Evaluation of Water Quality Monitoring Data at the Local Level, a Reality Check

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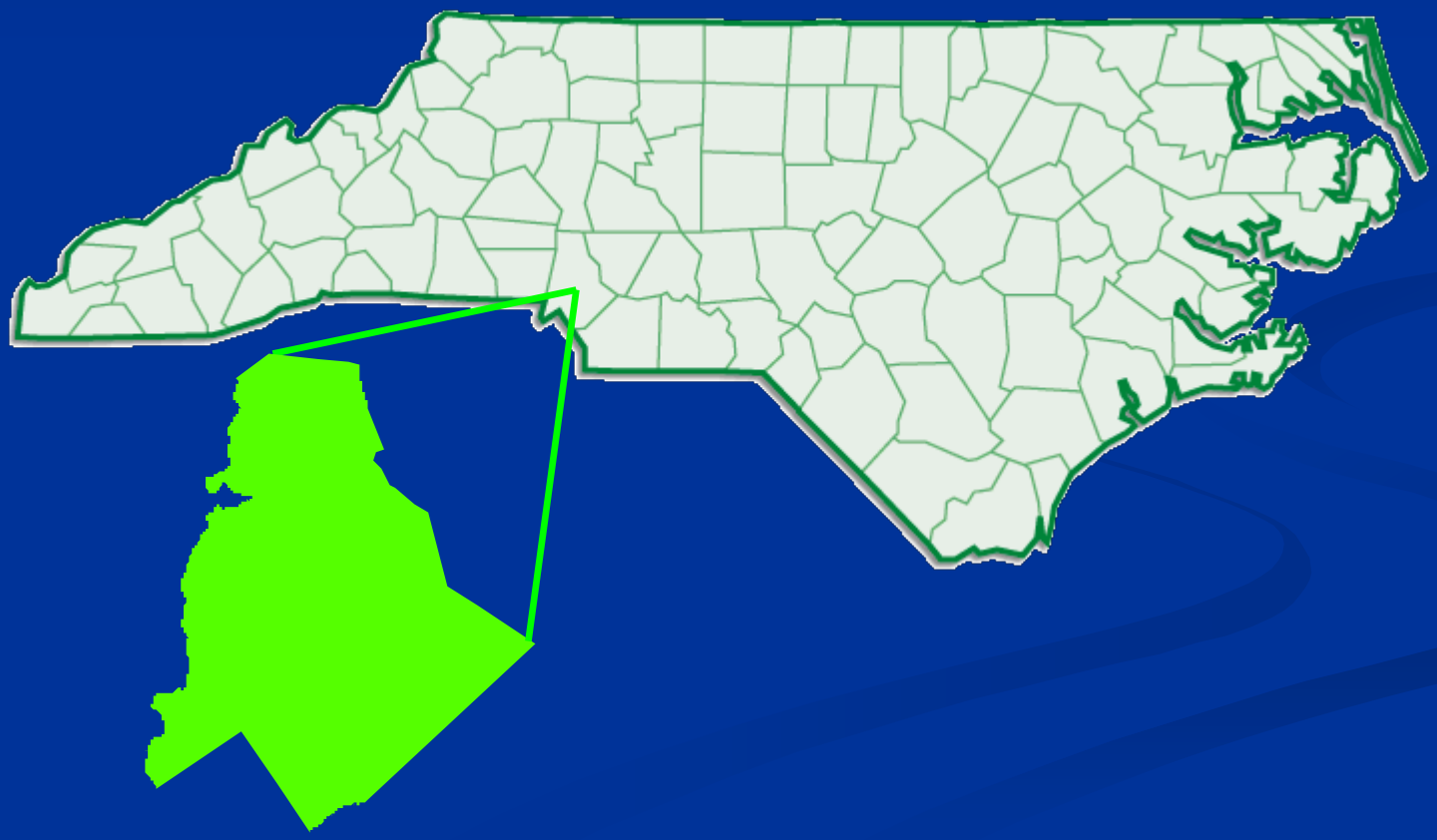


A Brief History Lesson

A Tip: Don't Go Near The Water

A Sewer Named Sugar

Evening Prayer

Catch Any Fish In Sugar? You Can Forget About It

THE CHARLOTTE NEWS, Sat. Sept. 13, 1969

The Creek Is Simply A Sewer

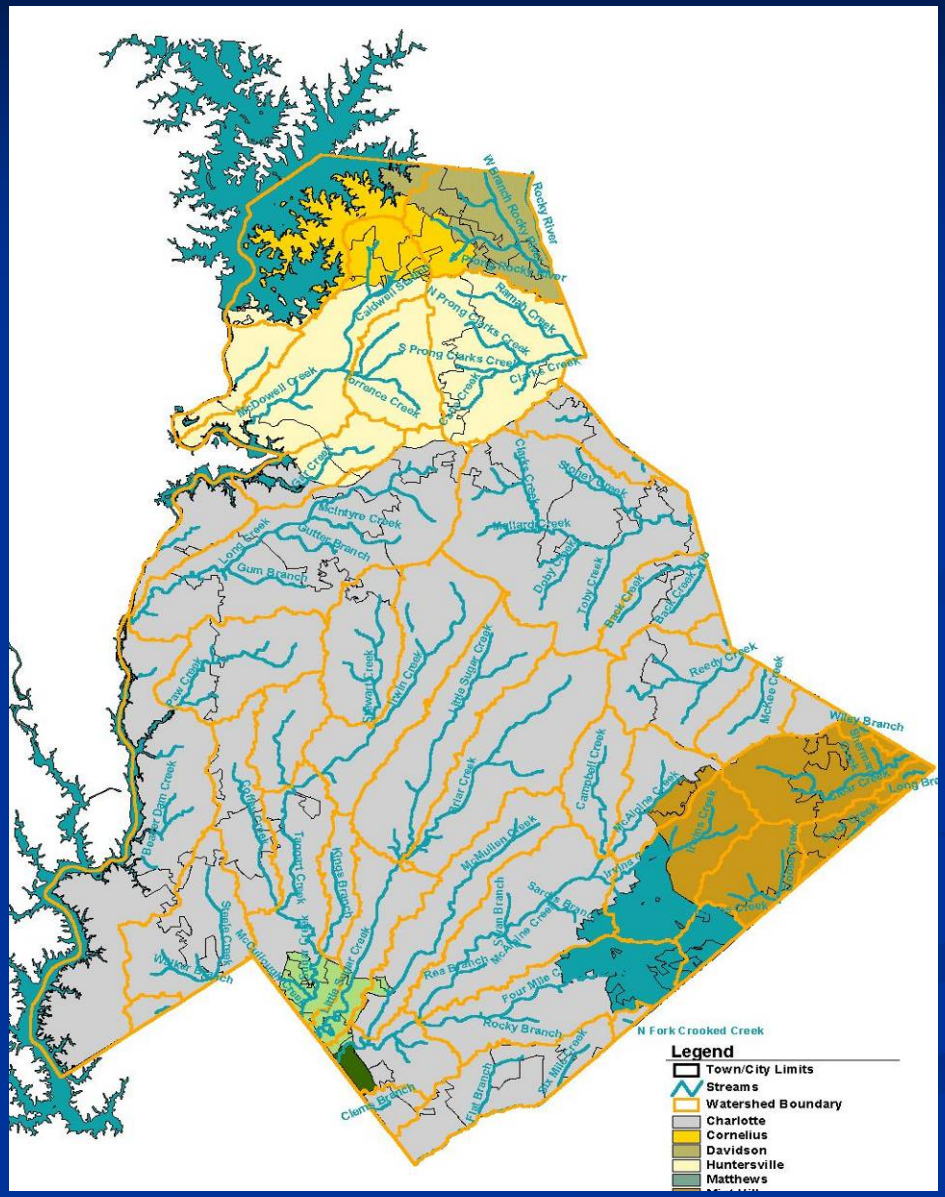
3 Chlorine Units Not Being Used

September 1969
Water Quality Articles

How do you address odor problems?

Use Deodorant

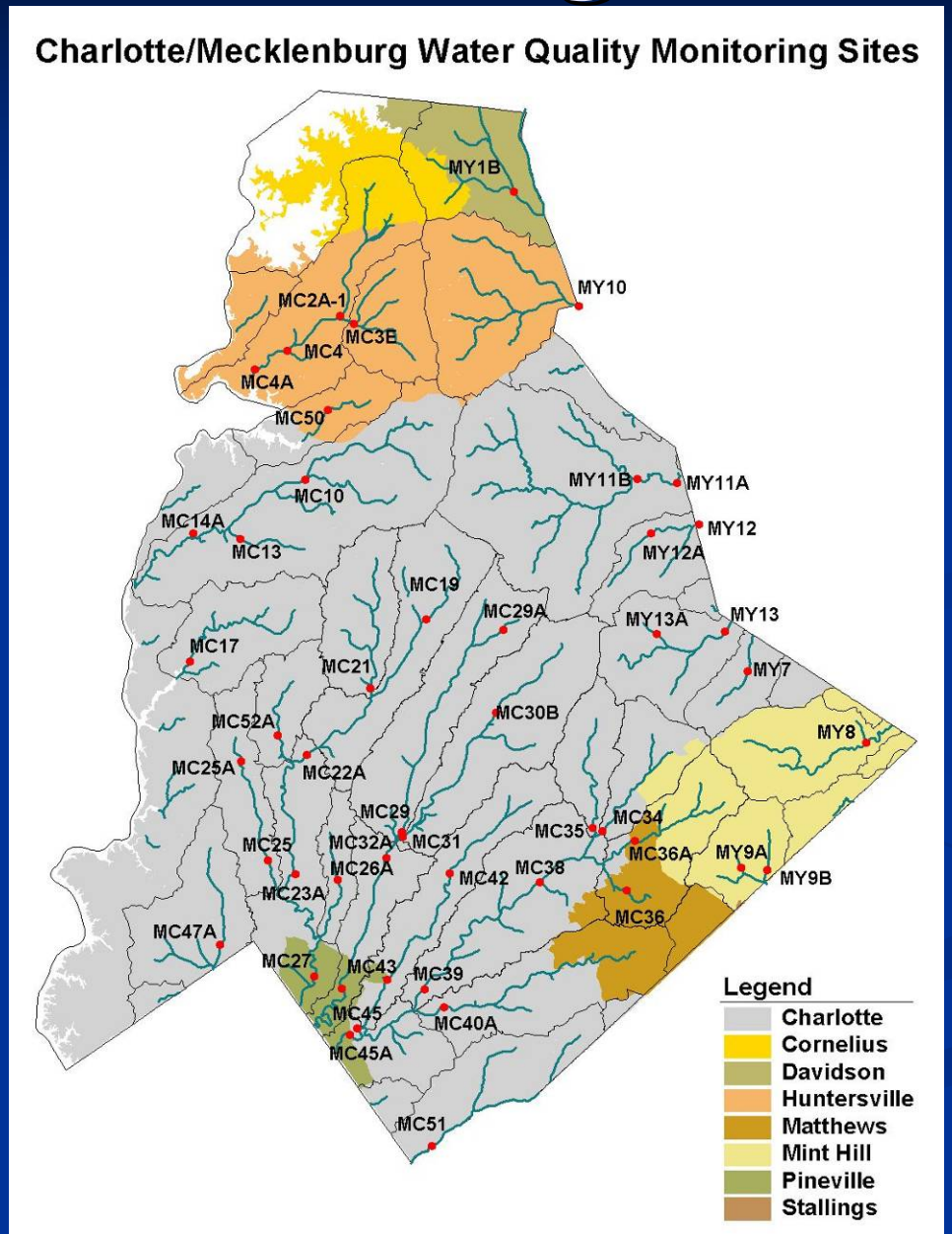
Headwater Streams



Monitoring Program Objectives

- Identify general water quality conditions
- Assess effectiveness of program activities and identify trends
- Designated Use assessment / TMDL compliance
- Pollutant source identification
- Support management initiatives

Monitoring Sites



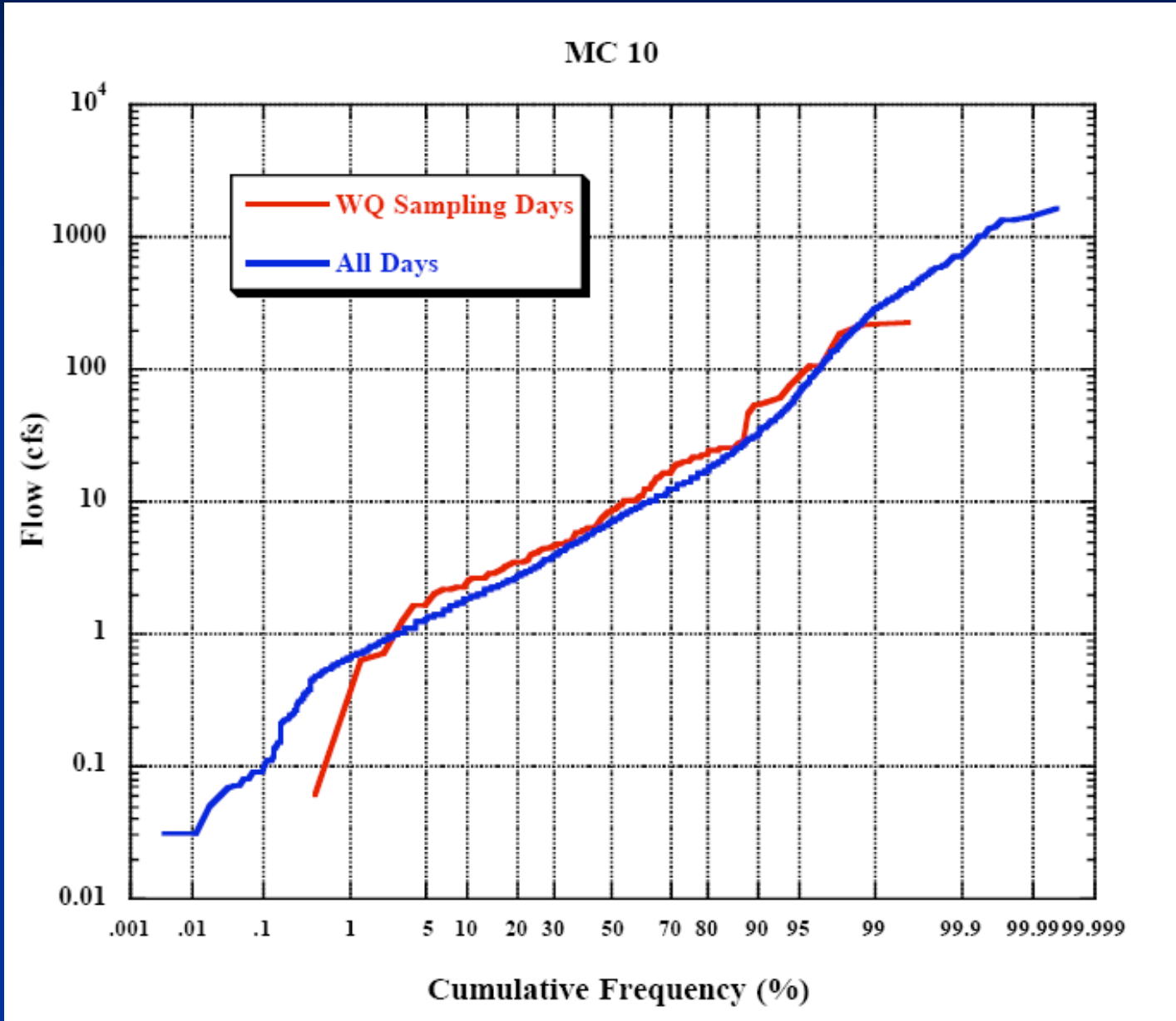
Monitoring Evaluation Goals

- Is the sampling program adequate in capturing the full range of flow conditions?
- How useful is the program in establishing pollutant concentration and loading trends (assess program effectiveness)?
- Should the program be modified to reduce cost and/or increase cost effectiveness?

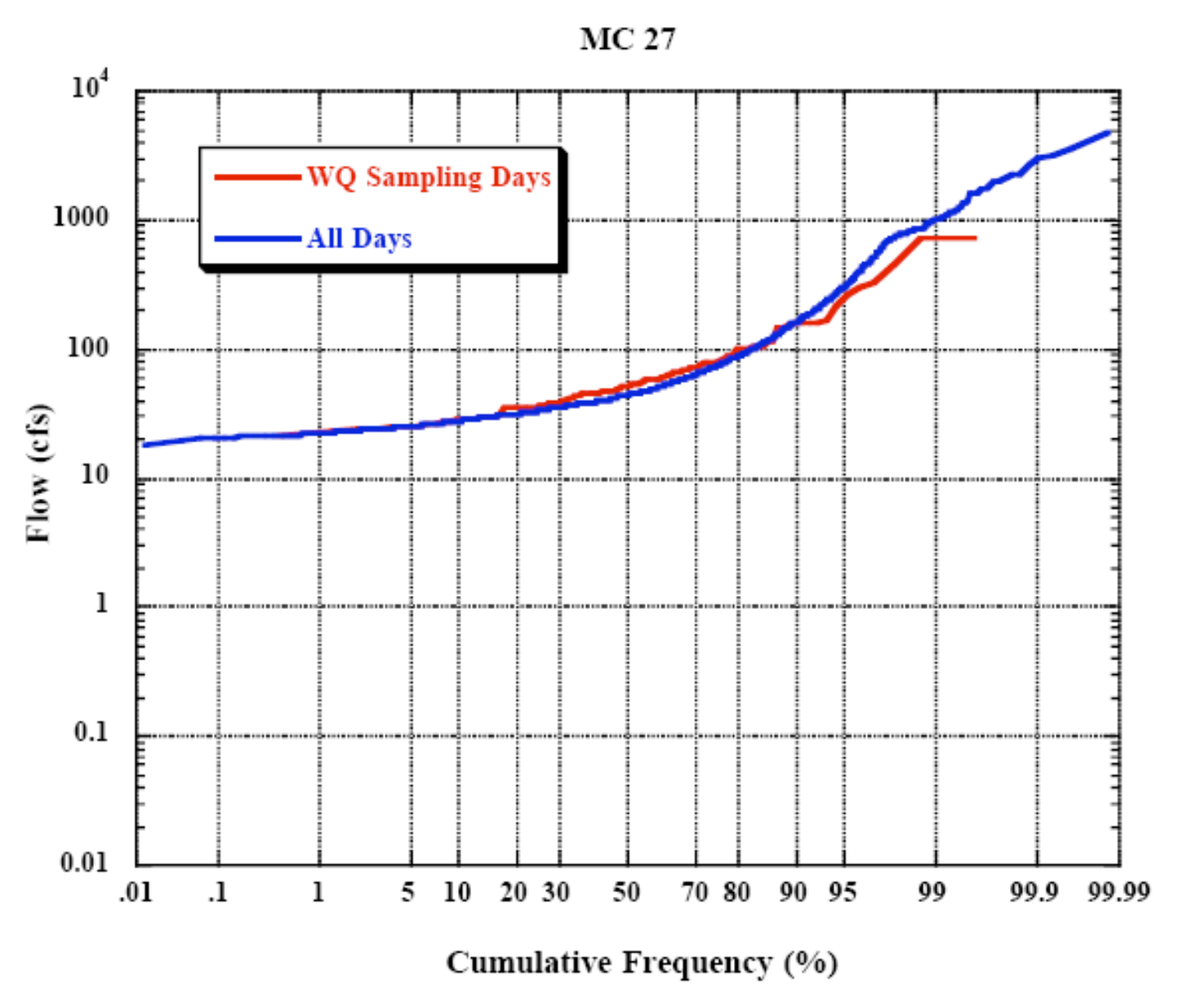
Flow distribution Analysis

- Cumulative frequency distributions were determined for entire flow record
- Second streamflow distribution was calculated based on streamflow measured on sampling days
- Comparison of distributions assesses whether full range of streamflows are included in data set
- Important because bias in streamflow distribution could produce a bias in loading estimates
- Stations grouped according to presence of upstream WWTP and whether stormwater samples were collected

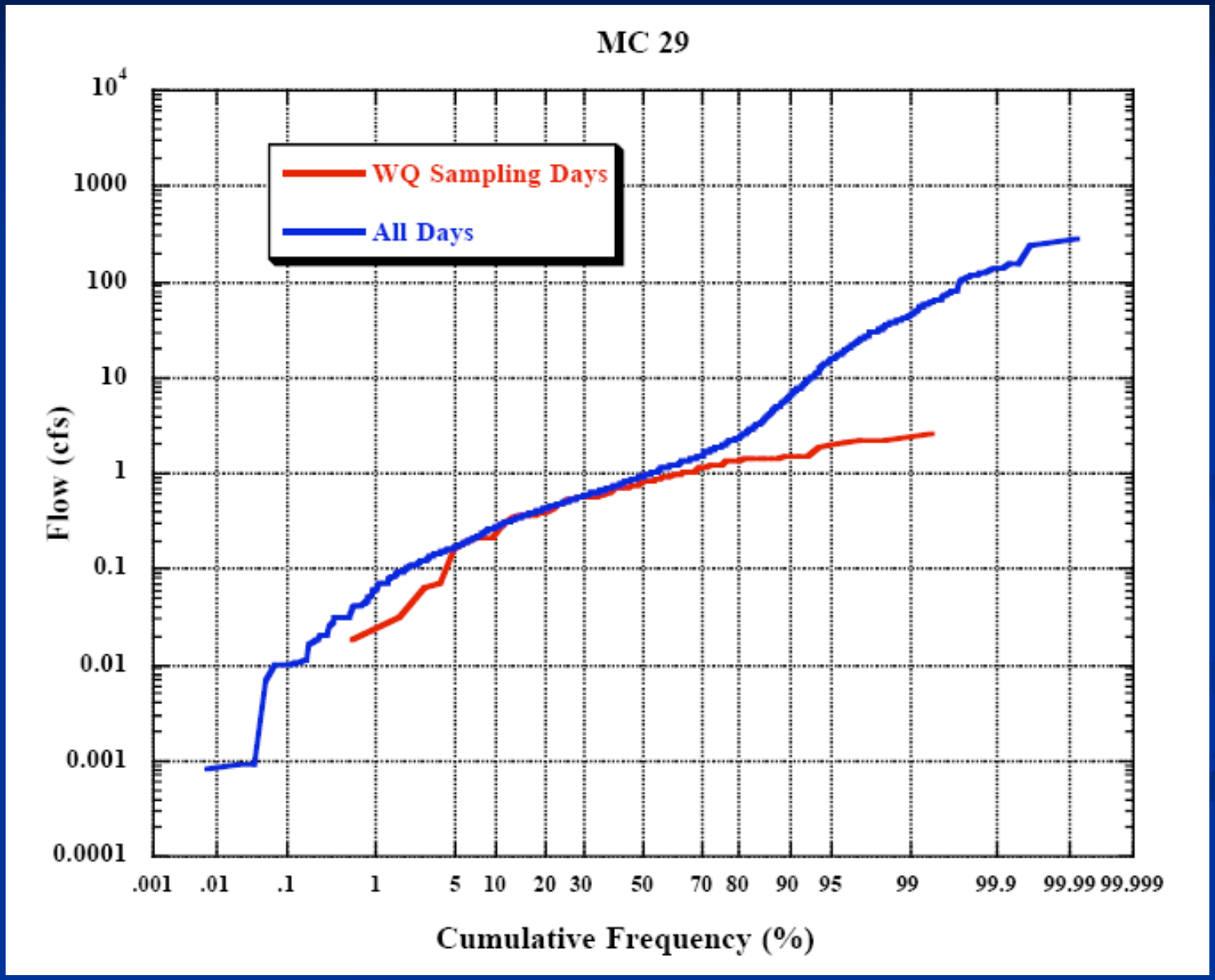
No Upstream WWTP, Ambient and Stormwater Samples



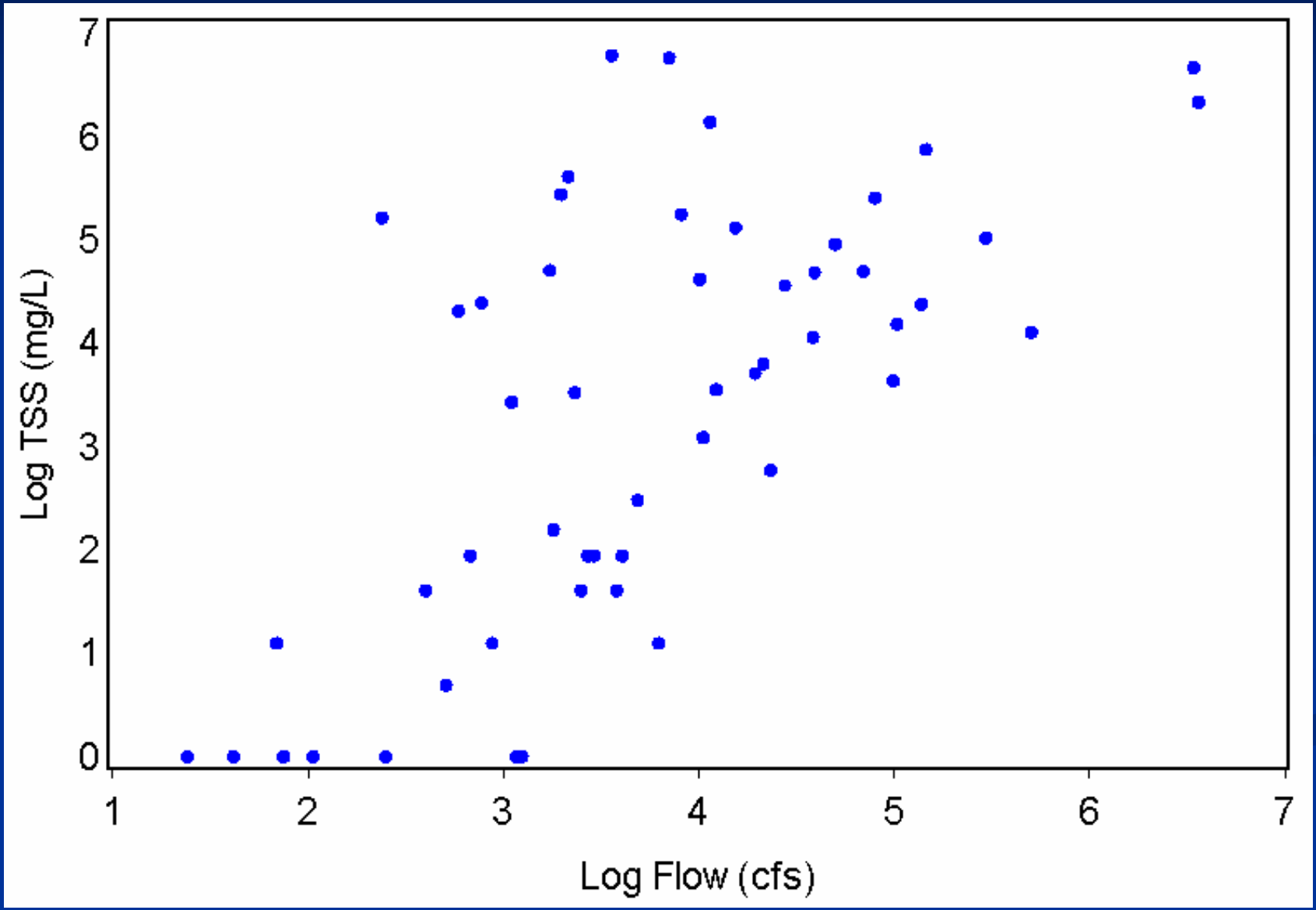
Upstream WWTP, Ambient and Stormwater Samples



No Upstream WWTP, Only Baseflow Samples



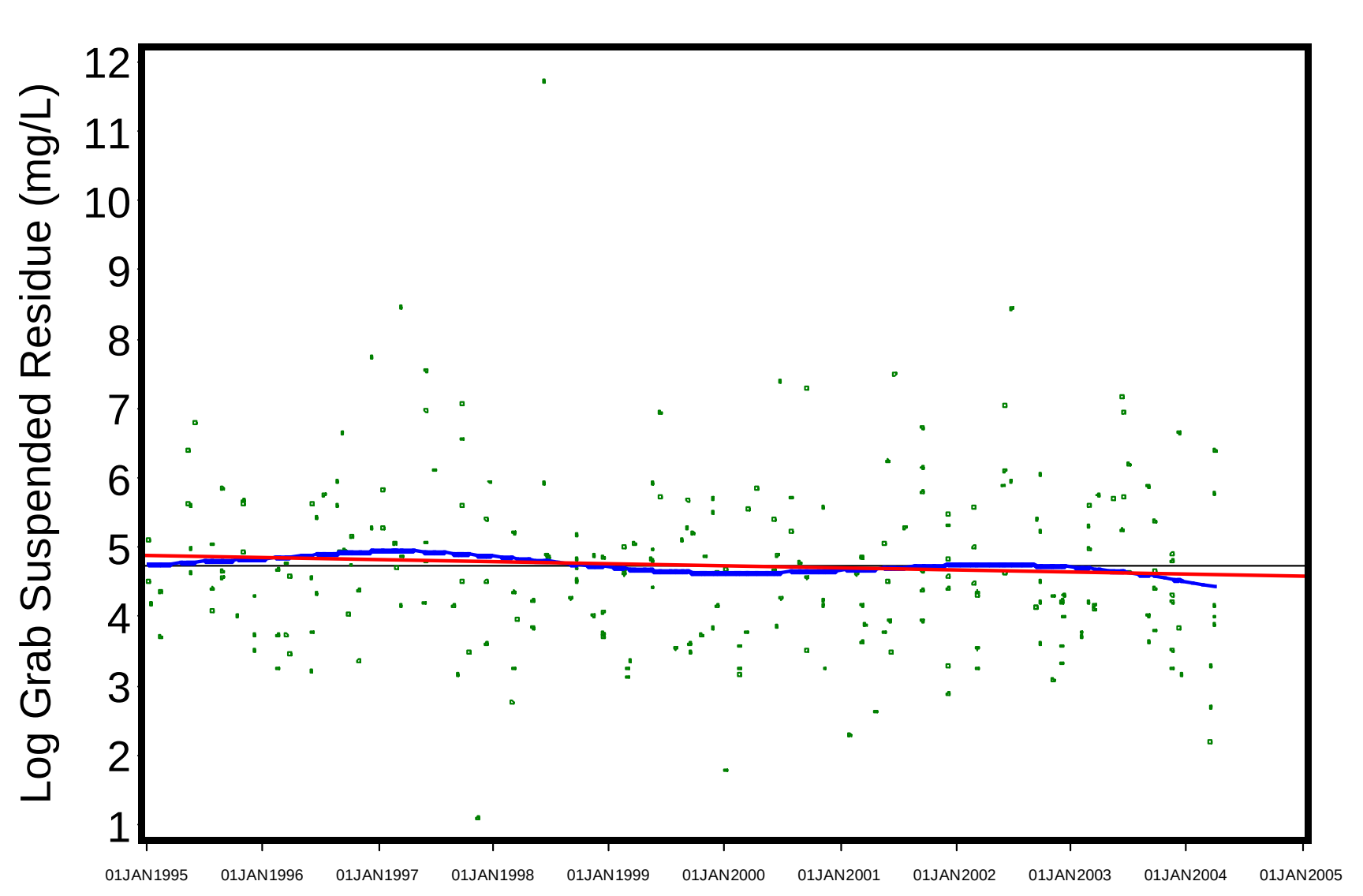
Flow-Concentration at MC-45



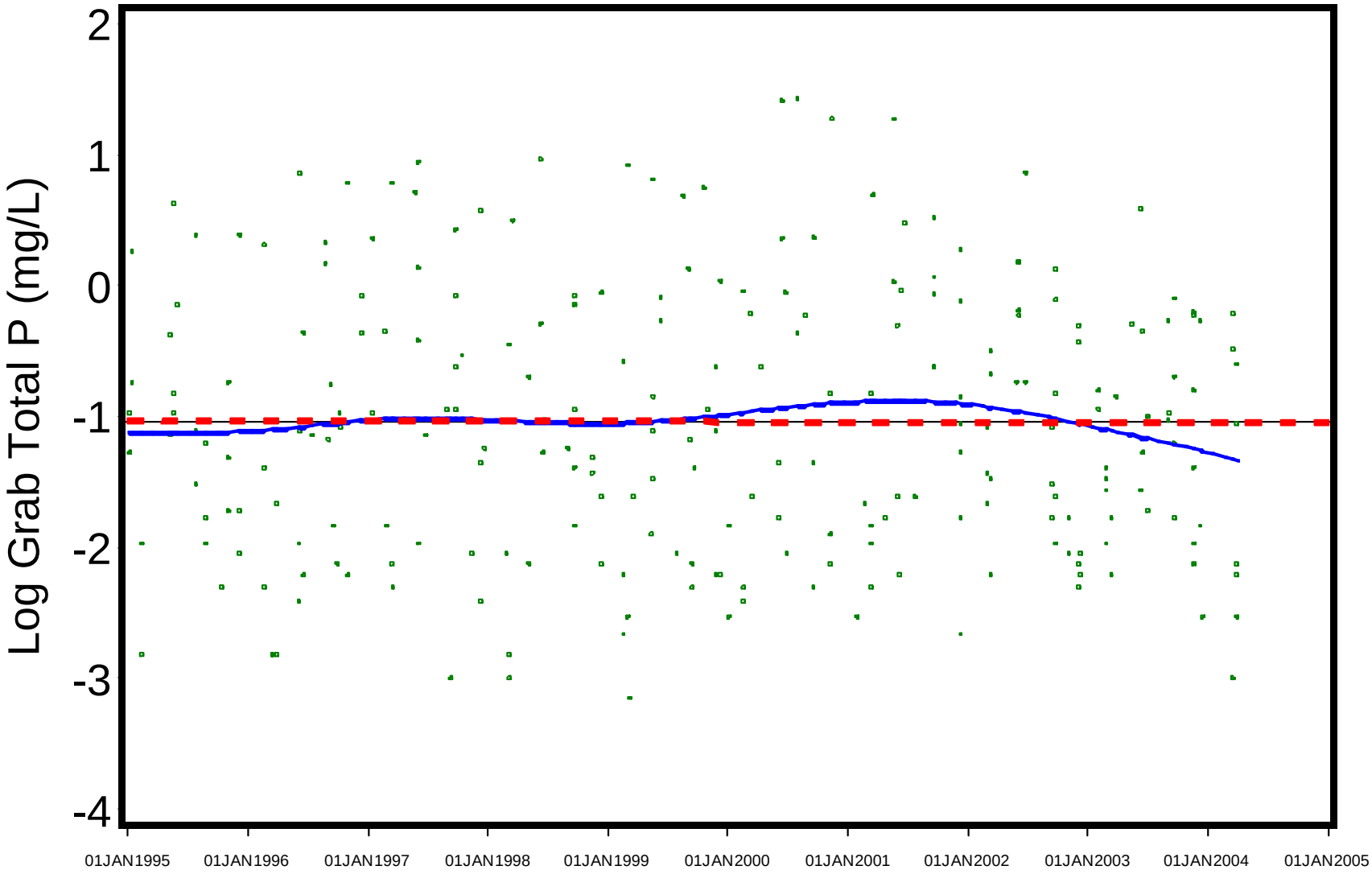
Trend Analysis

- Important to gage program effectiveness
- Time plots of data from all monitoring stations for each constituent was examined for a broad visual assessment
- Regression lines were generated indicating the overall change that has occurred with time
- Two-sample t-test approach was used to provide an approximation of number of samples required to discern a change in the mean concentration of each water quality characteristic

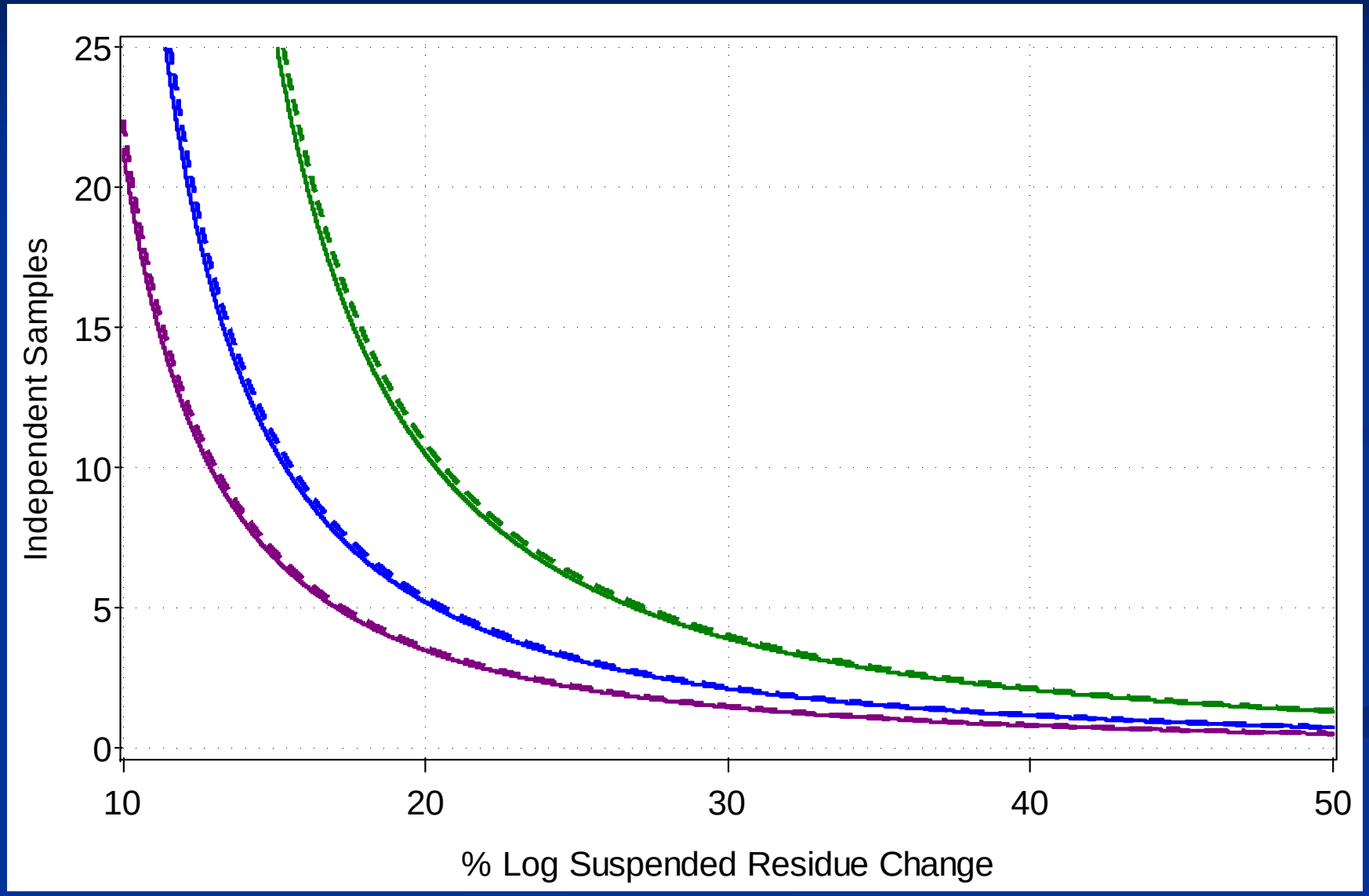
Time Series – Suspended Residue



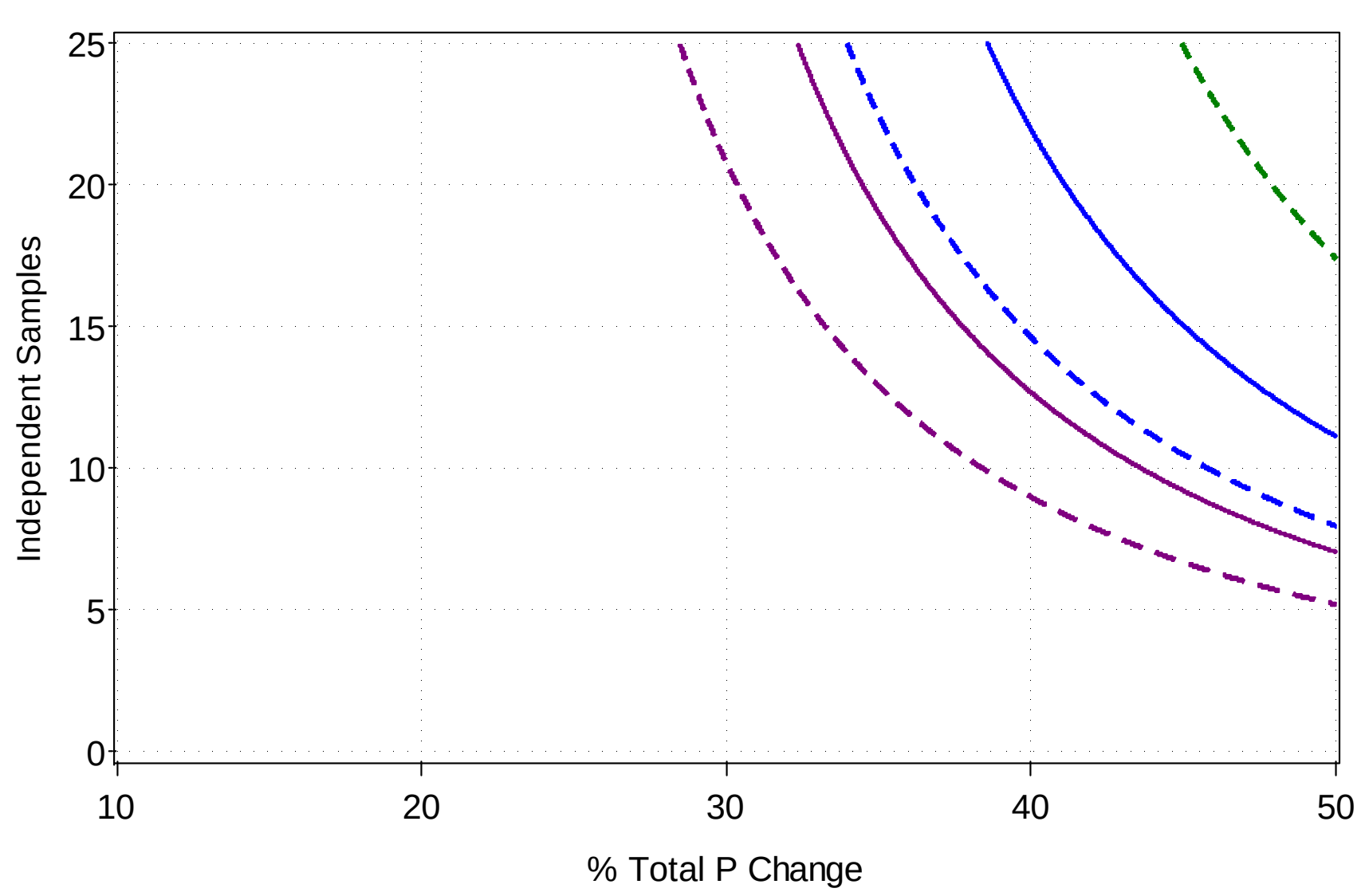
Time Series – Total Phosphorus



T-Test Results for Suspended Residue



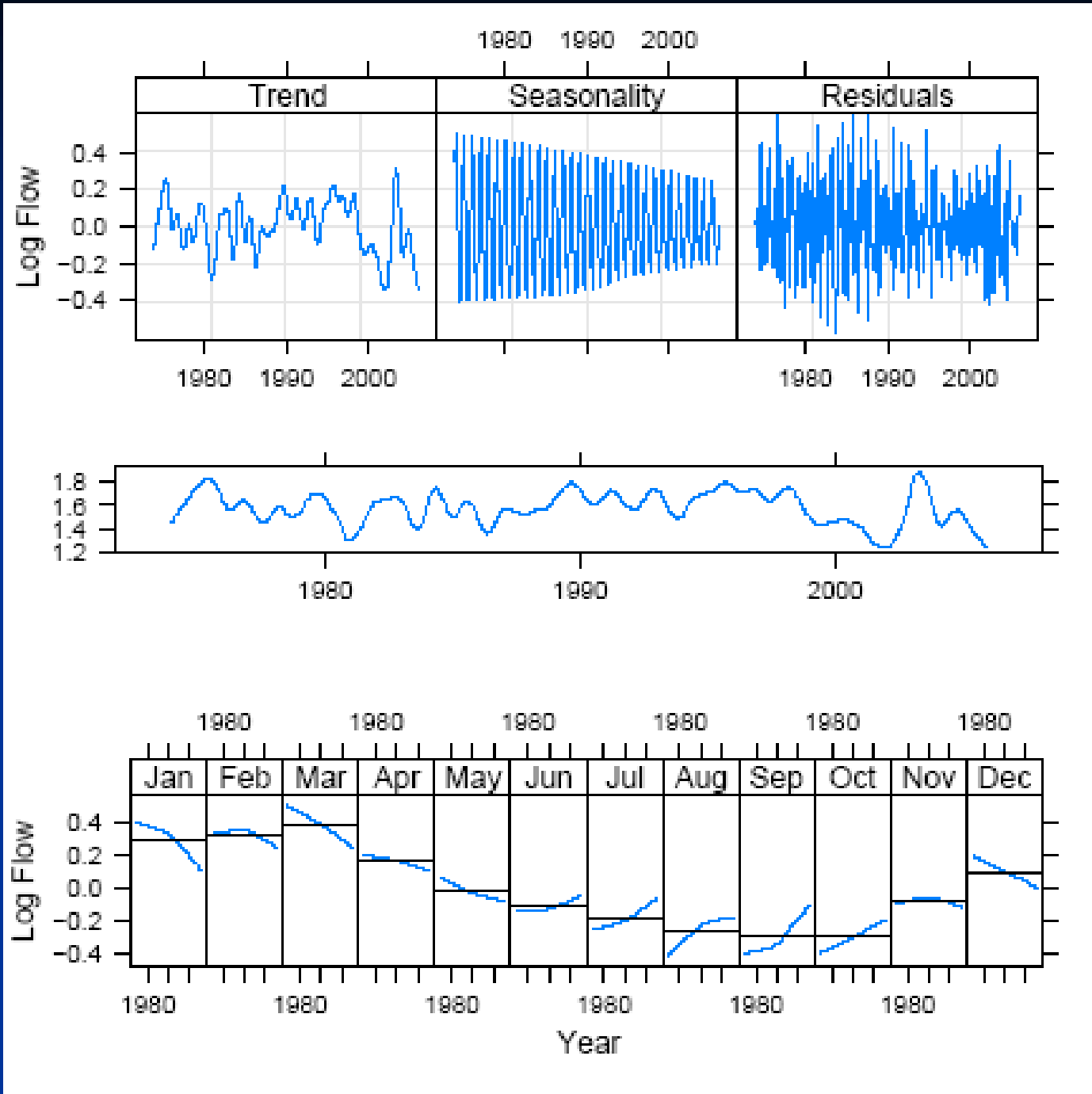
T-Test Results for Total Phosphorus



Program Recommendations

- Shift focus of water quality sampling from watershed scale to smaller spatial scale where changes are more likely to be detected
- Make additional use of continuous monitors along with flow and water quality measurements to assess creek conditions
- Make additional use of water quality information collected by other agencies to assess water quality conditions

Trend Analysis of Flow Regime



Reality Check

- Identify general water quality conditions
  - Stormwater samples needed to capture flow regime
  - Water chemistry only a part of the story
  - Public understanding of chemical data
  - Habitat / visual assessment may be better
- Assess effectiveness of program activities and identify trends
  - Cannot identify trends with current protocols
  - Number of samples needed cost prohibitive
  - Potential to move station upstream to project locations where changes more likely detected

Reality Check (continued)

- Designated Use assessment / TMDL compliance
  - State relies mostly on benthic macroinvertebrate data / habitat to assess use attainment
  - TMDL compliance points at bottom of watersheds
- Pollutant source identification
  - Cannot determine sources at the watershed scale
- Support management initiatives
  - NPDES Permits require data collection
  - Limited guidance given regarding how to use / interpret data

Questions?

- Contact information

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