STATE OF THE RIVER REPORT 2011 FOR THE LOWER ST. JOHNS RIVER BASIN:

WATER QUALITY, FISHERIES, AQUATIC LIFE, and CONTAMINANTS

Jacksonville University **University of North Florida**

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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 City of Jacksonville
- Jacksonville City Council
- River Branch Foundation

History

- 2011 marks the fourth year of the State of the River Report.

Topical Coverage of the Report

- The report describes the health of the Lower St. Johns River Basin based on a number of broad indicators.

1. **WATER QUALITY**
2. **FISHERIES**
3. **AQUATIC LIFE**
4. **CONTAMINANTS**

- How each indicator contributes to, or signals, overall river health is discussed in terms of its current status in 2011 and trends over time.

Four Components of the Report

Full Report (with new Glossary)

Appendix

Website
http://www.SJRreport.com

Brochure released in August 2011

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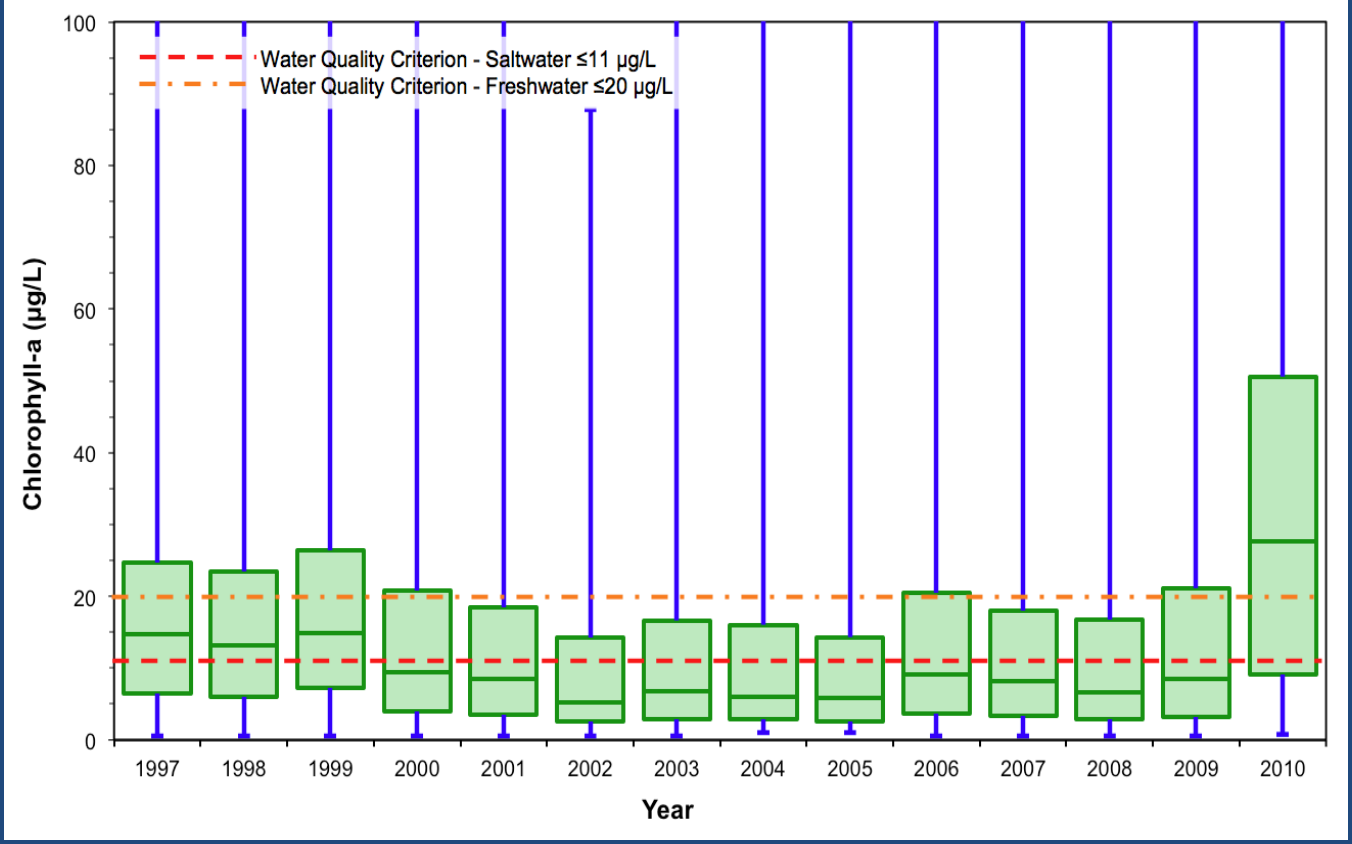
Water Quality

Turbidity	Main Stem: Satisfactory Tributaries: Unsatisfactory	Conditions improving
Algal Blooms	Unsatisfactory	Conditions worsening
Fecal Coliform	Main Stem: Satisfactory Tributaries: Unsatisfactory	Conditions improving
Nutrients (nitrogen and phosphorus)	Unsatisfactory	Conditions stable
Dissolved Oxygen	Unsatisfactory	Conditions stable
Metals	Unsatisfactory	Conditions improving

Water Quality

Algal Blooms

- Chlorophyll a concentrations versus Year



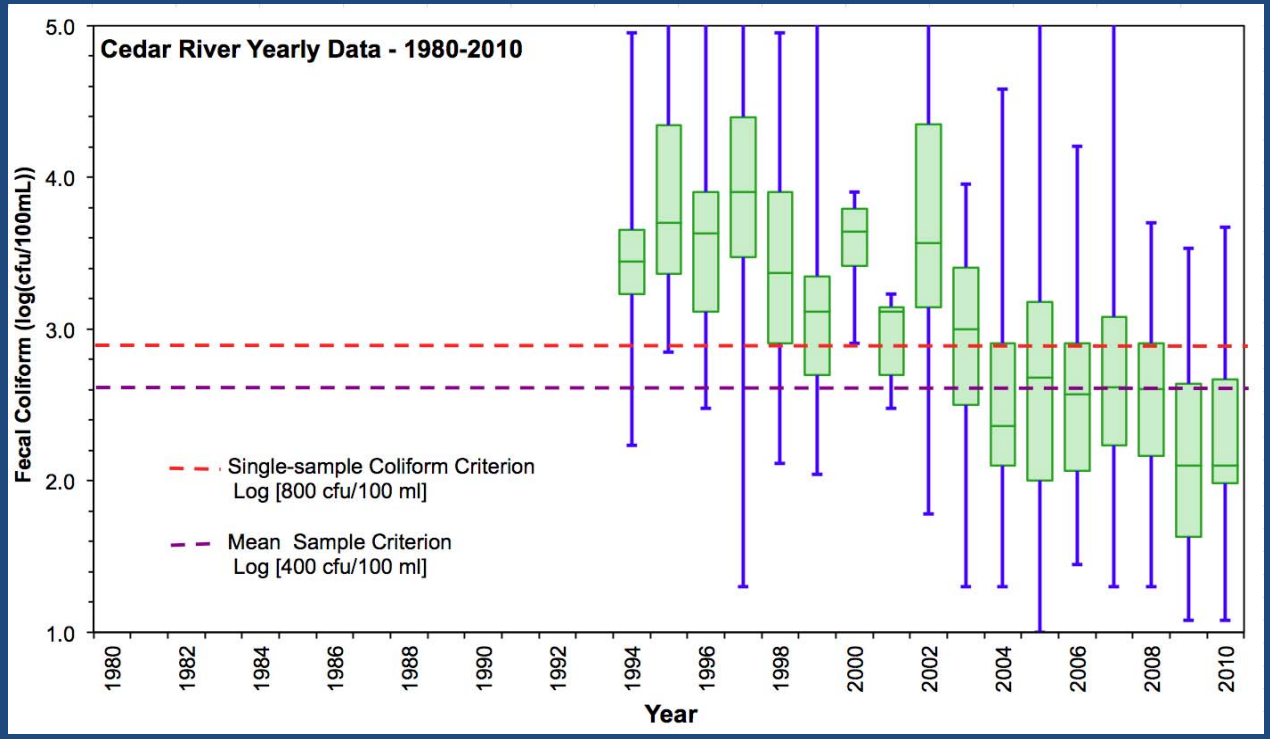
- In 2010, exceeded standards for impairment.

Water Quality

Fecal Coliform

- New this year: analysis of fecal coliform in six selected tributaries
  - Data from COJ Tributary Monitoring Program
  - Tributaries analyzed include: Big Pottsburg Creek, Cedar River, Durbin Creek, Greenfield Creek, Ortega River and Trout River

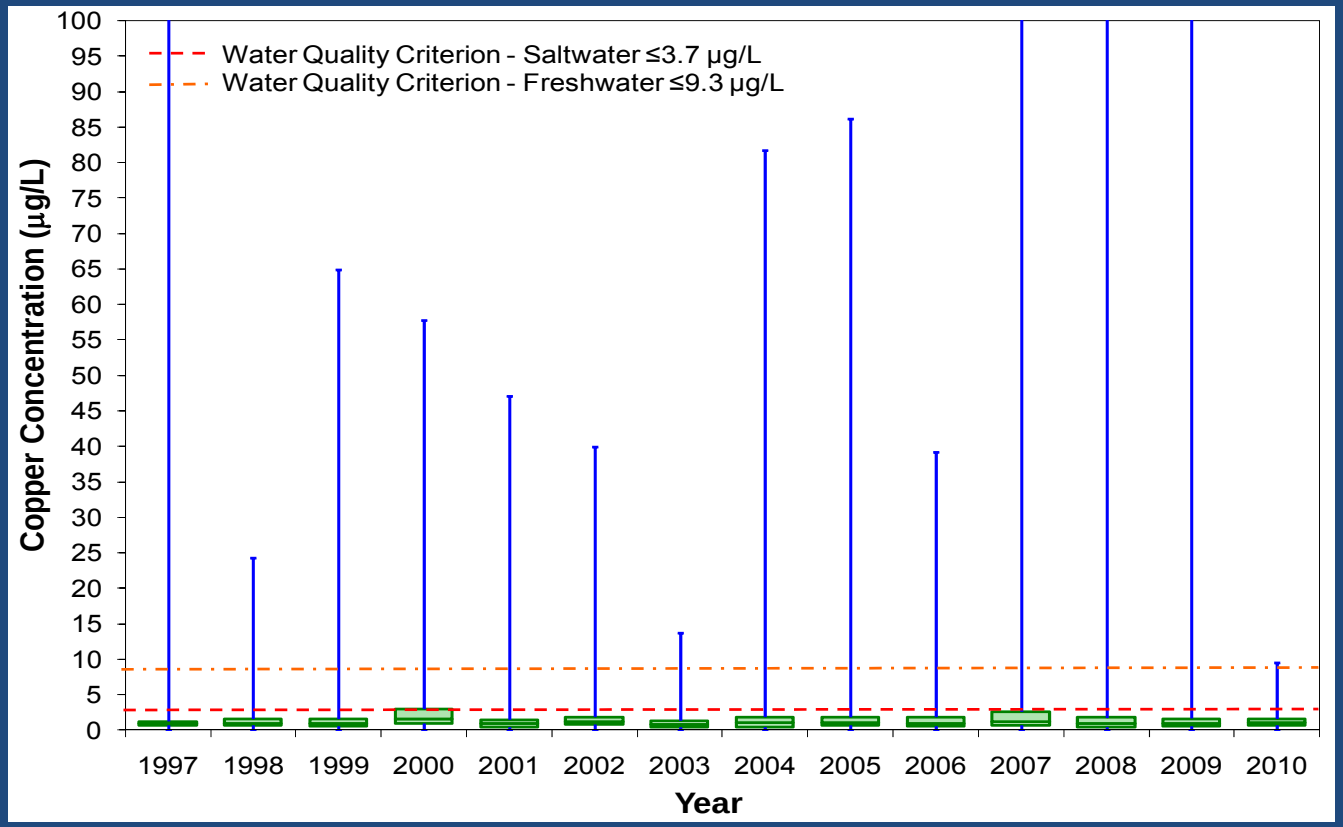
- Example below: Cedar River.
  - Has shown most dramatic and steady progress.



Water Quality Metals

• Metal concentrations have decreased in the water column over the last three years, and most values were at or below WQC in 2010.

•Example below: Copper.



Water Quality

Tributaries of the Lower St. Johns River

- Added three new tributaries to Report: Big Fishweir Creek, Greenfield Creek, and Open Creek

- More detail on the river
- Make the report more personal
- Highlight the variability of the tributaries

Fisheries

Three long-term data sets analyzed (for 12 species)

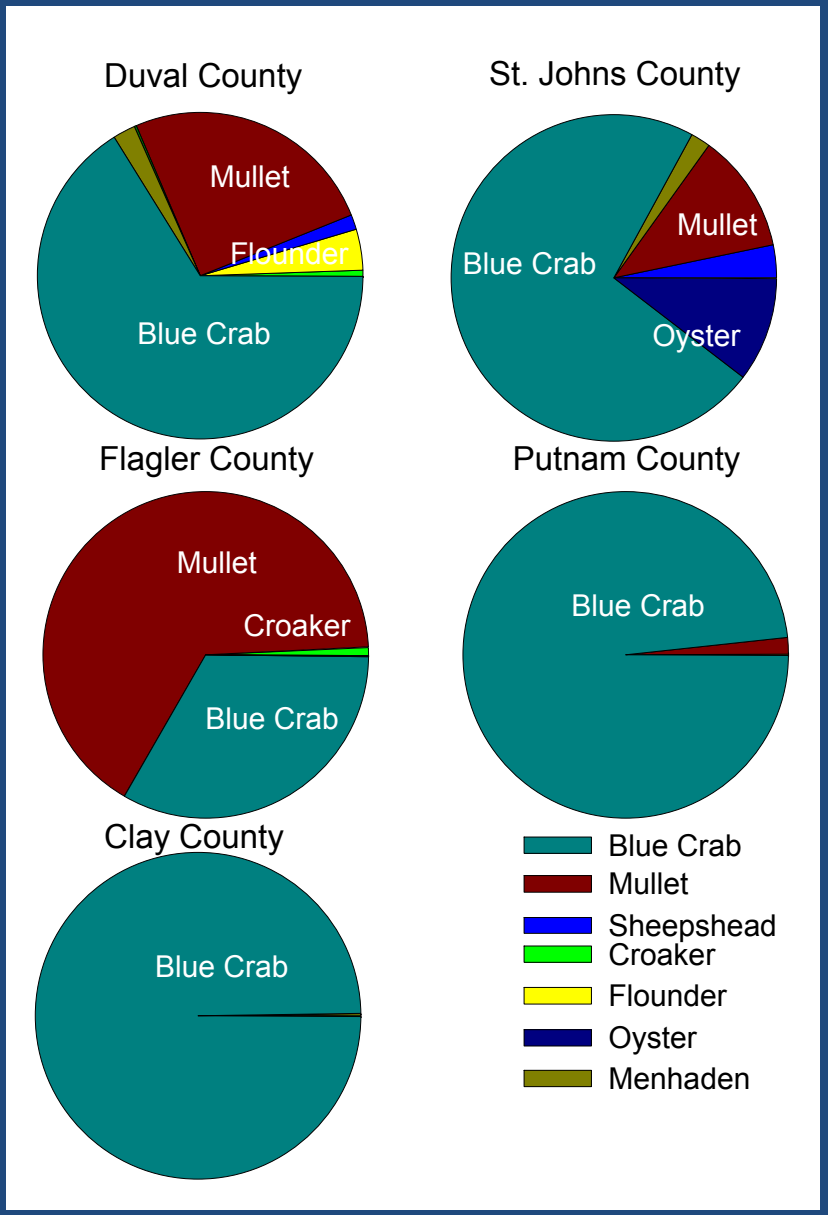
Commercial landings for LSJR counties (FWRI) (1994 – 2009)

Recreational estimates for LSJR counties (NOAA) (1982-2009)

Fisheries Independent Monitoring data (FIMS) from FWRI (2001- 2008)

Commercial Fisheries

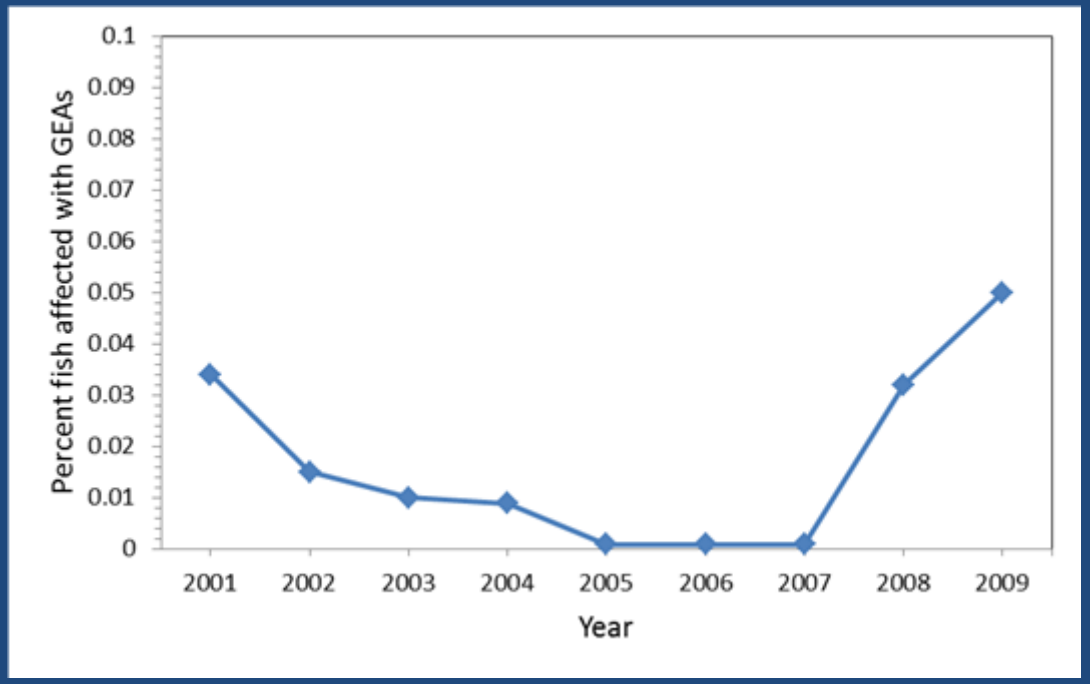
Percent comparison of commercially important fish & invertebrates caught during 2010



Gross external abnormalities (GEAs) encountered in fish in the LSJR

The percentage of fish with GEAs has been less than 0.06 % since 2001.

Significant decreases in GEAS since 2001 may be related to changes in sites sampled.



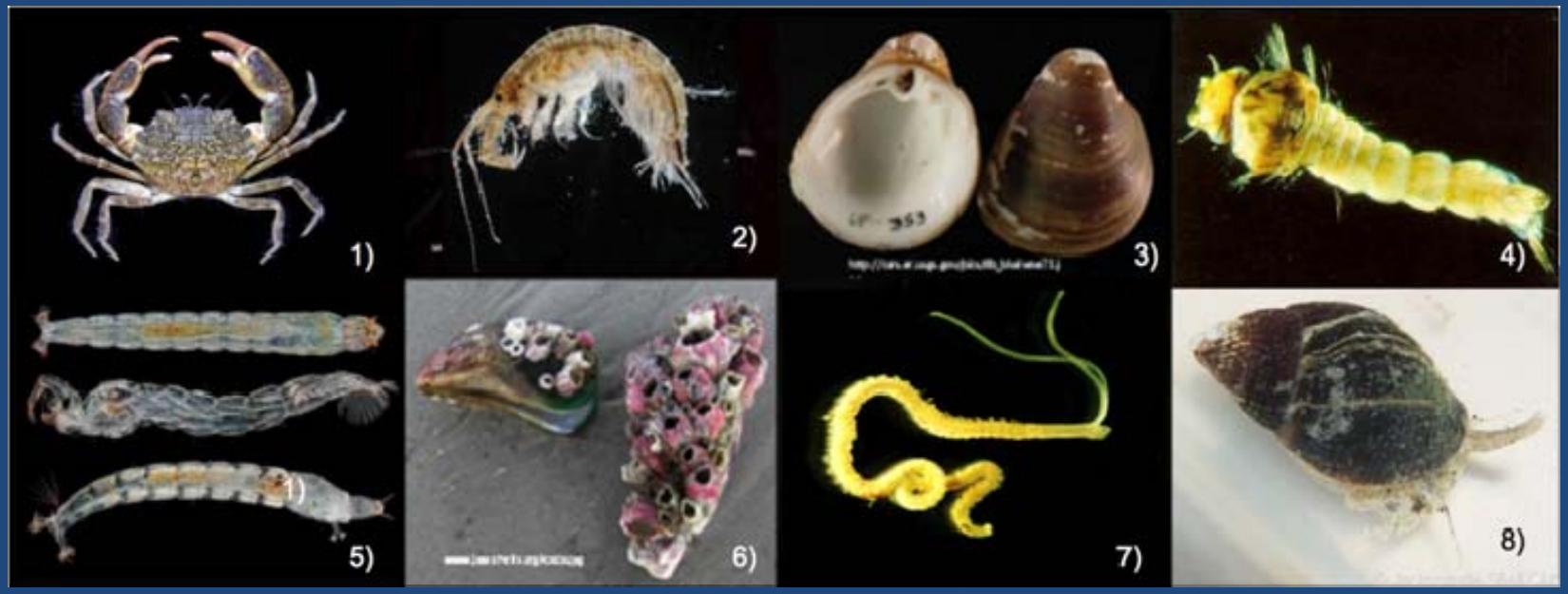
Fisheries Status and Trends

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

Aquatic Life

Macro-invertebrates

Dan McCarthy, Ph.D.
Jacksonville University



- Animals without a backbone that live on or in the sediment (including crabs, shrimp, bivalves, snails, insects, worms, and barnacles).
- Important part of the food web.
- Affect the aeration and sediment size of river bottom.
- Can signal river stress and pollution.

Aquatic Life

Macroinvertebrates

INDICATOR	STATUS	TREND
Macrobenthic Invertebrates	Unsatisfactory	Uncertain

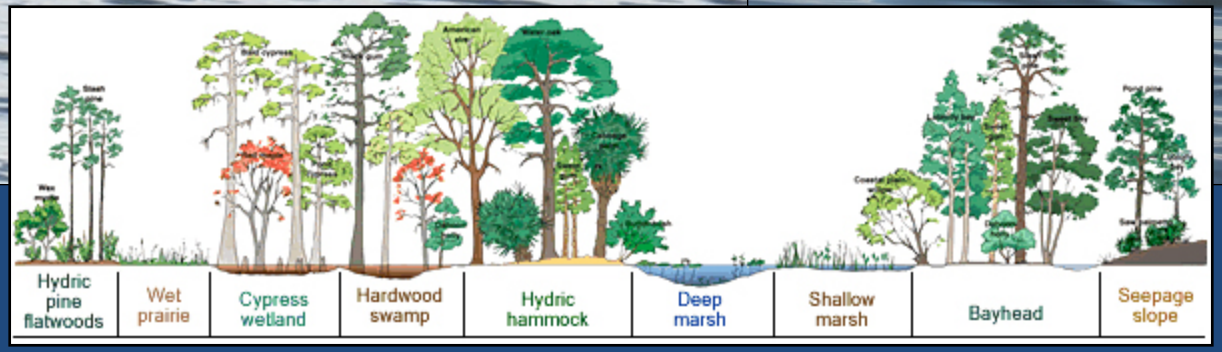
- Generally degraded in many areas within the LSJRB.
- May be more pollution-tolerant species at main stem sites within the river that are dominated by fresh versus saltwater.
- Particularly high environmental stress suggested with species encountered in the Cedar-Ortega River Basin and Julington Creek.

Aquatic Life

Wetlands

Heather McCarthy, M.E.M.
Jacksonville University

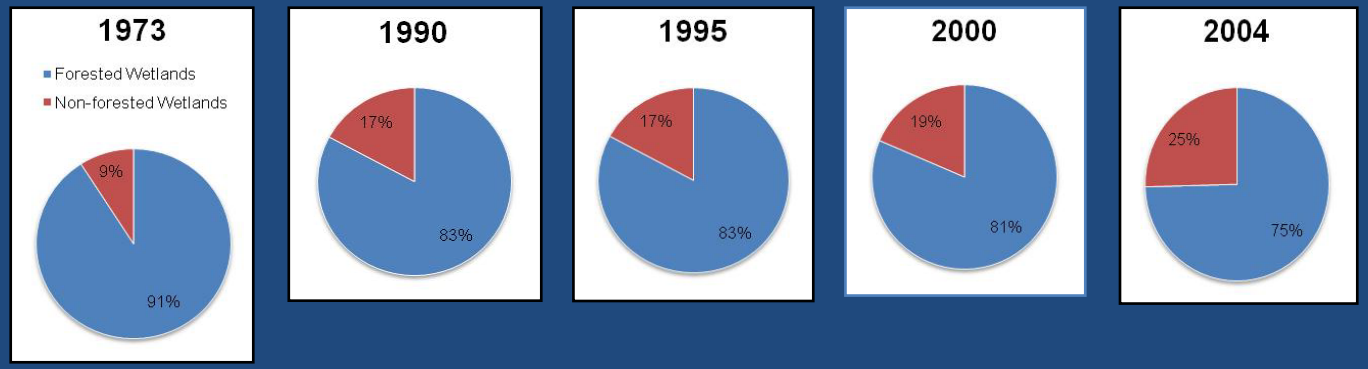
INDICATOR	STATUS	TREND
Wetlands	Florida: Unsatisfactory LSJRB: Uncertain	Uncertain

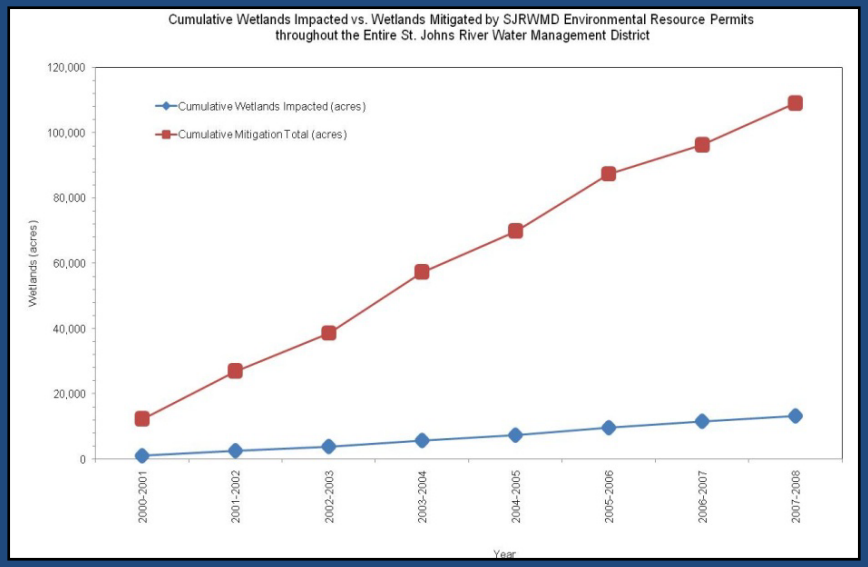


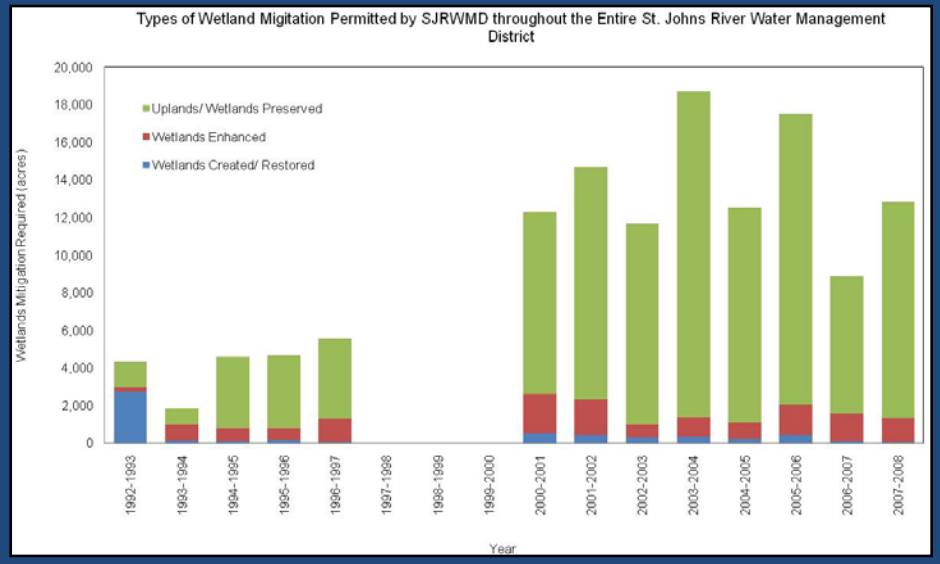
Aquatic Life

Wetlands

INDICATOR	STATUS	TREND
Wetlands	Florida: Unsatisfactory LSJRB: Uncertain	Uncertain







Aquatic Life

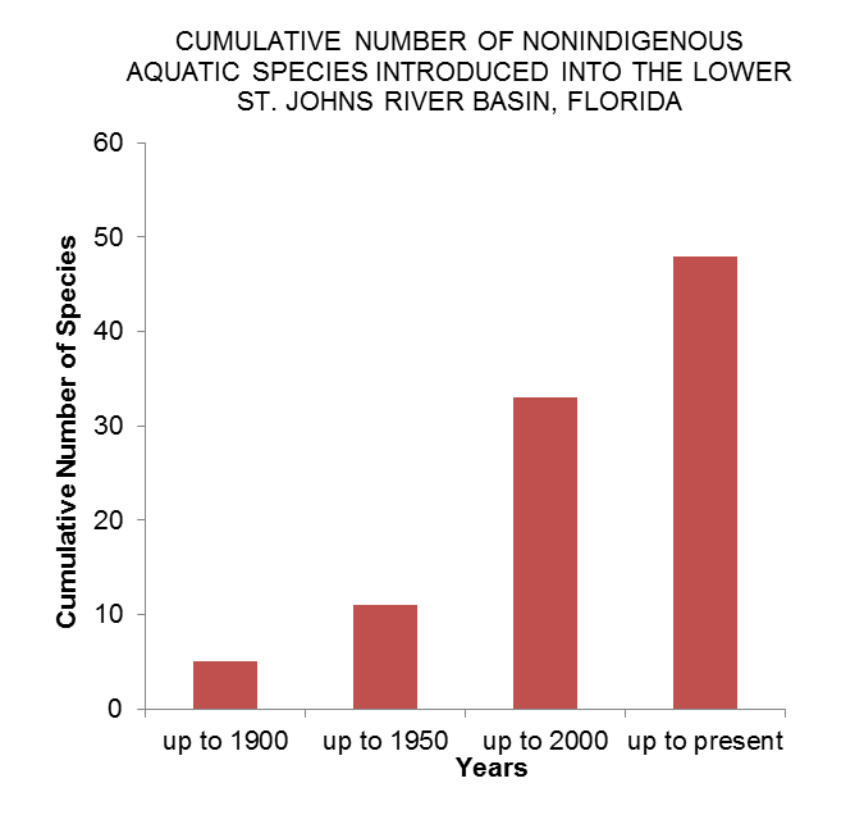
Non-native Aquatic Species

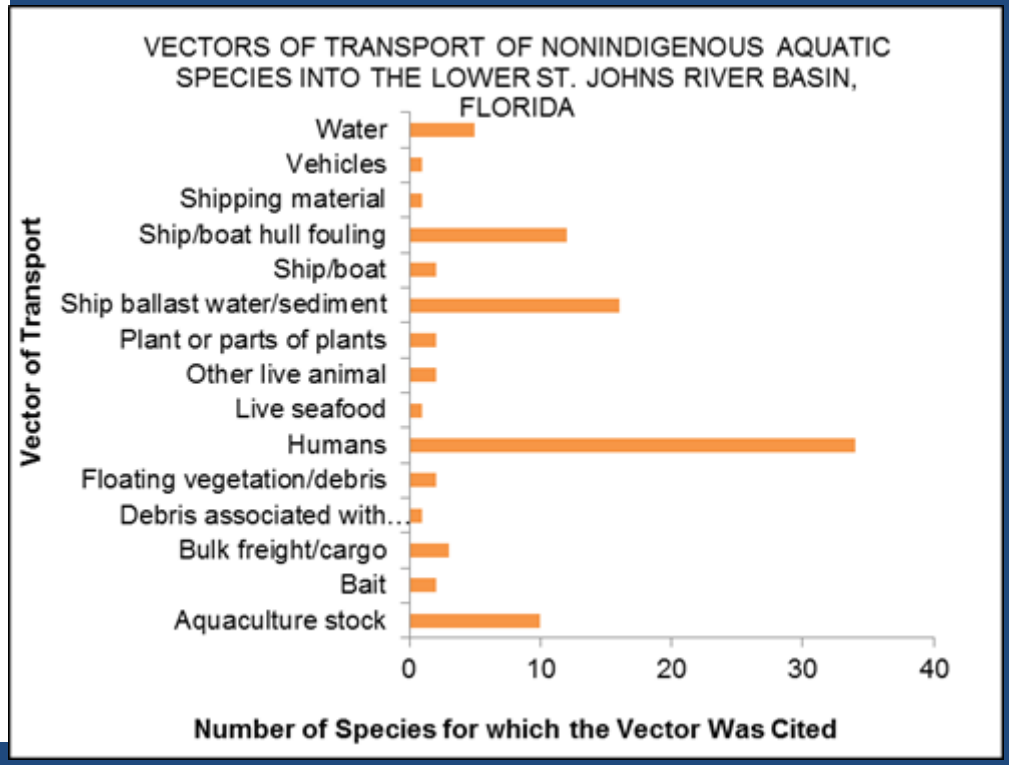
INDICATOR	STATUS	TREND
Non-native Aquatic Species	Unsatisfactory	Conditions worsening

Aquatic Life

Non-native Aquatic Species

INDICATOR	STATUS	TREND
Non-native Aquatic Species	Unsatisfactory	Conditions worsening

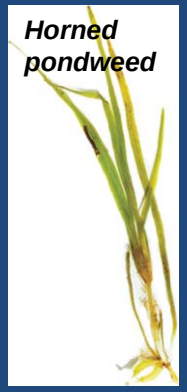


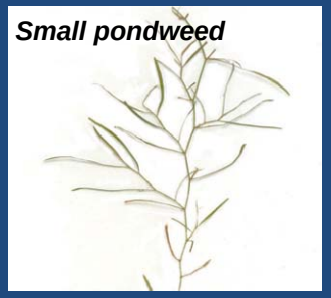


Aquatic Life

Submerged Aquatic Vegetation

Gerry Pinto, Ph. D.
Jacksonville University





Significance

- Nurseries for many different species
- Food for manatees, fish, invertebrates
- Improves water quality (oxygen, turbidity, nutrient uptake)
- Reduces erosion

Data

- SJRWMD
- Transects in 6 sections of LSJR
- Bed length, % total cover, % tape grass
- Aerial observations 2008-2010

Aquatic Life

Submerged Aquatic Vegetation

Gerry Pinto, Ph. D.
Jacksonville University

INDICATOR	STATUS	TREND
Submerged Aquatic Vegetation	Unsatisfactory	Conditions worsening

- From 2008-2010 there is declining trend in grass parameters north of Buckman Bridge.
- Other areas of the river are highly variable.
- They are highly influenced by light and salinity fluctuations from extreme weather events.
- Continued monitoring and research necessary to discern trends and overall health of beds.

Aquatic Life

Federally Threatened and Endangered Species

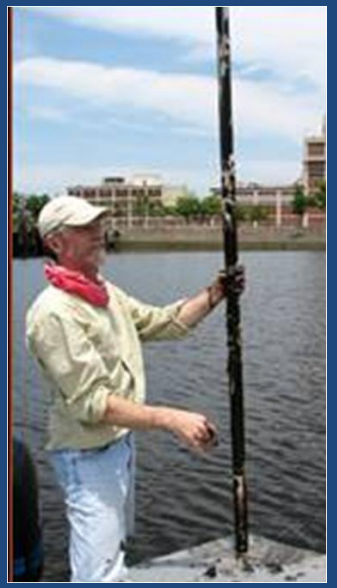
Gerry Pinto, Ph. D.
Jacksonville University

INDICATOR	STATUS	TREND
Federally Threatened and Endangered Species		
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

Sediment Contaminants

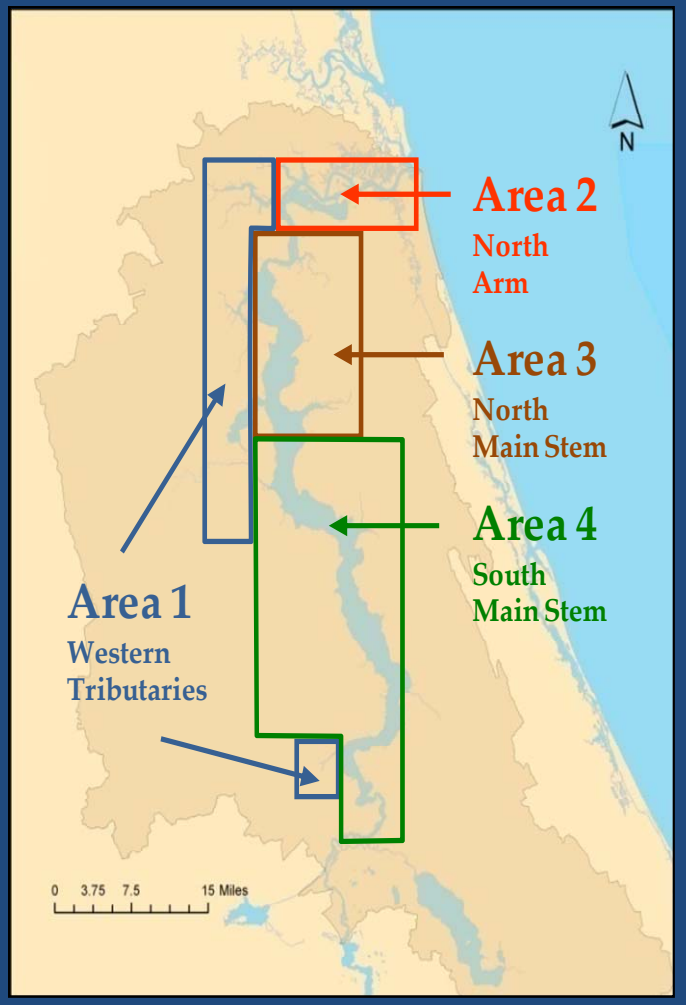
Lucinda Sonnenberg, Ph. D.
Jacksonville University

- Reasons for study
  - Sediments attract contaminants that persist, bioaccumulate, and are toxic.
  - Sediment organisms accumulate contaminants which then move up the food chain.
  - History of contamination is reflected in sediments.



Sediment Contaminants

- Approach of study
  - Data reviewed for metals (8), PAHs (12), Total PCBs, organochlorine pesticides (10).
  - Sources: SJRWMD, FDEP, Mote Marine Laboratories, Savannah Laboratories, Fish and Wildlife, NOAA.
  - LSJR divided into four regions of similar salinity, habitat, land use
  - Concentrations assessed for time trends and for toxicity effects

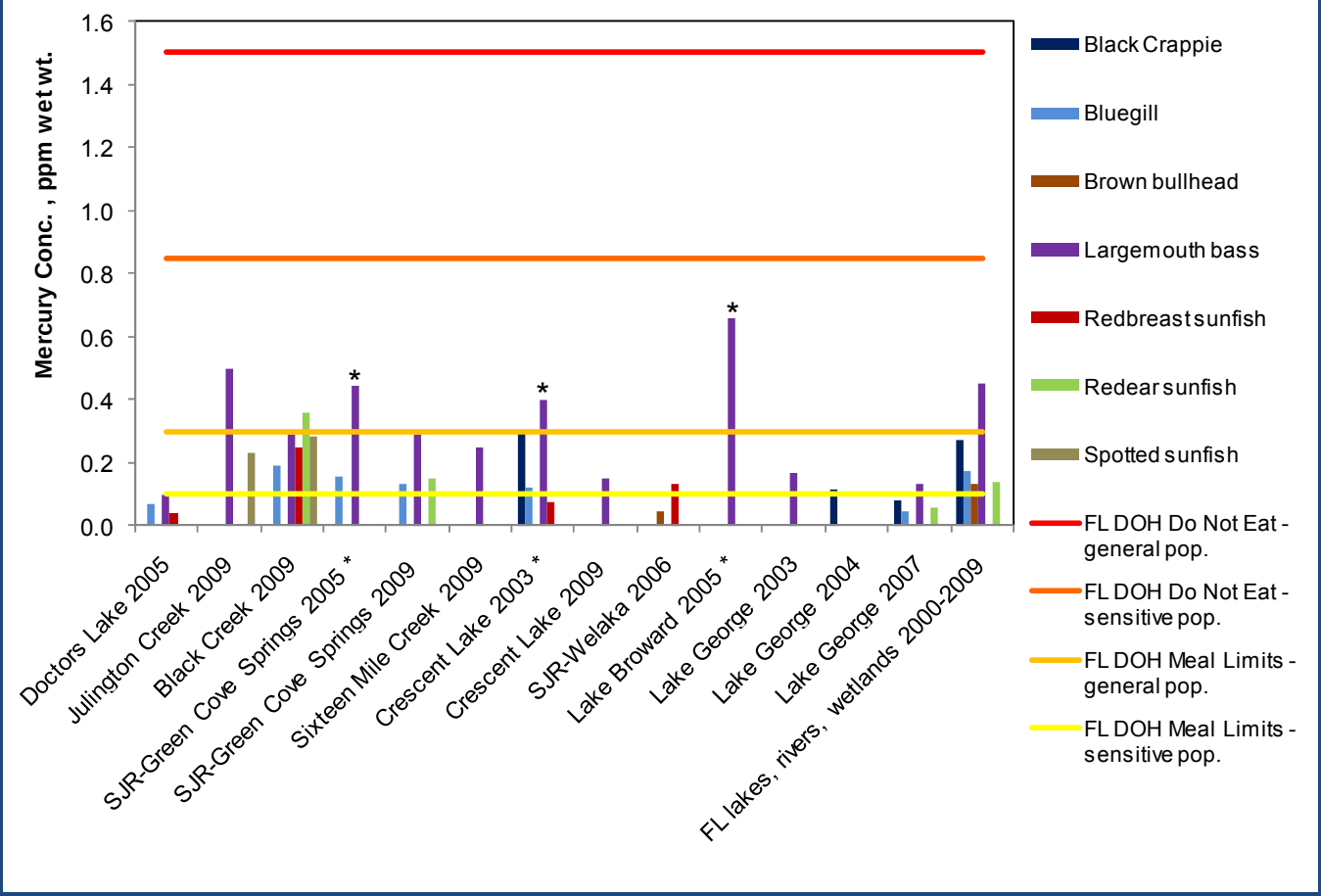


Sediment Contaminants

INDICATOR	STATUS	TREND
Polyaromatic Hydrocarbons (PAHs)	Unsatisfactory	NORTHERN LSJRB – Recovery from 1980s creosote contamination. SOUTHERN LSJRB – Urbanization may be increasing some types.
Metals	Unsatisfactory	Leveled off since 1990s.
Polychlorinated Biphenyls (PCBs)	Unsatisfactory (Western tributaries worst)	No significant decline in last 20 years.
Organochlorine Pesticides (OCPs)	Unsatisfactory (Western tributaries worst)	No significant decline in toxic effects over 20 years, but pesticides are slowly transforming.

Mercury in Fish and Shellfish

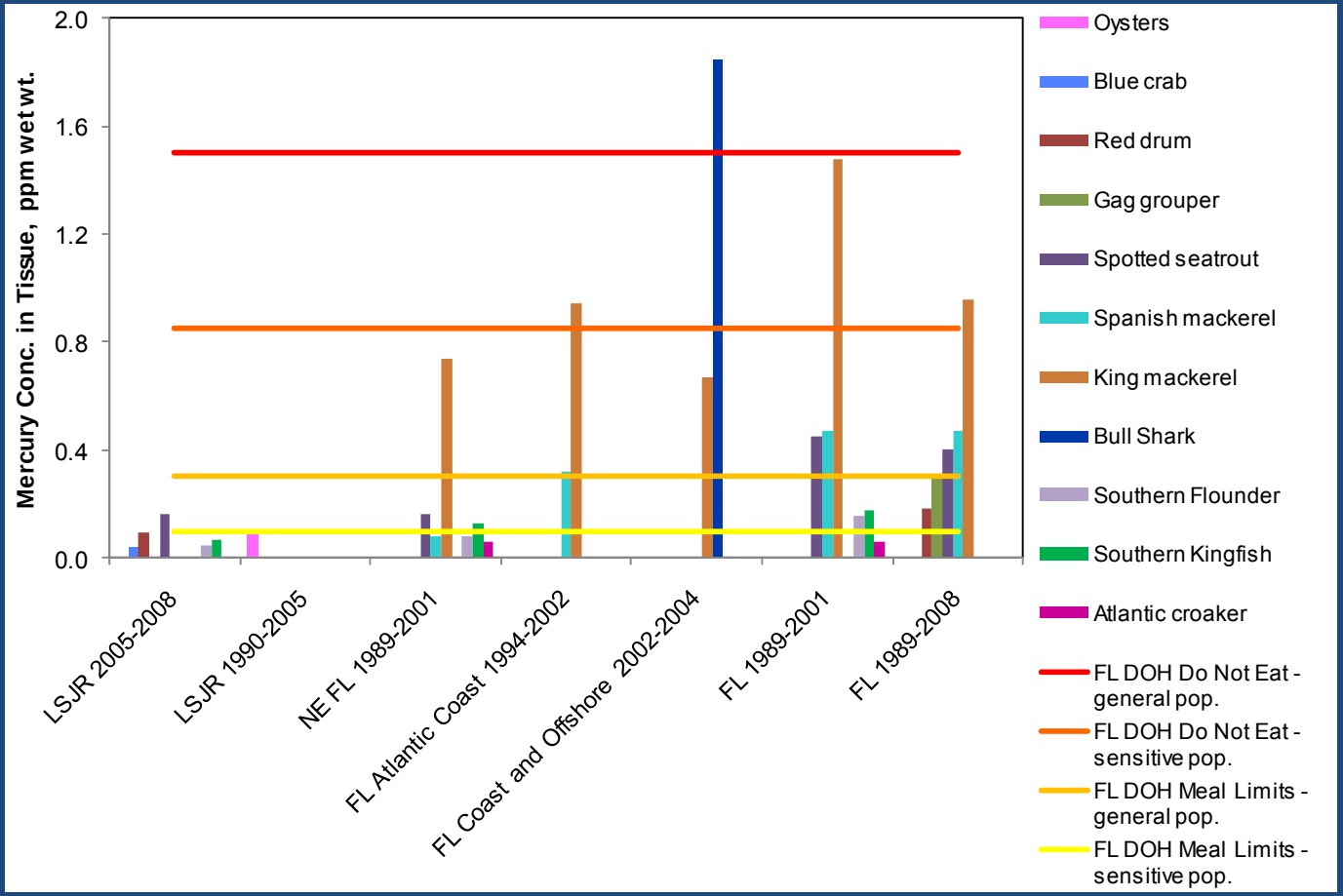
- Data – FL DEP, FWRI, FL DOH
- Freshwater



Fish consumption information at http://www.doh.state.fl.us/floridafishadvice/

Mercury in Fish and Shellfish

- Data – FL DEP, FWRI, FL DOH
- Estuarine and Marine



Fish consumption information at http://www.doh.state.fl.us/floridafishadvice/

Events of Summer and Fall 2010 on the Lower St. Johns River

May through June of 2010 - Cyanobacteria blooms grew in the freshwater areas.

May to July - Widespread reports of fish kills with damage to internal organs.

-Investigations ongoing

Smaller fish mortality event in Fall - Attributed to the fungus *Aphanomyces invadans*.

Events of Summer and Fall 2010 on the Lower St. Johns River

May through September

- Seventeen dead bottlenose dolphin were reported .

NOAA designated event as UME.

Major collaborative effort underway to better understand causes of dolphin mortality.

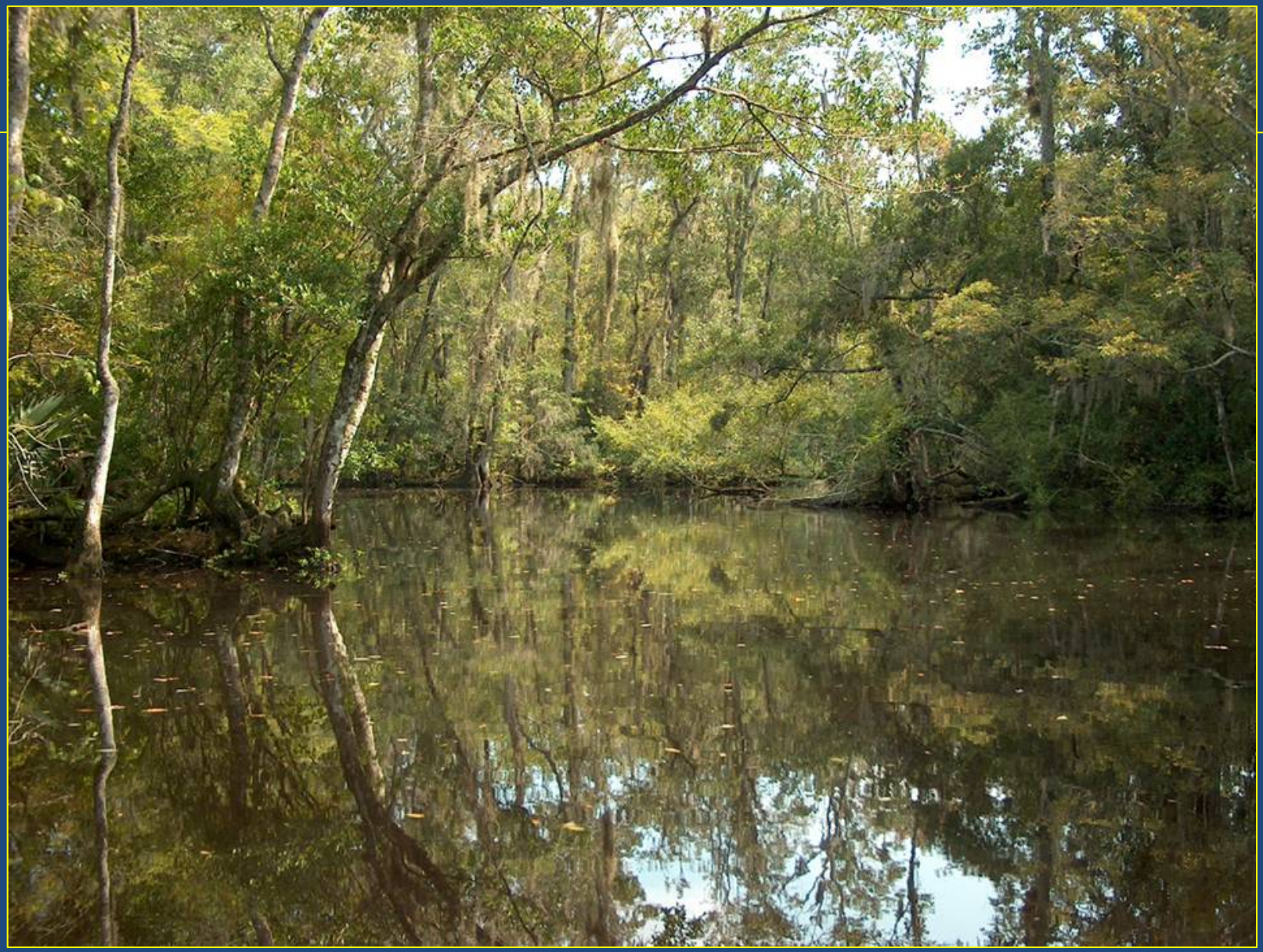
Mid-July

-Widespread reports of voluminous drifts of unusual white foam in approximately the same areas as the cyanobacteria blooms and the fish kills.

-Preliminary investigations indicate foam largely of salts similar to those in LSJR, as well biological compounds such as protein, carbohydrates, lipids, and nucleic acids.

The Future

- Start 2012 report and continue the report each year into the foreseeable future.
- Evaluate additional indicators & datasets to improve upon the report.



Thank you.