IRLON 2.0: Addressing Emerging Environmental Issues in the Indian River Lagoon

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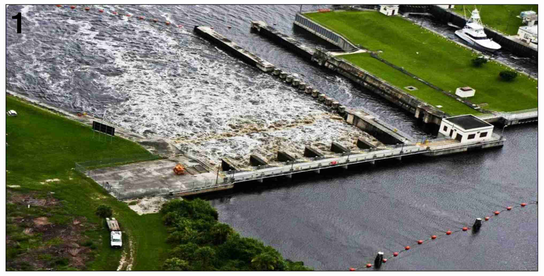
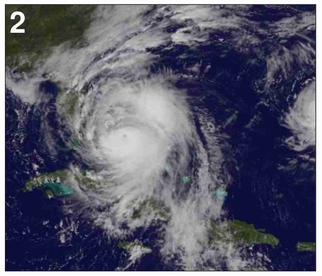
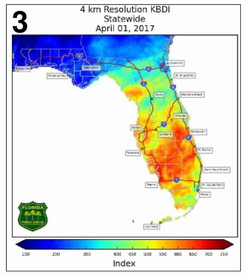
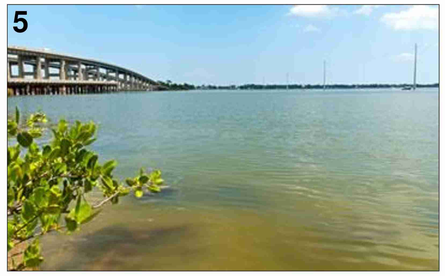
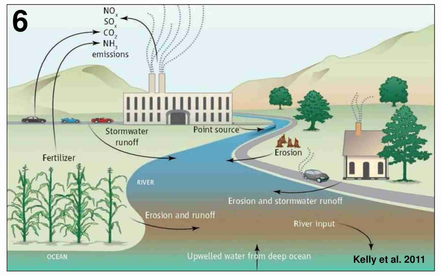
The Indian River Lagoon Observatory Network of Environmental Sensors (IRLON) is an estuarine observation network launched with a single site in 2013 and expanded into 10 sites in the south central Indian River Lagoon (IRL) and St. Lucie Estuary. IRLON enables researchers to track environmental changes in the IRL system; assist resource and planning managers to make informed decisions; model and correlate environmental data to biological, chemical and physical phenomena; and contribute to education and public outreach on the lagoon. In 2020, new technical capabilities are enhancing IRLON to address emerging threats (climate change, coastal acidification, and harmful algal blooms) to the IRL, and three new sites will expand observations into the northern IRL system. These high-frequency, continuous observatory data enable better quantification and modeling of relationships between environmental factors and biological processes in estuaries, such as the IRL with tremendous climate-related interannual variability.



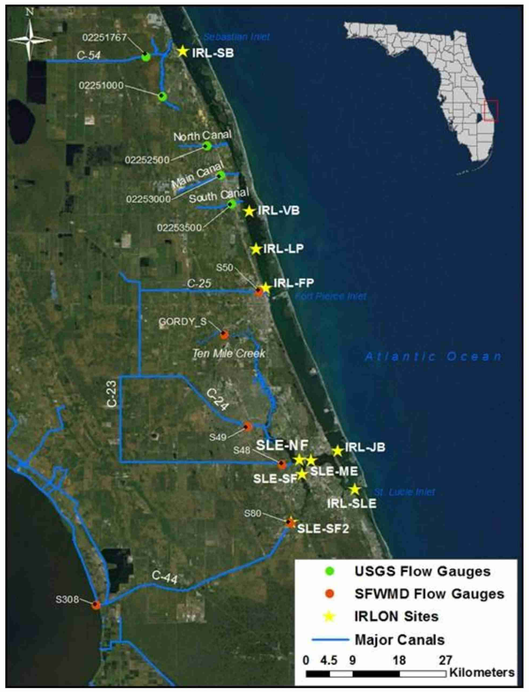






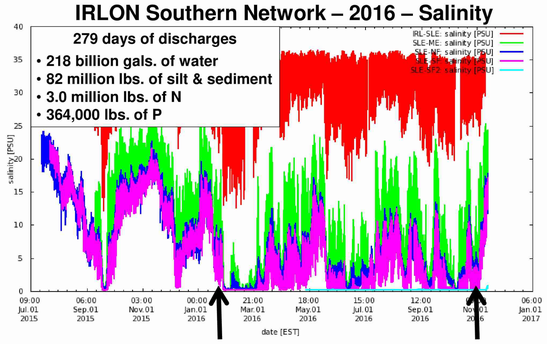


While the IRL system has been plagued by numerous anthropogenic impacts for decades, since 2010, those stresses have accelerated with devastating effects on the IRL and its plants and animals. From left to right: Massive discharges from the C-44 canal linking the IRL to Lake Okeechobee have occurred in greater frequency (1). Some of that is due to climate changes including greater interannual variability in precipitation; both major storms (2) and droughts (3) are occurring more frequently. Meanwhile, harmful algal blooms have occurred with greater intensity and frequency, both in the southern (4) and northern (5) IRL system. Coastal acidification (CA), while to date poorly studied in the IRL, needs to be assessed lagoon-wide, due to the prominence of major CA drivers, eutrophication and freshwater discharges. See examples of IRLON observations below

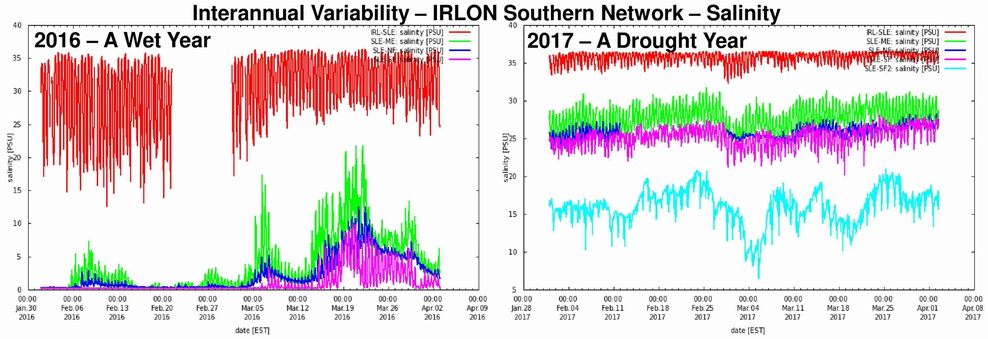


Locations of 10 current IRLON sites, major canals, and flow gauges.

IRLON Southern Network – 2016 – Salinity

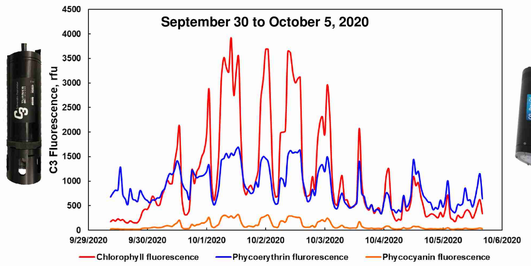


Interannual Variability – IRLON Southern Network – Salinity

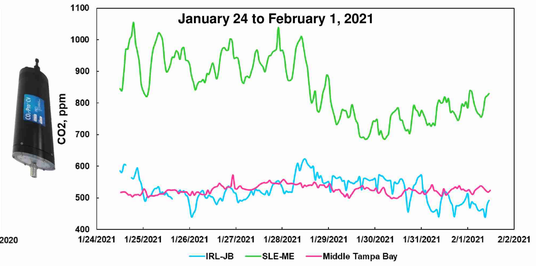


IRLON 2.0 Objectives

Add new technical capabilities to address emerging issues of IRL health: phycocyanin/phycoerythrin, fluorescent chlorophyll, pCO2

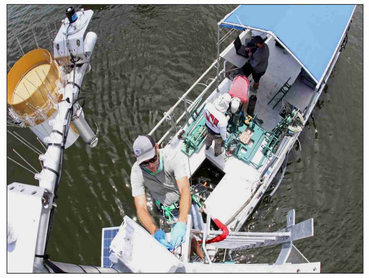


Turner C3 at IRL-SB shows higher relative fluorescence for phycoerythrin from water flowing south from Brevard County

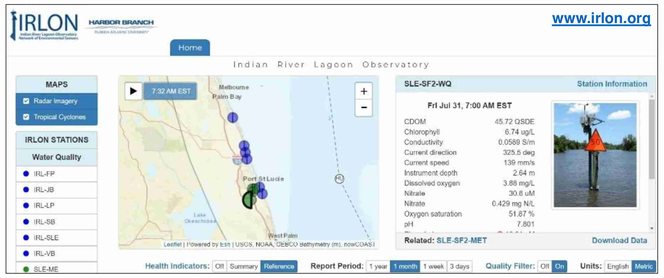


Preliminary CO2 data indicate similarity of levels at IRL-JB with Middle Tampa Bay, but quite elevated levels at SLE-ME

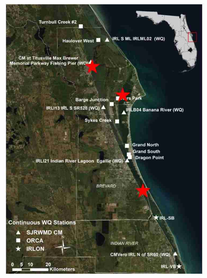
Evaluate and address existing challenges: remote connections, additional stations, and new data loggers

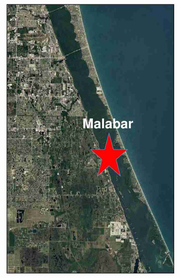


Add new utility to IRLON website to facilitate better understanding of IRL health



Add 3 new stations in Brevard County





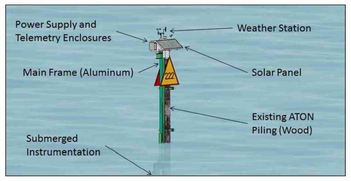
Current IRLON Measurements (Hourly)

Parameters (measured 1 m off bottom)

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

Meteorological Parameters

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



Acknowledgements

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IRLON Data Portal: www.irlon.org
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