STATE OF THE RIVER REPORT 2013 FOR THE LOWER ST. JOHNS RIVER BASIN:

WATER QUALITY, FISHERIES, AQUATIC LIFE, and CONTAMINANTS

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Origins of the State of the River Report

Purpose

- To inform the public about health of the Lower St. Johns River Basin, Florida (LSJRB).

Funding

- Environmental Protection Board (EPB) of the City of Jacksonville
- Jacksonville City Council
- River Branch Foundation

History

- First report was issued in 2008
- 2013 is the sixth report

Topical Coverage of the Report

- The report describes the health of the LSJRB based on a number of broad indicators.

1. **WATER QUALITY**
2. **FISHERIES**
3. **AQUATIC LIFE**
4. **CONTAMINANTS (integrated with Aquatic Toxicology)**

- How each indicator contributes to, or signals, overall river health is discussed in terms of its current status in 2013 and trends over time.

Seven Components of the Report

Full Report with Glossary
Appendix
Website: **http://www.sjrreport.com**
Brochure (released August 23, 2013)
Digital archive of all references

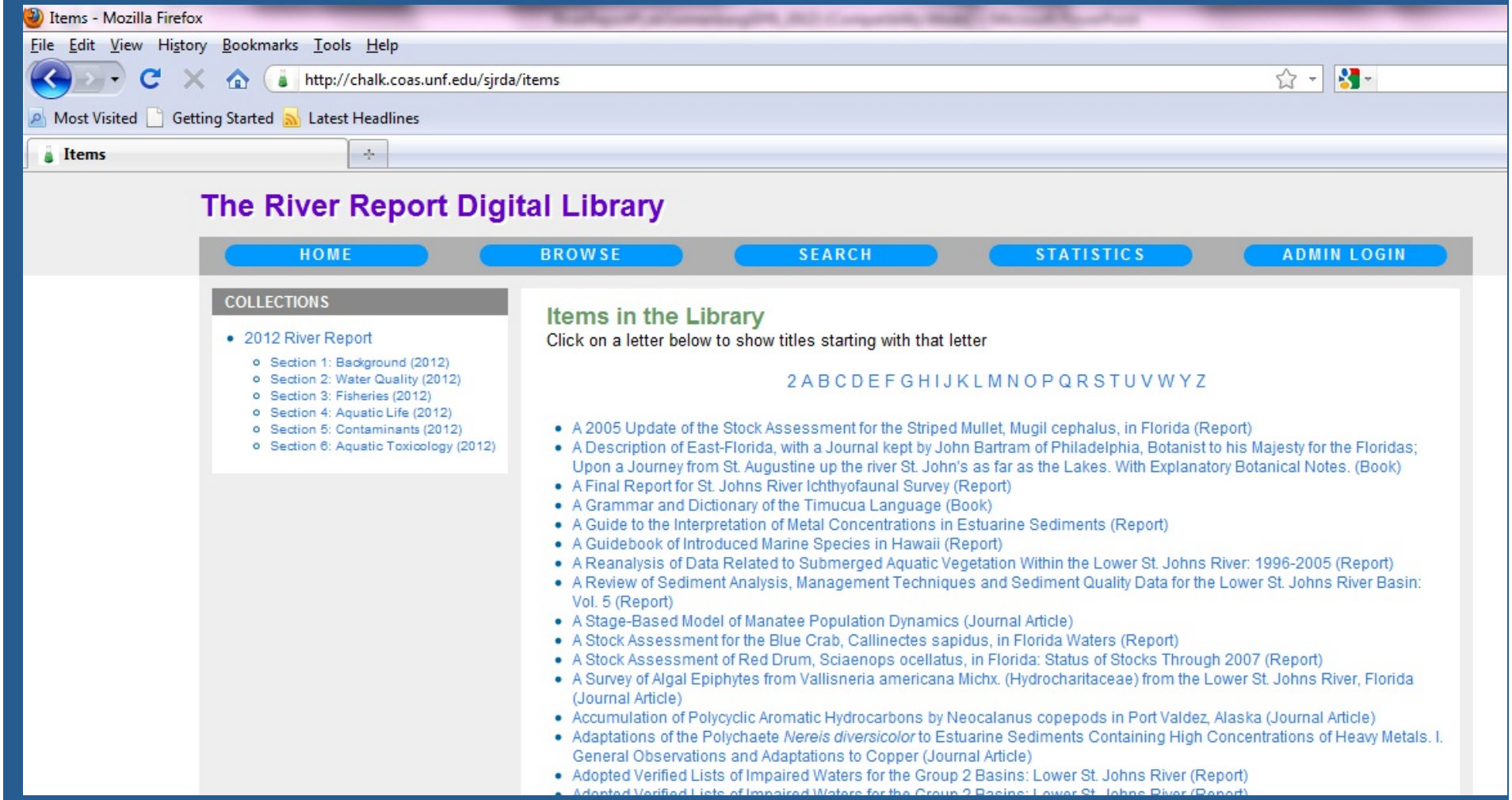
Available September 30, 2013

New this year:

Online interactive format for selected tributaries

K-12 curriculum development – multiyear process

Digital Archive – Browse Page



Online September 30th 2013

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nutrients, harmful algal blooms, contaminants

Gerry Pinto, Ph.D.
Submerged aquatic vegetation, fisheries, and threatened and endangered species

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Wetlands, nonnatives

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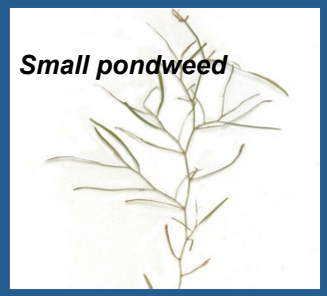
Aquatic Life

Submerged Aquatic Vegetation



Significance

- Nurseries
- Food for manatees, fish, invertebrates
- Improves water quality
- Reduces erosion

Critical Conditions

- Salinity
- Water clarity
- Shoreline condition
- Epiphytes

Aquatic Life

Submerged Aquatic Vegetation

INDICATOR	STATUS	TREND
Submerged Aquatic Vegetation	Unsatisfactory	Uncertain

Results

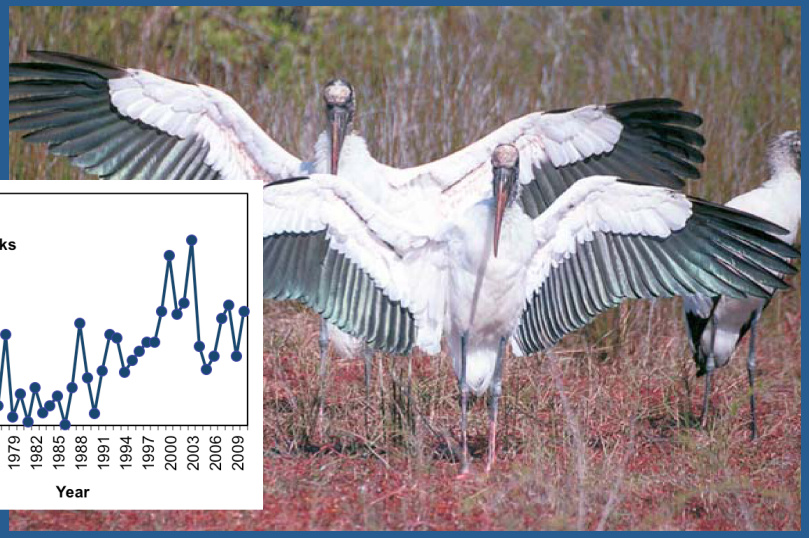
- Highly variable
- Decline in grass bed coverage north of the Buckman Bridge
- Higher salinity, lower % total cover and % tape grass

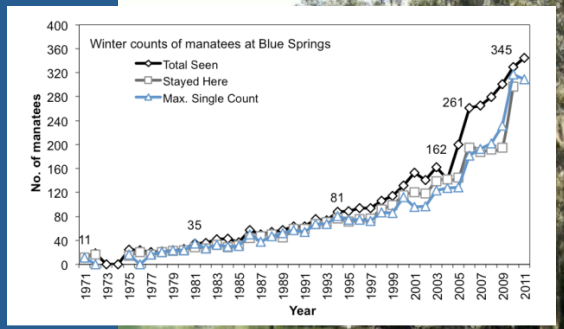
- Some increase in rainfall in 2011 may suggest a slowing in decline of SAV

Aquatic Life

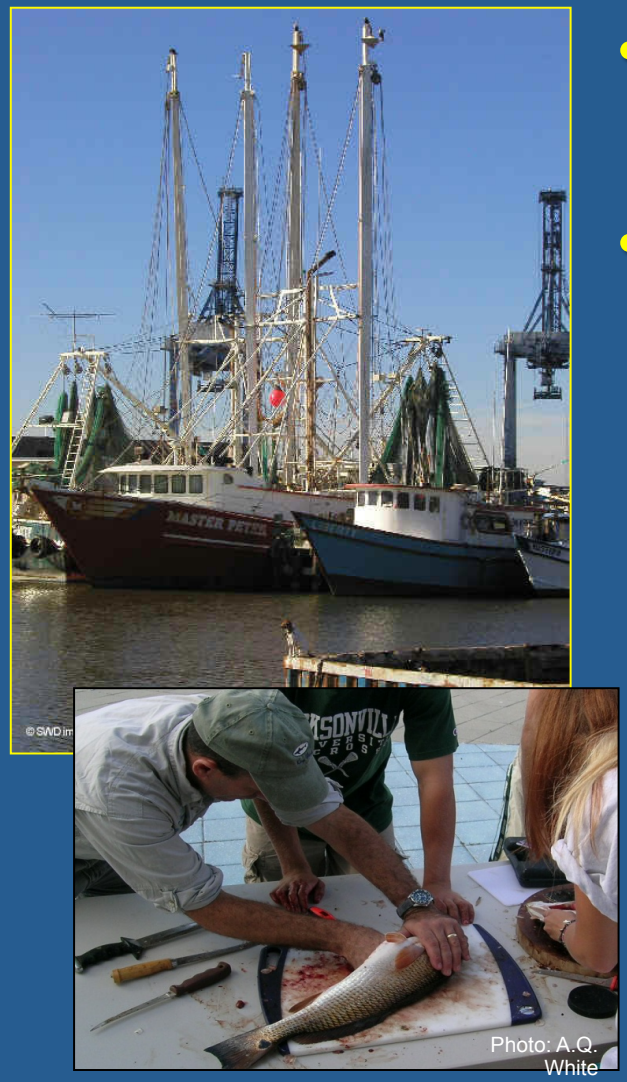
Federally Threatened & Endangered Species

INDICATOR	STATUS	TREND
Florida manatee	Satisfactory	Atlantic sub-population: stable Blue Springs sub-population: improving
Bald eagle	Satisfactory	Improving
Wood storks	Satisfactory	Improving
Shortnose sturgeon	Satisfactory	Uncertain
Piping plover	Uncertain	Uncertain





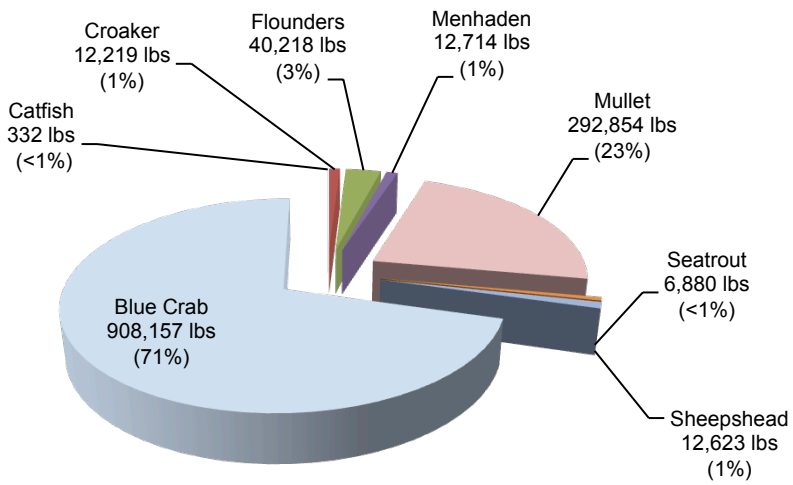
Fisheries



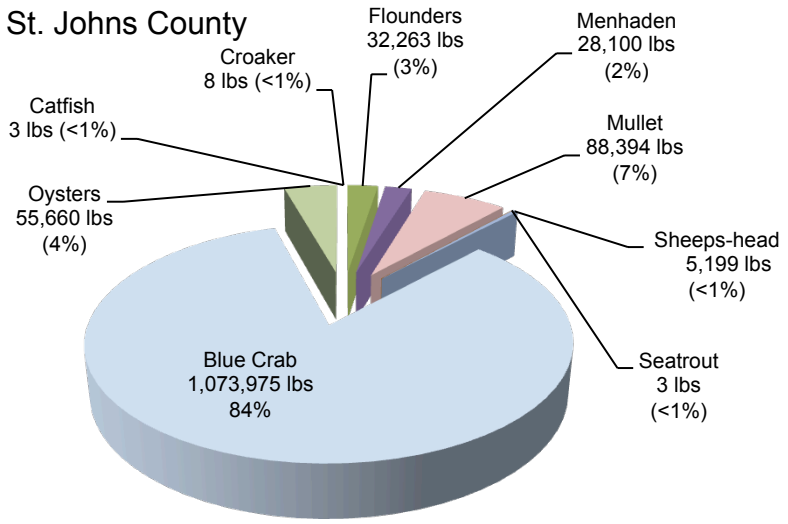
- 12 freshwater, estuarine and marine species
- Two long-term data sets analyzed
  - Fisheries Independent Monitoring data (FIMS) from FWRI (2001- 2012)
  - Commercial landings for LSJR counties (FWRI) (1994 – 2012)

Fisheries Landings in 2012

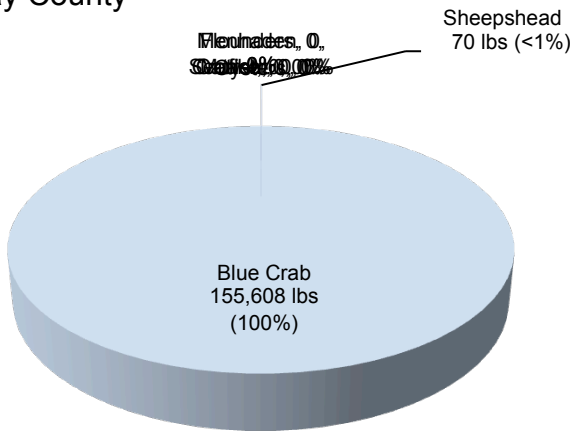
Duval County



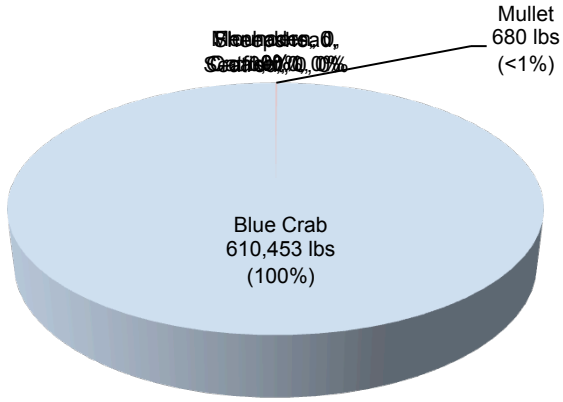
St. Johns County



Clay County



Putnam County



Fisheries

INDICATOR	STATUS	TREND
Red drum	Satisfactory	Stable
Sheepshead	Satisfactory	Stable
Spotted seatrout	Satisfactory	Stable
Largemouth bass	Uncertain	Stable
Freshwater catfish	Uncertain	Conditions Worsening
Striped mullet	Satisfactory	Uncertain
Southern flounder	Uncertain	Uncertain
Stone crab	Satisfactory	Stable
Blue crab	Uncertain	Uncertain
Shrimp	Uncertain	Uncertain

Fisheries

- Finfish
  - Many of the species in the LSJR today (~ 170 species total) were present in the 1960s
  - Changes in salinity regimes may change their relative abundance in different zones of the river at different times

Atlantic Croaker
Micropogonias undulatus


http://www.floridafishandhunt.com/.../atlcroaker.jpg

Aquatic Life Macroinvertebrates

- Animals without a backbone that live on or in the sediment
- Important part of the food web
- Affect the aeration and sediment size of river bottom
- Can signal river stress and pollution

Aquatic Life Macroinvertebrates

- Generally degraded in many areas within the LSJRB
- More pollution-tolerant species at main stem sites in fresher regions.
- Salinity affects types of organisms making up macroinvert communities.

INDICATOR	STATUS	TREND
Macrobenthic Invertebrates	Uncertain	Uncertain

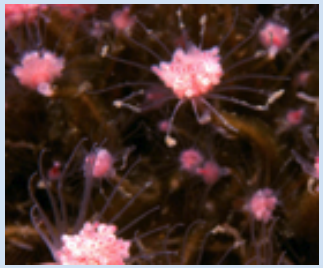
Aquatic Life Macroinvertebrates

INDICATOR	STATUS	TREND
Macrobenthic Invertebrates	Uncertain	Uncertain

- More data needed for certain assessment
- New section with descriptions of 16 groups in the LSJR

4.3.1.1. Jellyfish, Sea Anemones, and Hydrozoans (Phylum Cnidaria)

All the species in this phylum have stinging cells called nematocysts. They have two basic body forms – medusa and polyp. Medusae are the free-moving, floating organisms such as jellyfish. Polyps are the opposite, they are stationary organisms residing on the sea floor bed such as the hydrozoans (**Myers 2001c**). In the LSJR, most species seen are hydrozoans with a few jellyfish and sea anemones.



Tubularian Hydroid (Tubularia crocea)
Photo by Bob Michelson from
http://stellwagen.noaa.gov

Sea Anemone (Order Actiniaria) from
http://digitalmedia.fws.gov

Jellyfish (Class Scyphozoa) from
http://digitalmedia.fws.gov

Aquatic Life Non-native Aquatic Species

Aquatic Life Non-native Aquatic Species

INDICATOR	STATUS	TREND
Non-native Aquatic Species	Unsatisfactory	Conditions worsening

- 68 nonnative species recorded this year; increase from 64 species last year.
- Introduced through release of exotic pets, ship ballast, interconnected water bodies.

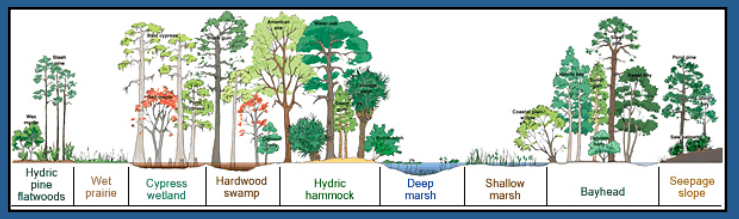
Aquatic Life Non-native Aquatic Species

INDICATOR	STATUS	TREND
Non-native Aquatic Species	Unsatisfactory	Conditions worsening

- ~68 non-native species established in LSJRB
- Introduced through release of exotic pets, ship ballast, interconnected water bodies.
- In 2012: invasive **old world climbing fern and Cuban tree frog** in St Johns and Duval counties from southern FL

Aquatic Life Wetlands

- 29% of land use along LSJR is residential
  - *high impact land use (Reiss and Brown 2007)*
- 15 mitigation banks serving LSJRB
  - *most away from tidal wetlands*
- High number permits <100 acres
  - *Fragmentation effects possible*
- Swamps & transitional species affected by salinity changes
  - *Wetlands between Fuller Warren and Shands Bridges vulnerable*



INDICATOR	STATUS	TREND
Wetlands	Unsatisfactory	Uncertain

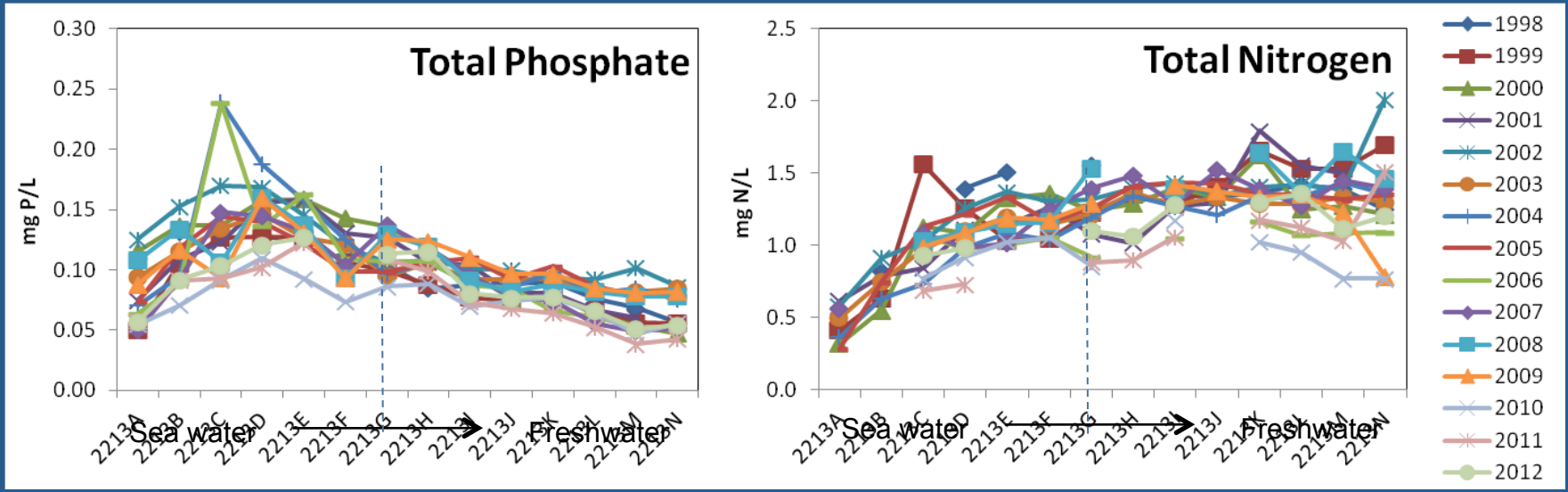
Water Quality

INDICATOR	STATUS	TREND
Nutrients	Nitrogen: Unsatisfactory Phosphorus: Unsatisfactory	***N: Conditions improving*** ***P: Conditions unchanged***
Algal Blooms	Unsatisfactory	***Conditions unchanged***
Dissolved Oxygen	Unsatisfactory	Conditions unchanged
Fecal Coliform	Main Stem: Satisfactory Tributaries: Unsatisfactory	Conditions improving
Turbidity	Satisfactory	Conditions improving

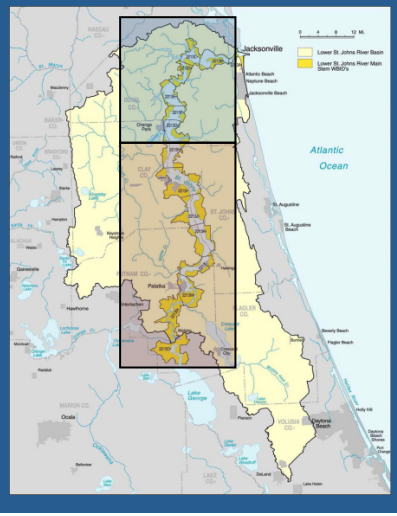
Water Quality

Sea Water to Spring Water

- TP and TN

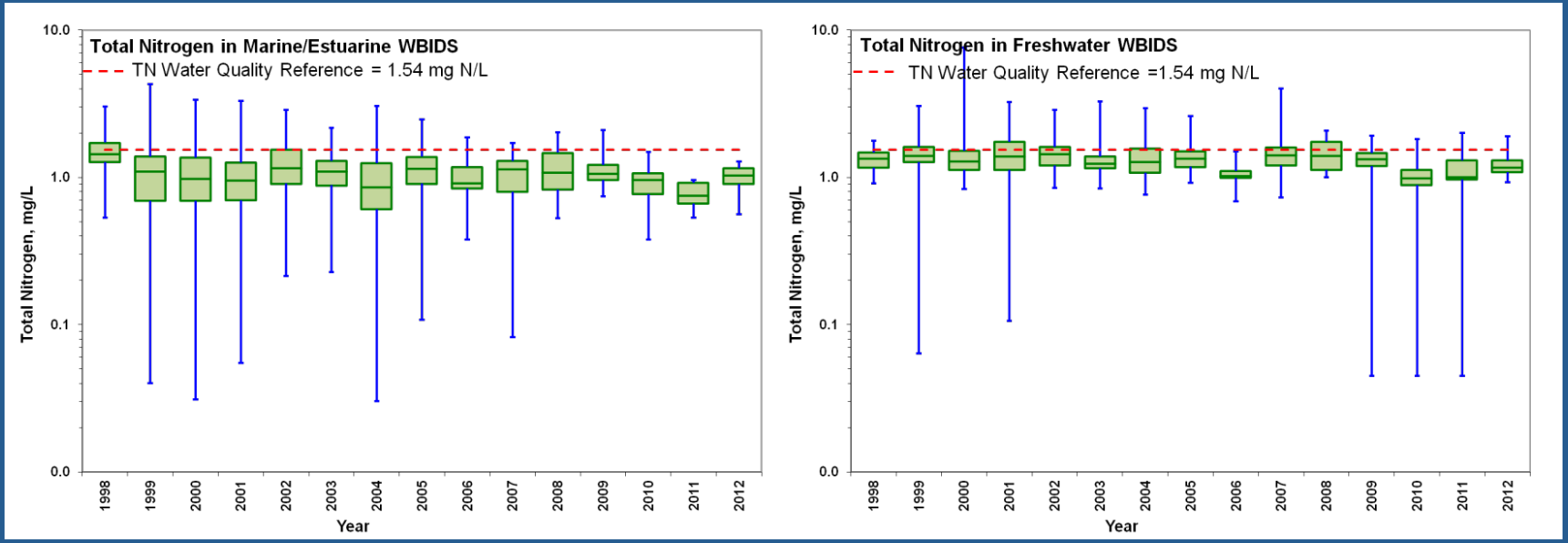


- Nutrient levels vary with distance to mouth
- Data divided into marine/estuarine and freshwater regions



Water Quality Total Nitrogen (TN)

- TN versus Year for LSJR Mainstem

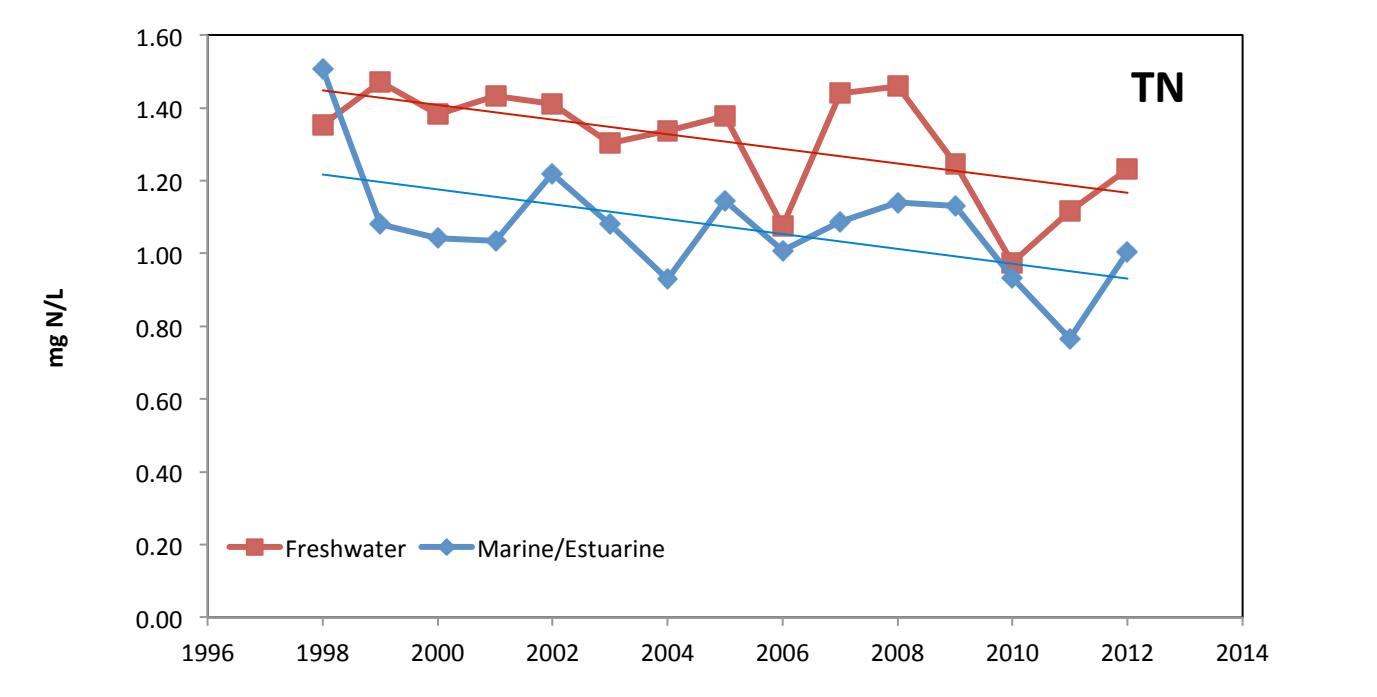


- Levels remain low but maxima exceed WQC in freshwater.

Water Quality

Total Nitrogen (TN)

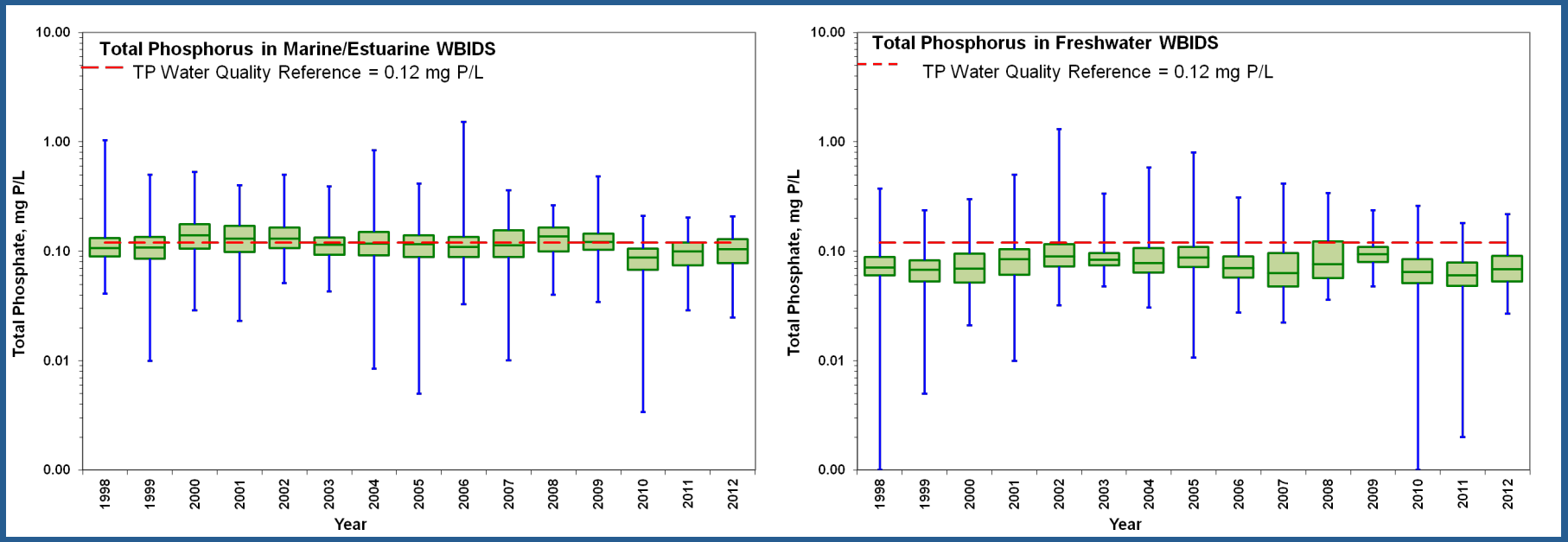
- TN annual average trends



- Annual average nitrogen concentrations going down in both regions of the river.

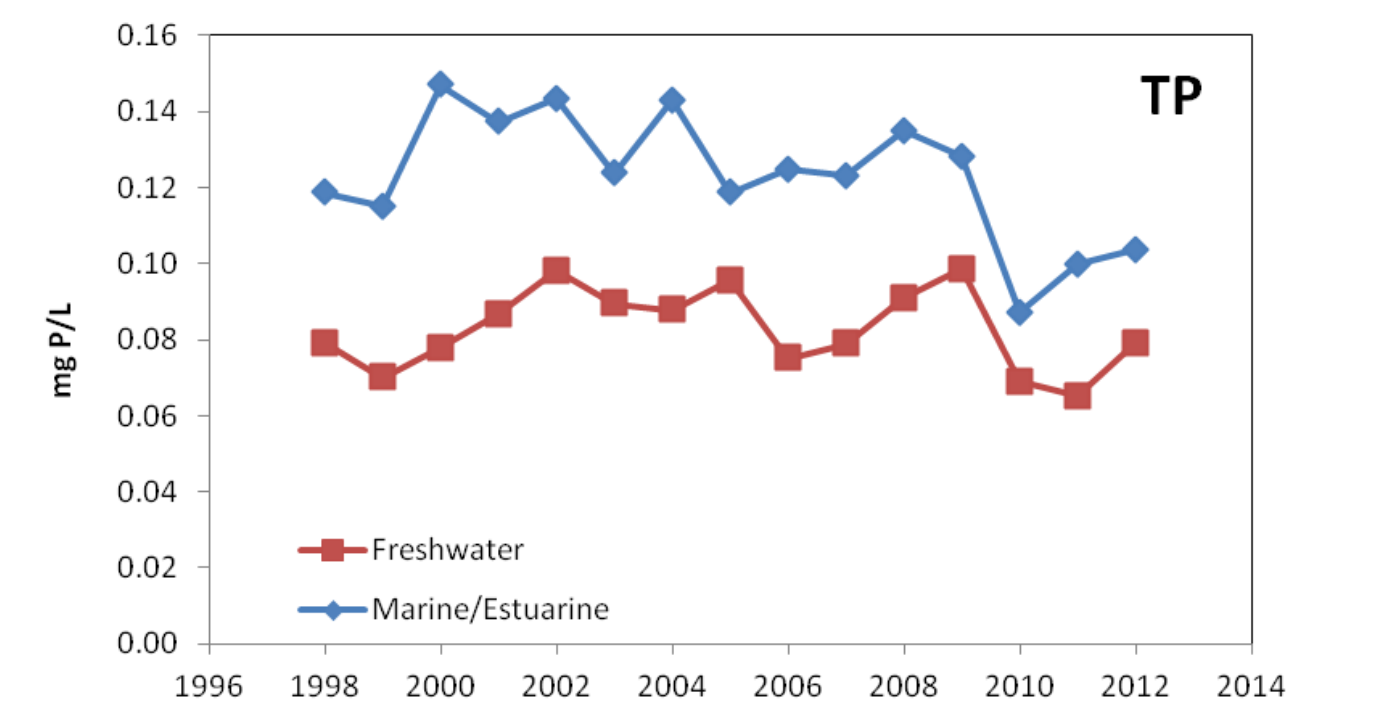
Water Quality Total Phosphorus (TP)

- TP versus Year for LSJR Mainstem



Water Quality Total Phosphorus (TP)

- TP annual average trends

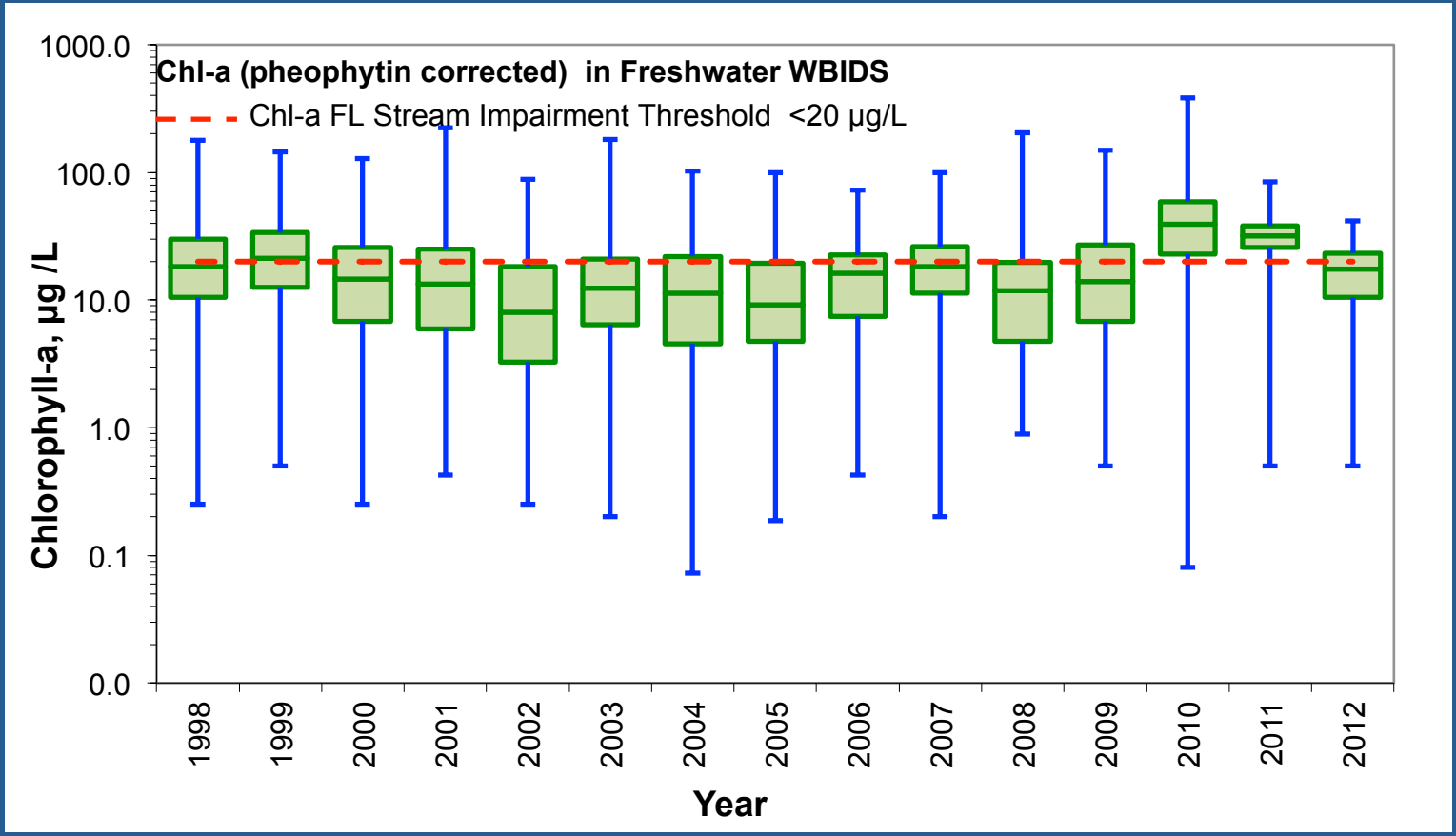


- Phosphorus concentrations not changing.

Water Quality

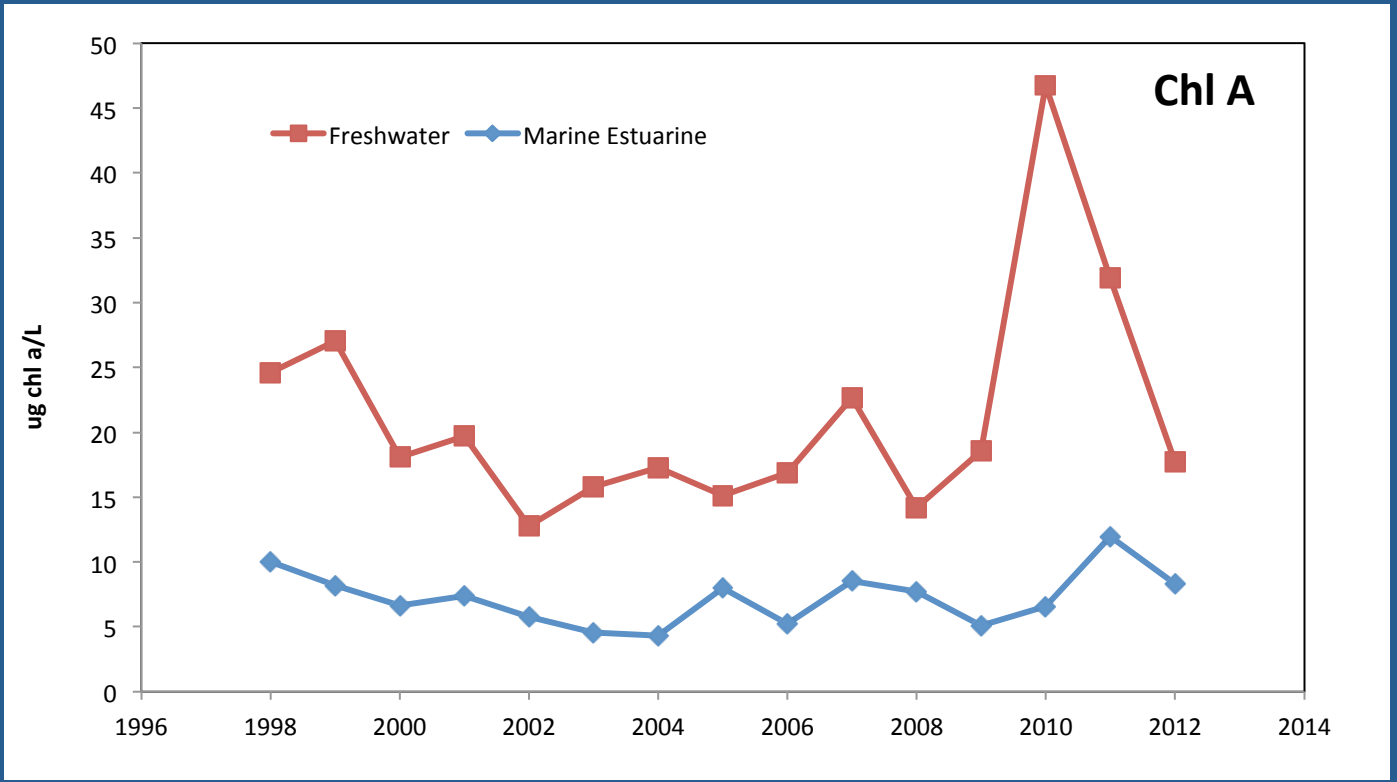
Harmful Algal Blooms

- Chlorophyll-a – phytoplankton indicator



Water Quality Harmful Algal Blooms

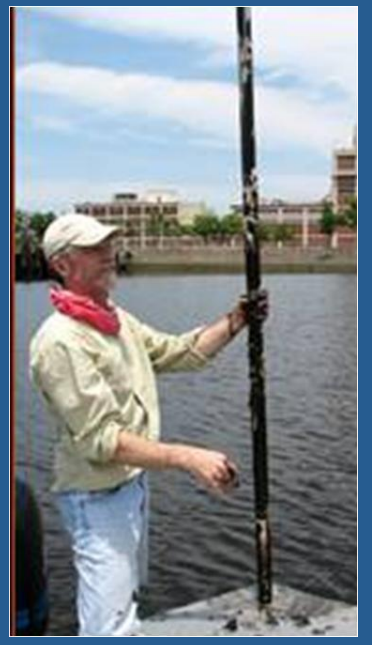
- Chlorophyll-a annual average trends



- No significant change in HABs indicator
- Better assessment methods coming soon

Contaminants

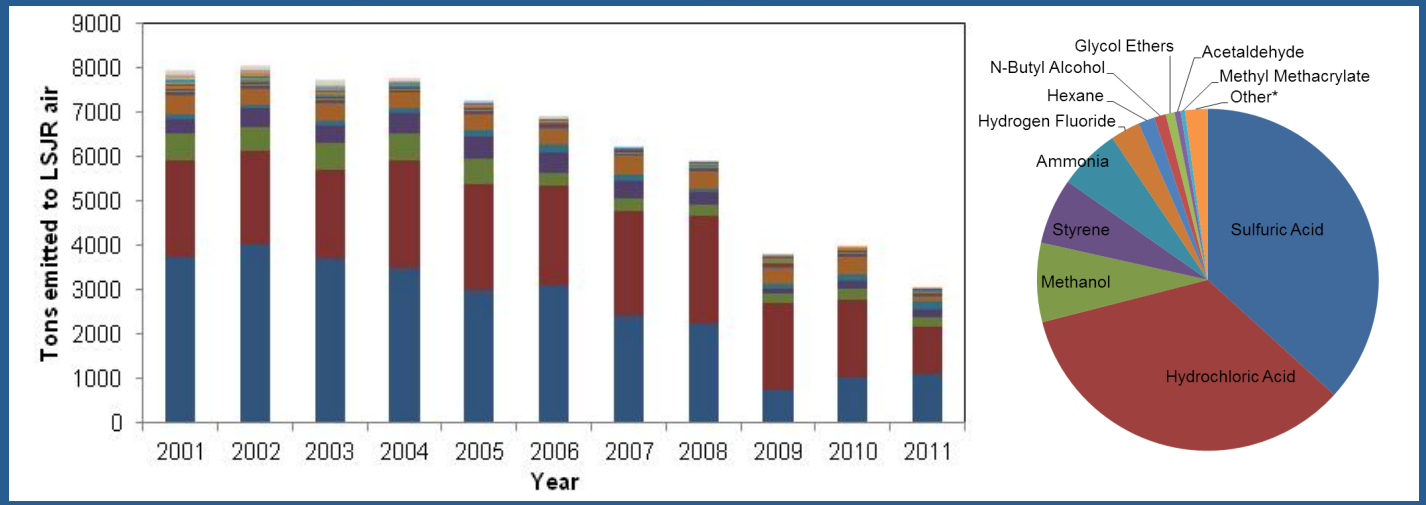
- Releases into the LSJR environment: TRI
  - Toxics Release Inventory (USEPA) Reports annual releases into air, water, and land by industries
- Water column metals concentrations
- Sediment concentrations and toxicity
  - Four types of contaminants examined
  - Concentrations compared to toxic effect levels for sediment organisms



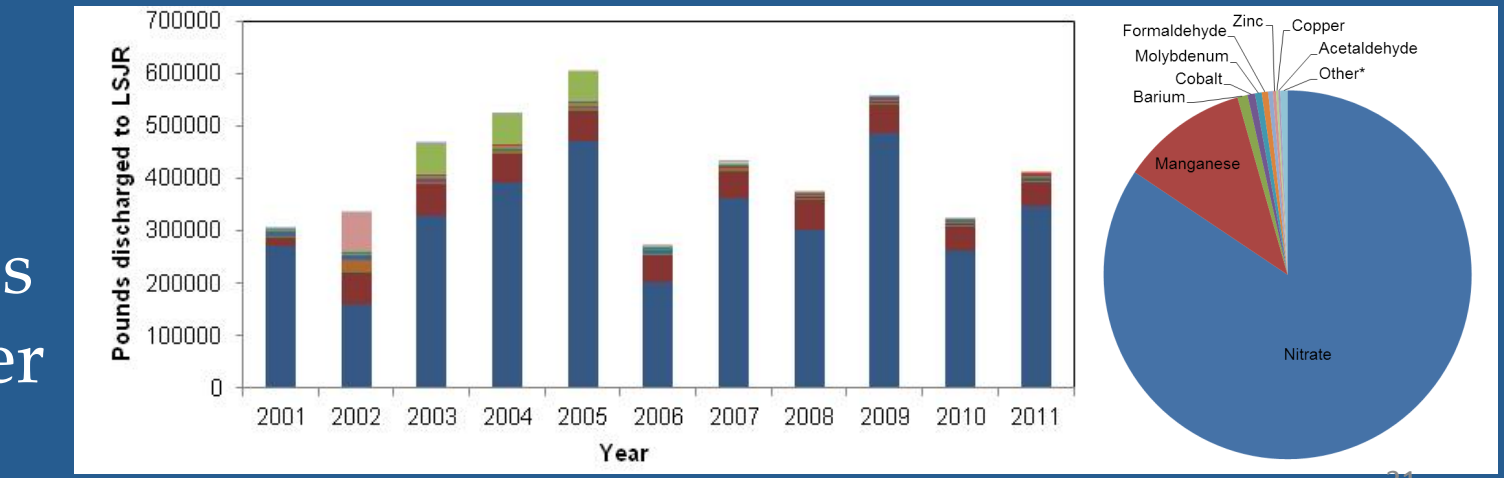
Contaminants

Toxics Release Inventory: Point Sources

- Total releases to air



- Total releases to water

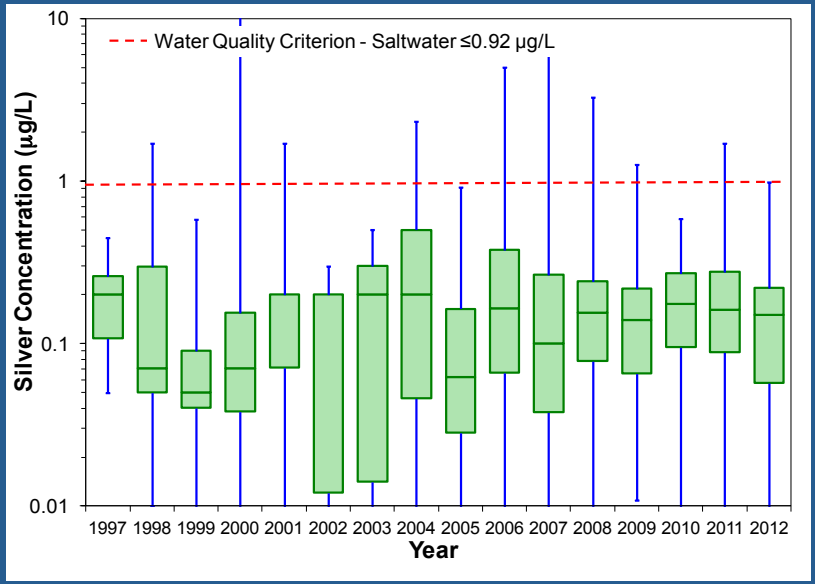


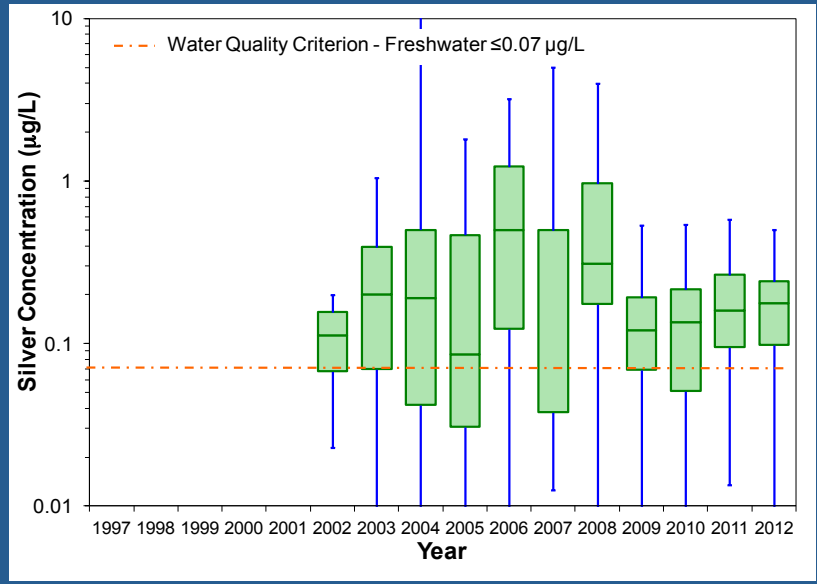
Contaminants

INDICATOR	STATUS	TREND
Chemical Releases (TRI)	Air – Satisfactory Water - Satisfactory	Air – Improving Water - Unchanged
Water Metals	Mixed	Conditions Unchanged
Sediment Metals	Unsatisfactory	Conditions Unchanged
Sediment Polyaromatic Hydrocarbons (PAHs)	Unsatisfactory	NORTHERN LSJRB – Improving SOUTHERN LSJRB - Uncertain
Sediment Polychlorinated Biphenyls (PCBs)	Unsatisfactory	Conditions Unchanged
Sediment Pesticides with Chlorine	Unsatisfactory	Conditions Unchanged

Contaminants Metals in Water

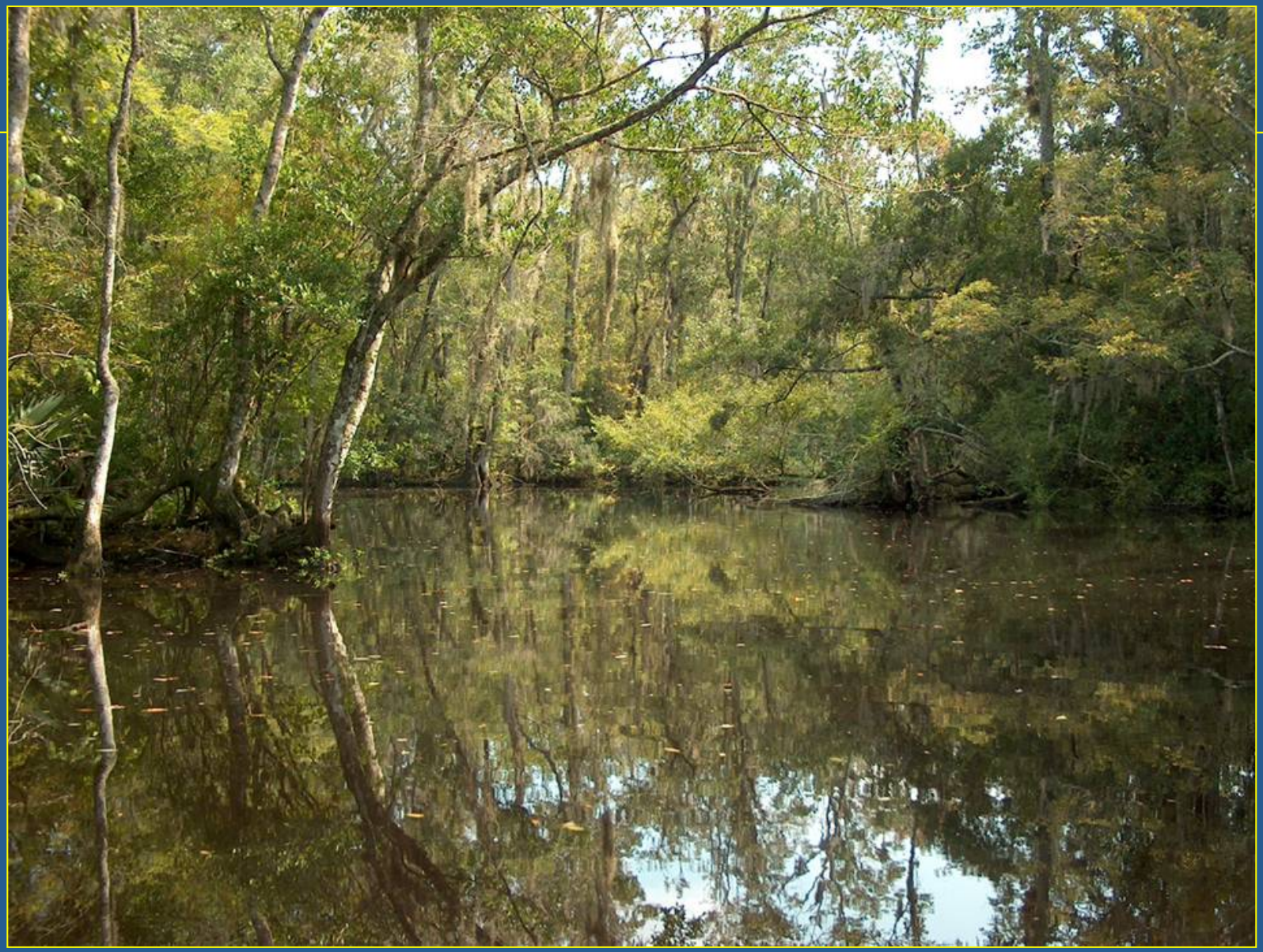
- Arsenic, cadmium, nickel and zinc levels acceptable
- Copper, lead, silver potential problems





The Future

- Continue the report each year
- Tiered K-12 project with buy-in from local schools
- Development of online interactive format
- Salinity information added



Thank you.