

Can we determine which watershed changes are driving nitrogen trends in Sarasota County?

A Presentation to the Florida Stormwater Association, December 5, 2019

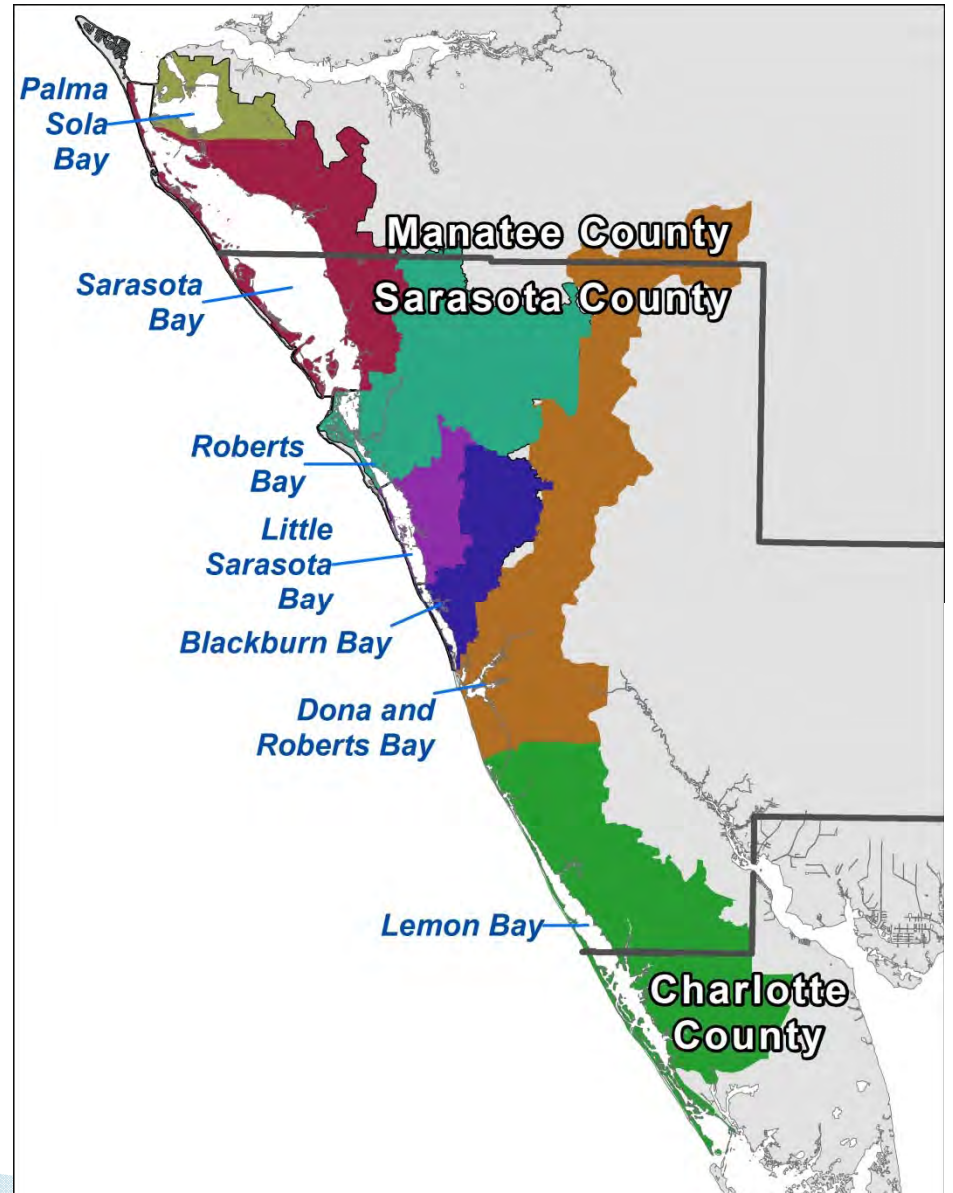
Jon Perry, Mike Wessel, and Tony Janicki



The Sarasota Bay Estuary Program

Between 1980's and 2010:

- Nitrogen pollution was reduced by an estimated 64%
- Seagrasses rebounded by 46% and have recently been above historical acreages
- Water quality achieved state standards and used to set the NNC

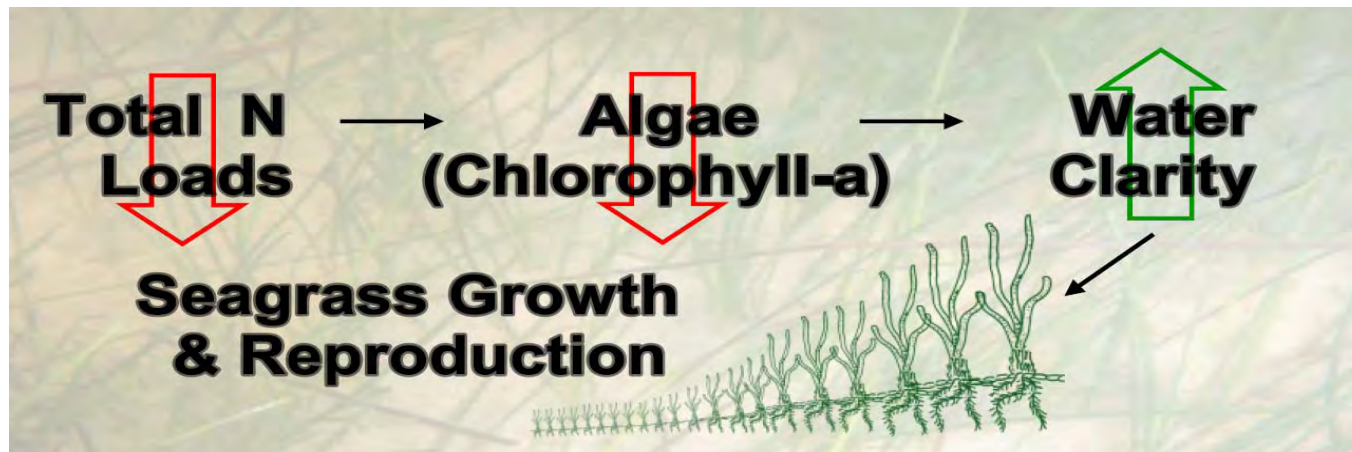


Factors Affecting Improvements

- ▶ Grizzle–Figg Act – required wastewater discharges to SW Florida estuaries be treated to Advanced Wastewater Treatment (AWT) standards
- ▶ Improved stormwater treatment
- ▶ Septic to Sewer conversions in priority watersheds
- ▶ Eliminating small package plants and surface water discharges
- ▶ Increasing production for reclaimed water supply

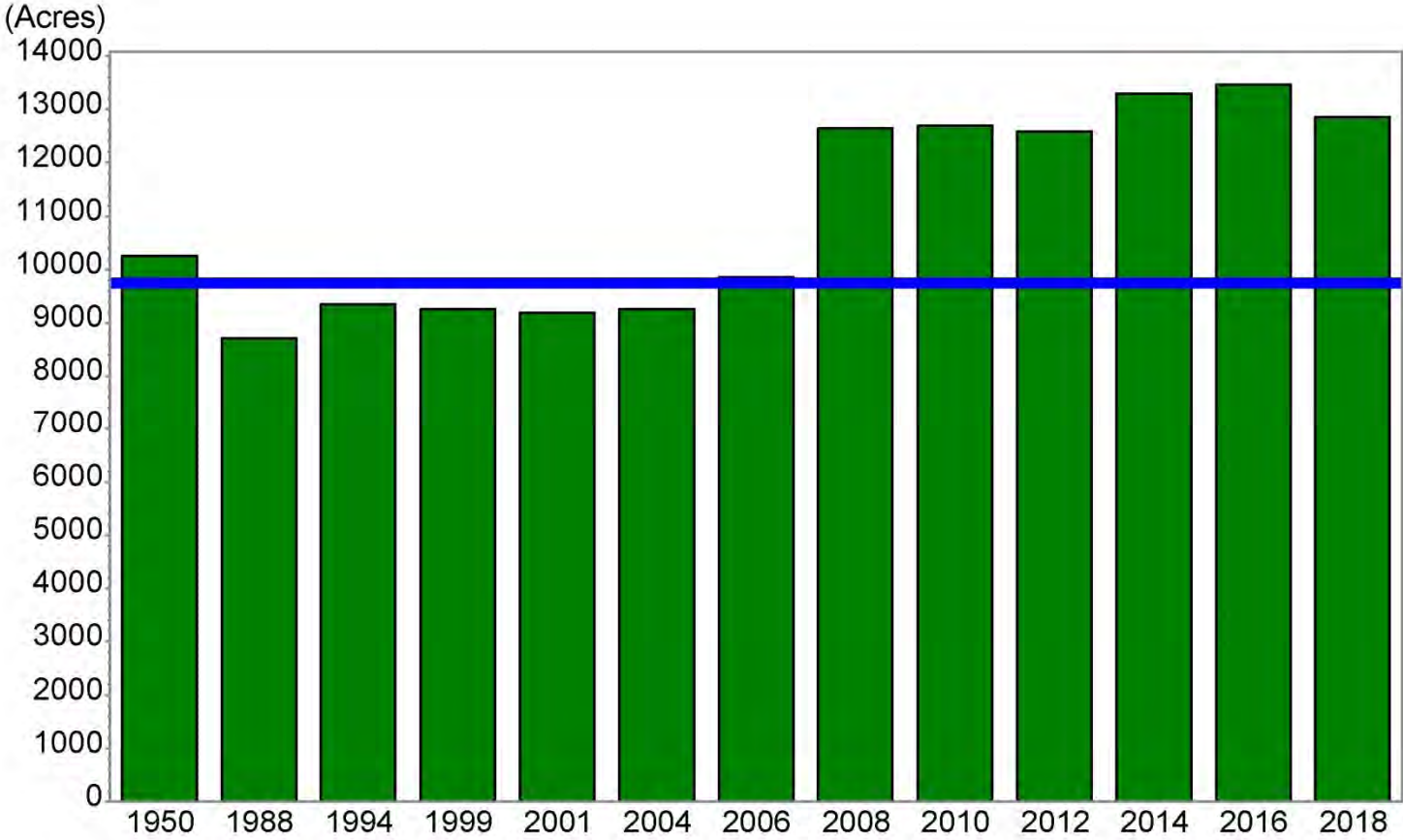
Relevance to Water Quality Standards

- ▶ Numeric Nutrient Criteria



- ▶ Based on a reference period when seagrasses (key ecological indicator) were stable

Seagrass – The Keystone Indicator



Target for Sarasota Bay Estuary Program = 9,739 acres

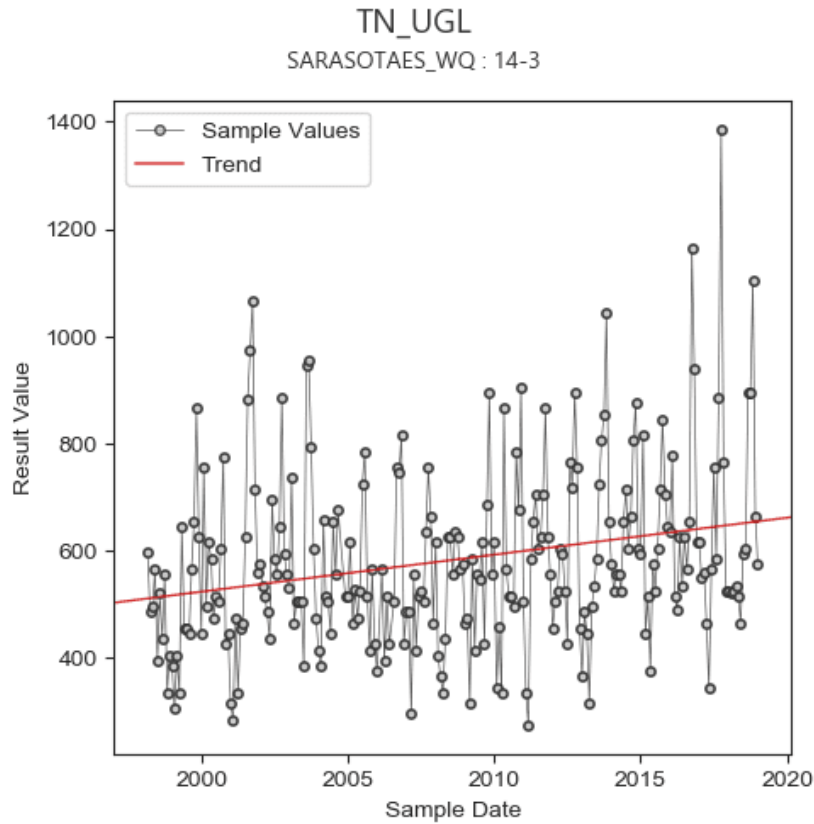


However:

- ▶ Trends in nitrogen concentrations have recently been increasing in Sarasota County
- ▶ Water quality standards for chlorophyll are now being exceeded in most segments
- ▶ Coincident episodes of harmful algal blooms have heightened concerns regarding nutrient pollution and its effects on estuarine health

Timeseries Trends in TN

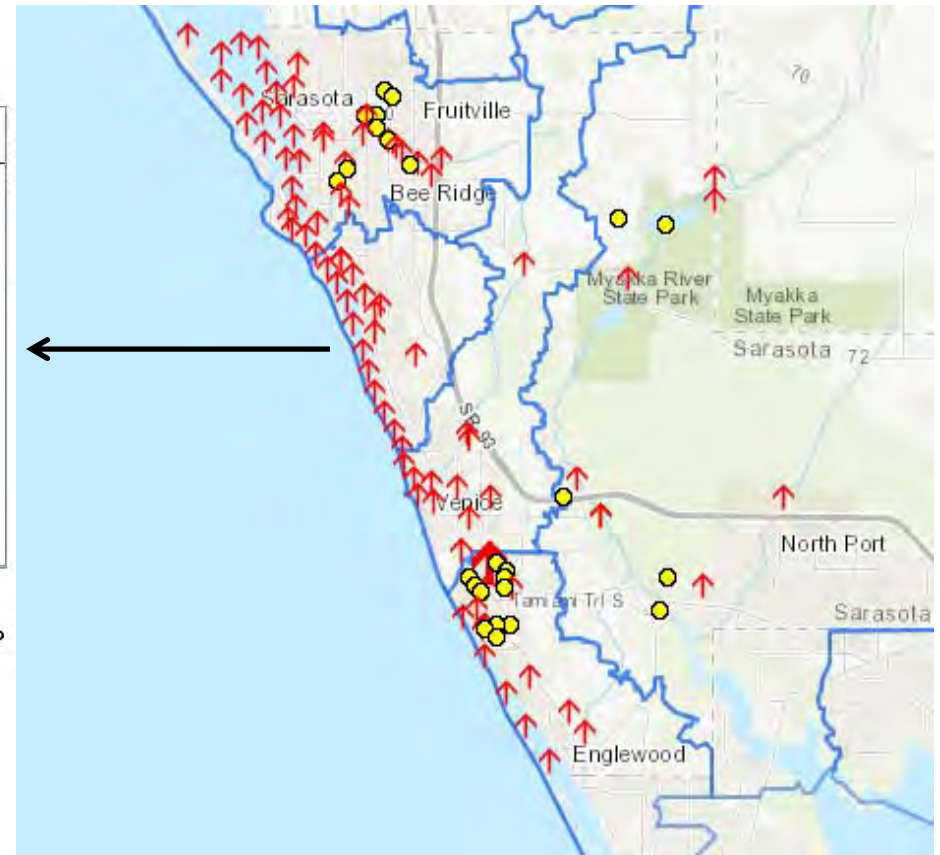
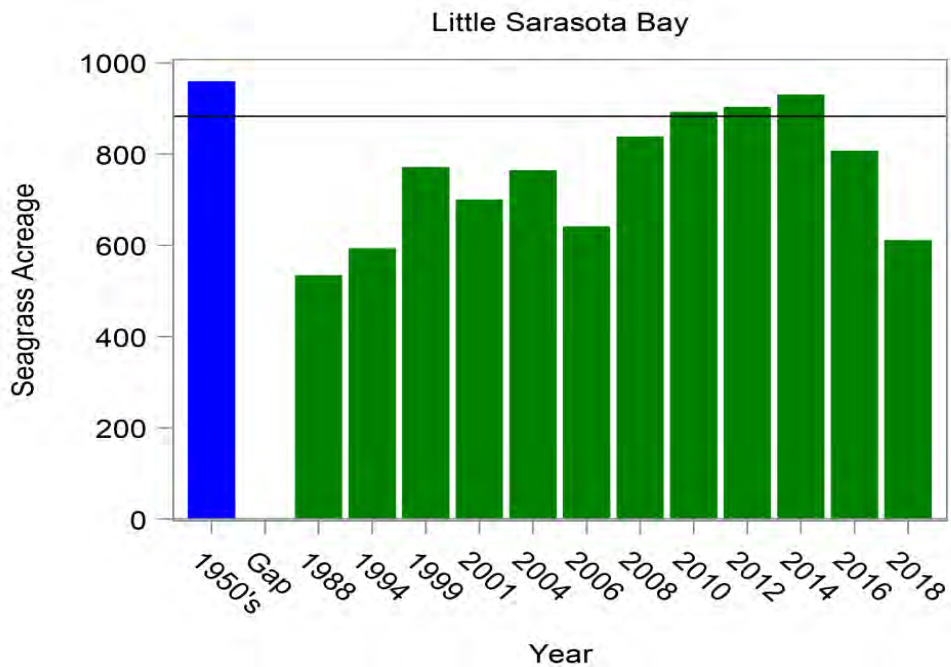
1998-2018



<http://www.sarasota.wateratlas.usf.edu>

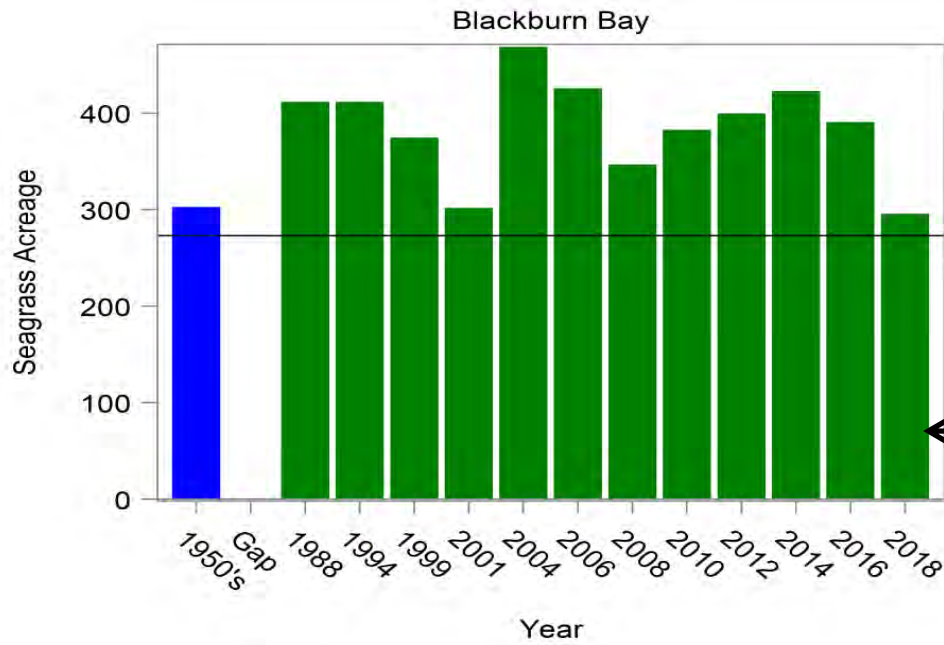
Little Sarasota Bay

2008-2017



Blackburn Bay

2008-2017



FDEP Assessment

Segment	WBID	Chlorophyll <i>a</i>	TN	TP
Sarasota Bay	1968C	Impaired	Not Impaired	Not Impaired
Roberts Bay	1968D	Impaired	Not Impaired	Not Impaired
Little Sarasota Bay	1968E	Impaired	Not Impaired	Not Impaired
Blackburn Bay	1968F	Impaired	Impaired	Not Impaired

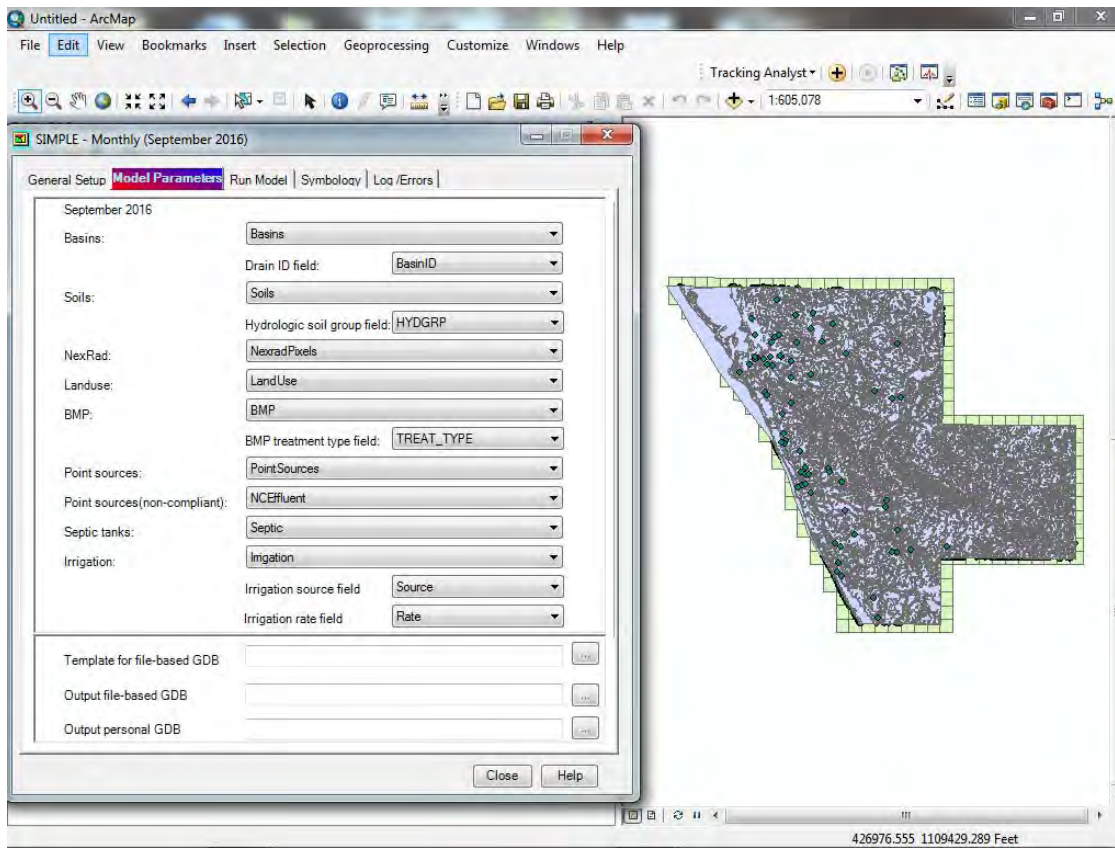
FDEP Evaluation Due in 2020

What's with these TN trends?

- ▶ **Lots of Ideas**
 - Laboratory results systematically biased?
 - Rainfall / Atmospheric deposition changing?
 - Groundwater concentrations increasing?
 - Background conditions increasing?
 - Has increased volume of reuse affected nitrogen trends?

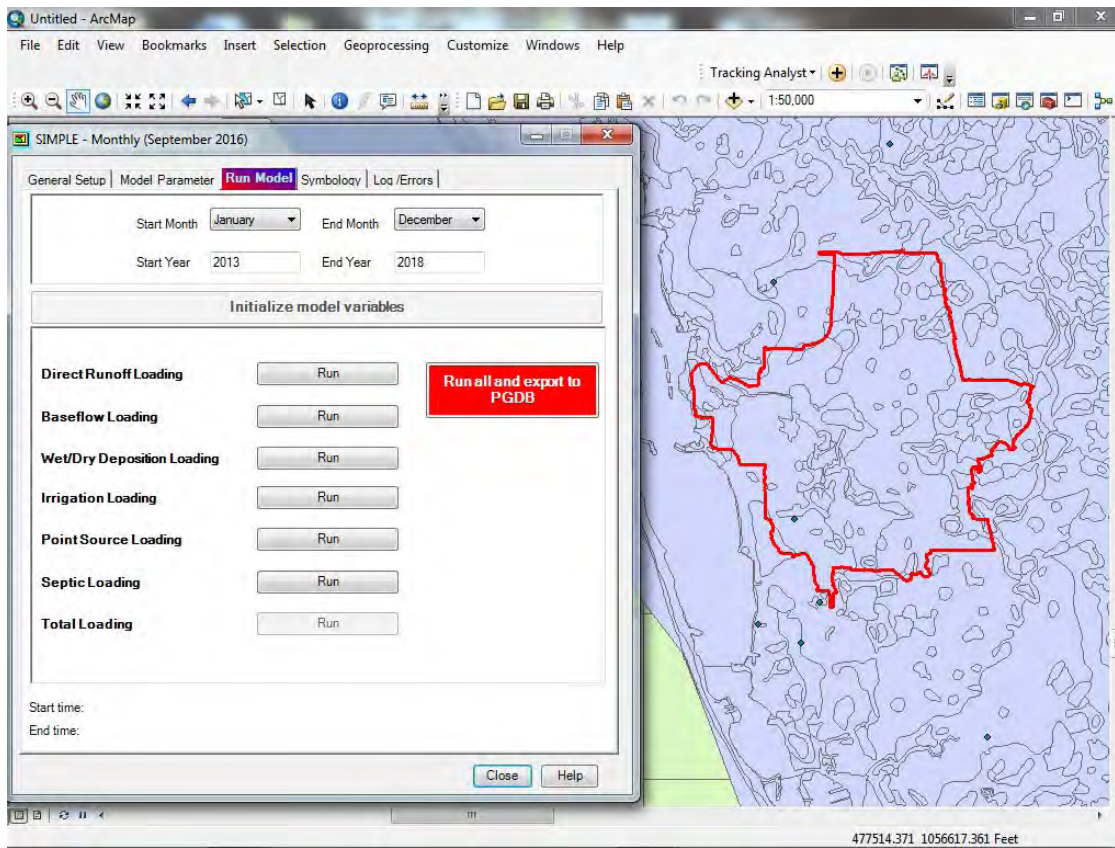
- ▶ **Need for a systematic approach**

SIMPLE MODEL



- Spatial – Uses GIS Data
- Temporal – Date stamped
- NEXRAD Rainfall
- Model Various Parameters
- Approved for use by WMDs, FDEP and EPA

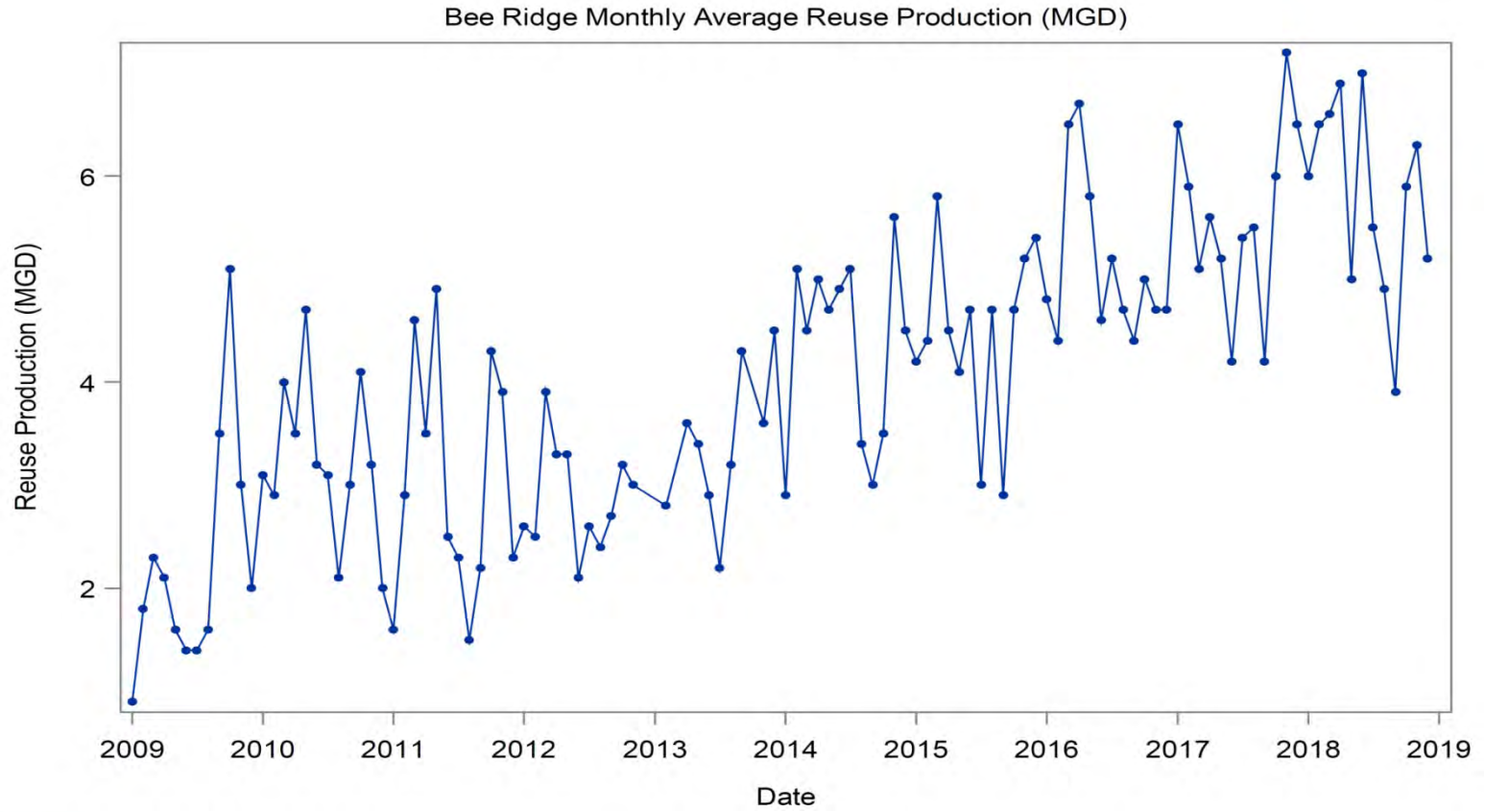
SIMPLE MODEL



- Sources

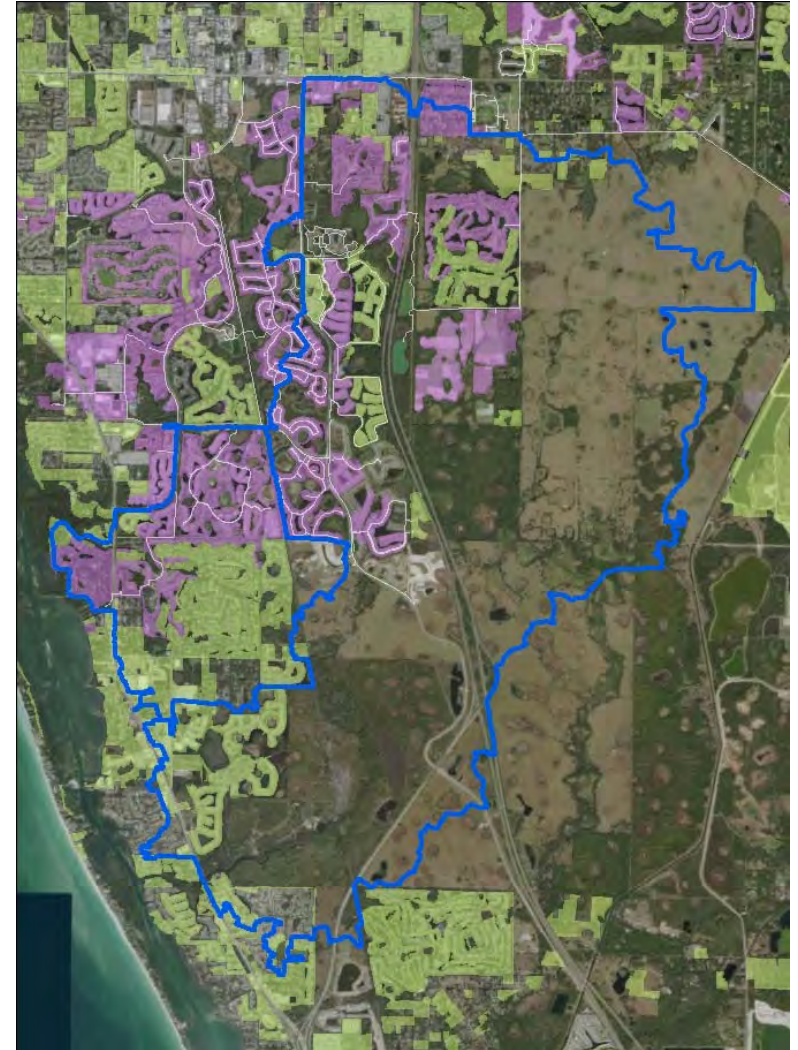
- Direct Runoff
- Baseflow
- Point Sources
- Septics
- Irrigation
- Atmospheric deposition

Reclaimed Irrigation – Update



Reclaimed Irrigation

- Groundwater or Reclaimed
- Potable (\$\$\$)
- Reclaimed Water Irrigation
 - Currently set to 3 mg/L TN
 - Volumes applied based on IFAS turf recommendations
 - 90% efficiency



Reclaimed Irrigation

- Reclaimed Water Irrigation
 - Actual effluent 9–20 mg/L of TN
 - Adjust the volumes applied to volumes delivered
 - Based on meter readings, either to customer or aggregate by basin
 - 90% Efficiency

Summary

- TN Concentrations are increasing
- Chlorophyll exceeding criteria
- Coincidental seagrass loss

But!

- SIMPLE Model Enhancements underway to better understand the drivers
- SBEP is championing the development of a restoration plan

Restoration Plan or Reasonable Assurance Plan

SBEP serve as honest broker – existing inter-local agreements and WQ consortium and management structure in place

- ▶ Reevaluate Water Quality Targets
- ▶ Update/Reevaluate Loading Model
- ▶ Update Evaluation of Estuarine Responses
- ▶ Identify Nutrient Loading Limits
- ▶ Identify Nutrient Load Reduction Projects that Achieve Loading Limits

Many of the tools and data sources are in place

Restoration Plan or Reasonable Assurance Plan

- ▶ Eligibility for funding and cost sharing
- ▶ Stresses proactive efforts to reduce nutrients in the watershed
- ▶ Maintains local control – Provides opportunity to demonstrate local efforts and provide local expertise
- ▶ *Cleaner water faster*