A Systematic Approach in Evaluating the Source/Sink Behaviors for Water Quality Parameters in an STA Canal

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Study Objectives

- Do total phosphorus (TP) concentrations change when conveyed along Stormwater Treatment Area (STA) Canals?
- How much TP has accumulated in or exported from an STA canal over time?
- What are potential influencing factors?

Study Approach

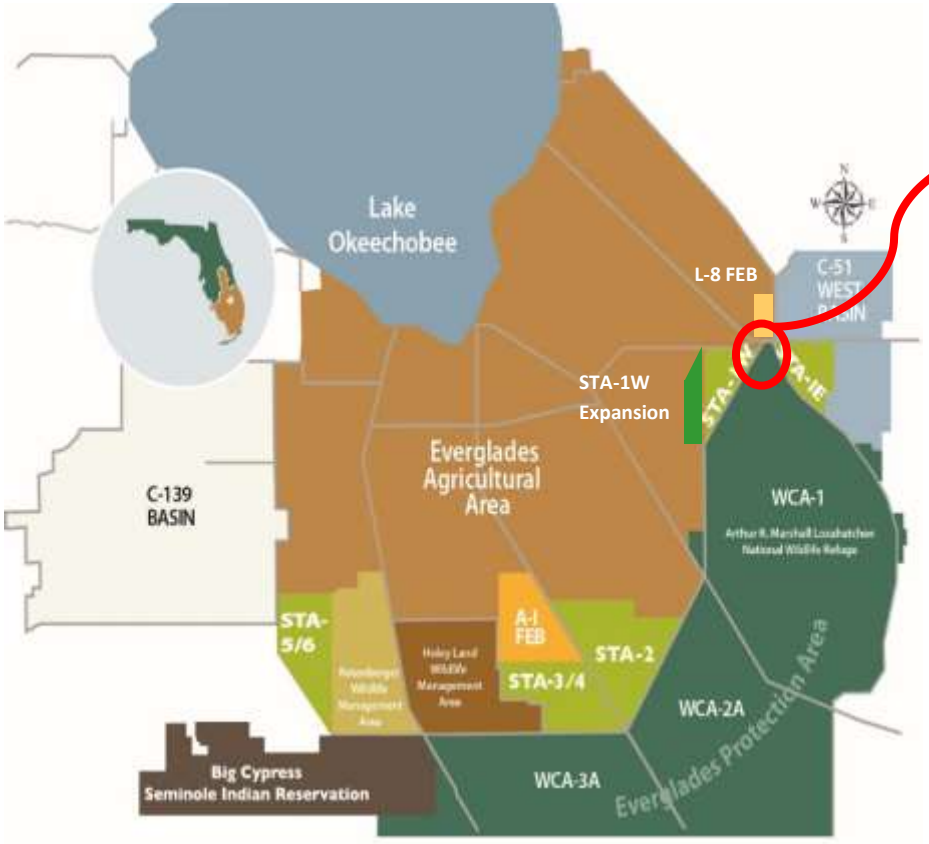
Part I: Water quality concentration variability and trend analyses

Part II: Nutrient accumulation or export using mass balance analyses

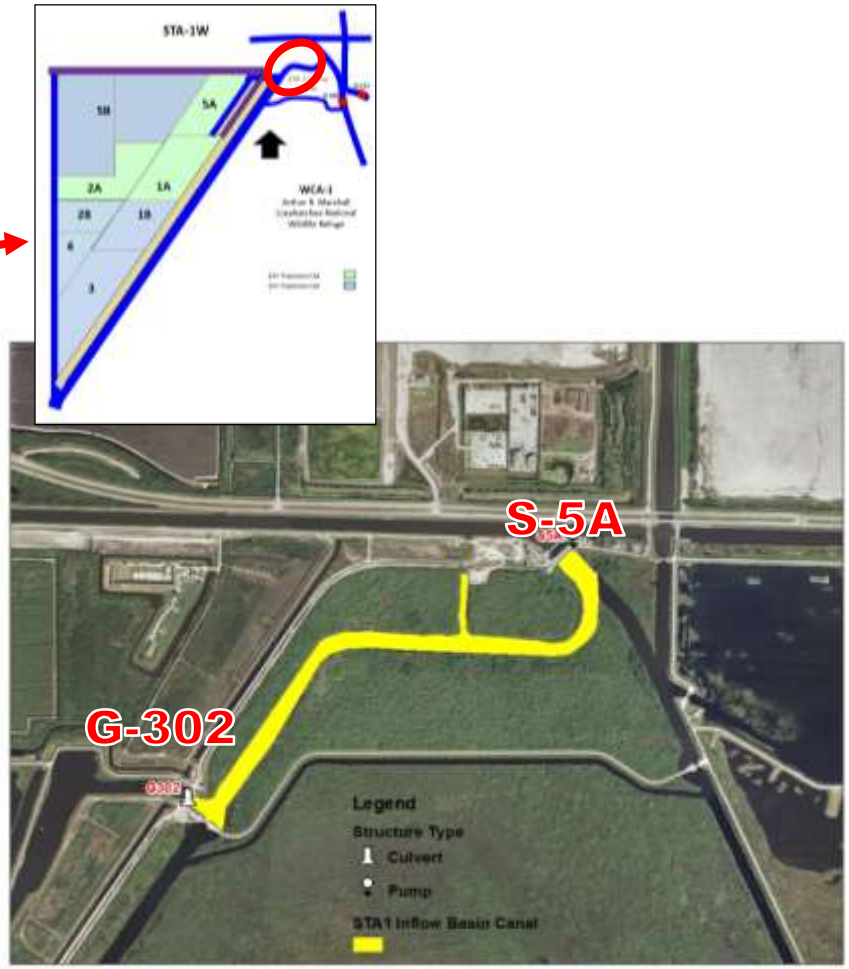
Part III: Flow event-based mass balance for TP and other water quality parameters

Part IV: Evaluate potential influencing factors of water quality changes in canals

Project Location



Location Map



STA-1 Inflow Basin Canal

Data

Data Sources

Flow and water quality concentration data at S-5A and G-302 from 2000 to 2013

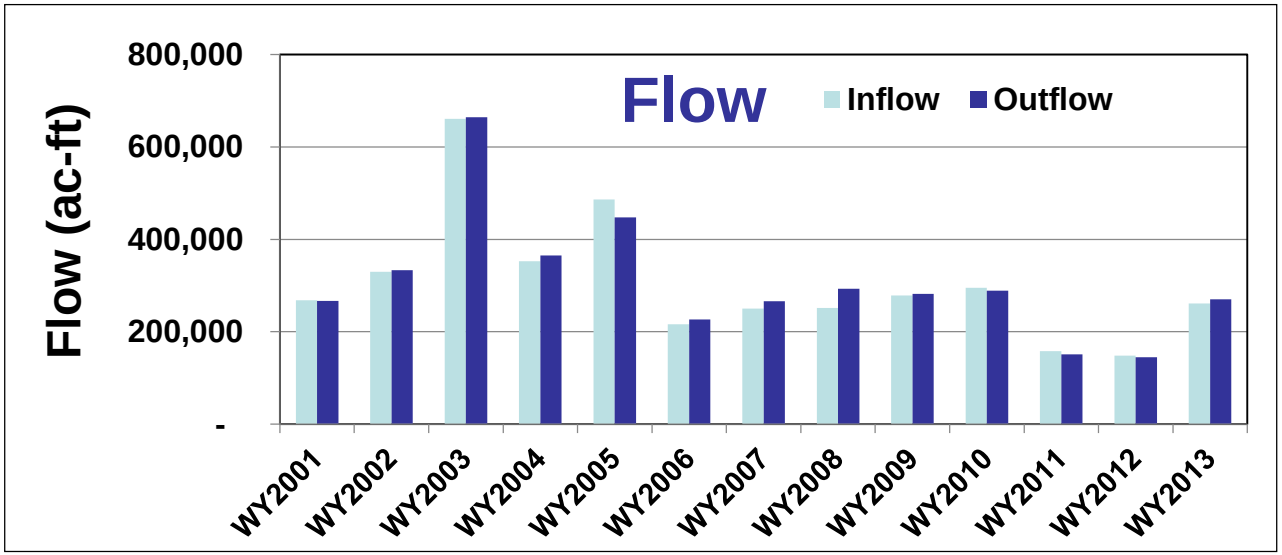
Water Quality Parameters

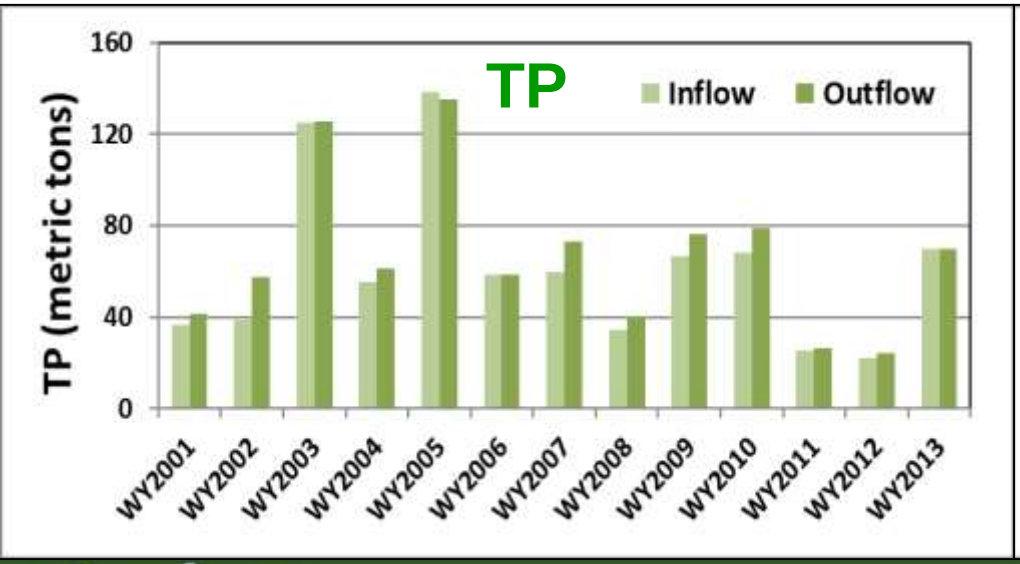
- Total pohosphorous (TP)
- **Total dissolved phosphorous** (TDP)
- Soluble reactive phosphorus (SRP)
- Particulate phosphorous (PP)
- Dissolved organic ohosphorous (DOP)
- Total suspended solid (TSS)
- Dissolved chloride (CLD)

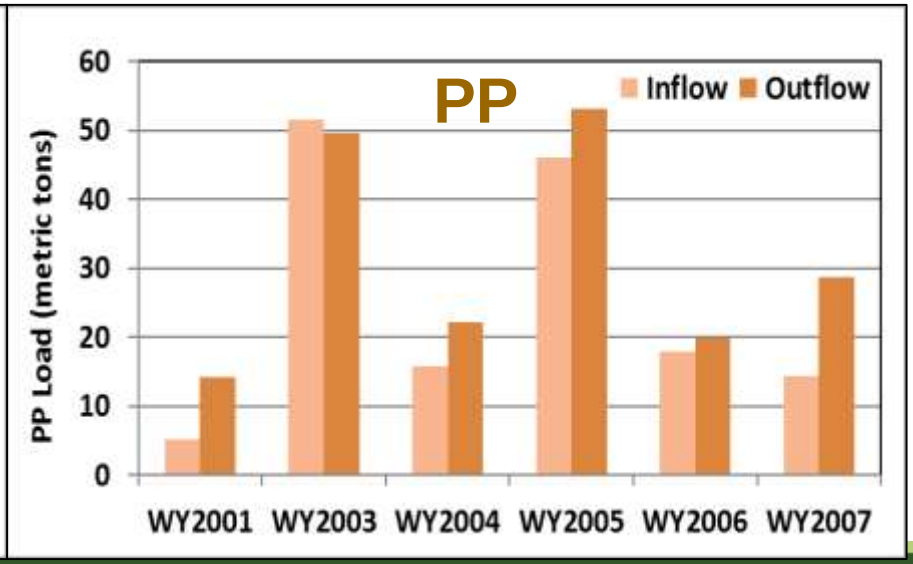
Part I: Wilcoxon Signed-Rank test

- TP and PP concentrations at downstream G-302 were significantly higher than at upstream S-5A
- TSS statistically higher at G-302 than at S-5A but not practically higher
- DOP, TDP, and SRP were significantly lower at G-302 than at S-5A
- CLD showed no difference

Part II: Annual Mass Balance Results



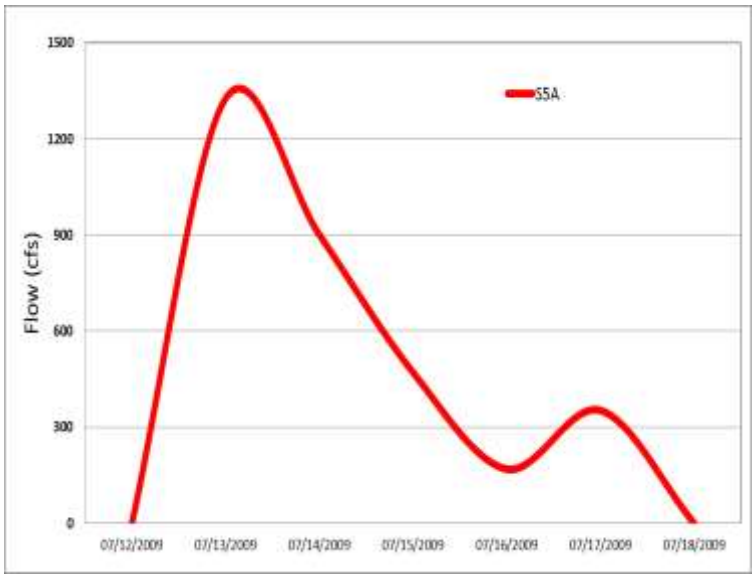


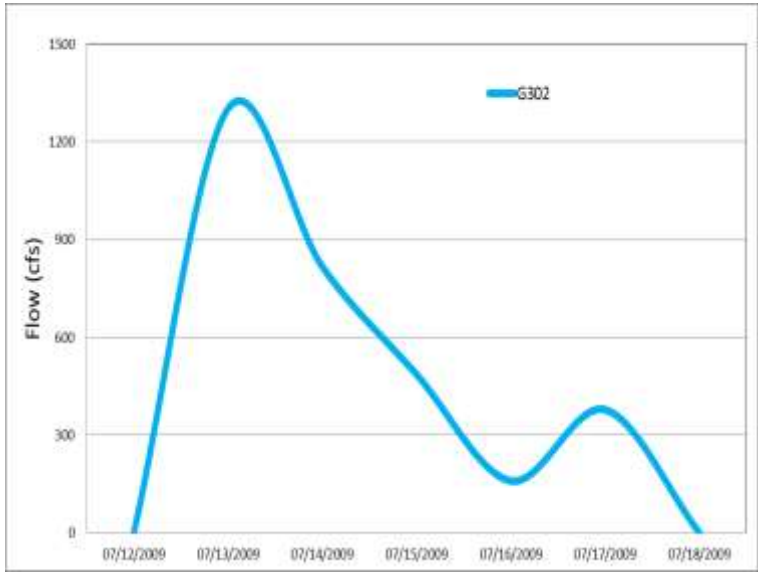


Part III: Event-Based Analysis

S-5A (Upstream)

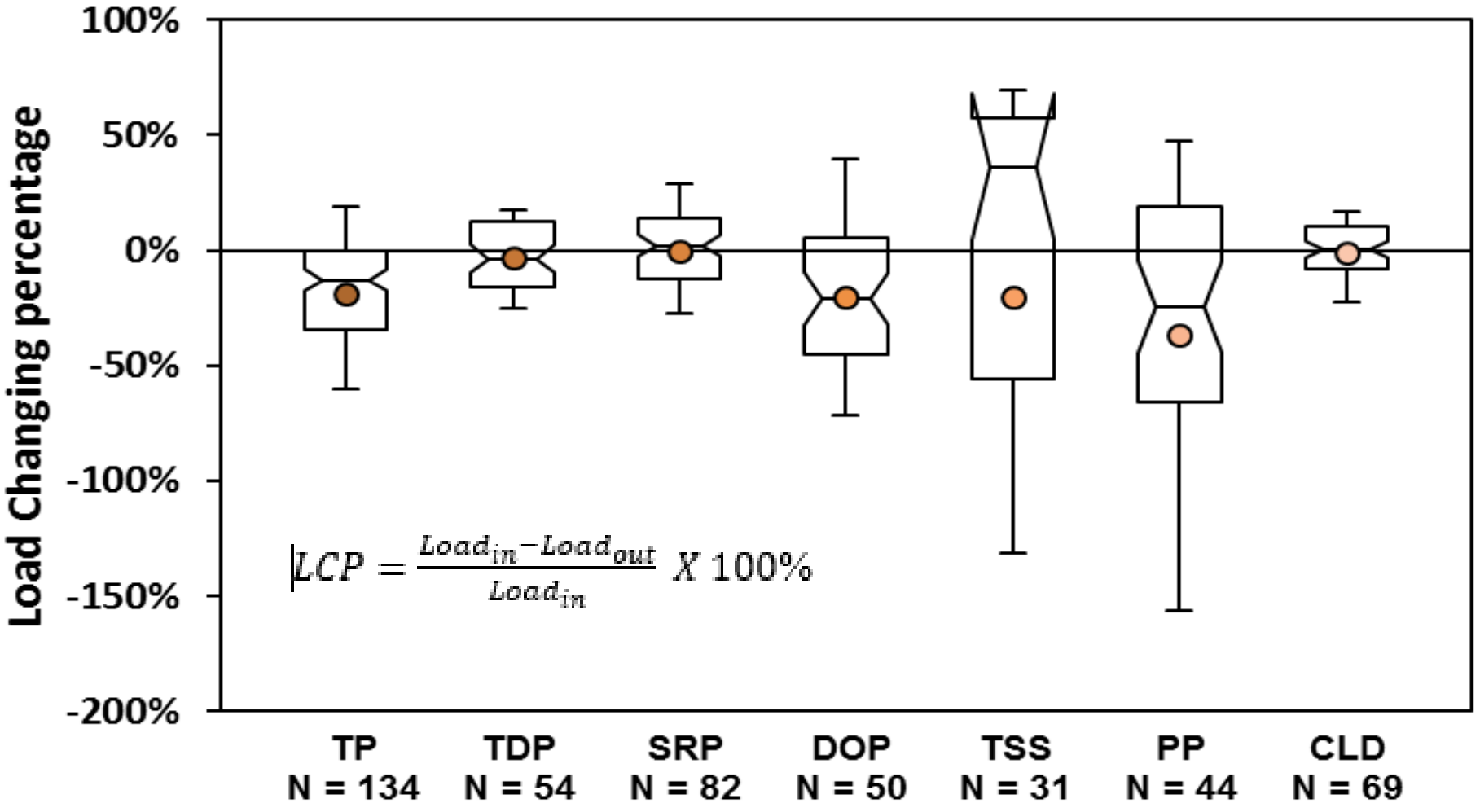
G-302 (Downstream)





Flow Event Hydrograph Comparison

Part III: Event-Based Results

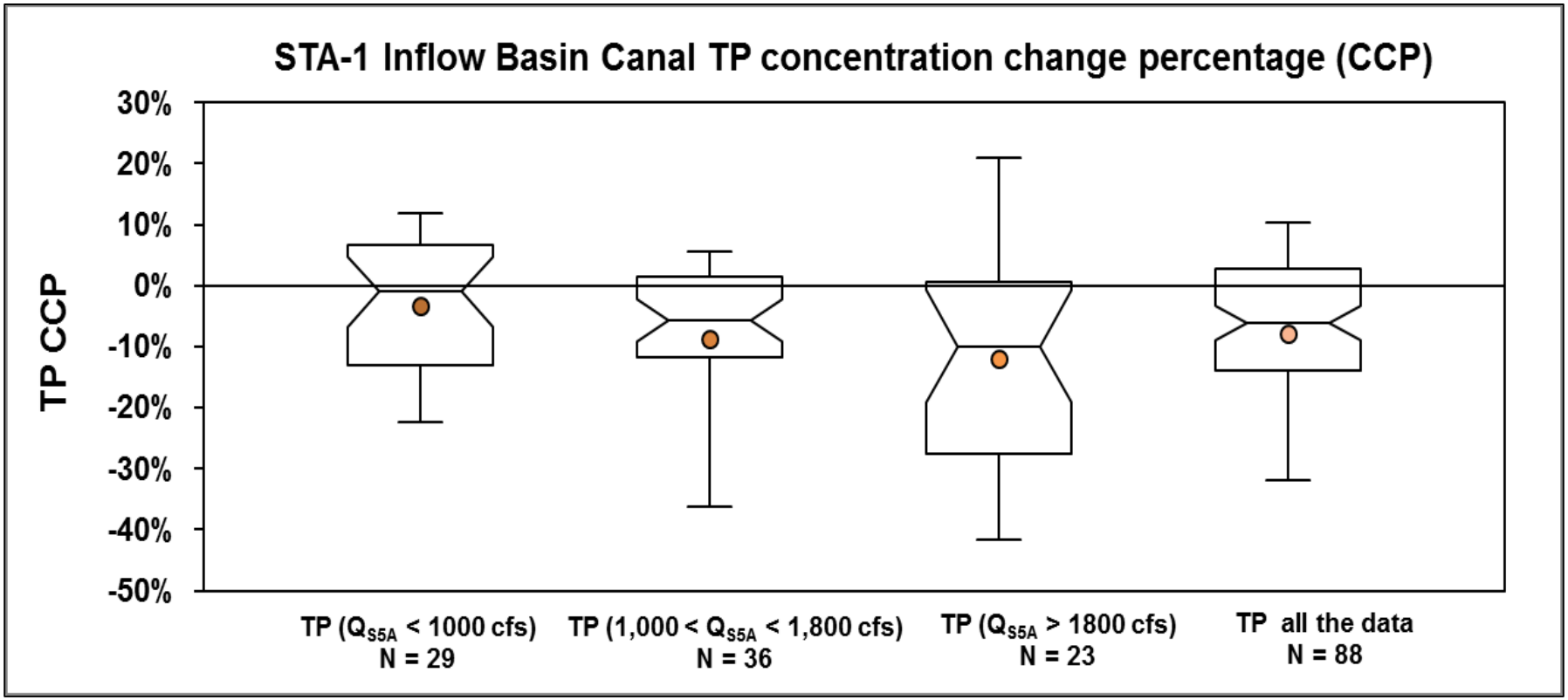


Part IV: Potential Influencing Factors

- **Evaluate relationships between water quality changes and Influencing factors: flow, velocity, and stages**

- **Approach**
  - **Descriptive Statistics**
  - **Correlation Analysis**
  - **Regression Analysis**

Influencing Factors



As flow and velocity increase, the TP concentrations at the downstream structure were higher.

Summary

- **Concentration and load-based analyses show STA-1 Inflow Basin Canal was TP source during the period analyzed**
- **TP load exported was mainly particle phosphorous**
- **Flow and velocity were shown to be influencing factors**
  - **New upstream L-8 Flow Equalization Basin is expected to reduce high flow frequency**


Questions ?