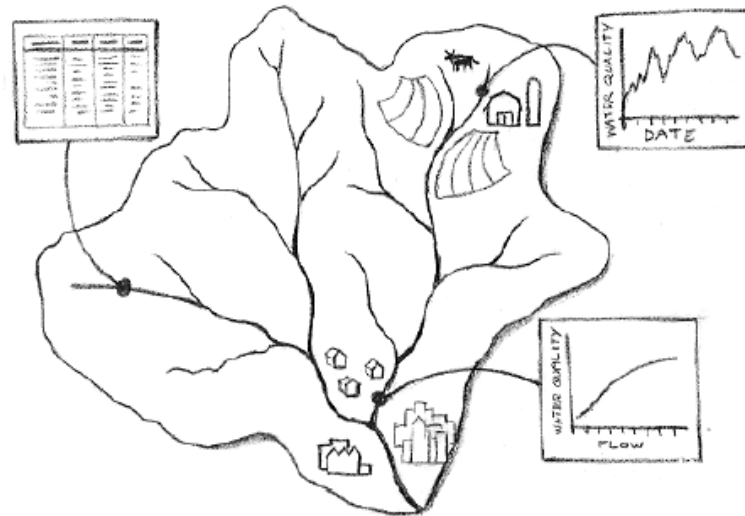


# Characterizing Baseline Water Body Conditions



# What?

- Confirm impairments and identify problems
- Statistical summary
- Spatial analysis
- Temporal analysis
- Stressor identification

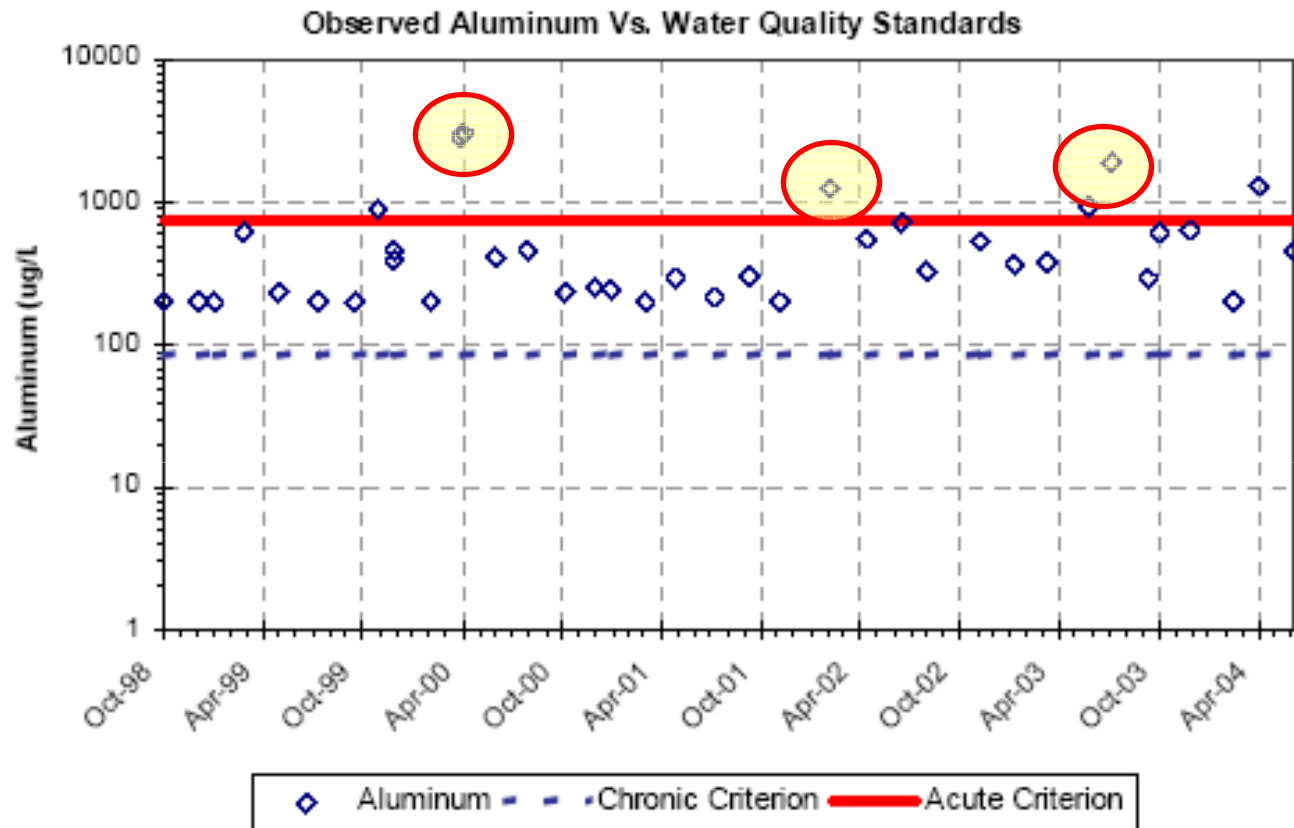
# Why?

- Lay groundwork for identification of causes and sources
- Document “before” conditions
- Select and target BMPs
- Support design of monitoring and evaluation program

# Confirm impairments and identify problems

Compare available monitoring data to wqs, but go beyond 305(b) or 303(d) assessments:

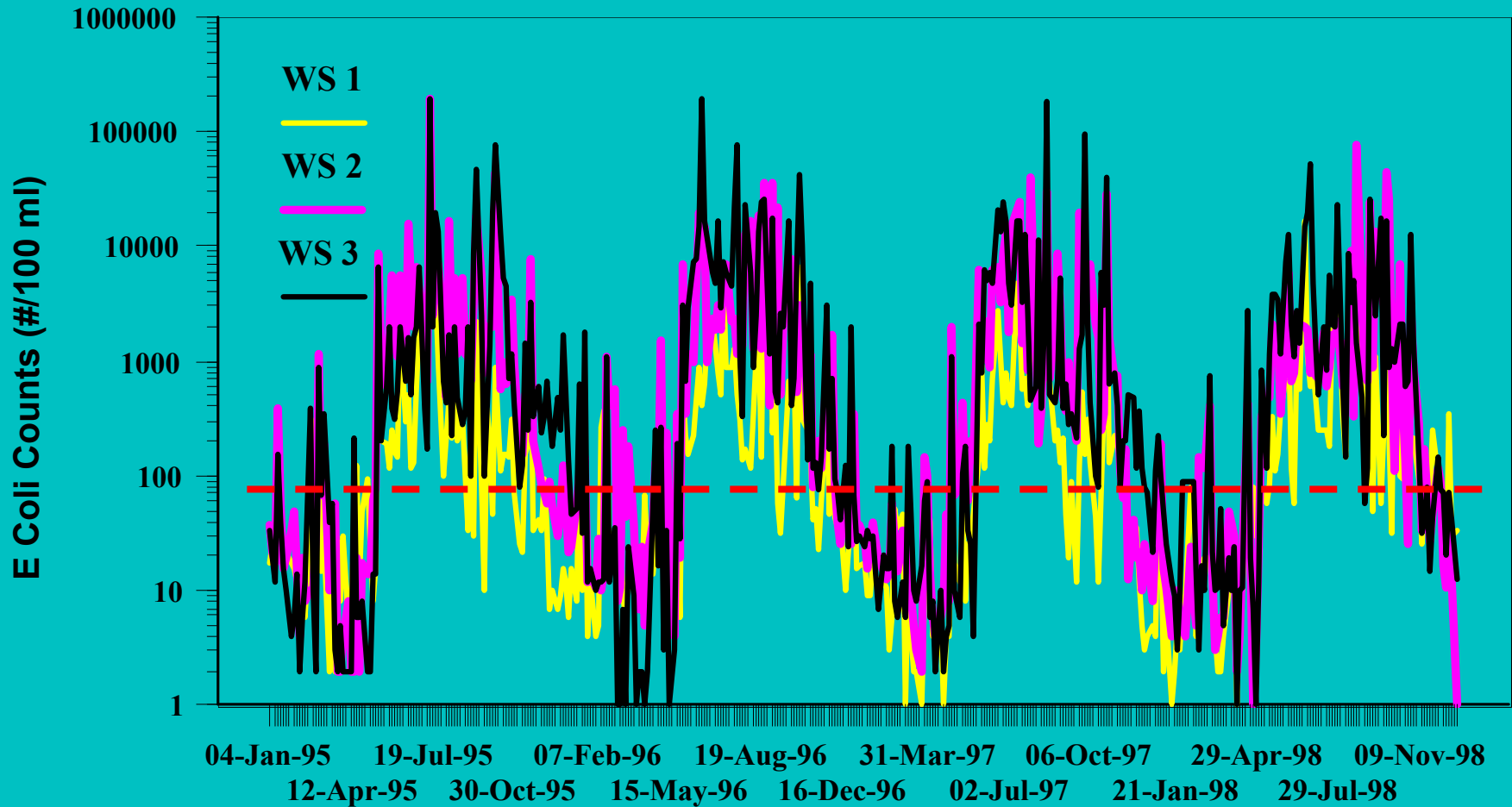
- Assess magnitude of the impairment
  - % exceedance
- When do impairments occur?
  - Seasonally?
  - Associated with rainfall or high flows?
- Where do impairments occur?



**Figure 7-1. Example graph of observed aluminum concentrations compared to water quality criteria.**

# E. Coli Counts 1995 - 1998

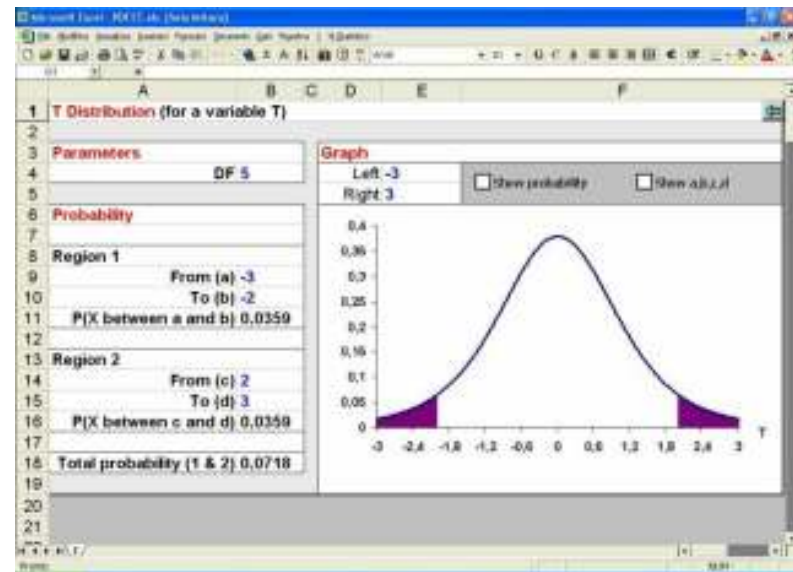
## Lake Champlain Basin Ag Watersheds NMP Project



# Statistical summary

## Basic descriptive statistics:

- Number of observations
- Minimum, maximum, range
- Mean, median
- Variance
- Skewness
- Distribution



# Statistical summary

Always plot your data!

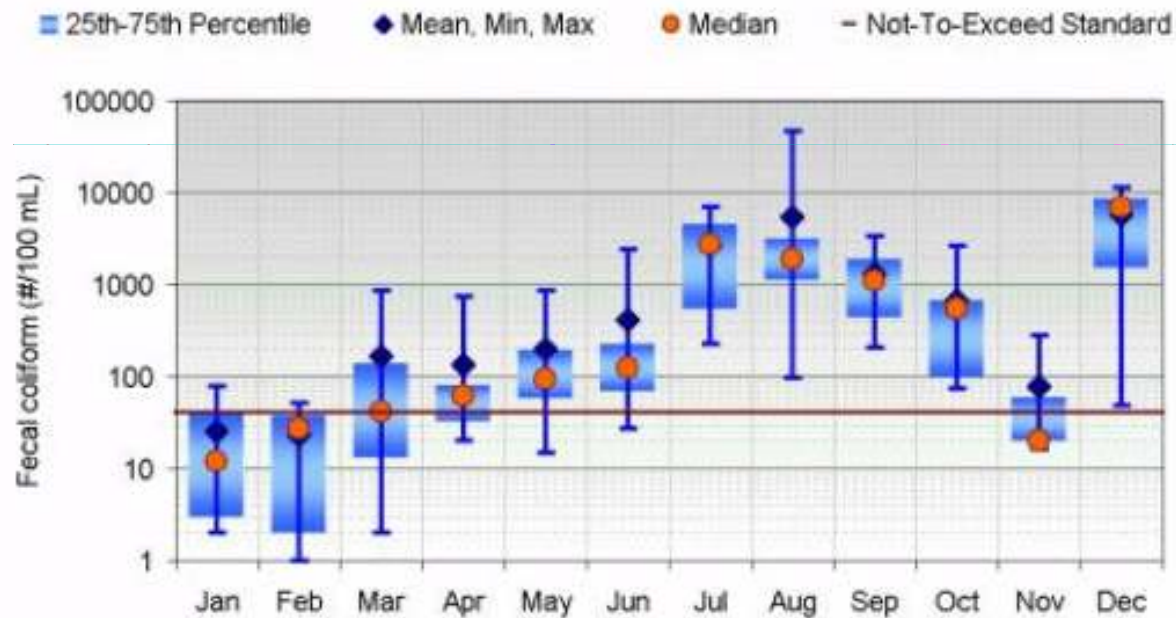


Figure 7-4. Example graph of monthly statistics for fecal coliform bacteria.

# Statistical summary

Support design of monitoring program:

Use observed variance in WQ data to establish effective sampling frequencies

$$n = \frac{t^2 s^2}{d^2}$$

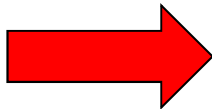
where:

n = the calculated sample size

t = Student's t at (n-1) degrees of freedom and a specified confidence level

s = estimate of the population standard deviation

d = acceptable difference of the estimate from the true mean



# Spatial Analysis

- Determine general distribution of water quality conditions, impairments
- Identify locations of critical areas, likely pollutant sources
- Determine impacts of a specific source

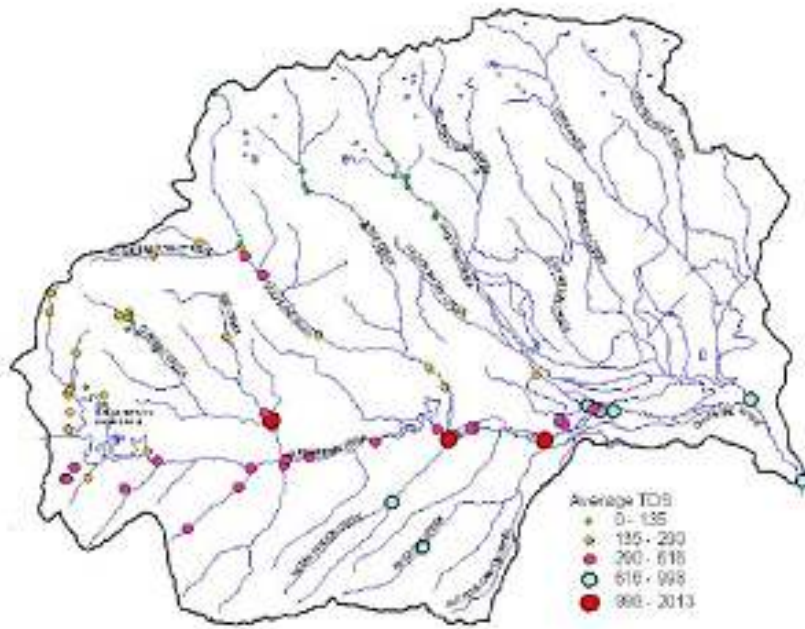
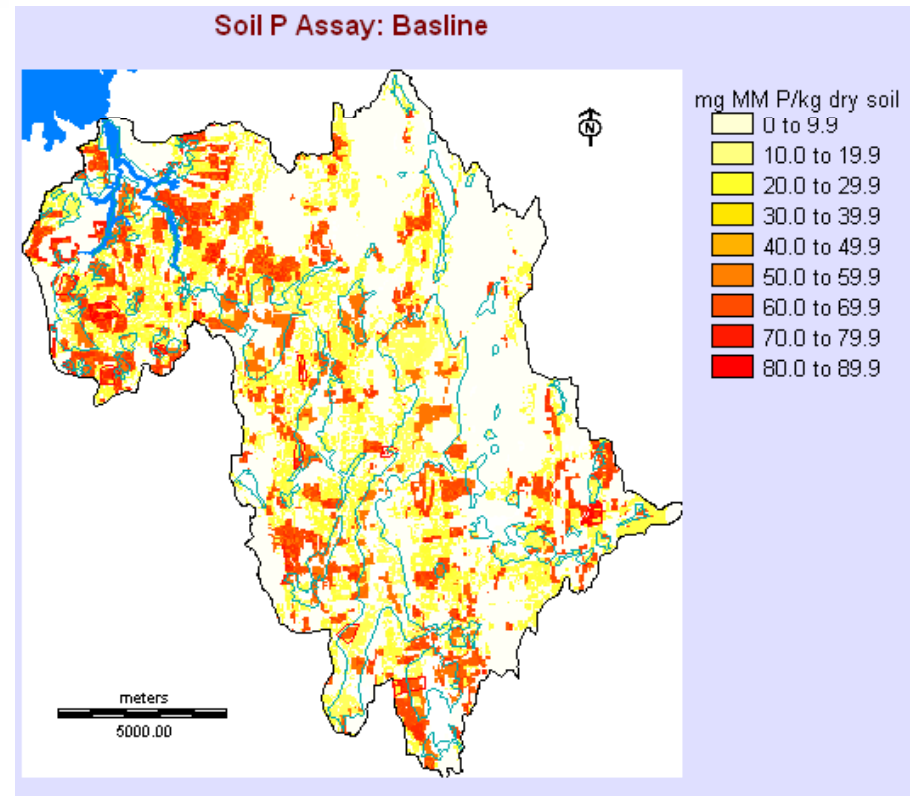


Figure 7-3. Example map of average total dissolved solids concentration throughout a watershed.

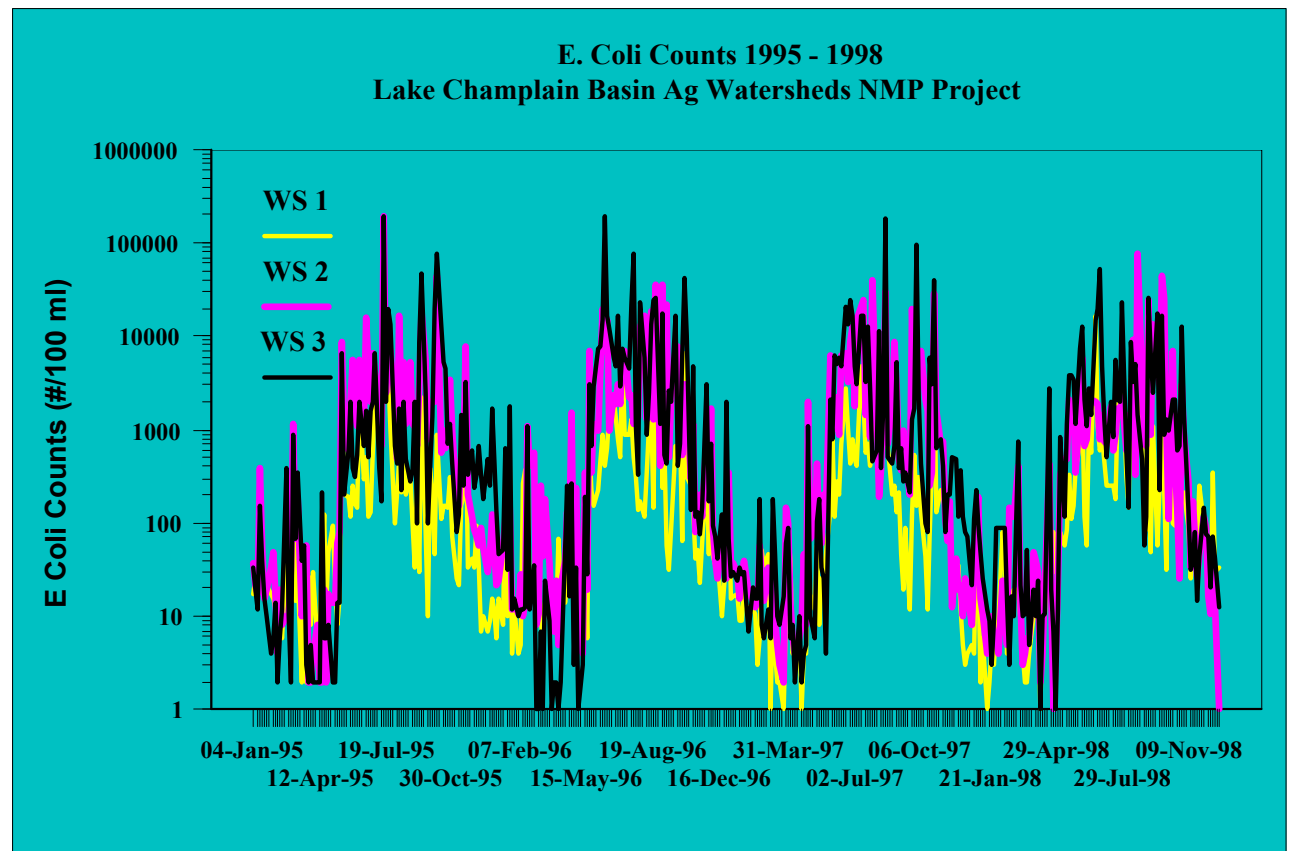


# Temporal Analysis

- Seasonality
- Trends
- Relationships with flow
- Relationships between constituents

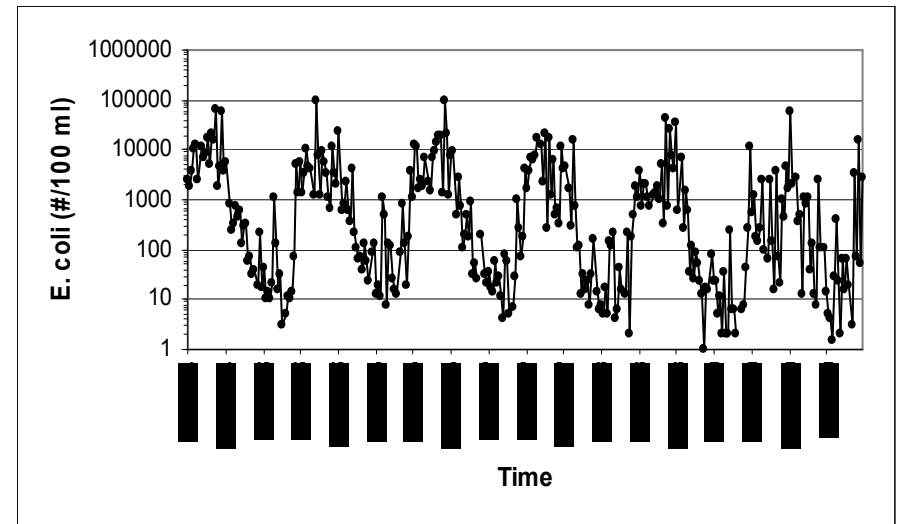
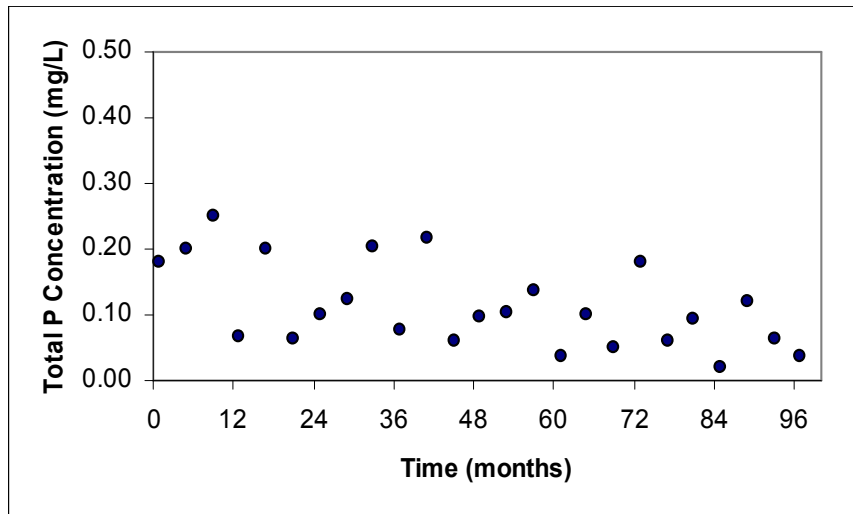
# Temporal Analysis

## Seasonality



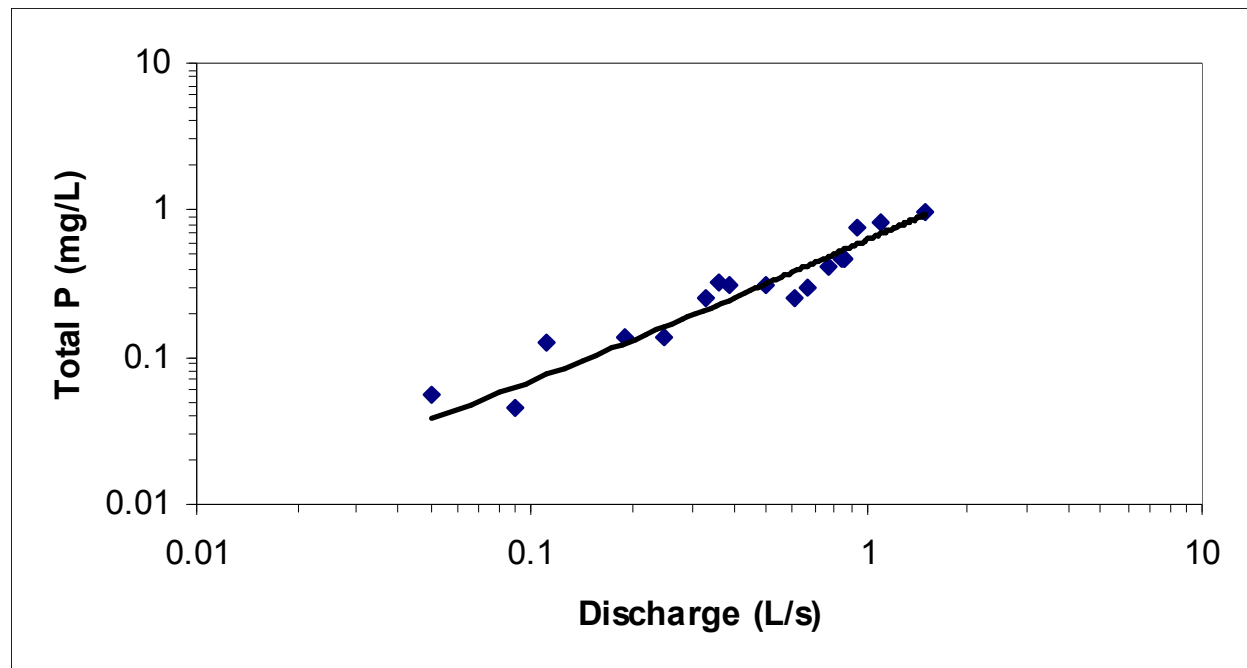
# Temporal Analysis

## Trends



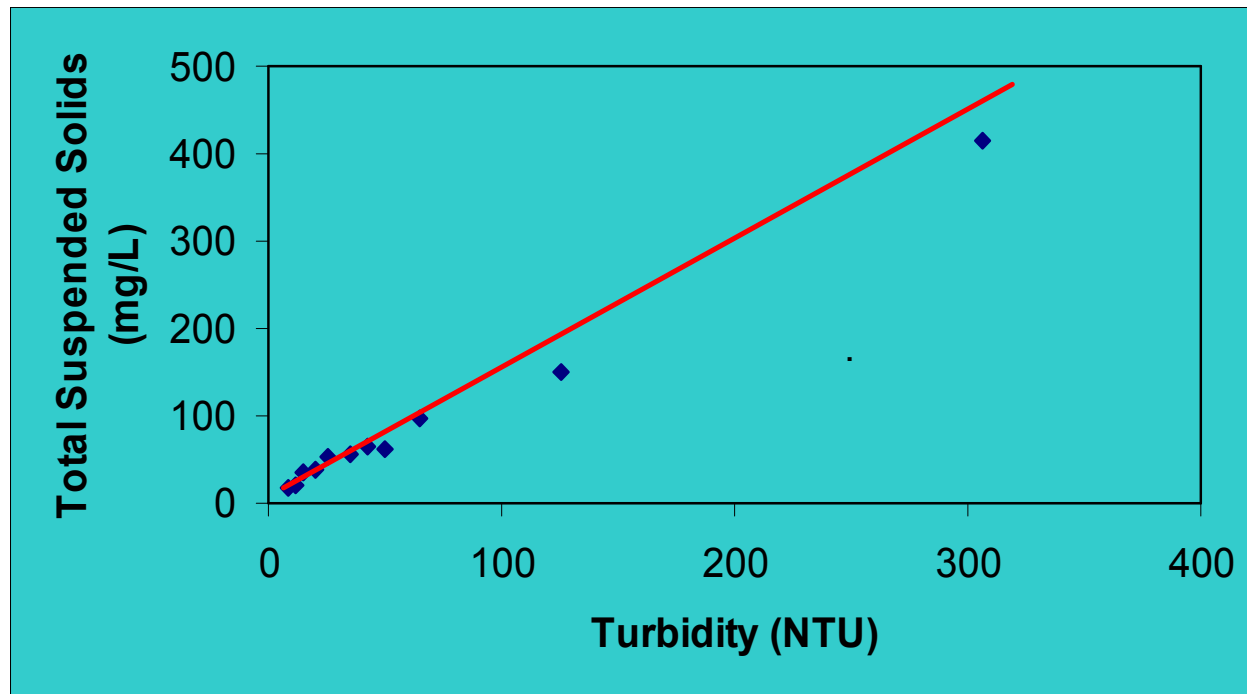
# Temporal Analysis

## Flow-concentration relationships



# Temporal Analysis

Relationships among constituents



# Identification of causes/sources

- Combine watershed observations + local knowledge + characterization analysis to identify causes and sources of impairment

