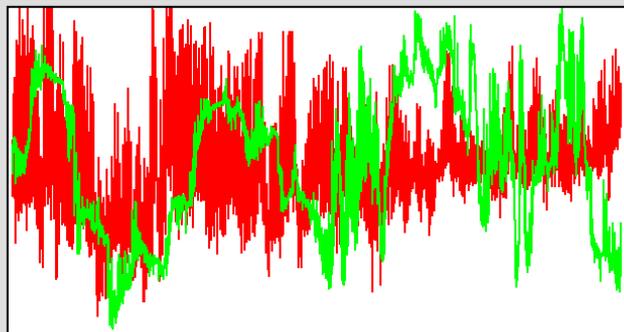


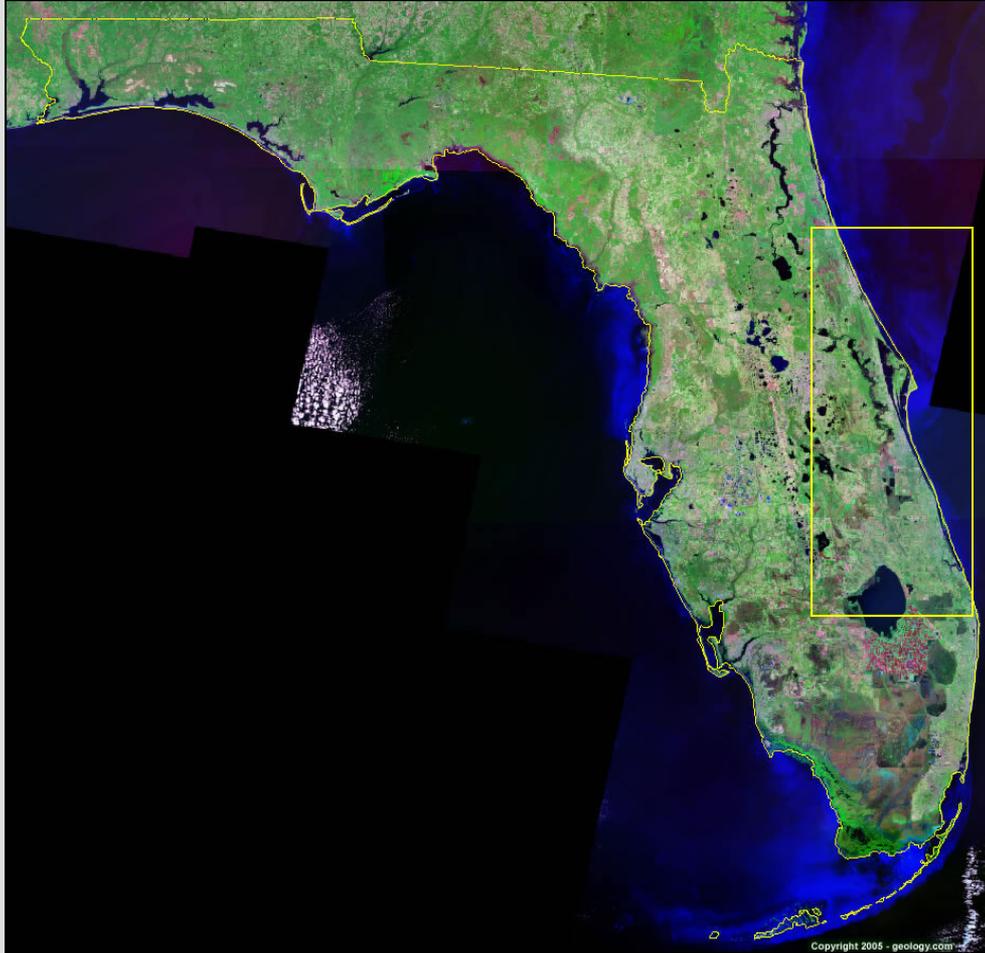
The Indian River Lagoon Observatory Network of Environmental Sensors



M. Dennis Hanisak
SECOORA Annual Meeting
May 17, 2017



The Indian River Lagoon



Critical Issues Facing the IRL & SLE

- Excessive freshwater release
- Degradation of water quality
- Contaminant loading
- Loss of habitat
- Decline of fisheries
- Emerging diseases in marine mammals



The Indian River Lagoon Observatory (IRLO)



Goal: to acquire and disseminate data and knowledge on components of the IRL critical to its ecological function and its sustainable management

Key Elements of IRLO

- Long-term, multi-disciplinary, ecosystem-based approach
- Collaboration among organizations
- A network of advanced observing stations



The Indian River Lagoon Observatory Network of Environmental Sensors (IRLON)



IRLON Overview

An estuarine observation and prediction network in the IRL providing real-time, high-accuracy and high-resolution water quality and weather data through a dedicated interactive website

High-resolution measurements for:

- Temperature
- Salinity
- Depth
- Current speed and direction
- Dissolved oxygen
- pH
- Turbidity
- CDOM (water color)
- Chlorophyll *a*
- Nitrate
- Phosphate

Weather station for:

- Air humidity
- Air temperature
- Barometric pressure
- PAR
- Pressure
- Rain
- Wind direction
- Wind gust
- Wind speed

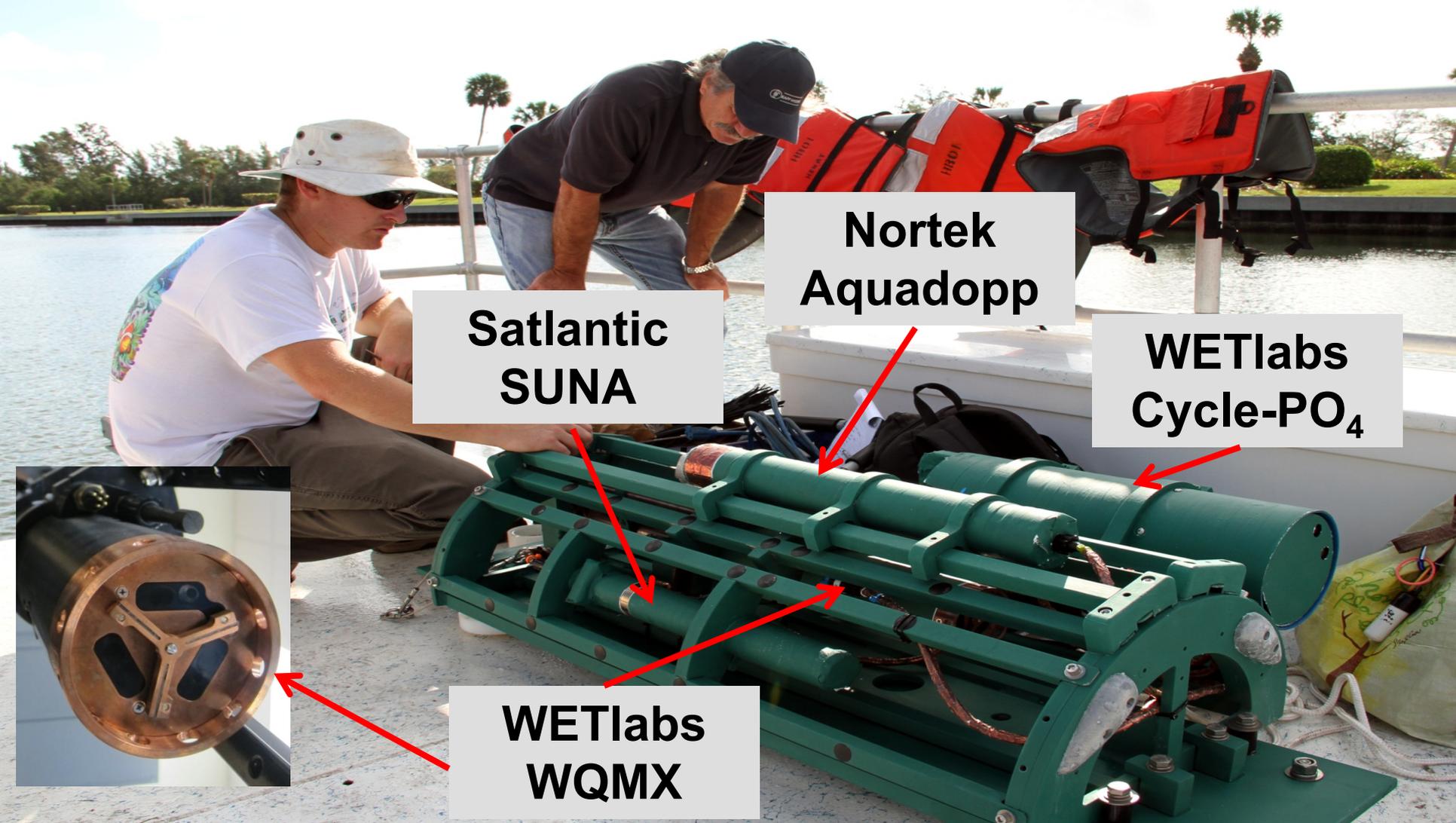
WET Labs Cycle-PO₄

Satlantic SUNA
(behind WQMX)

WET Labs WQMX

**STOR-
X**



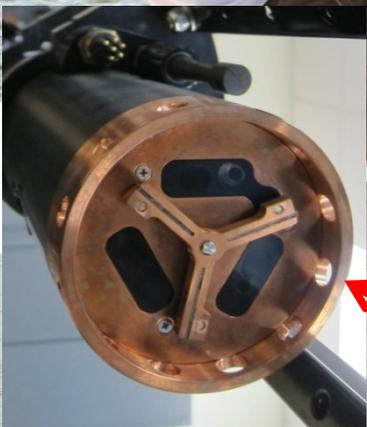


**Satlantic
SUNA**

**Nortek
Aquadopp**

**WETlabs
Cycle-PO₄**

**WETlabs
WQMX**





Data Access

<http://fau.loboviz.com/>

Continuous real-time, high-accuracy and high-resolution observatory data available to all through a dedicated interactive website to better quantify and model relationships between environmental factors and biological processes in the IRL

HARBOR BRANCH **LOBO** Land/Ocean Biogeochemical Observatory
FLORIDA ATLANTIC UNIVERSITY

HOME LOBOVIZ CGI QA/QC WIRELESS GE ABOUT CONTACT

Latest: *Click site name for data.*

Weather

- IRL-LP Indian River Lagoon - Link Port
2016-07-06 16:00:00 EST [Q](#)
- IRL-JB Indian River Lagoon-Jensen Beach
2016-07-06 16:00:00 EST [Q](#)
- IRL-SLE Indian River Lagoon-St. Lucie Estuary
2016-07-06 16:00:00 EST [Q](#)
- SLE-ME St. Lucie Estuary-Middle Estuary
2016-07-06 16:00:00 EST [Q](#)
- SLE-NF St. Lucie Estuary-North Fork
2016-07-06 16:00:00 EST [Q](#)
- SLE-SF St. Lucie Estuary-South Fork
2016-07-06 16:00:00 EST [Q](#)
- SLE-SF2 St. Lucie Estuary-South Fork 2
2016-07-06 16:00:00 EST [Q](#)

Water Quality

- IRL-LP Indian River Lagoon - Link Port
2016-07-06 16:00:00 EST [Q](#)
- IRL-FP Indian River Lagoon - Fort Pierce
2016-07-06 16:00:00 EST [Q](#)
- IRL-VB Indian River Lagoon - Vero Beach
2016-07-06 16:00:00 EST [Q](#)
- IRL-SB Indian River Lagoon - Sebastian
2016-07-06 16:00:00 EST [Q](#)
- IRL-JB Indian River Lagoon-Jensen Beach
2016-07-06 16:00:00 EST [Q](#)

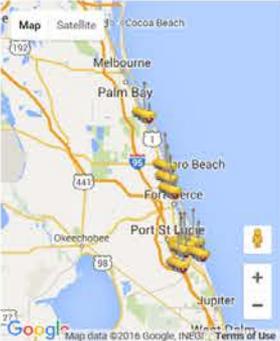
FAU Harbor Branch Indian River Lagoon Observatory



The Indian River Lagoon Observatory Network of Environmental Sensors

The Indian River Lagoon (IRL) is situated along 156 miles of Florida's east coast. Urbanization, excessive freshwater releases, degradation of water quality, contaminant loading, loss of habitat (e.g., seagrasses, mangroves), harmful algal blooms, decline of fisheries, and emerging diseases in marine mammals and other biota are increasingly important issues in the IRL, as they are throughout the world's estuaries and coastal waters. The Indian River Lagoon Observatory (IRLO), based at Florida Atlantic University's Harbor Branch Oceanographic Institute, is conducting long-term, multi-disciplinary, ecosystem-based research on this nationally significant estuary.

IRLO research and education activities are being enhanced by the deployment of an estuarine observation network of land/ocean biogeochemical observatory (LOBO) units and weather sensors to provide real-time, high-accuracy and high-resolution water quality/weather data through this dedicated interactive website. The LOBO network enables researchers to follow environmental changes in



Archived Data

Use **LOBOviz** to graph and download archived data from this LOBO node.

Configuration

Manufacturer	Instrument	Measurements
Satantic	LOBO	Power distribution Sensor control Wireless communication Data management
Satantic	SeaFET pH	pH

Benefits to IRL & SLE

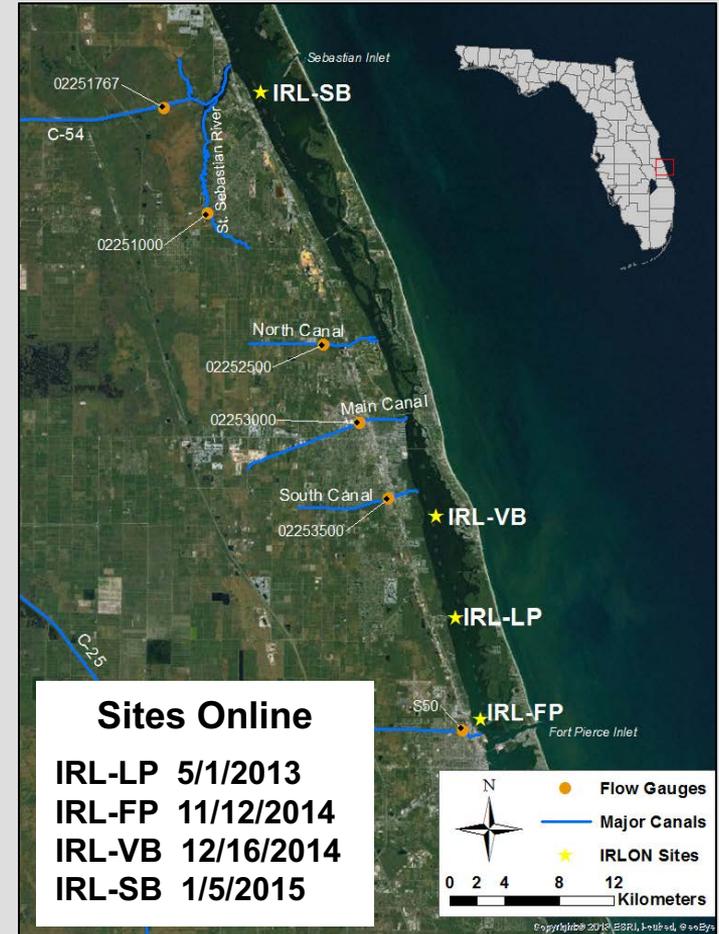
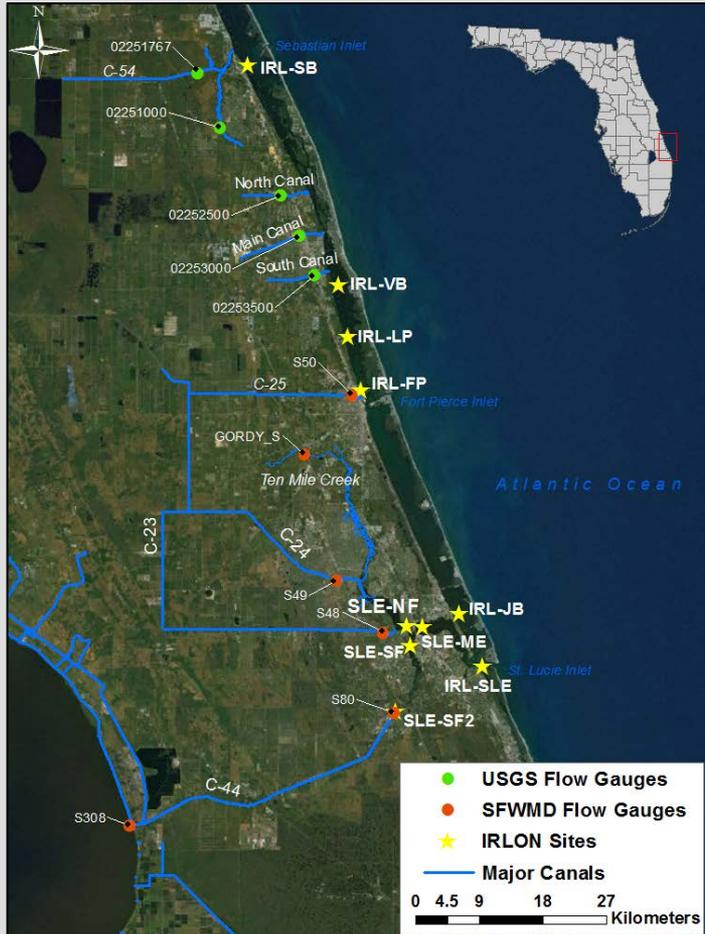
IRLON technology will provide researchers, governmental agencies, students, and the public unprecedented IRL & SLE environmental data

- Provide real-time environmental data via a publicly accessible website**
- Enable researchers to follow environmental changes in these estuaries and create the ability to do comparative studies on the east and west coasts of Florida**
- Assist resource and planning managers to make informed decisions for the good of the IRL & SLE**
- Model and correlate environmental data to biological, chemical, and physical phenomena of the IRL & SLE**
- Create a platform for education and outreach activities**

Questions to Address with IRLLO Network

- **How do freshwater discharges and watershed runoff impact water quality in the Indian River Lagoon and St. Lucie Estuary?**
 - **What is the nutrient (nitrate, phosphate) load?**
 - **What is the impact on light attenuators (impact on seagrass)?**
 - **What is the relationship to algal blooms?**
- **How does water from these freshwater discharges interact with oceanic water flowing through the inlets?**

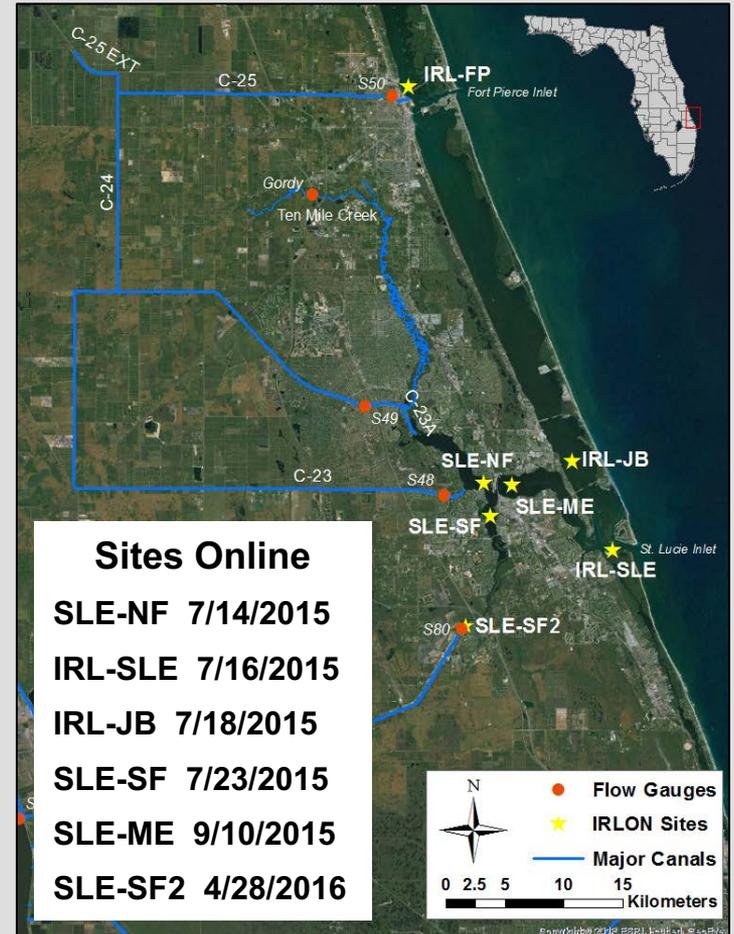
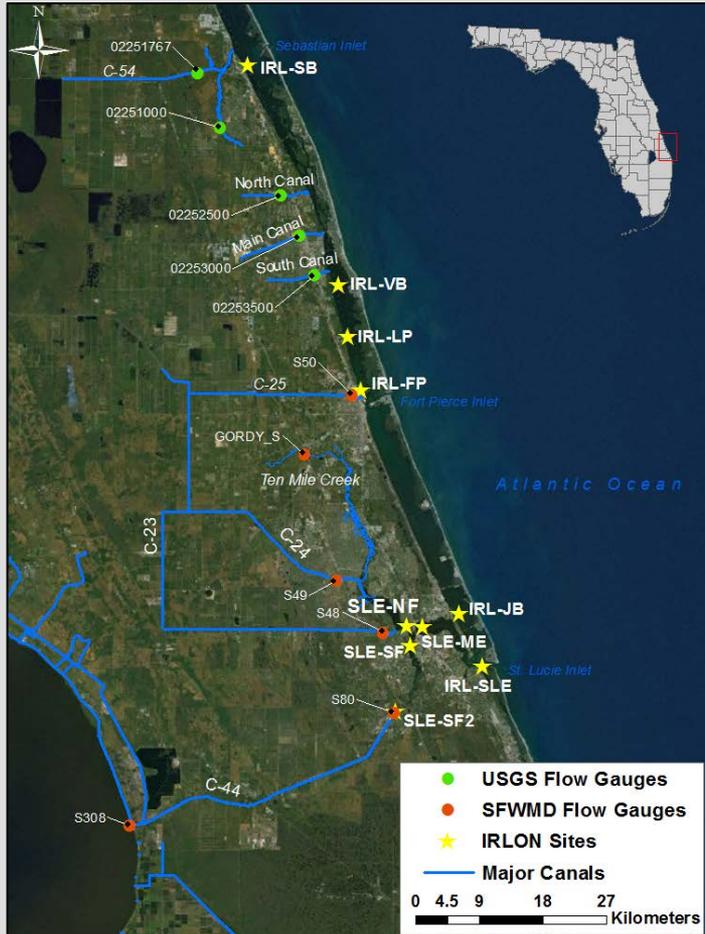
IRLON Sites



Sites Online

IRL-LP 5/1/2013
 IRL-FP 11/12/2014
 IRL-VB 12/16/2014
 IRL-SB 1/5/2015

IRLON Sites



Sites Online

SLE-NF 7/14/2015

IRL-SLE 7/16/2015

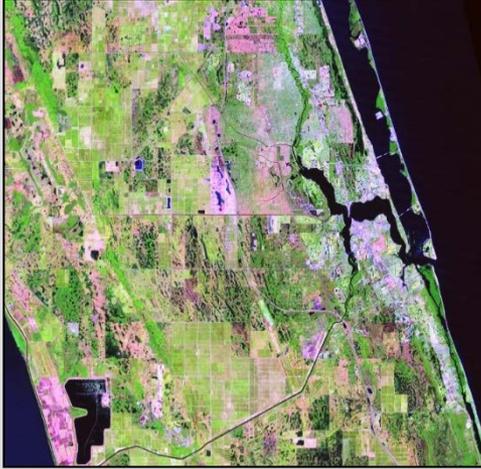
IRL-JB 7/18/2015

SLE-SF 7/23/2015

SLE-ME 9/10/2015

SLE-SF2 4/28/2016

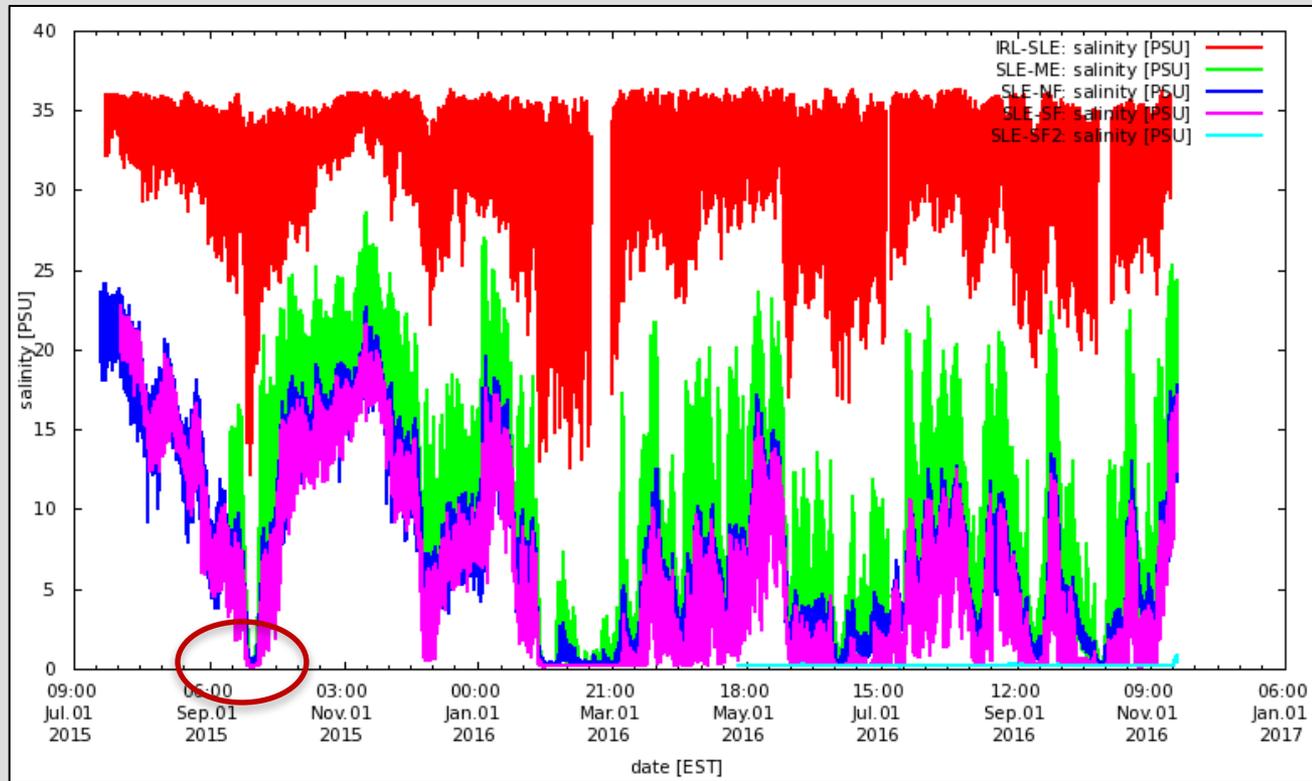
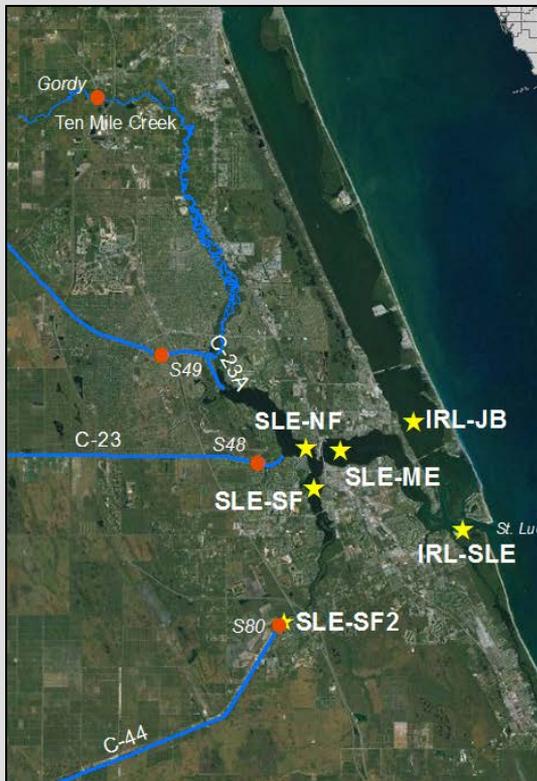
Short Story 1: 2016 Lake Okeechobee Discharges



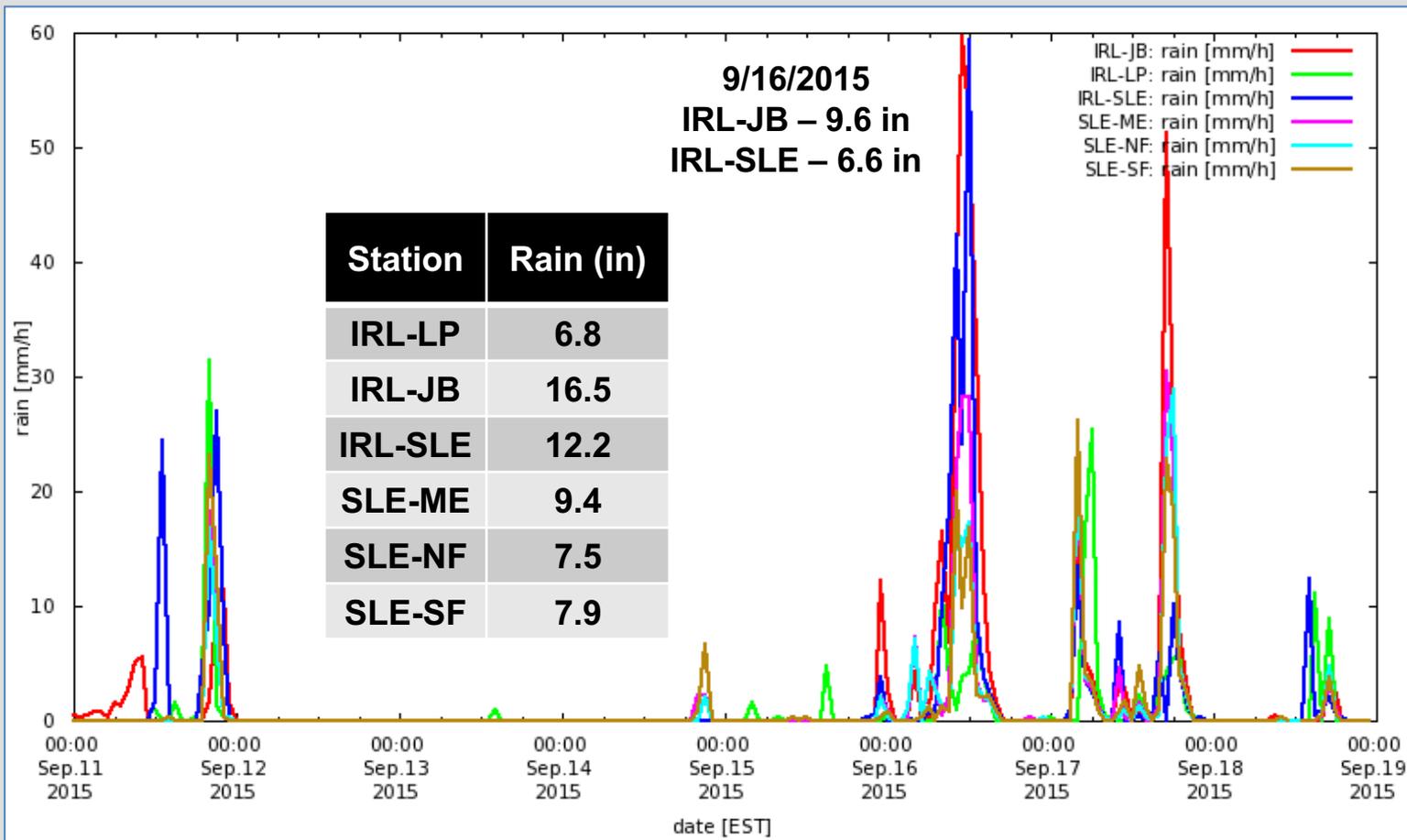
SLE – 2016 Cyanobacteria Blooms



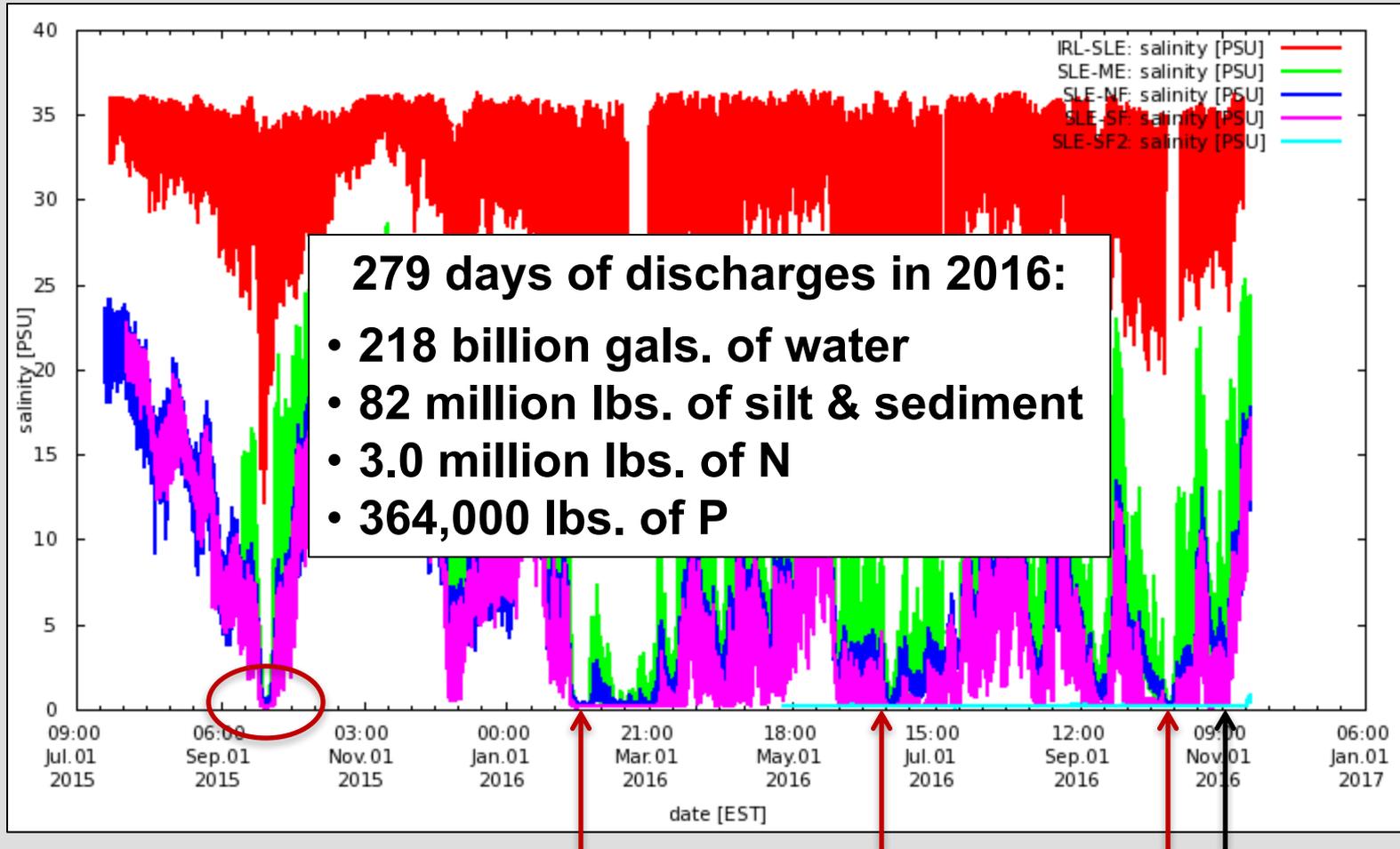
IRLO Southern Network – Salinity



LOBO Weekly Rainfall (9/11-9/18/2015)

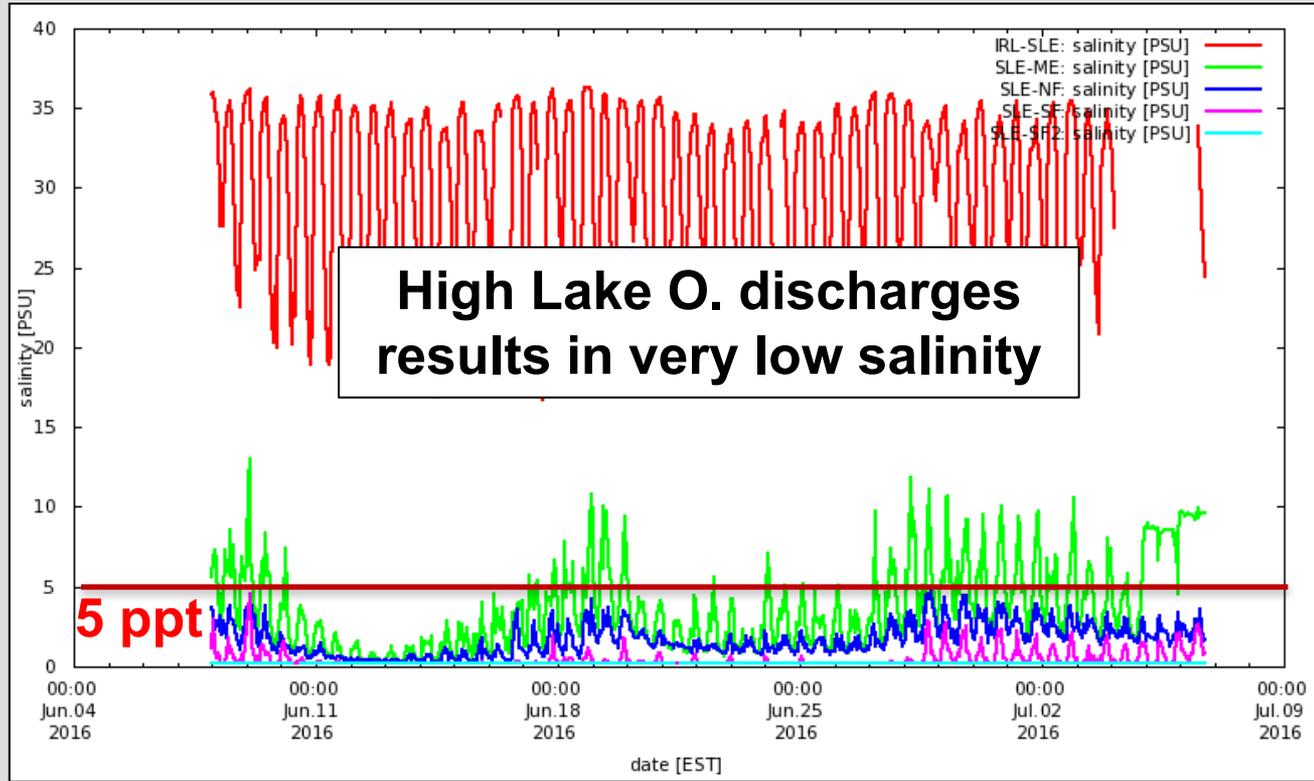
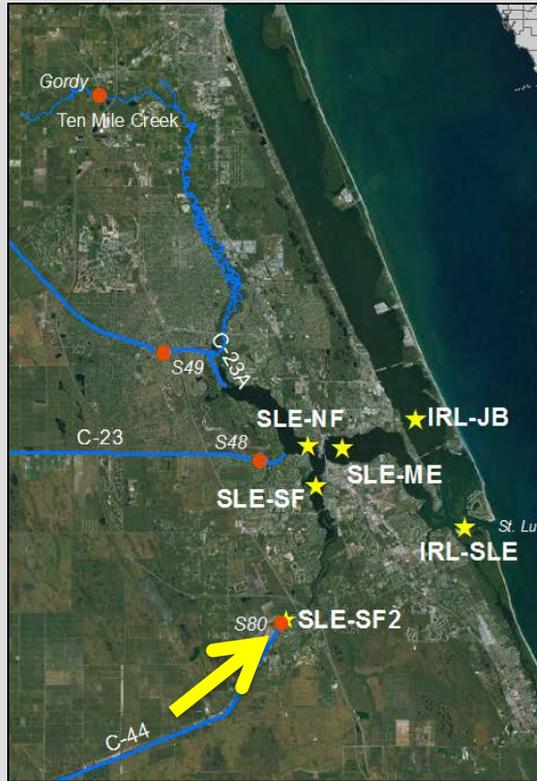


IRLO Southern Network – Salinity



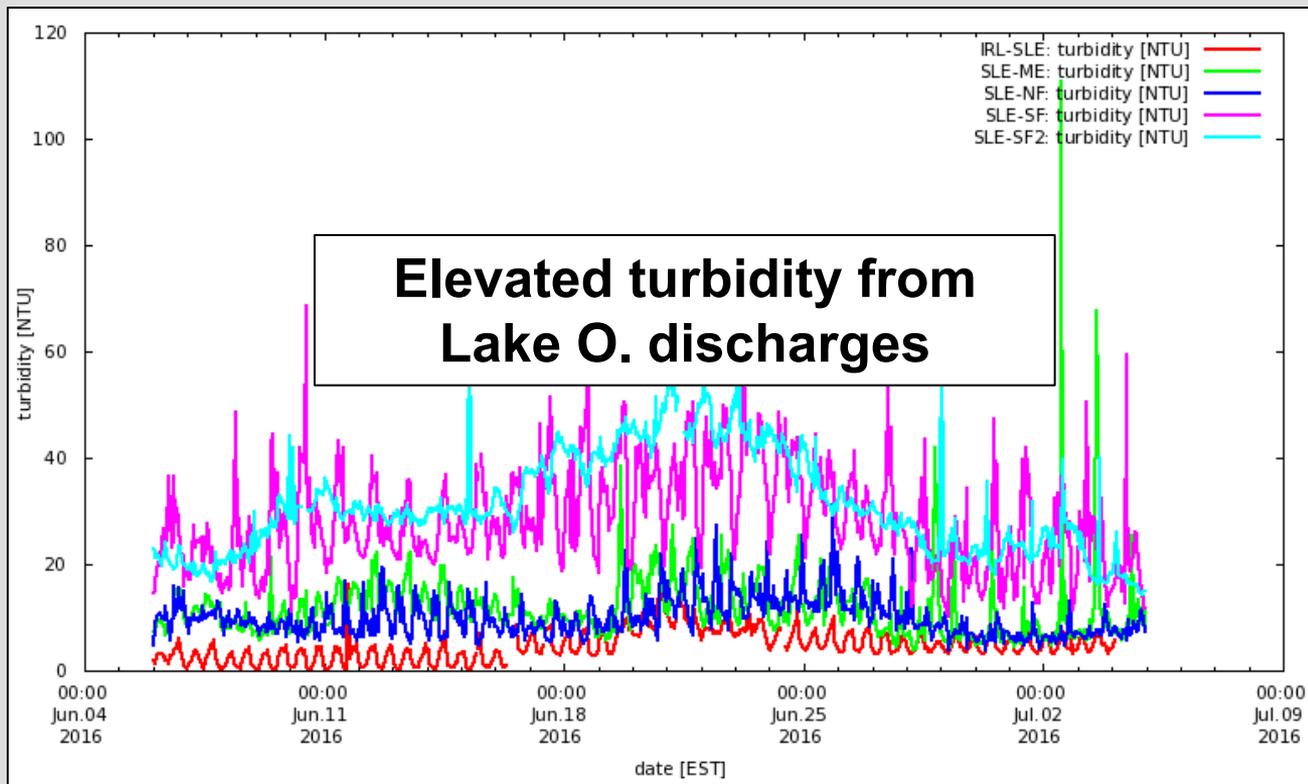
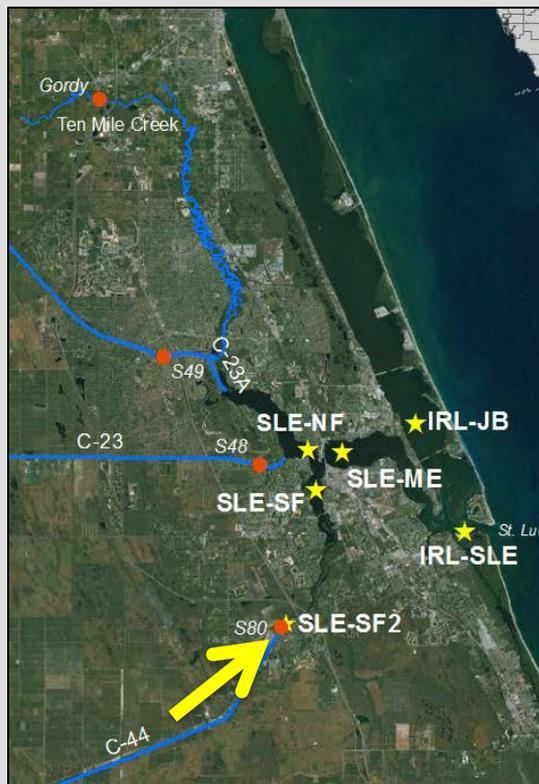
IRLO Southern Network – Salinity

(June 8 – July 7, 2016)



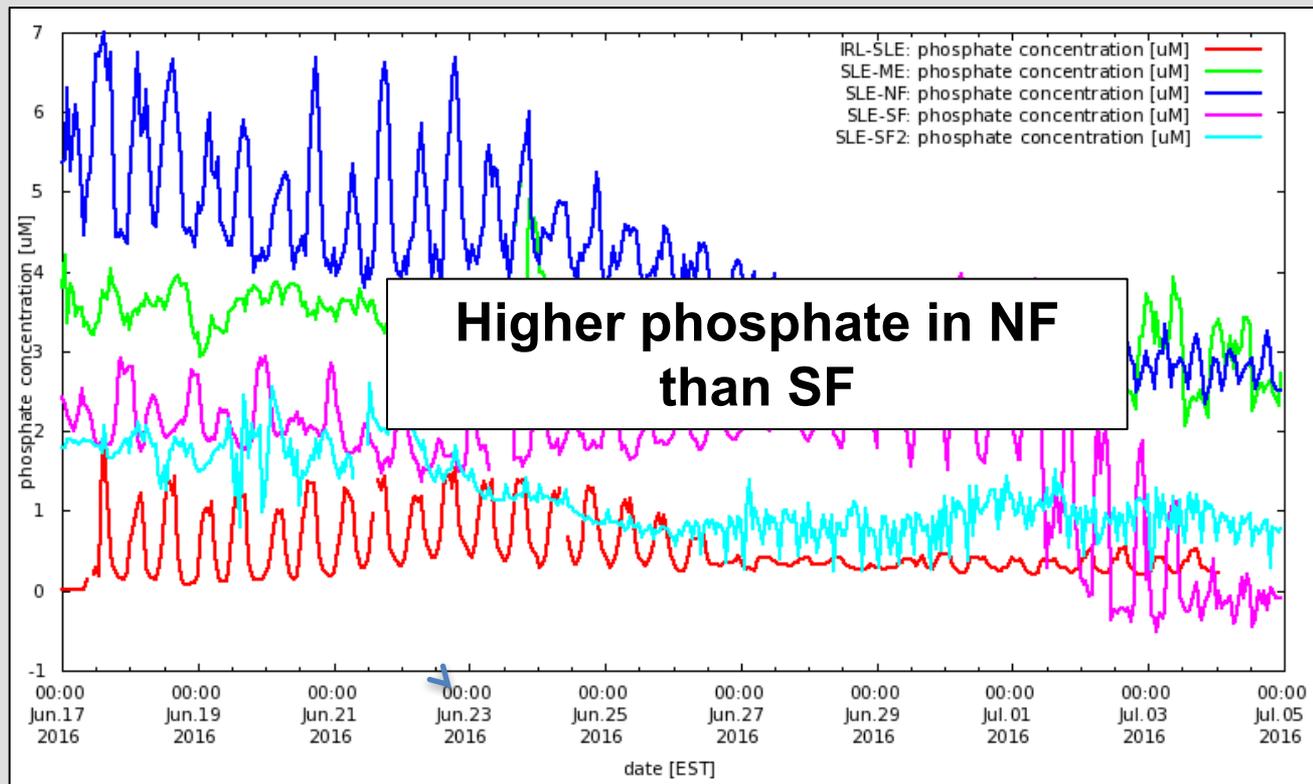
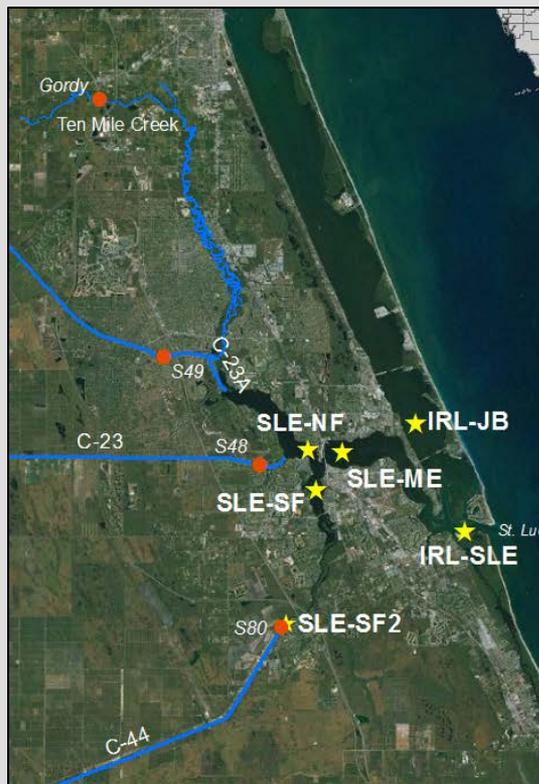
IRLO Southern Network – Turbidity

(June 8 – July 7, 2016)



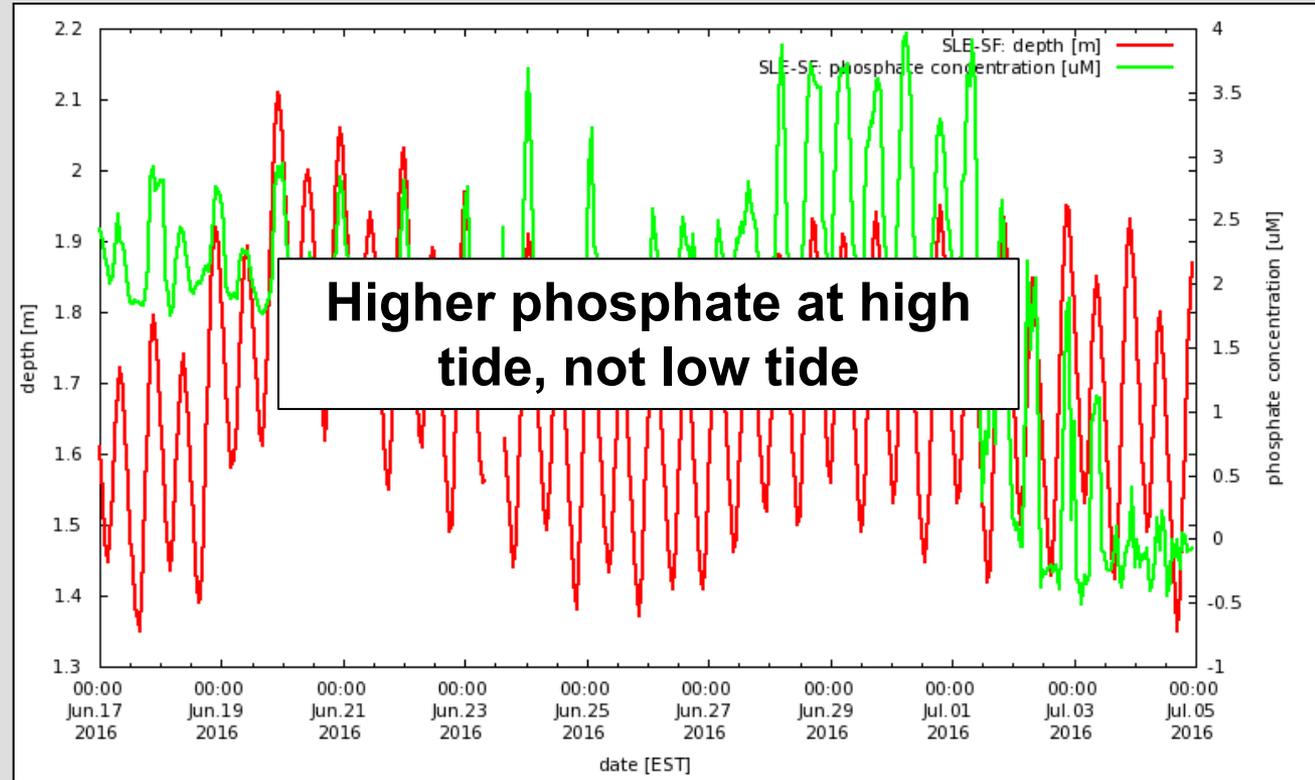
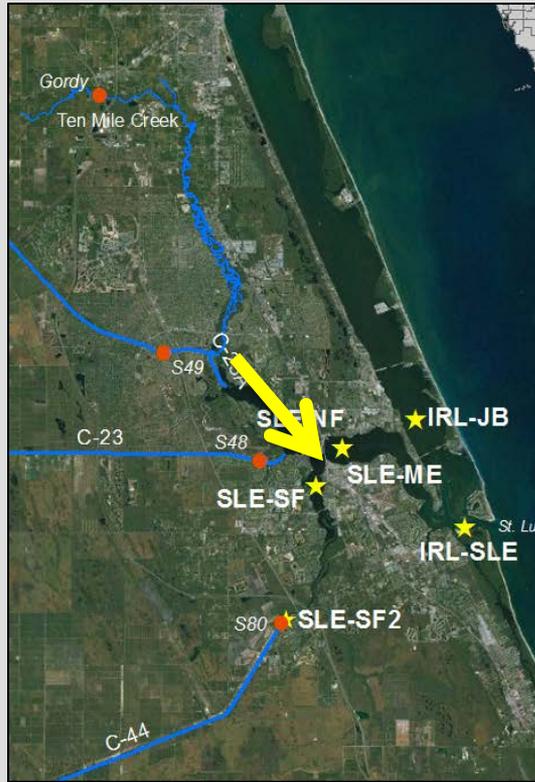
IRLO Southern Network – Phosphate

(June 8 – July 7, 2016)



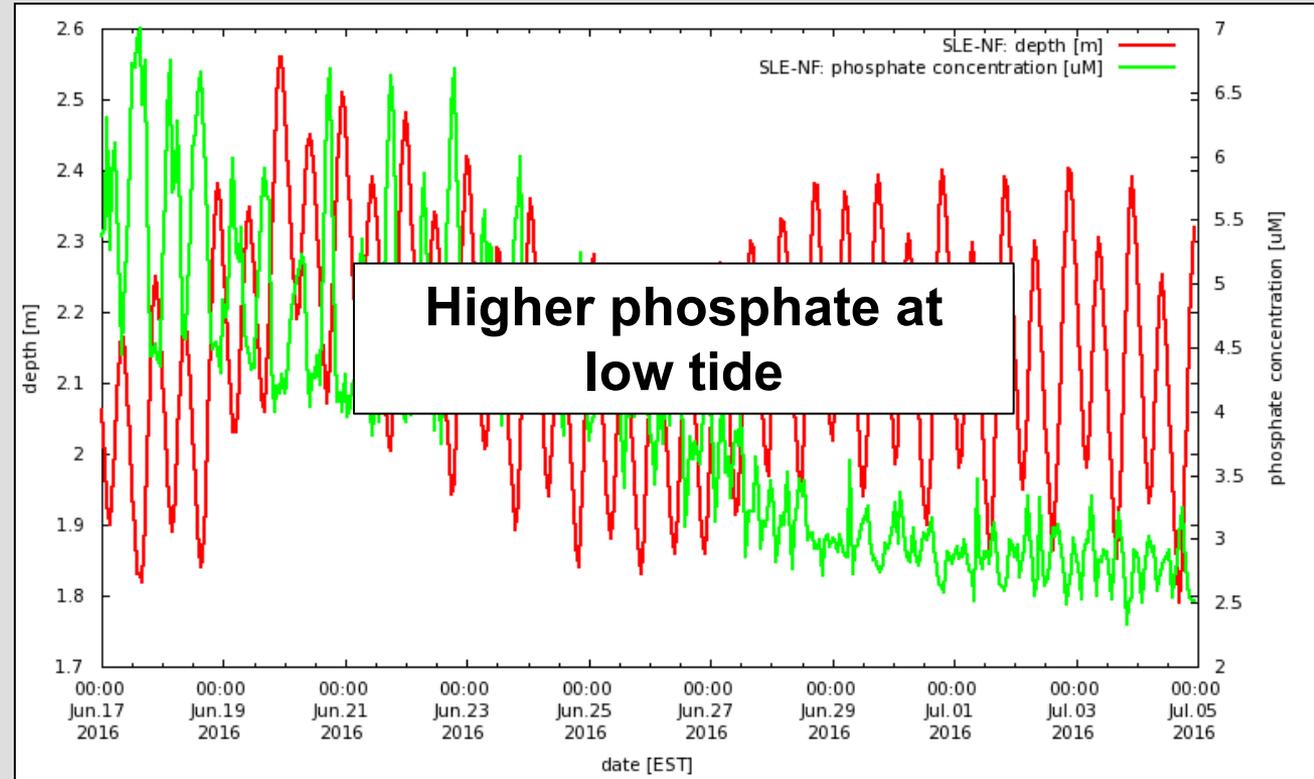
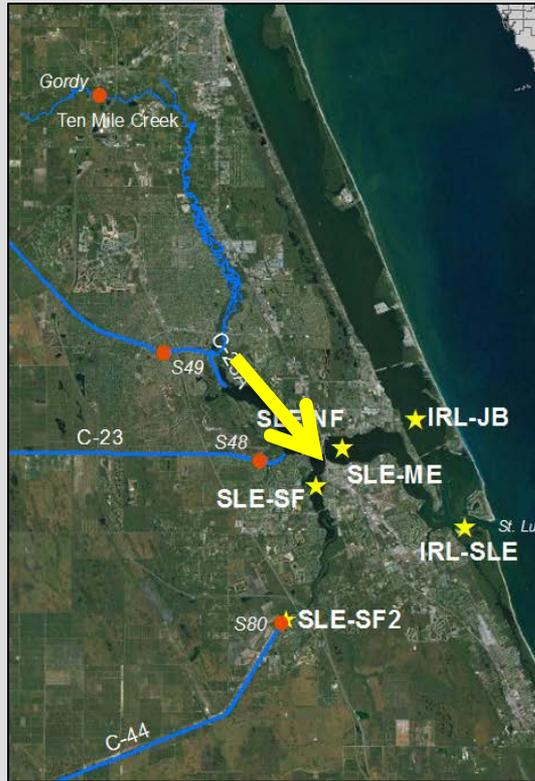
IRLO South Fork – Phosphate

(June 8 – July 7, 2016)

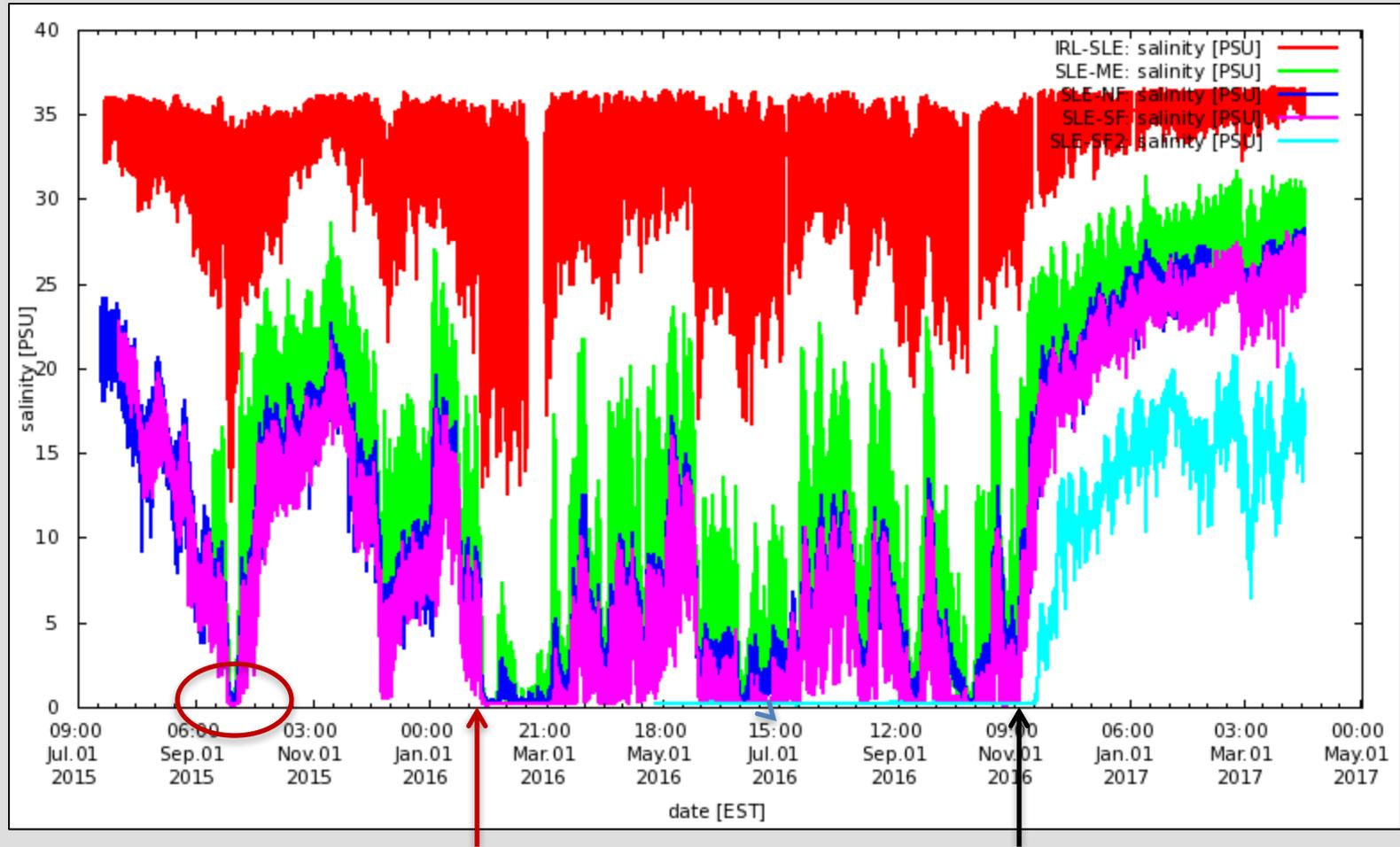


IRLO North Fork – Phosphate

(June 8 – July 7, 2016)

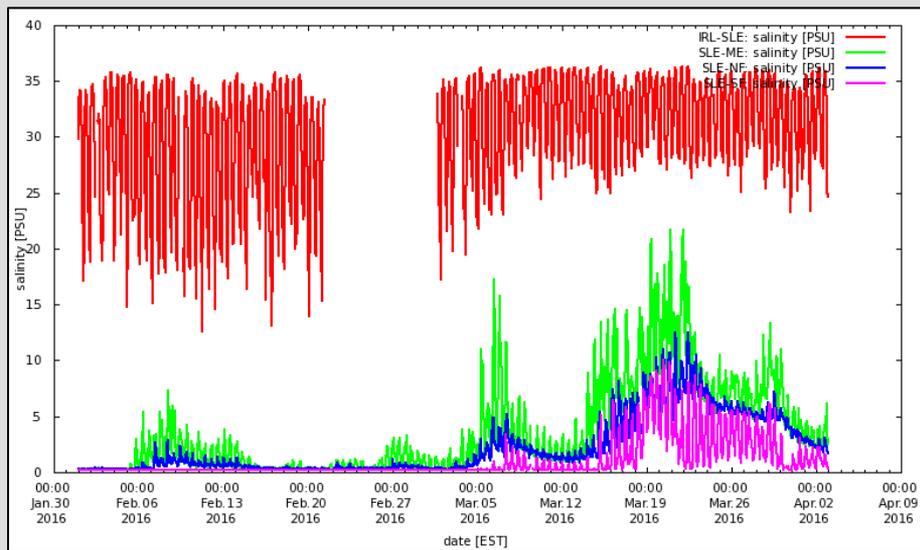


IRLO Southern Network – Salinity

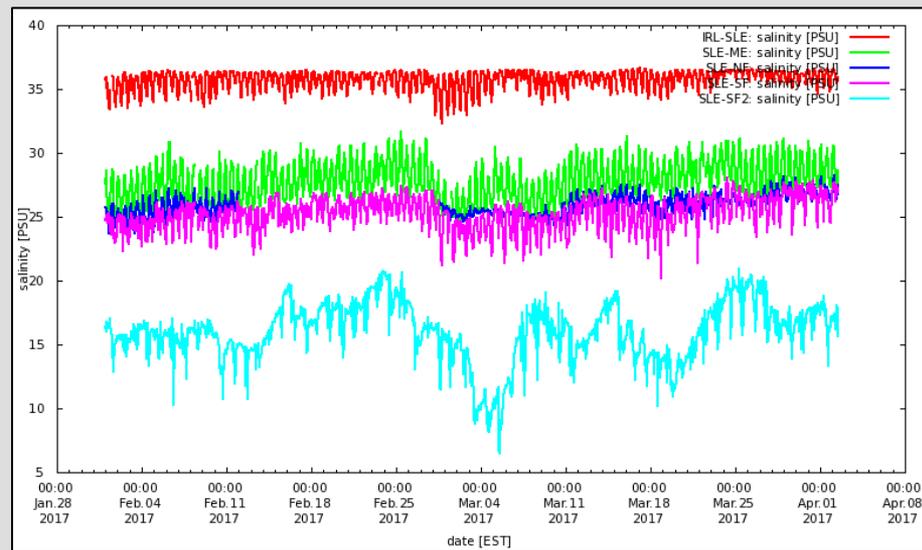


IRLO Salinity Comparison – Southern Network February & March 2016 vs. 2017

SLE - 2016



SLE - 2017

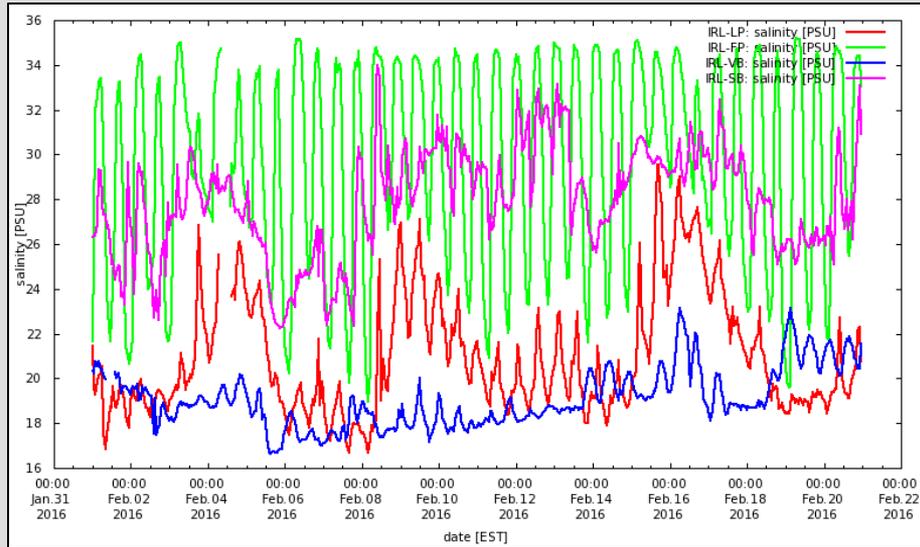


What a difference a year makes!

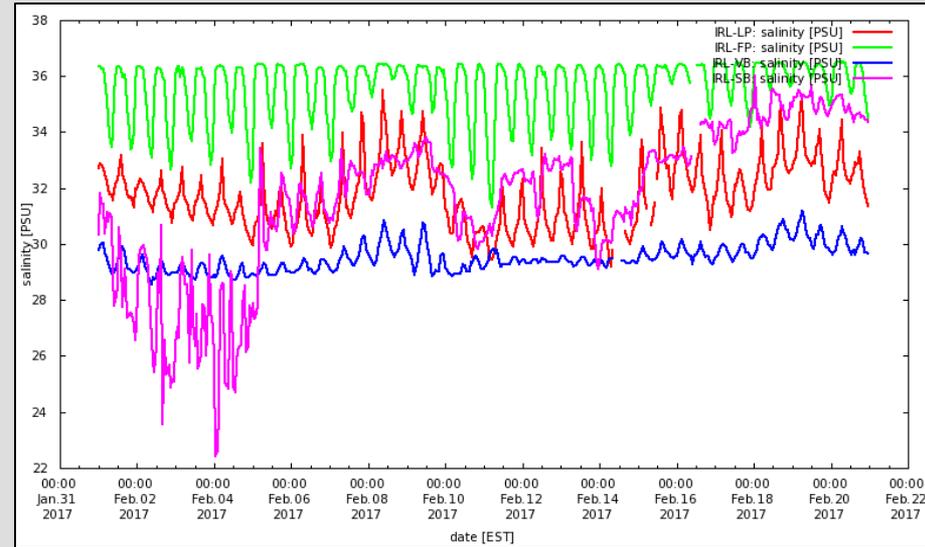
IRLO Salinity Comparison – North Network

February 2016 vs. 2017

IRL - 2016



IRL - 2017

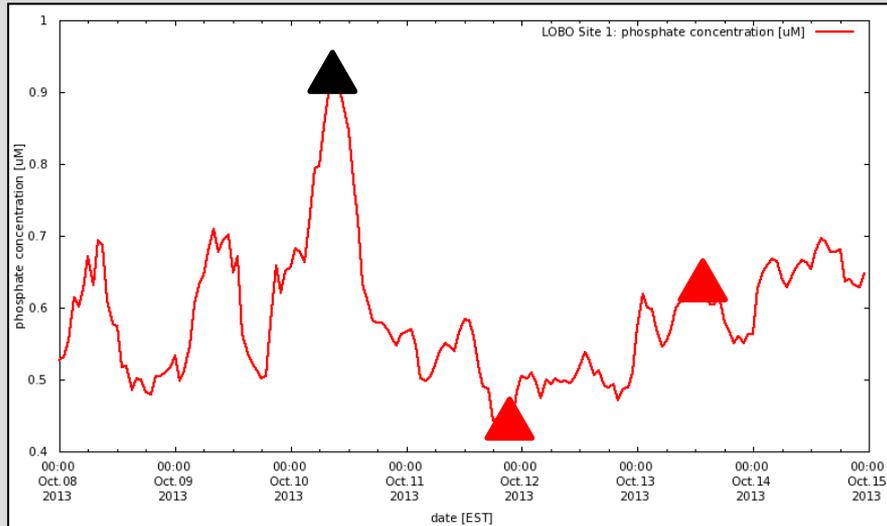


The IRLO water quality time series demonstrates the tremendous climate-related interannual variability in the IRL

Data: Opportunities and Challenges

High frequency environmental observations provide much more data and capture events missed by less frequent traditional sampling.

This unprecedented large amount of data presents both opportunities and challenges.



Data: Opportunities and Challenges



- We are currently developing a comprehensive IRLON database and related products (data, metadata)
- We will then develop better visualization tools for a variety of users

- We need to translate the data to users and tell “our story”



<http://www.fau.edu/hboi/irlo/index.php>

The Indian River Lagoon Observatory Network of Environmental Sensors (IRLON)



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<http://fau.loboviz.com/>

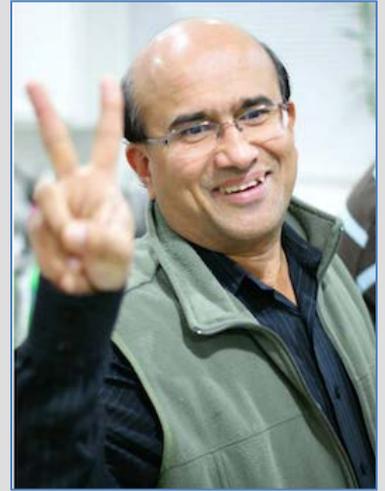
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Liberta Scotto

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Subramanian



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the Harbor Branch Oceanographic Institute Foundation**