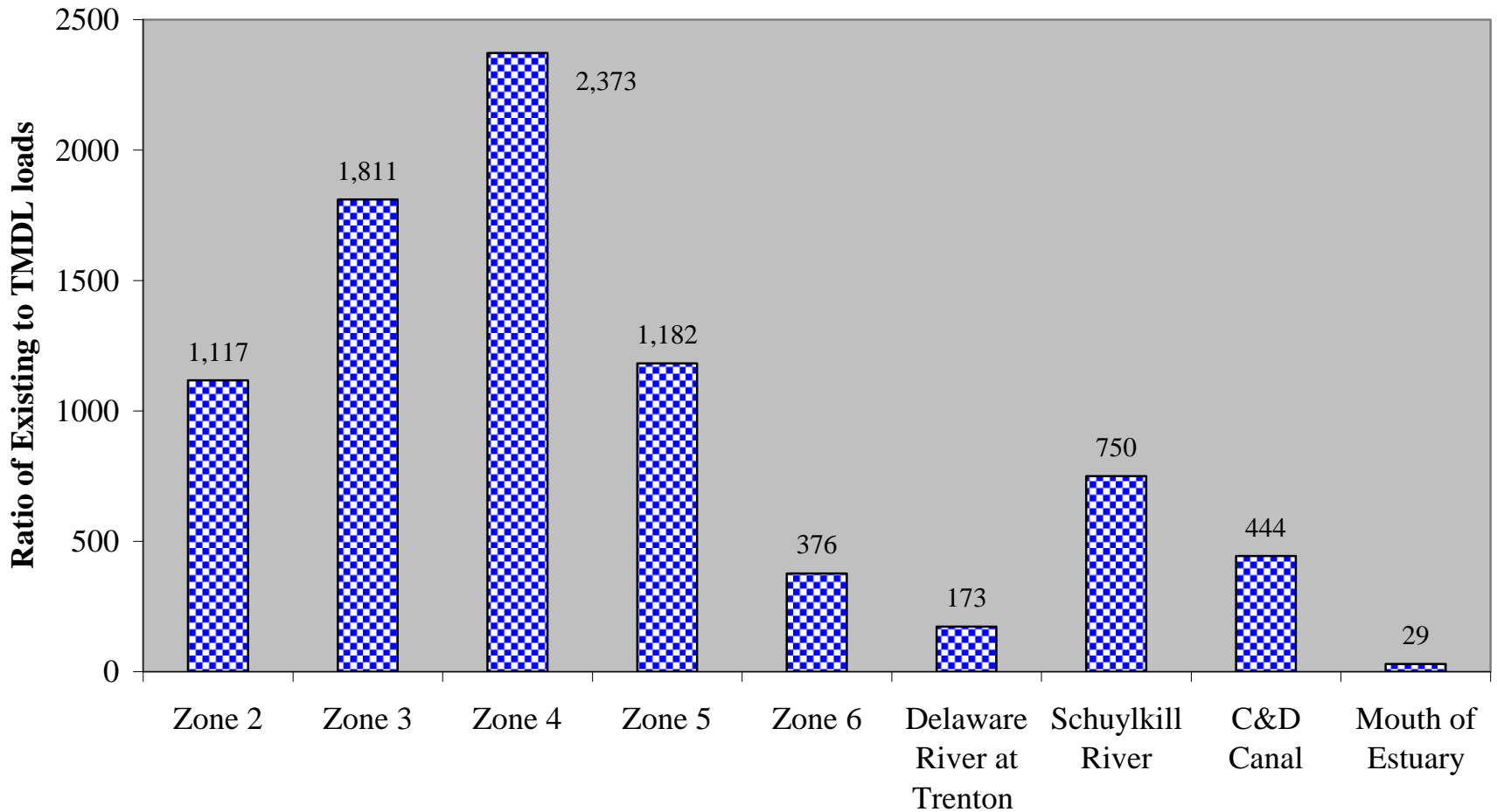
# PCB Homolog Distribution Stage 1 TMDLs



# Implications for TMDLs

- ❑ PCB concentrations in the coastal waters significantly influence PCB concentrations in Delaware Bay.
  - ✓ The Stage 1 TMDL for Zone 6 allocates 444 mg/day to the ocean; a full 90% of the TMDL.
  - ✓ This influx is lost to the sediment through net deposition.
  - ✓ The current loading from the ocean is estimated at 12,860 mg/day. While ~30 times higher than the TMDL load, the difference is less than other source categories.

# Ratios of Existing Loads to Stage 1 TMDL Loads



# Summary

- ❑ PCB concentrations in ambient waters decline from the urban portions of the river (Zones 2 - 5) to the Bay (Zone 6) and coastal waters.
- ❑ A greater proportion of PCBs is in the dissolved form in the Bay and coastal waters compared to the urban river.
- ❑ The current loading of PCBs from coastal waters exceed allowable levels by 1-2 order of magnitude.

For more information contact:

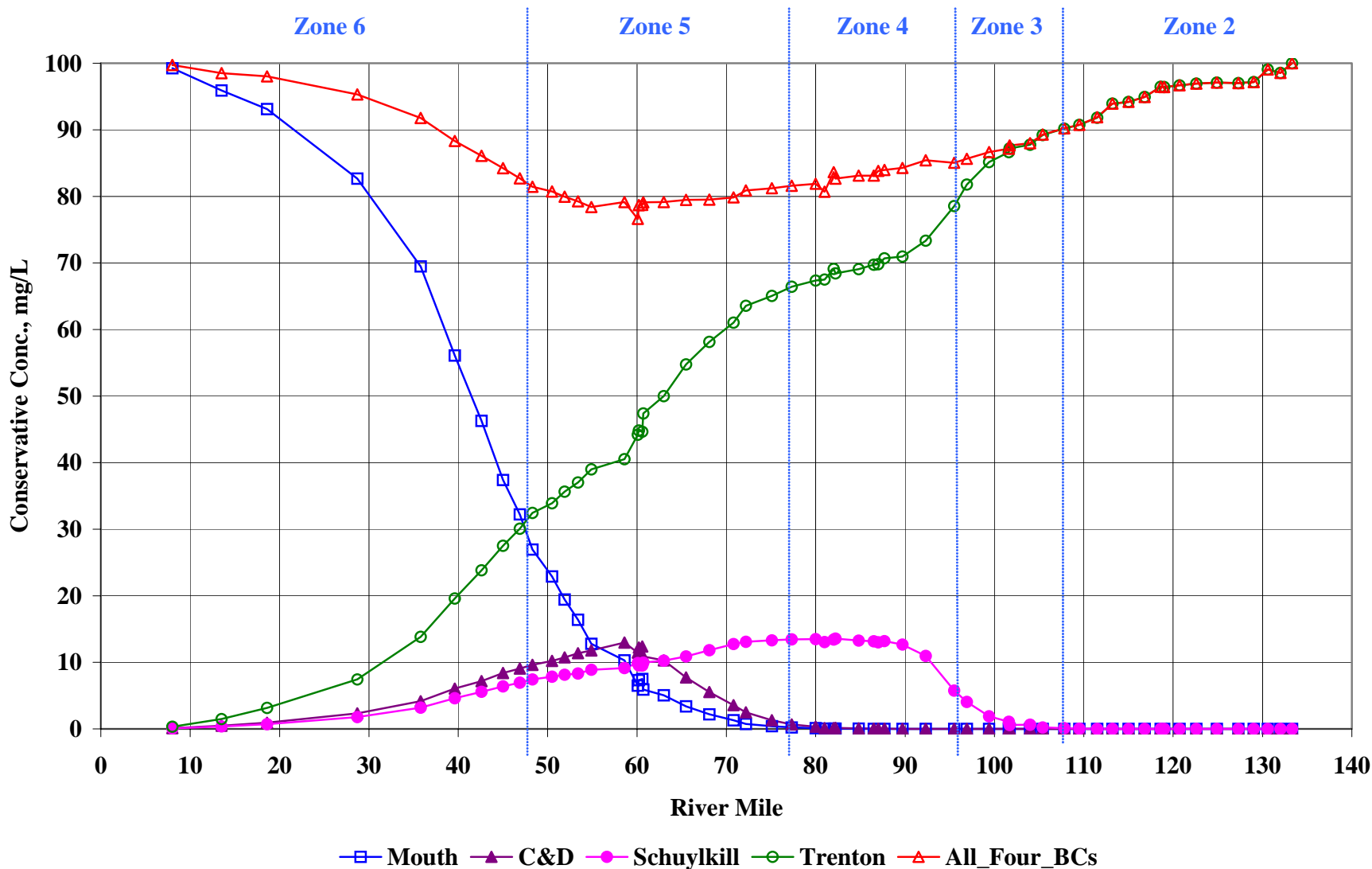
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# Spatial Plot: Relative Impact of the Boundary Conditions:

Median Values: BC = 100mg/l for Mouth of the Bay, C&D, Schuylkill, and/or Trenton



# Magnitude and Direction of Penta PCB Mass Loads, Transfers, and Fluxes - TMDL Condition

