

Lake Okeechobee Water Quality Trends and Lingering Impacts

Paul R. Jones PhD

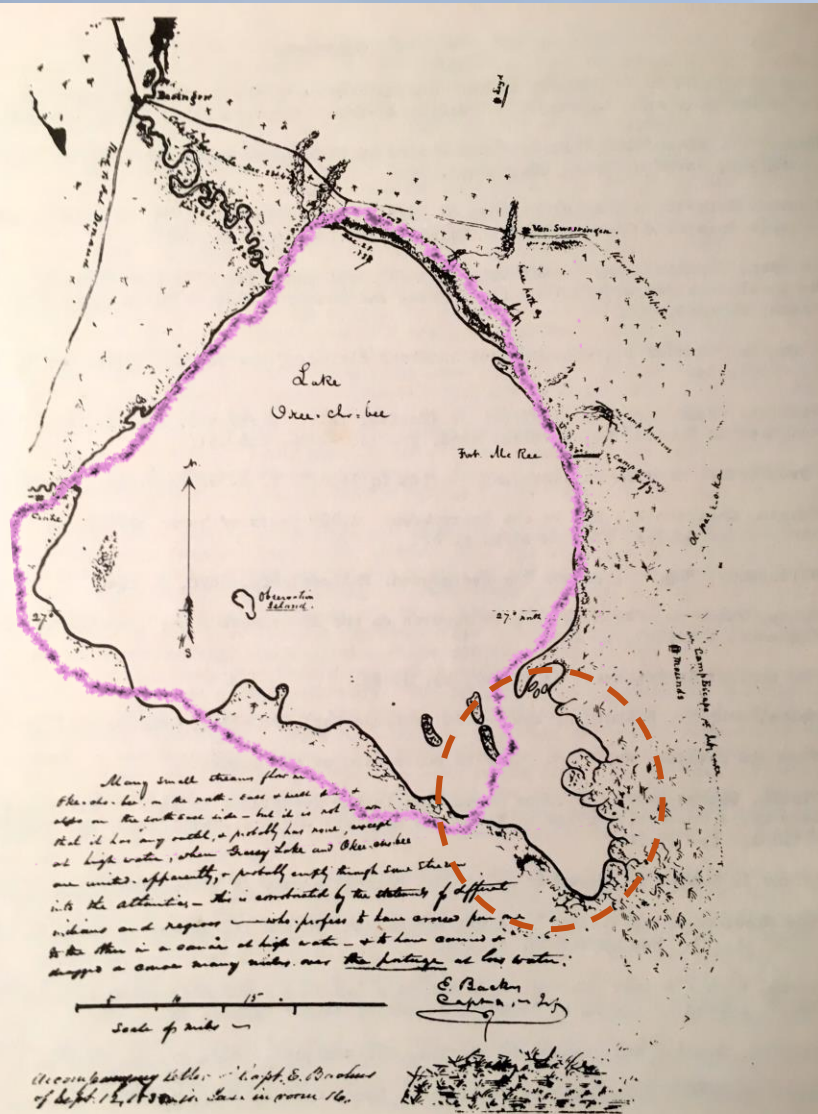
South Florida Water Management District

Greater Everglades Ecosystem Restoration Conference

April 24th, 2025

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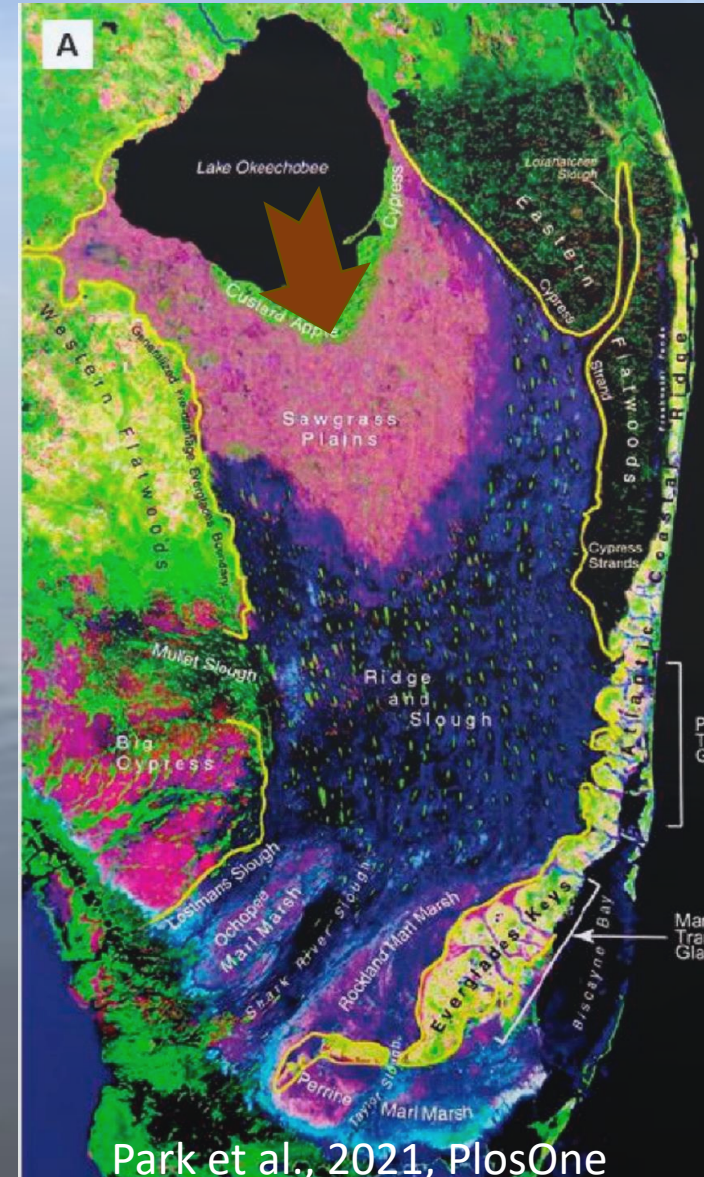
Lake Okeechobee: Pre-drainage



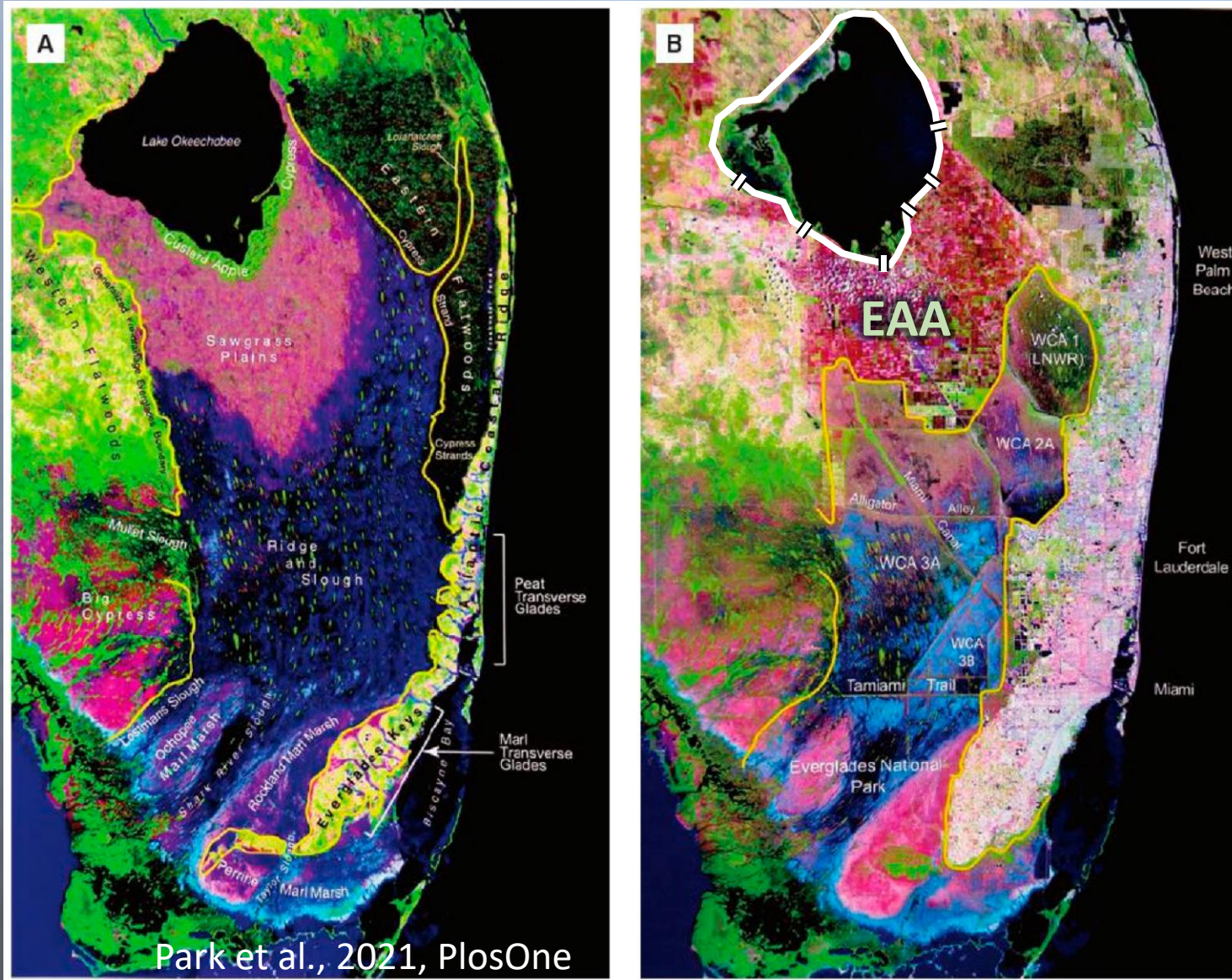
- 1838 map drawn by Captain E. Backus
 - As well as Kissimmee River meandering from Ft. Basinger, many small streams entering Lake O from N, E & W
 - No notable outlets “except at high water when Grassy Lake (Everglades) and Okee-cho-bee are united”
- According to the Captains map, Belle Glade and South Bay were once in Lake O
 - Historical outlet now cut-off

Lake Okeechobee: Pre-drainage

- Lake accumulates sediments & organic material from internal and external sources
- Periodic “flushing” during high water/flooding events deposits highly fertile material on the lands south of the Lake



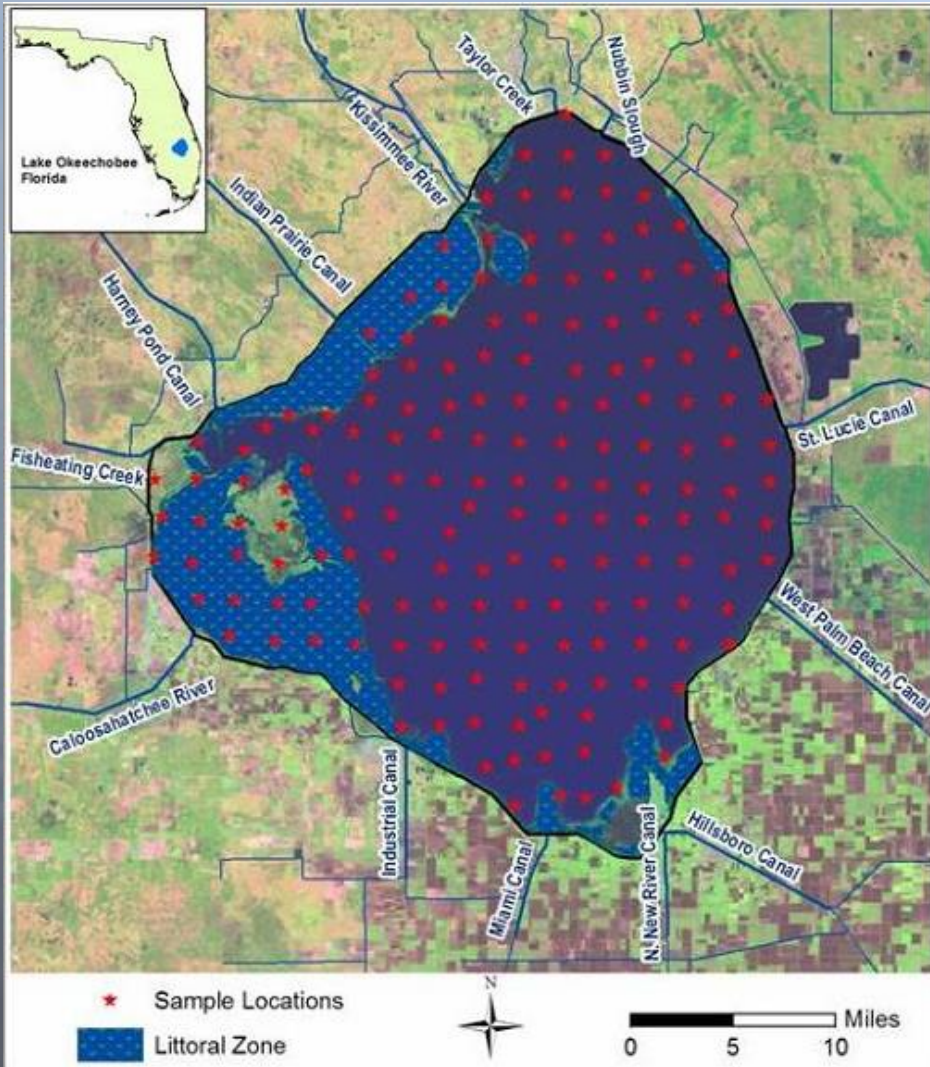
Lake Okeechobee: Pre- and Post-drainage



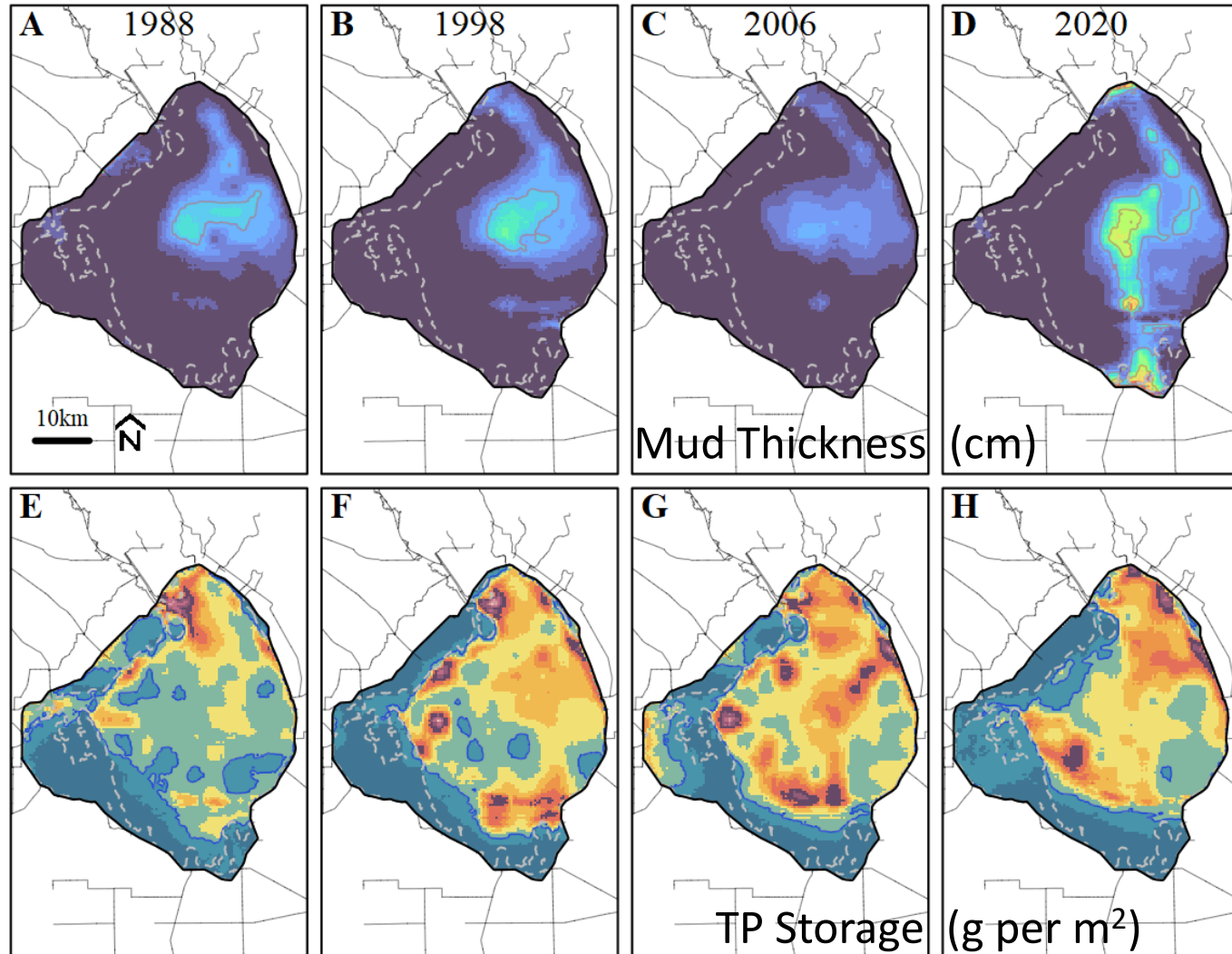
- Lake surround by the Herbert Hoover Dike
- All outflows are through water control structures
- Sawgrass plains are now the Everglades Agricultural Area
- What happens to the next-gen black gold?

Lake Okeechobee Sediment Studies

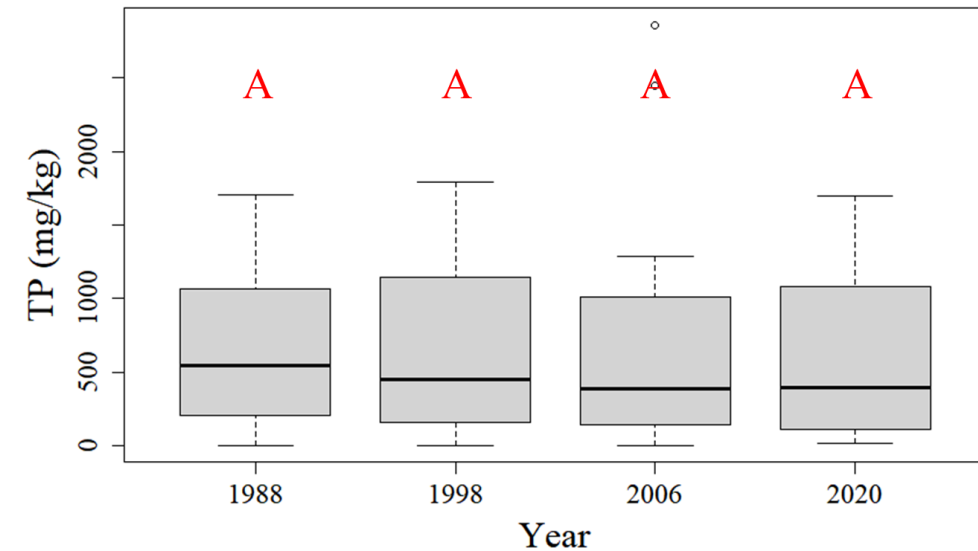
- Lake-wide sediment sampling studies occurred in 1988, 1998, 2006 & 2020
- Cores taken from the same locations for each study
 - Sediment type, mud thickness, nutrient content etc.



Lake Okeechobee Sediment Studies

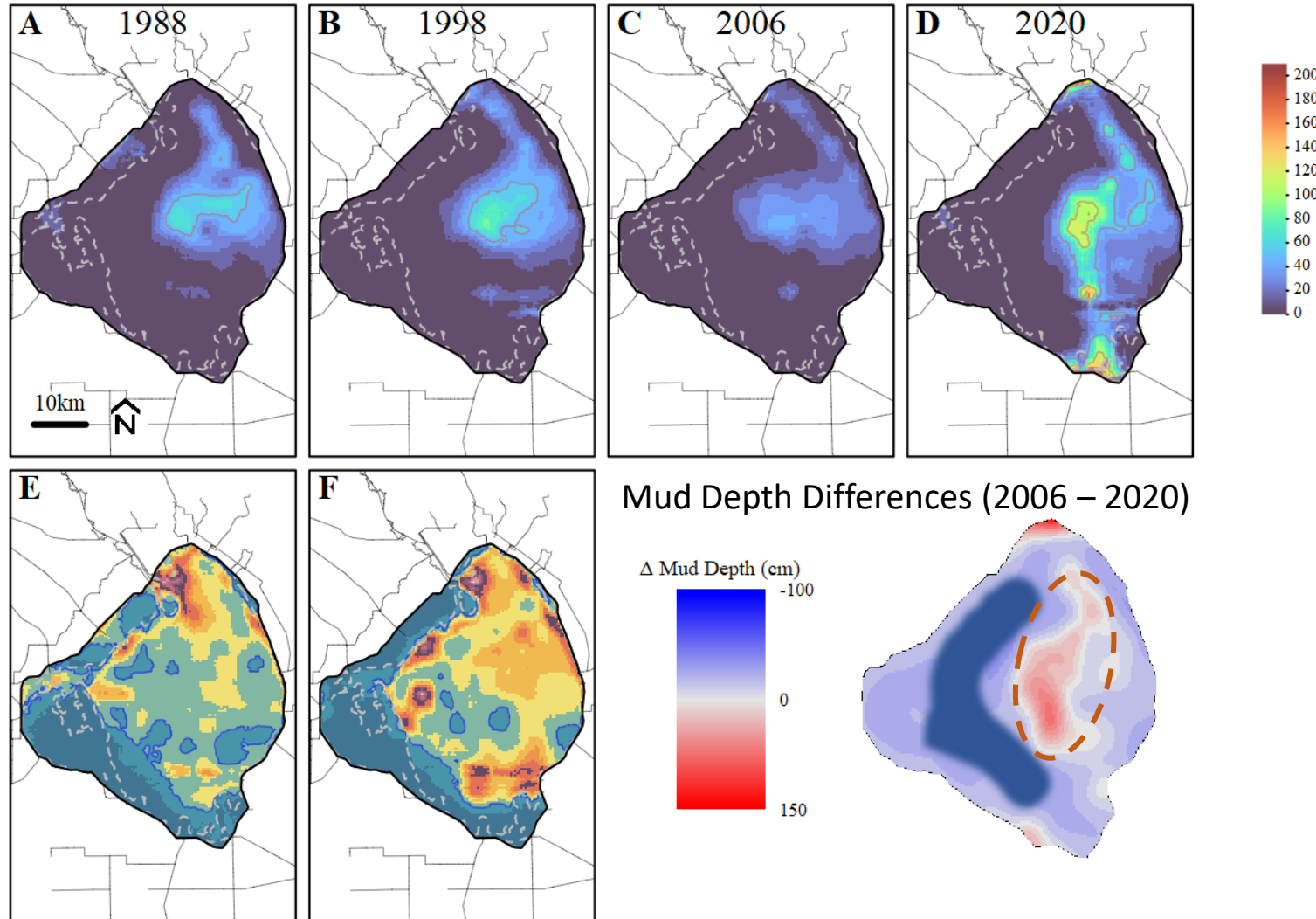


- 2006 had the lowest mud depth, 2020 had deepest
- But....

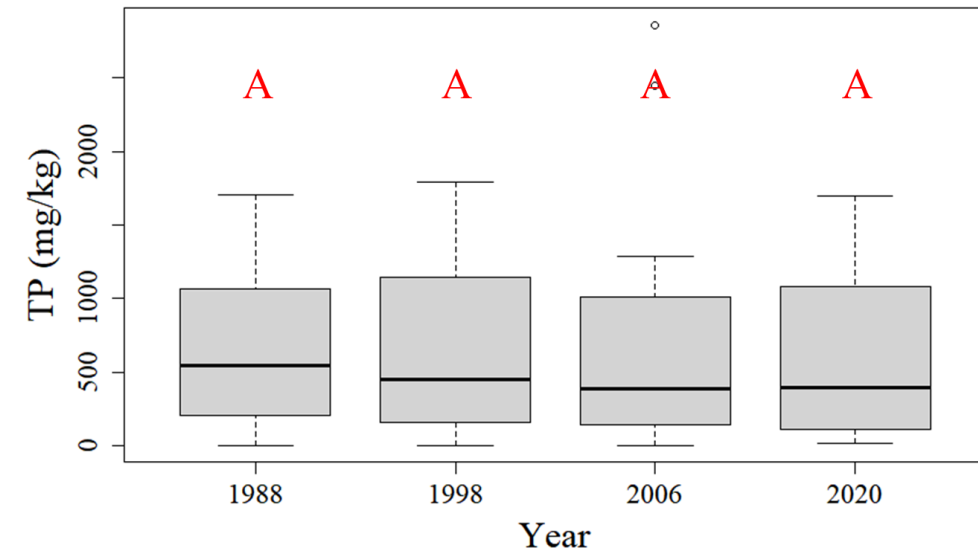


- No significant difference in core TP content over time

Lake Okeechobee Sediment Studies

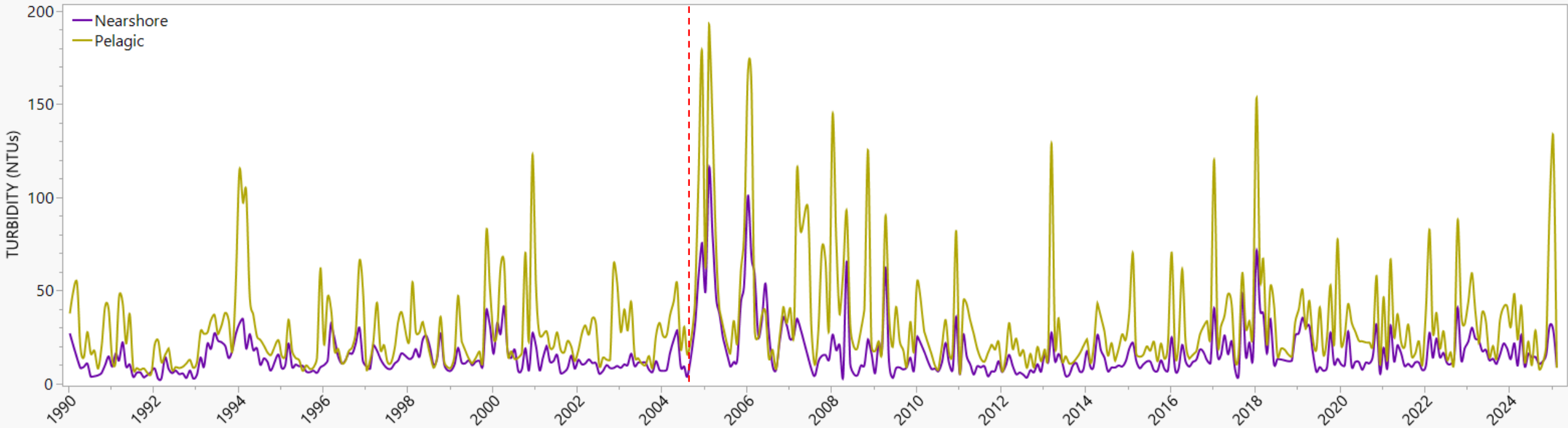


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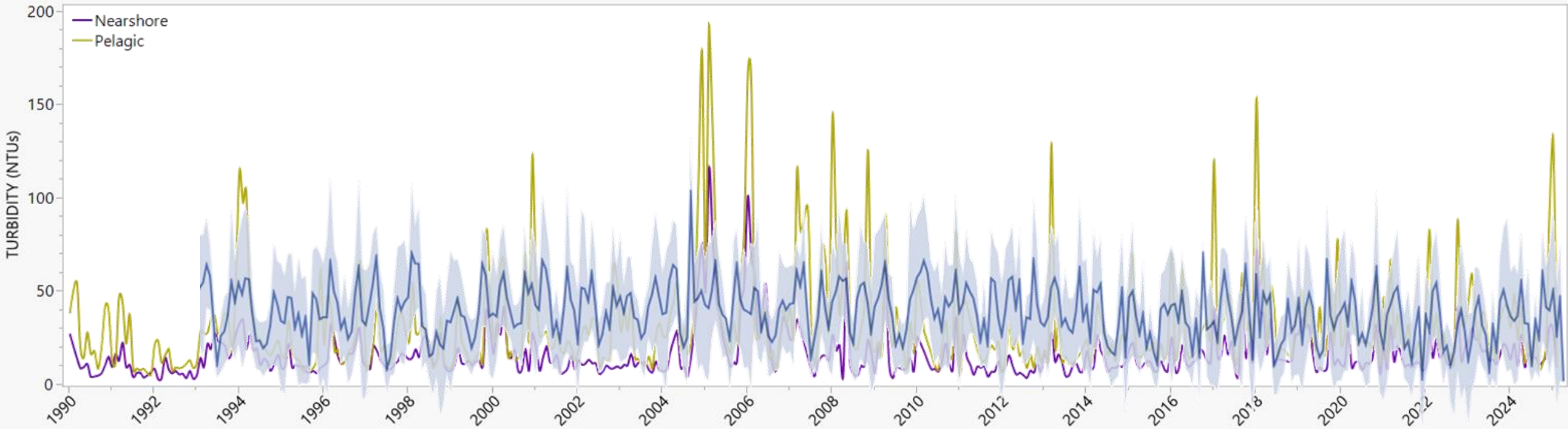


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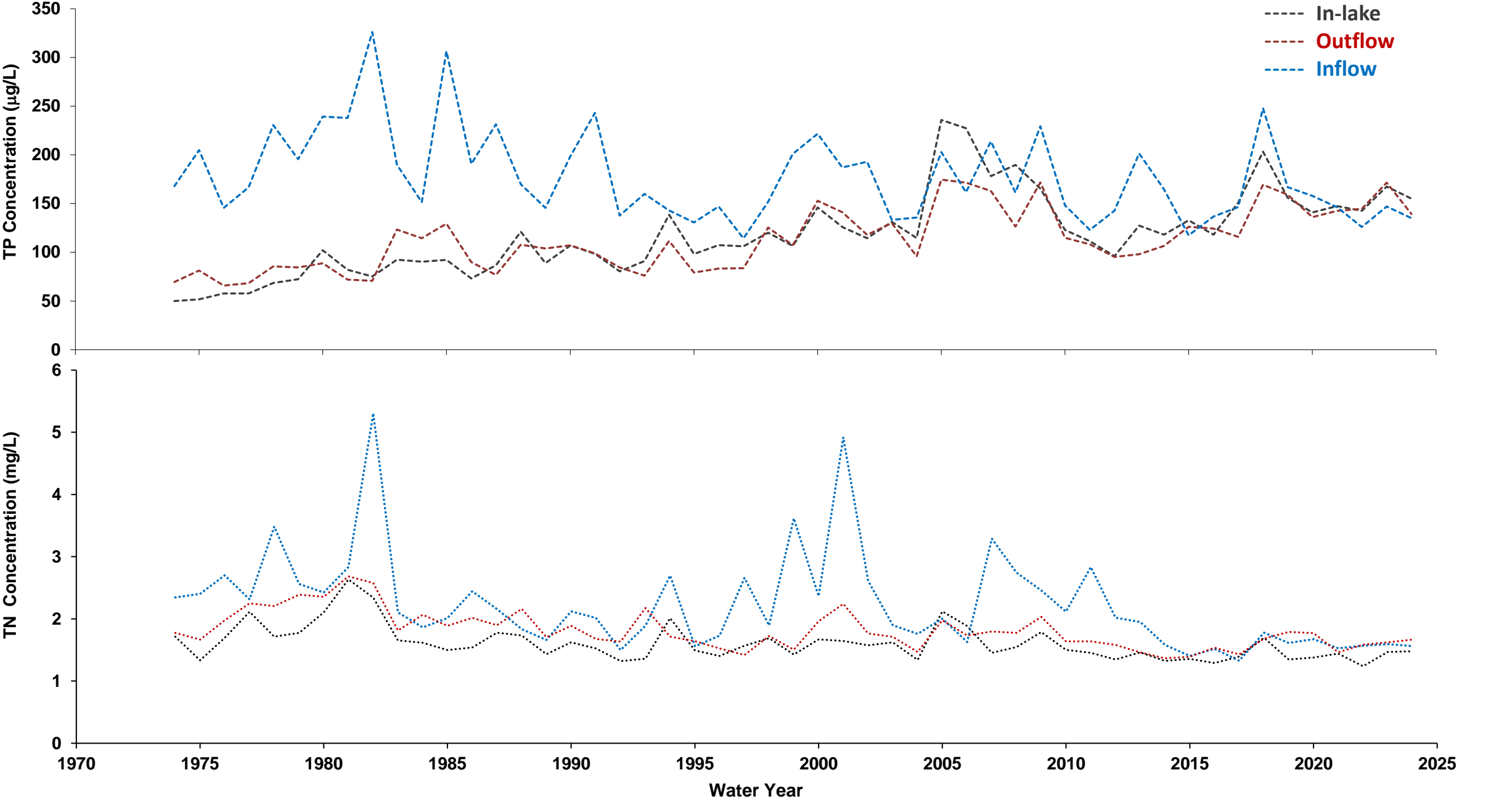
Are sediments more easily resuspended since the hurricanes of 2004-05?



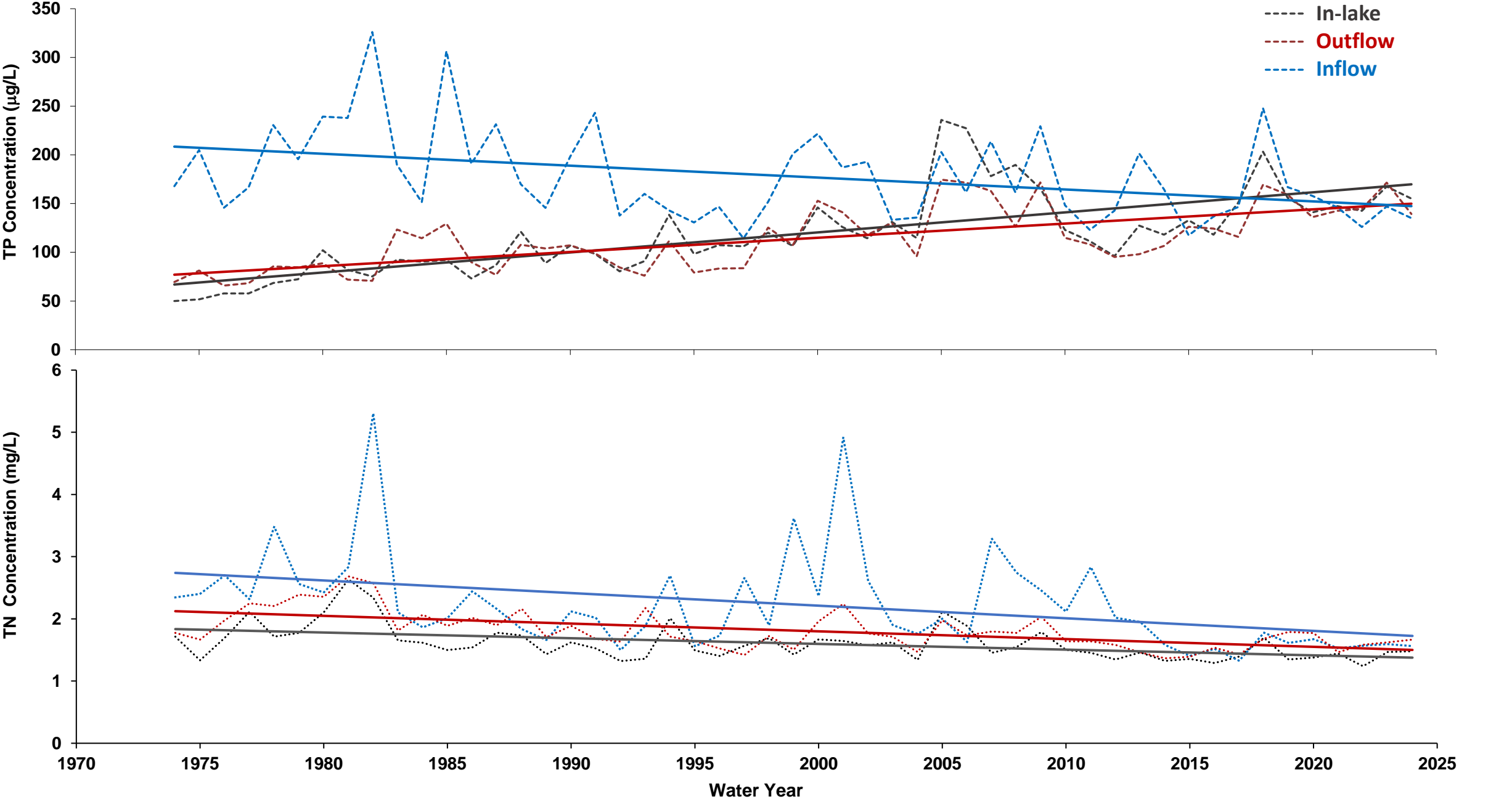
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Average Annual Total Phosphorus and Total Nitrogen Concentrations in Lake Water, Inflows and Outflows



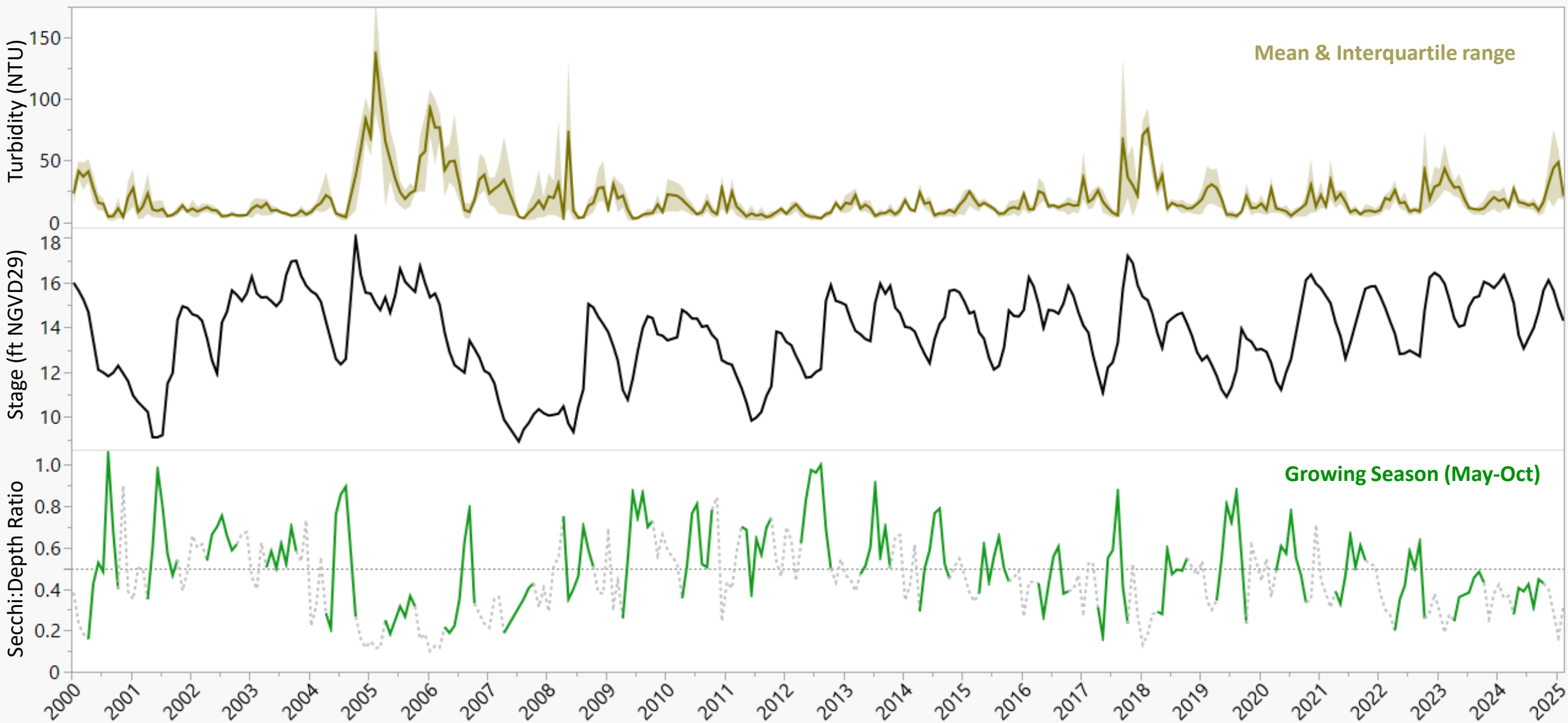
Average Annual Total Phosphorus and Total Nitrogen Concentrations in Lake Water, Inflows and Outflows



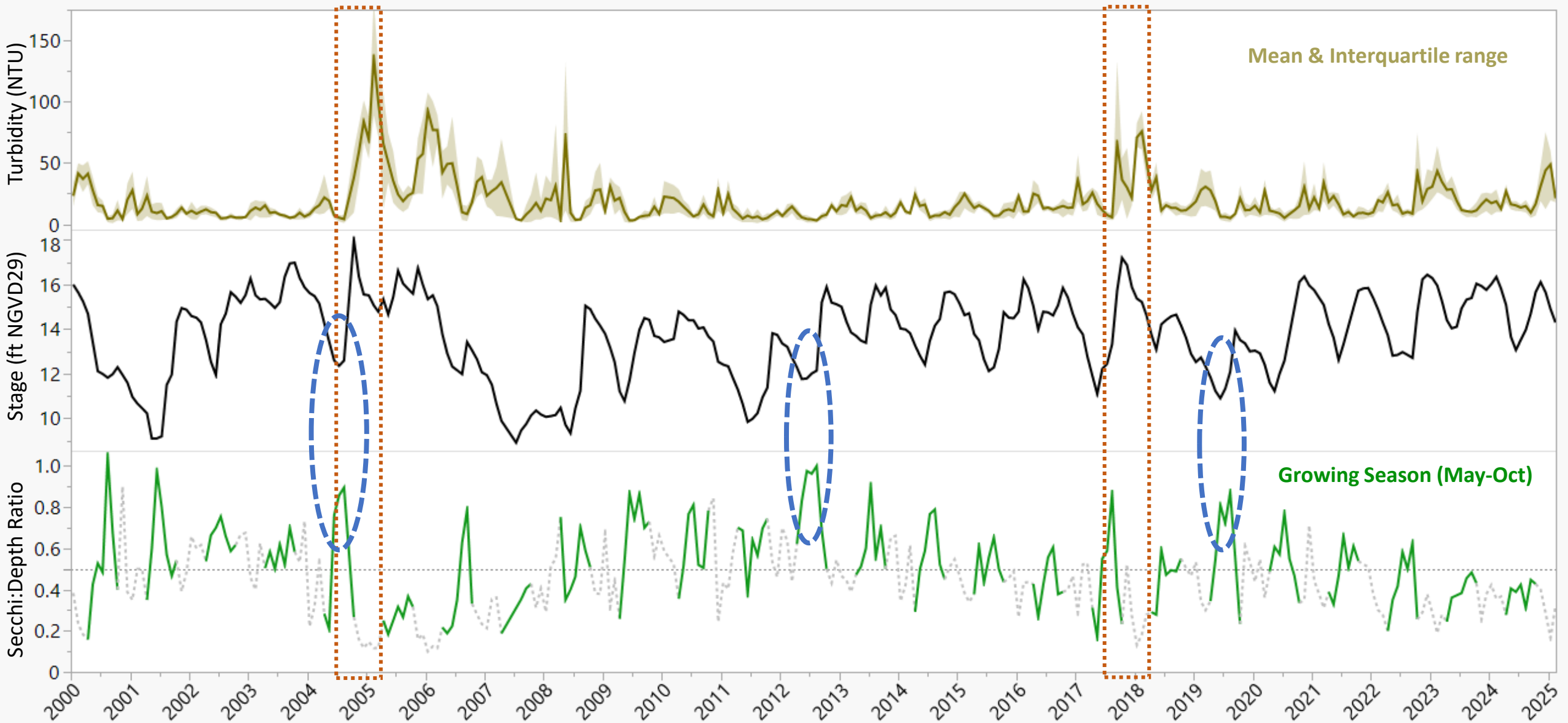
How does the shift from LORS08 to LOSOM effect water quality in Lake Okeechobee?

- In the pelagic zone?
 - Not much, other than extreme highs or lows
- In the nearshore region
 - Lake stage alters ecological relevance of certain WQ parameters

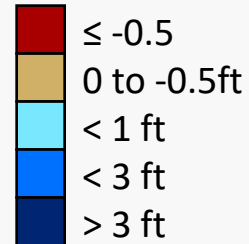
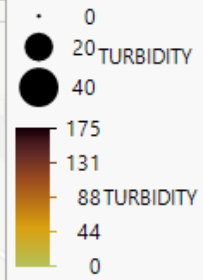
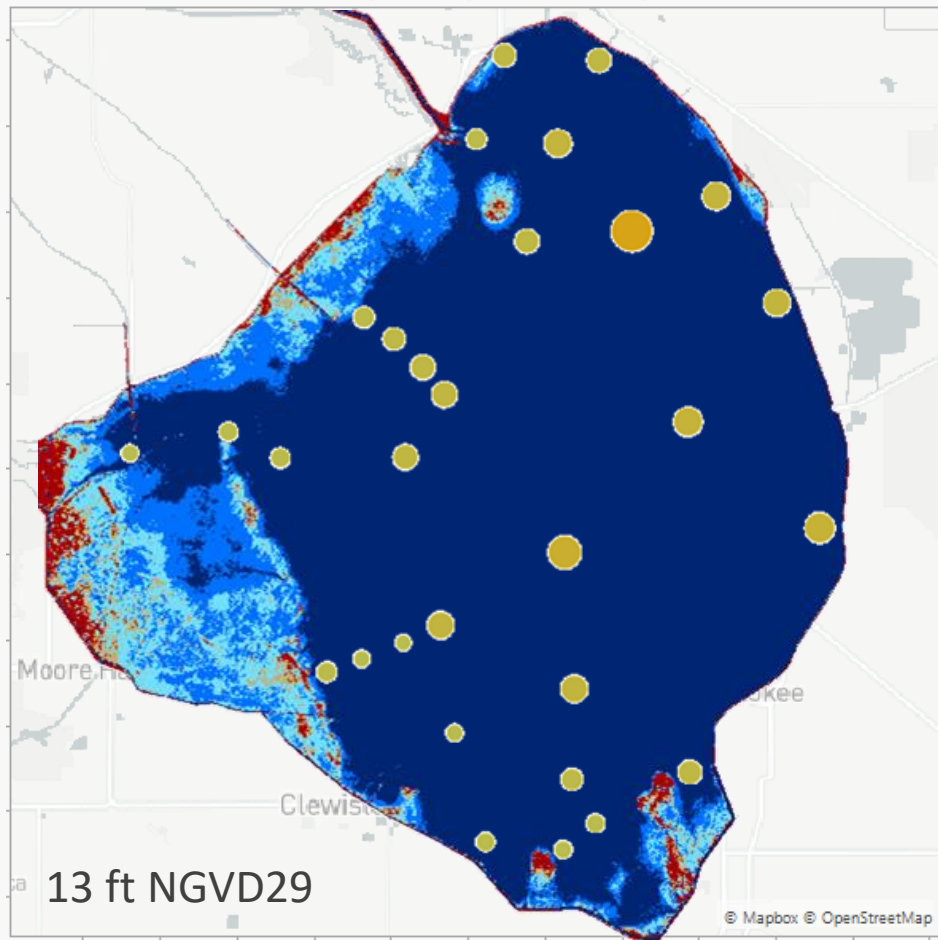
Turbidity, Lake Stage and Secchi Depth to Total Depth Ratios



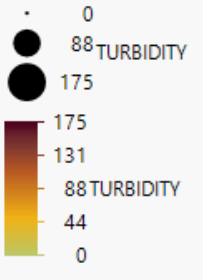
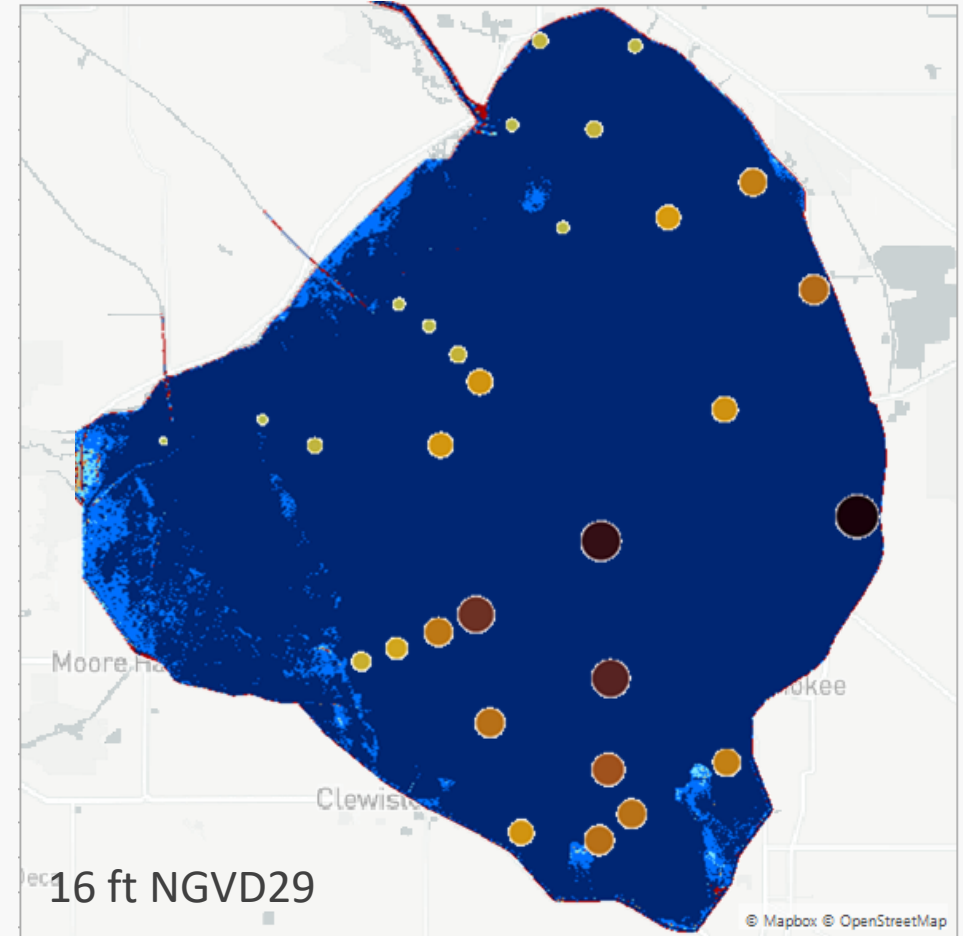
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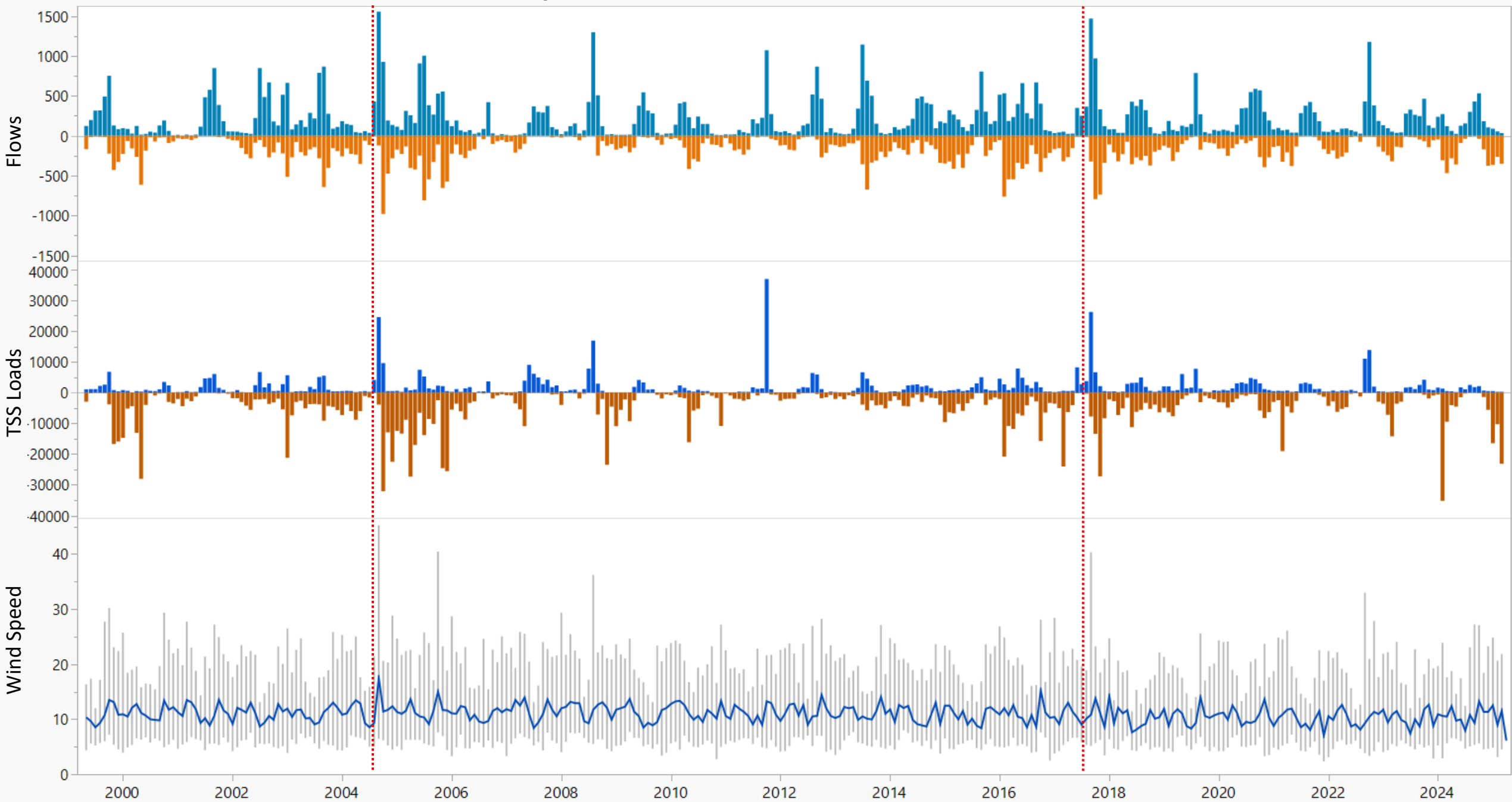
Mean Turbidity 2022 (pre-lan) Jul-Sep



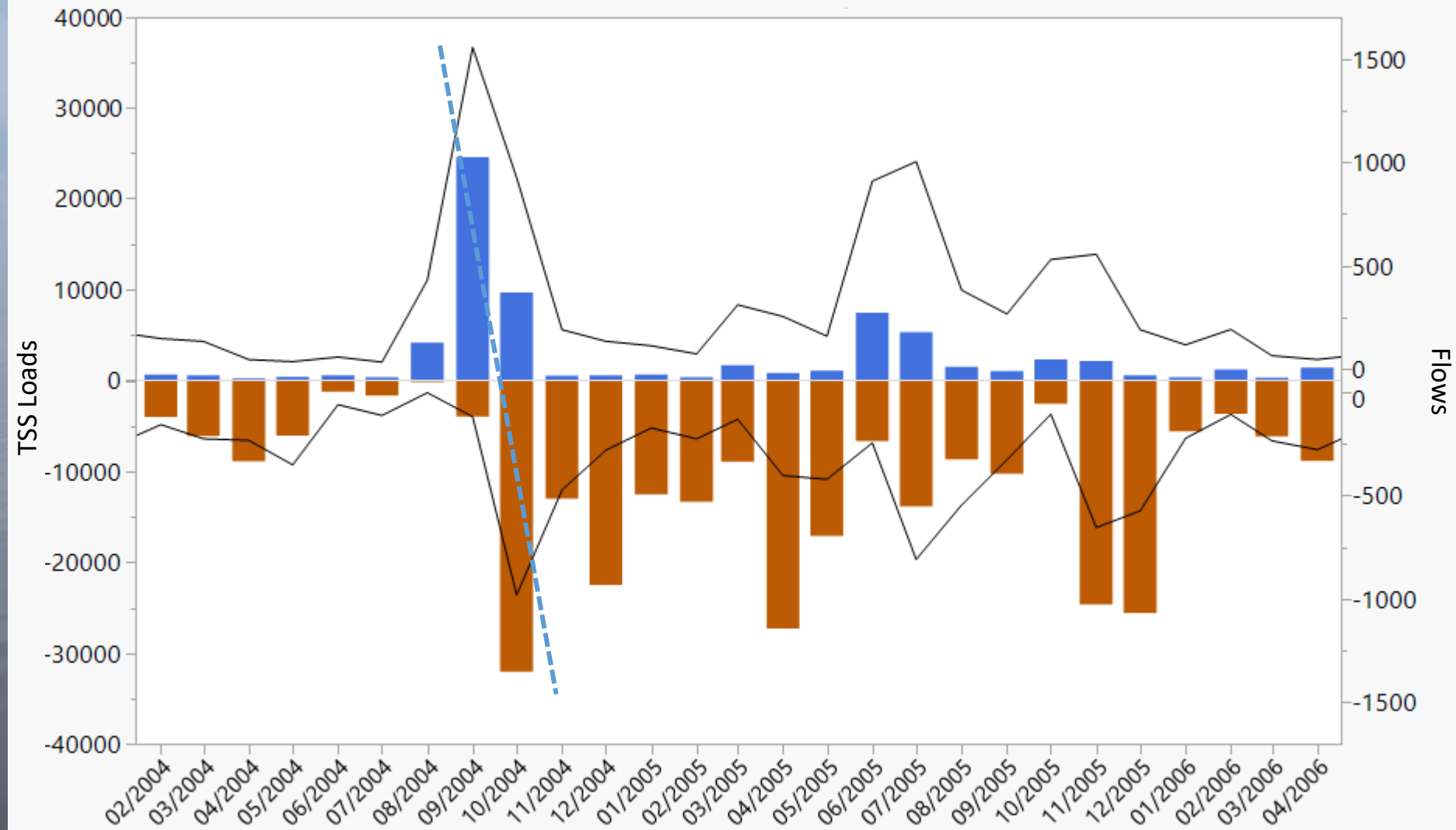
Mean Turbidity 2022 (post-lan) Sep-Nov



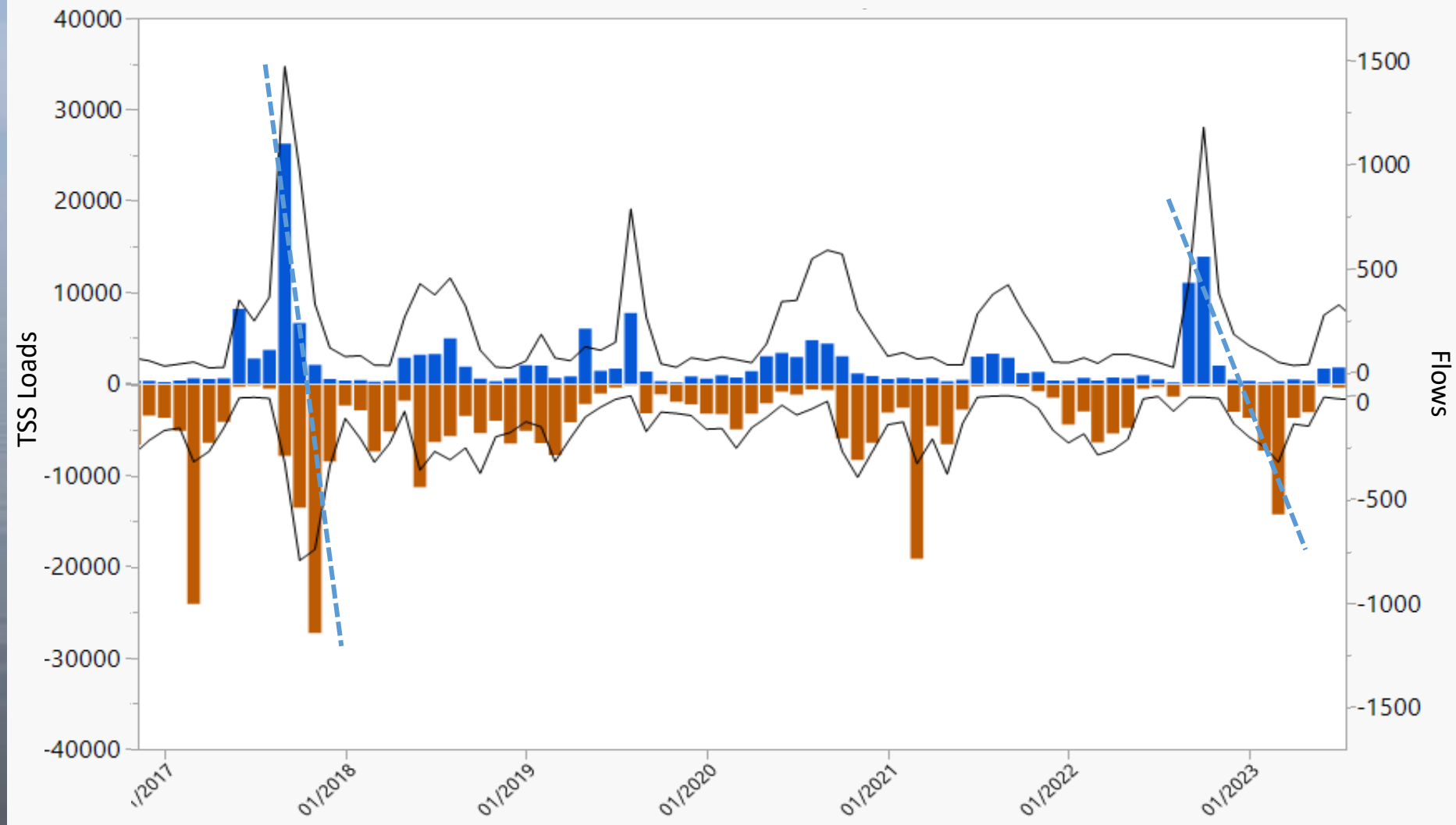
Total Suspended Solids, Water Flows and Wind



TSS Loads and Water Flows - 2004-2005



TSS Loads and Water Flows - Hurricanes Irma & Ian

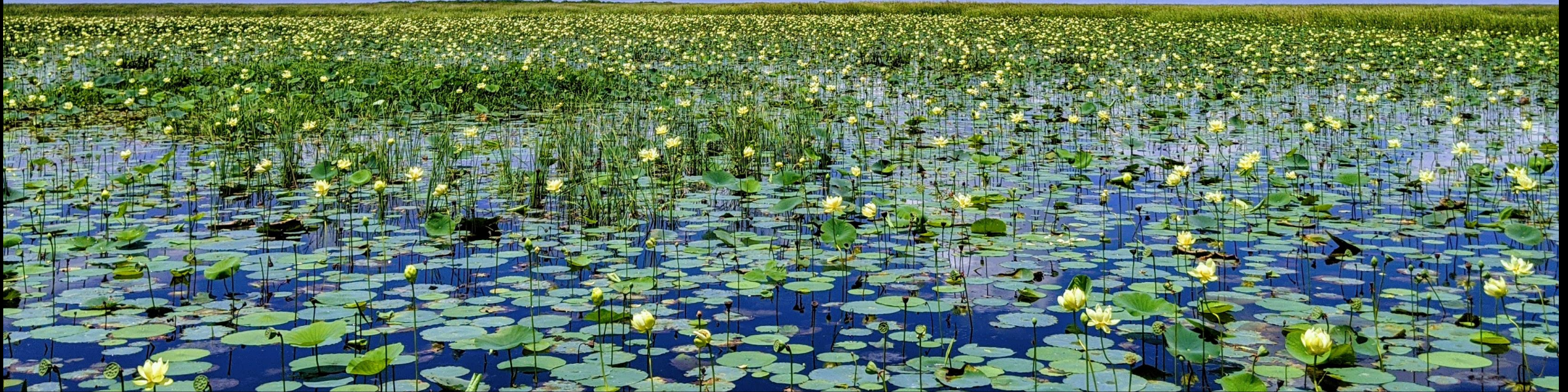


Thank You to:

SFWMD Applied Sciences Bureau - Lake & River Ecosystems

SFWMD WQ Monitoring & Analytical Services Sections

Paul Julian (Everglades Foundation) & Todd Osborne (U. of Florida)





Questions?

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