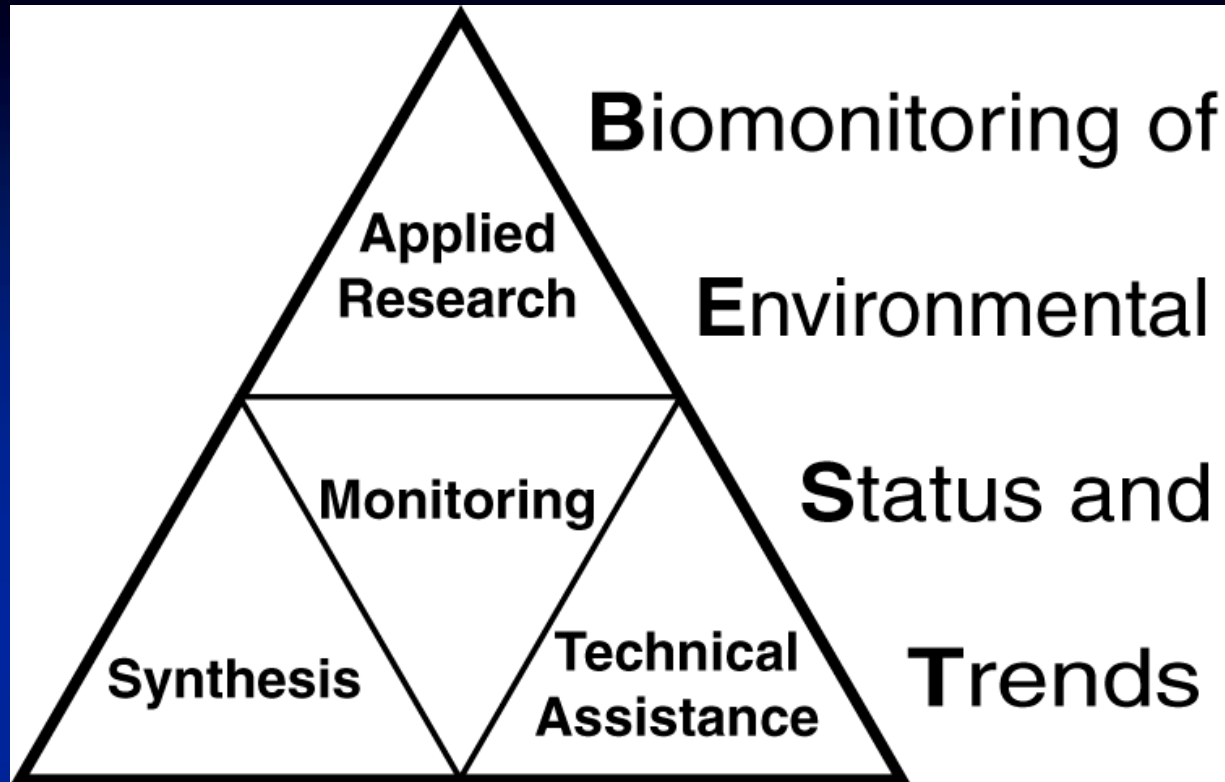


# **Contaminant Exposure and Effects--Terrestrial Vertebrates Database: Trends and Data Gaps for Chesapeake Bay Wildlife**



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**The BEST program seeks to monitor, identify, and understand the effects of environmental contaminants on the Nation's biological resources, particularly those under DOI stewardship.**

# Retrospective Monitoring

- Predictive information obtained through review of existing temporal, geographic and phylogenetic ecotoxicological data
- Passive but labor intensive activity
- Emphasis on lands and species under DOI stewardship

# Contaminant Exposure and Effects—Terrestrial Vertebrates (CEE-TV) Database



# Data Compilation

**Who:** Amphibians, Reptiles, Birds and Mammals

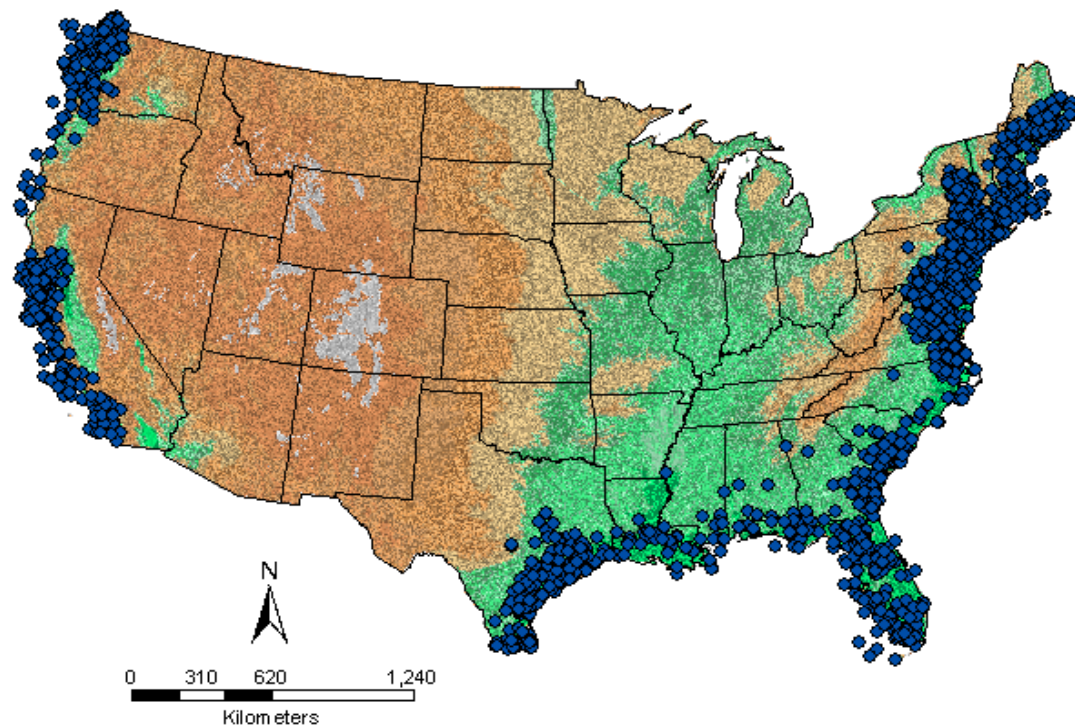
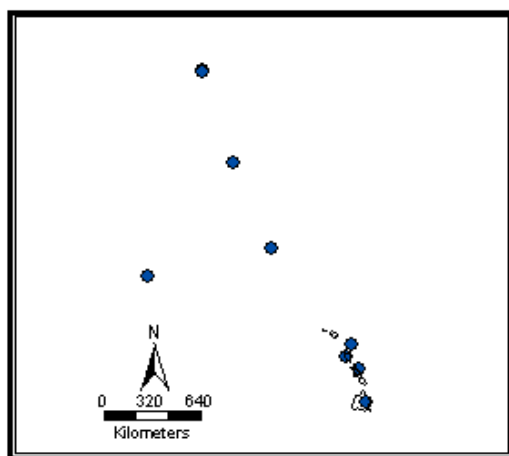
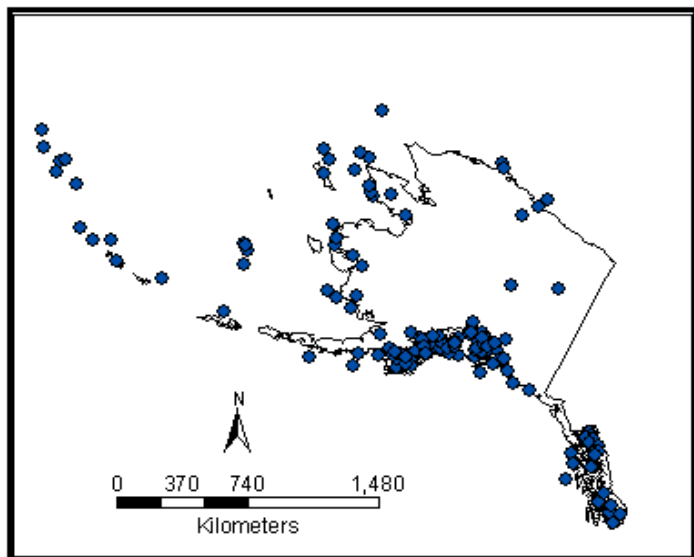
**What:** Contaminant Exposure and Effects Data

**When:** 1938 to present

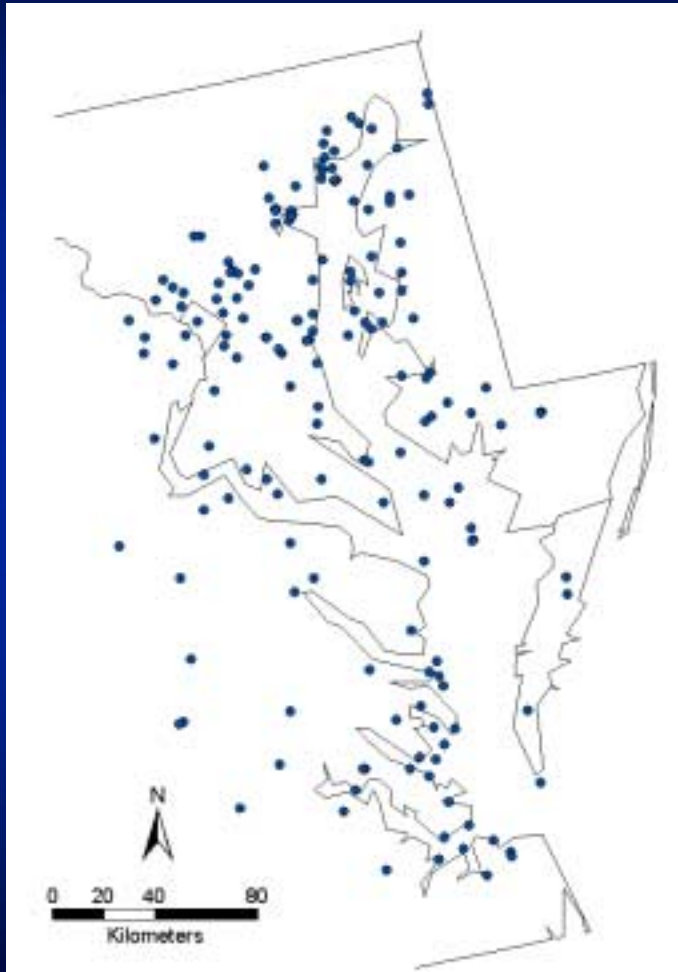
**Where:** Atlantic, Gulf, and Pacific Coasts,  
Alaska and Hawaii  
Great Lakes: coming soon

**How:** Computerized Literature Searches  
“Gray” Literature  
Written and Telephone Inquiries  
Electronic Database Searches

# Plot of CEE-TV Records



# Chesapeake Bay CEE-TV Records



**Total number of records: 621**

**Individuals per record: 1 to 767**

**Total individuals: ~8000**

**Total number of species : 71**

**15% Mammals**

**73% Birds**

**8% Reptiles**

**3% Amphibians**

**Sample matrices studied: 17**

# Temporal Trends

## Distribution of Records among Decade

<u>Decade</u>	<u>Number of Records</u>
1960's	21
1970's	222
1980's	104
1990's	220
2000-present	27



# Contaminant Trends in Chesapeake Bay Records

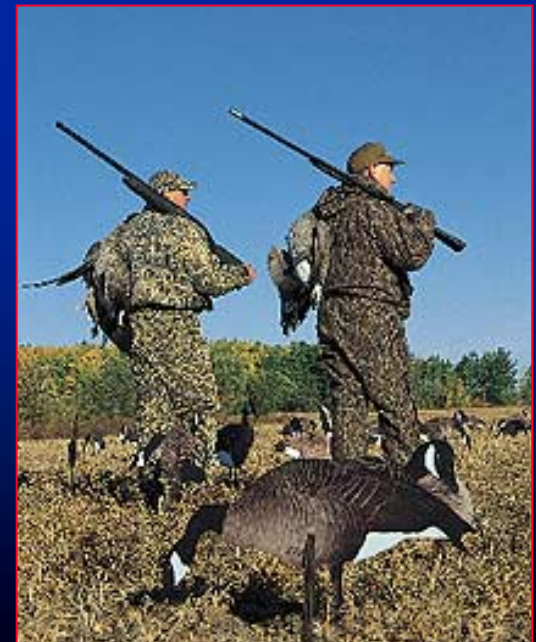
DDE, DDD and DDT	42% records
Ah-receptor active PCB Congeners	1% records
Dioxins/ Dibenzofurans	0 records
Hg	25% records
Pb	44% records
Biomarker/bioindicator responses	15% records

<b>Toxic Substances Control Act</b>	<b>75,500</b>
<b>Food Quality Protection Act</b>	
<b>Pesticides</b>	<b>900</b>
<b>Inert ingredients</b>	<b>2,500</b>
<b>Foods and Drug Act</b>	<b>8,000</b>
<b>Totals cmpds/subs in commerce</b>	<b><u>86,900</u></b>

**< 0.1% (76 of 86,900) are “found” in CEE-TV records in the Chesapeake Bay**

# Lead

- 108 records documenting lead exposure
- 27 records (480 individuals) of waterfowl with lead levels indicative of subclinical or clinical poisoning
- Since the ban of lead shot, only 13 records (42 individuals)
  - mostly mute swans and geese
  - some info on dabbling ducks
  - no data for diving ducks
  - 5 records indicating lead poisoning
  - No data on lead shot ingestion



# Mercury

- **37 records (1973-2001) in eggs of fish-eating birds**
  - **None above the threshold for adverse effects**
- **49 records (1971-2001) in liver and kidney of reptiles, birds, and mammals**
  - **Highest values are 1.3 and 8.8 ug/g, well below the 20-30 ug/g threshold for adverse effects**



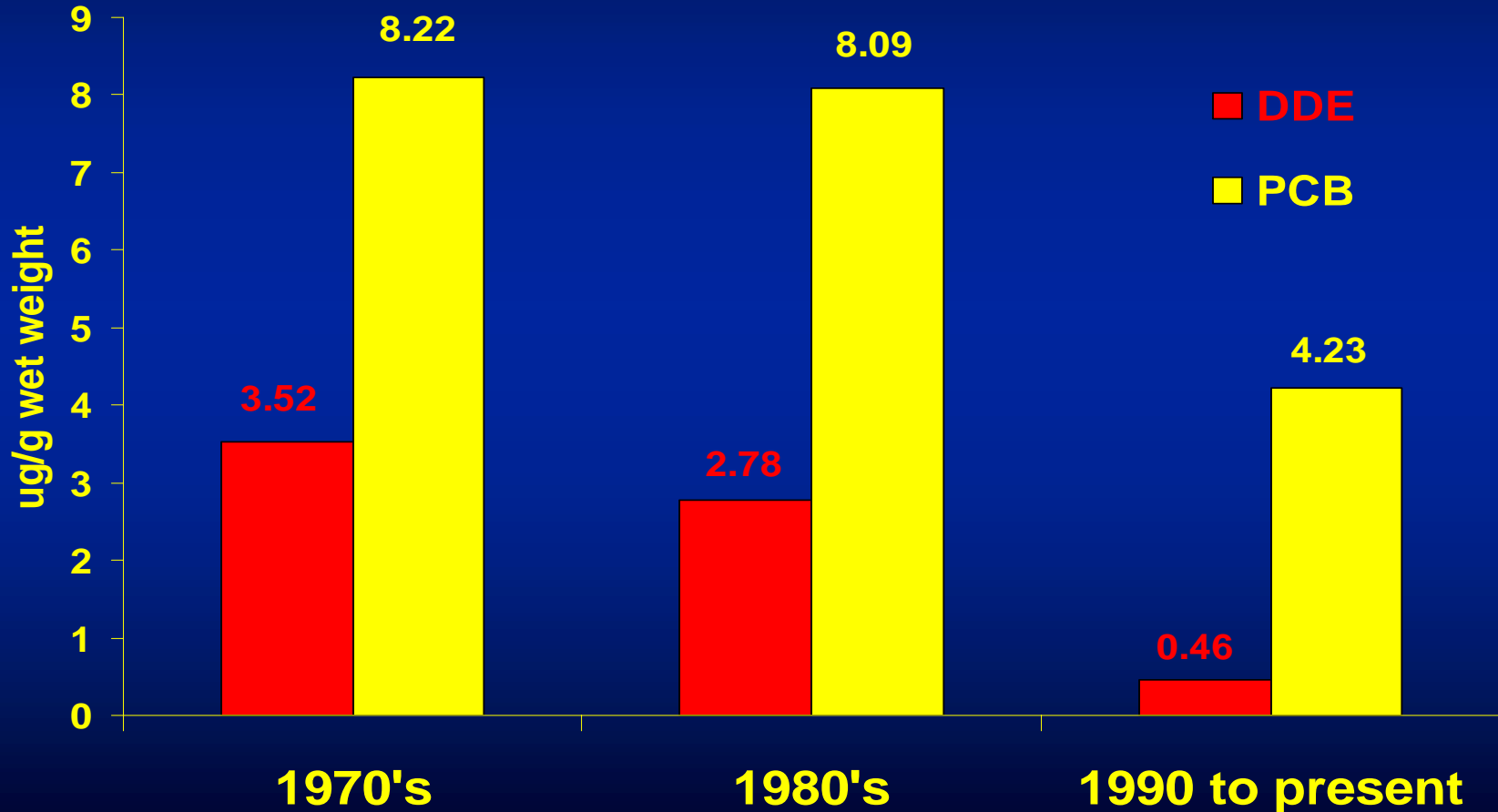
# Selenium

- Of 45 records (1973-1998), 11 above the threshold in which toxicity may occur (10 ug/g liver)
  - All were wintering waterfowl

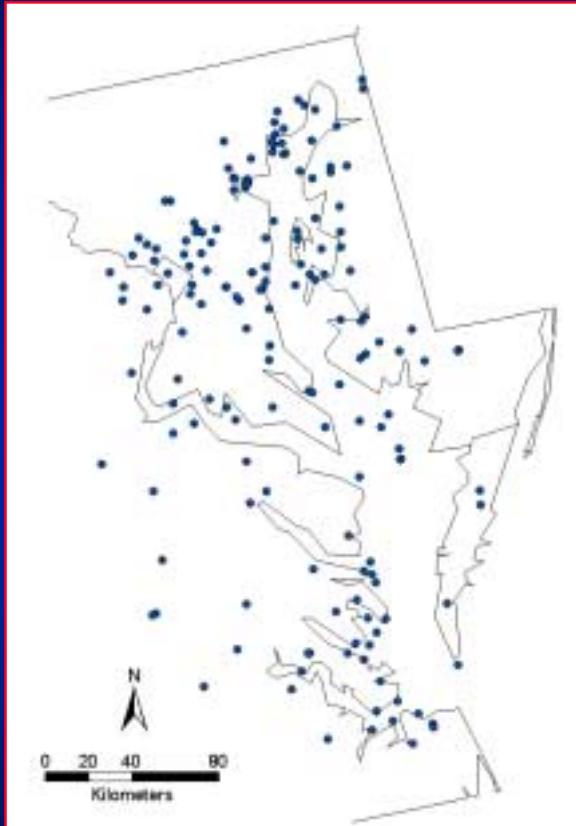
# Cadmium

- Of 168 records (1972-1995) of reptiles, birds, and mammals, none approached levels associated with toxicity

# DDE and PCB in Eggs of Fish-Eating Birds in the Chesapeake Bay



# Other Contaminants



- Only 1 record on rodenticide exposure
- 21 records on OPs/carbamates,
  - only 1 record since since 1993
- No data on dioxins or dibenzofurans

# Chesapeake Bay “Regions of Concern”

**Baltimore Harbor**

**Anacostia River**

**Elizabeth River**

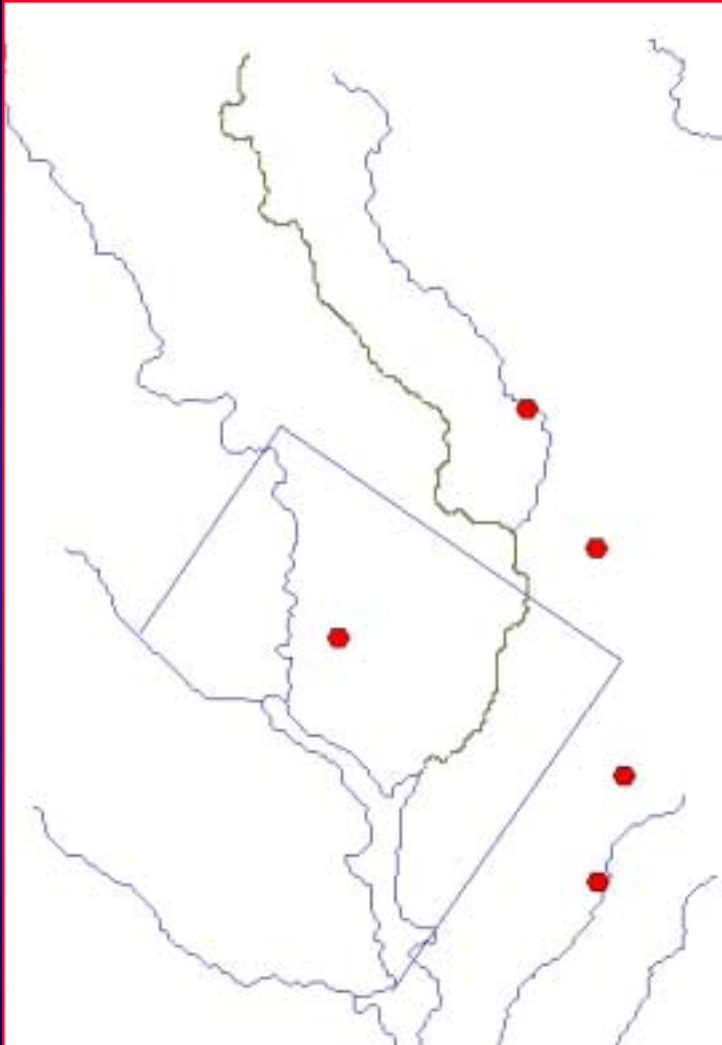






## Baltimore Harbor

- Excessive levels of As, Cr, Pb, Zn, PCBs, and PAHs
- 32 records representing over 300 individuals through 1998
  - PCBs in eggs 3-10 ug/g
  - No data on PAHs
  - Lack of recent Pb data
  - Some data on As, Cr, Zn



## Anacostia River

- Excessive levels of Pb, Zn, chlordane, PCBs and PAHs
- No data points on the river

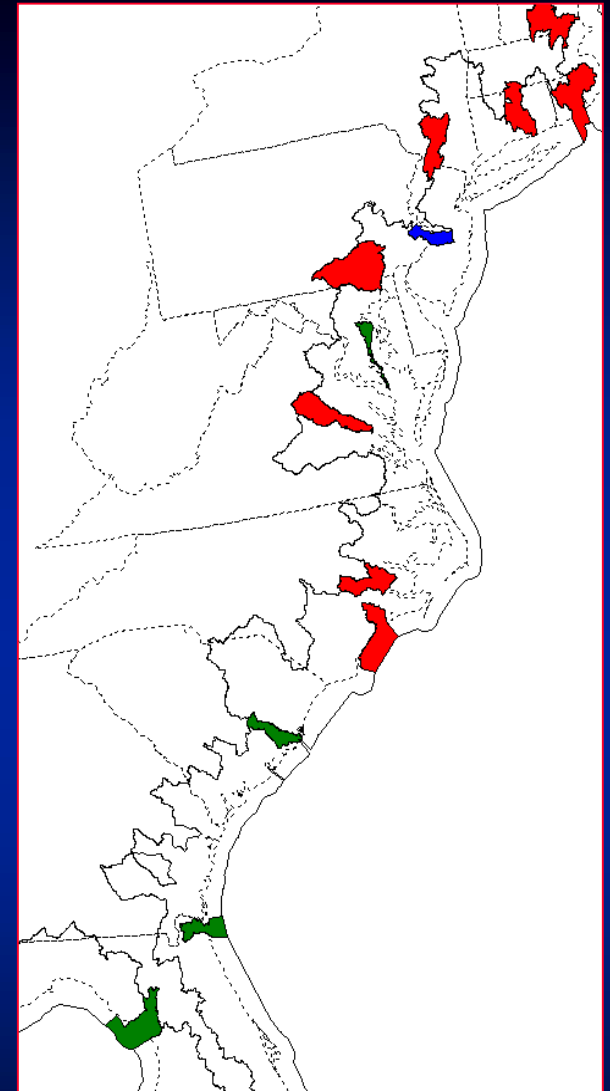


## **Elizabeth River**

- **Excessive levels of Pb, Zn, PCBs, and PAHs**
- **5 records**
  - **Detectable levels of PAHs in 63% muskrats**
  - **No data since 1989**
  - **No data on organochlorine pesticides, PCBs or dioxins**

## 5 NPs in watersheds of potential concern with no terrestrial vertebrate data

Greenbelt Park	(Potomac River)
Nat'l Capital Parks East	(Potomac River)
Manassas NBP	(Potomac River)
Green Springs NHL	(York River)
Richmond NBP	(James River)



### Index of Watershed Indicator Rating

- High Vulnerability
- Water Quality Problems
- Both

# 7 NWRs in watersheds of potential concern with no terrestrial vertebrate data

Susquehanna (Patapsco/Gunpowder Rivers)

Martin (Choptank River)

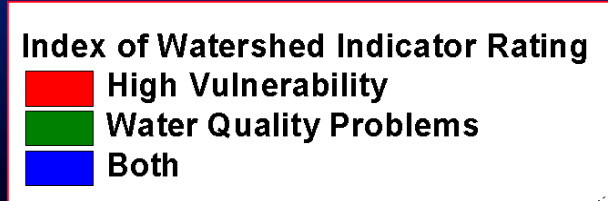
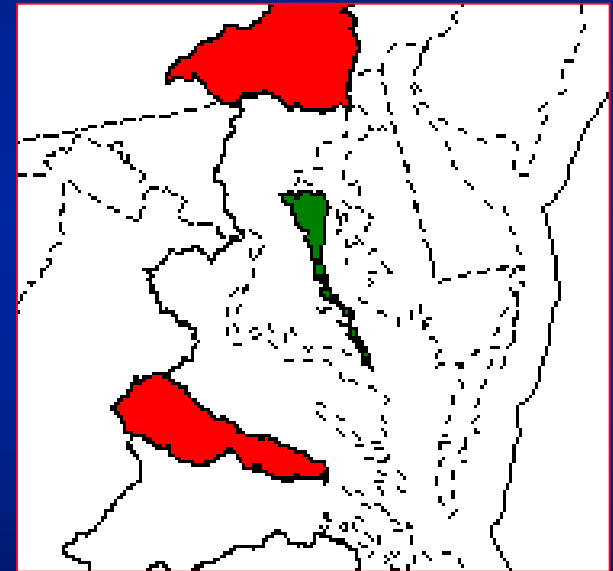
Marumsco (Potomac River)

Featherstone (Potomac River)

Presquile (James River)

James River (James River)

Nansemond (James River)



# Conclusions: The Good News

- Compared to other estuaries, large amount of data
- Mercury levels below toxic thresholds

# **Conclusions:**

## **Data Gaps (The Bad News)**

- **Data on <0.1% of chemicals in commerce**
- **No dioxin or dibenzofuran data**
- **Very little PCB data in wild mammals**
- **Little data on amphibians and reptiles**
- **Little data following ban of Pb shot**
- **Several DOI trust properties lack data**
- **Limited data on emerging contaminants**