Perspectives on Septic Tank Loading to the St. Lucie Estuary

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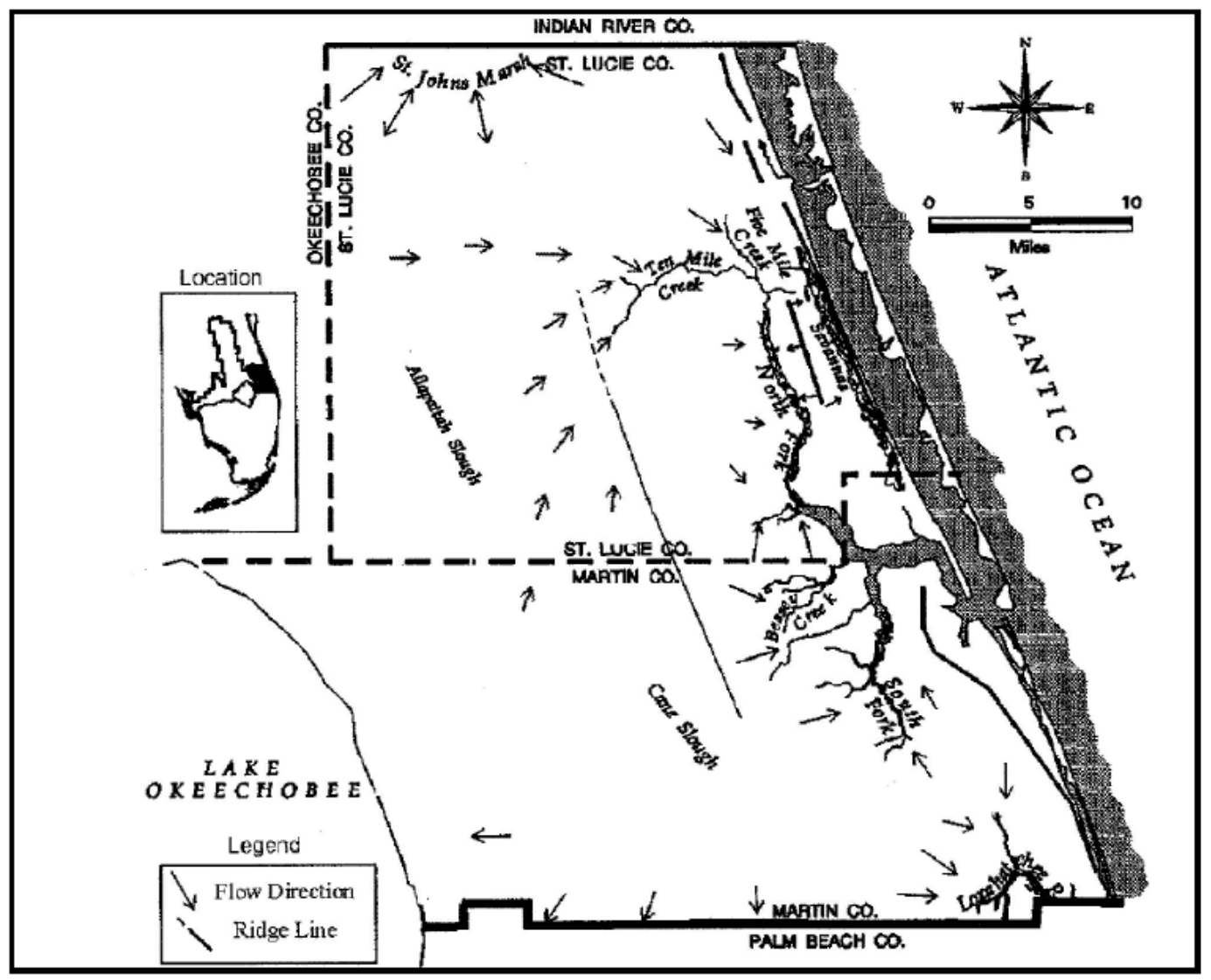
Discussion Points

- The St. Lucie Estuary is impacted by pollution from several sources, including Lake Okeechobee discharges, agricultural stormwater, urban runoff, and others, including poorly operating septic tanks
  - Toxic algae
  - Sediment
  - nutrients

- Activities are underway by agencies and landowners to reduce nutrient pollution loading to the estuary

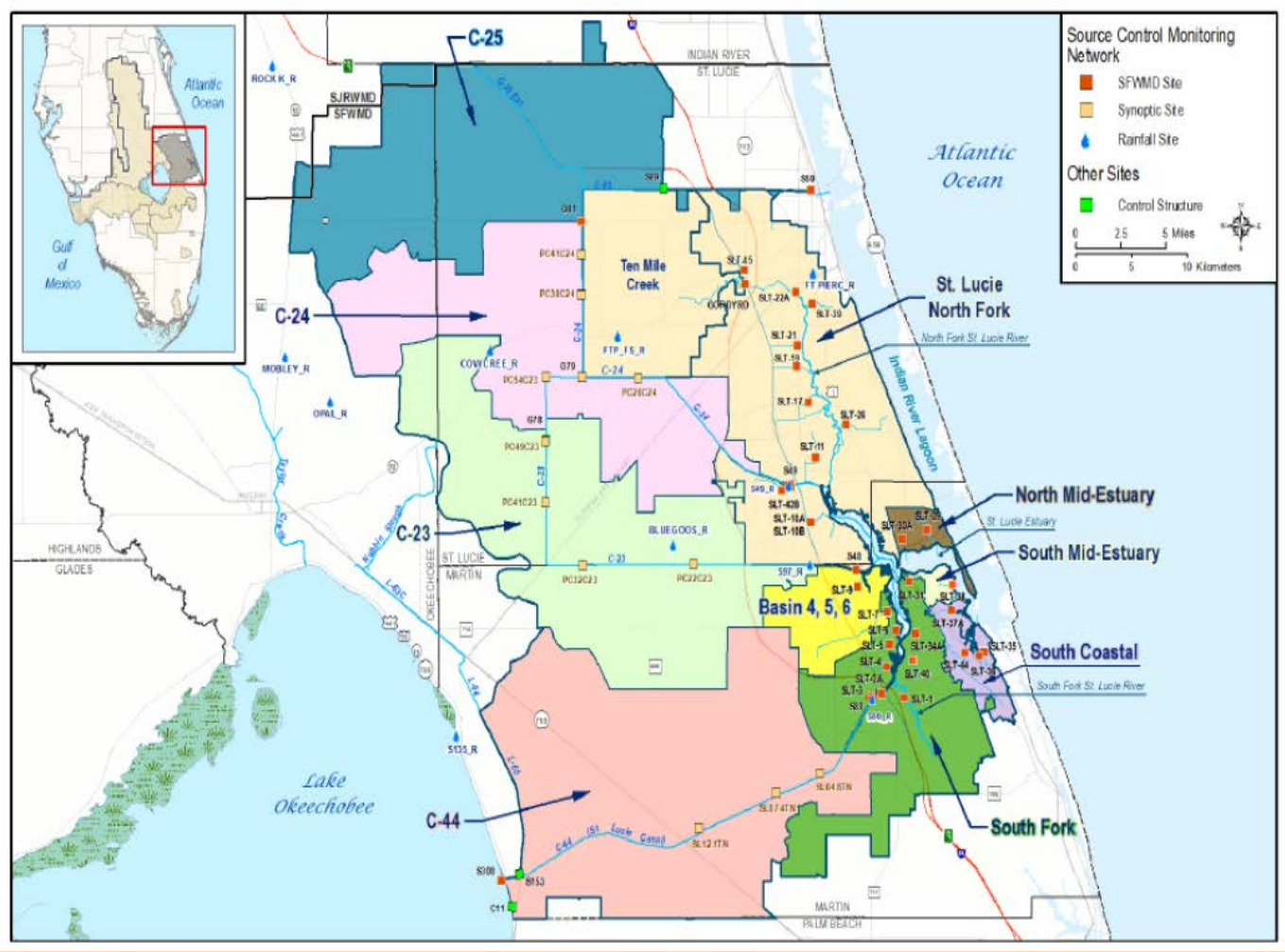
- No “one-size-fits-all” approach to septic tanks

Historical Watershed



From SFWMD 2002

Watershed has More Than Doubled with Construction of Major Agricultural Canals



From SFWMD 2016

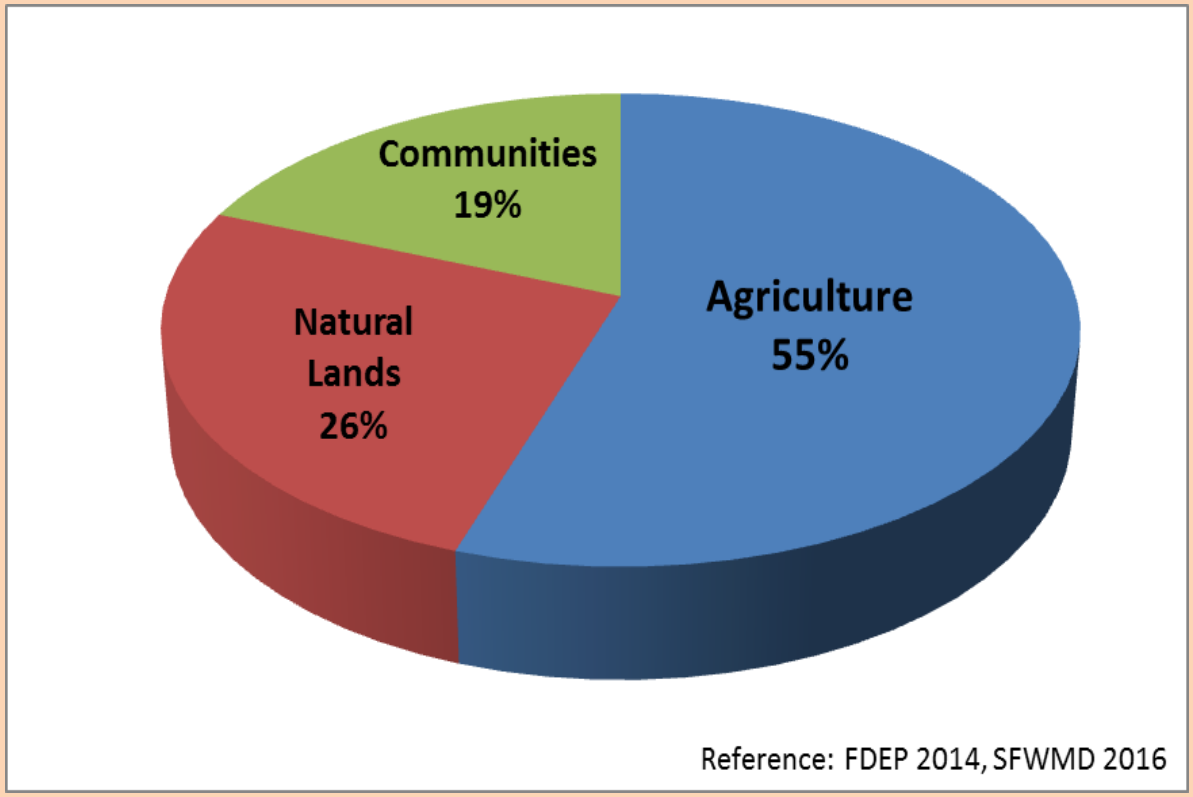
Land Use in Watershed

Agriculture is the dominant land use

Communities comprise less than 20%

Table 1. Characteristics of Basins Contributing to the SLRE (from FDEP 2014, SFWMD 2016)

Basin	Area (acres)	Ag Area (acres)	Ag Area (%)	Natural Area (acres)	Natural Area (%)	Urban & Other (acres)	Urban & Other (%)
C-23 Canal Basin	112,160	84,744	76%	23,706	21%	3,710	3%
C-24 Canal Basin	83,373	67,516	81%	15,701	19%	156	0%
C-44 Canal Basin	132,717	78,351	59%	37,163	28%	17,203	13%
Ten Mile Creek	39,726	32,491	82%	0	0%	7,235	18%
Tidal Basins, composed of the following:	157,840	26,533	17%	59,945	38%	71,362	45%
North Fork, excl. Ten Mile Cr.	*92,138*	*3,968*	*4%*	*33,129*	*36%*	*55,041*	*60%*
South Fork	*50,121*	*20,120*	*40%*	*18,987*	*38%*	*11,014*	*22%*
Basin 4-5-6	*15,581*	*2,445*	*16%*	*7,830*	*50%*	*5,306*	*34%*
Total SLRE Watershed	**525,816**	**289,635**	**55%**	**136,516**	**26%**	**99,665**	**19%**



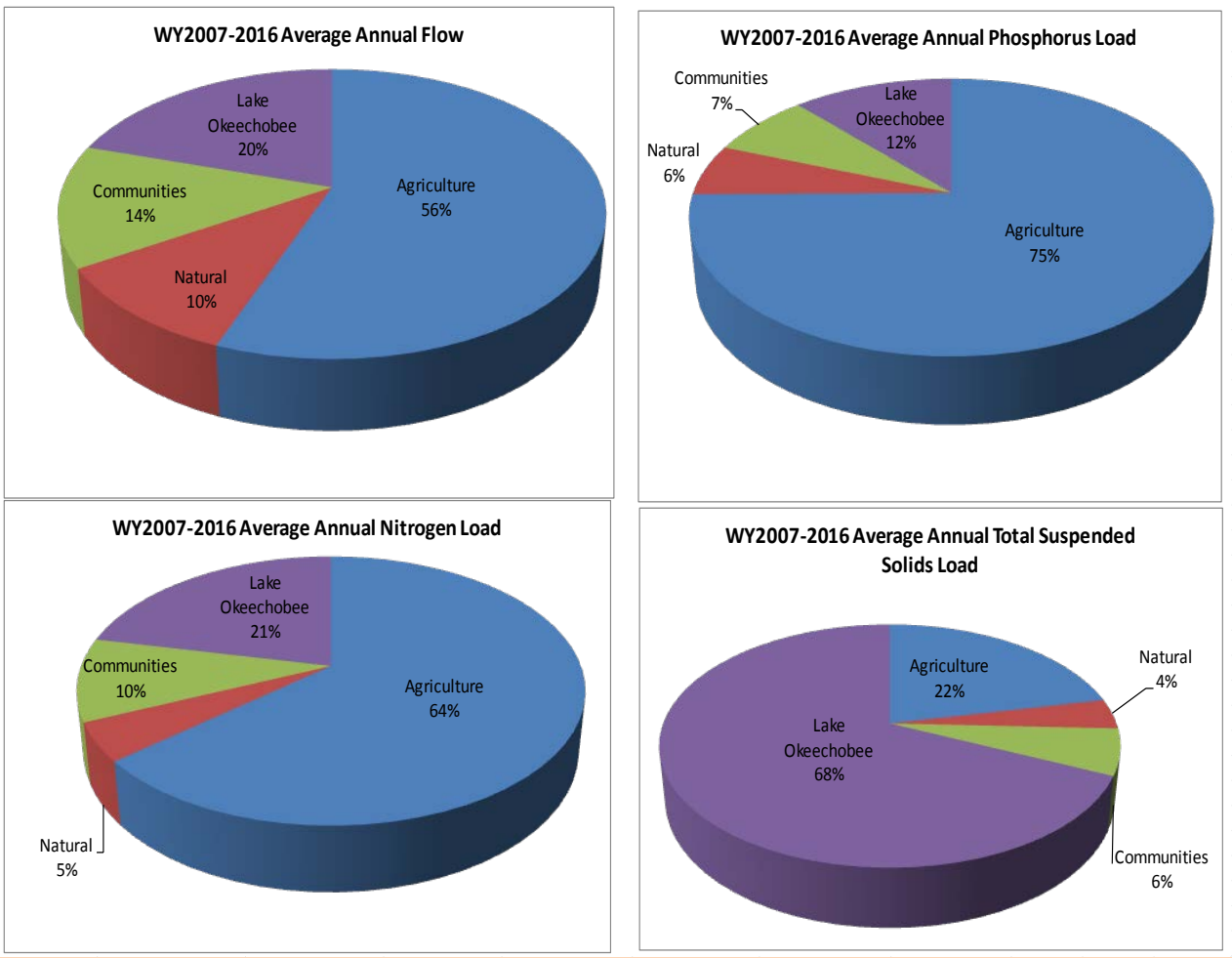
Contribution of Inflows by Land Use

Flow – 80% from "local watershed" – but of that, majority is agricultural land use, only about 14% of local watershed flow is from communities

Phosphorus - "local" 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



Estimated contribution by land use based on FDEP method (2013)

Revised

Load Reduction Measures

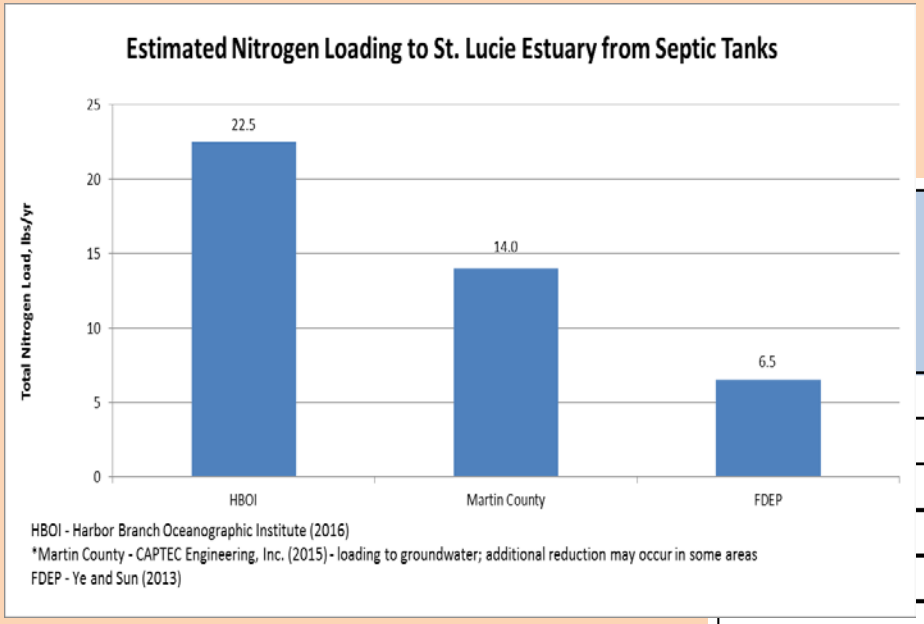
- Lake discharges – additional storage and treatment – south, east (C-44 RSTA), north and west
- Ag runoff – best management practices
- Urban runoff – city and county projects
  - Stormwater treatment areas, fertilizer ordinances, etc.
  - Convert septic tanks to centralized sewers
    - City of Stuart – very effective voluntary program
    - Martin County - "all septic tanks are evil" program – currently mandatory
      - Approximately ~$16 million to convert Sewall's Point septic tanks to central sewers (utility costs, homeowner costs and State grant)
  - Other projects described in Basin Management Action Plan (FDEP)
  - Martin County has achieved its nitrogen load reduction goals

Are All Septic Tanks Evil?

- Absolutely not!
- Septic tanks and drainfields have been successfully used for many years.
- They have proven to be a reliable and effective alternative to central sewer collection systems when properly designed, installed and maintained.
  - Periodic inspection and pump-out is responsibility of owner
- 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 identify problem areas

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

Uncertainty Surrounding Septic Loading Estimates



During 2016, septic tank loading estimated at less than 5%

Source Basin	1980-2016 Average Annual Total Nitrogen Load, lbs
C-23 Canal Basin	652,009
C-24 Canal Basin	631,237
C-44 Canal Basin	550,528
Ten Mile Creek Basin	291,936
Lake Okeechobee	1,075,469
Tidal Basin (SFWMD 2016)	669,537
Total Nitrogen Load to Estuary	3,870,717
No. of Martin and St. Lucie septic tanks that drain to the estuary (Ye and Sun 2013)	35,439
Estimate of TN load from septic tanks to the estuary (Ye and Sun 2013)	230,936
Estimate of % of total nitrogen load to St. Lucie Estuary from septic tanks	6%

SFWMD 2016. Draft Chapter 8C: St. Lucie and Caloosahatchee River Watershed Research and Water Quality Monitoring Results and Activities, South Florida Environmental Report, September 2016

Ye, Ming and Huaiwei Sun 2013. Estimation of Nitrogen Load from Removed Septic Systems to Surface Water Bodies in the City of Port St. Lucie, the City of Stuart, and Martin County. Prepared for the Florida Department of Environmental Protection. September 2013.

Total nitrogen loads estimated from data obtained from the SFWMD database, DBHYDRO.

Data and calculations are provisional and subject to revision.

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

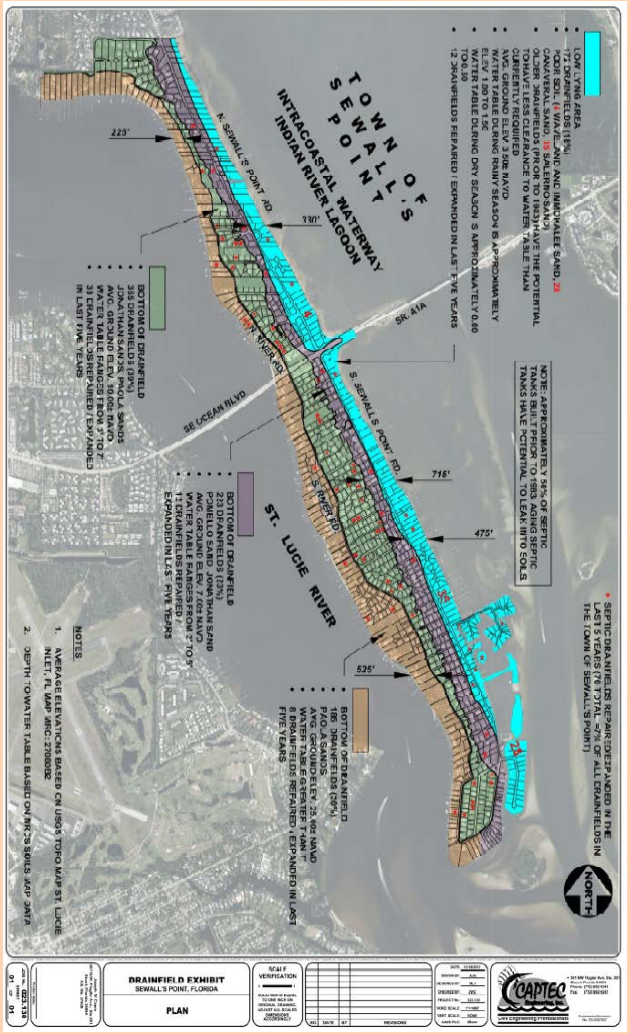
Sewall's Point is Unique

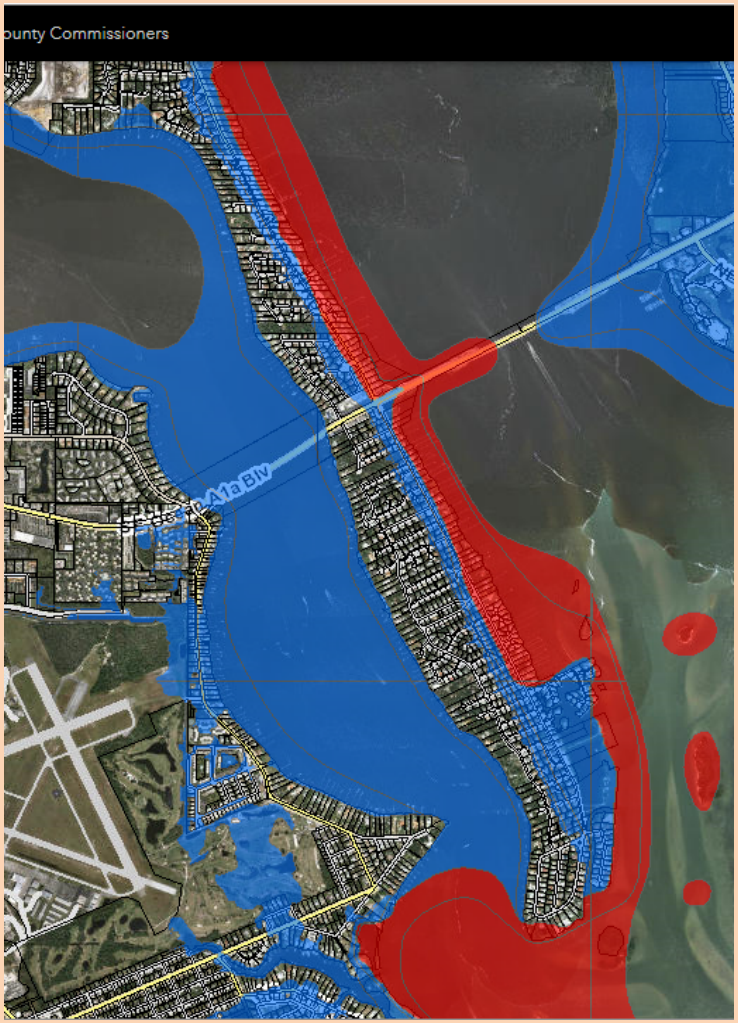
- Very diverse geographic and environmental features
  - Long and narrow
  - Borders the Estuary to west and IRL to east
  - Ground elevations range from 0 – 57 ft above sea level!
- One of the 1st communities on east coast to enact strong fertilizer ordinance

Unlikely that one septic tank management strategy fits all

Areas of potential concern –

- Septic tank drainfield characteristics compared to FEMA flood zone maps

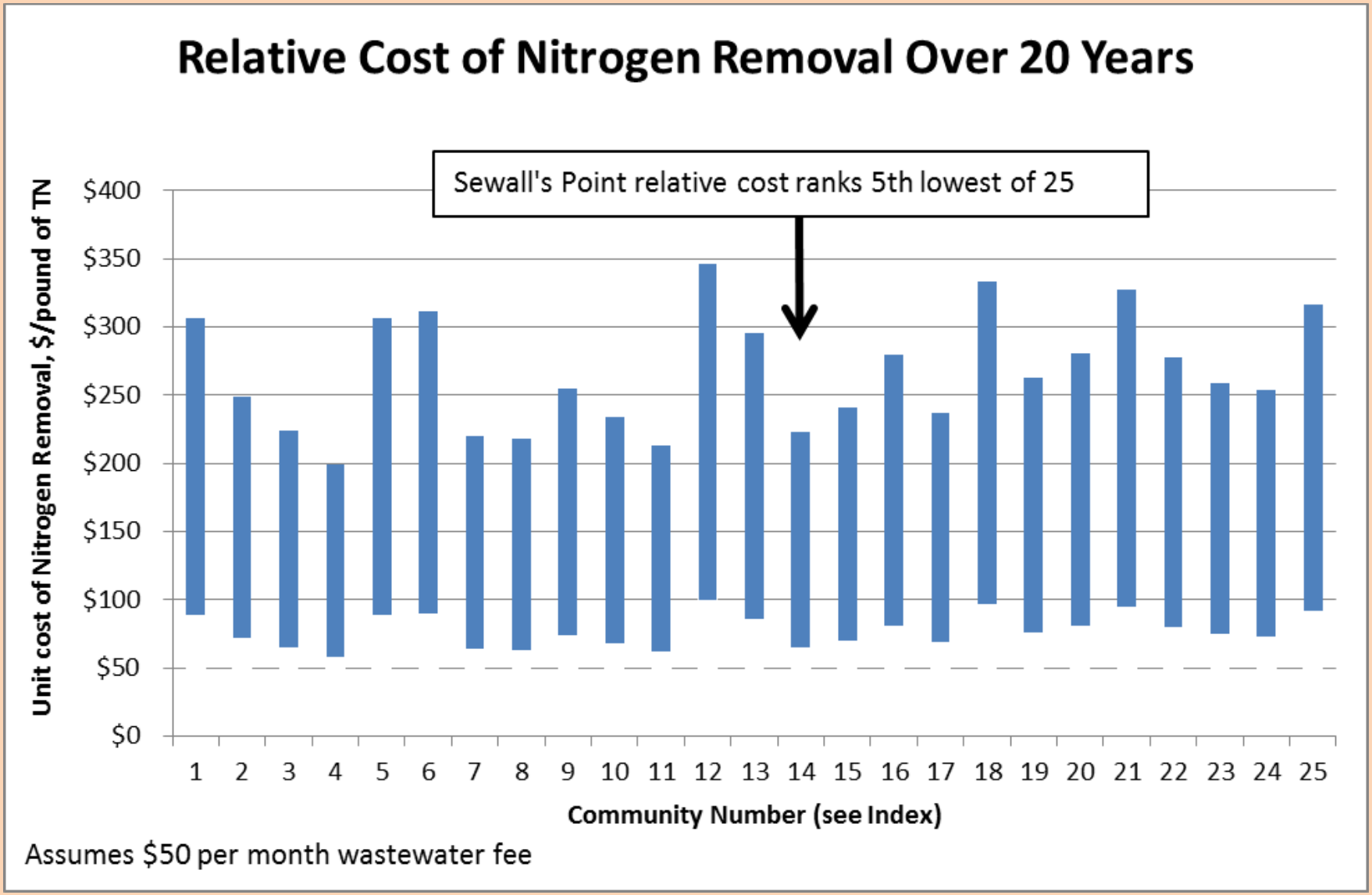




Unlikely that one septic tank management strategy fits all

- Other municipalities have had success:
  - Require periodic inspection and pump-out
  - Provide centralized sewer skeleton
    - voluntary hook-up (e.g., City of Stuart)
    - Hybrid – mandatory hook-up if tank or drainfield fails
  - Perform water quality sampling to determine if problem areas exist – e.g., Martin County/FDEP
  - Comprehensive water quality management program

High scientific uncertainty warrants additional investigation(s)



Estimates are provisional and subject to revision

Summary

- ***The Town of Sewall's Point may need to structure a diverse septic tank management program to match the local conditions.***

- ***Additional scientific data are likely needed to support multi-million dollar investment.***

More information available at www.garygoforth.net