

# Water Resources Working Group Lake Worth Lagoon Initiative November 13, 2013

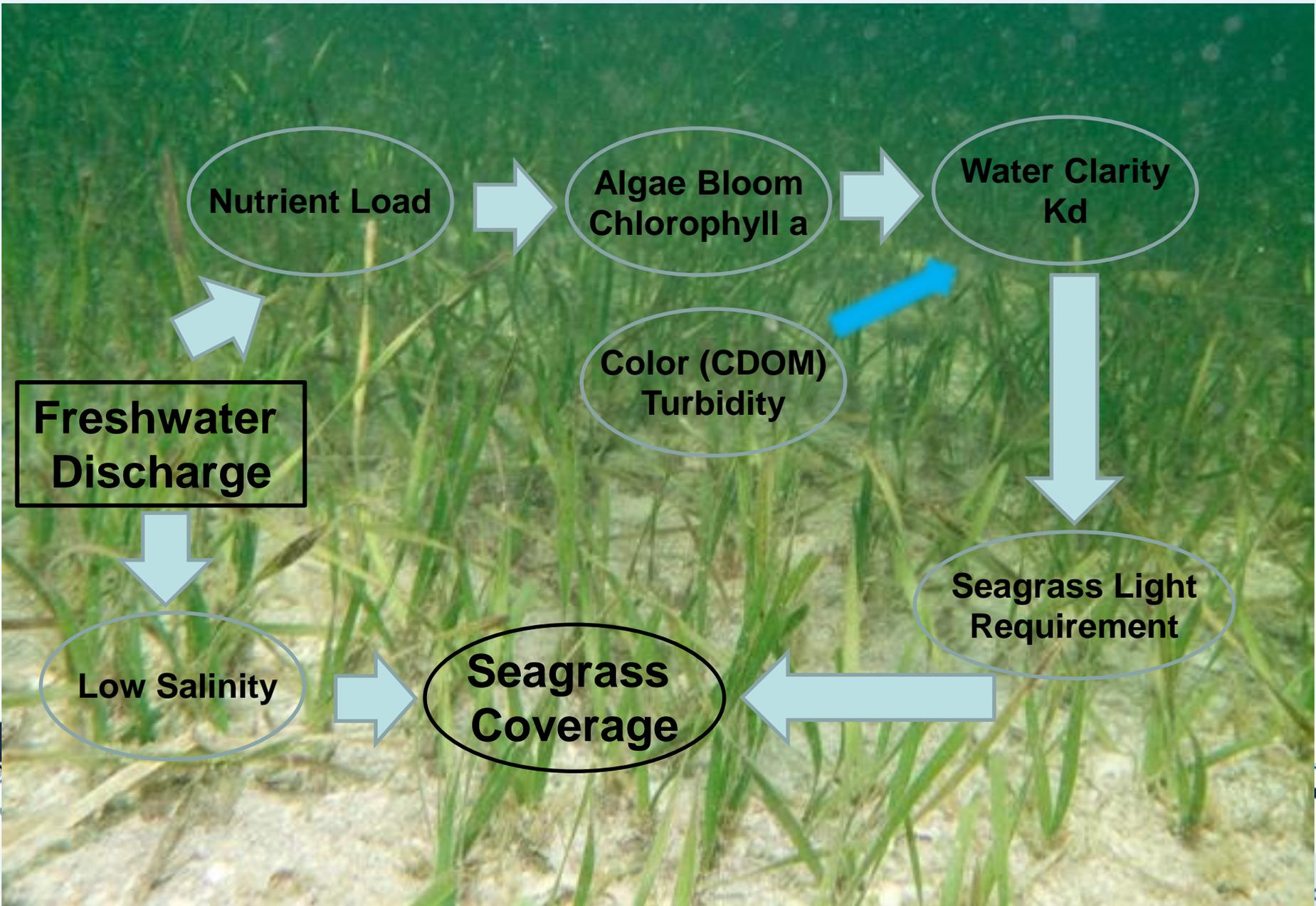
## Freshwater Inflows and Water Quality in Lake Worth Lagoon

**Zhiqiang Chen, Ph.D.**

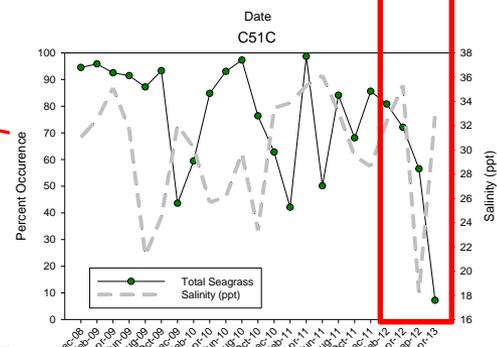
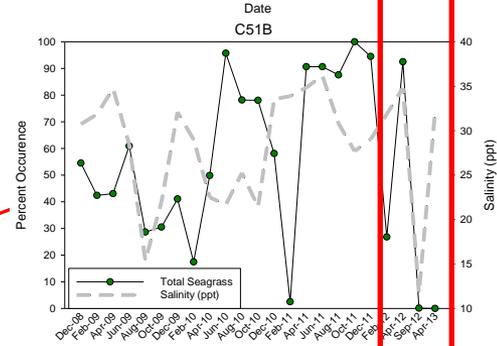
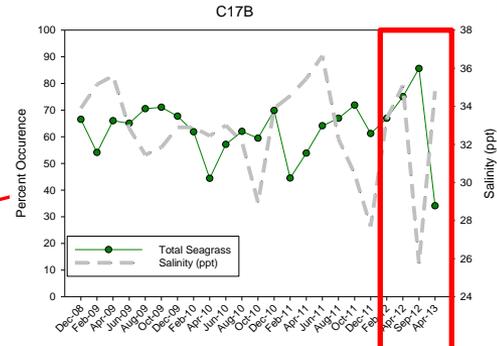
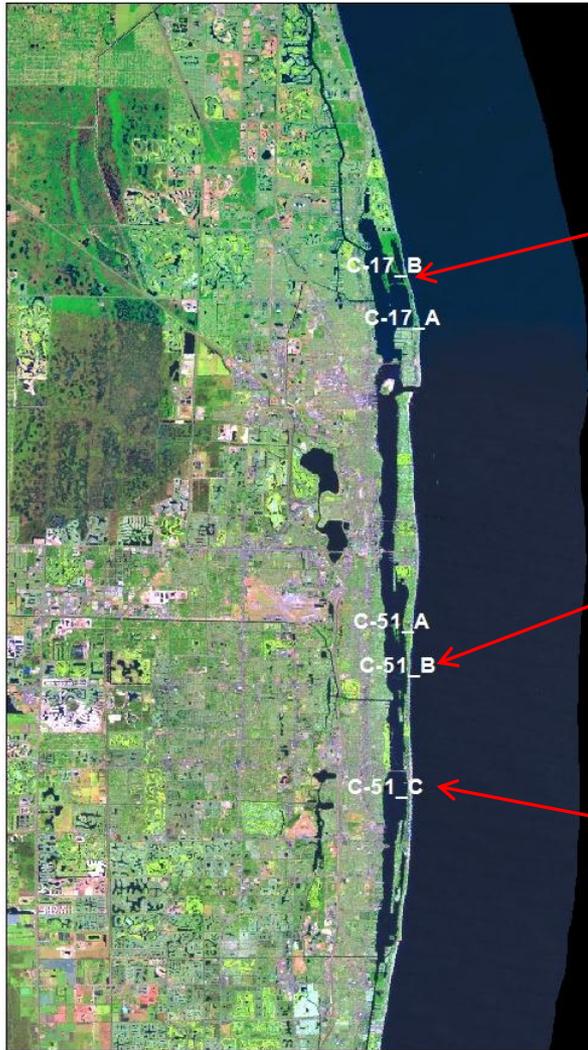
Senior Scientist, Coastal Ecosystems Section  
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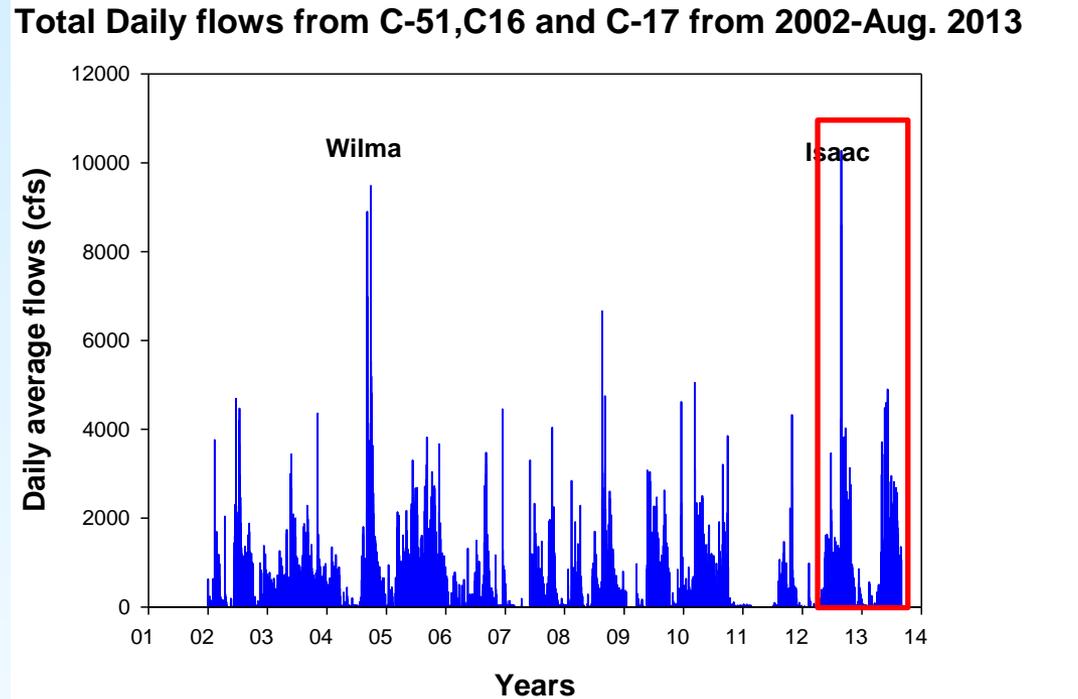
## Links between freshwater discharge, water quality and seagrass habitat



# Seagrass and Salinity

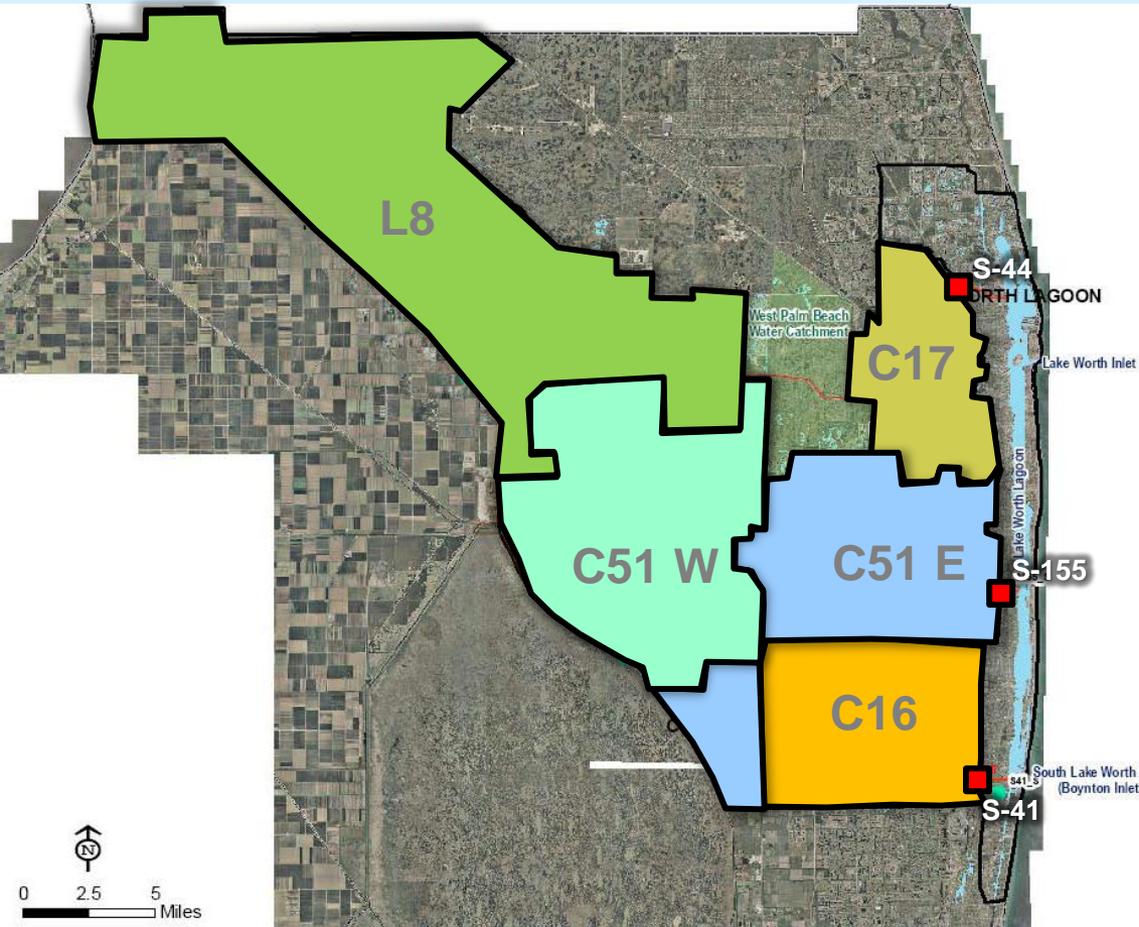


# Freshwater Inflows



Question: How does freshwater correlate to water quality in LWL?

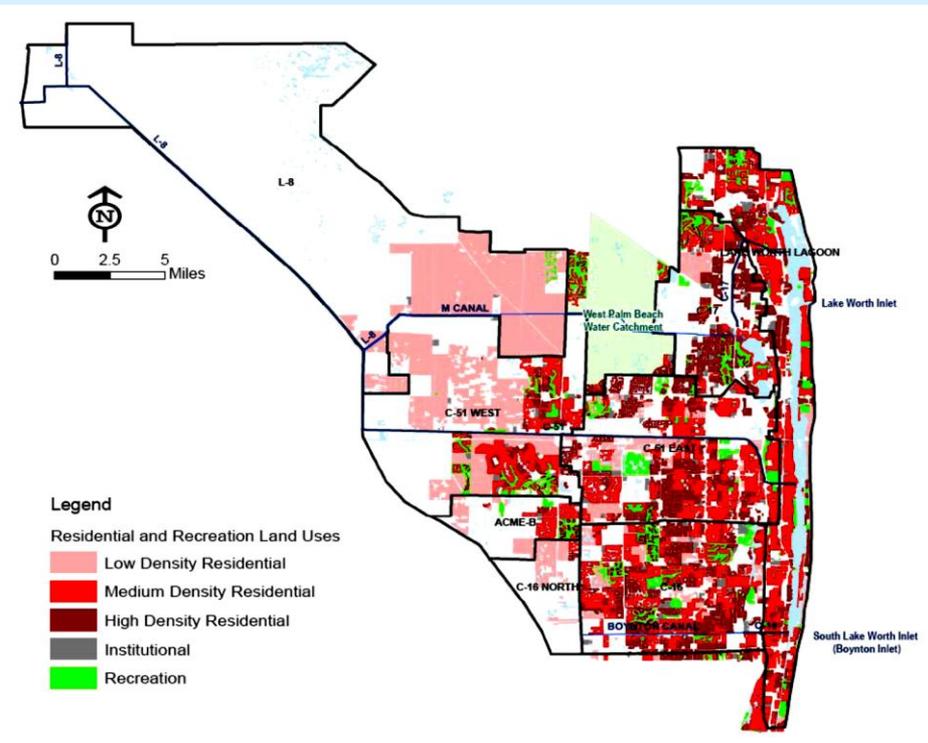
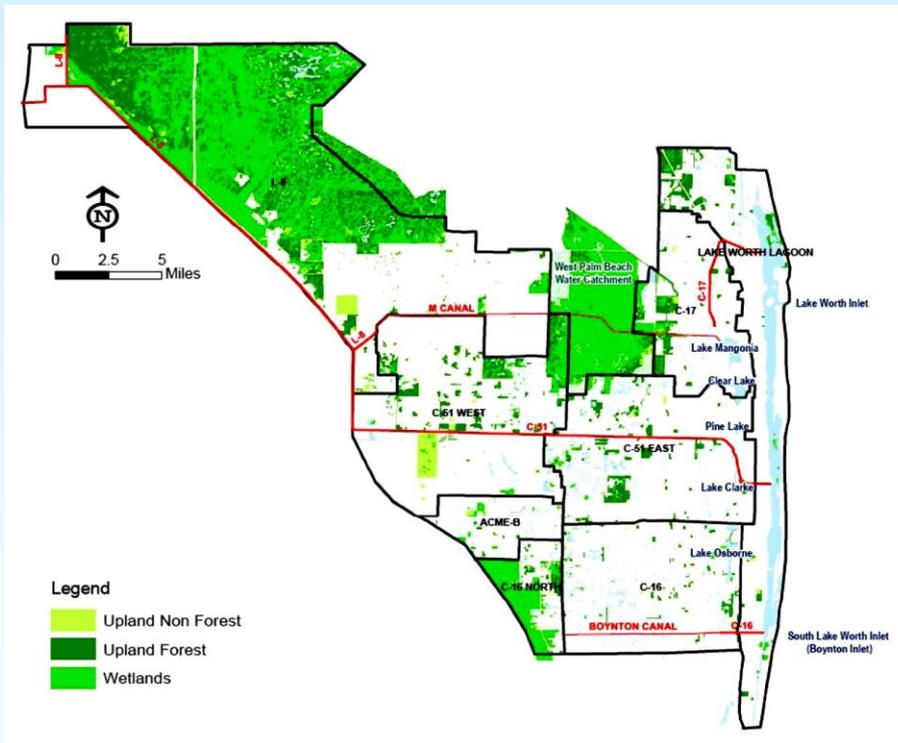
# LWL Watershed Consists of 6 Major Drainage Basins (Totaling About 480 Square Miles)



Basin	Area (SMs)	Structure
C17	35	S-44
L-8	166	
C51 EAST	73	S-155
C-51 WEST	81	
C16	62	S-41
LAKE WORTH LAGOON	59	UNGAUGED

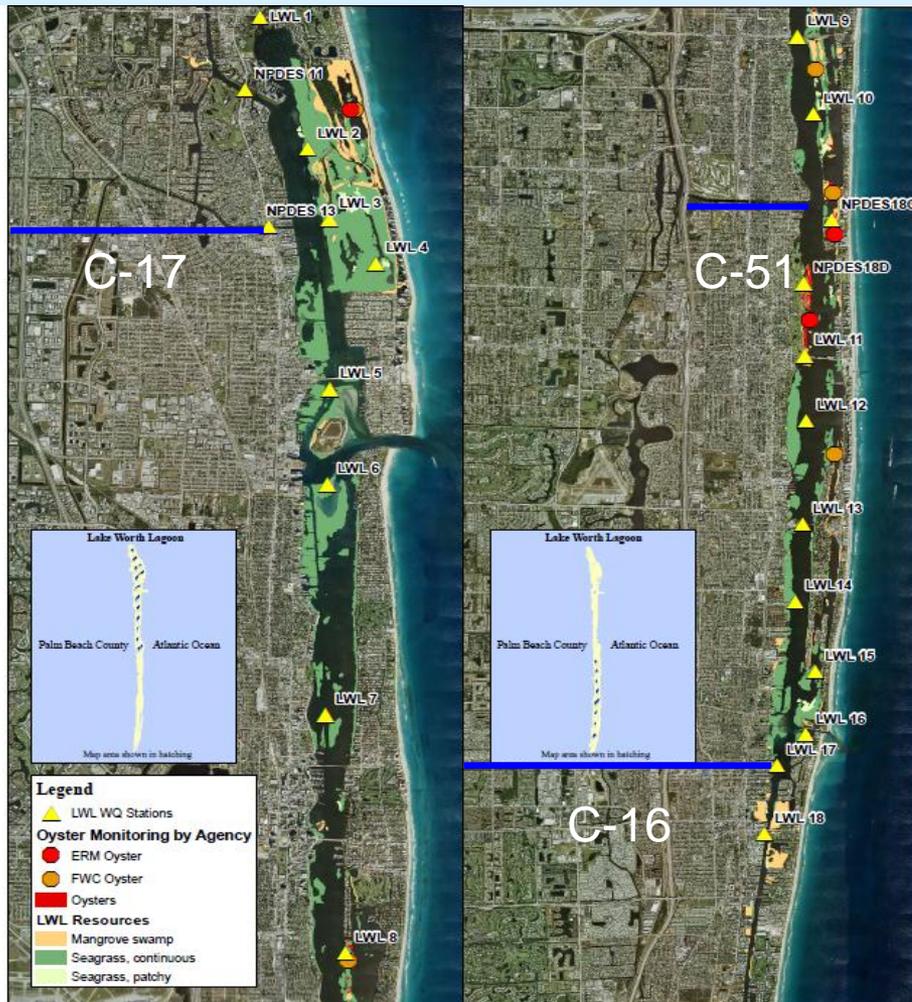
↑  
12%

# About 50% of Land Use is Residential and Urban Development



**High and medium density residential: high percentage of impervious areas for runoff generation**

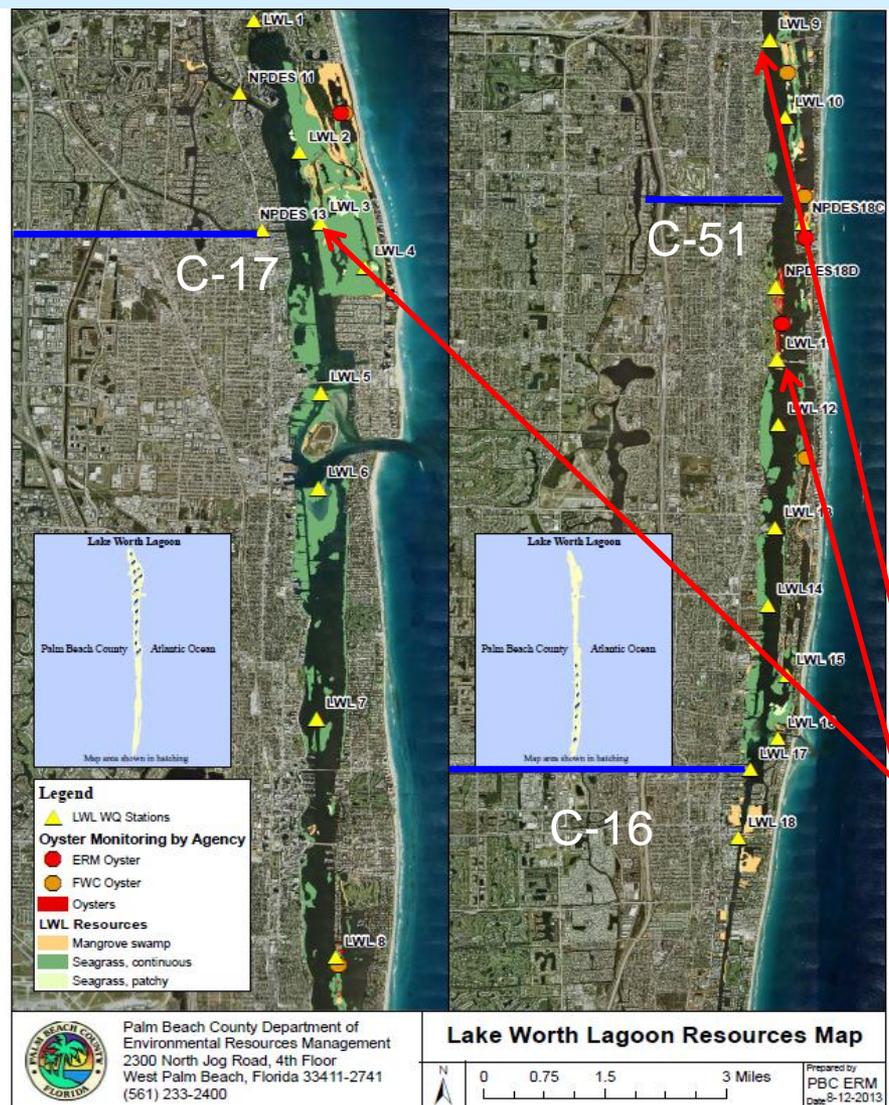
# Lagoon Features



- Three canals;
- Two inlets;
- 20 miles long, 0.5 mile wide,
- Shallow (8 feet or 2.4 m)
- Two main ecological endpoints/indicators (RECOVER Monitoring:
  - Seagrasses
  - Oysters



# Water Quality Stations



- Located near SAV and/or Oyster Beds and canal outflows;
- Former FDEP Stations (2002-2005)
- Existing water quality monitoring stations (2007-present)

LWL-3\*

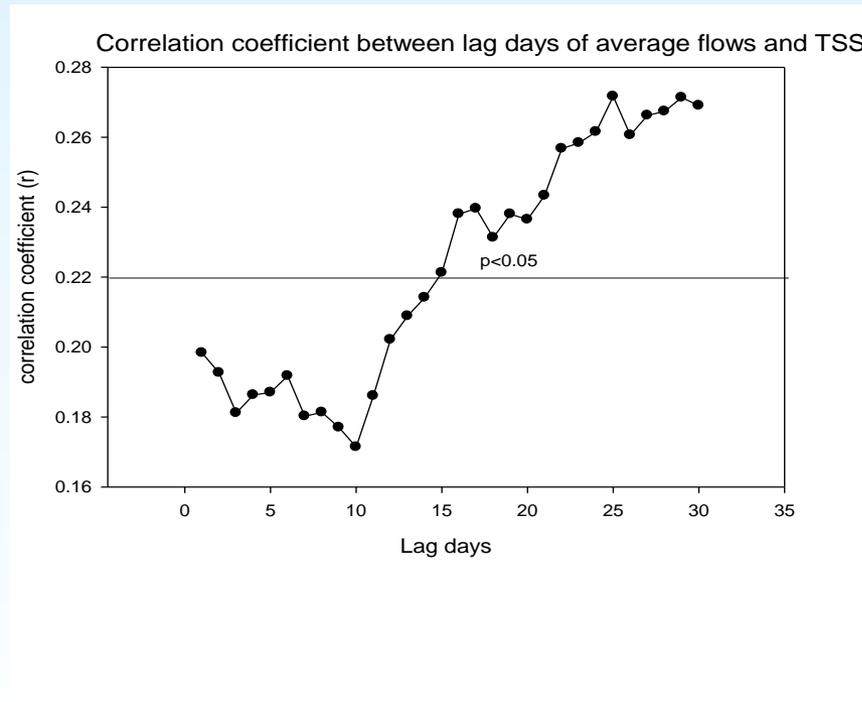
LWL-9\*

LWL-11

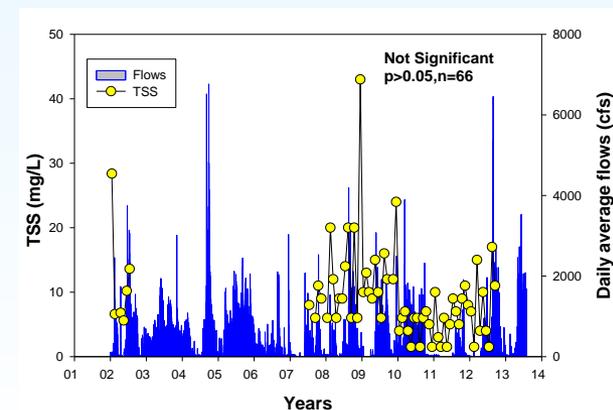
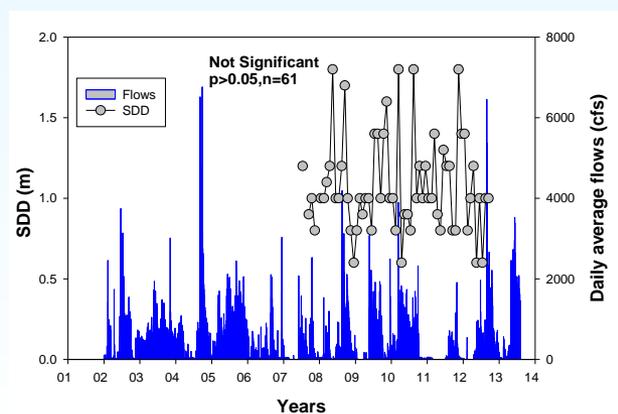
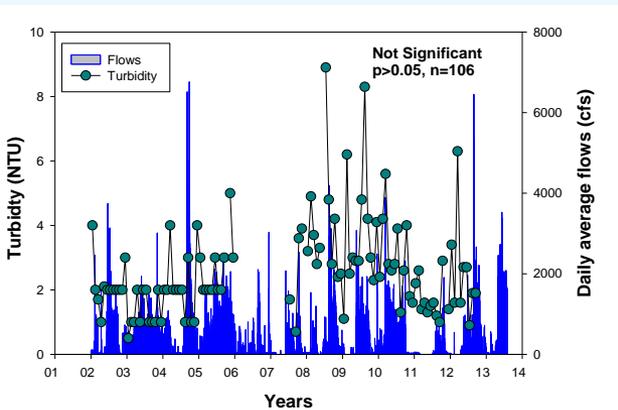
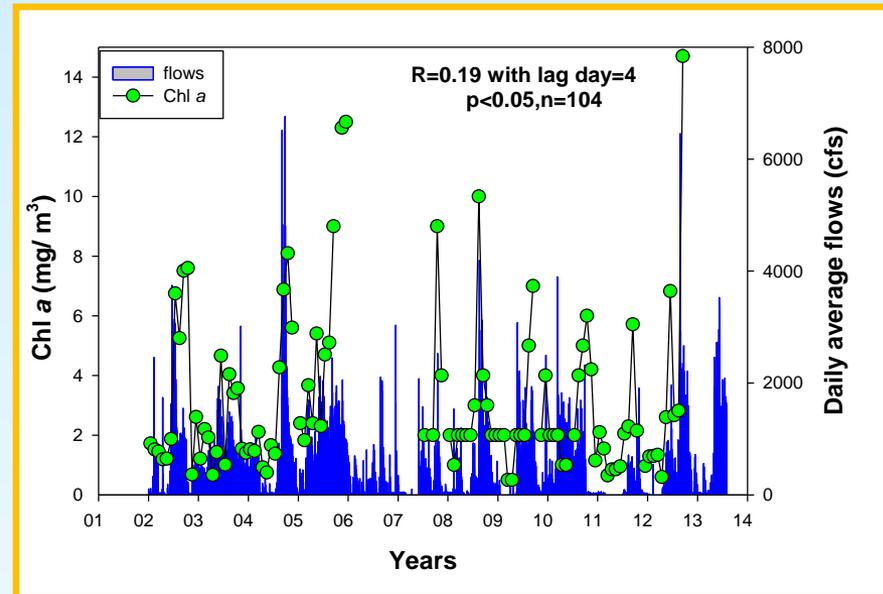
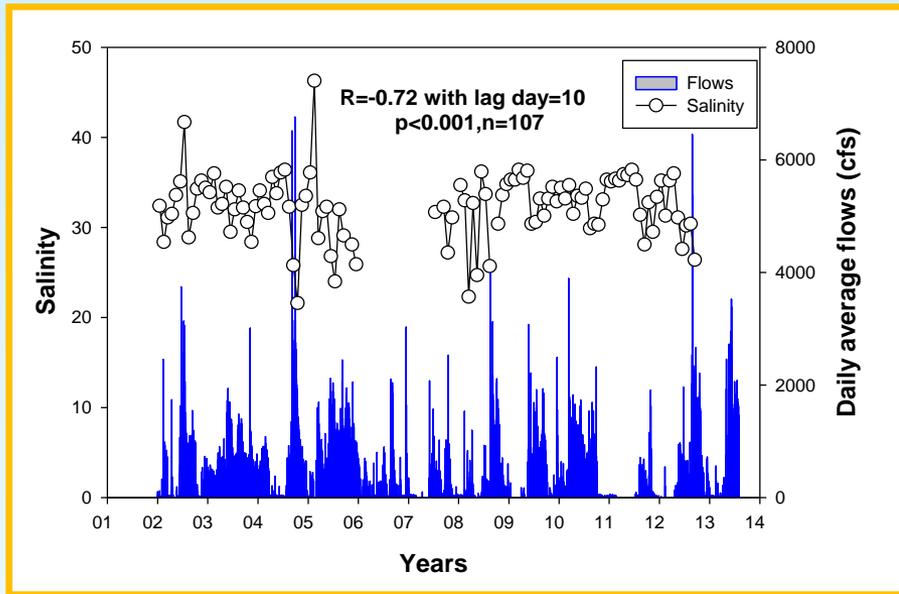
\* Discontinued Sept. 2012

# Approach

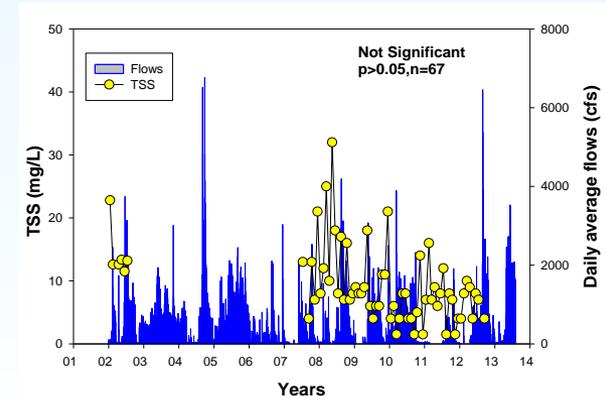
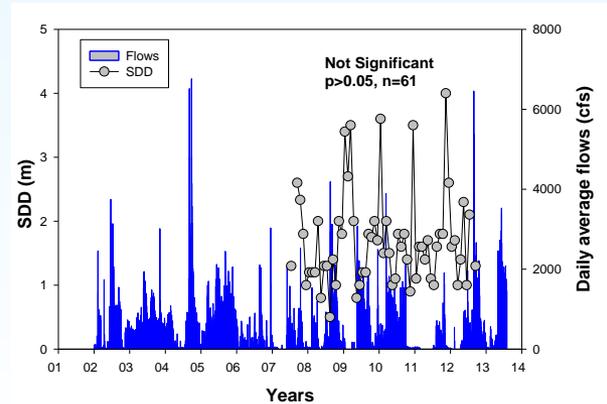
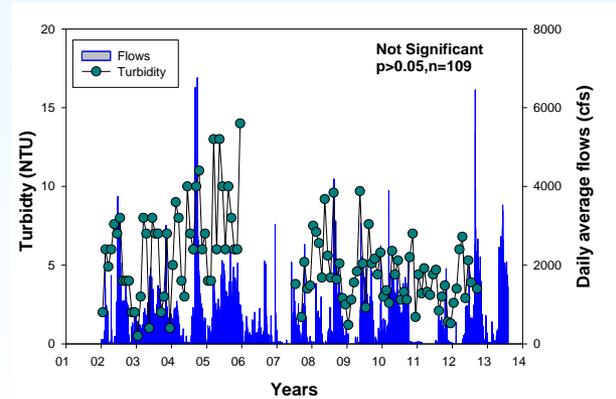
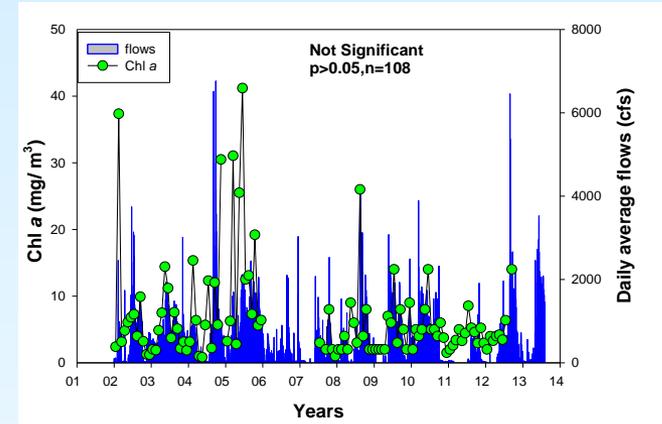
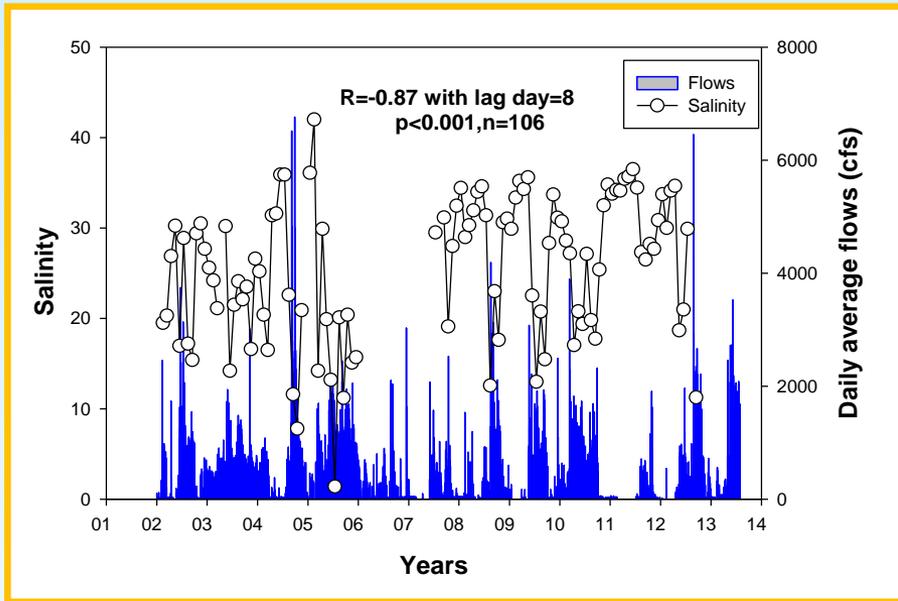
- Using nonparametric correlation analysis;
- Inflows versus salinity, turbidity, TSS, Secchi Disk Depth (SDD), Chlorophyll *a* (Chl *a*)



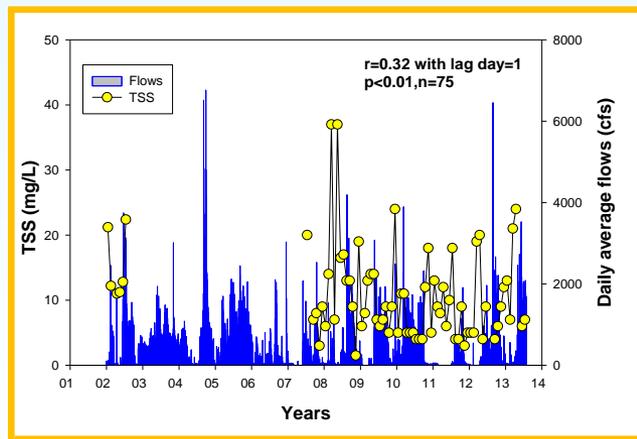
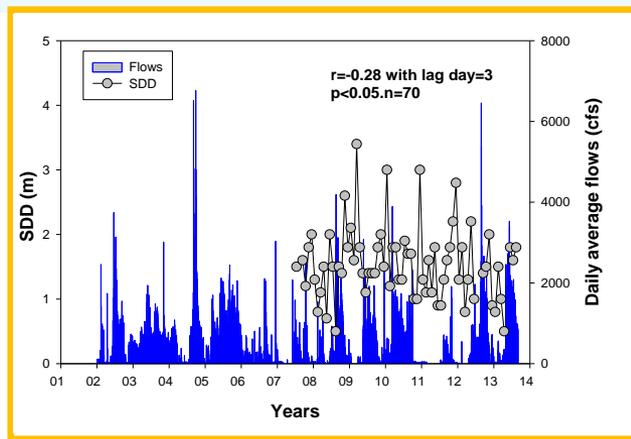
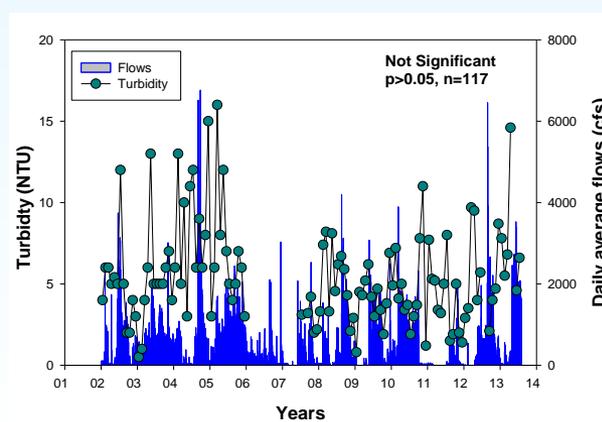
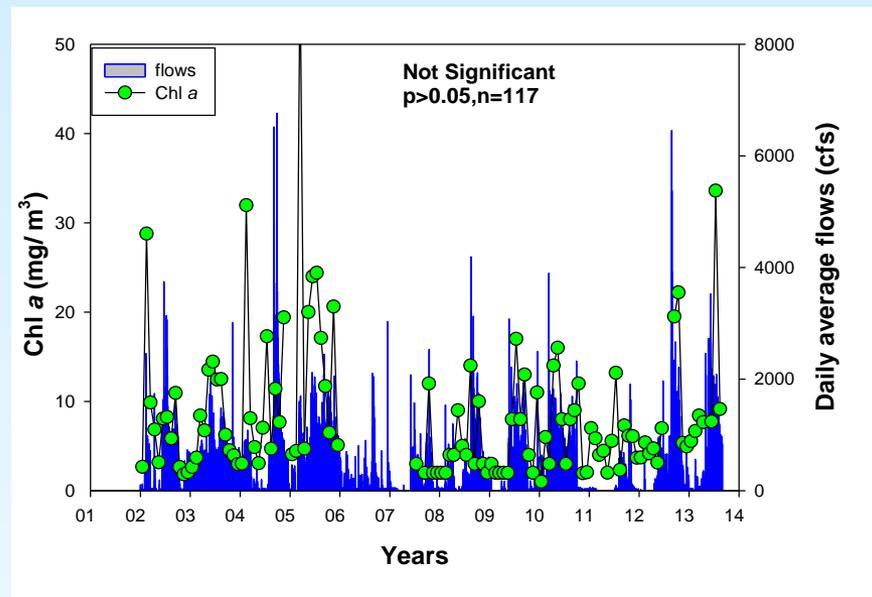
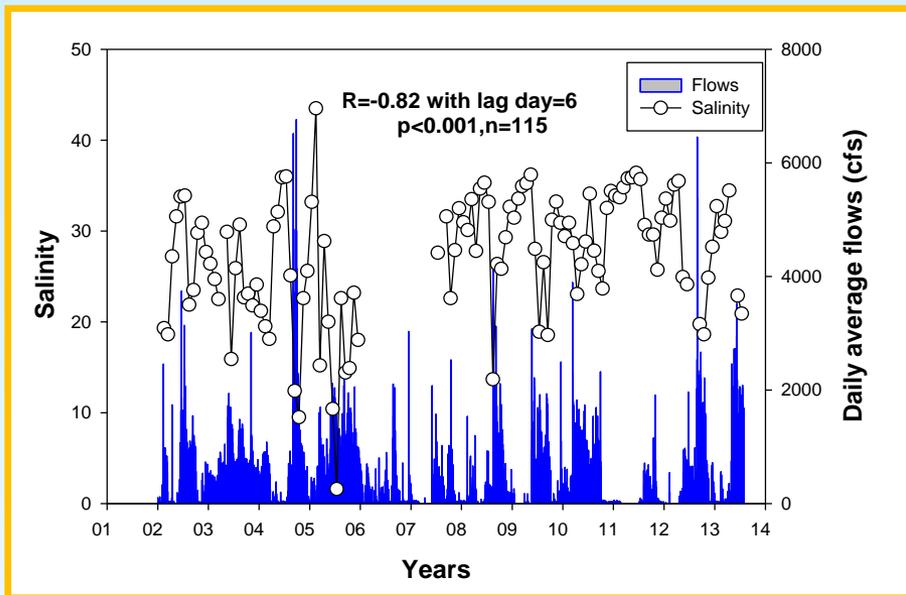
# Inflows and Water Quality at LWL-3



# Inflows and Water Quality at LWL-9



# Inflows and Water Quality at LWL-11



# SUMMARY

- Approximately 12% of the watershed, directly adjacent to Lake Worth Lagoon, is ungauged and highly developed (~63% urban and residential).
- Combined freshwater inflows from C-51 and C-17 are significantly correlated to salinity at all 3 stations (i.e. LWL 3, 9 and 11) included in this analysis (with 6-10 days lag time).
- In general, lag time for flow/salinity correlation increases with increasing distance from the C-51.
- Based on available data, freshwater inflow does not appear significantly correlated to turbidity at any of the 3 stations.
- In addition to salinity, freshwater inflow was also correlated to TSS and Secchi Disk Depth at the LWL-11 station (just south of the C-51, worst decline in seagrass occurrence), but not at other stations.
- Freshwater inflow was significantly related to Chl *a* at the LWL-3 station, but not at LWL-9 or LWL-11.