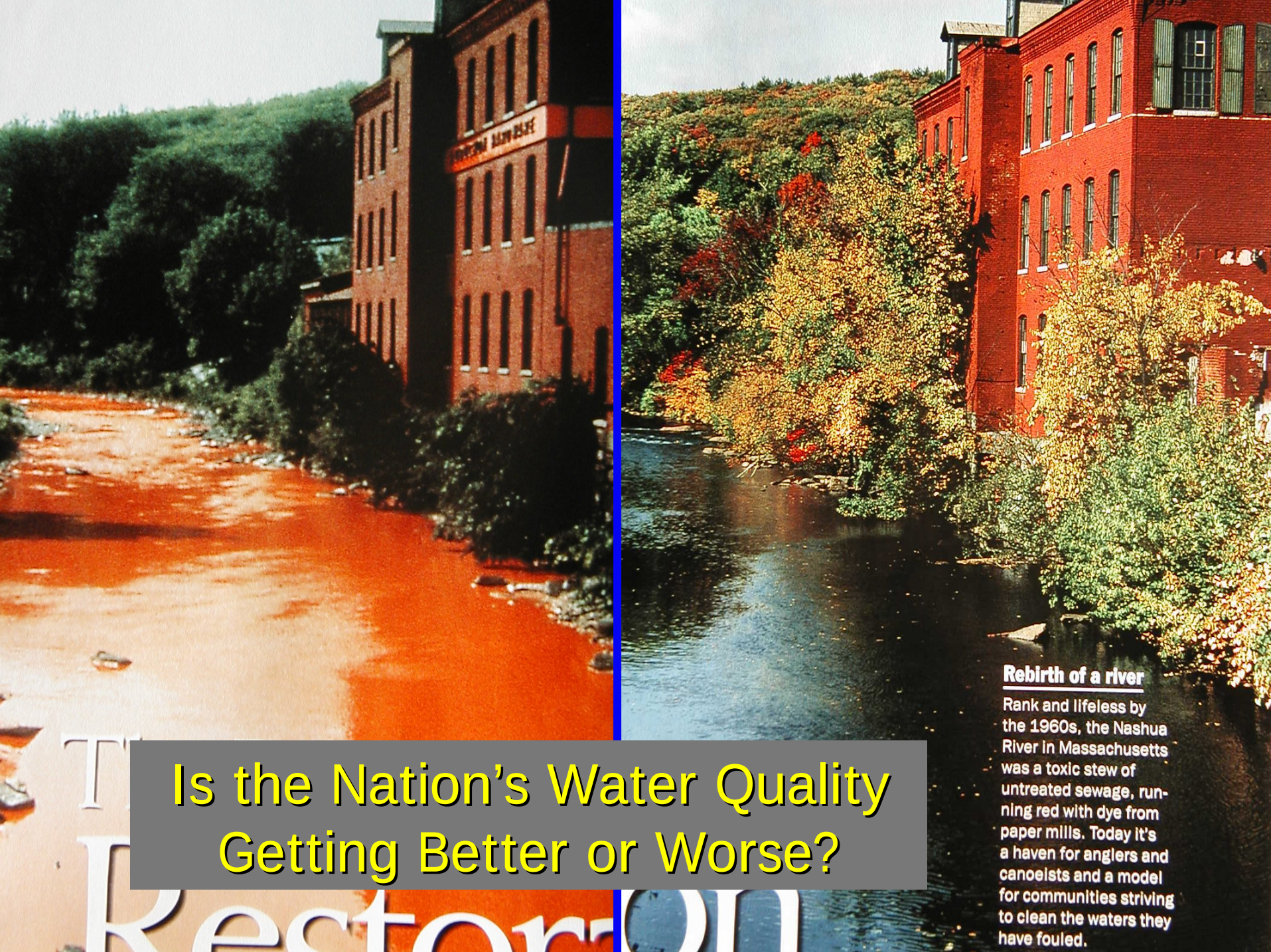
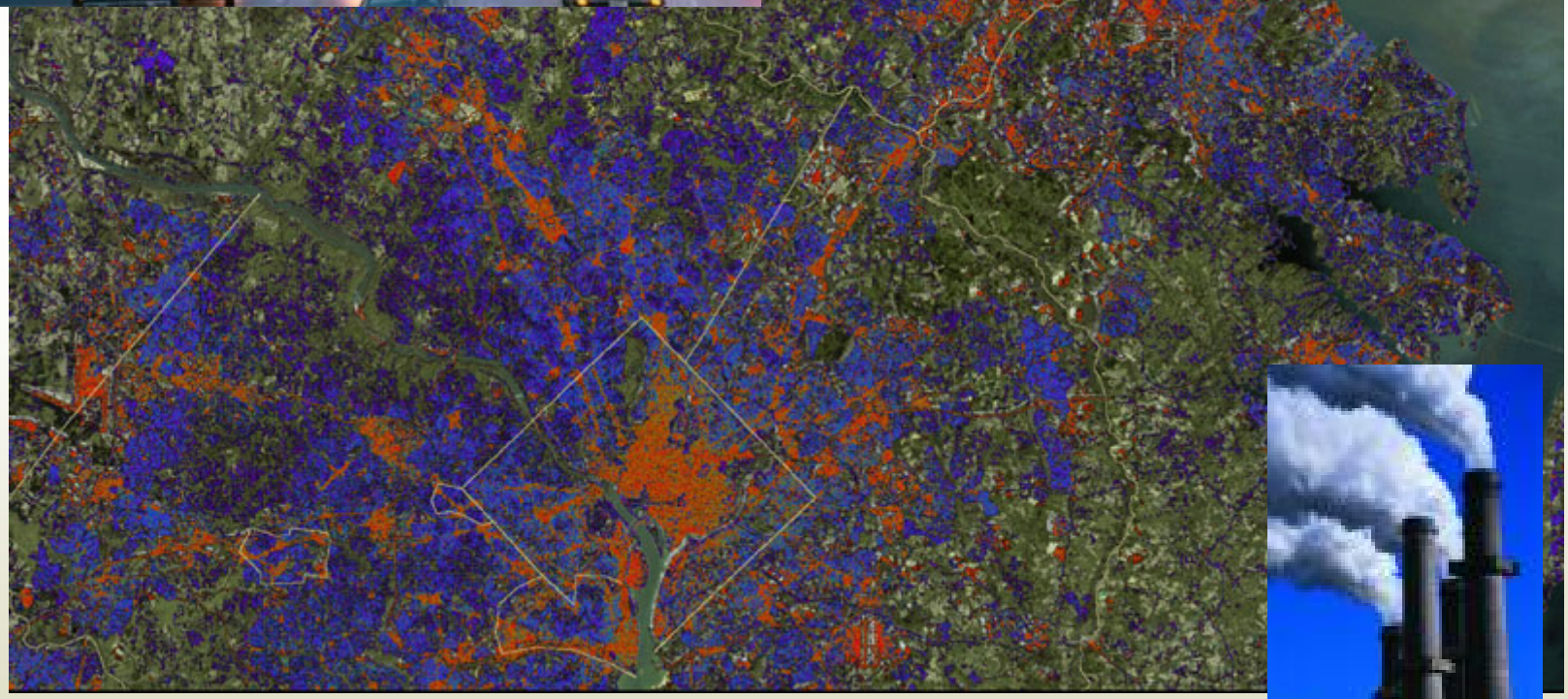
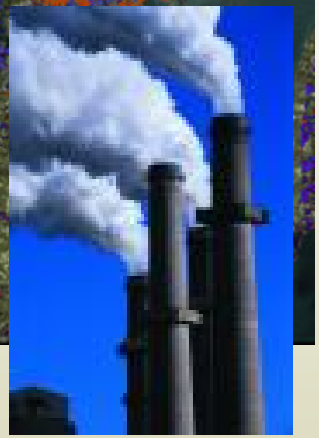
Contaminant Trends in Urban and Reference Lake Sediments Across the United States, 1970 to 2001

USGS
science for a changing world



Is the Nation's Water Quality Getting Better or Worse?





Washington-Baltimore urban sprawl

Contaminants in Streams

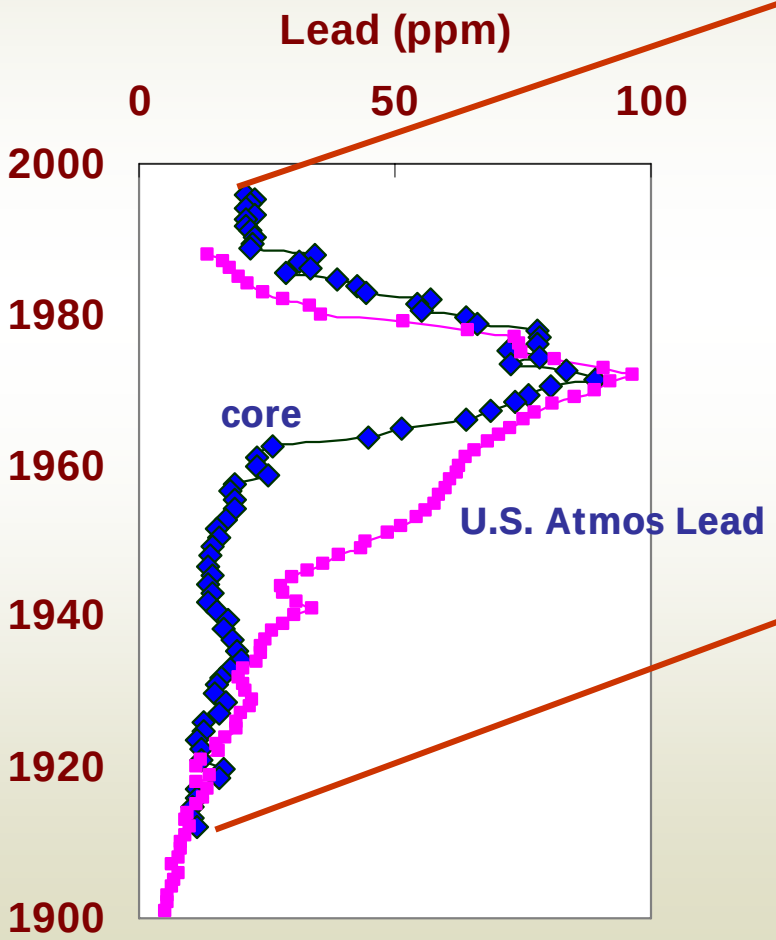
Soluble

- **PESTICIDES**
  - Atrazine
  - Diazinon
  - 2,4-D
- **SOLVENTS**
  - TCE
  - DCE
- **FUELS**
  - Benzene
  - Toluene
  - Xylene
- **NUTRIENTS**
  - Nitrate
  - Phosphorous

Insoluble

- **METALS**
  - Cadmium
  - Mercury
  - Lead
- **PESTICIDES**
  - DDT
  - Chlordane
  - Dieldrin
- **PCBs**
- **PAHs**
  - Fluoranthene
  - Pyrene
  - Benzo(a)pyrene
- **OTHER…**

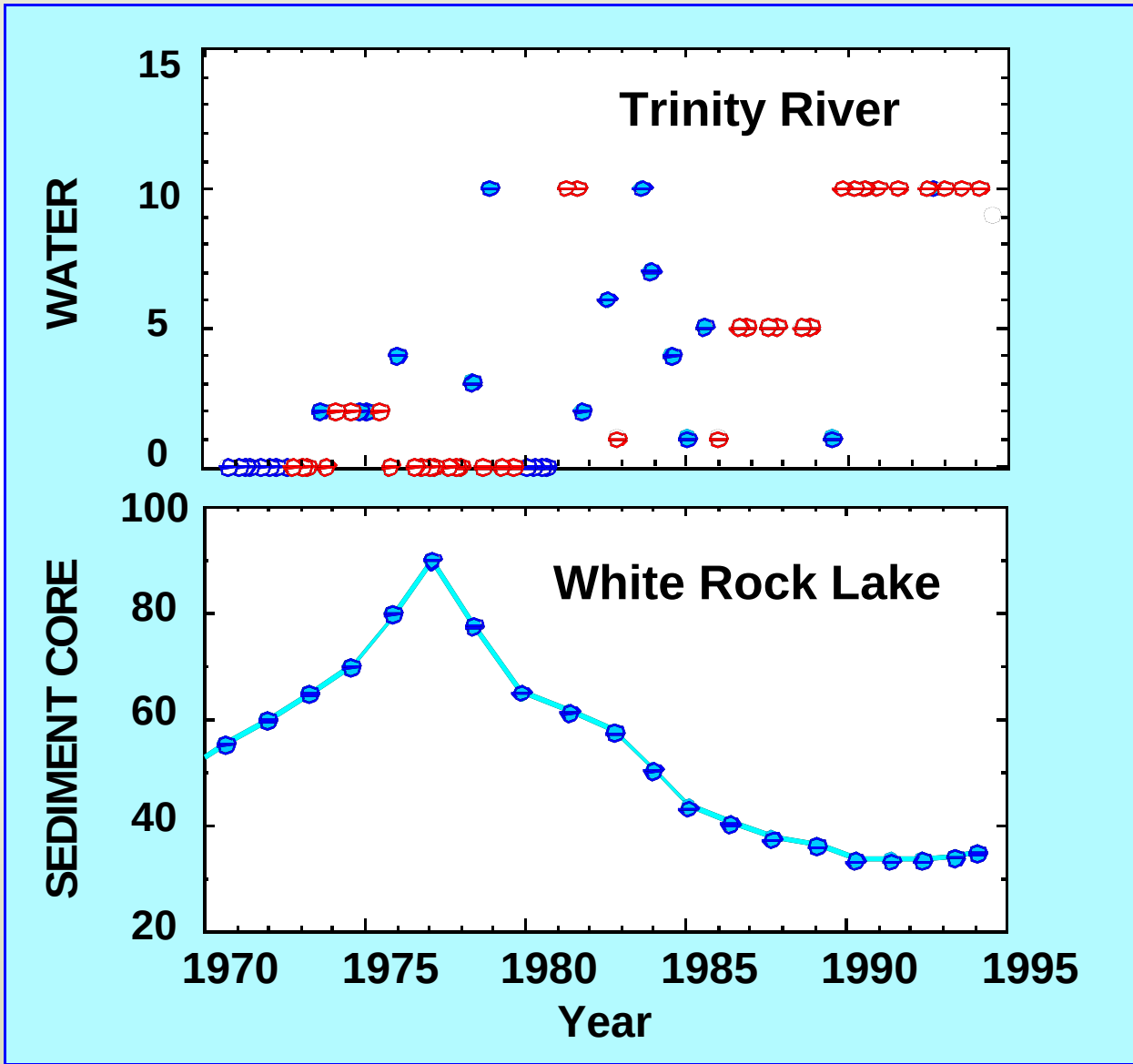
If it's hydrophobic and persistent…



We can see trends in sediment cores

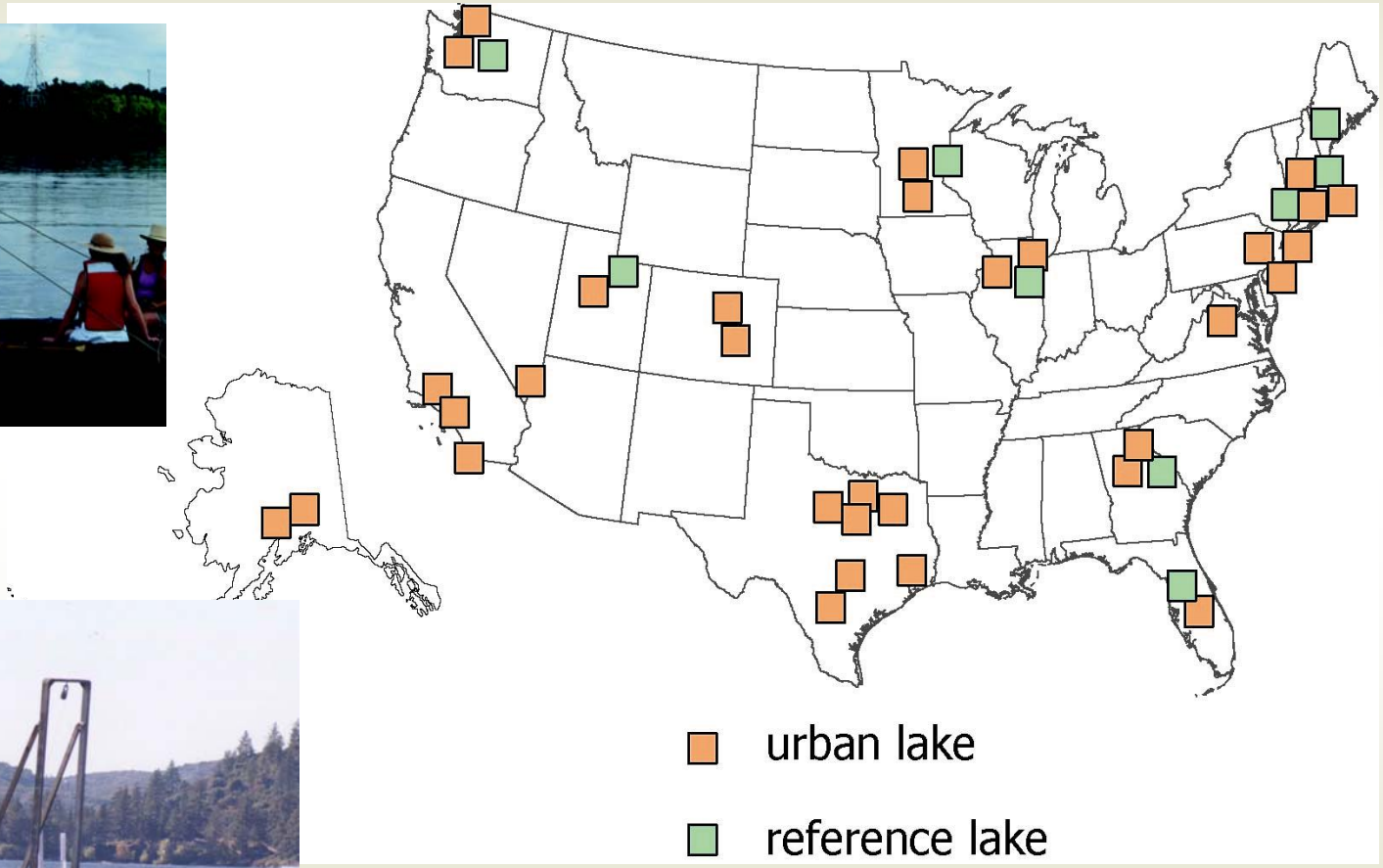
Why not use historical water-quality data?

Lead in the Trinity River Basin, Texas



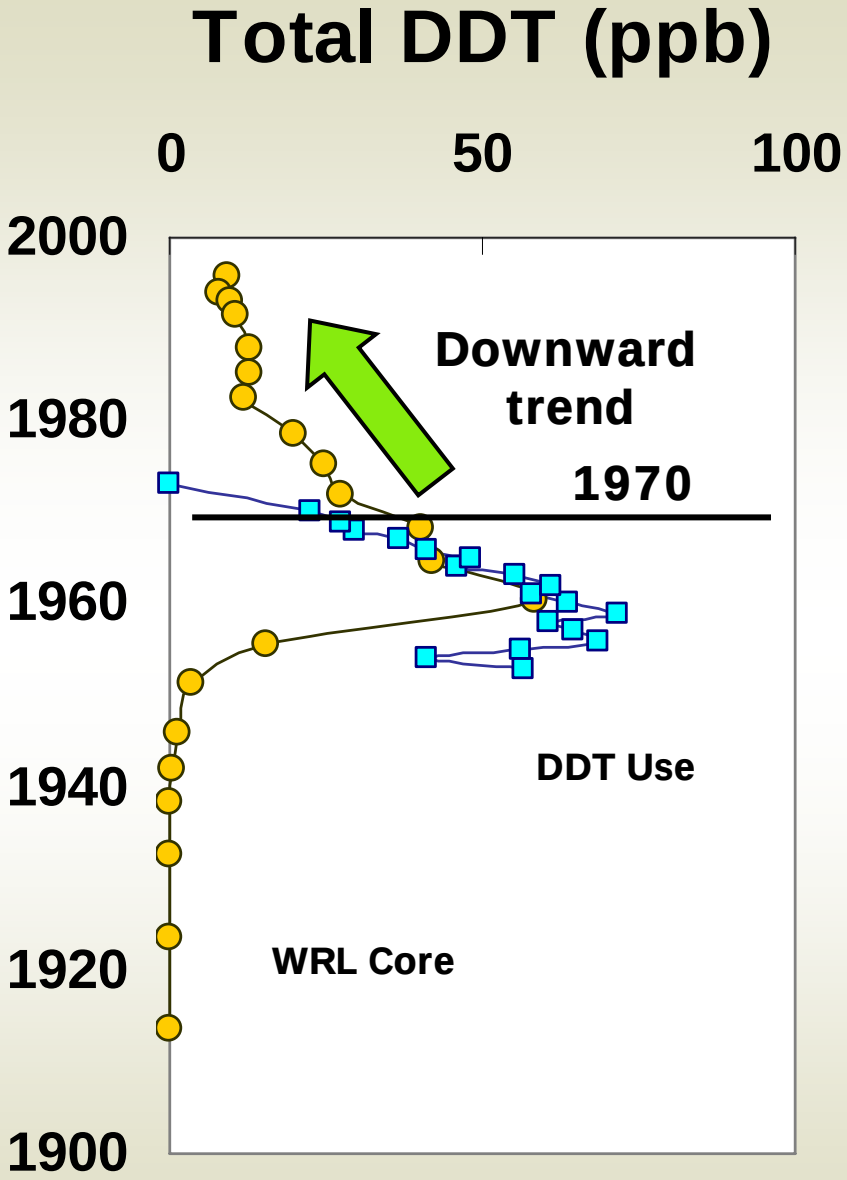
Lakes Sampled from 1996-2001

33 urban lakes, 9 reference lakes

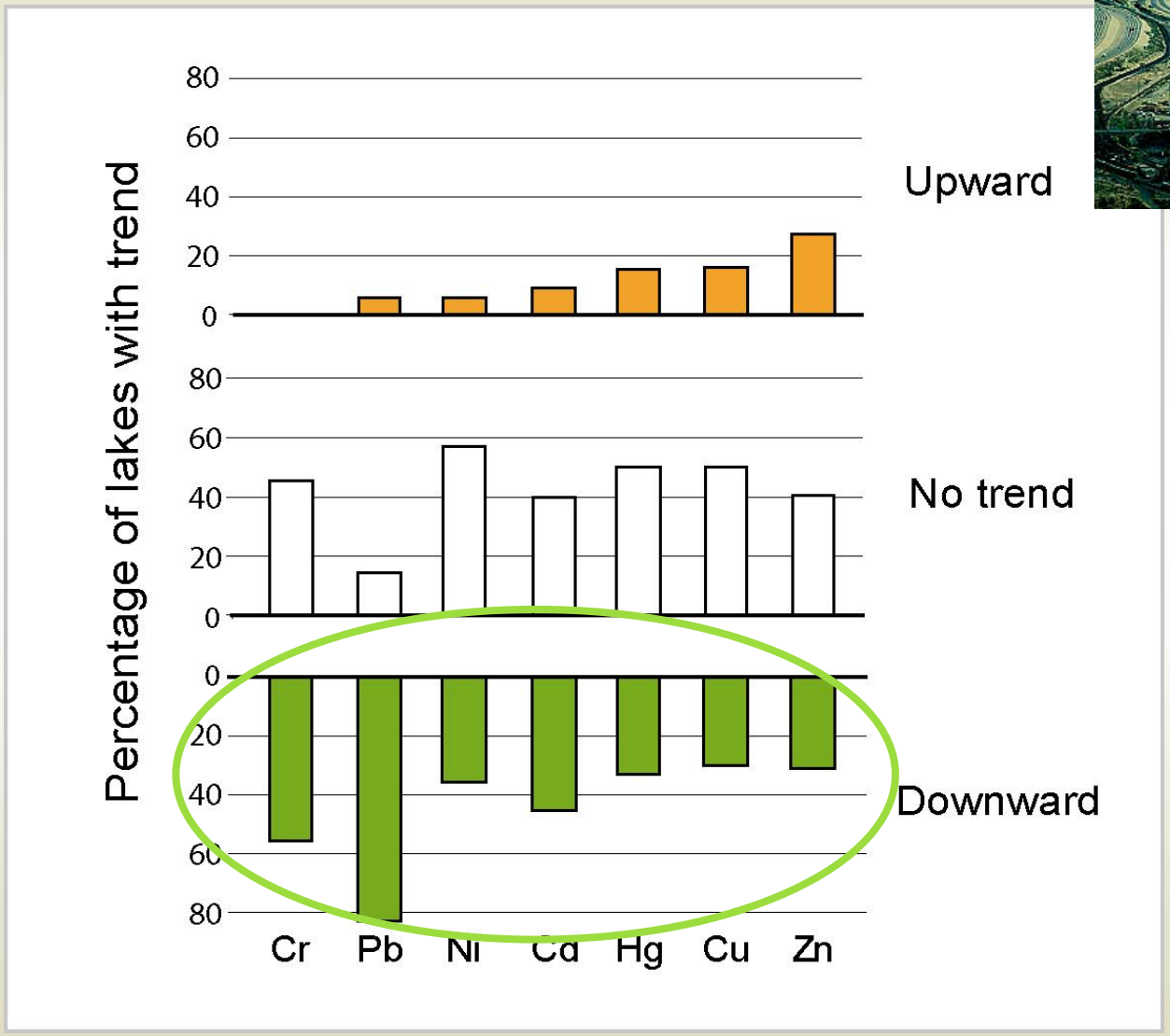


Organics – Van Metre and Mahler, ES&T, 2005
Metals – Mahler et al., ET&C, in press

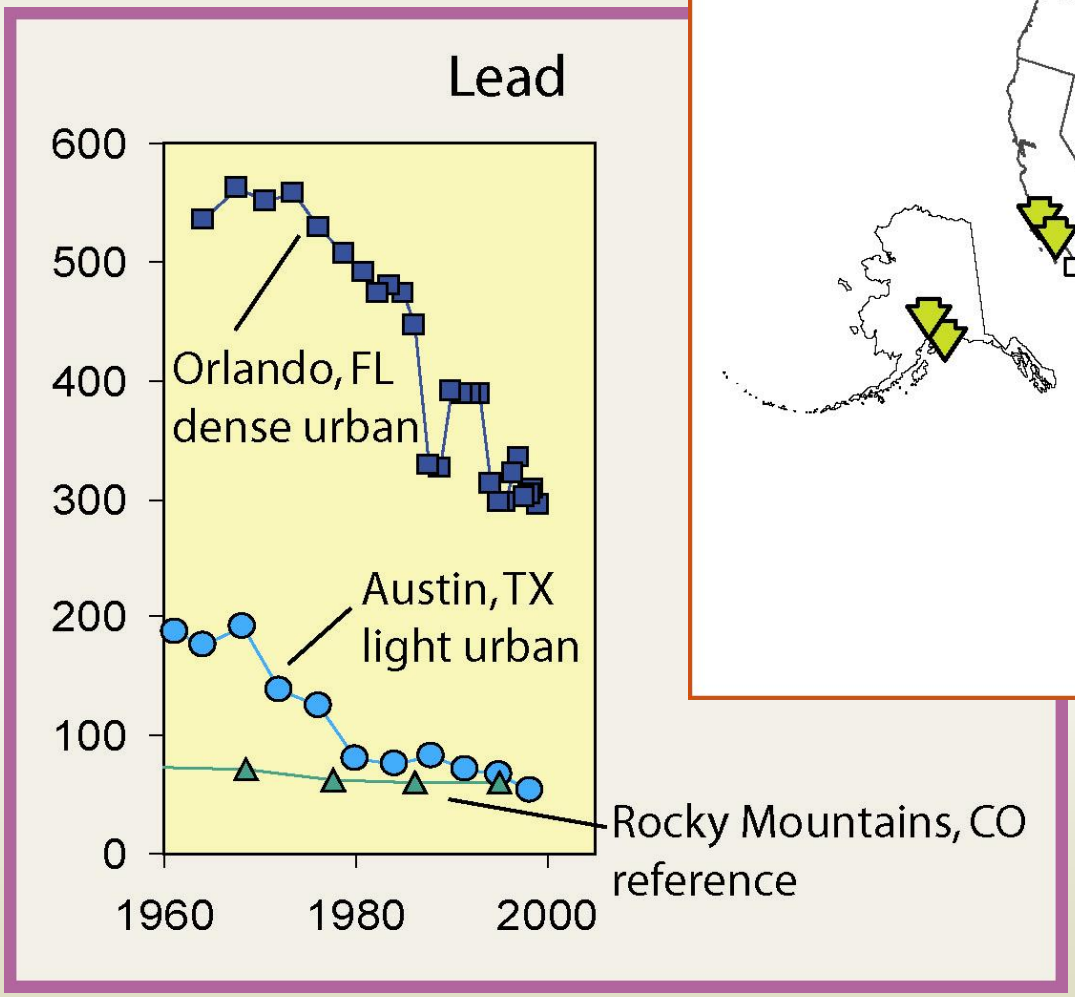
Testing Trends

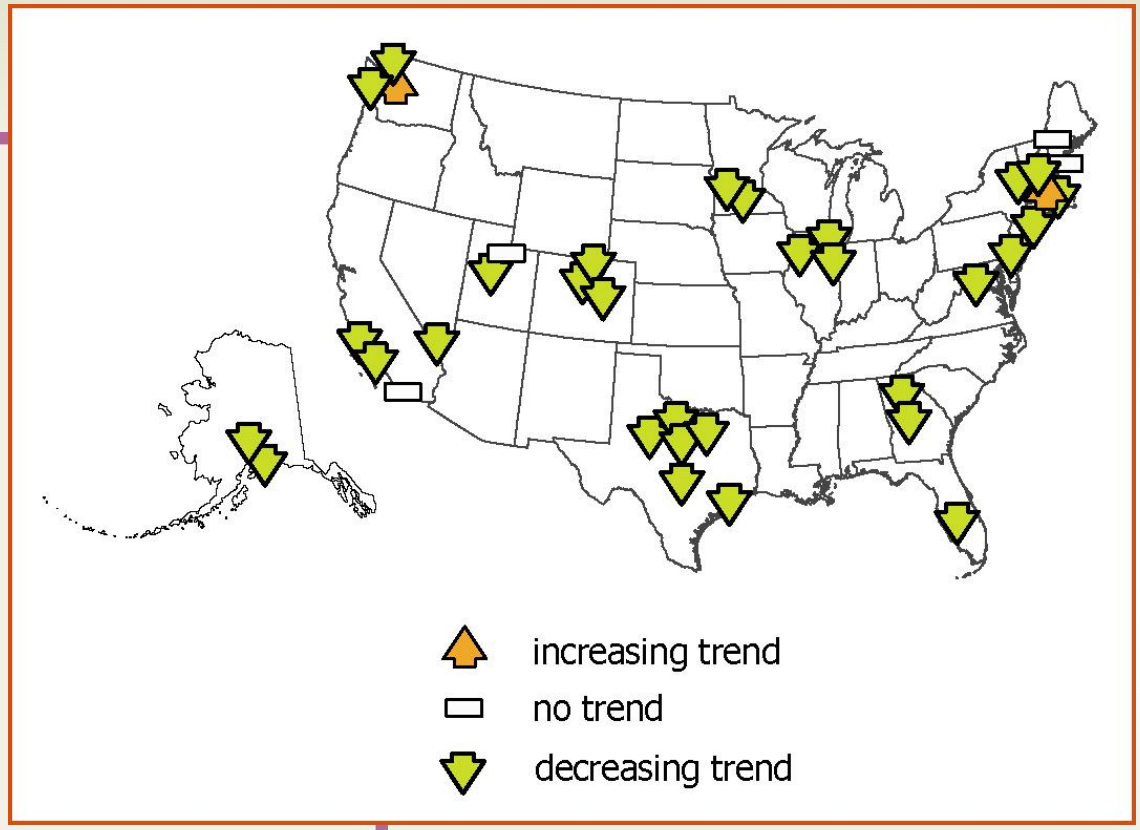


Metals trends

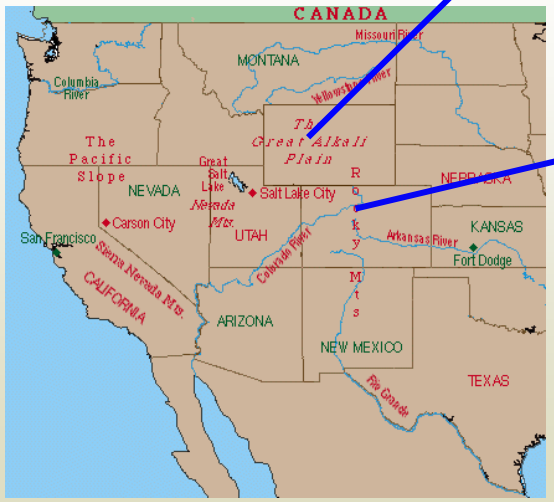


Lead

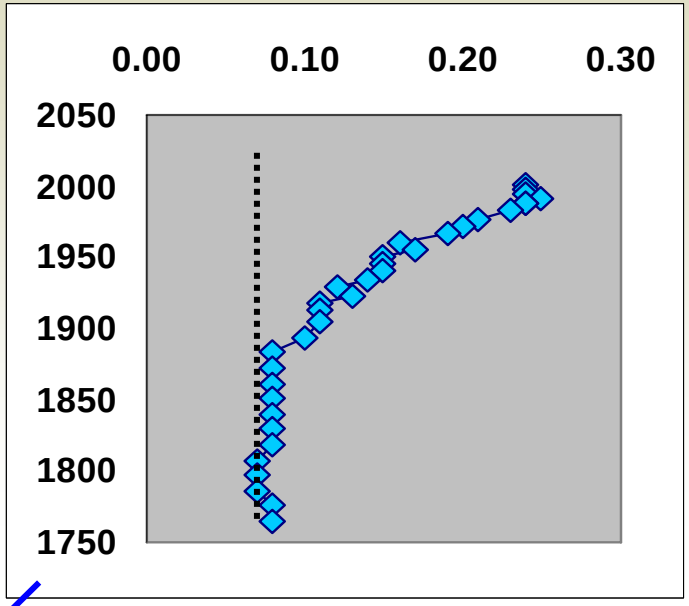

Lead
600
500
400
300
200
100
0
1960
1980
2000
Orlando, FL
dense urban
Austin, TX
light urban
Rocky Mountains, CO
reference


increasing trend
no trend
decreasing trend

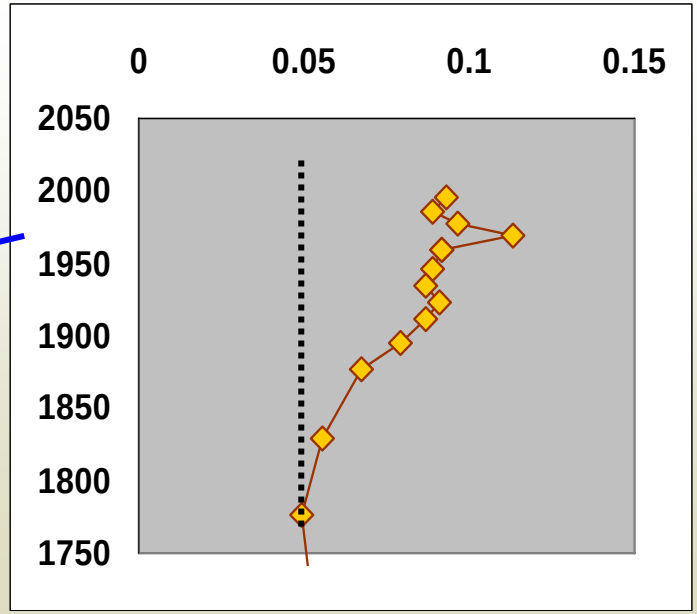
Mercury



Hobbs Lk, Wind Rivers, WY

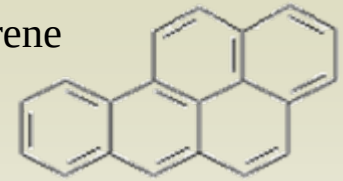


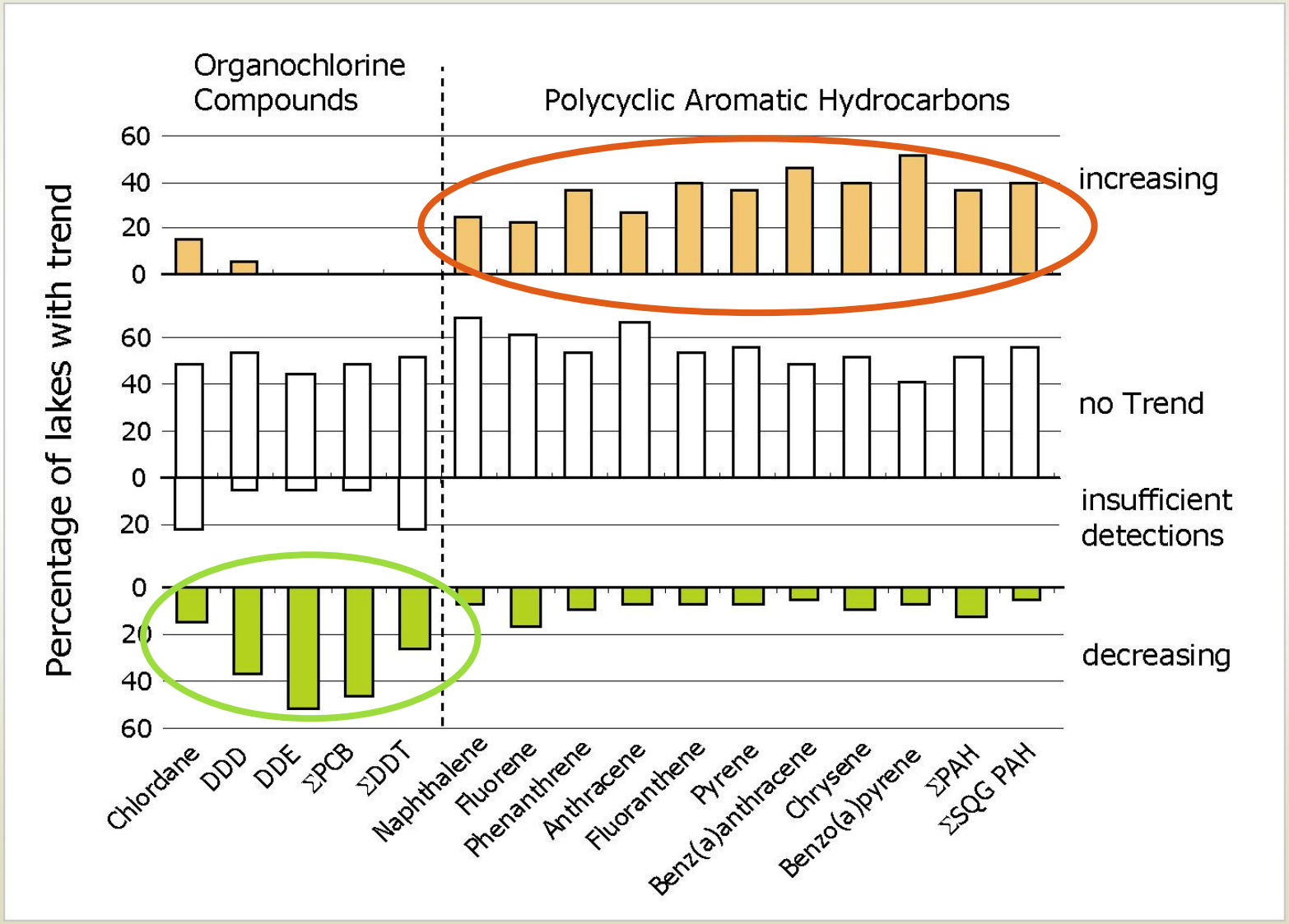
Lk Elbert, Zirkels, CO



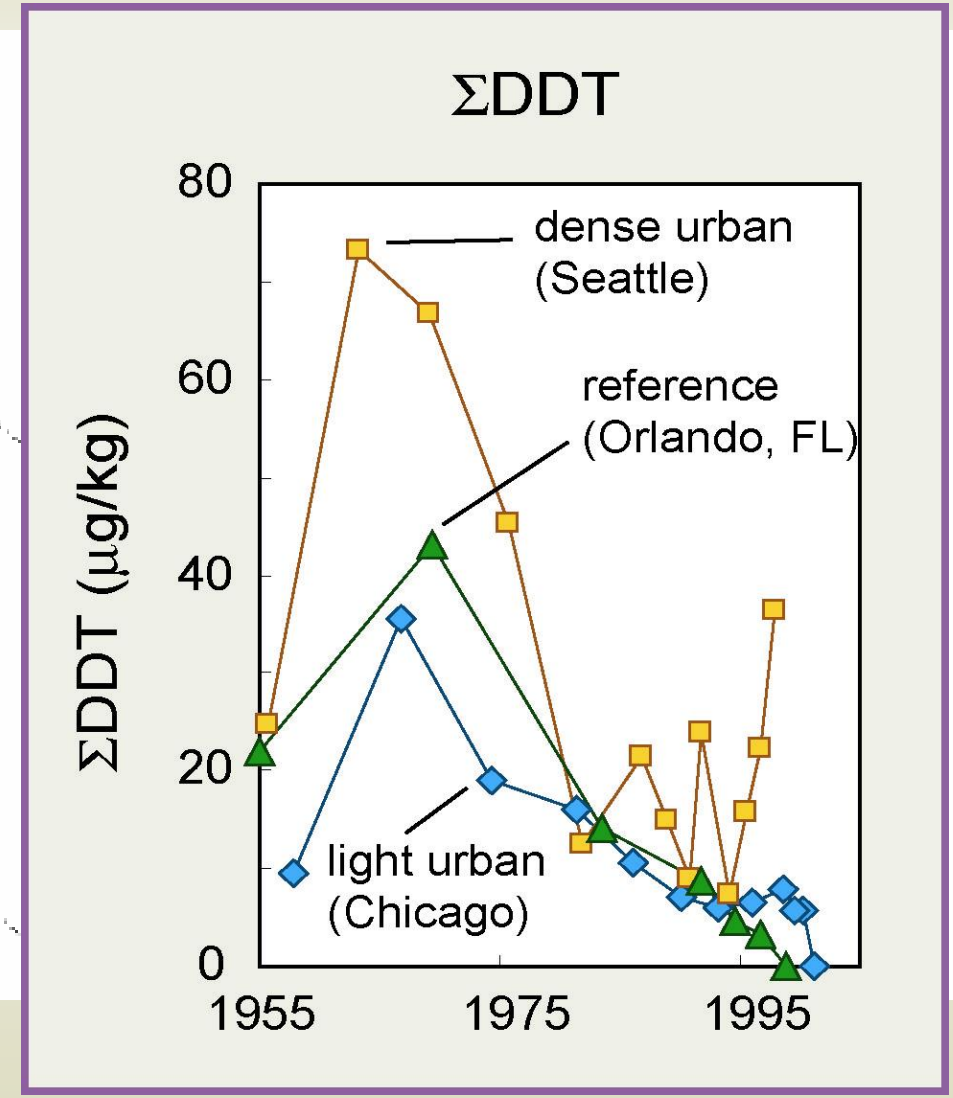
Organic Compounds

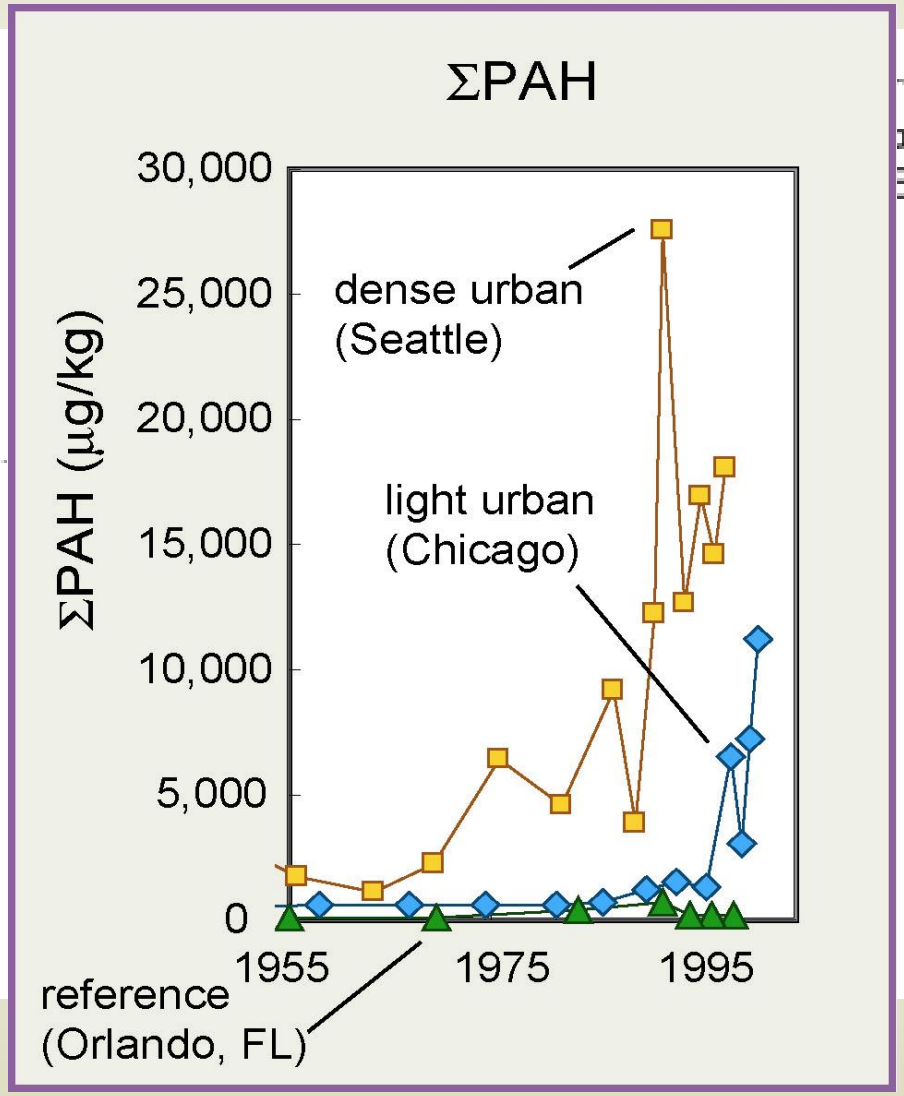
Benzo(a)pyrene





Two directions of change





You're standing on it!

Parking lot sealcoat and urban PAHs

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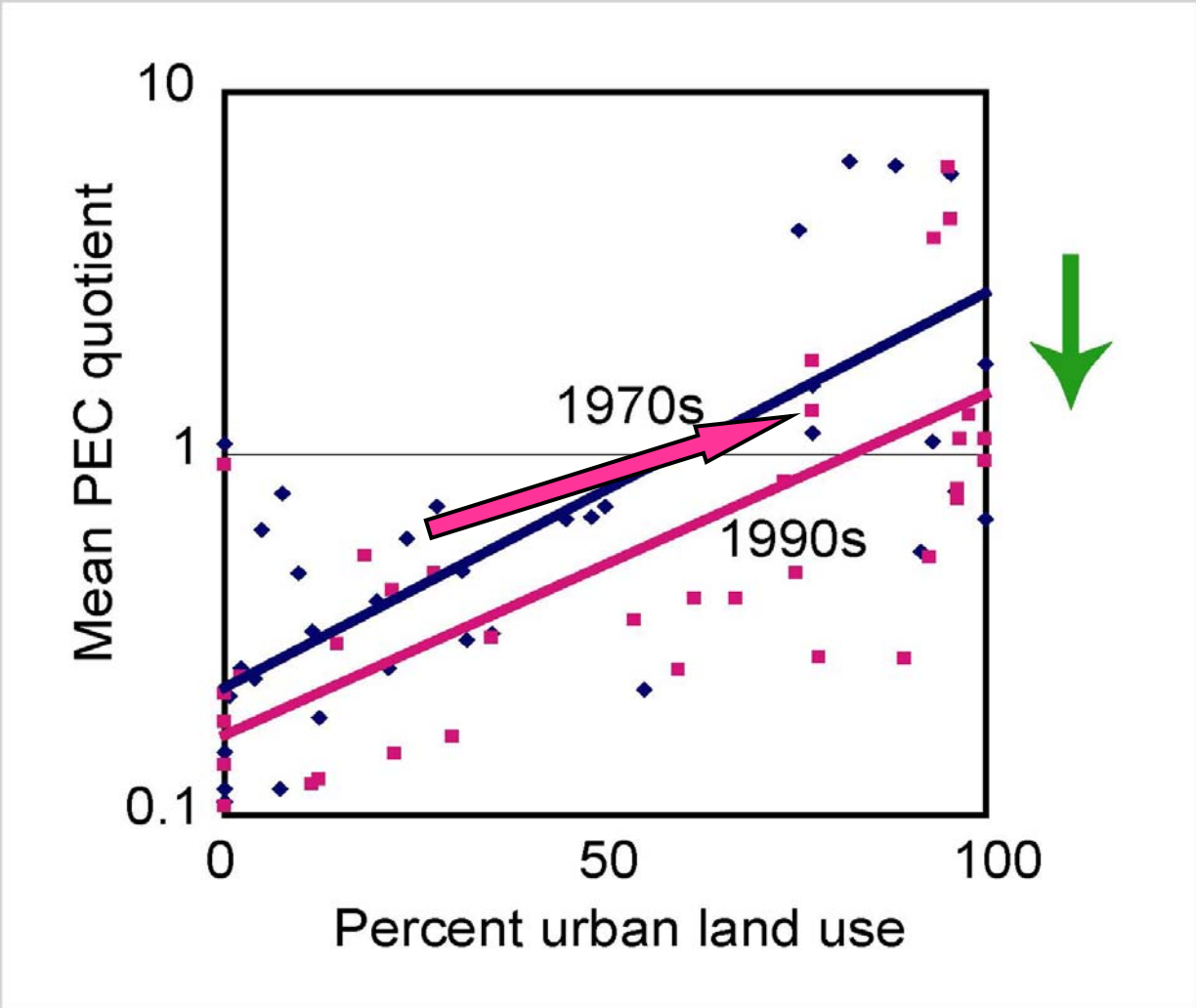
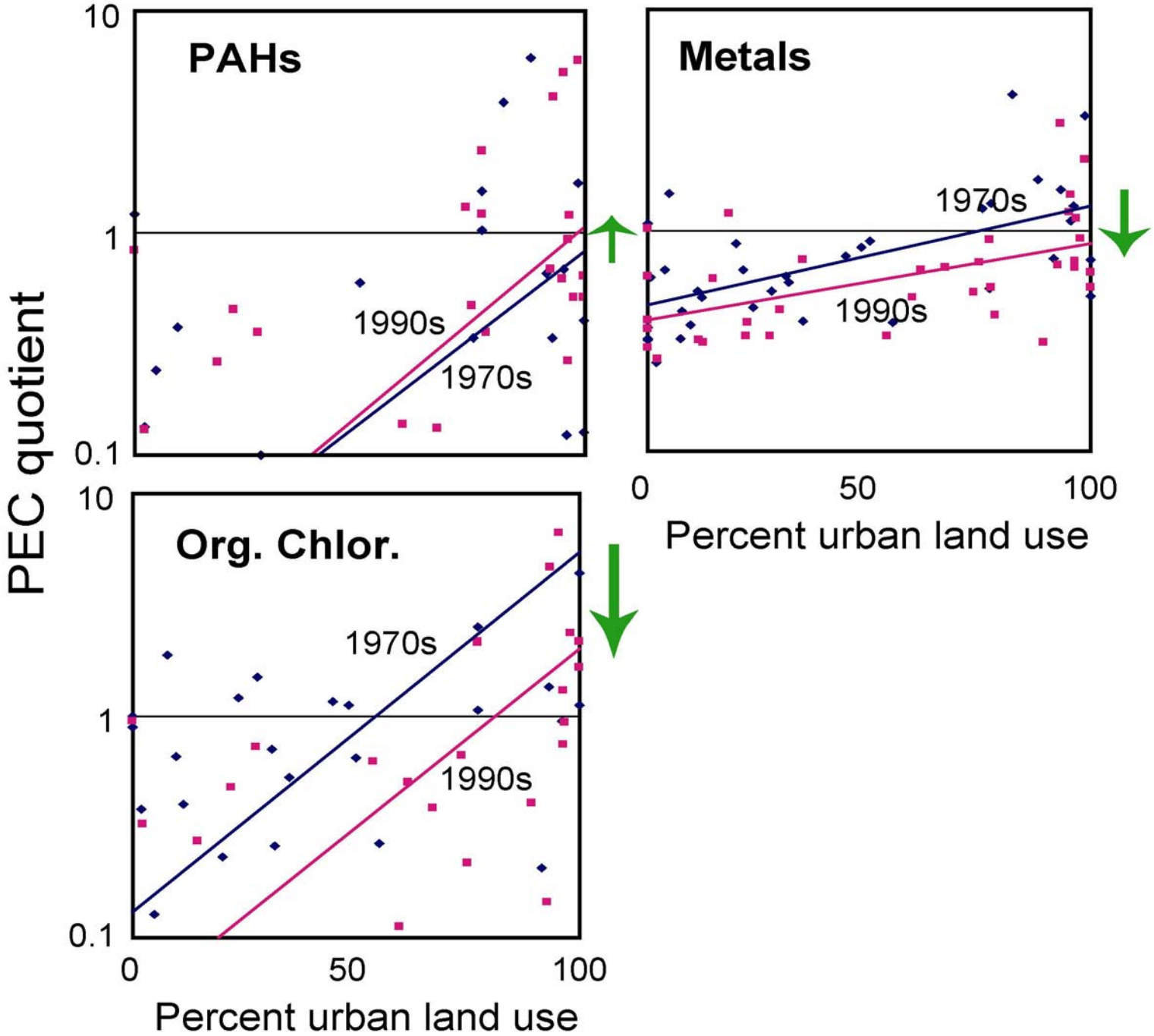
USGS
science for a changing world

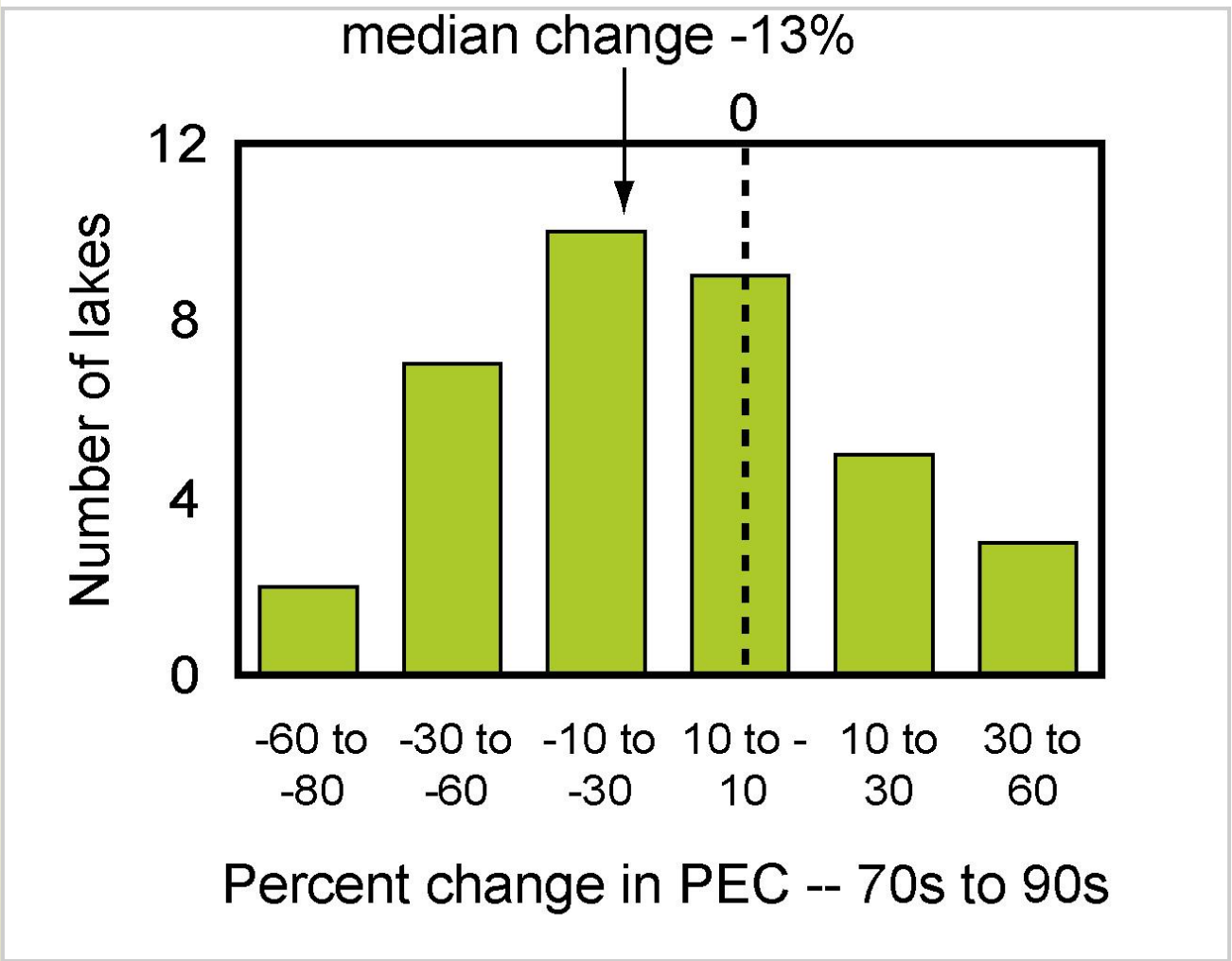
Effects of urbanization on water quality II,
Tuesday, 3:35pm, Rm A2

Is the Nation's Water Quality Getting Better or Worse?




PAHs
Metals
Org. Chlor.
1990s
1970s
1970s
1990s
1970s
1990s
PEC quotient
10
1
0.1
10
1
0.1
0
50
100
0
50
100
Percent urban land use
Percent urban land use

On average, better in these 36 lakes



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