



## To Move or not to Move

Water quality and sediment entrainment responses to two flow events

*Sue Newman, M. Manna, K. Seitz, E. Tate-Boldt, C. Hansen, E. Cline, C. Saunders*



# The DECOMP Physical Model

**Addresses two of six uncertainties that hindered movement of CERP DECOMP**

Ecological need to backfill canals

Ecological benefit of sheetflow

## **DPM Science Plan**

An objective of DPM is to build structural features that will cause a range of surface water velocities to occur in marginally degraded portion of the natural system.

The creation of this “flow field” should allow the evaluation of the spatial variability of particle and nutrient transport

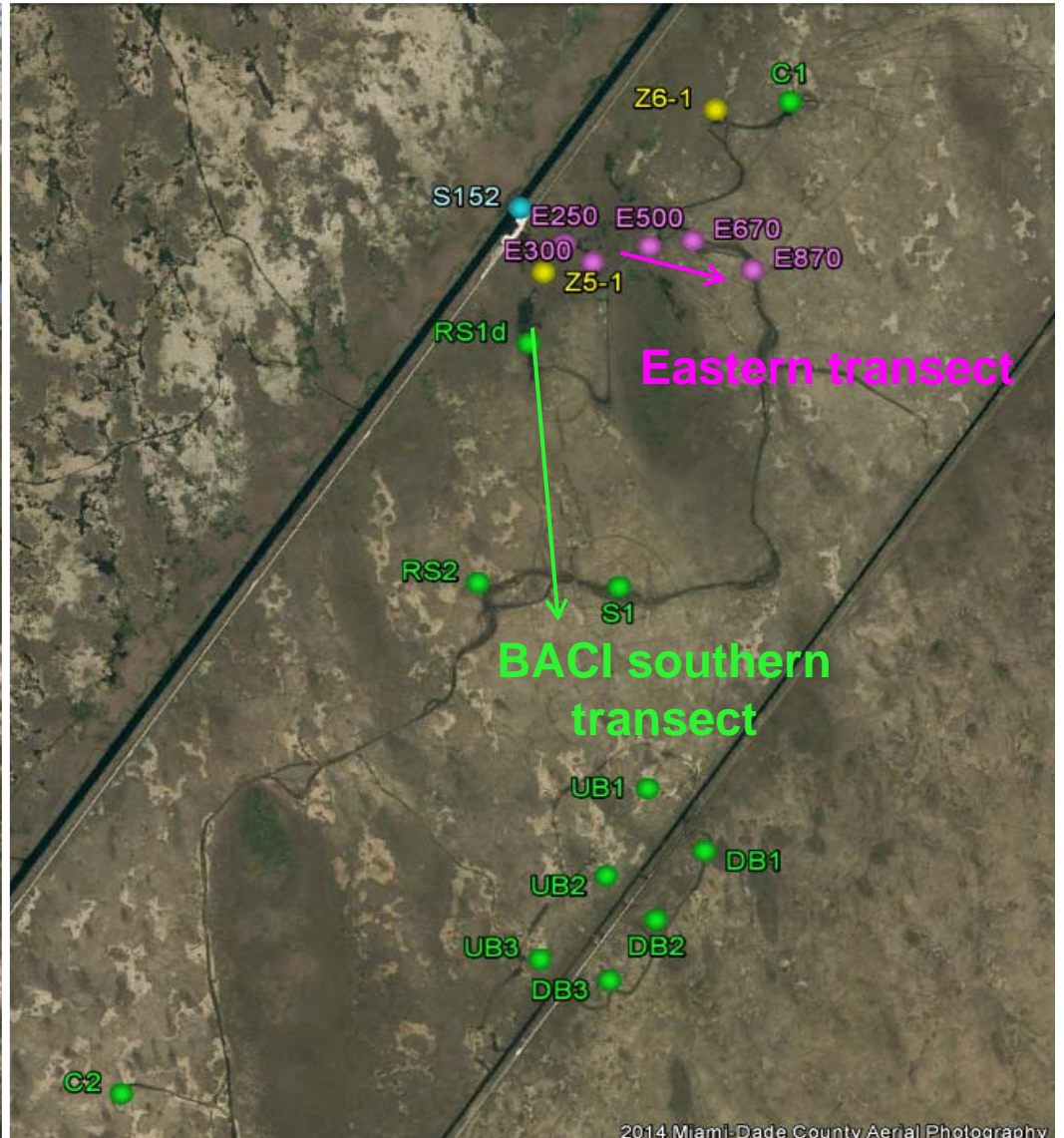


# Objectives

- Water quality responses to increased flow
  - Inflow concentrations and loads
  - Spatial variability in flow field
  
- Sediment movement responses to increased flow
  - Critical entrainment velocities
  - Particle dynamics

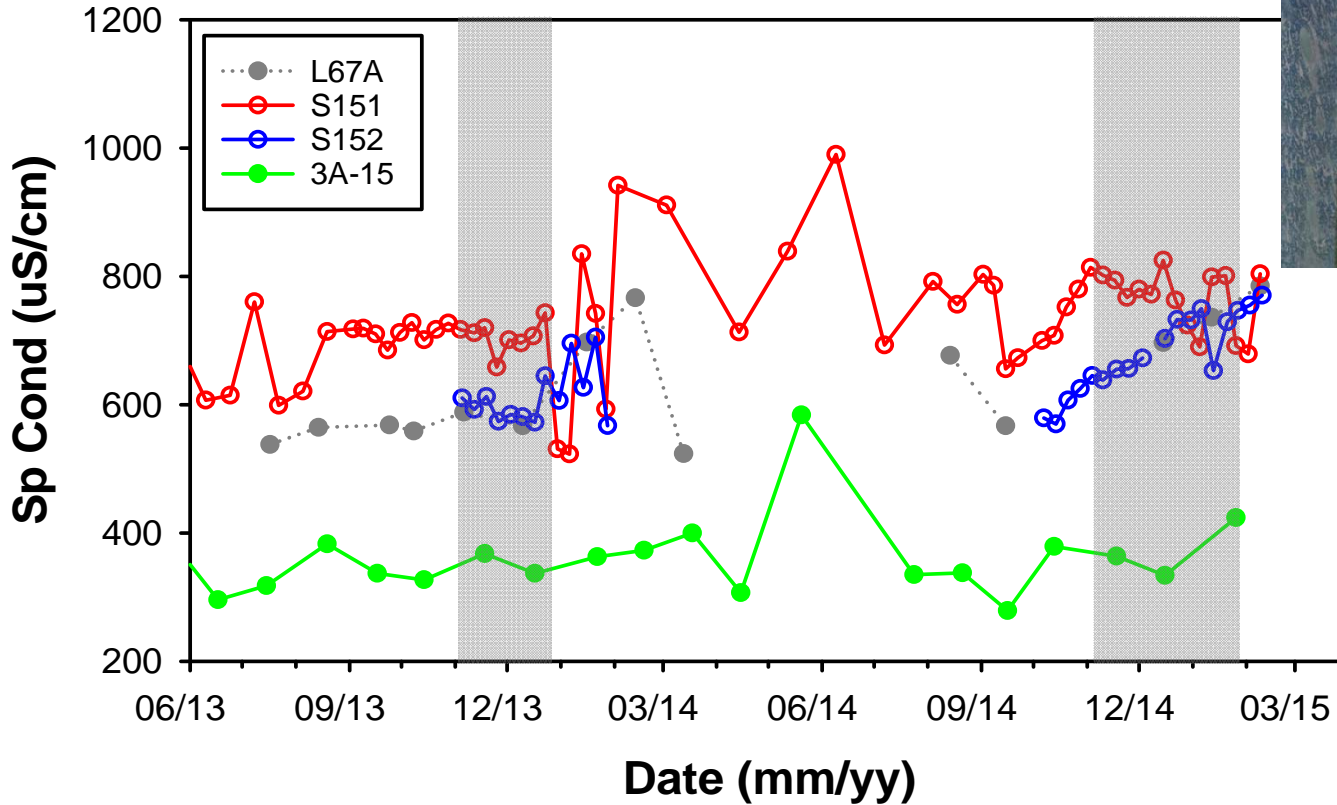


# Southern and eastern transects



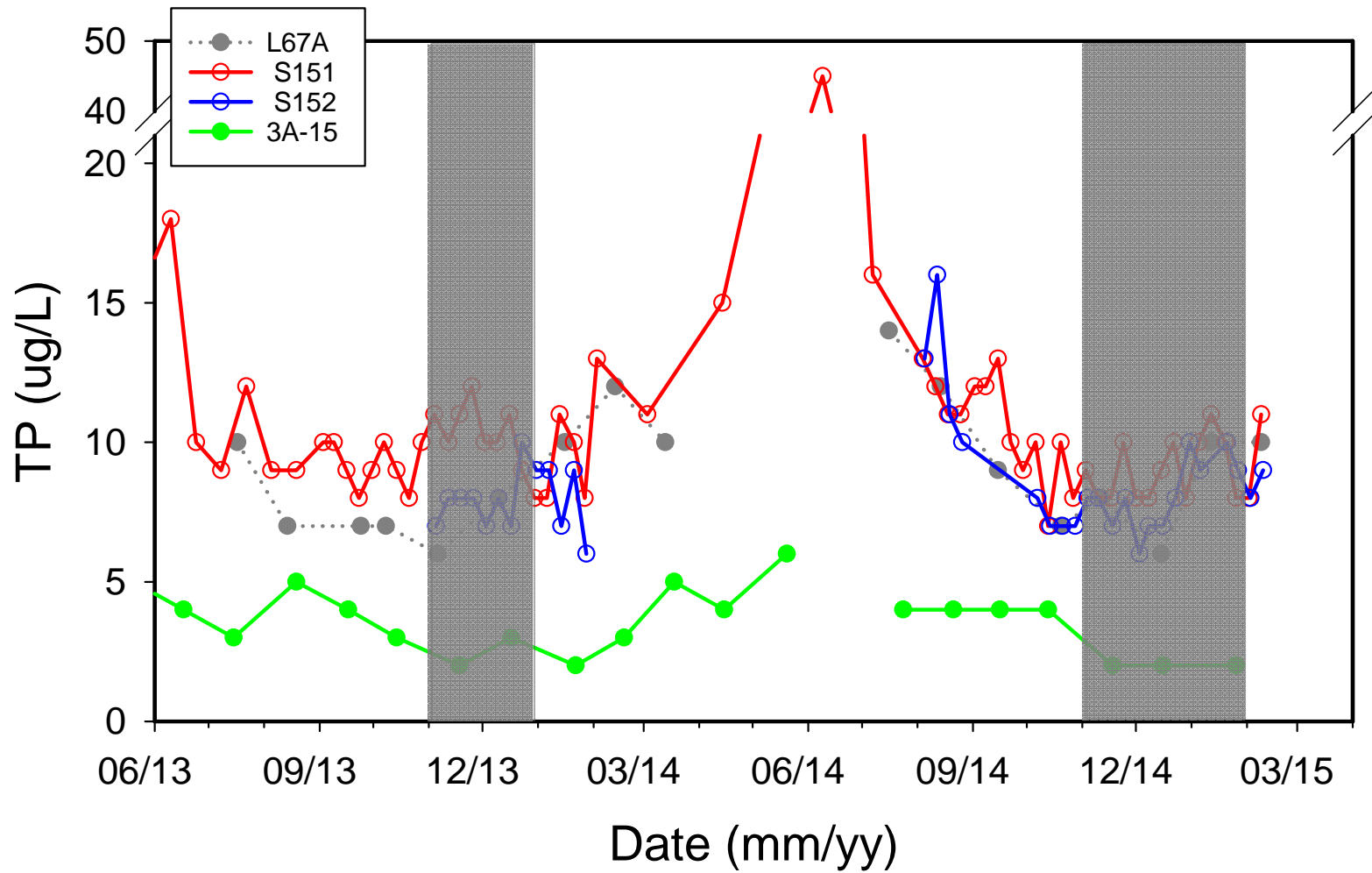


# Water source to DPM





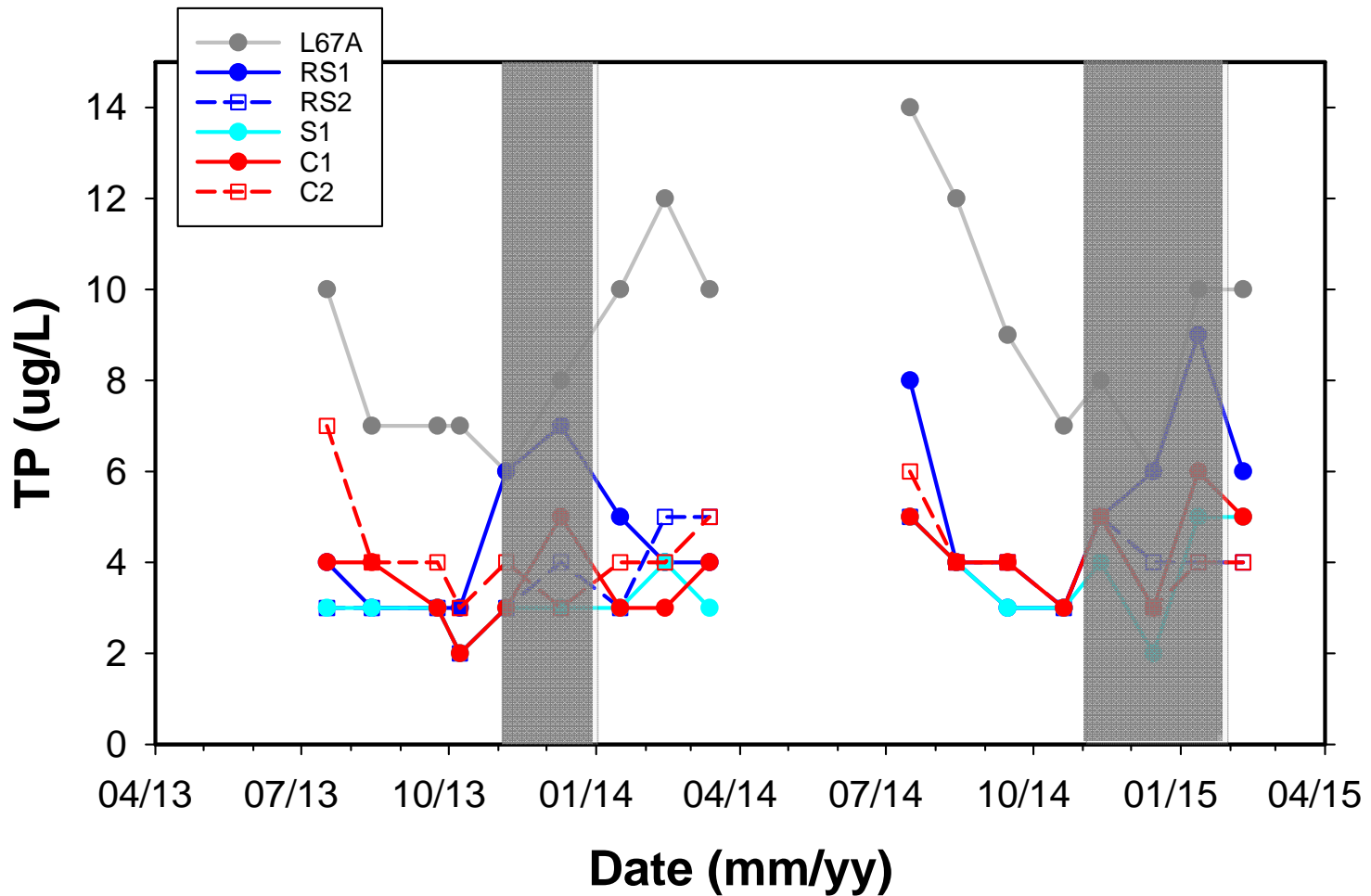
# TP input into DPM





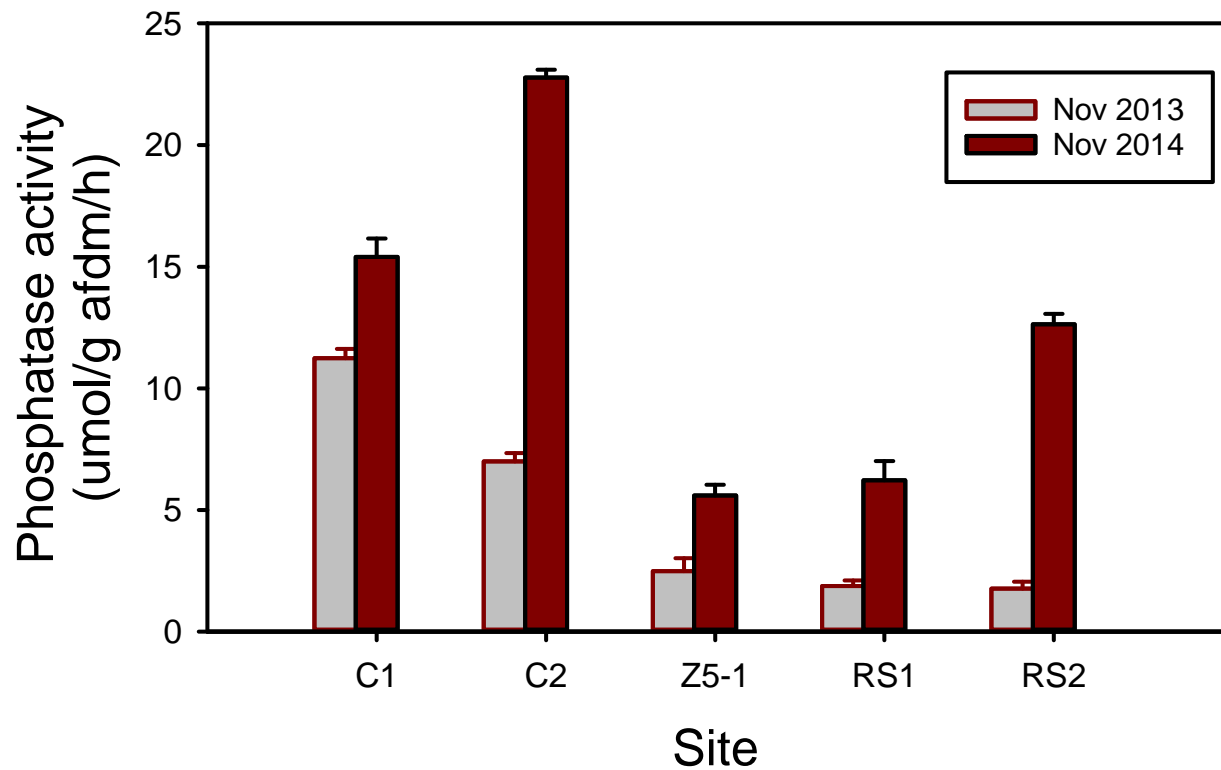
# Temporal flow and no-flow conditions

- Elevated TP concentration observed at RS1





# Increased P supply = reduced P limitation





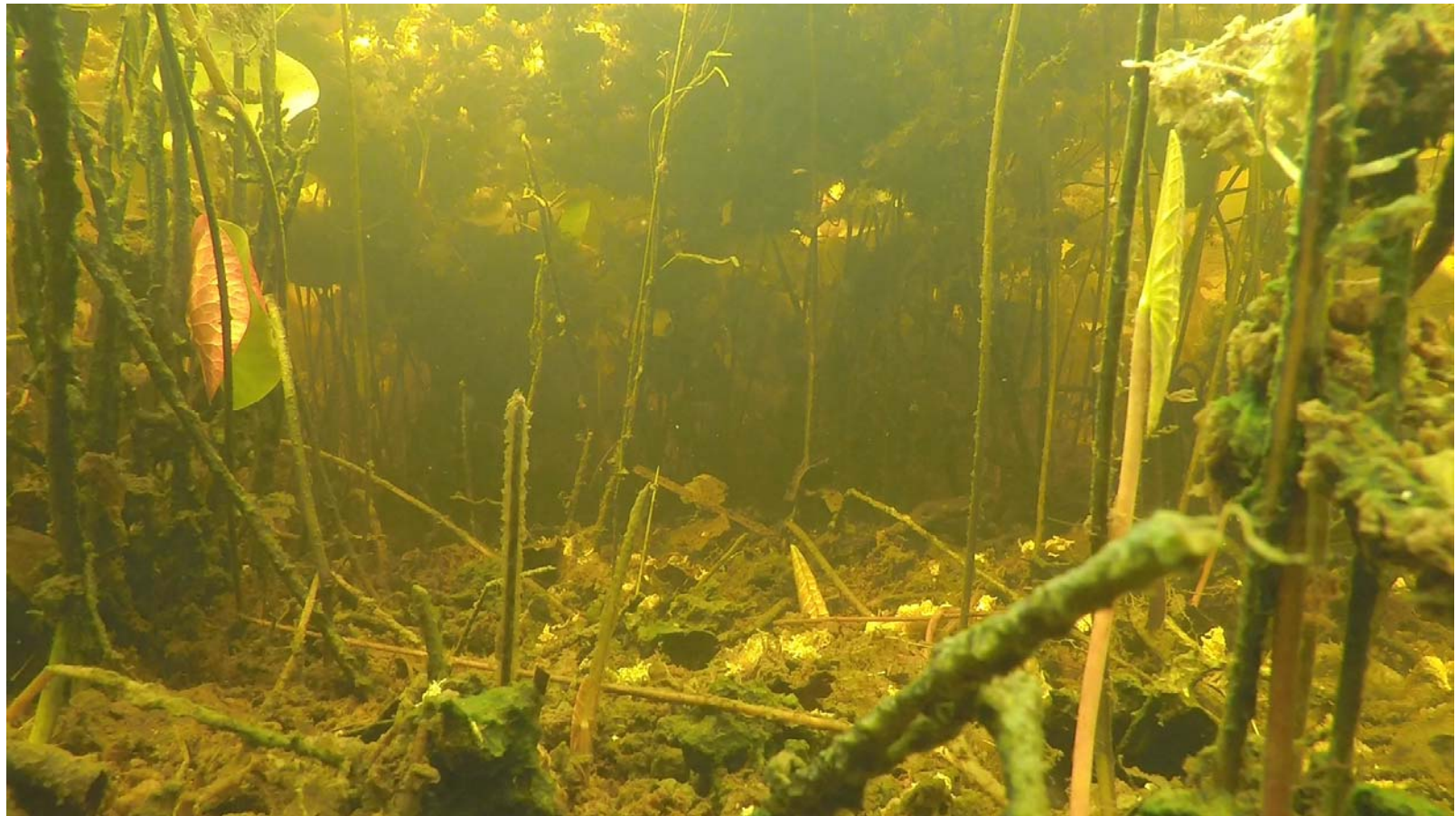


# What moved?





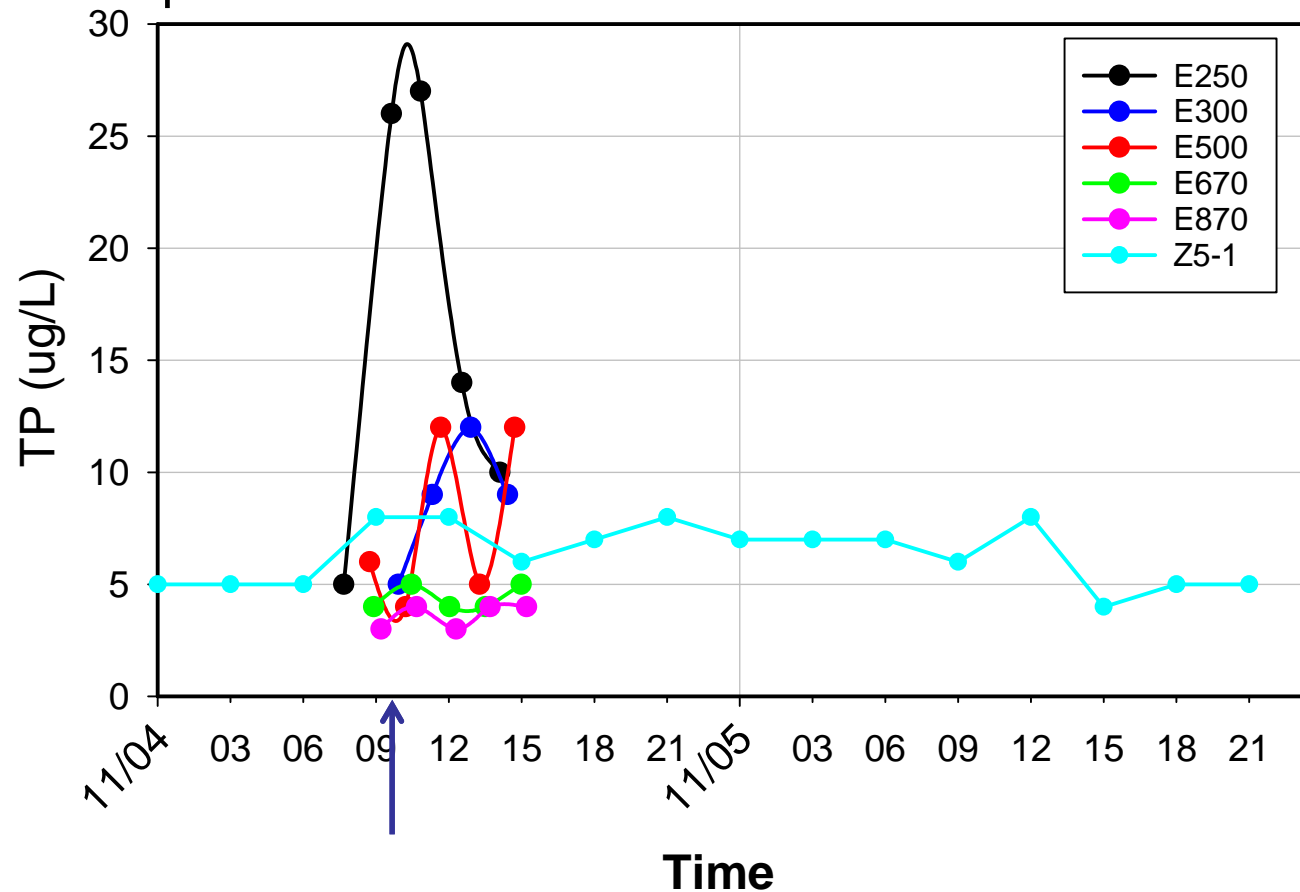
# What moved?





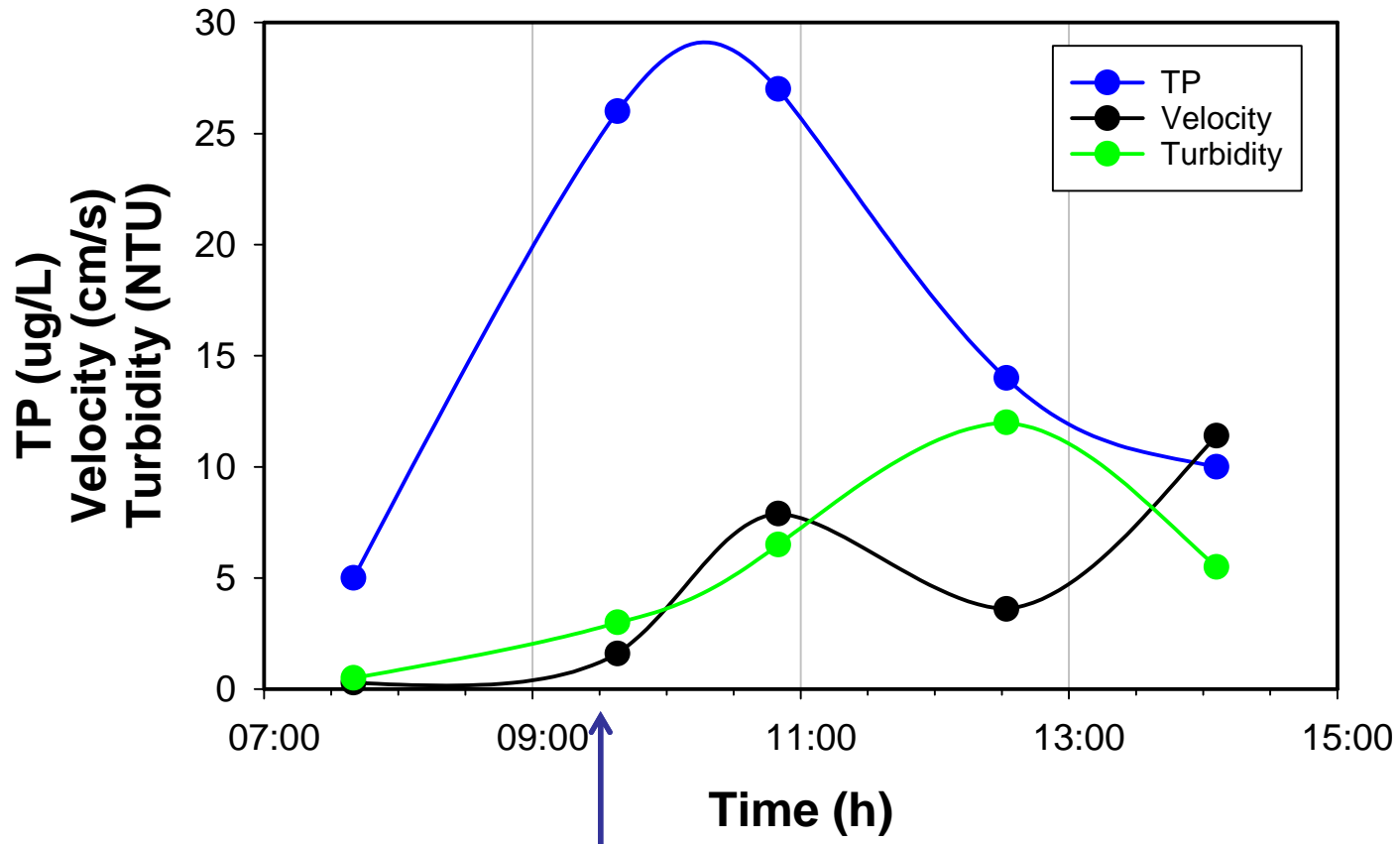
# Eastern transect - flow day Nov 2014

- Greater flow in easterly direction
- Higher TP concentration
- Spike short-lived





# Relationship between TP, particles and flow at E250, 250 m from inflow





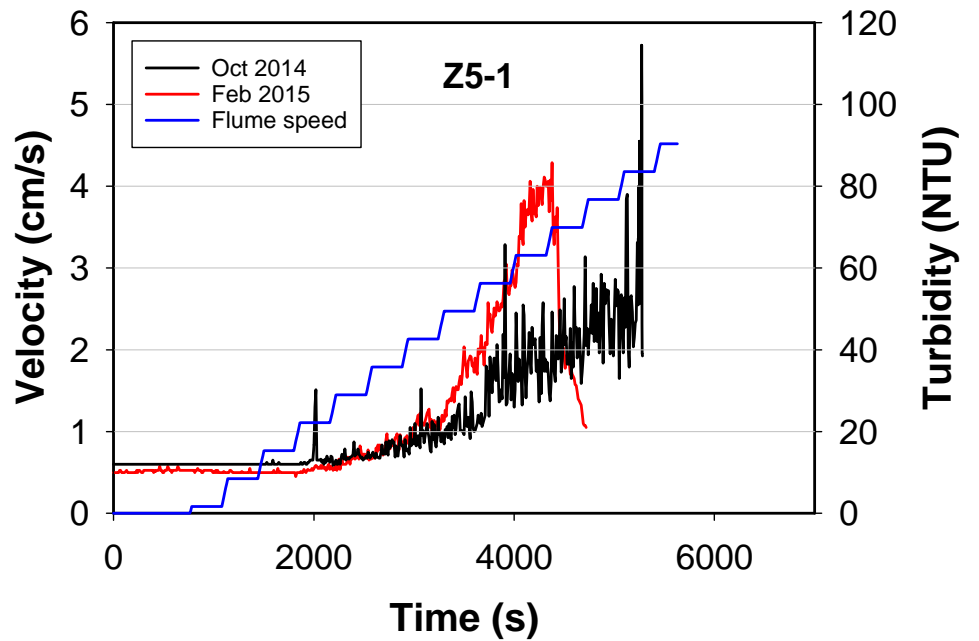
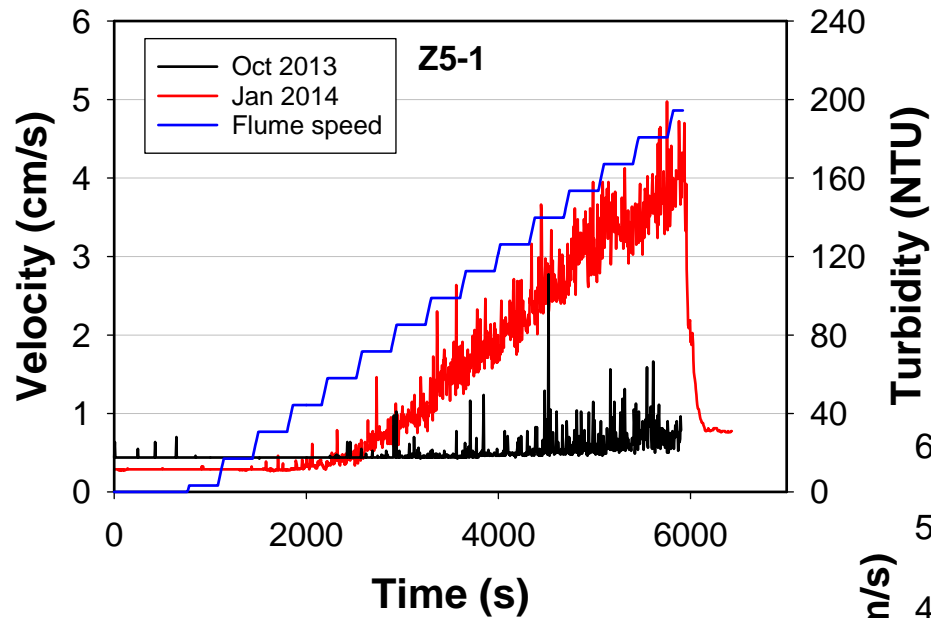
# Sediment entrainment



1.5 cm /s (5 cm above sediment bed)

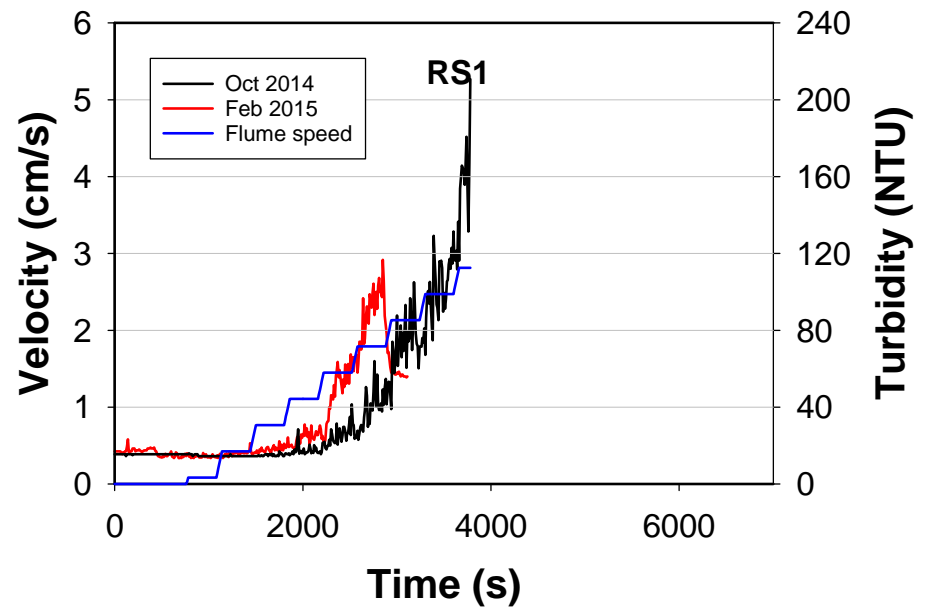
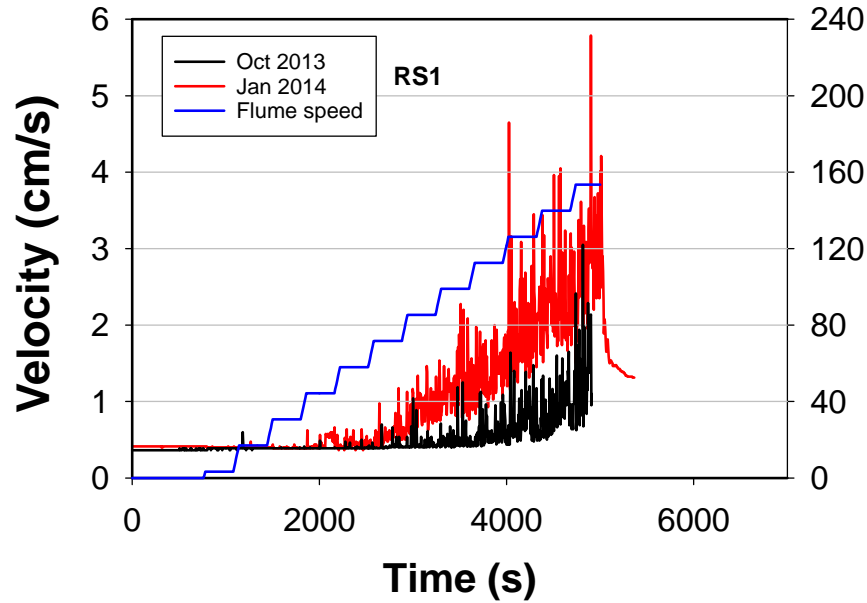


# Changes in floc entrainment- Z5-1



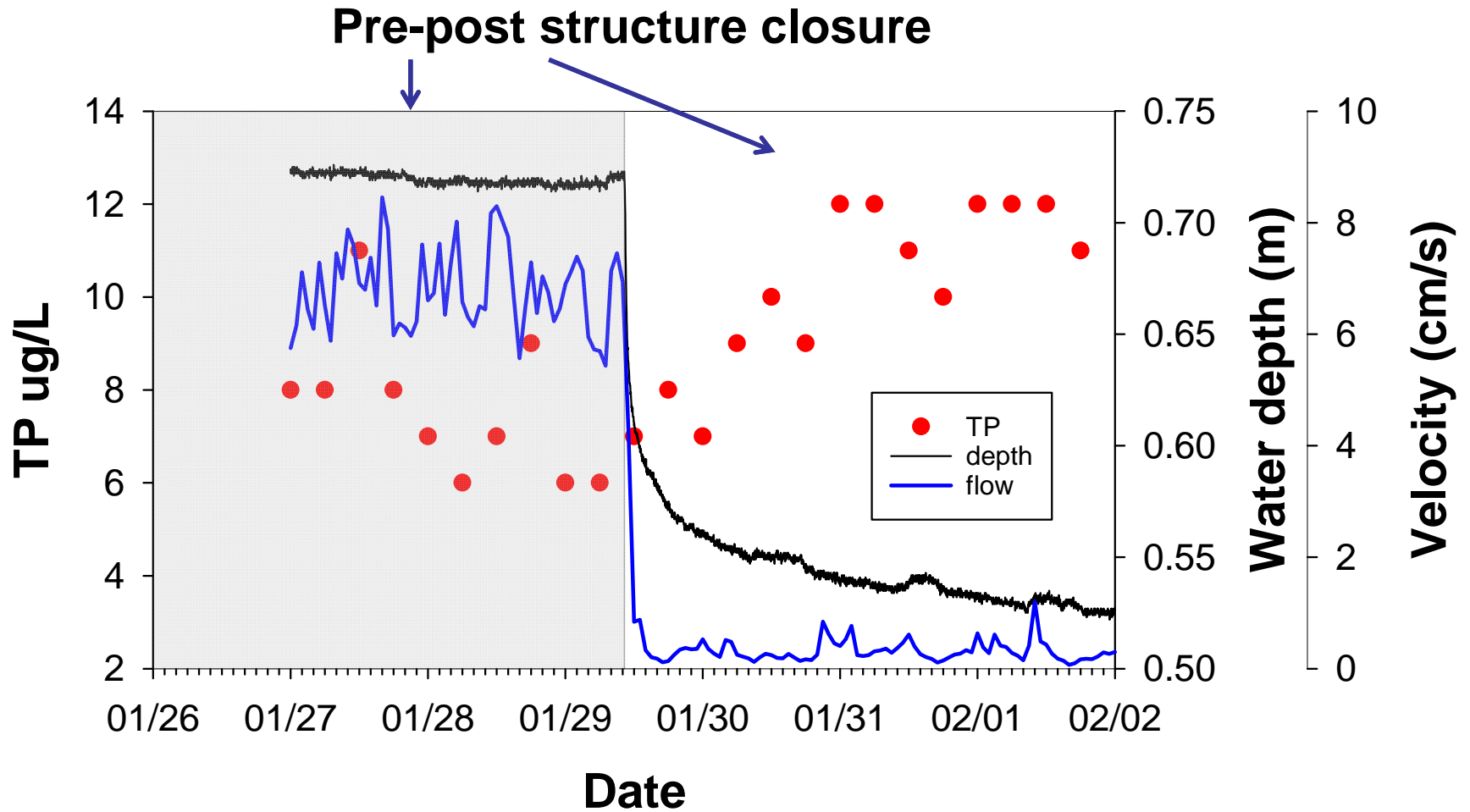


# Changes in floc entrainment- RS1





# Increased TP concentration at Z5-1 following closure of S152







## Summary

- Short-term increased TP concentrations at sites closest to the structure, particularly along the path of greater flow. A similar response was observed for turbidity, though offset in time to TP. Turbidity does not accurately measure fine particles which may have higher TP content
- TP increased in response to structure closure and drop in water levels
- CET values measured post-flow in 2013 were generally lower than those measured pre-flow. Flow may have long lasting effects on sediment entrainability. 2014 pre and post flow were similar, but entrainment was greater post-flow.



# Acknowledgements:

