

South Indian River Water Control District Water Quality Workshop



July 20, 2017

Discussion Agenda

- ∅ Water Quality Standards
 - ∅ Trends
 - ∅ Numeric Nutrient Criteria
 - ∅ Waterbody Classifications

- ∅ FDEP Impaired Waters Program
 - ∅ Loxahatchee River Watershed
 - ∅ SIRWCD WBIDs

- ∅ Reassurance Plan

- ∅ Watershed Assessment Program

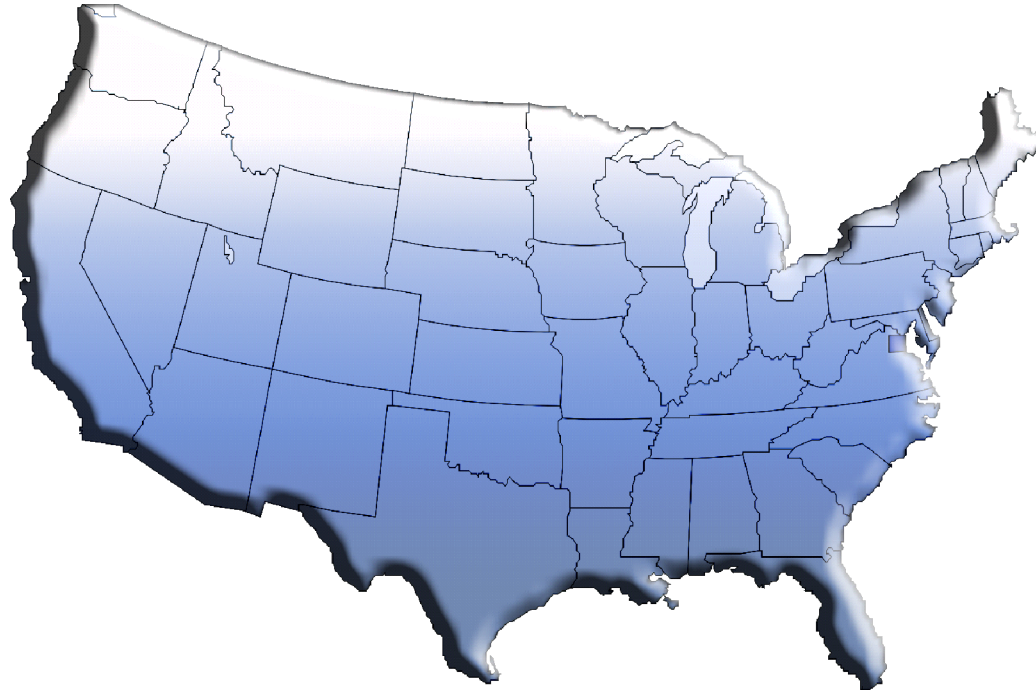
- ∅ SIRWCD Water Quality Monitoring

- ∅ Loxahatchee River Watershed Restoration Project



Water Quality Standards - Trends

- More stringent requirements developing across the country
- Agencies discharging to sensitive water bodies leading the way
- Working to advance stormwater treatment technology levels



Facts Driving Water Quality

Direct Outcomes of High TN and TP Loadings

- g Harmful algal blooms
- g Fish kills
- g Reduced spawning grounds
- g Degraded nursery habitats
- g "Dead" zones



Public Health Concerns

- § Consumption of Fish
- § Suitability for Contact Recreation
- § Impaired drinking water sources
- § Increased exposure to toxic microbes

Over 300 US Coast areas experienced hypoxia in 2008 versus 12 areas in 1960.



Numeric Nutrient Criteria

Numeric Nutrient Criteria (NNC)

- § EPA Proposed Draft Rules in January 2010
- § FDEP petitioned EPA to cease in their determination of the NNC for Florida
- § FDEP published a draft of the proposed rule on September 29, 2011
- § The Environmental Regulation Commission (ERC) passed rule December 8, 2011
- § The rules were ratified by the Florida Legislature and signed into law (HB 7051) by Governor Rick Scott
- § EPA approved FDEP's NNC on November 30, 2012
- § FDEP's rule did not cover all the waters in the state



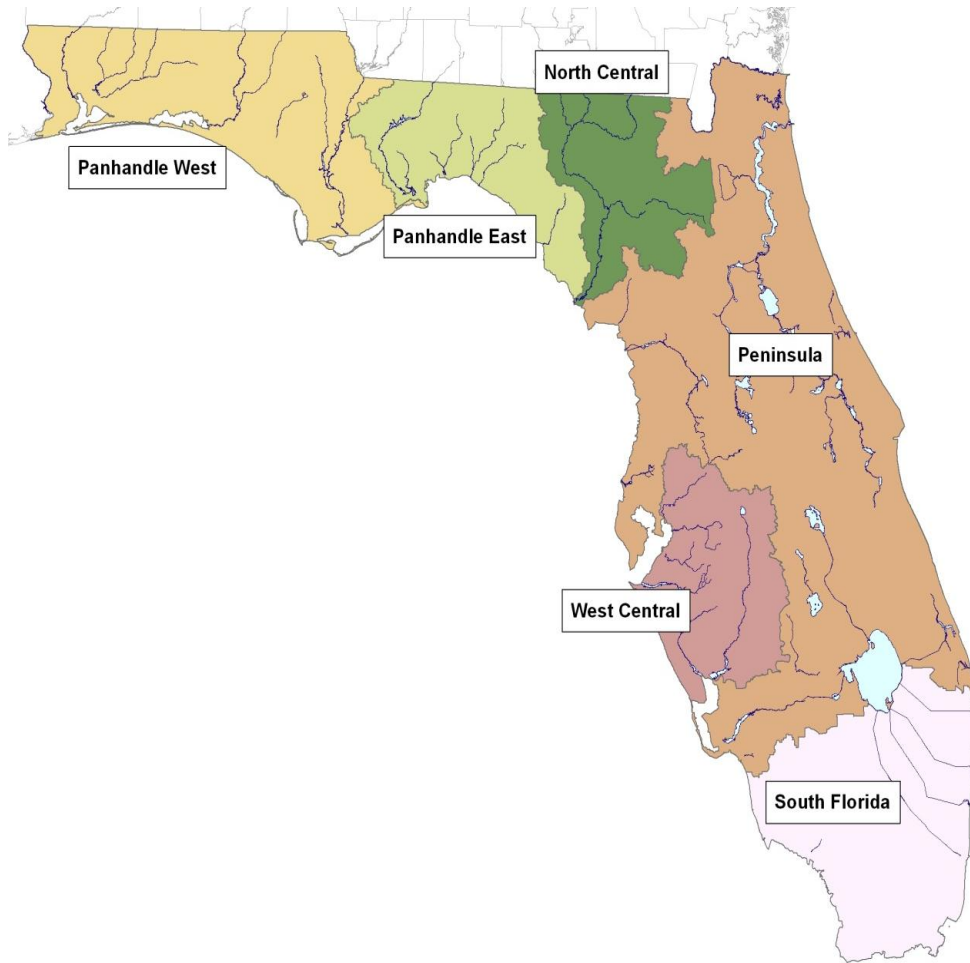
Numeric Nutrient Criteria

“Path Forward”

- § EPA and FDEP’s “Path Forward” agreement on March 15, 2013
- § Plan for FDEP to develop NNC for the remaining water bodies by EPA’s deadline on September 30, 2013
- § FDEP adopted a NNC Implementation Document April 23, 2013
- § FDEP adopted Criteria for Additional Waterbodies on June 20, 2013
- § Status report to Governor on August 1, 2013 titled, *“Status of Efforts to Establish Numeric Interpretations of the Narrative Nutrient Criterion for Florida Estuaries and Current Nutrient Conditions of Unimpaired Waters”*



Numeric Nutrient Criteria - Streams

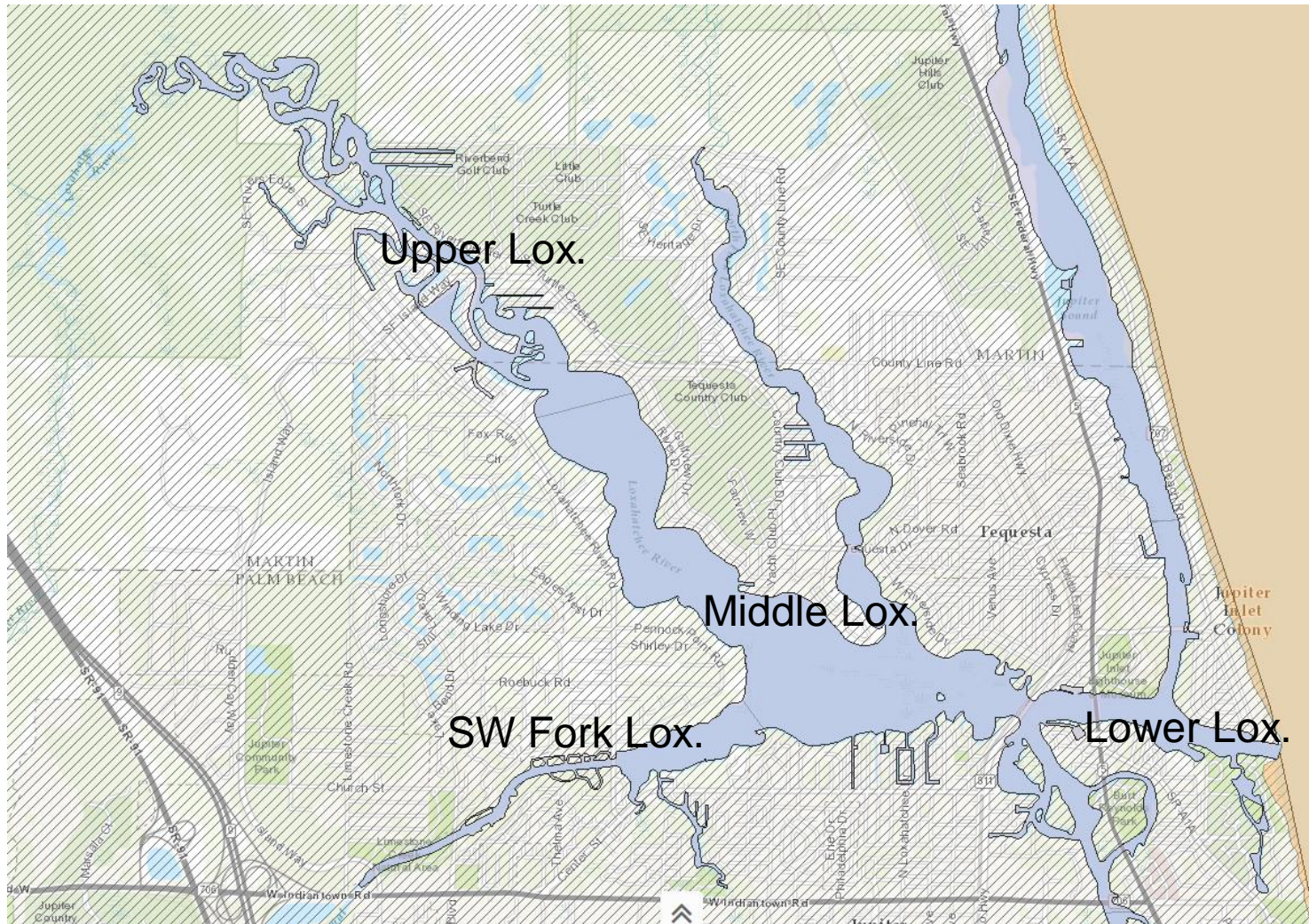


Nutrient Region	Total Phosphorus Threshold	Total Nitrogen Threshold
Panhandle West	0.06 mg/L	0.67 mg/L
Panhandle East	0.18 mg/L	1.03 mg/L
North Central	0.30 mg/L	1.87 mg/L
Peninsula	0.12 mg/L	1.54 mg/L
West Central	0.49 mg/L	1.65 mg/L
South Florida	No numeric nutrient threshold. The narrative criterion in paragraph 62-302.530(47)(b), F.A.C., applies.	

Floral Metric	Evidentiary Threshold of No Imbalances
Chlorophyll	< 20 ug/L; 3.2 to 20 ug/L = site specific

Floral measures summary. These values were based on the distribution of a population of minimally disturbed Benchmark sites sampled by the Department as part of Numeric Nutrient Criteria development (the same benchmark sites EPA used for their criteria).

Numeric Nutrient Criteria – Loxahatchee Estuary



Numeric Nutrient Criteria – Loxahatchee Estuary

Loxahatchee River Estuary	For estuary segments with criteria expressed as annual geometric means (AGM), the values shall not be exceeded more than once in a three year period. For all other estuary segments, the criteria shall not be exceeded in more than 10 percent of the measurements and shall be assessed over the most recent seven year period.		
Estuary	Total Phosphorus	Total Nitrogen	Chlorophyll <i>a</i>
1. Lower Loxahatchee	0.032 mg/L as AGM	0.63 mg/L as AGM	1.8 µg/L as AGM
2. Middle Loxahatchee	0.030 mg/L as AGM	0.80 mg/L as AGM	4.0 µg/L as AGM
3. Upper Loxahatchee	0.075 mg/L as AGM	1.26 mg/L as AGM	5.5 µg/L as AGM
4. Loxahatchee River Estuary (Southwest Fork)	0.075 mg/L as AGM	1.26 mg/L as AGM	5.5 µg/L as AGM

Waterbody Classification

The Clean Water Act requires that the surface waters of each state be classified according to designated uses.

- Class I – Potable Water Supplies
- Class II – Shellfish Propagation or Harvesting
- Class III – Fish Consumption, Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife
- **Class III – Limited – Fish Consumption, Recreation or Limited Recreation; and/or Propagation and Maintenance of a Limited Population of Fish and Wildlife**
- Class IV – Agricultural Water Supplies
- Class V – Navigation, Utility and Industrial Use

Waterbody Classification – Class III - Limited

Class III – Limited – Fish Consumption, Recreation or Limited Recreation; and/or Propagation and Maintenance of a Limited Population of Fish and Wildlife

This classification is restricted to waters with human-induced physical or habitat conditions that, because of those conditions, have limited aquatic life support and habitat that prevent attainment of Class III uses.

In order to be classified as Class III – Limited, a site specific evaluation must be done and examines:

- Limited aquatic life support
- Habitat limitations
 - Physical and Hydrologic Characteristics
 - Water Management Uses

FDEP Impaired Waters Program

Section 303(d) of the Federal CWA requires states to:

- Submit lists of waters that do not meet applicable water quality standards, including designated uses
 - “impaired waters”
- Identify pollutant causing or expected to cause impairment
- Establish/implement TMDLs for these waters on a prioritized schedule

FDEP Impaired Waters Program

- **DEP implements Impaired Waters assessment program as part of Watershed Management Approach**
 - Started in July, 2000
 - Assessment
 - TMDL Development
 - Implementation
 - Watershed Restoration
- **Watershed Approach established five-phase cycle that rotates through all basins in the state over five-year period**
 - Divided state's basins into groups

FDEP Impaired Waters Program

Uses Addressed by Assessment Methods

- Aquatic Life
 - Metals, Turbidity, Pesticides, Biological assessment
- Primary Contact and Recreation
 - Bacteria, Beach advisories
- Fish and Shellfish Consumption
 - Pathogenic bacteria, Mercury, Shellfish Classification
- Drinking Water
 - Metals, Pesticides, Bacteria

**Water Quality Standards 62-302 F.A.C.
Impaired Waters Rule 62-303 F.A.C**

FDEP Impaired Waters Program

Watershed Management Cycle

Phase 1 - Preliminary Assessment

- Produce Strategic Monitoring Plan

Phase 2 – Targeted Monitoring and Assessment

Restoration Options

Phase 3 - Develop and adopt TMDLs

Phase 4 – Establish TMDL Implementation Strategy

- Basin Management Action Plan or
- Other Implementation Option

Phase 5 - TMDL Implementation

FDEP Impaired Waters Program – Assessment Categories

- Category 1 – Not Impaired (attains ALL uses)
- Category 2 – Meets standards; Not Impaired
- Category 3 – Insufficient data to verify
- **Category 4 – Does not meet standards but a TMDL is not needed**
- Category 5 – Does not meet standards; Impaired by a pollutant

FDEP Impaired Waters Program – Impaired, but TMDL Not Needed

- **4a - TMDL Completed**
- **4b - Waters with Reasonable Assurance**
 - Waters where we have formal documentation that existing or proposed pollution control measures are expected to restore the water
- **4c - Waters impaired but it is not due to a pollutant**
 - Includes waterbodies that are impaired due to natural conditions or pollution (e.g. hydrologic modifications).

These categories qualify for delisting from the State's Verified List and the federal 303(d) list.

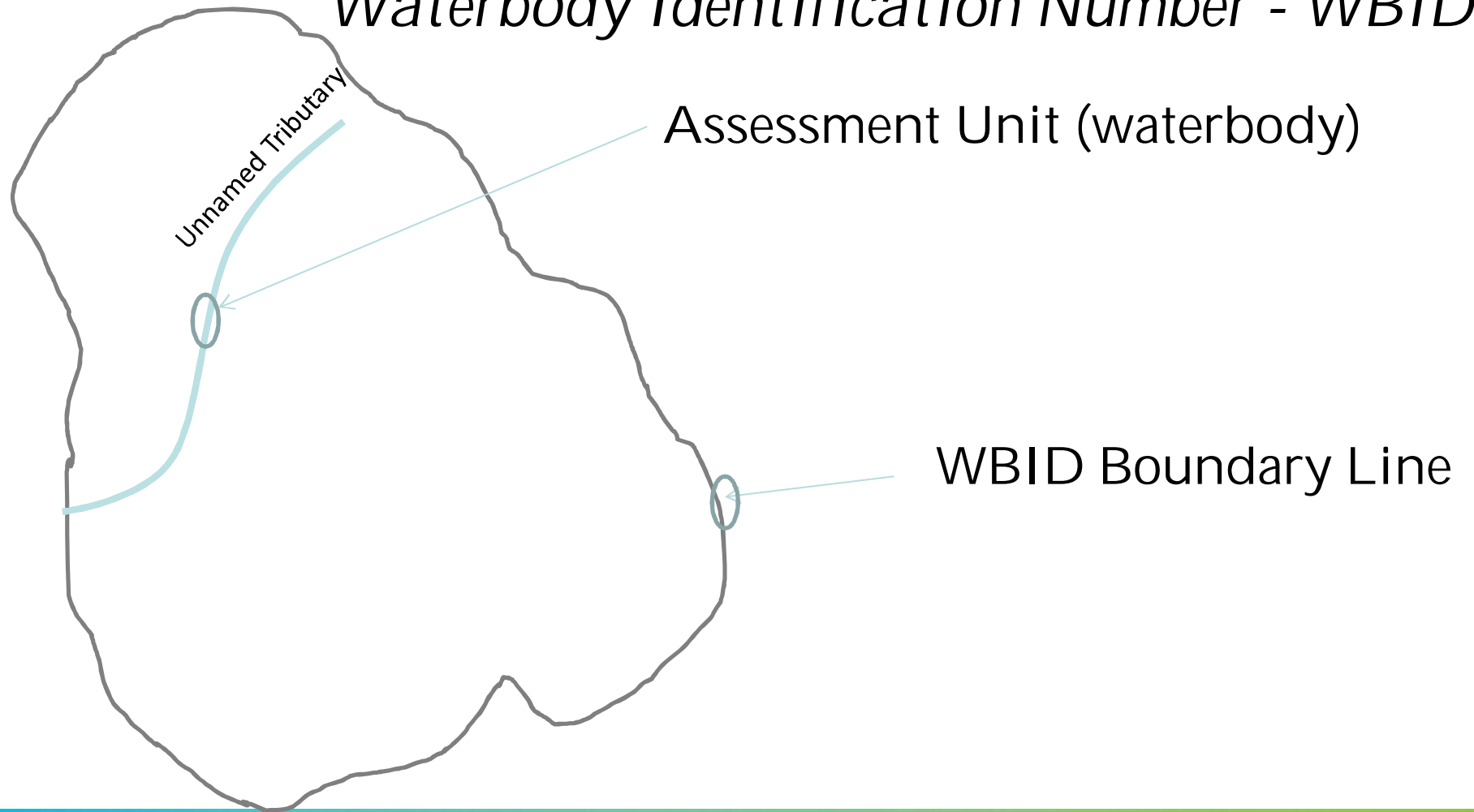
FDEP Impaired Waters Program – Impaired, but TMDL Not Needed

- **4d - Waters that are impaired, but no pollutant has been identified**
 - typically for dissolved oxygen or biology
 - SSACs, UAAs, reclassification
- **4e - Waters that have been identified as impaired, but for which an on-going restoration initiative has begun, but not completed.**
(Not covered by a Reasonable Assurance plan.)

These categories are not on the State's Verified List, but are on the federal 303(d) list.

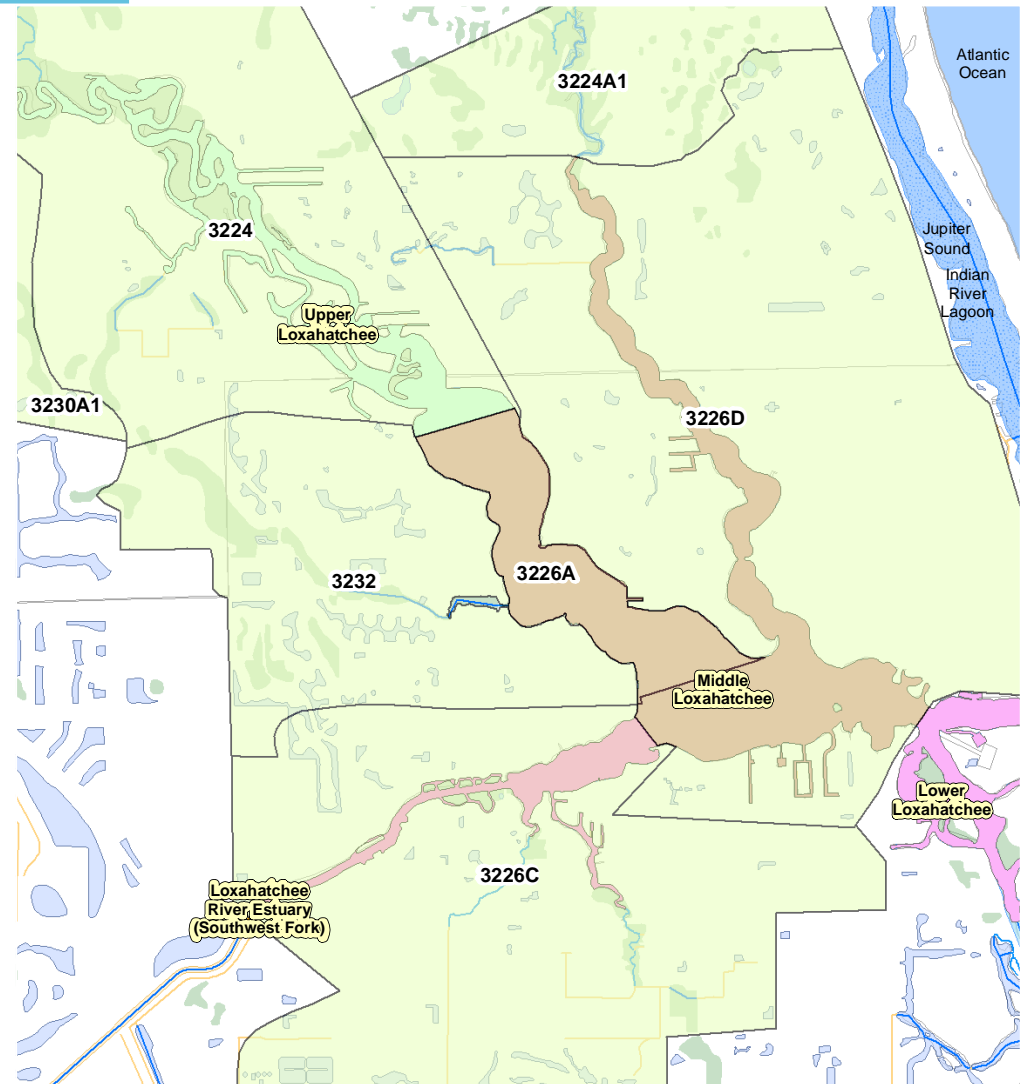
FDEP Impaired Waters Program – Assessment Units

Waterbody Identification Number - WBID

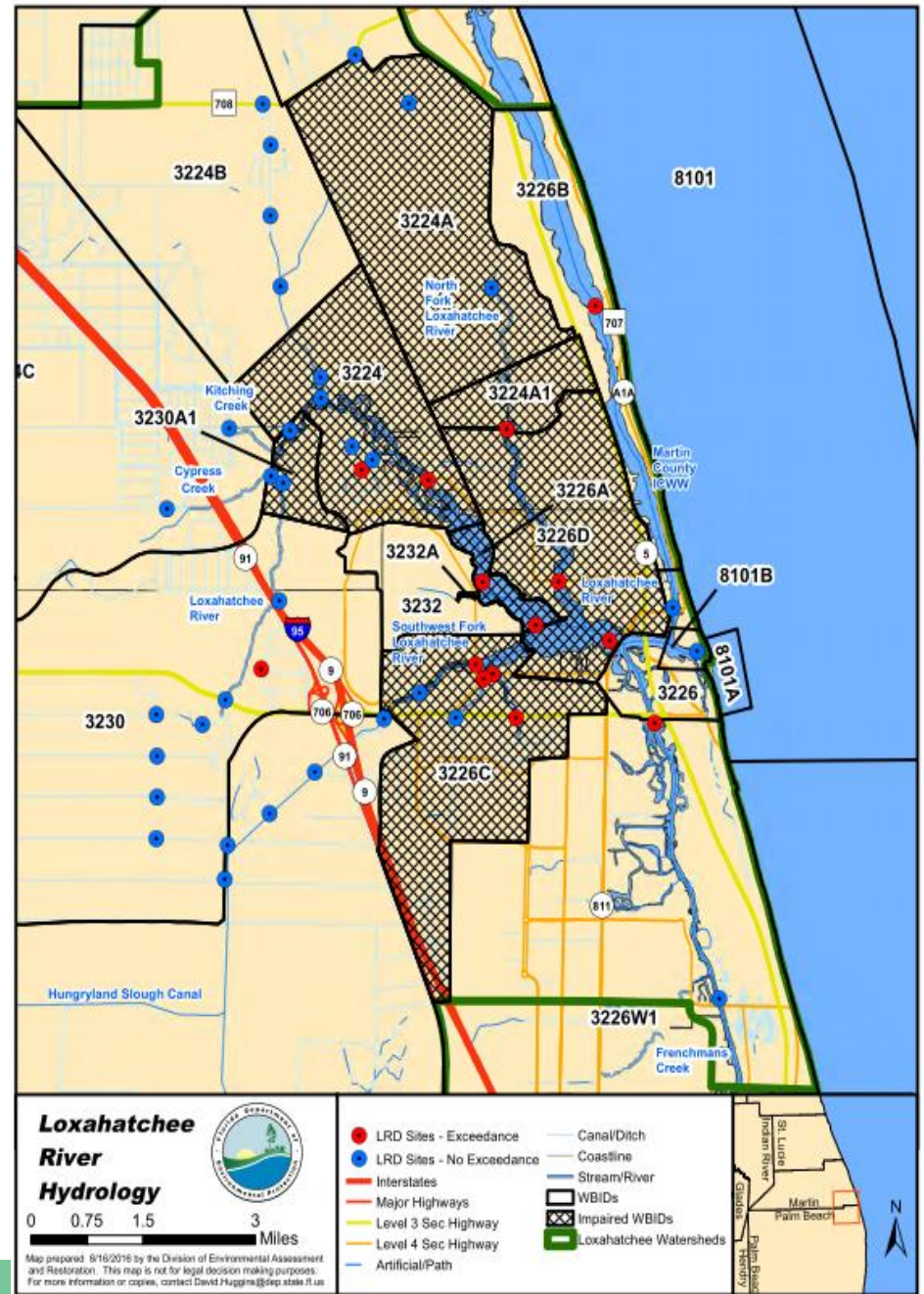


FDEP Impaired Waters Program – WBIDs of Interest

- **Loxahatchee River**
 - WBID 3224 – Upper segment, estuary
 - WBID 3226C – SW Fork, estuary
 - WBID 3226A – NW segment, estuary
 - WBID 3226D – Middle segment, estuary
 - WBID 3226 – Jupiter Inlet, estuary



FDEP Impaired Waters Program – WBIDs of Interest



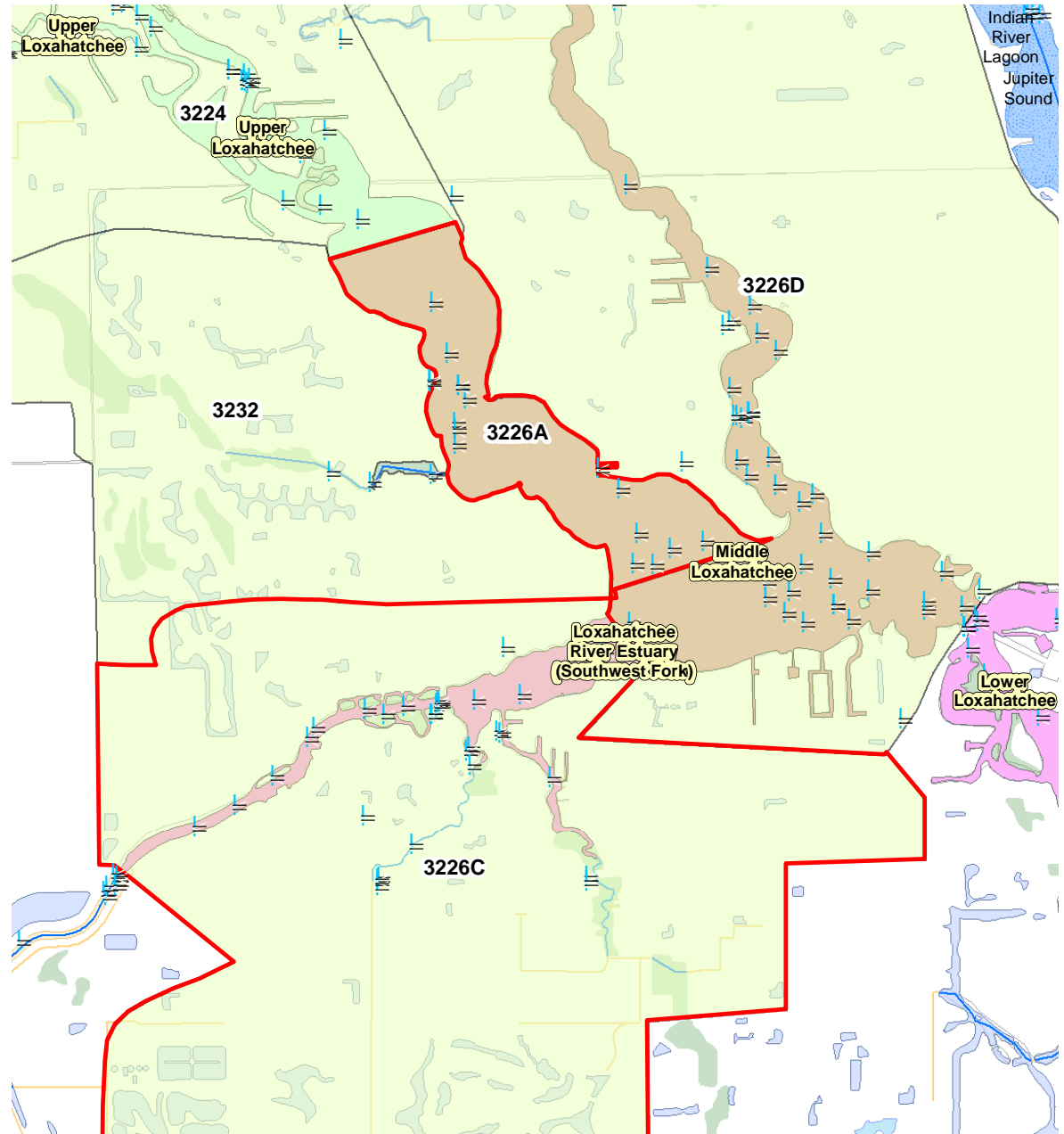
FDEP Impaired Waters Program – Current Status

- **Loxahatchee River (estuary segments)**
 - **WBID 3224 – Upper Loxahatchee**
 - **Impaired for:** fecal coliforms, dissolved oxygen (study list)
 - **Not Impaired for:** chlorophyll-a, TN, or TP
 - **WBID 3226C – Loxahatchee River Estuary (Southwest Fork)**
 - **Impaired for:** chlorophyll-a, fecal coliforms (TMDL-not to exceed 43 counts/100mL in any sampling event for Class 2)
 - **Not Impaired for:** DO, TN, or TP
 - **WBID 3226A – Northwest Segment of Estuary**
 - **Impaired for:** chlorophyll-a, fecal coliforms
 - **Not Impaired for:** DO, TN, or TP
 - **WBID 3226D – Middle Segment of Estuary**
 - **Impaired for:** fecal coliforms
 - **Not Impaired for:** DO, chlorophyll-a, TN, or TP

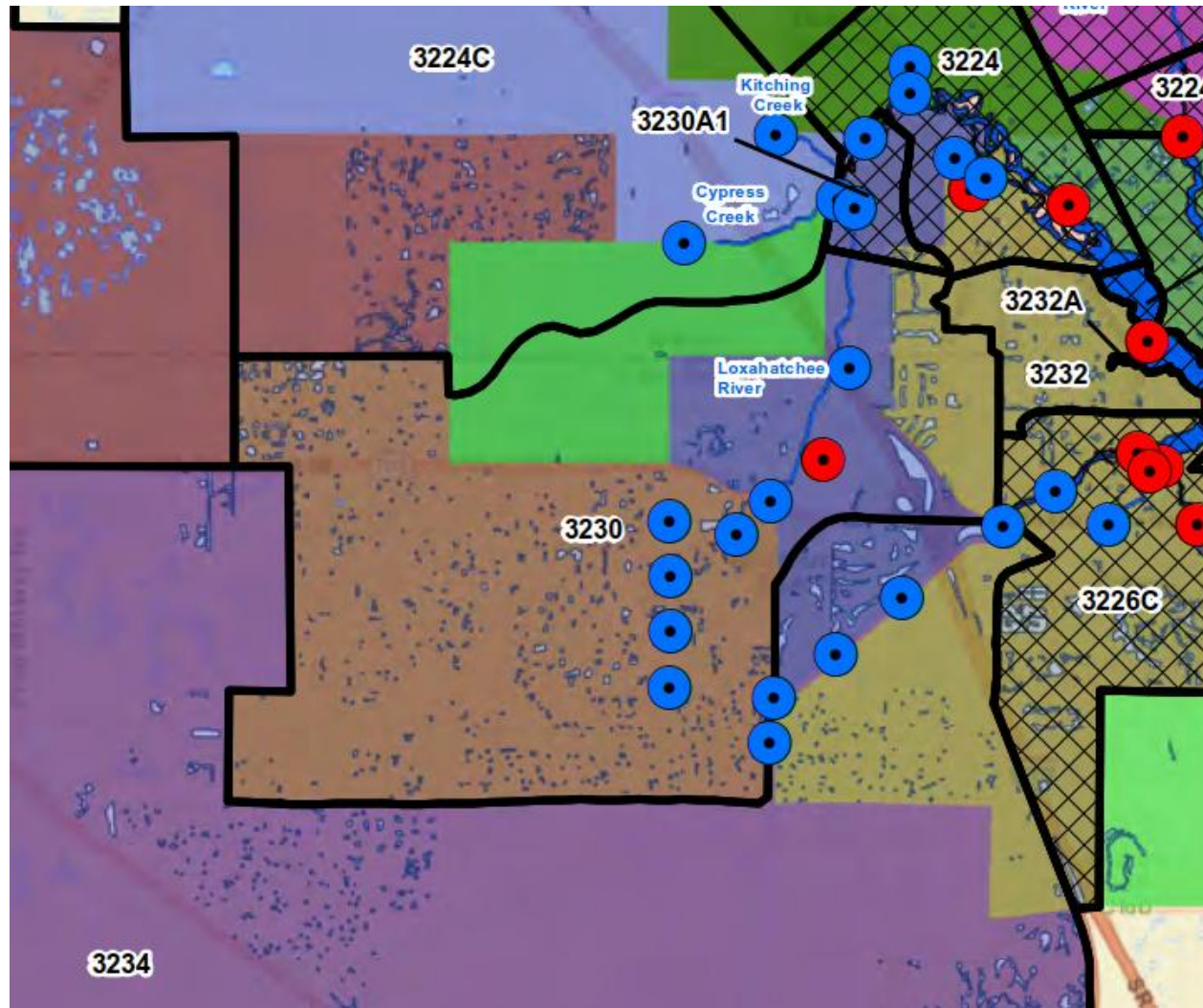
FDEP Impaired Waters Program – Current Nutrient Status

Waterbody Information			Chlorophyll-a			Total Nitrogen			Total Phosphorus		
WBID	Estuary Nutrient Region	Waterbody Name	Criterion	Assessment Status	Verified Period Assessment Data	Criterion	Assessment Status	Verified Period Assessment Data	Criterion	Assessment Status	Verified Period Assessment Data
3224	ENRQ3	Loxahatchee River (Jonathan Dickinson State Park)	AGM ≤ 5.5 µg/L	Not Impaired	ENRQ3: AGM 2007 (3.0 µg/L) 2008 (5.1 µg/L) 2009 (5.8 µg/L) 2010 (5.5 µg/L) 2011 (4.9 µg/L) 2012 (3.8 µg/L) 2013 (5.4 µg/L)	AGM ≤ 1.26 mg/L	Not Impaired	ENRQ3: AGM 2007 (0.77 mg/L) 2008 (0.88 mg/L) 2009 (0.67 mg/L) 2010 (0.85 mg/L) 2011 (0.91 mg/L) 2012 (0.73 mg/L) 2013 (0.75 mg/L)	AGM ≤ 0.075 mg/L	Not Impaired	ENRQ3: AGM 2007 (0.061 mg/L) 2008 (0.062 mg/L) 2009 (0.052 mg/L) 2010 (0.061 mg/L) 2011 (0.060 mg/L) 2012 (0.058 mg/L) 2013 (0.061 mg/L)
3226A	ENRQ2	Loxahatchee River (Northwest Fork)	AGM ≤ 4.0 µg/L	Impaired	ENRQ2: AGM 2007 (2.7 µg/L) 2008 (3.7 µg/L) 2009 (4.7 µg/L) 2010 (6.0 µg/L) 2011 (5.1 µg/L) 2012 (4.2 µg/L) 2013 (6.8 µg/L)	AGM ≤ 0.8 mg/L	Not Impaired	ENRQ2: AGM 2007 (0.5 mg/L) 2008 (0.5 mg/L) 2009 (0.3 mg/L) 2010 (0.4 mg/L) 2011 (0.4 mg/L) 2012 (0.3 mg/L) 2013 (0.4 mg/L)	AGM ≤ 0.03 mg/L	Not Impaired	ENRQ2: AGM 2007 (0.03 mg/L) 2008 (0.03 mg/L) 2009 (0.03 mg/L) 2010 (0.03 mg/L) 2011 (0.04 mg/L) 2012 (0.03 mg/L) 2013 (0.03 mg/L)
3226C	ENRQ4	Loxahatchee River (Southwest Fork)	AGM ≤ 5.5 µg/L	Impaired	ENRQ4: AGM 2007 (8.0 µg/L) 2008 (12.3 µg/L) 2009 (8.5 µg/L) 2010 (12.9 µg/L) 2011 (8.0 µg/L) 2012 (9.6 µg/L) 2013 (9.2 µg/L)	AGM ≤ 1.26 mg/L	Not Impaired	ENRQ4: AGM 2007 (0.72 mg/L) 2008 (0.54 mg/L) 2009 (0.45 mg/L) 2010 (0.48 mg/L) 2011 (0.58 mg/L) 2012 (0.48 mg/L) 2013 (0.48 mg/L)	AGM ≤ 0.075 mg/L	Not Impaired	ENRQ4: AGM 2007 (0.031 mg/L) 2008 (0.041 mg/L) 2009 (0.033 mg/L) 2010 (0.041 mg/L) 2011 (0.039 mg/L) 2012 (0.040 mg/L) 2013 (0.043 mg/L)
3226D	ENRQ2	Loxahatchee River	AGM ≤ 4.0 µg/L	Not Impaired	ENRQ2: AGM 2007 (2.3 µg/L) 2008 (2.6 µg/L) 2009 (2.3 µg/L) 2010 (2.8 µg/L) 2011 (2.9 µg/L) 2012 (3.4 µg/L) 2013 (1.8 µg/L)	AGM ≤ 0.8 mg/L	Not Impaired	ENRQ2: AGM 2007 (0.4 mg/L) 2008 (0.2 mg/L) 2009 (0.1 mg/L) 2010 (0.2 mg/L) 2011 (0.2 mg/L) 2012 (0.3 mg/L) 2013 (0.2 mg/L)	AGM ≤ 0.03 mg/L	Not Impaired	ENRQ2: AGM 2007 (0.02 mg/L) 2008 (0.02 mg/L) 2009 (0.01 mg/L) 2010 (0.02 mg/L) 2011 (0.02 mg/L) 2012 (0.02 mg/L) 2013 (0.02 mg/L)

FDEP Impaired Waters Program – Sample Locations



FDEP Impaired Waters Program – SIRWCD WBIDs of Interest



FDEP Impaired Waters Program – Jupiter Farms WBID

- **WBID 3230 – Jupiter Farms**

- Waterbody Type – Stream
- Waterbody Class – 3F
- Parameters Assessed Using the Impaired Surface Waters Rule (IWR) – Nutrients (Algal Mats)
- Criterion Concentration or Threshold Not Met – RPS \leq 25%, or when between 20% - 25%
Evaluation of Algal Autoecological Data Indicates No Imbalance
- EPA’s Intergrated Report Category – 5, Water quality standards are not attained and a TMDL is required
- Summary Assessment Status – Impaired
- Priority for TMDL Development is Medium

Verified Period Assessment Data ⁵	Comments
05/08/2008: 0% 05/15/2008: 0% 05/22/2008: 0% 09/29/2008: 0% 09/30/2008: 0% 09/30/2008: 0% 04/20/2010: 63.33% 04/06/2011: 58% 04/20/2011: 5.13%	This waterbody is impaired for this parameter based on failing rapid periphyton survey results. This parameter is being added to the 303(d) List.

FDEP Impaired Waters Program – Next Steps for Lox.

- **For some waterbodies:**
 - TMDL Development
 - BMAP Development
 - Restoration implementation

- **Other options:**
 - Pollutant Source Reduction Plans
 - Establishment of Alternative Criteria
 - Reasonable Assurance Plan

Reasonable Assurance (4b) Plans (RAP)

- **Basic Requirements:**
 - Description of Impaired Waterbody
 - Description of Water Quality or Aquatic Ecological Goals
 - The water quality–based targets or aquatic ecological goals (both interim and final) that have been established for the pollutant(s) of concern.
 - Description of Proposed Management Actions To Be Undertaken
 - Schedule for restoration projects, including funding sources
 - Description of Procedures for Monitoring and Reporting Results
 - Description of and Commitment to Proposed Corrective Actions

Reasonable Assurance (4b) Plans (RAP)

- **Course of Action:**
 - Develop a draft RA plan
 - Submit to the Department for Review
 - RA Plan is approved by the Department and adopted by the Secretary
 - Updates are provided to the Department based on the schedule established in the Plan
 - Updates are reviewed for confirmation of reasonable progress
 - Implementation of plan continues until targets are achieved

Reasonable Assurance (4b) Plans (RAP)

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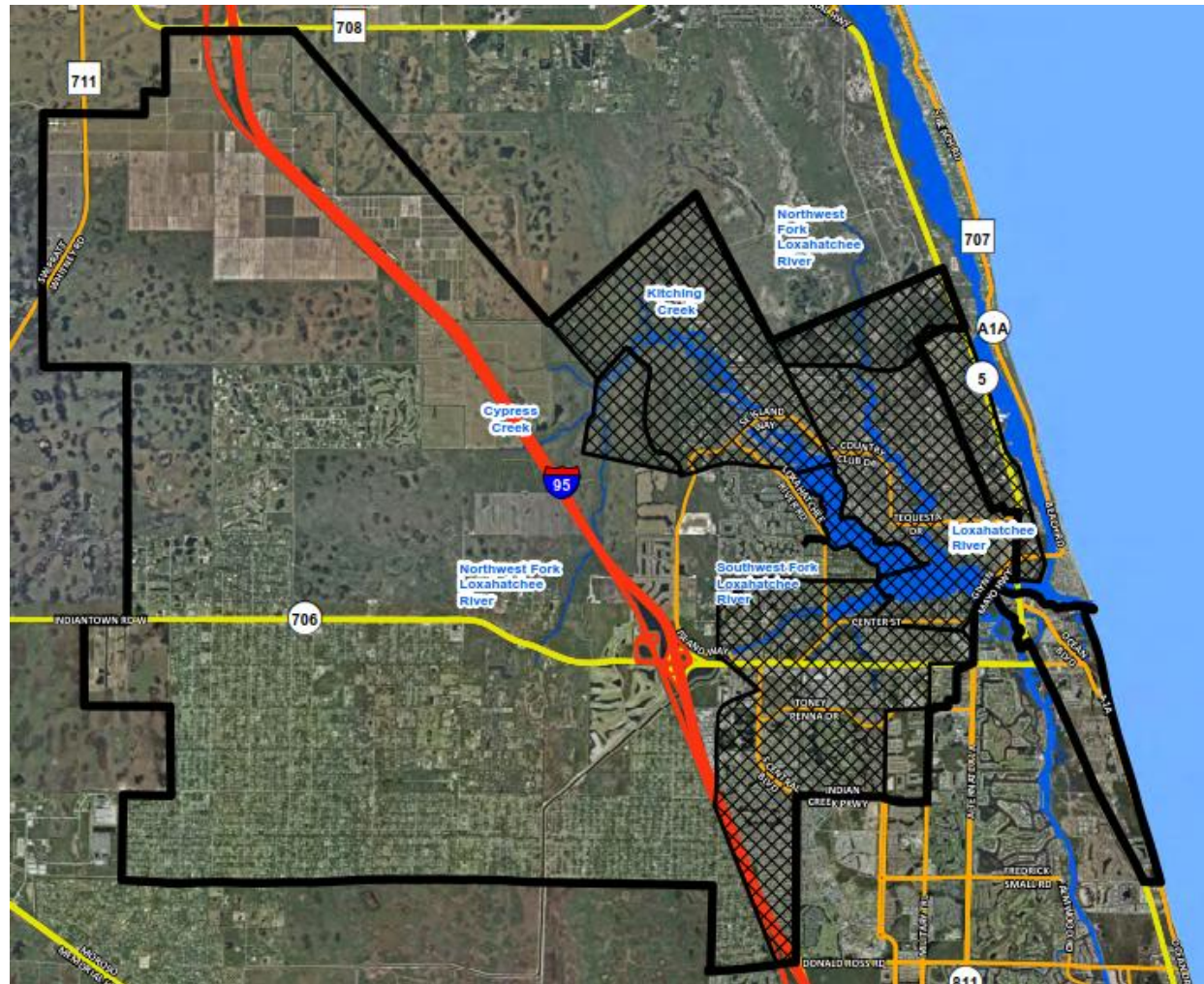
RAP Path Forward for Loxahatchee

- **DEP's role**
 - TMDL Development
 - DEP Contractors
 - EPA model
 - Assistance with the plan
 - Facilitation
 - Technical support on WQ target
- **Loxahatchee Stakeholder commitments**
 - Staff resources
 - Funding for restoration projects
 - Monitoring

RAP Status

- Loxahatchee River Management Coordinating Council (LRMCC) agreed to proceed with a RAP for the impaired waters in the Loxahatchee
- Determine the RAP boundary
- Adjusting the WBID Boundaries
- Preliminary modeling complete (LRMCC has not accepted modeling)
- FDEP is collecting projects that have been completed since 2005

RAP Boundary



SIRWCD Role in RAP

- SIRWCD is a member of the LRMCC
- SIRWCD is included in the RAP boundary
- Staff is an active member in reviewing the boundary adjustments and the modeling
- SIRWCD provided FDEP current monitoring plan
- SIRWCD will provide past projects that had received Loxahatchee River Preservation Initiative (LRPI) funding (water quality benefits)
- In future, SIRWCD will need to develop projects that address water quality since it is included in the RAP boundary

Watershed Assessment Program

- SIRWCD is a member of the Palm Beach County National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, which is managed by the Northern Palm Beach County Improvement District (NPBCID)
- As part of this permit, permittees have to develop an Assessment Program
- The purpose of the program is to assist permittees in evaluating the effectiveness of its stormwater management (permit compliance) program in reducing stormwater pollutant loadings

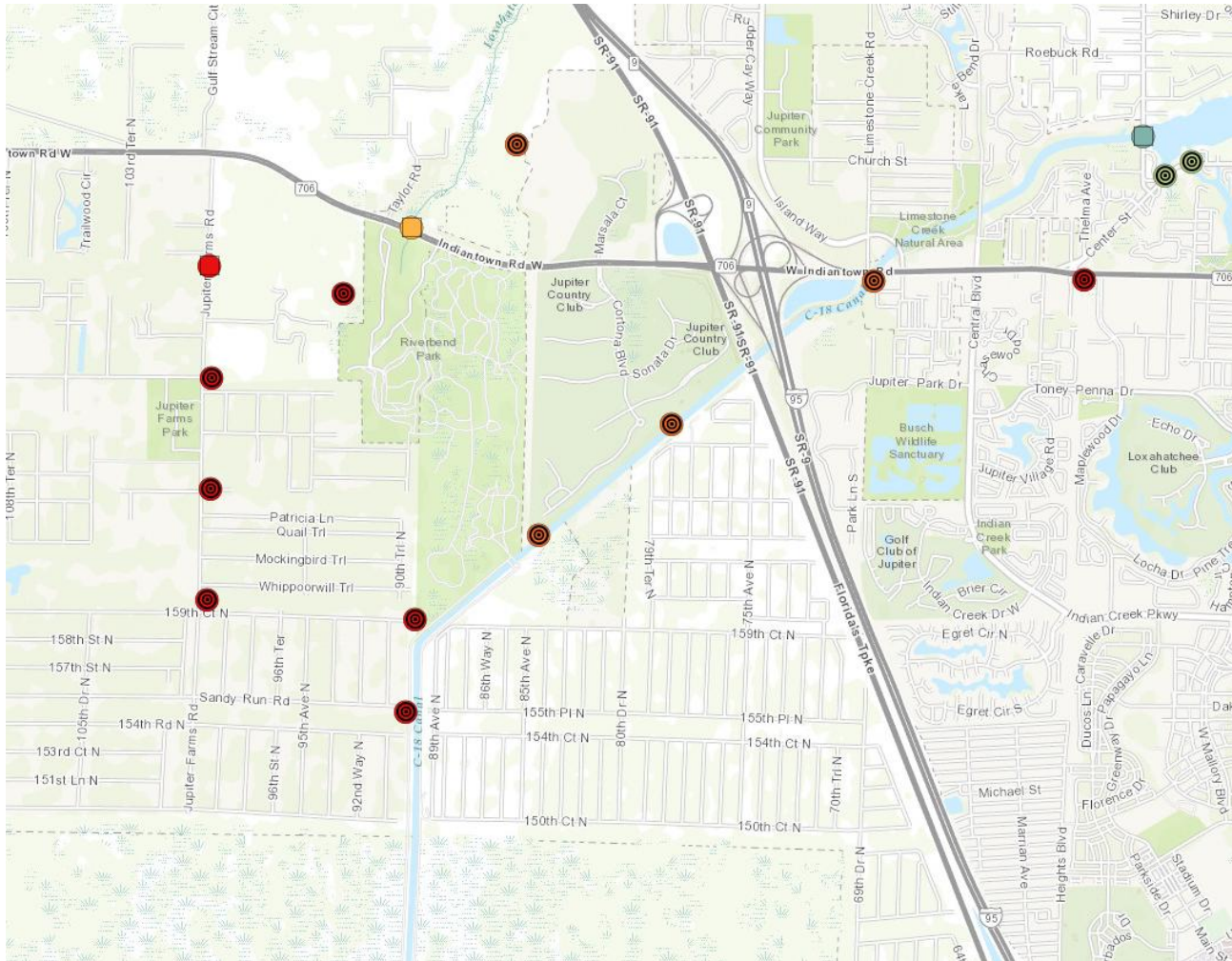
Watershed Assessment Program

Includes 3 parts:

- A water quality monitoring plan
- A pollutant loading estimate plan
- An action/response plan

As part of the permit, this assessment program document is due September 7, 2017. The results are reported on an annual basis.

SIRWCD Water Quality Monitoring – LRD Monitoring Sites



SIRWCD Water Quality Monitoring – LRD Monitoring Sites Results



Loxahatchee River District
 WildPine Laboratory
www.loxahatcheeriver.org

RiverKeeper Water Quality Monitoring Program Monthly Average Stoplight Maps

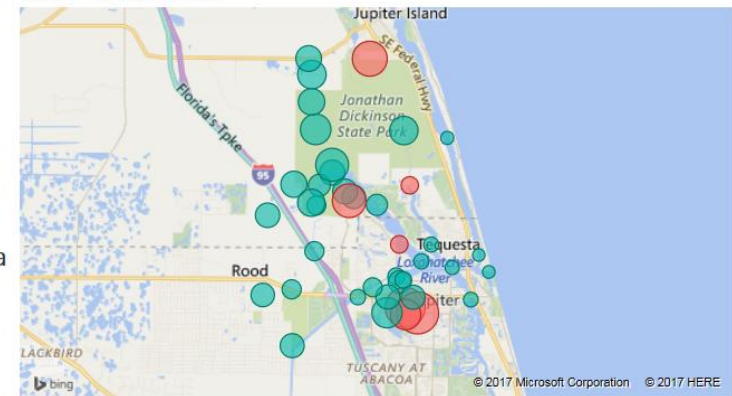
Nutrients - Total Nitrogen, Total Phosphorus, and Chlorophyll a Scored to EPA/DEP Numeric Nutrient Criteria for each Site

Month-Year

- July 2017
- June 2017
- May 2017
- April 2017
- March 2017
- February 2017
- January 2017
- December 2016
- November 2016
- October 2016
- September 2016
- August 2016
- July 2016
- June 2016
- May 2016

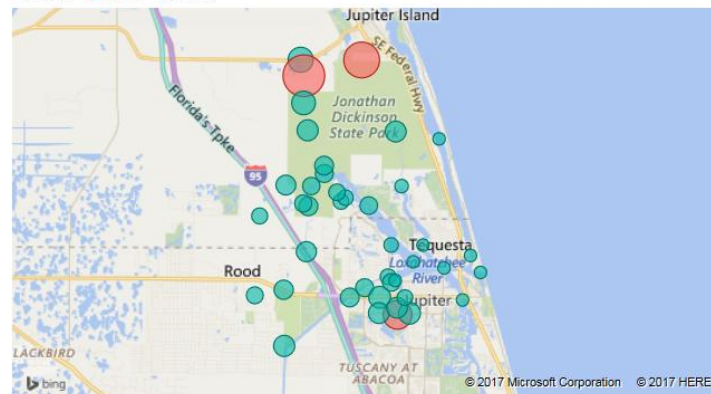
Total Phosphorus (mg/L)

TP_Score ● GOOD ● POOR



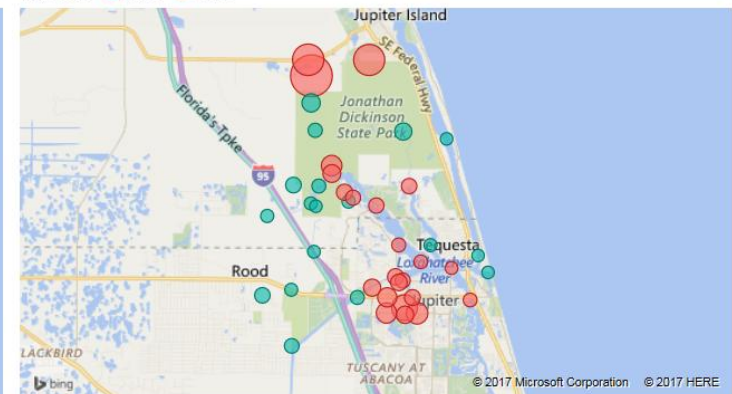
Total Nitrogen (mg/L)

TN_Score ● GOOD ● POOR



Chlorophyll a (ug/L)

CHL_Score ● GOOD ● POOR



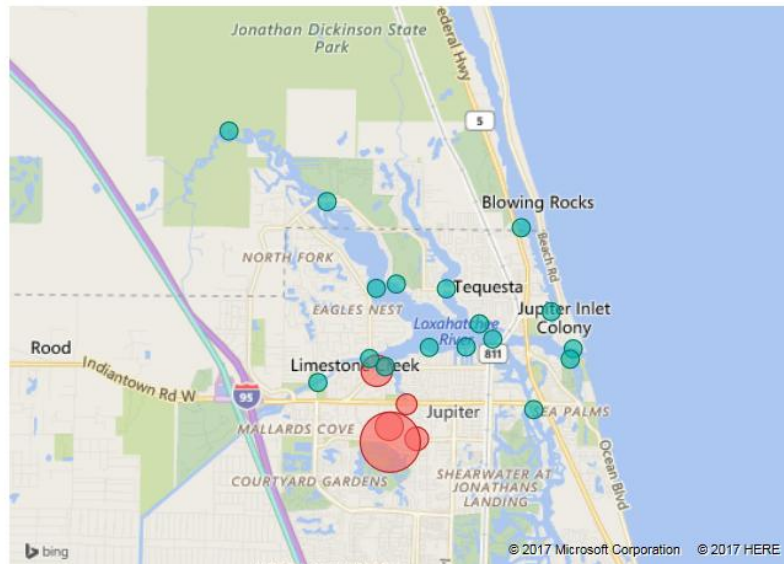
SIRWCD Water Quality Monitoring – LRD Monitoring Sites Results

Month-Year

- July 2017
- June 2017
- May 2017
- April 2017
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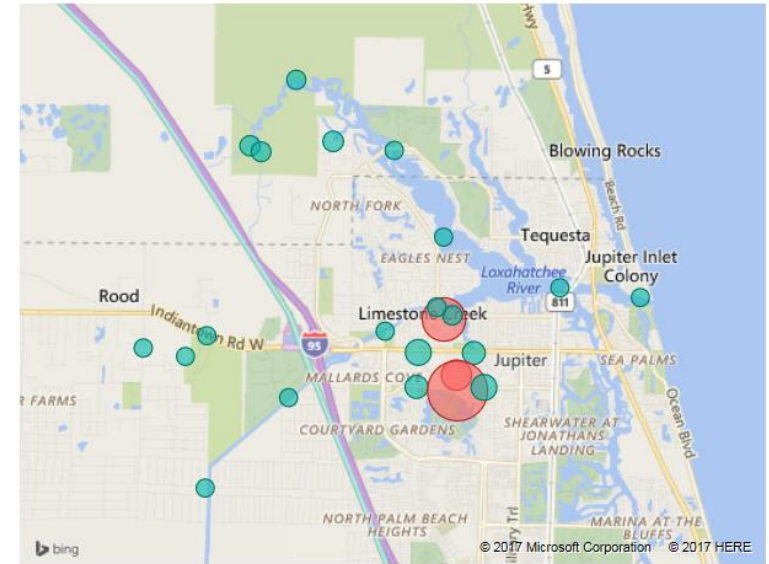
Enterococci Bacteria

EC_Score ● GOOD ● POOR

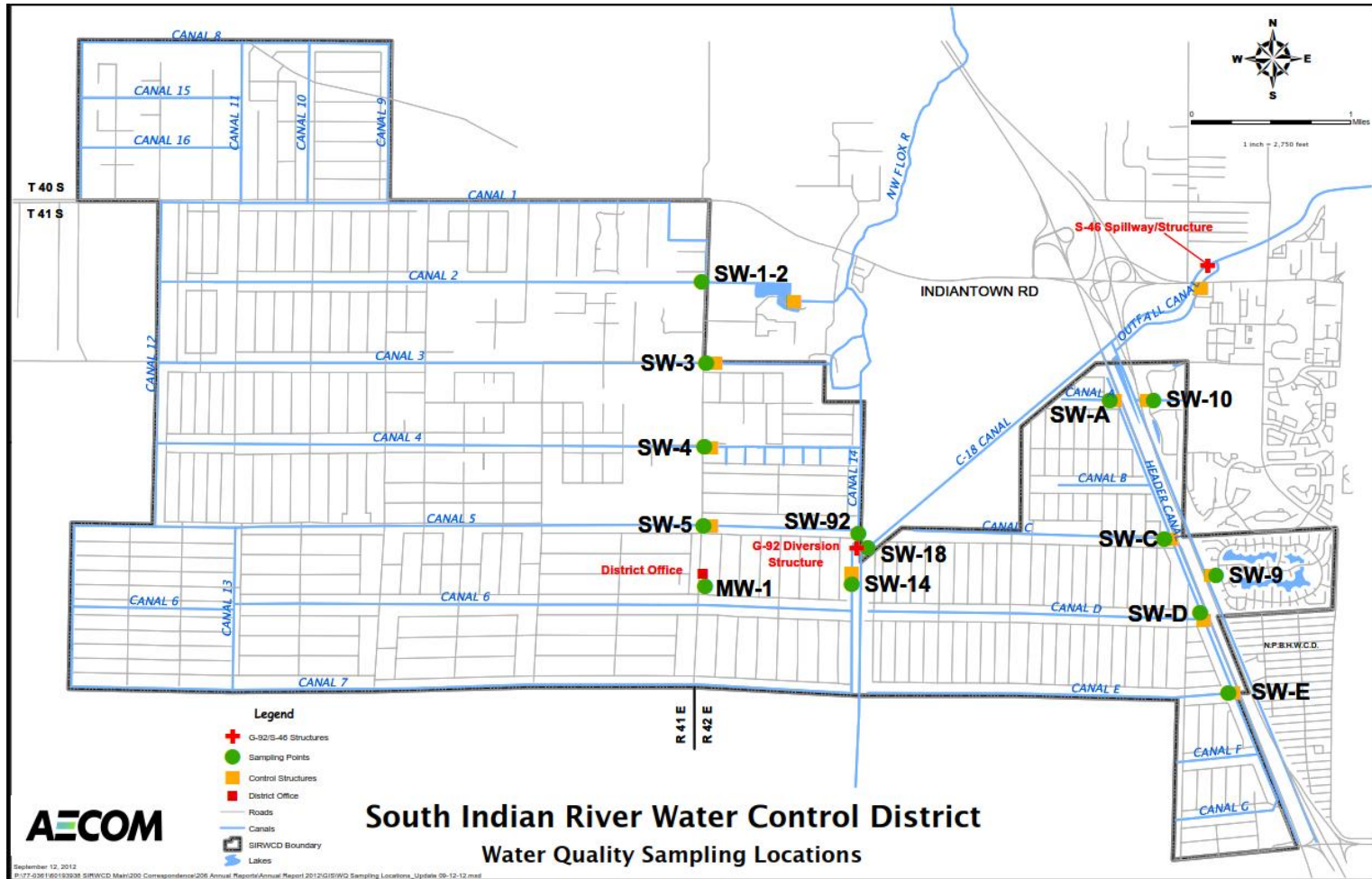


Fecal Coliform Bacteria

FC_Score ● GOOD ● POOR



SIRWCD Water Quality Monitoring



SIRWCD Water Quality Monitoring

Alkalinity
Arsenic
Cadmium
Chlorophyll-a (corrected)
Copper
Color
Dissolved Oxygen
Fecal Coliform
Lead
Nitrogen, Ammonia
Nitrogen, Nitrate-Nitrite
Nitrogen, Total Kjeldahl
pH
Phosphorus, Orthophosphate
Phosphorus, Total
Salinity
Specific Conductivity
Temperature
Total Hardness (as CaCO ₃)
Total Suspended Solids
Turbidity
Zinc

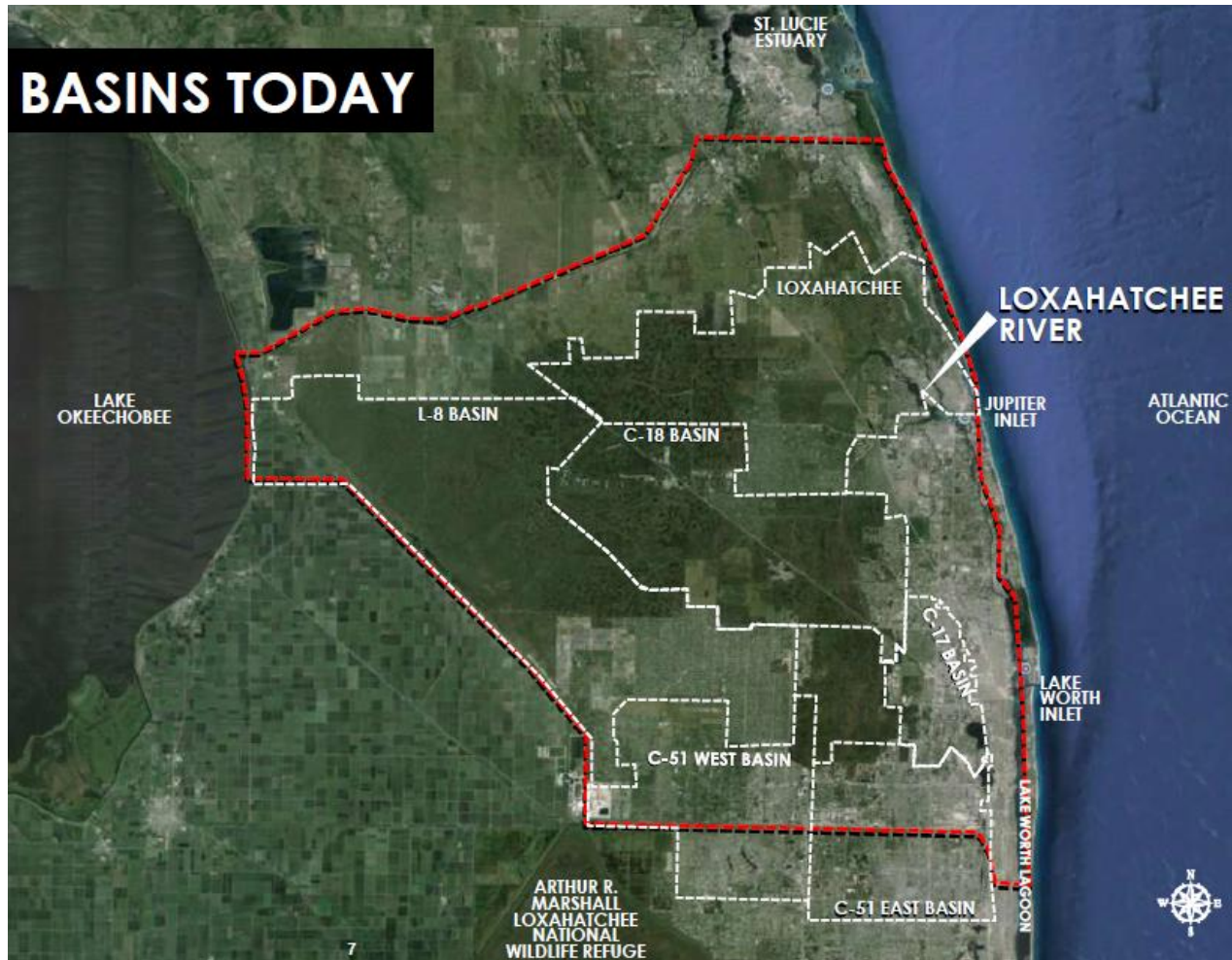
Potential SIRWCD Issues

- Preclusion of a Mixing Zone – Florida Law currently precludes use of a mixing zone if the receiving water body is impaired (End-of-pipe compliance)
- Downstream Protection Standard may require discharges to meet the marine/brackish limits instead of the freshwater/flowing water limits (Effectively reclassifies water bodies)
- Adequacy of the Compliance Period is critical for long-term success and cost control
 - Planning for implementation
 - Undertaking management practices (if required)
 - Purchasing nutrient credits (if necessary)
- Coordination with Fellow Stakeholders
 - Shared agendas and action items
 - Shared water quality treatment facilities (if viable)
 - Strength in numbers

SIRWCD Path Forward in Water Quality

- Continue to monitor water quality data
- Continue to monitor regulations
- Continue to participate in the RAP process
- Develop projects that help with both flood control and water quality
 - Increase roadside ditch widths to gain more storage
 - Installing sumps at the outfall pipes so that water can be detained longer
 - Remove vegetation within the canals and outfall ditches
 - Investigate in projects that may help outside the District limits
 - Investigate where is our current system longer detention times can be achieved without impacting flood control
 - Investigate new technologies – Stormceptors/BAM (Biosorption Activated Media)
 - Buy vacant lots close to canals

Loxahatchee River Watershed Restoration Project



Item 4: Adjourn

Motion to Adjourn?

