



# Perspectives on Water Quality in the St. Lucie Estuary Watershed

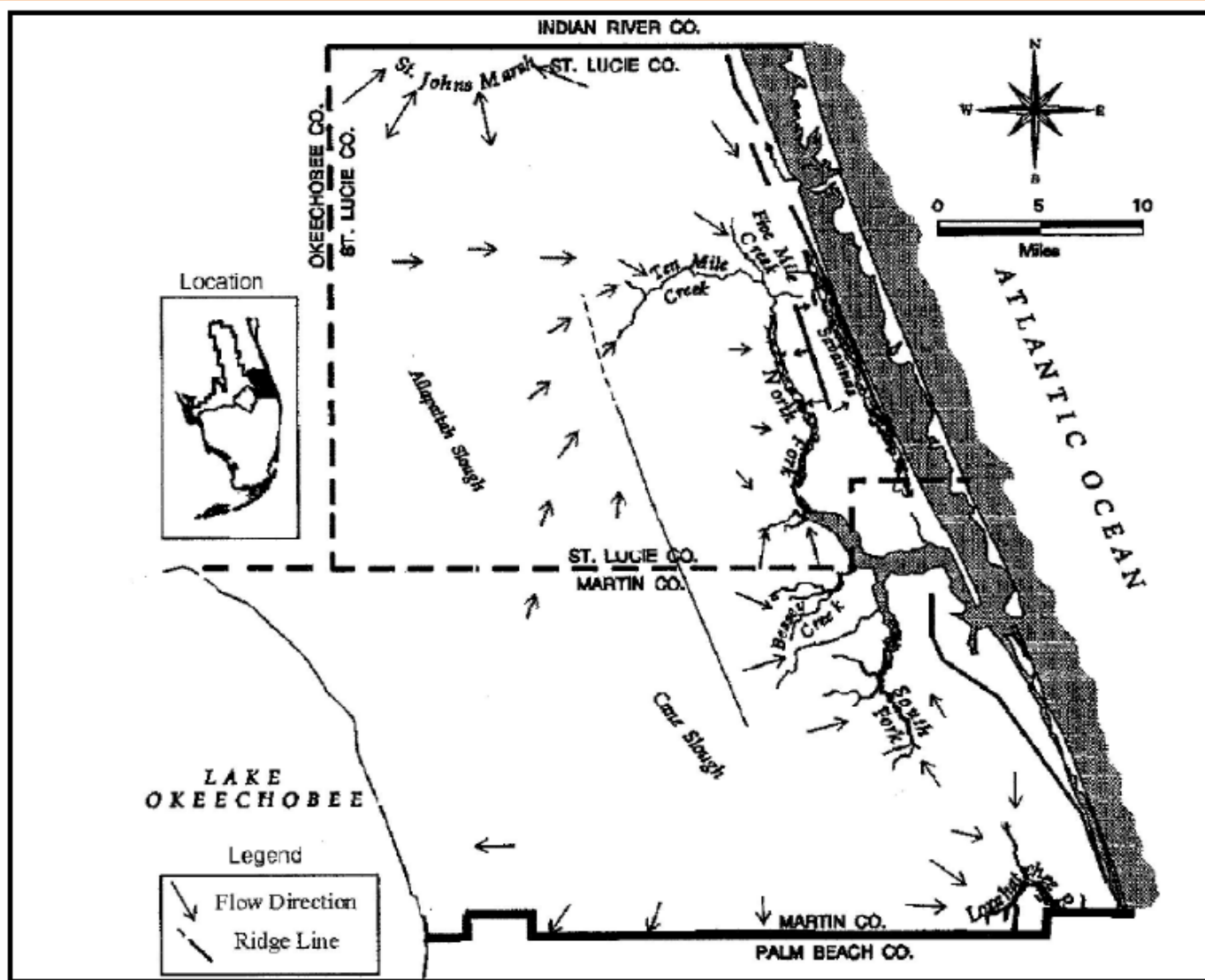
August 17, 2017  
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# Discussion Points

- The St. Lucie Estuary is impacted by water pollution from several sources, including Lake Okeechobee discharges, agricultural stormwater, urban runoff, and others, including poorly operating septic tanks
- Activities are underway by agencies and landowners to reduce nutrient pollution to the estuary
  - *However, State agencies are publishing misleading “progress reports”*
- The State of Florida in general, and coastal communities specifically, suffers significant economic, public health and environmental damages resulting from harmful Lake Okeechobee discharges to the estuaries
  - The single most important project that can be implemented to reduce damaging discharges to the estuaries and restore flow to the Everglades is completion of the EAA Storage Reservoir, which has been an integral component of Everglades restoration for more than 20 years.

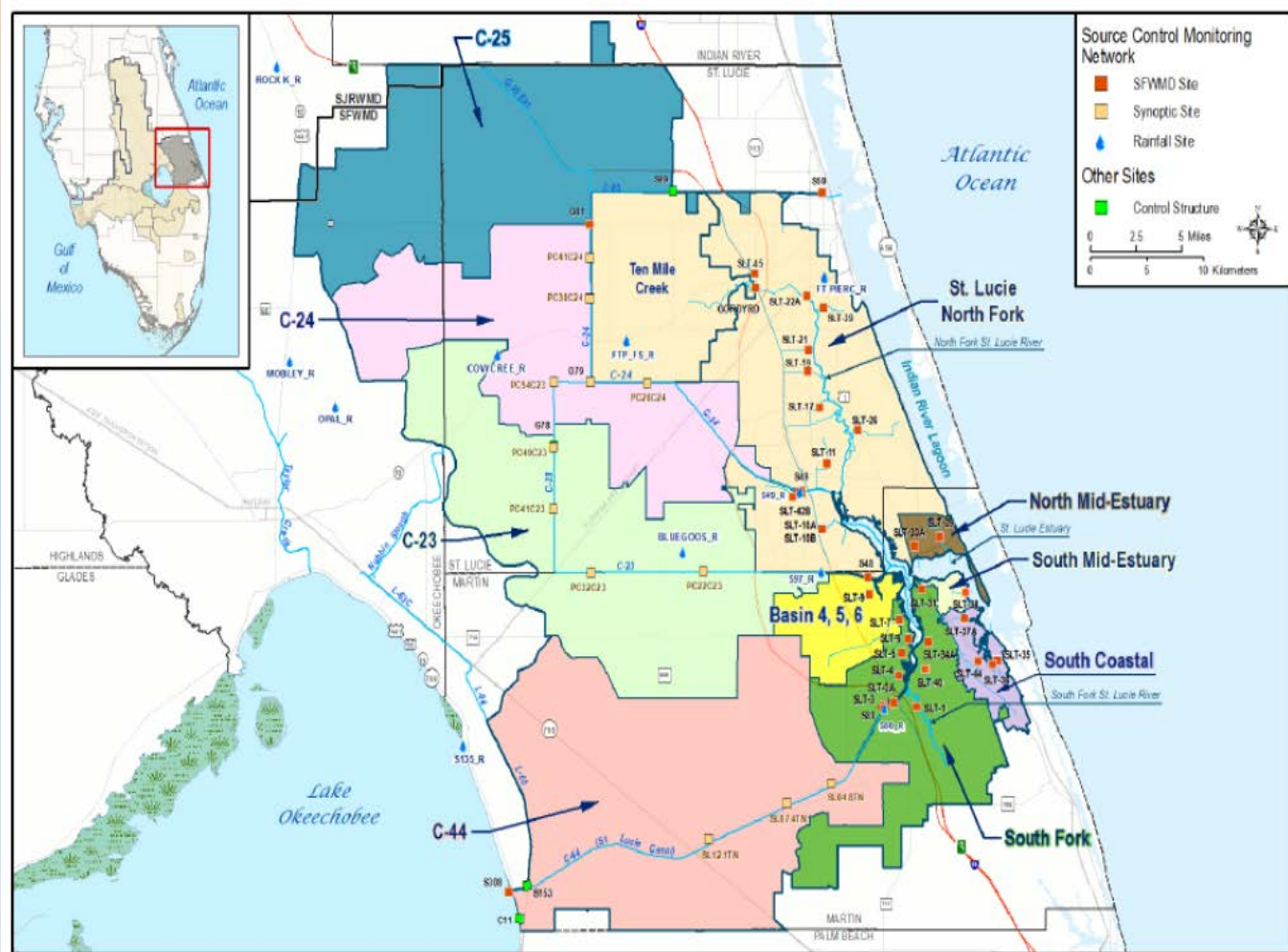
# Historical Watershed

less than 400 square miles



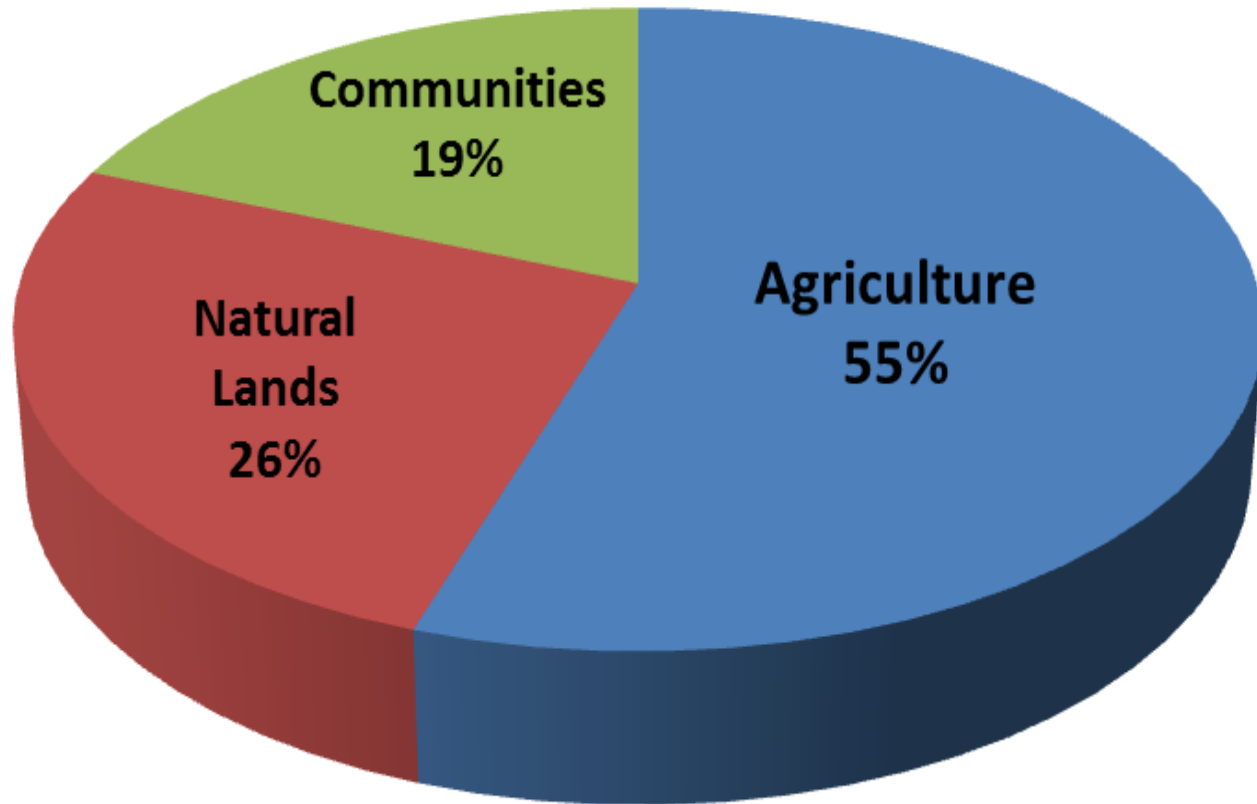
From SFWMD 2002

# Watershed has More Than Doubled with Construction of Major Agricultural Canals



# Land Use in Watershed

Agriculture is the dominant land use; Communities comprise less than 20%



Reference: FDEP 2014, SFWMD 2016

# Where Does the Pollution Come From?

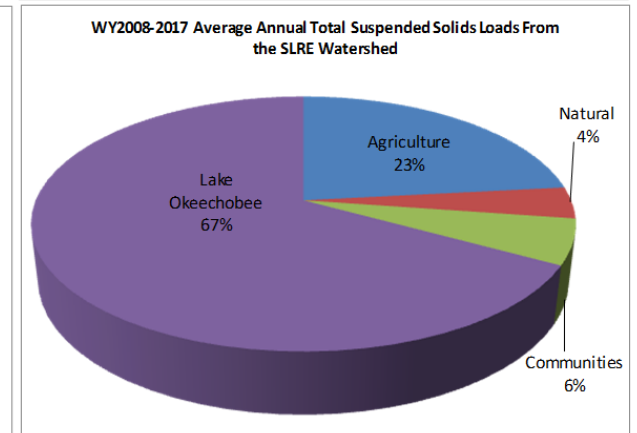
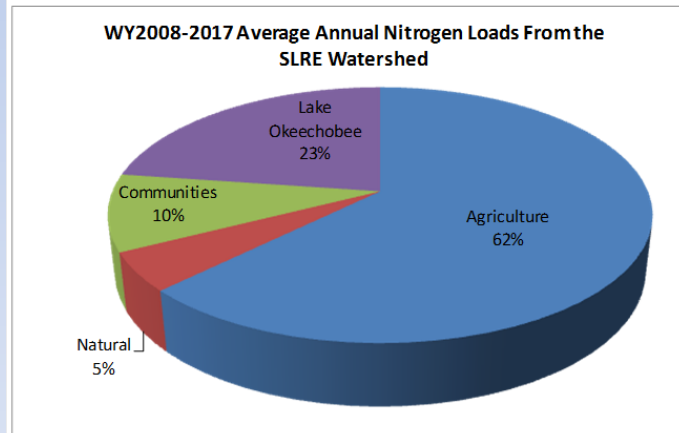
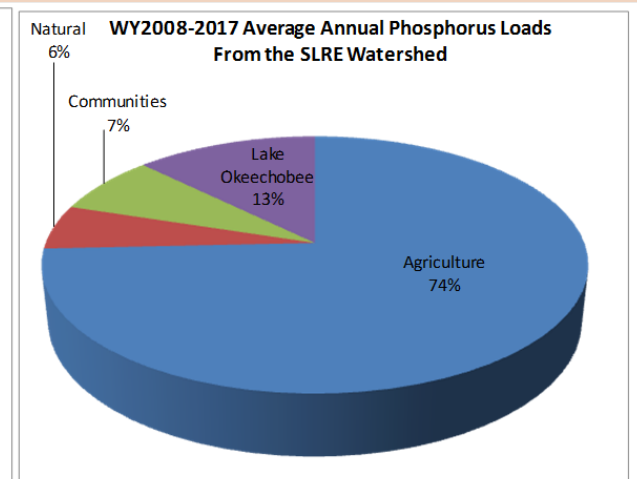
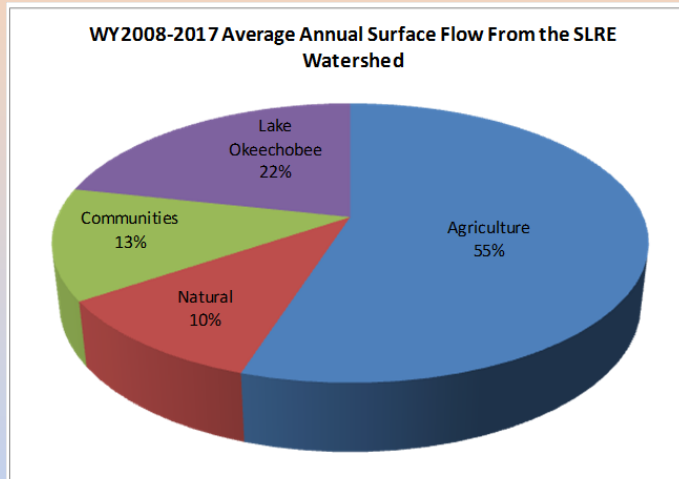
Flow – On average, about 20% from Lake; almost 80% from “local watershed” – but of that, majority is ag land use, only about 13% of local watershed flow is from communities

2016 Toxic algae – Lake Okeechobee

Phosphorus - Ag contribution is more than 10 times contribution from communities

Nitrogen – estimated loads from agriculture is more than 6 times the loading from communities

Sediment – Lake discharge is overwhelmingly the primary contributor



# Economic and Ecologic Impacts of Lake Discharges

## Economic impacts

- 27,000 jobs and \$840 million per year in water-related businesses around the St. Lucie Estuary
- Florida Realtors 2015 report: loss of property values associated with large Lake discharge events
  - \$428 million around St. Lucie Estuary

## Ecologic impacts

- Estuaries:
  - loss of oysters, seagrass, habitat and associated impacts in food chain (fish, turtles, etc.)
  - deposition of muck, high nutrients and toxic algae
- Everglades, Gulf of Mexico and Florida Bay: loss of flow and associated impacts

## 1980-2017 average annual discharges to St. Lucie Estuary

- 75 billion gallons of harmful Lake discharges
  - dramatic decrease in salinity
  - could satisfy water supply demand for 1.3 million people
  - about \$260 million/yr to replace this wasted water
- 1.1 million pounds nitrogen (450,000 bags of fertilizer – 1,250 per day)
- 100,000 pounds phosphorus
- 21 million pounds suspended sediment
- Toxic algae? – nobody documents this ...

## 2016 – about 3 times average annual flows and pollution

- Martin/St. Lucie septic tanks estimated to contribute ~5% of nutrient loading

# 2016 – Toxic Algae Blooms in St. Lucie and Caloosahatchee Estuaries from Lake Okeechobee



**Toxic Algae Blooms** - Only occur during years with high Lake discharges to St. Lucie Estuary

- Causes acute human health problems – respiratory and skin – over 100 cases documented in Martin County in 2016
- Linked to chronic public health problems – Alzheimer's, Parkinson's and ALS
- Cattle and pet deaths



# Unprecedented public and media response

“Store it - Clean it - Move it south!”



# Pollution Reduction Measures

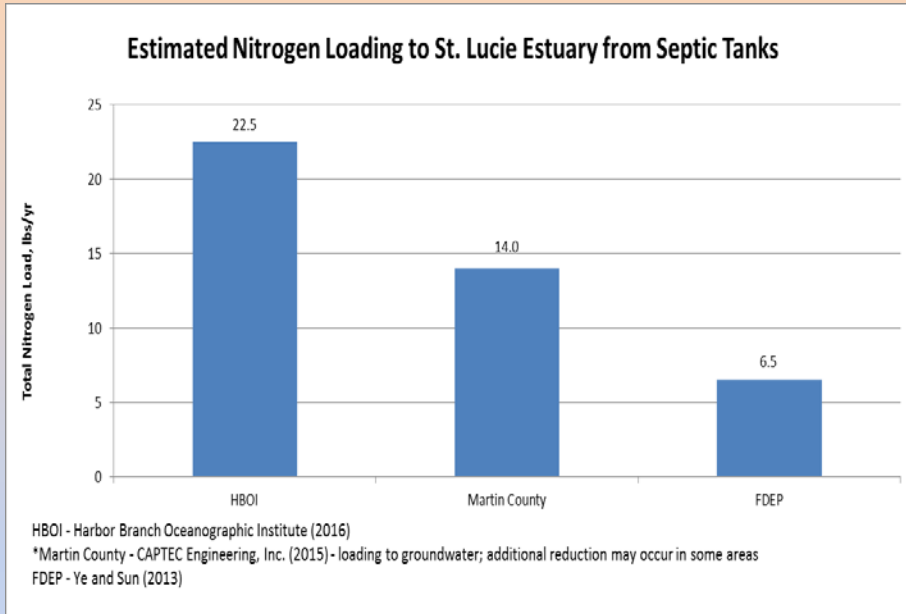
- Reduce Lake discharges – additional storage and treatment
  - east (C-44 Reservoir/STA), north, west and south
  - SB10: use existing State-owned land to complete EAA Reservoir –
    - The Unfinished 60-yr Old Project
    - 80 billion gallons now; evaluate additional 40 billion
- Agricultural runoff – best management practices
- Urban runoff – city and county projects
  - Stormwater treatment areas, fertilizer ordinances, etc.
  - Convert septic tanks to centralized sewers
    - City of Stuart – very effective voluntary program
    - Martin County - doesn't get enough credit for aggressive septic-to-sewer program –achieved its nitrogen load reduction goals
    - Martin County moving towards mandatory hookups
      - Exceeding \$300 million in capital and 20-yr operational costs
      - Going too far? Other more cost effective projects
  - Many other projects

# Are All Septic Tanks Evil?

- Absolutely not!
- Septic tanks/drainfields have been effectively used for many years
- They have proven to be a reliable and cost-effective alternative to central sewer collection systems when properly designed, installed and maintained
  - Periodic inspection and pump-out is responsibility of owner
- Distance to water, soil types, depth to groundwater, flooding affect performance
- However, poorly operating septic tanks/drainfields can impact the water quality of the Estuary and IRL – **and need to be addressed.**
- Site-specific studies can collect necessary data and identify problem areas:
- **Martin County and FDEP recently sampled 14 “hot spots” in the South Fork of the St. Lucie River in 2014 and 2015. Eleven of the sites did not exhibit the presence of a human biological marker during the wet season sampling, and nine did not indicate the presence during the dry season.**

In some areas, other water quality programs may be more cost-effective than requiring homeowners to convert a well-performing septic tank to centralized sewer, e.g., stormwater treatment area

# Uncertainty Surrounding Septic Loading Estimates



- During 2016, septic tank loading estimated at less than 5%
- Perform water quality sampling to determine if problem areas exist – e.g., Martin County/FDEP
- Unlikely that one septic tank management strategy fits all
- ***Additional scientific data are likely needed to support multi-million dollar investment.***

Septic tanks do not contribute toxic blue-green algae or sediment – two of the most pressing pollution problems facing the Estuary and Lagoon

# State Agencies Mislead Public on Pollution Control

- FDEP/SFWMD publish annual progress reports suggesting pollution reductions are meeting targets
  - Ignored available monitoring data showing otherwise
- Data show poor water quality; C-44 Canal Basin continues to deteriorate

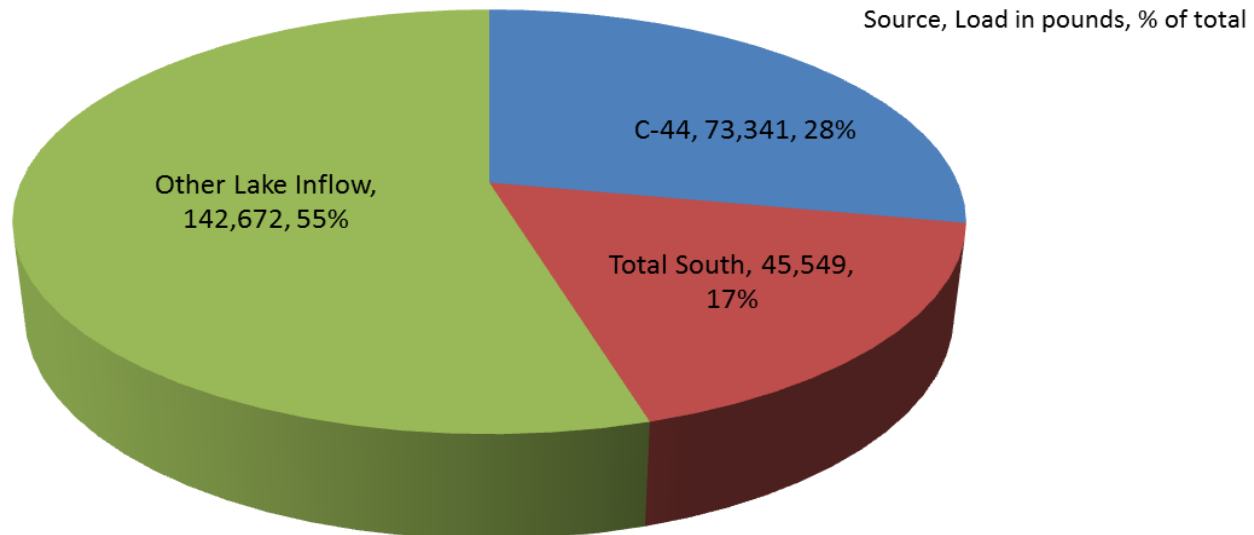
Source Basin	Total Phosphorus		Total Nitrogen	
	WY2017 Status	10-yr Trend	WY2017 Status	10-yr Trend
C-23 Canal	Poor	Improving	Fair	Improving
C-24 Canal	Poor	Improving	Fair	Improving
<i>C-44 Canal</i>	<i>Poor</i>	<i>Worsening</i>	<i>Poor</i>	<i>Worsening</i>
Ten Mile Creek	Poor	Improving	Poor	Improving
Tidal Basins	Fair	Improving	Fair	Improving
Lake Okeechobee	Poor	Improving	Poor	Improving
<b>Total Inflow</b>	<b>Poor</b>	<b>Improving</b>	<b>Poor</b>	<b>Improving</b>

Note the highly urbanized Tidal Basins have the best water quality – despite tens of thousands of septic tanks!

# 2017 Algae Blooms on Lake

- Some media suggest Martin County discharges are to blame
  - C-44 Canal is discharging polluted water to lake; one of many contributors
- **Pollution of Lake will continue until State implements and enforces an effective water quality regulatory program**
- Fortunately Lake level is currently much lower than last year with reduced risk of harmful discharges

Surface Phosphorus Inflows to Lake Okeechobee: Jan. - July 2017



"Total South" includes S-2, S-3, S-4, Industrial Canal, WPB Canal and L-8 Canal; some loads estimated from 5-yr average concentrations (2017 SFER); Provisional data subject to revision

# Take Home Messages

- The St. Lucie Estuary is impacted by water pollution from Lake Okeechobee discharges, agricultural stormwater, urban runoff, and other sources, including poorly operating septic tanks
- Activities are underway by agencies and landowners to reduce nutrient pollution loading to the estuary
  - Pollution reduction progress is not as positive as State reports
  - **Pollution will continue until State implements and enforces an effective water quality regulatory program**
- The State of Florida in general, and coastal communities specifically, suffers significant economic, public health and environmental damages resulting from harmful Lake Okeechobee discharges to the estuaries.
  - The single most important project to reduce damaging discharges to the estuaries and restore flow to the Everglades: **EAA Storage Reservoir**