

Marine Water Quality in California: An Evaluation of 24 Years of National Mussel Watch Data.

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NOAA National Mussel Watch Program

- Historic data, years 1986-2009
- Currently 71 sites (historic data 65 sites) along CA coastline
- Resident mussels
- 150 contaminants monitored

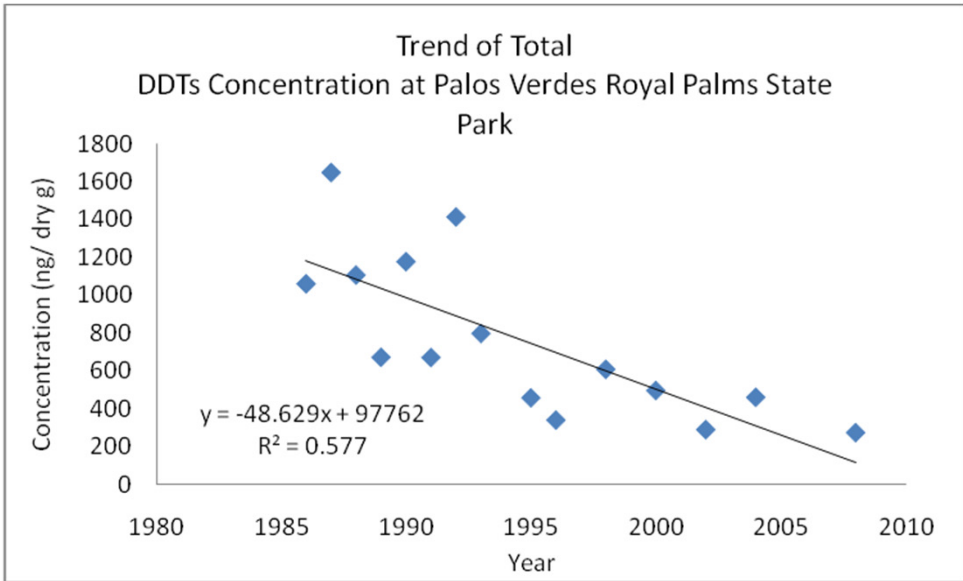
To support ecosystem-based management and describe the status and trends of contaminants

This presentation will focus on DDT, PCB, TBT, PAH, and Cu



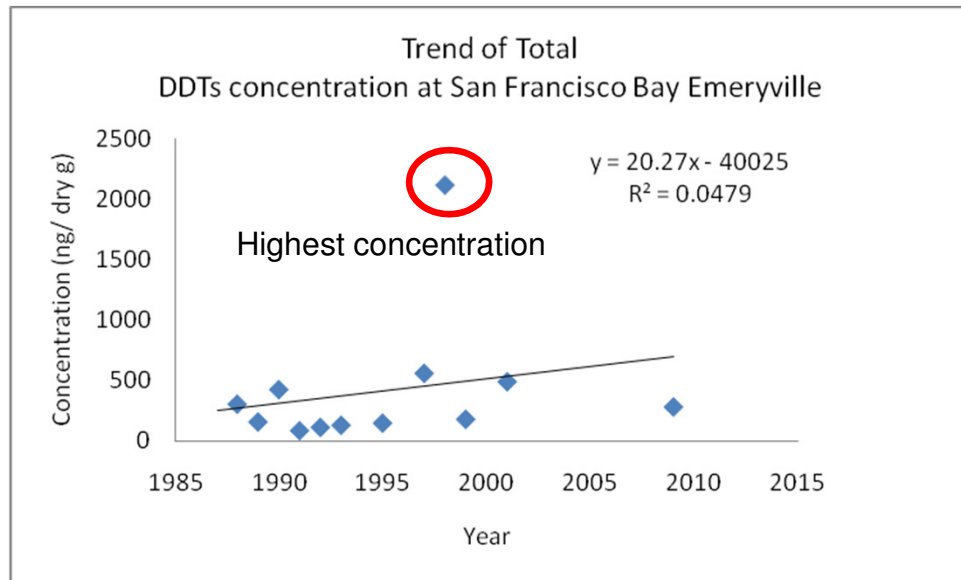
DDT trend (1986-2009)

- Declined at 26 sites, significantly declined at 13 sites.
- Biggest downward trend at Royal Palms (White Point) on the Palos Verdes Peninsula, where DDT dropped from 1061.1 ppb dw in 1986 to 274.77 ppb dw in 2008.
- Highest DDT concentration at San Francisco Bay Emeryville site (2118.25 ppb dw, in 1998).
- Of the sites with initial concentrations above 20 ppb dw, there are increasing (but not statistically significant) trends evident at only two stations, at Moss Landing and Emeryville (in San Francisco Bay).

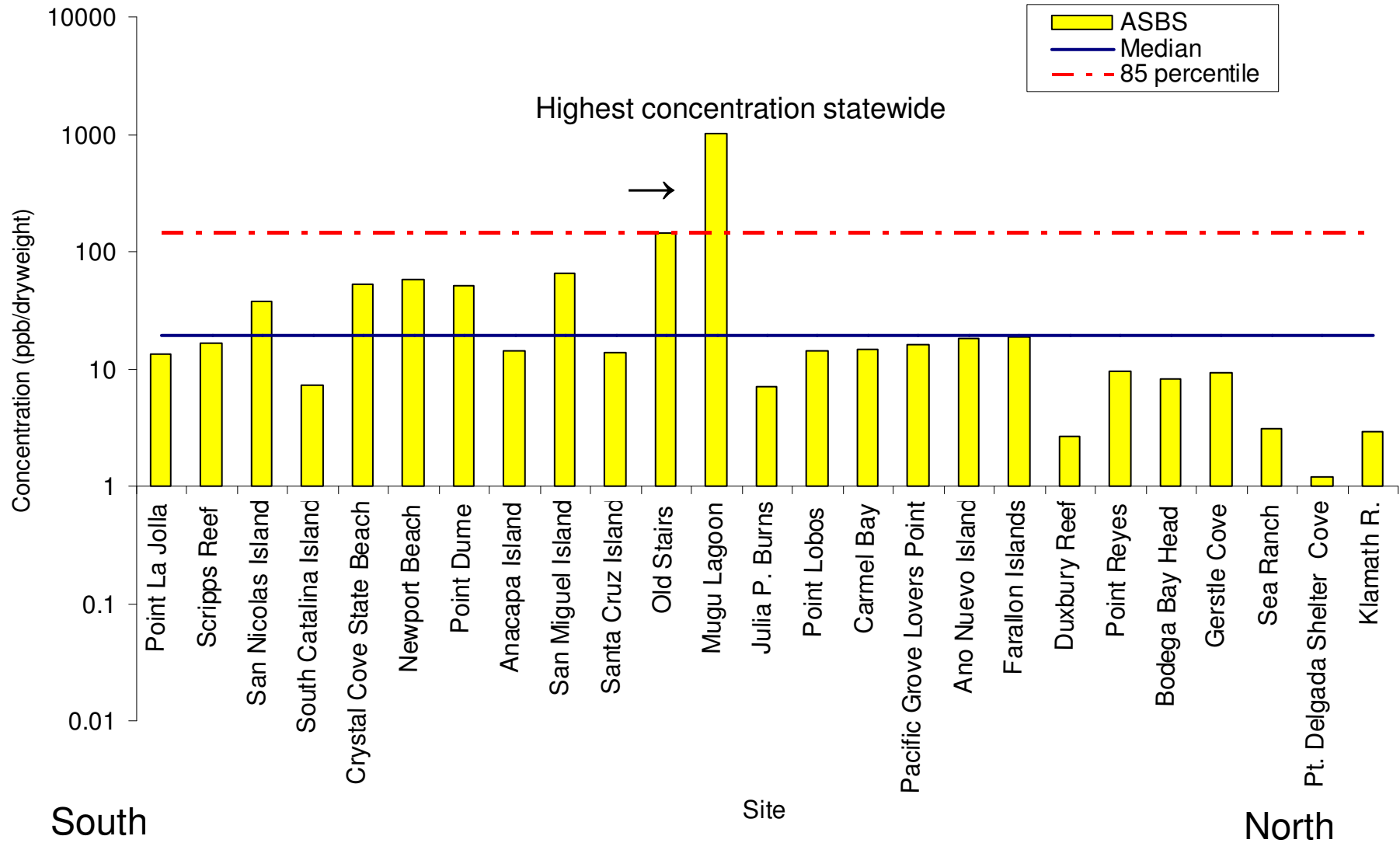


Significant decrease at Royal Palms (White Point)

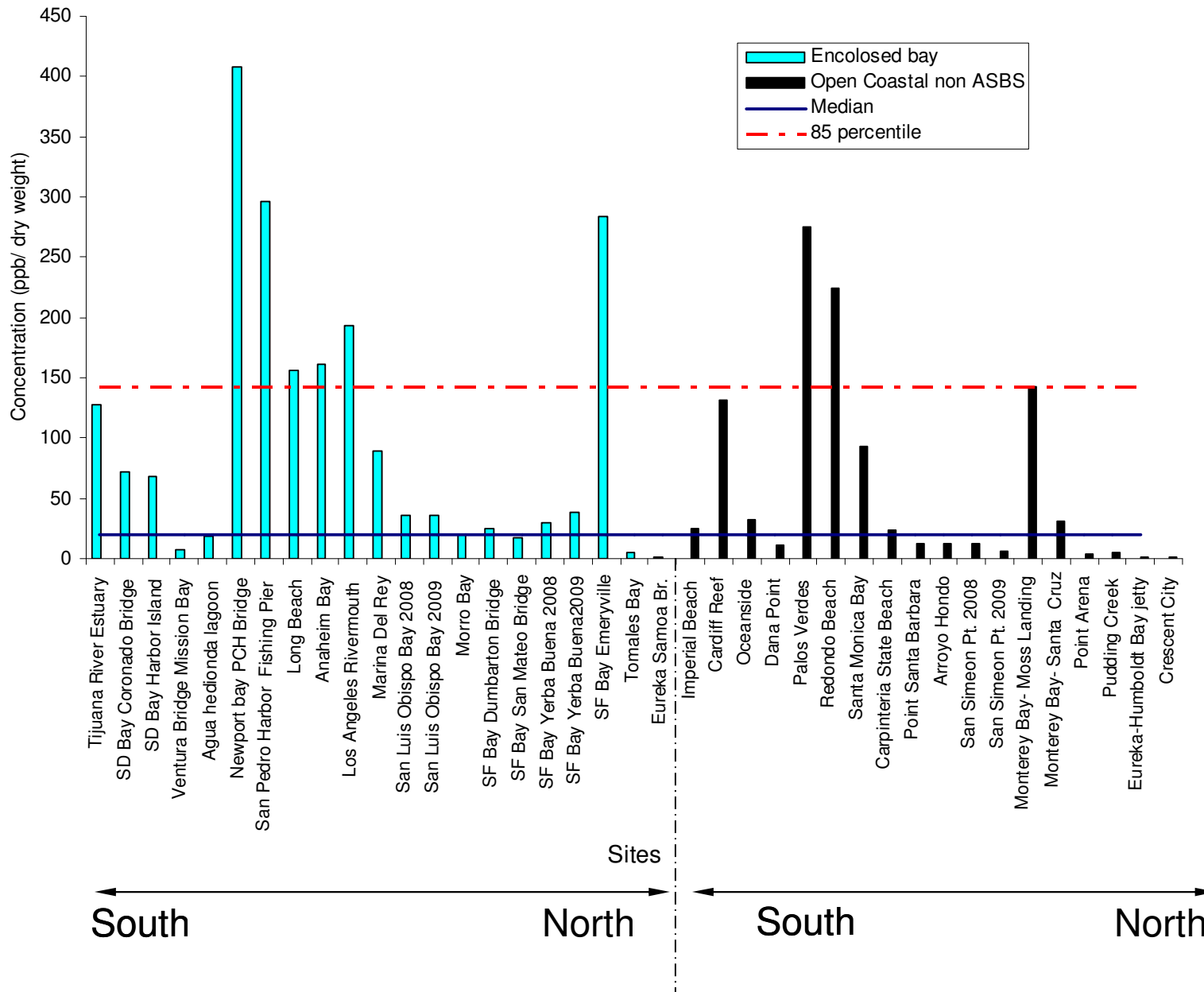
Increasing trend,
but not significant



DDT Status (2007-2009 samples, in or adjacent to ASBS)



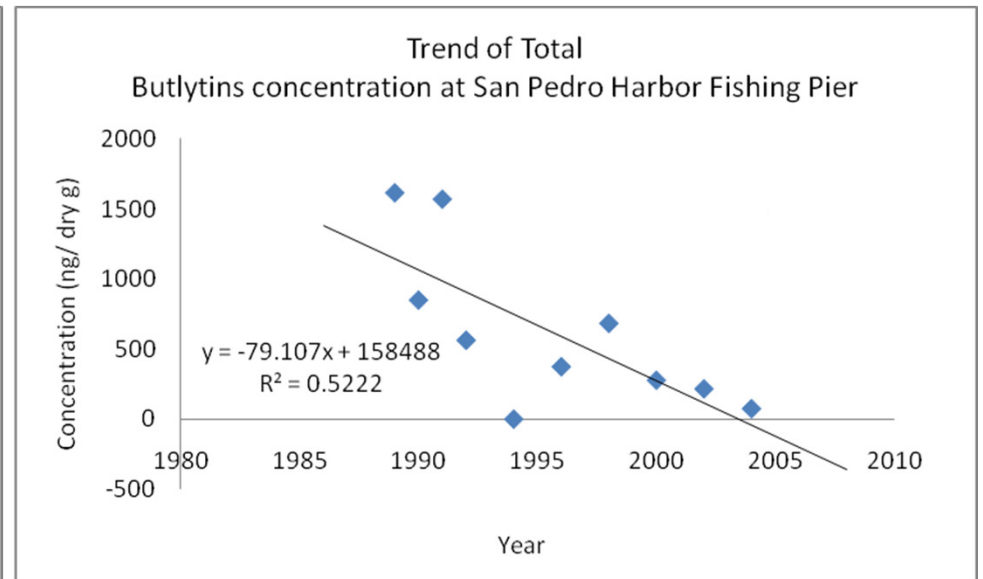
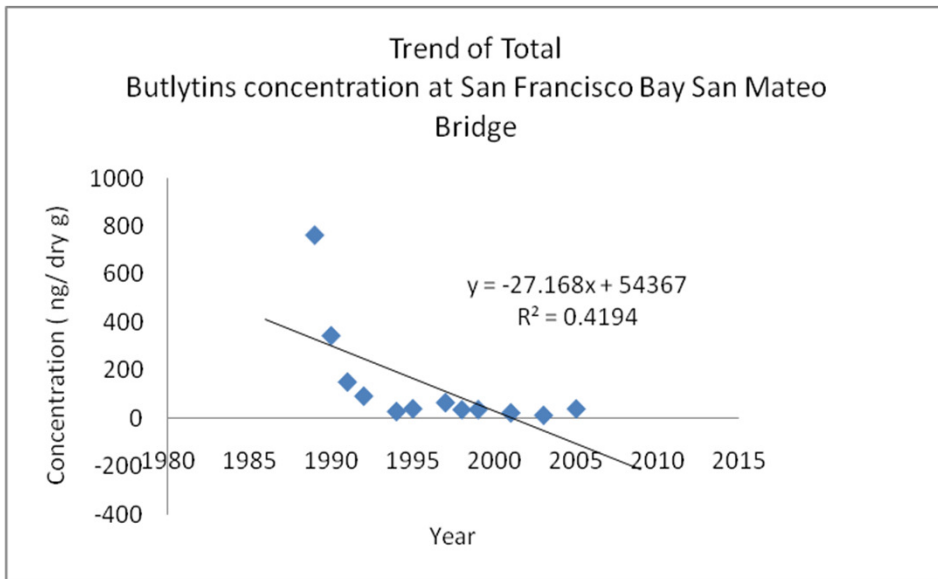
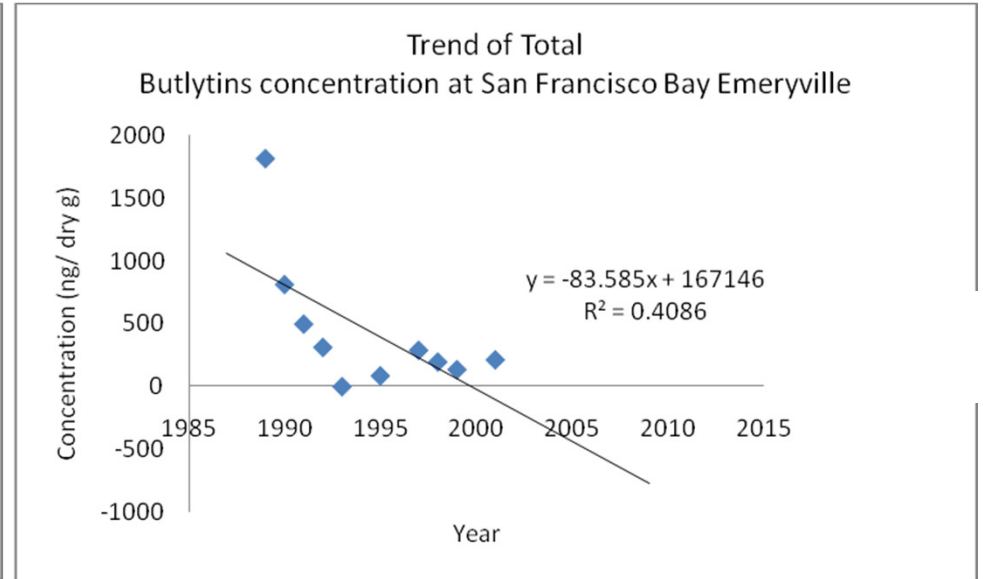
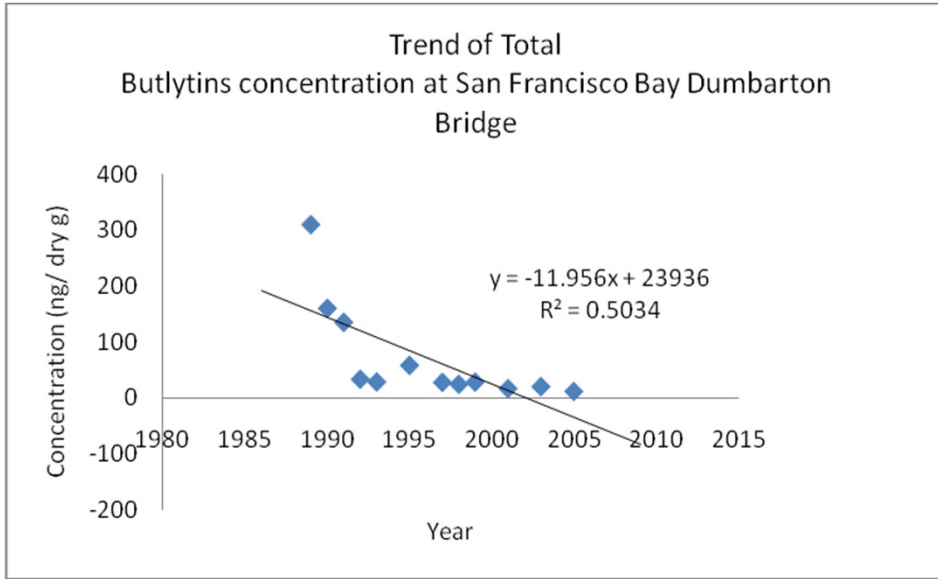
DDT Status (2007-2009 samples, open coast & enclosed bays)



Total Butyltin Trend (1986-2005 samples)

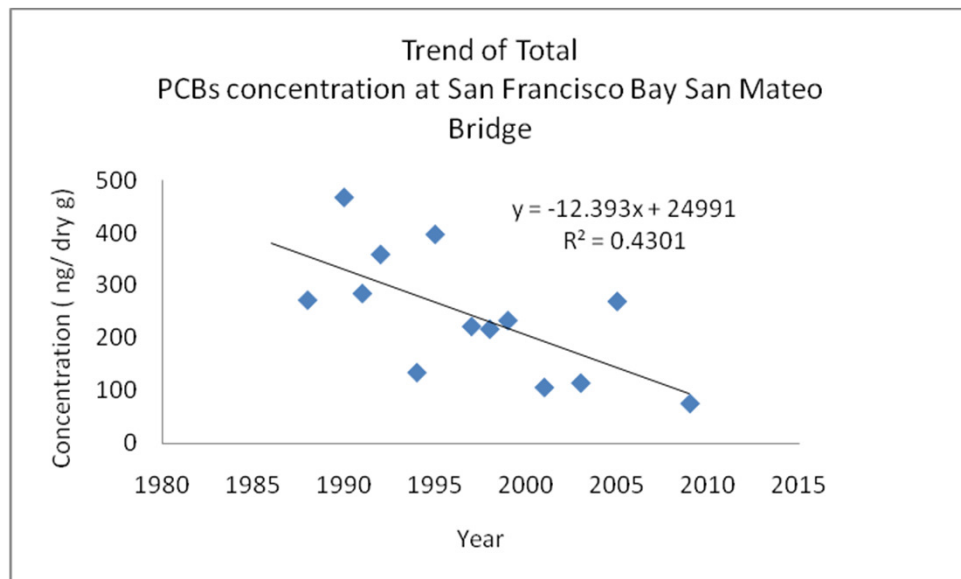
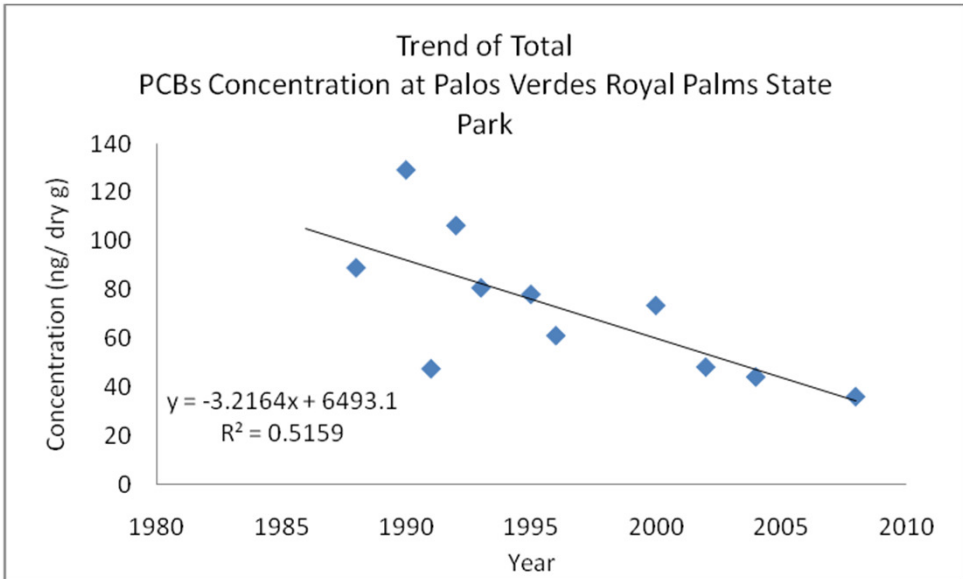
- Total BT declined at 33 out of 35 stations,
- 18 out of 35 stations had significant declines.
- 2 stations, Santa Cruz Island (Fraser Point) and Point Conception show upward trends, but neither were significant.
- This is undoubtedly due to the phase out of TBT based hull coatings.

Total BT trend in SF Bay

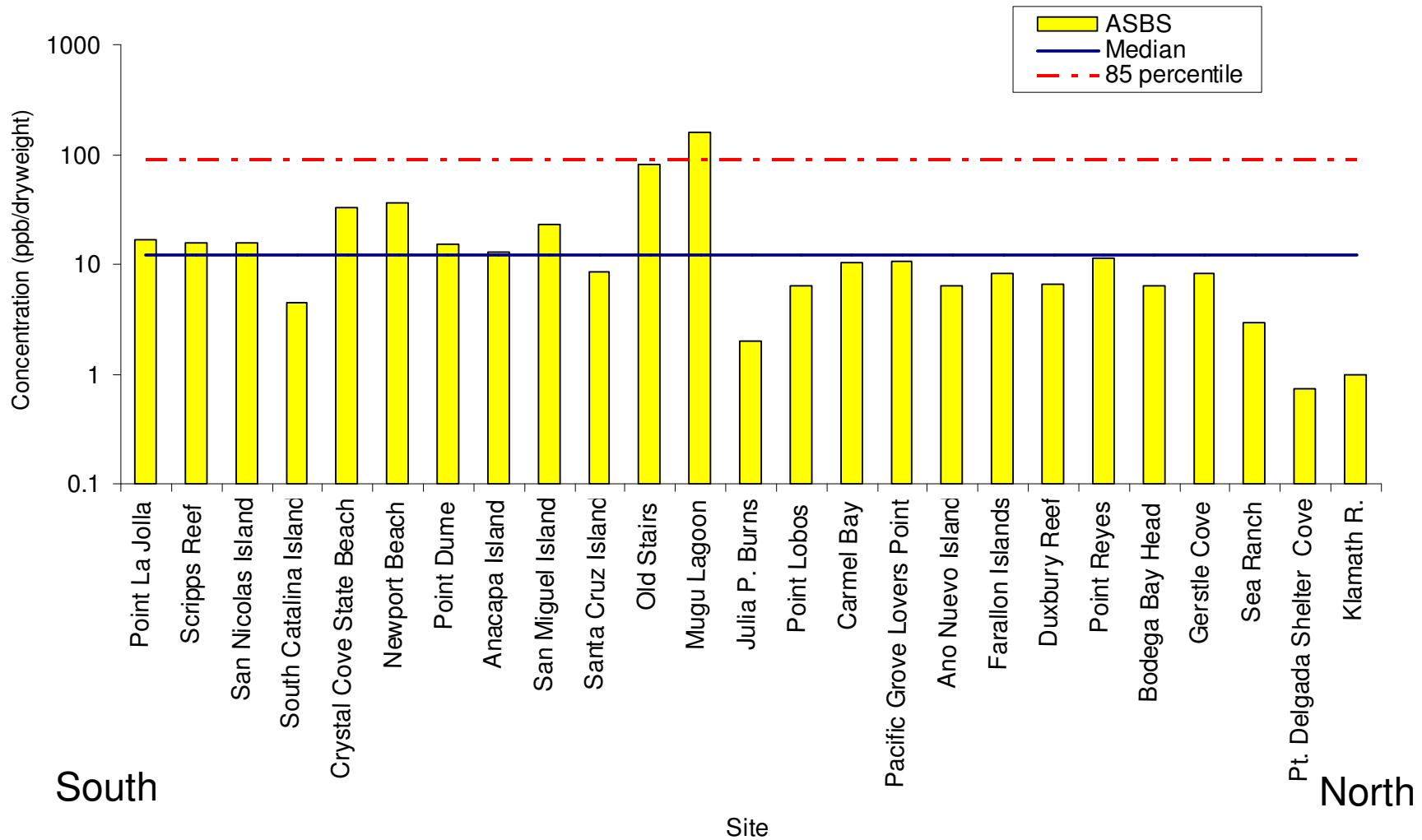


PCBs Trend (1986-2009)

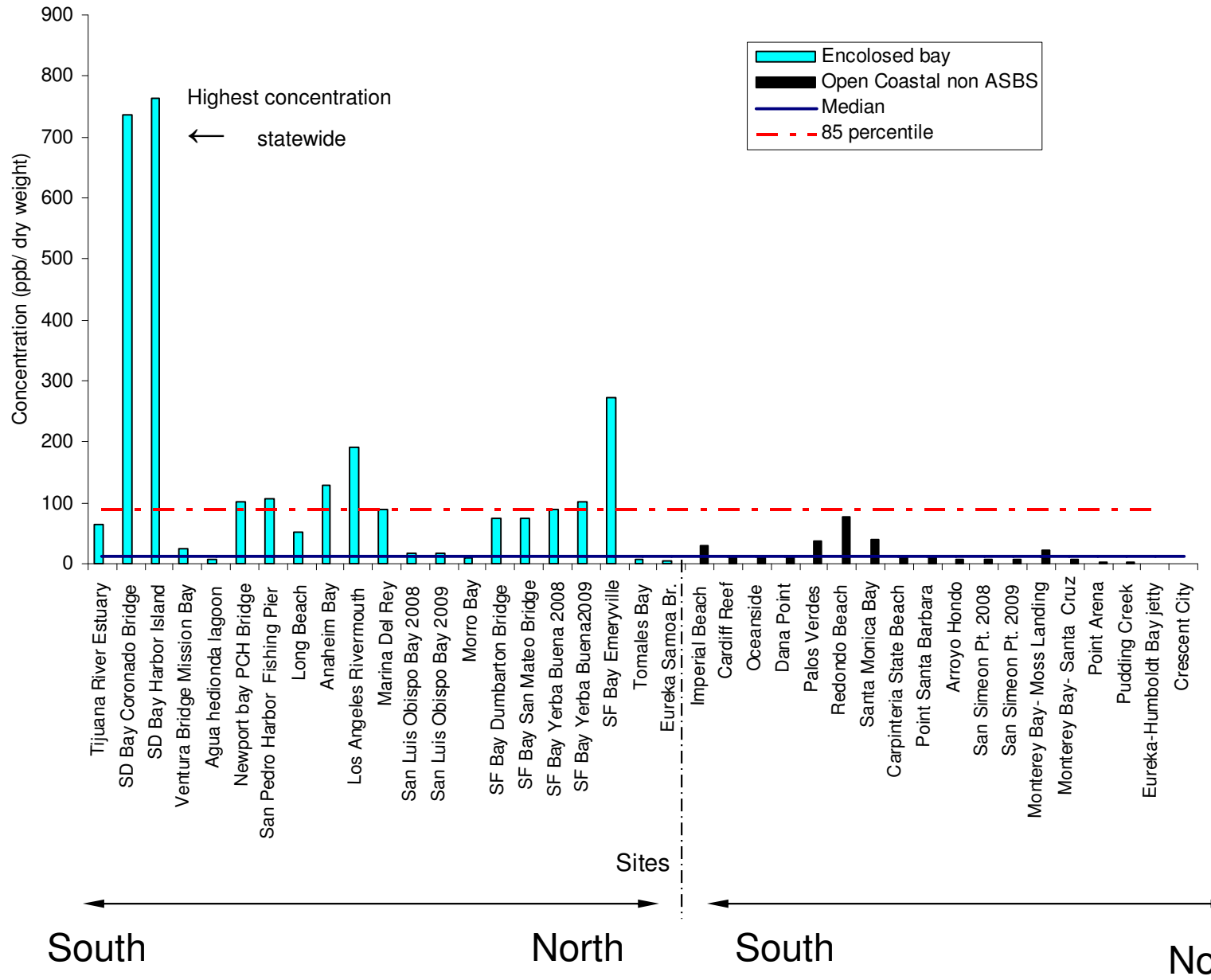
- 35 sites with sufficient number of samples, PCBs declined at most stations.
 - 8 had low initial concentrations (<10 ppb dw), not expected to show sig. declines
 - 21 showed no significant trend
 - 6 exhibited significant declines.
- Sites with significant declines:
 - Anaheim Bay
 - Mission Bay
 - Point Loma
 - Royal Palms/White Point
 - San Pedro Harbor Fishing Pier
 - San Francisco Bay San Mateo Bridge
- Largest statistically significant decline was at Royal Palms
 - concentrations dropped from 130 ppb dw in 1990 to about 40 ppb dw in 2007.



PCBs Status (2007-2009 samples, in or adjacent to ASBS)



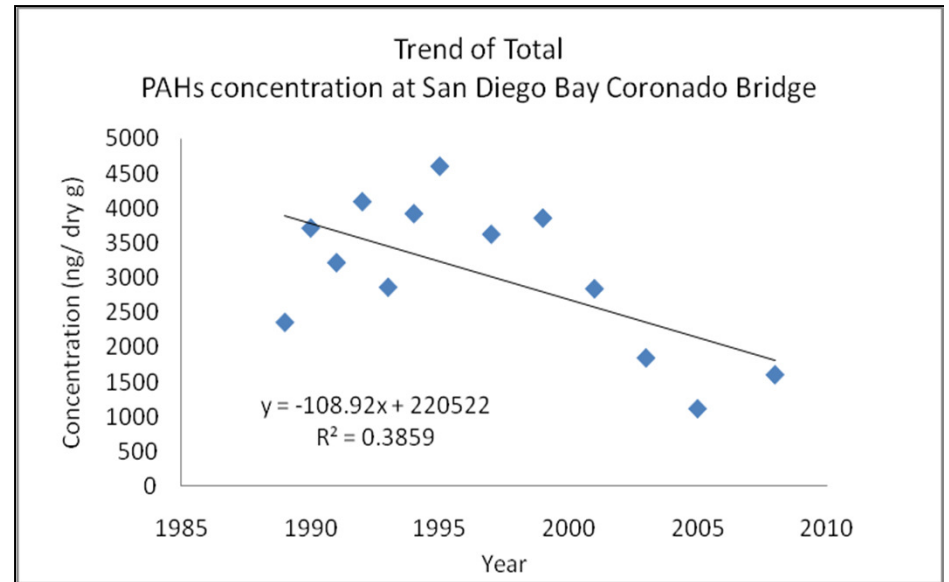
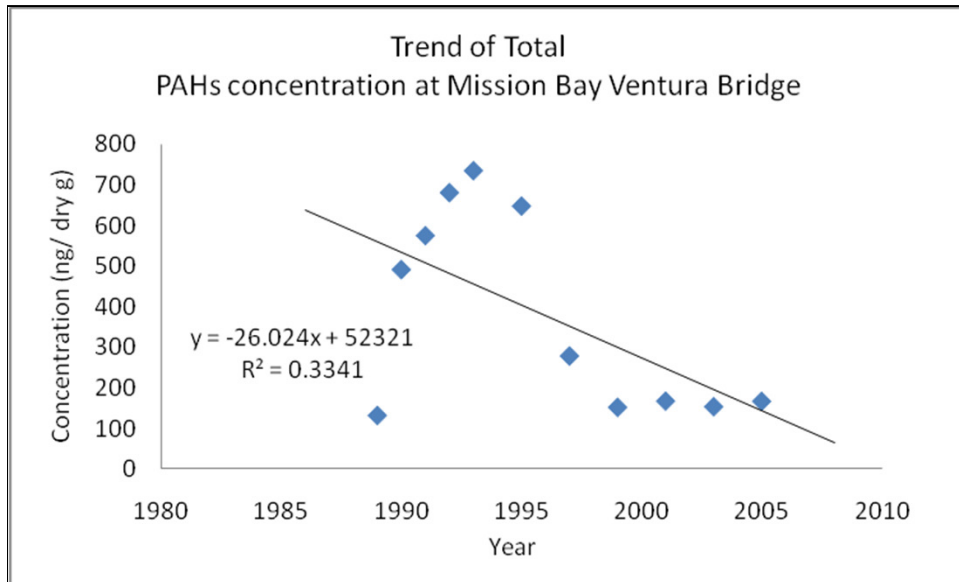
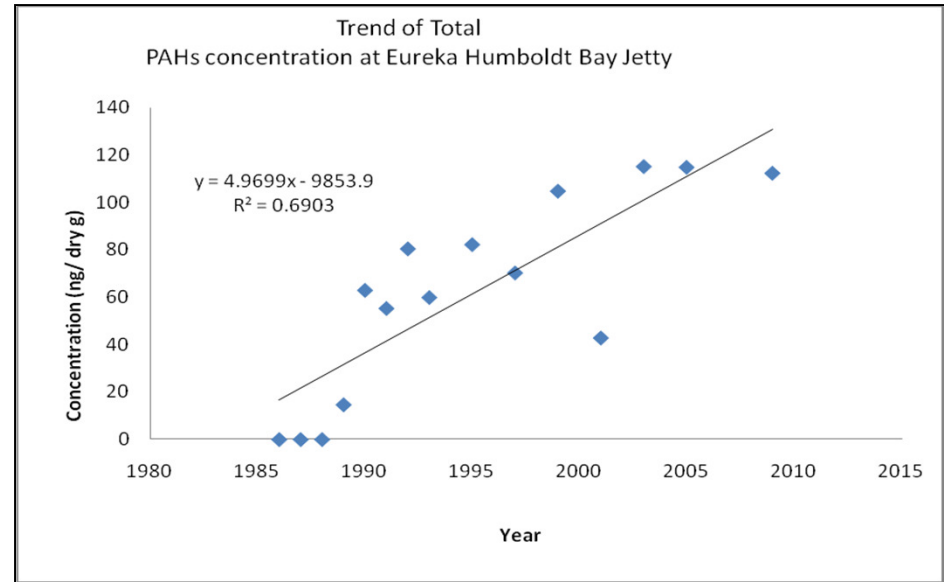
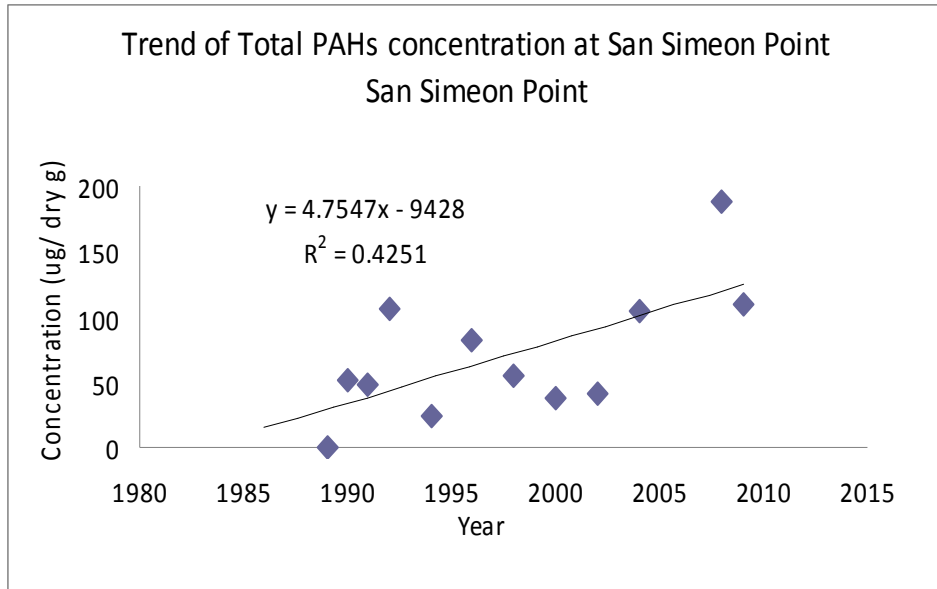
PCBs Status (2007-2009 samples, open coast & enclosed bays)



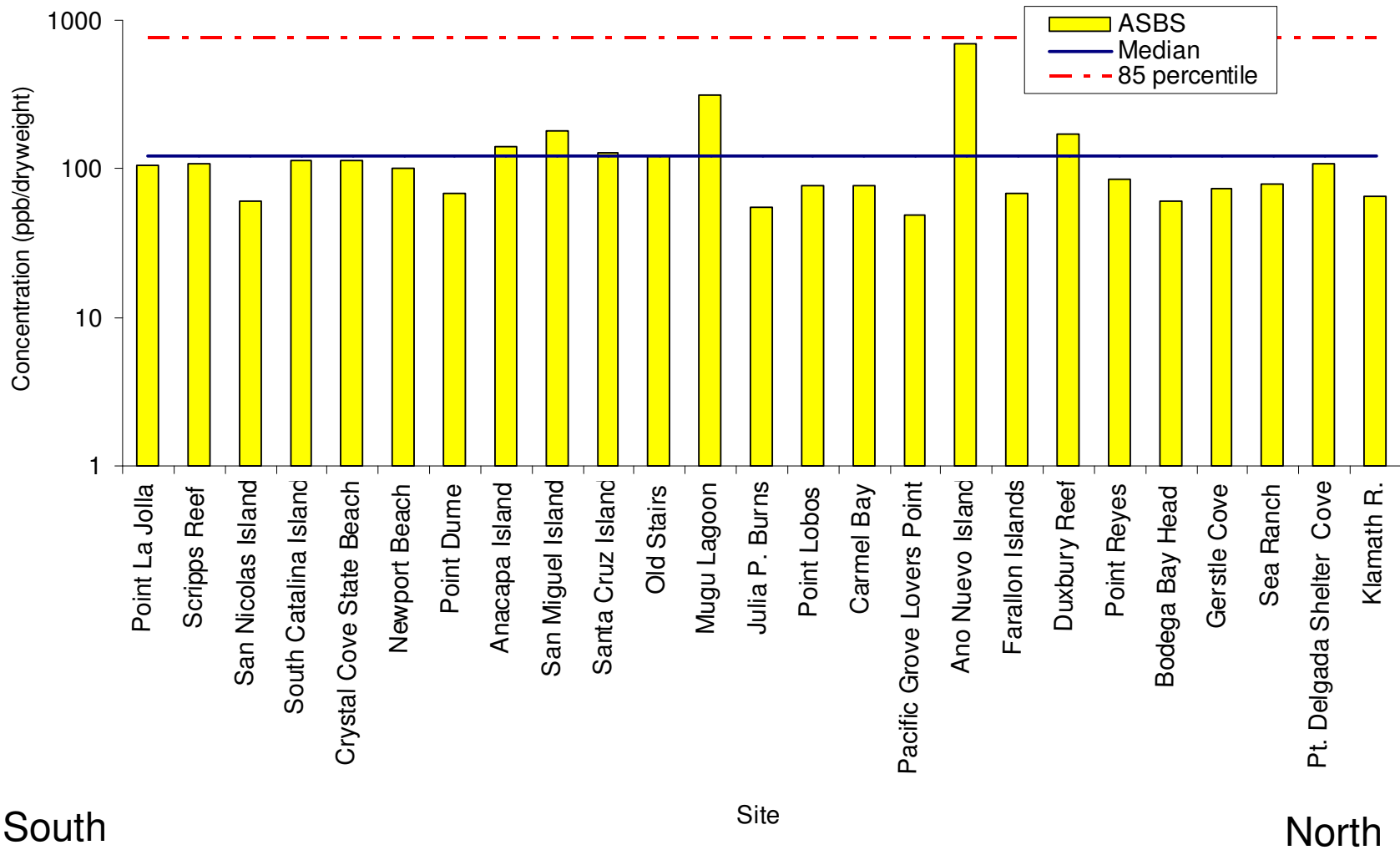
Total PAHs Trends (1986-2009)

- Twenty one out of 35 sites show upward trends
- 5 of these were statistically significant increases:
 - Anaheim Bay
 - Eureka/Humboldt Bay
 - Oceanside Municipal Beach
 - Point Santa Barbara
 - San Simeon Point.
- 4 sites had significant declines:
 - Mission Bay Ventura Bridge
 - San Diego Bay Coronado Bridge
 - San Diego Bay Harbor Island
 - San Francisco Bay Dumbarton Bridge
- The largest PAHs concentrations (48,453.4 ppb dw) were at Yerba Buena Island in San Francisco Bay (2008) following the Cosco Busan oil spill.

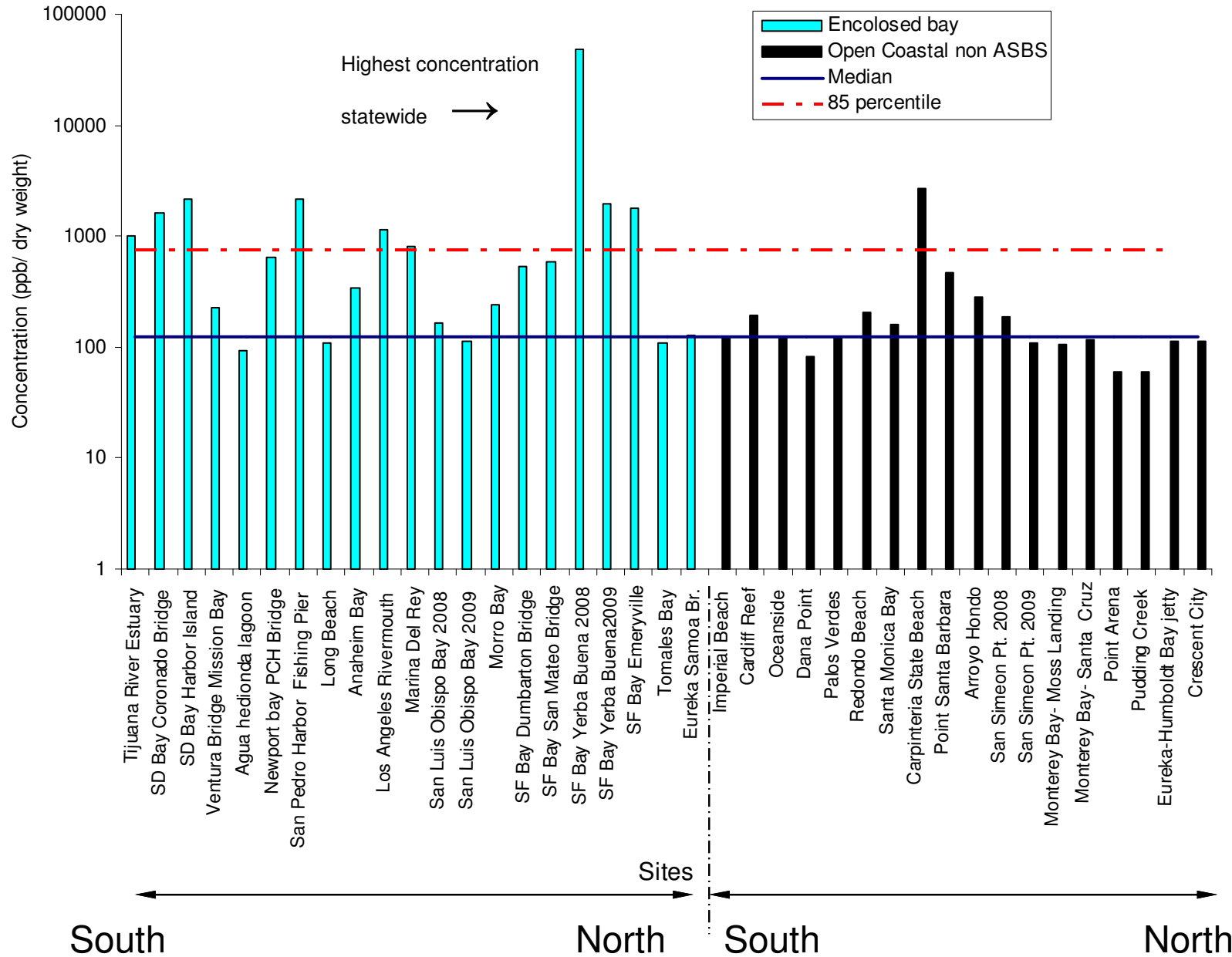
Total PAHs Trends (1986-2009)



PAH Status (2007-2009 samples, in or adjacent to ASBS)



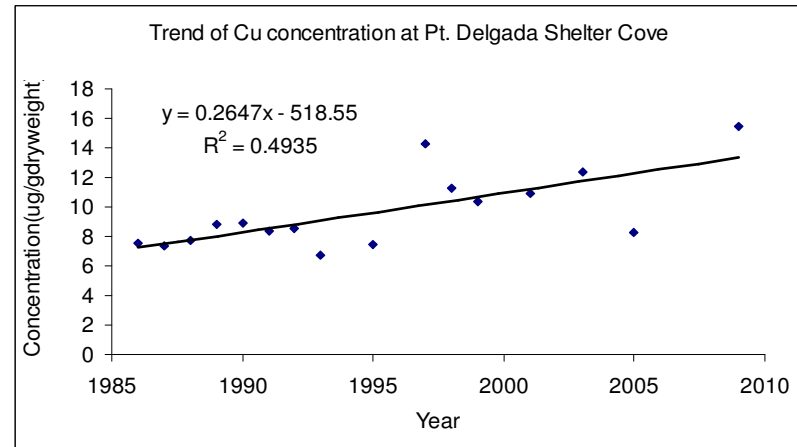
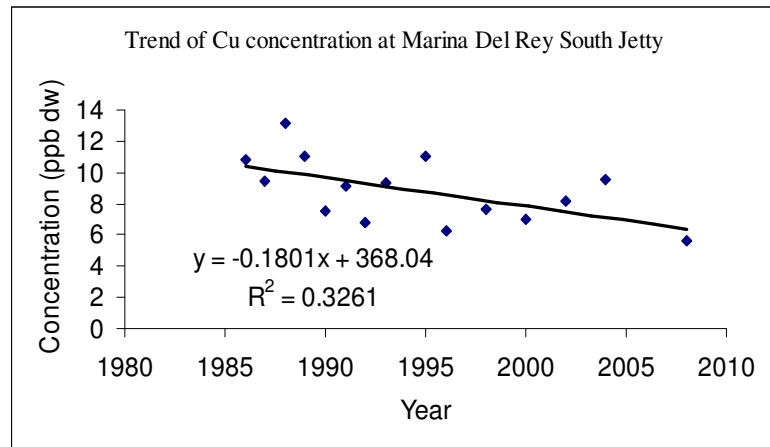
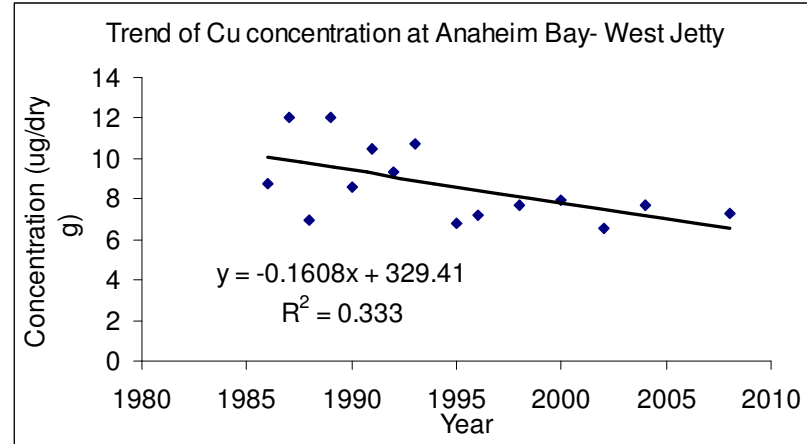
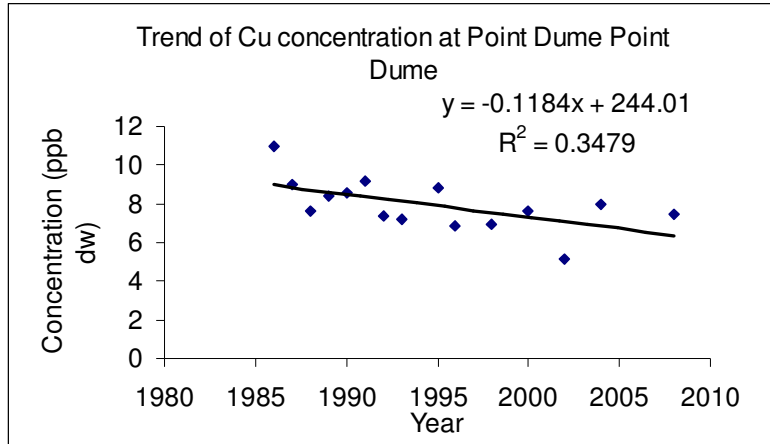
PAH Status (2007-2009 samples, open coast & enclosed bays)



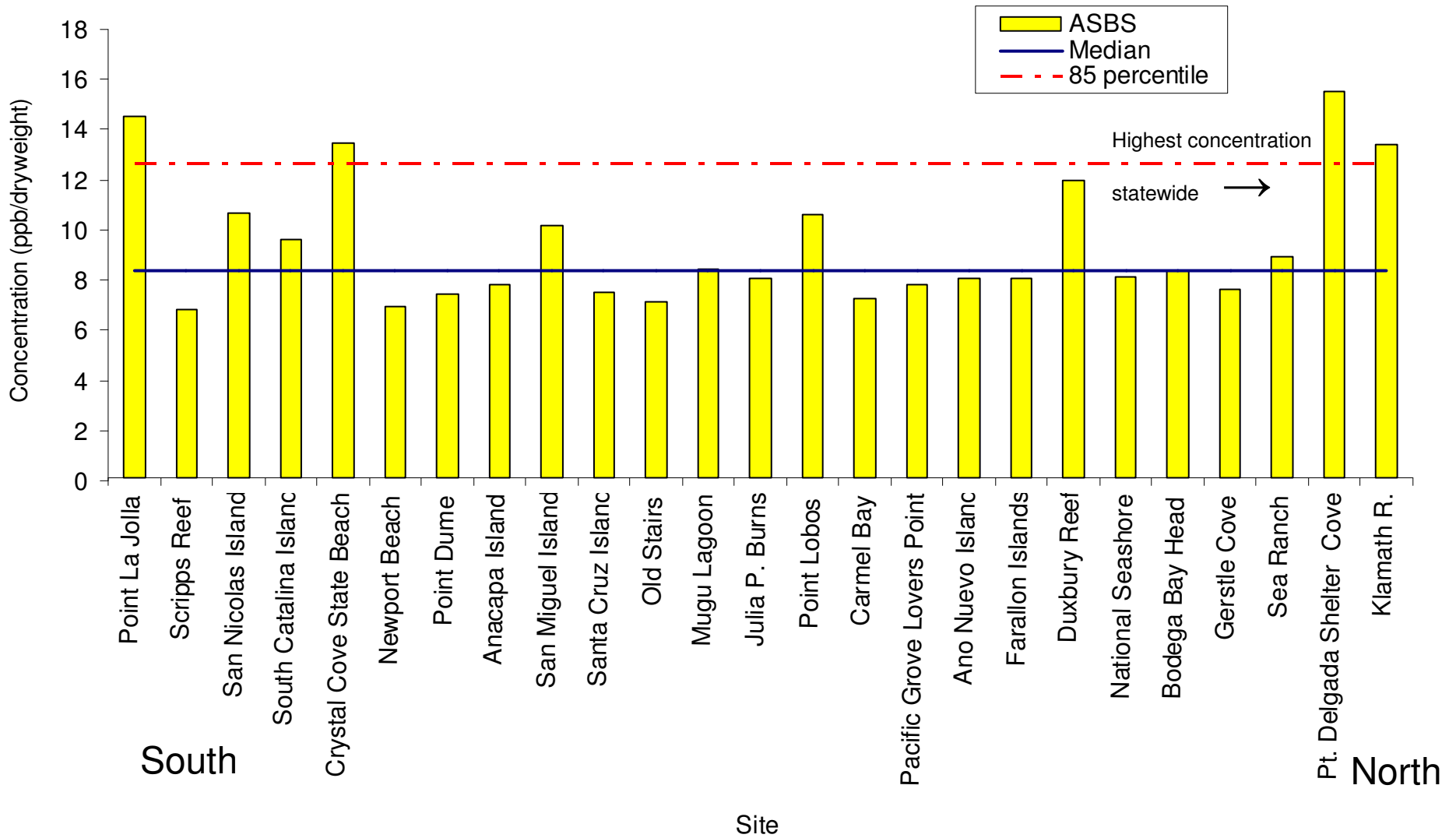
Copper Trend (1986-2009)

- Copper declined at most of the NOAA mussel watch stations; however only five stations exhibited significant declines:
 - Point Dume
 - Anaheim Bay
 - Marina Del Rey
 - San Diego Bay Coronado Bridge
 - Royal Palms.
- Two of these sites (Anaheim Bay and Royal Palms) were among those sites which initially had low concentrations.
- The largest statistically significant decline is at Coronado Bridge
 - Copper dropped from 35 ppm dw in 1992 to about 12 ppm dw in 2008.
- 3 sites with significant increasing trends (but low initial conc. < 10 ppm):
 - Shelter Cove
 - Point Arena
 - San Simeon Point

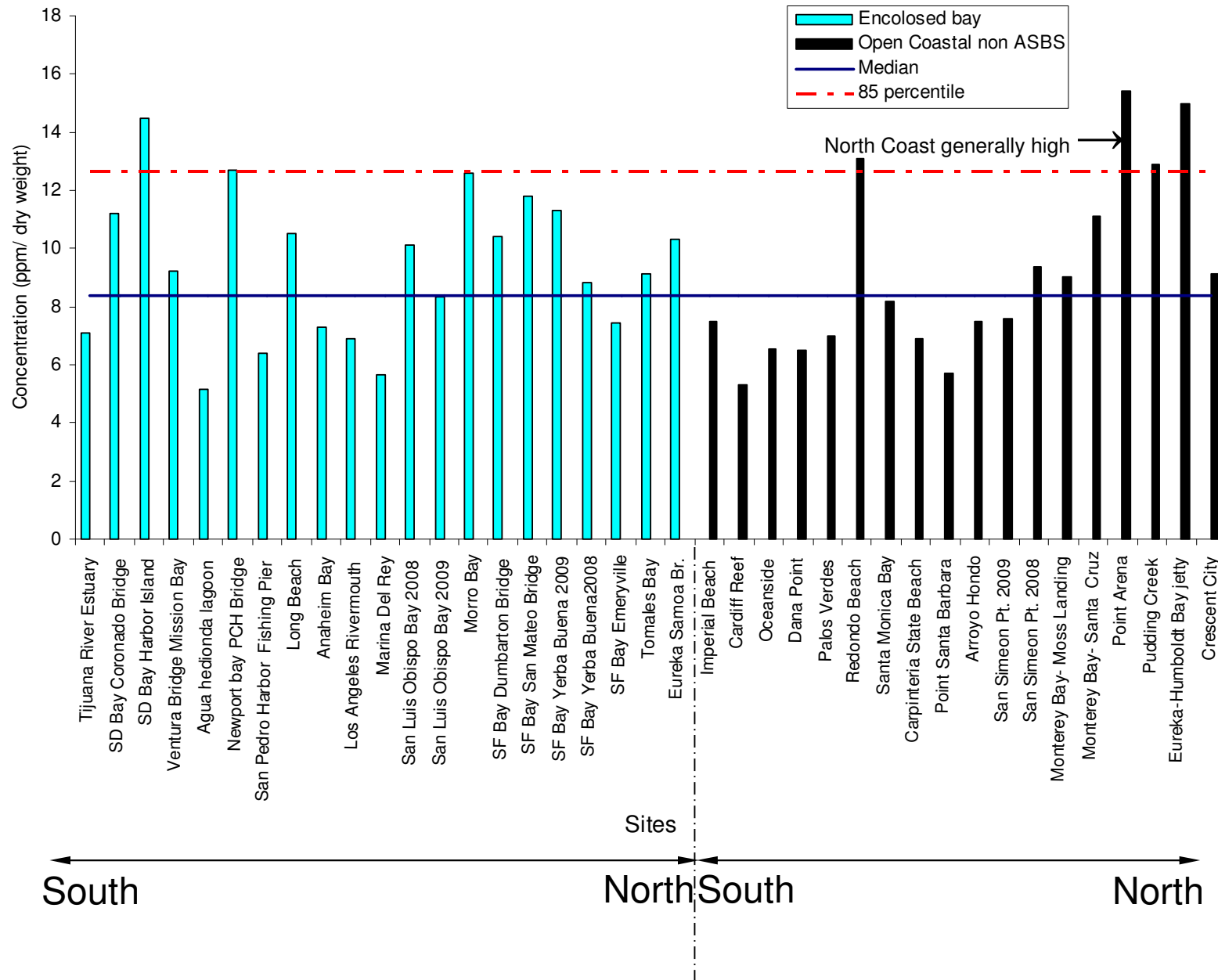
Copper Trend (1986-2009)



Copper Status (2007-2009 samples, in or adjacent to ASBS)



Copper Status (2007-2009 samples, open coast & enclosed bays)



Conclusions

- DDT, PCB, and Butyltins are generally decreasing in mussel tissue
- Total PAHs are generally increasing in mussel tissue
 - Highest recent concentrations in SF Bay after oil spill
 - But some sites in San Diego and San Francisco show decreases
- Copper concentrations declined at most stations, but there were increasing concentrations at certain sites on the central and north coast
 - Highest recent concentrations at sites in San Diego, Redondo and on the North Coast
- Most ASBS have lower concentrations of contaminants in mussel tissue than non-protected open coastal and enclosed bay sites
 - Exceptions
 - Mugu Lagoon (DDT, PCB)
 - Shelter Cove (Cu)
- Most open coastal sites have lower concentrations of contaminants in mussel tissue than enclosed bay sites