Water Quality Trends across 319 Monitoring Sites

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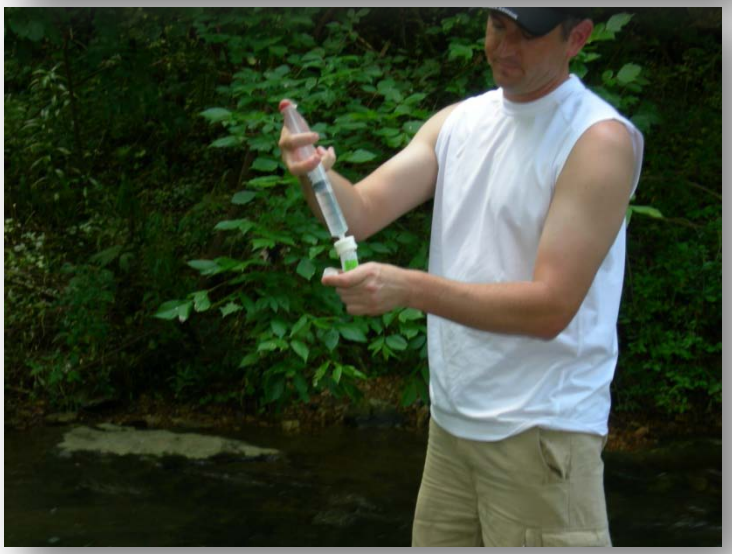
Identifying Water Quality Trends

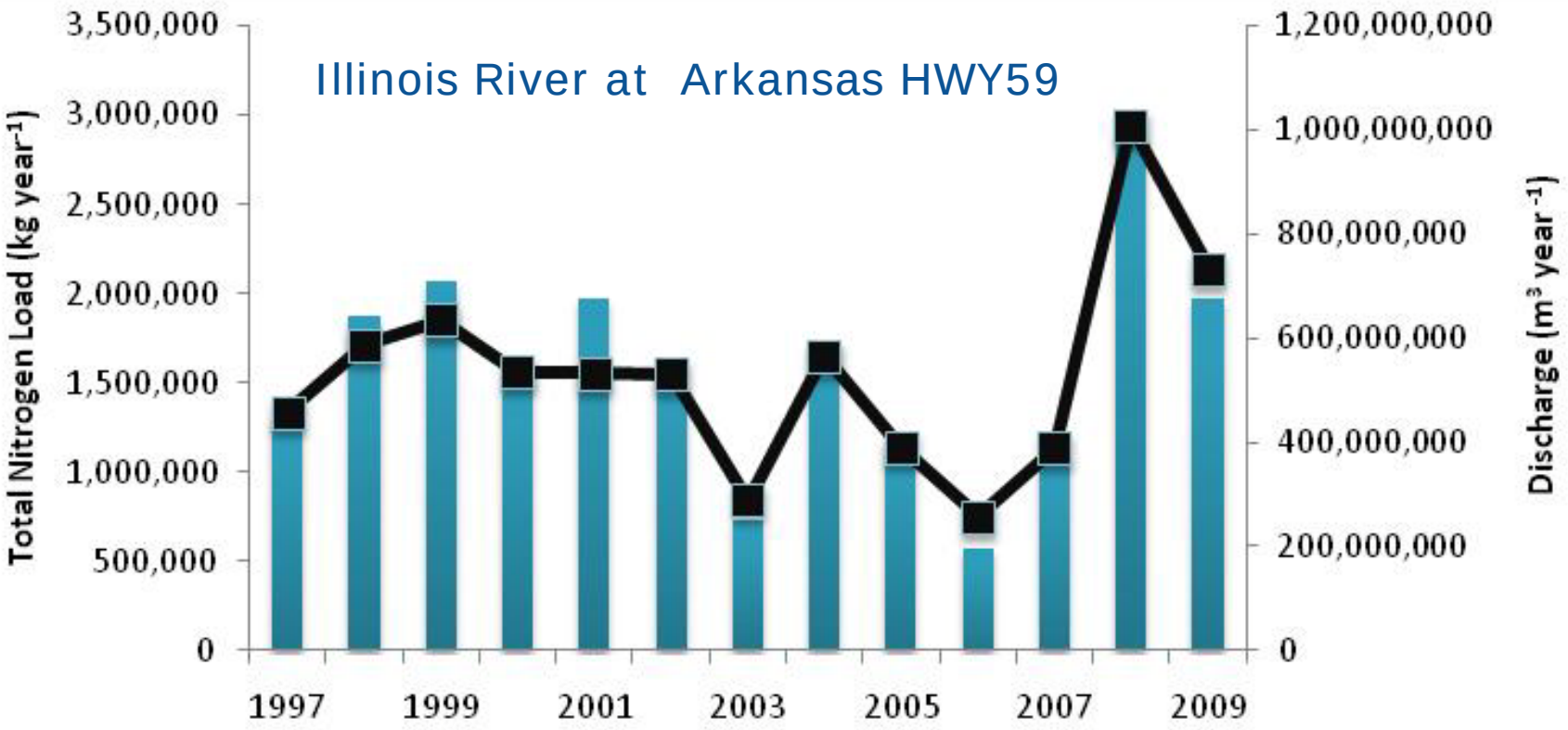
- The objective of this project is to evaluate changes in water quality, where we can…
  - Identify the effects of management actions (e.g., proper riparian buffers)
  - Identify the effects of new pollutant sources (e.g., new WWTP)



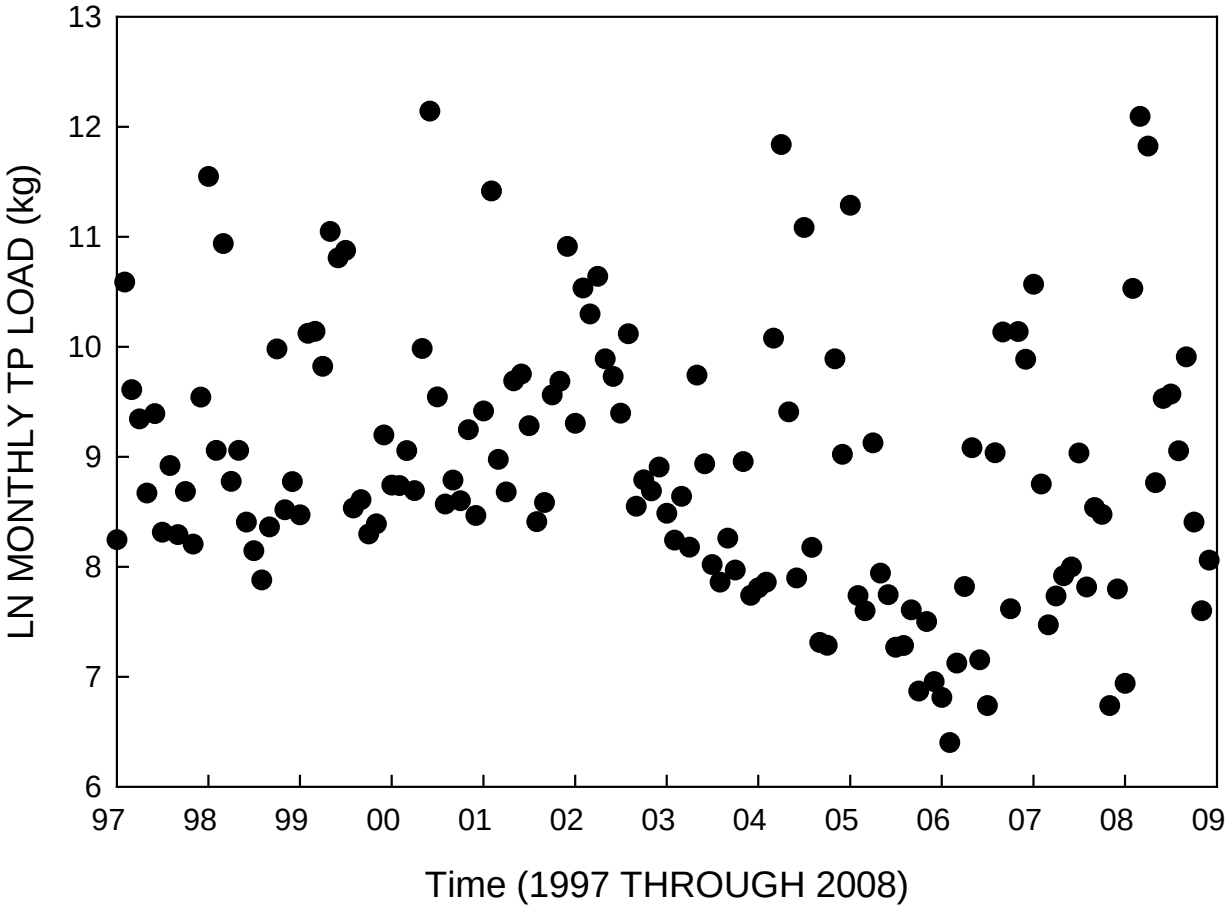
The selected sites were from the 319 monitoring program in northwest Arkansas

- Upper Illinois River Watershed
  - Ballard Creek
  - Osage Creek
  - Illinois River
- Upper White River Basin
  - West Fork White River
  - White River
  - Kings River

But, evaluating change in water quality is not as simple as looking at the increase or decrease in loads…

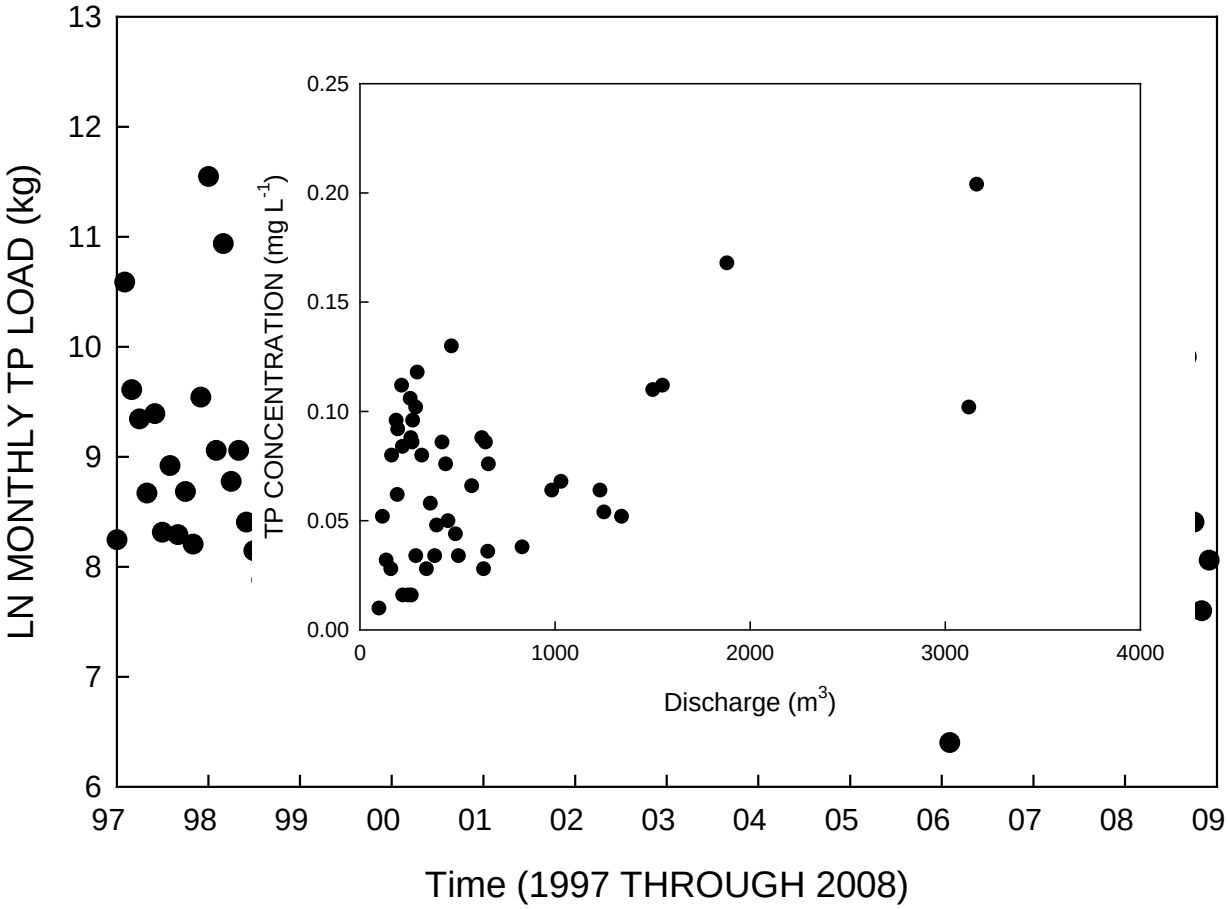


Loads are influenced by precipitation and runoff patterns over time…



You need to remove the influence of stream discharge on loads to identify true trends in water quality.

Concentrations also change with increasing discharge…



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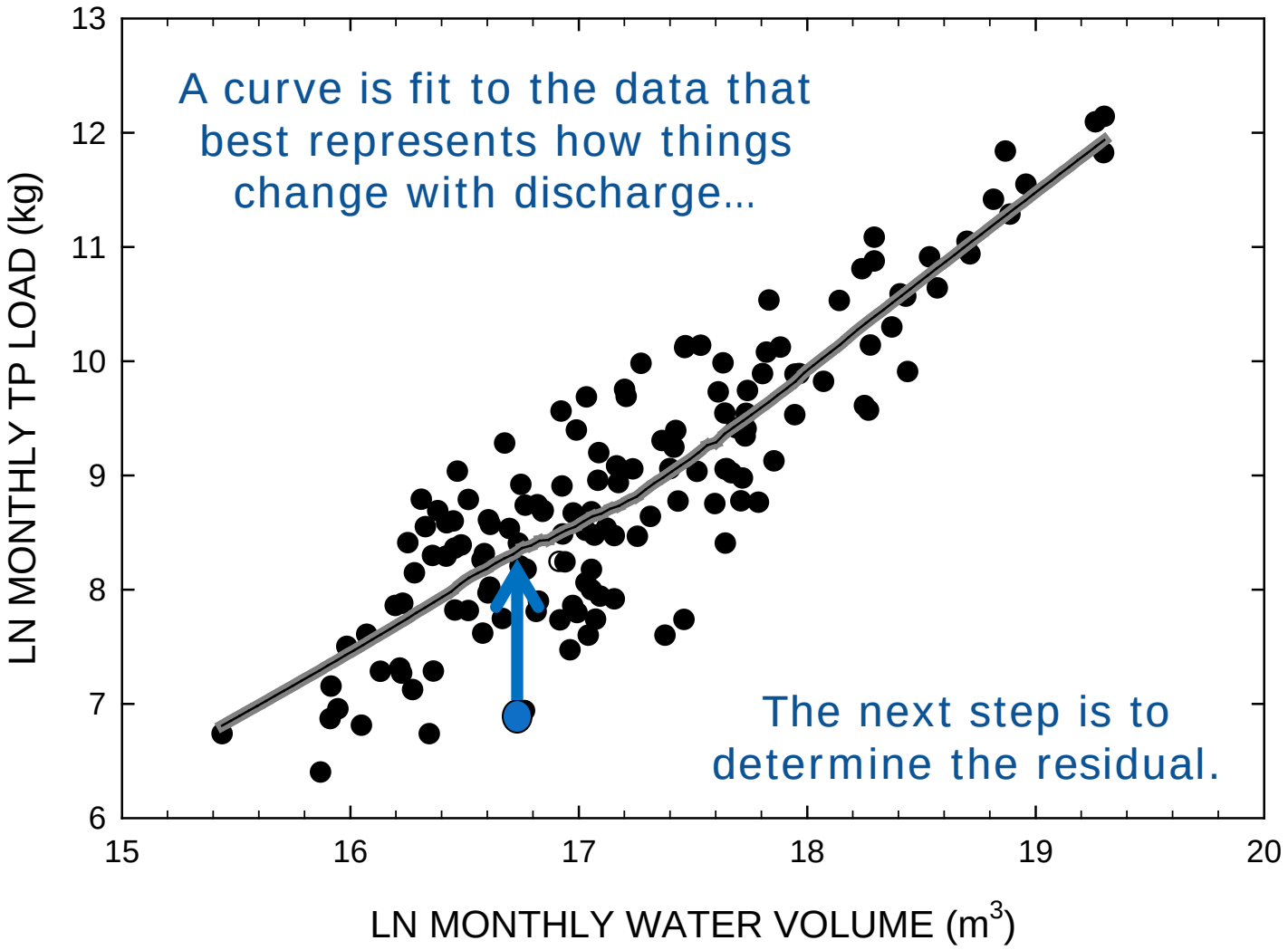
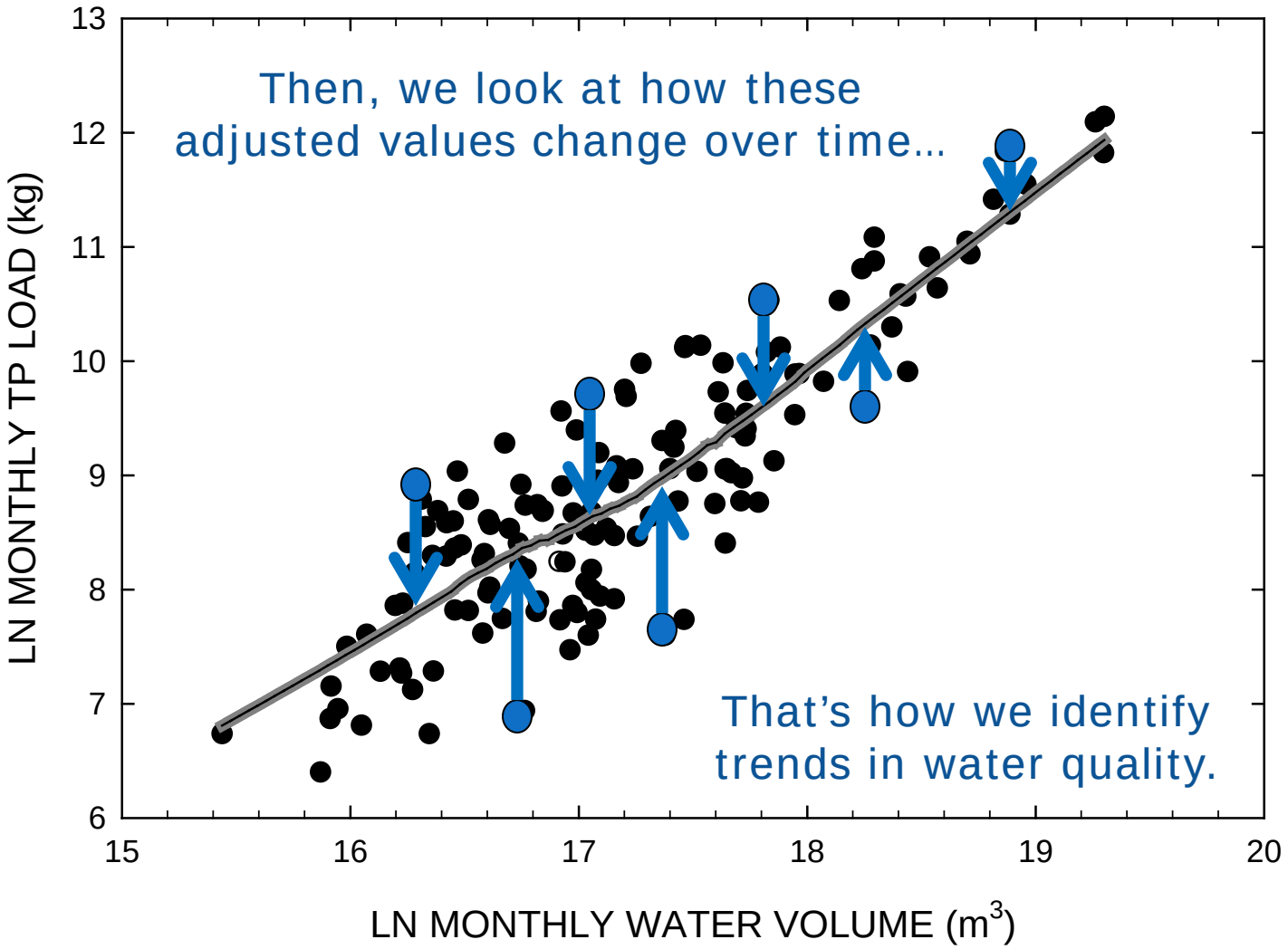
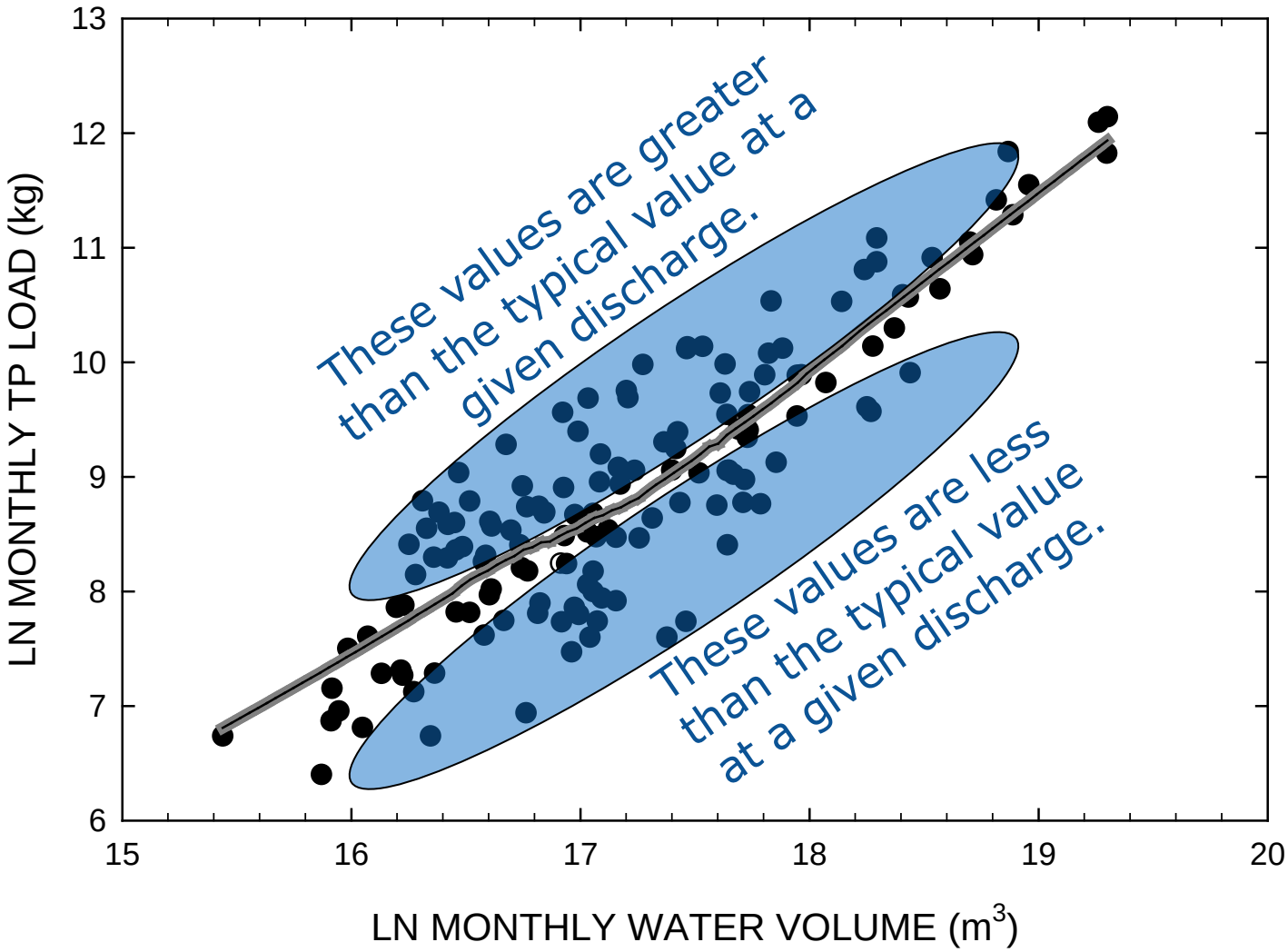
Removing the influence of discharge…



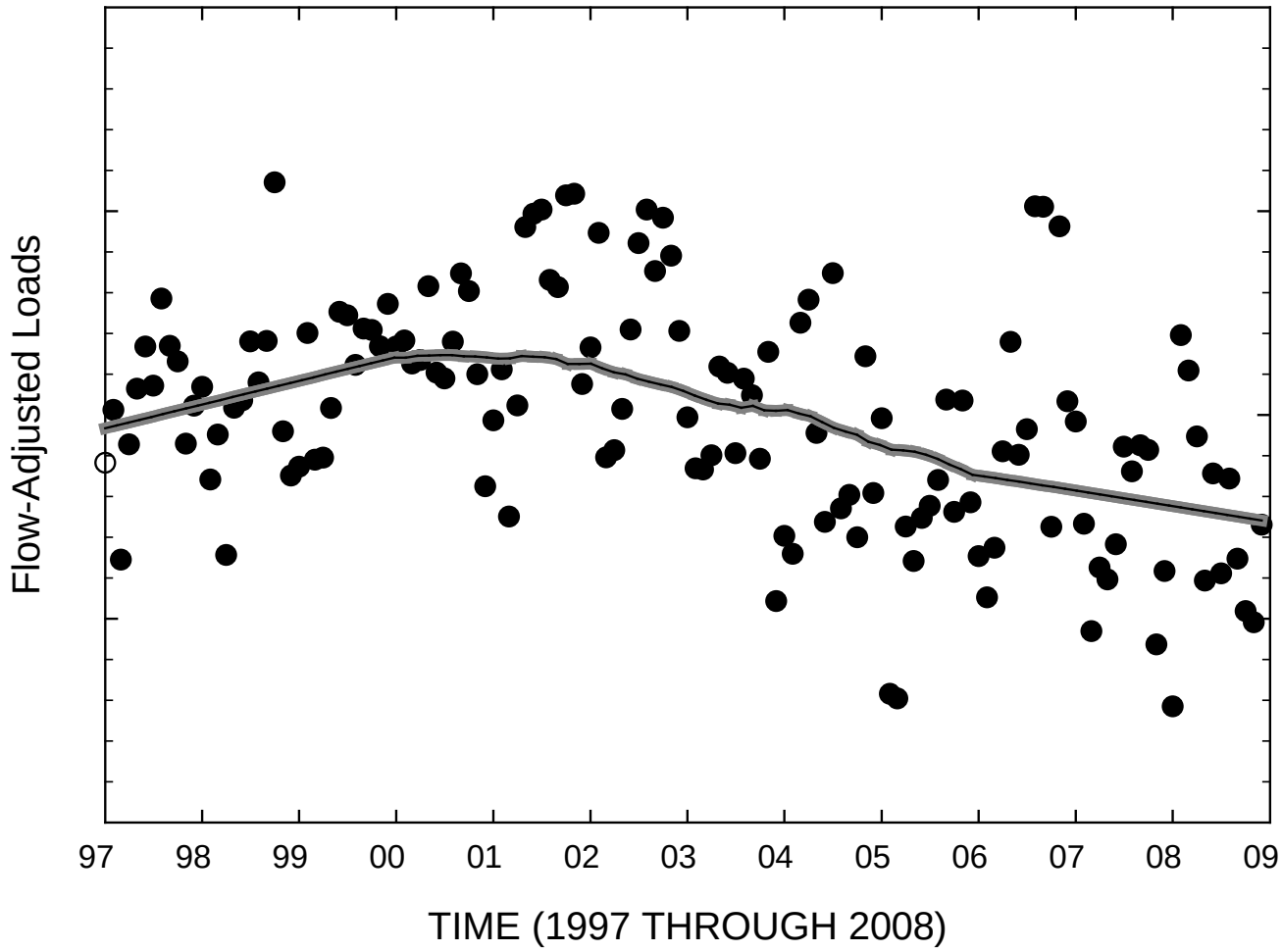
The residuals represent the flow-adjusted loads or concentrations…



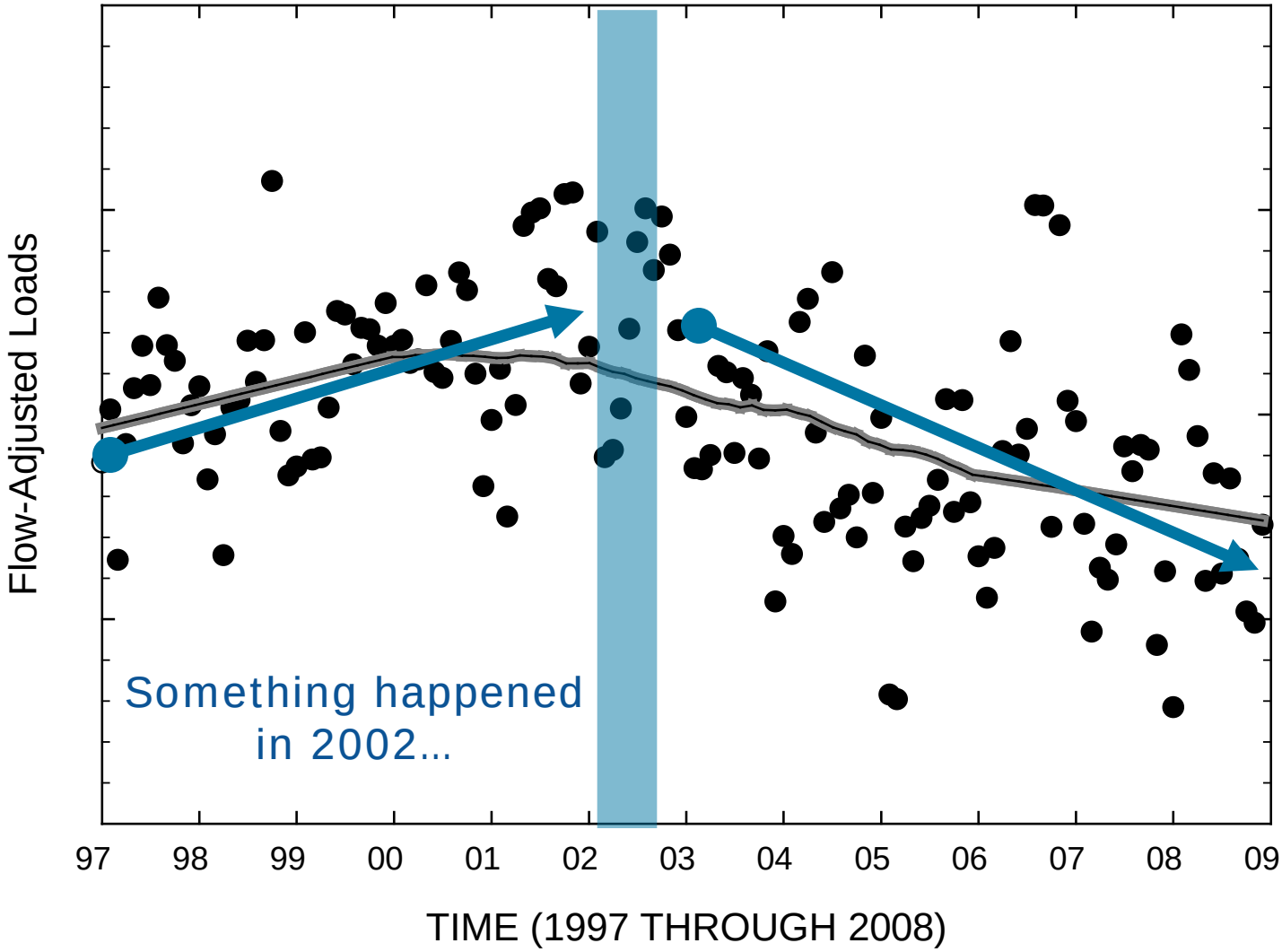
Flow-adjusted loads or concentrations are relative to the line, or expected…



The residuals are plotted over time to determine if flow-adjusted values are increasing or decreasing over time…



These flow adjusted loads are from the Illinois River at Arkansas HWY59…



It's important to have long term monitoring at sites to know what's going on…

- You need to have a relatively, consistent monitoring program:
  - Consistency in the number of samples collected
  - Consistency in the parameters analyzed
  - Consistency in the program design

We probably need five years of data with consistency…

Where we are now:

- Project extension was granted so that we could include data from 2009.
- To date, all databases have been compiled, including sampling date, constituent concentration and respective discharge measurements.
- Next, we will flow-adjust concentrations and then look at trends over time…

Take Home Message:

Loads are extremely dependent on the variations in discharge, and you need to be remove the effects of discharge to evaluate changes in water quality.

Questions?