USGS Approach to Water Indicators

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NWQMC Steering Committee Meeting
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Reston, VA

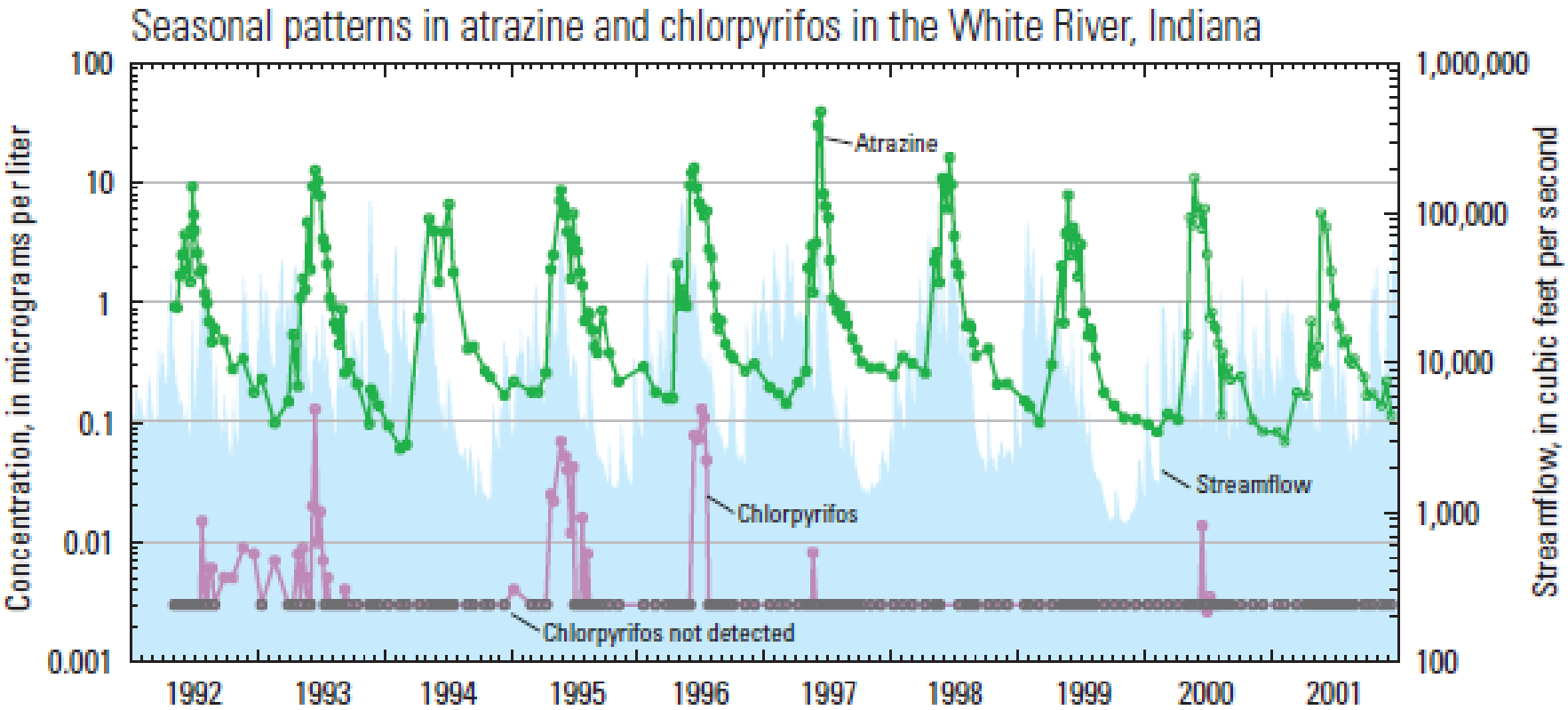
VISION

Try to use EPA and State Data to enhance breath and scope of water indicators

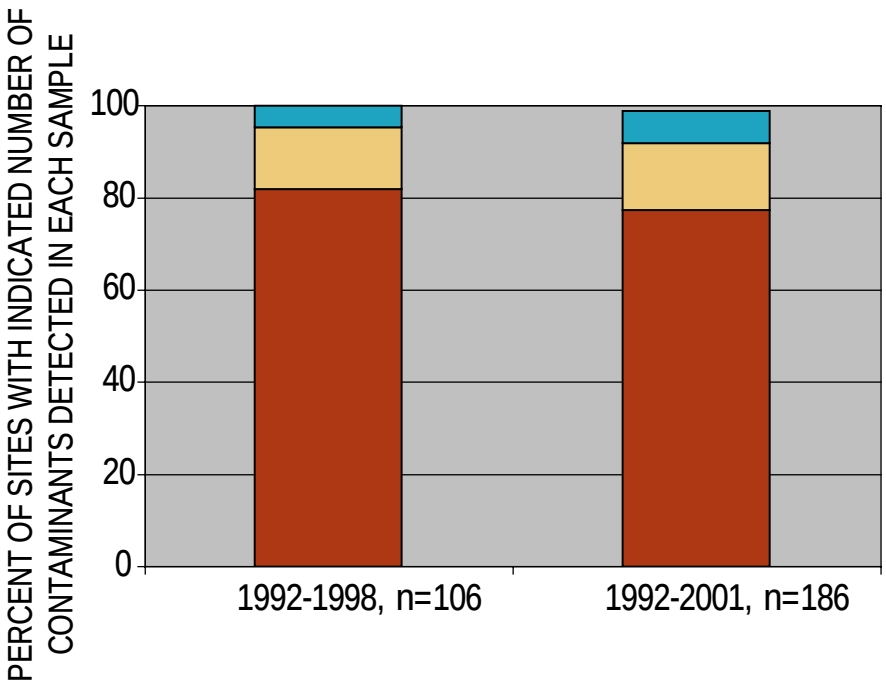
Multiple Tools Required

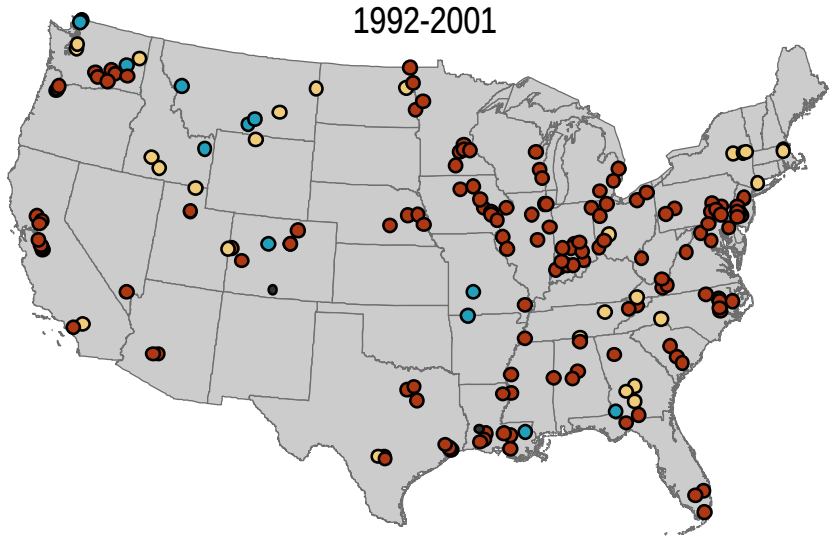
Design/Tool	Questions they can answer --
Probabilistic survey	• What percentage of the Nation's water resources meet the goals of the Clean Water Act? • What percentage of the Nation's water quality getting better or worse?
Modeling and landscape analysis	• Can we predict water quality conditions in space and time? • Can we extrapolate from sampled to un-sampled locations?
Targeted monitoring	• What are the causative and associative human and natural factors that effect water quality? • What is the water quality in a watershed or at a location and is it changing over time?

Changes with season, over time, and with streamflow



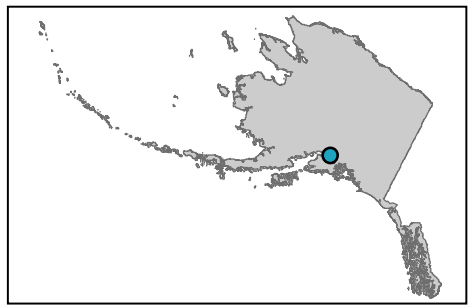
Contaminant Occurrence in National Stream Water



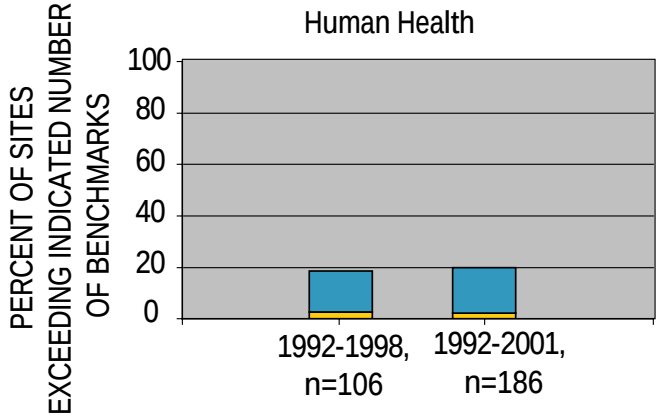


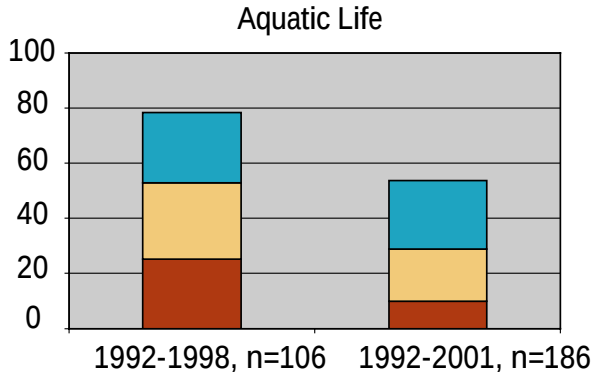
EXPLANATION
Number of contaminants detected in each sample

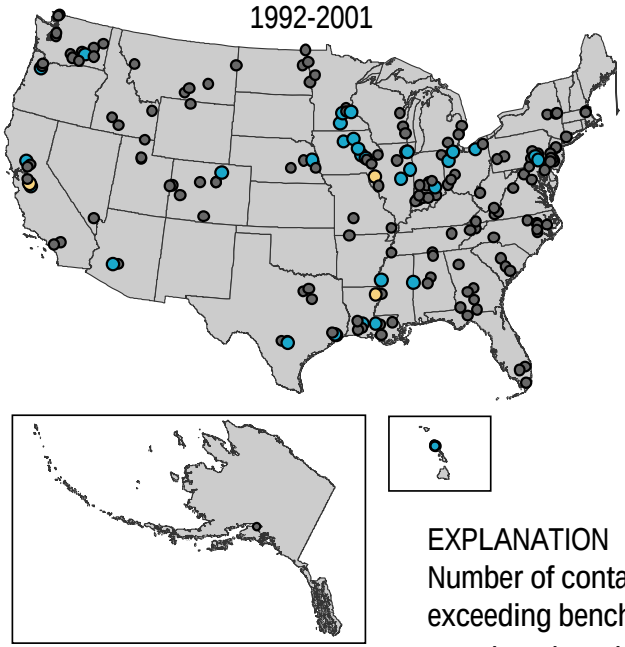
- 1 or 2
- 3 or 4
- 5 or more

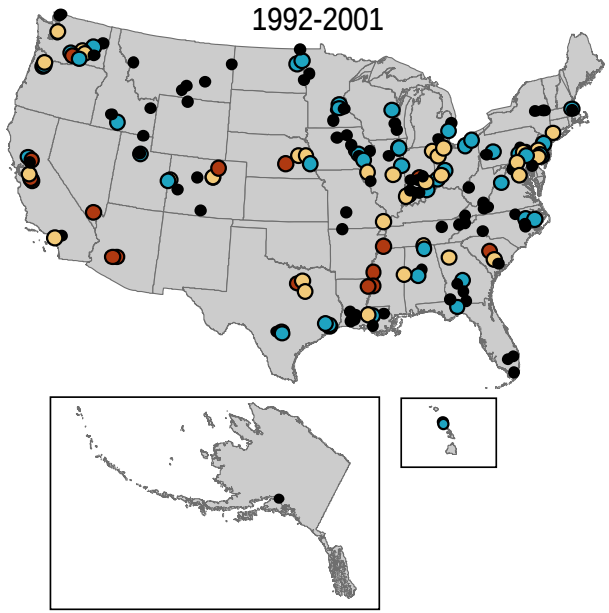


Contaminants in National Stream Water Exceeding Human-Health and Aquatic-Life Benchmarks







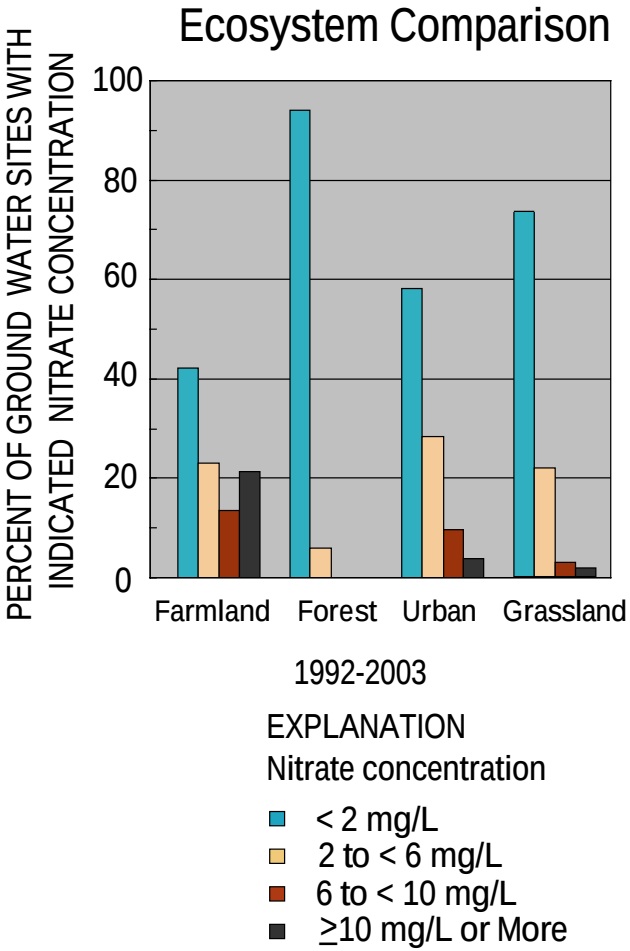


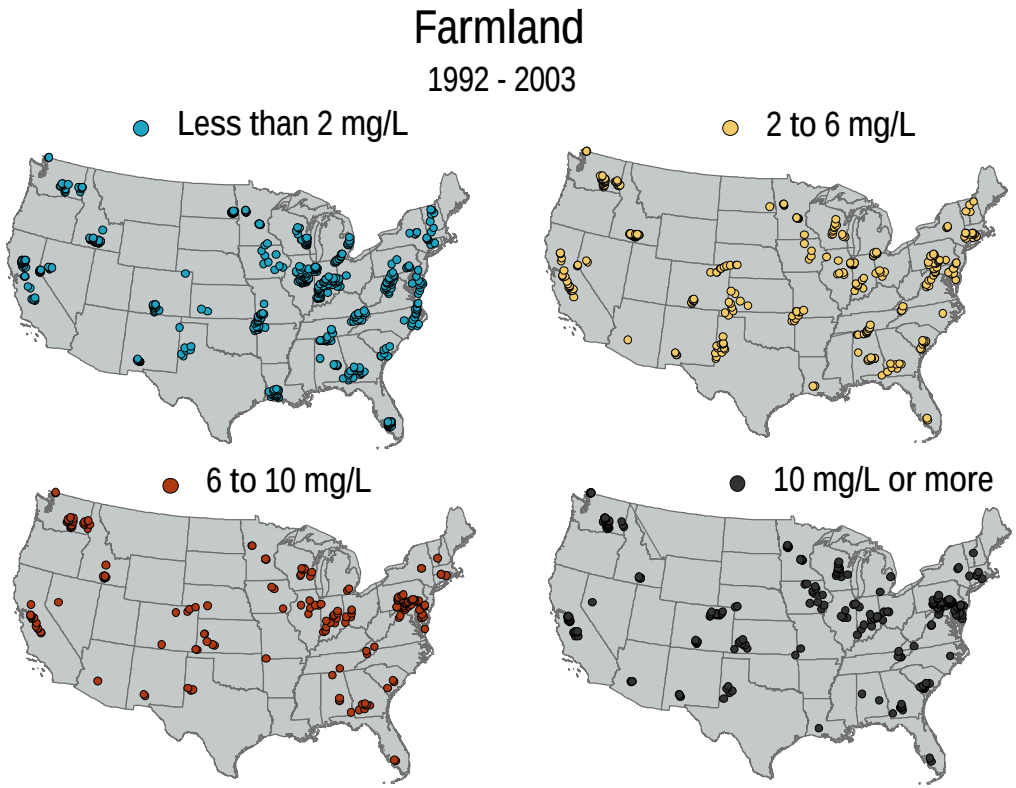
EXPLANATION

Number of contaminants exceeding benchmarks

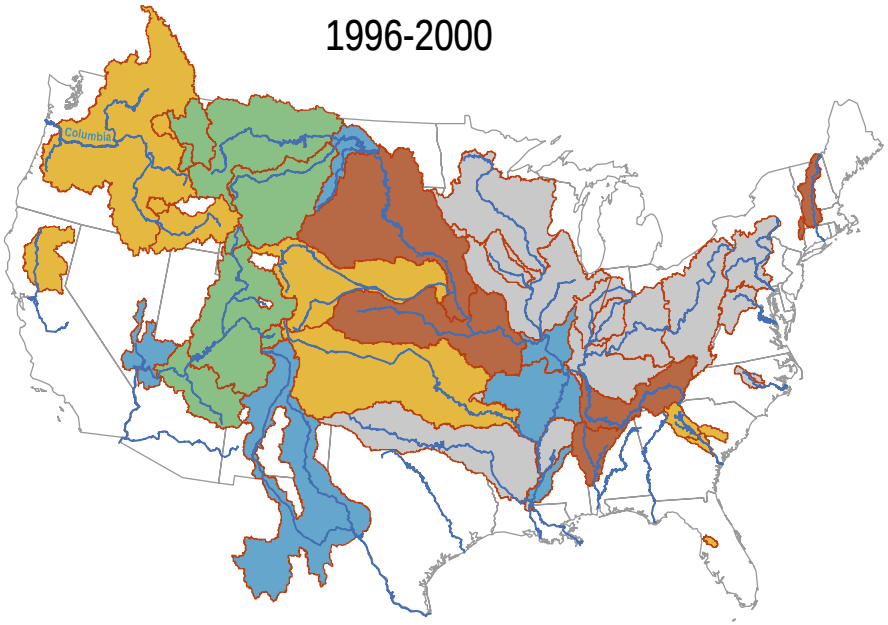
- no benchmark exceeded
- 1
- 2 or 3
- 4 or more

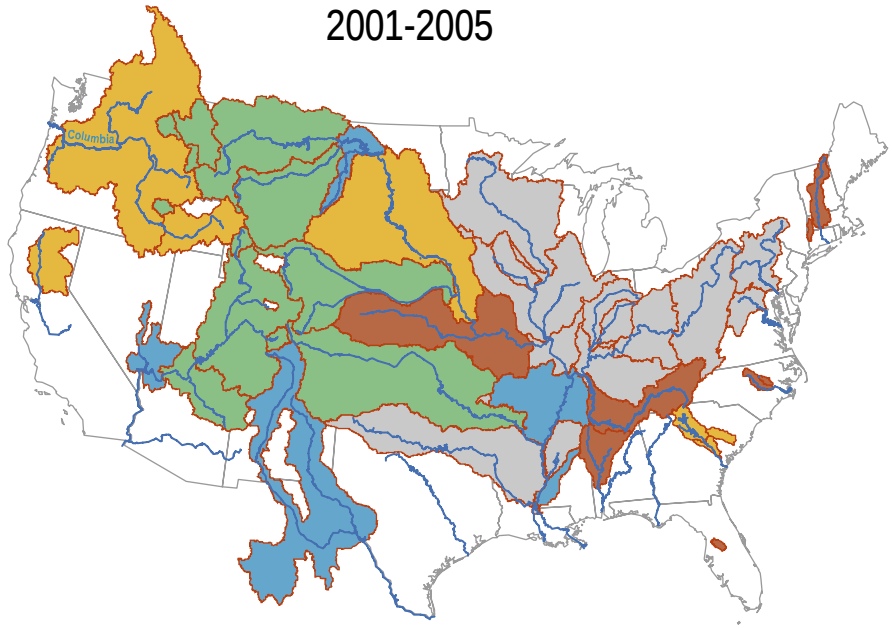
Nitrate Concentration in Farmland, Forest, Urban, and Grassland Ground Water





Five-Year Mean-Annual Incremental Yield of Total Nitrogen From Major Watersheds

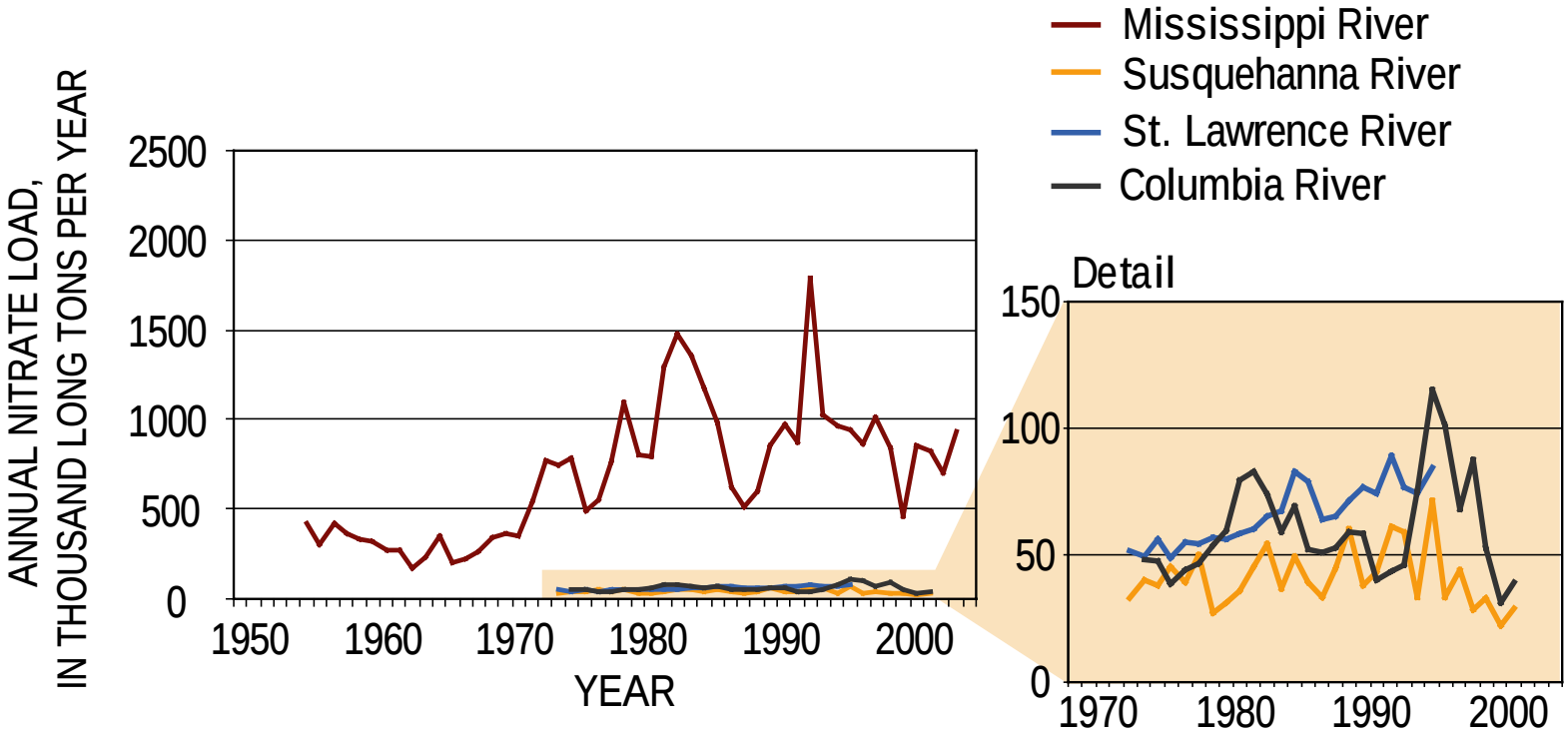


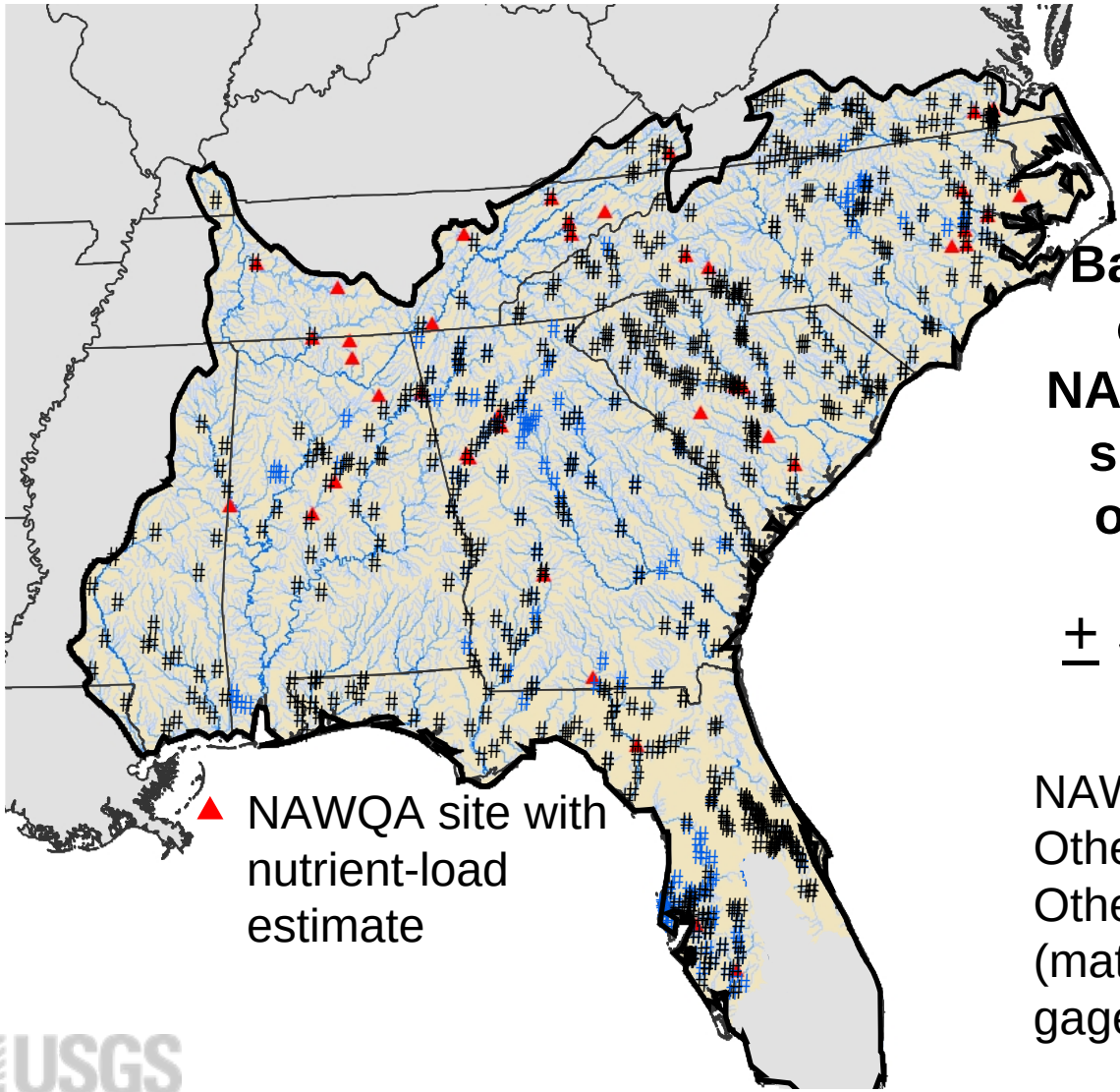


Total Nitrogen
(pounds of nitrogen per square mile per year)

- Less than 10
- 10 - 599
- 600 - 1,499
- 1,500 - 2,999
- More than 3,000

Annual Nitrate Load Discharged to Coastal Waters



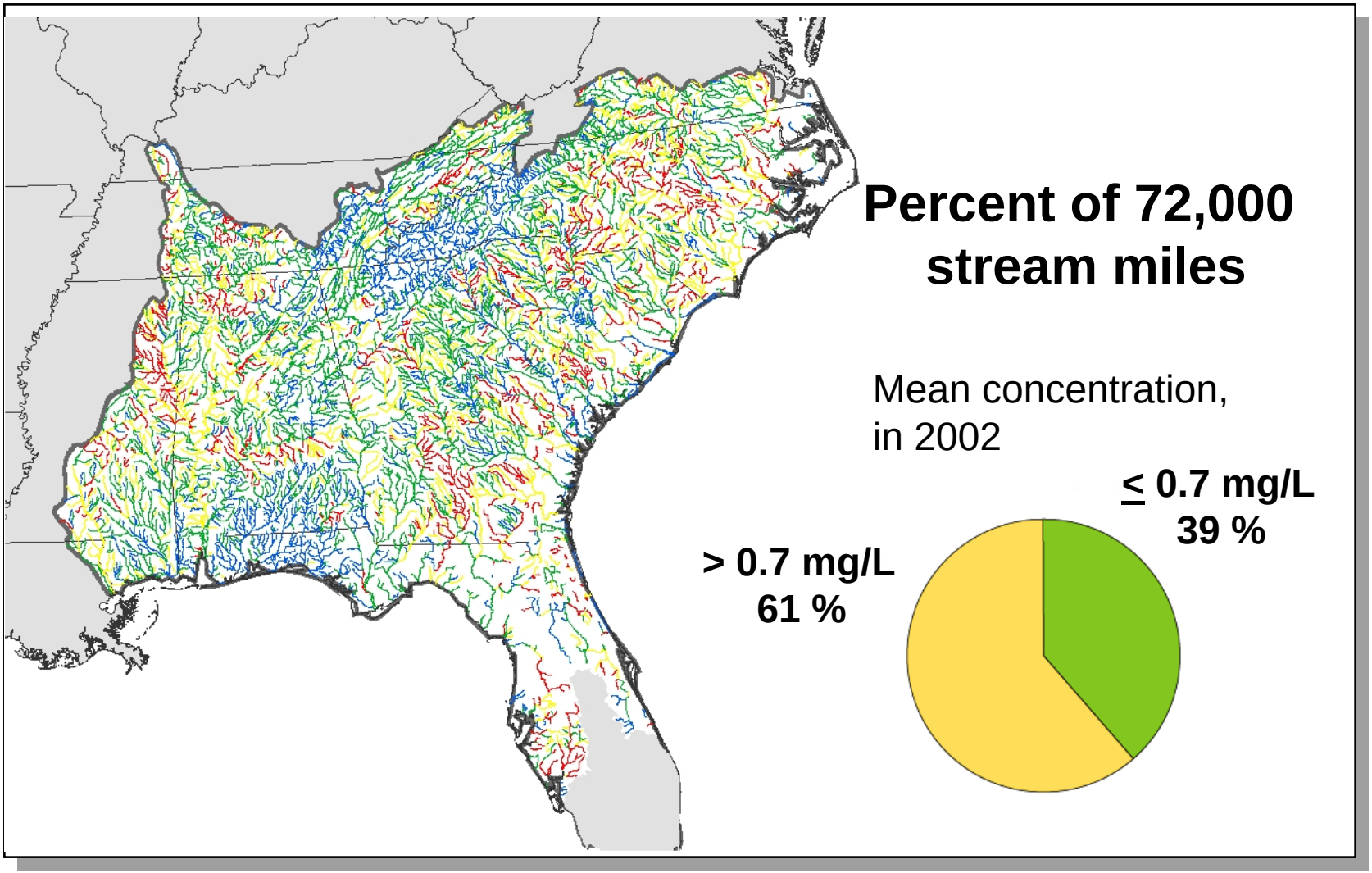


Prediction Error

Based on NAWQA sites only	Based on all sites
± 55%	± 30%

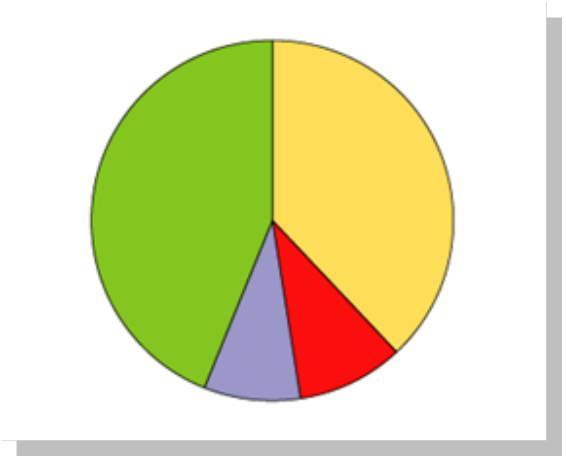
NAWQA: **44**
Other USGS: **174**
Other agency: **586**
(matched to USGS gage)

Assessment of Total Nitrogen Concentration

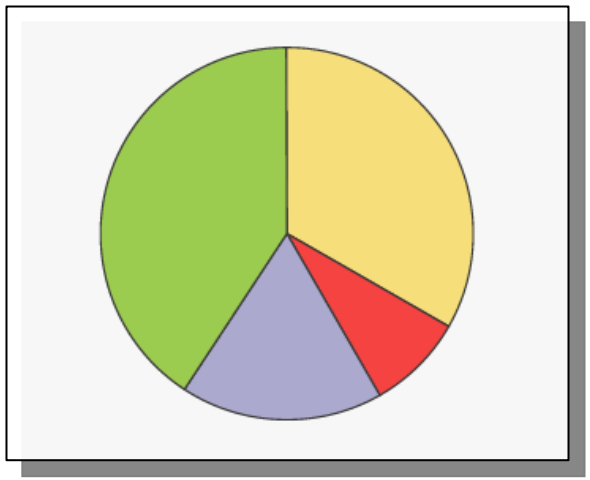


Source Shares Delivered to Sensitive Coastal Areas

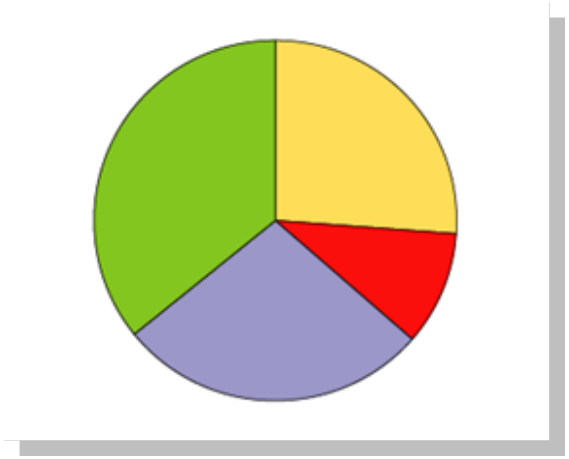
Mobile Bay



Cape Fear Estuary

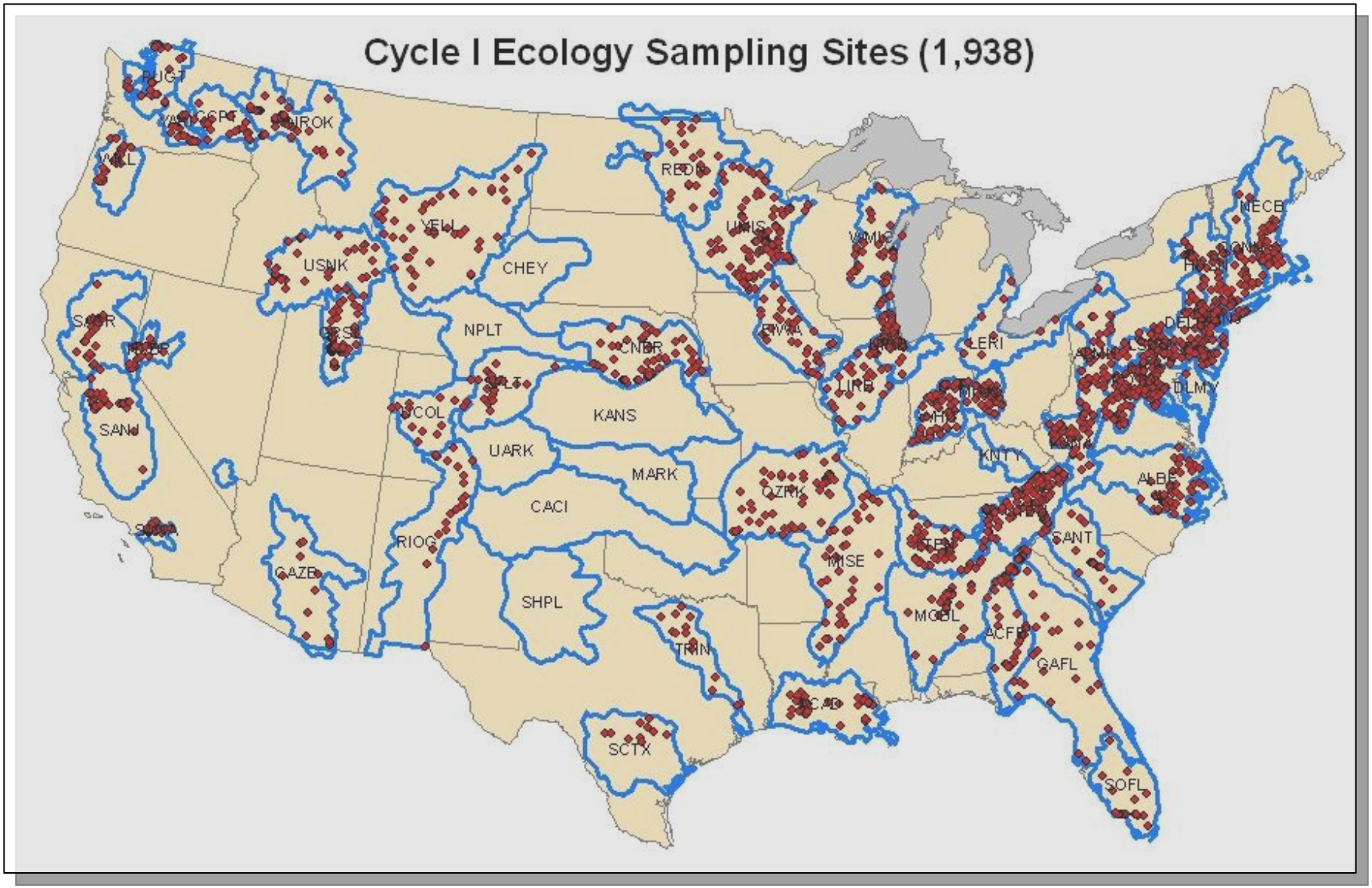


Savannah River Estuary

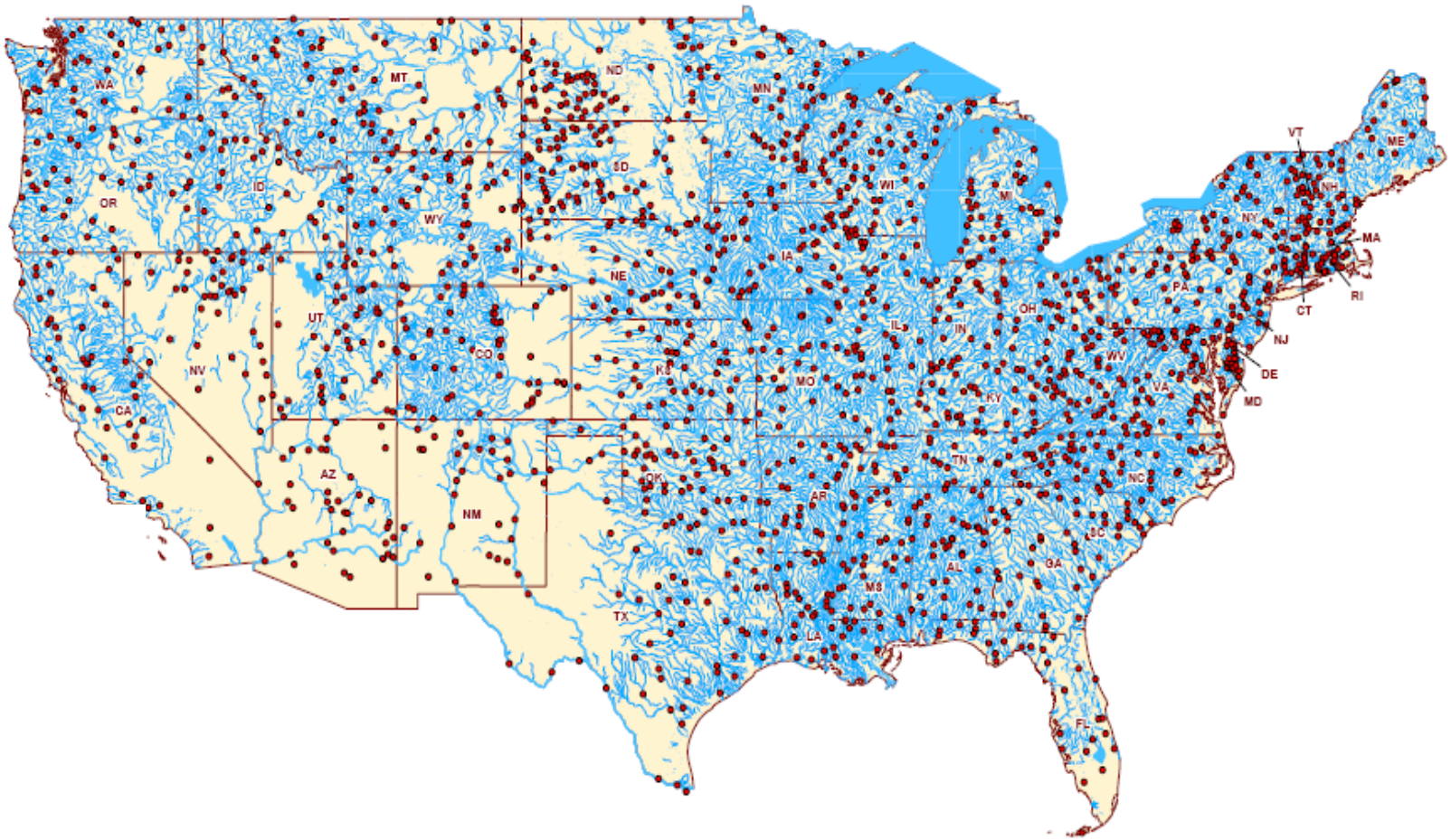


- Atmospheric deposition
- Agricultural sources
- Runoff from developed land
- Point-source discharge

NAWQA Ecological Data

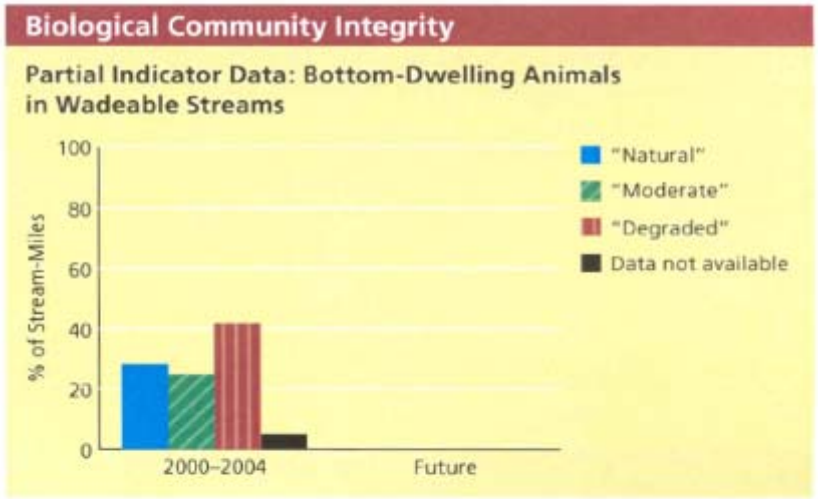


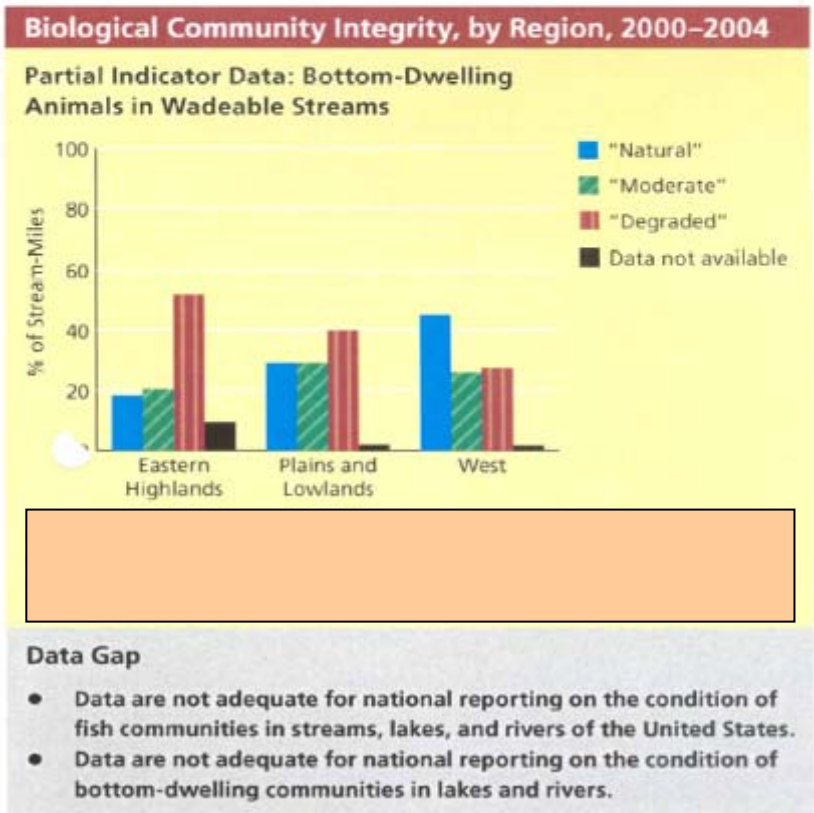
1800 National River and Stream Assessment Sites



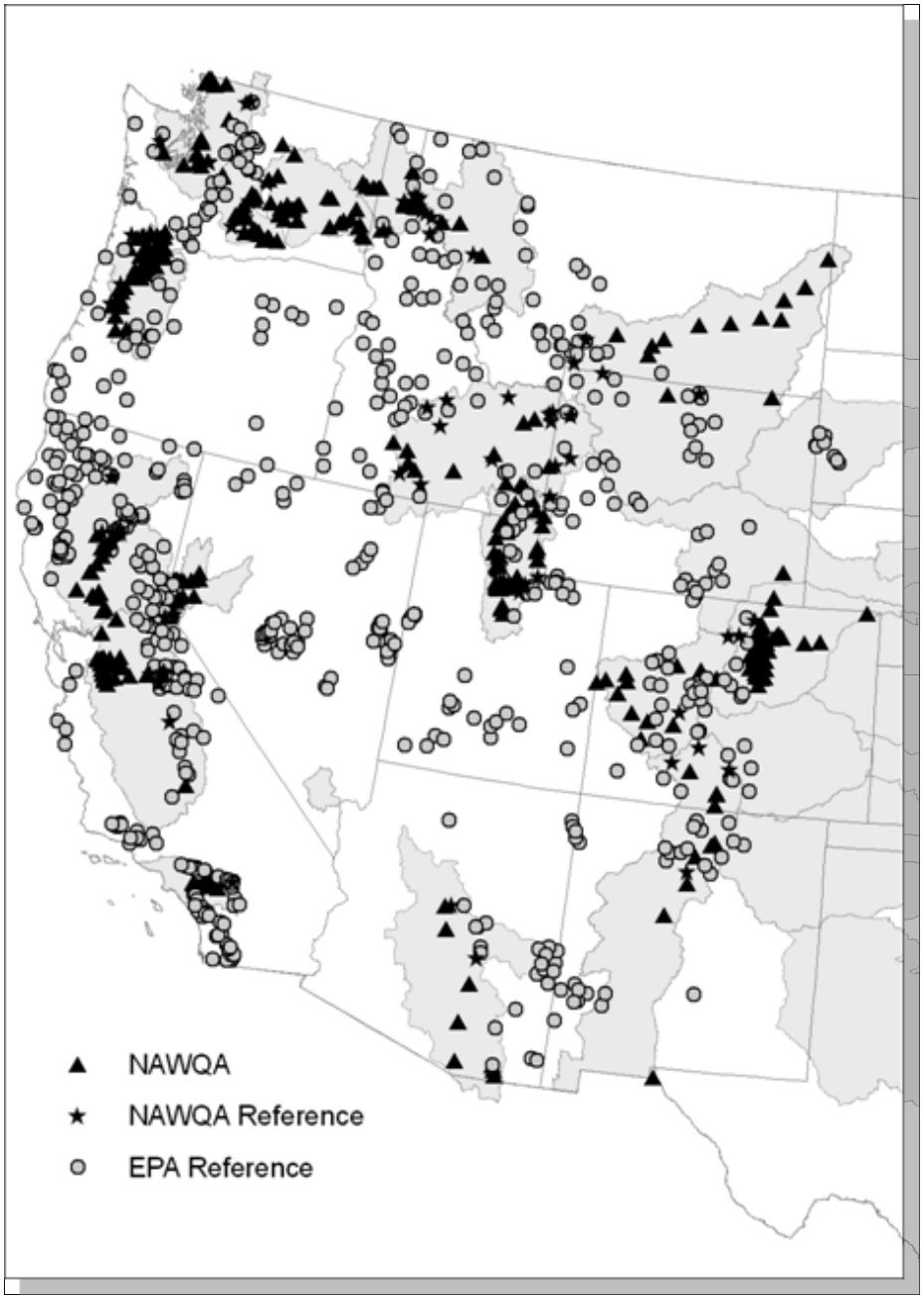
2008 Heinz Center Report on the State of the Nation's Ecosystems

Biological Community Integrity in Streams





VISION: Combine USGS and EPA data



Example:

- Combined NAWQA & EPA data facilitated regional assessment tool that is broadly applicable (Carlisle & Hawkins, in press)
- NAWQA assessments in regional context
- Direct comparisons of assessments among river basins
- Similar tools developed for Eastern U.S. (Meador et al., approved)