Florida Stormwater Association

Biosolids and Water Quality Concerns Webinar

February 14, 2019
10:30 a.m. – 11:30 a.m. (Eastern)

www.florida-stormwater.org

Applied Sciences

Community Based | Regionally Skilled

Today's Presenters

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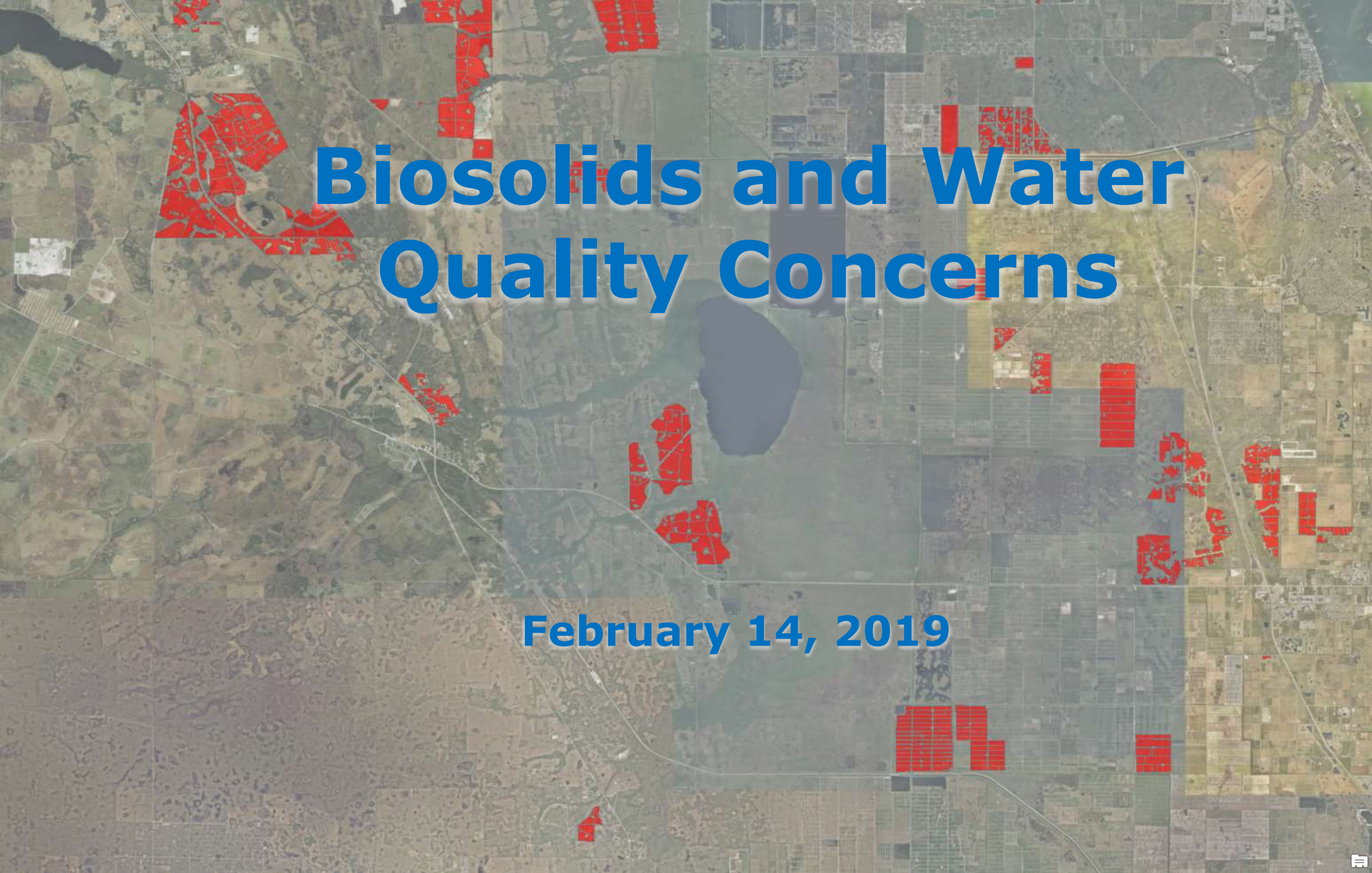

Biosolids and Water Quality Concerns
February 14, 2019

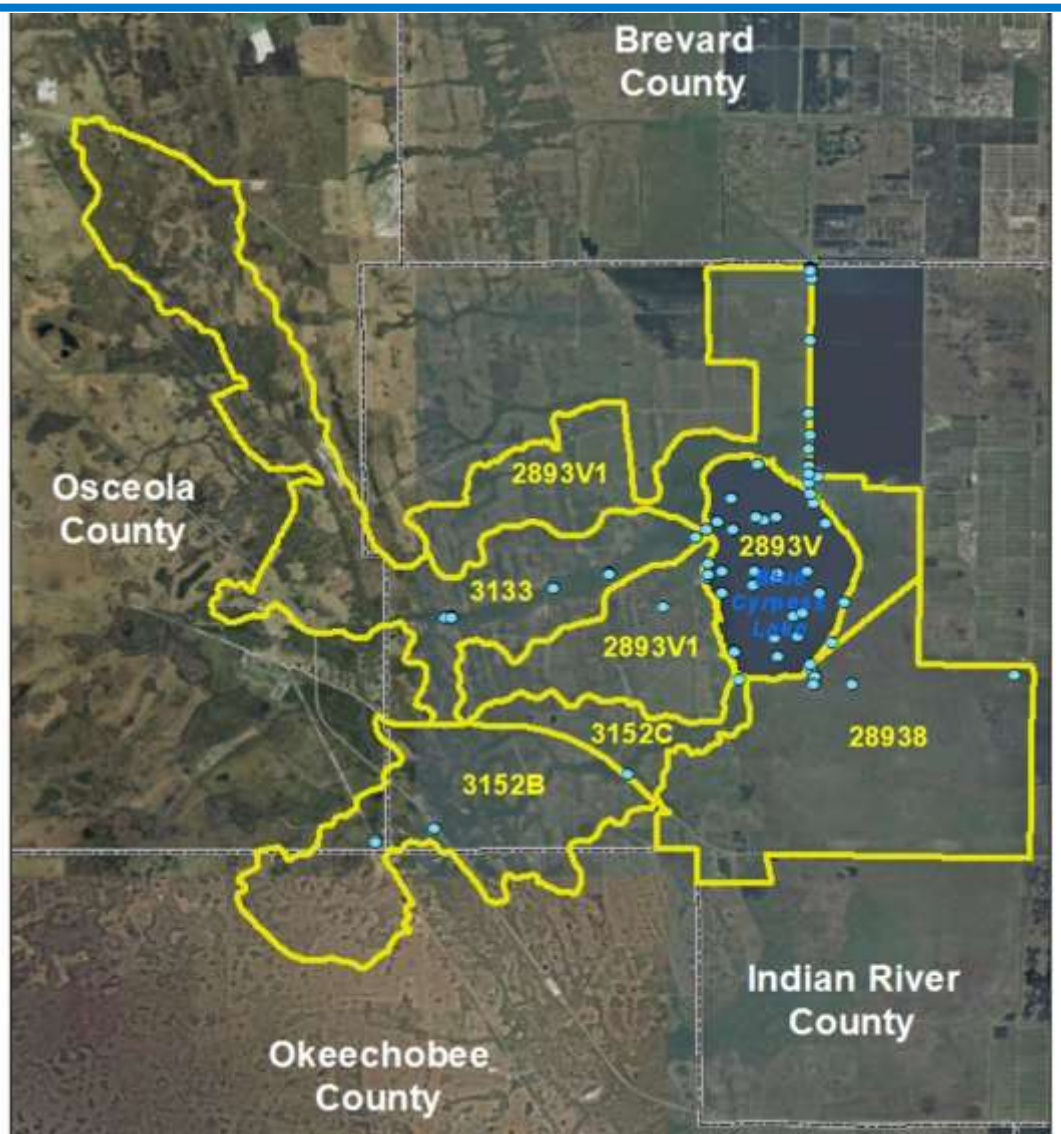
Presentation Elements

- Blue Cypress Lake
- Biosolids Technical Advisory Committee

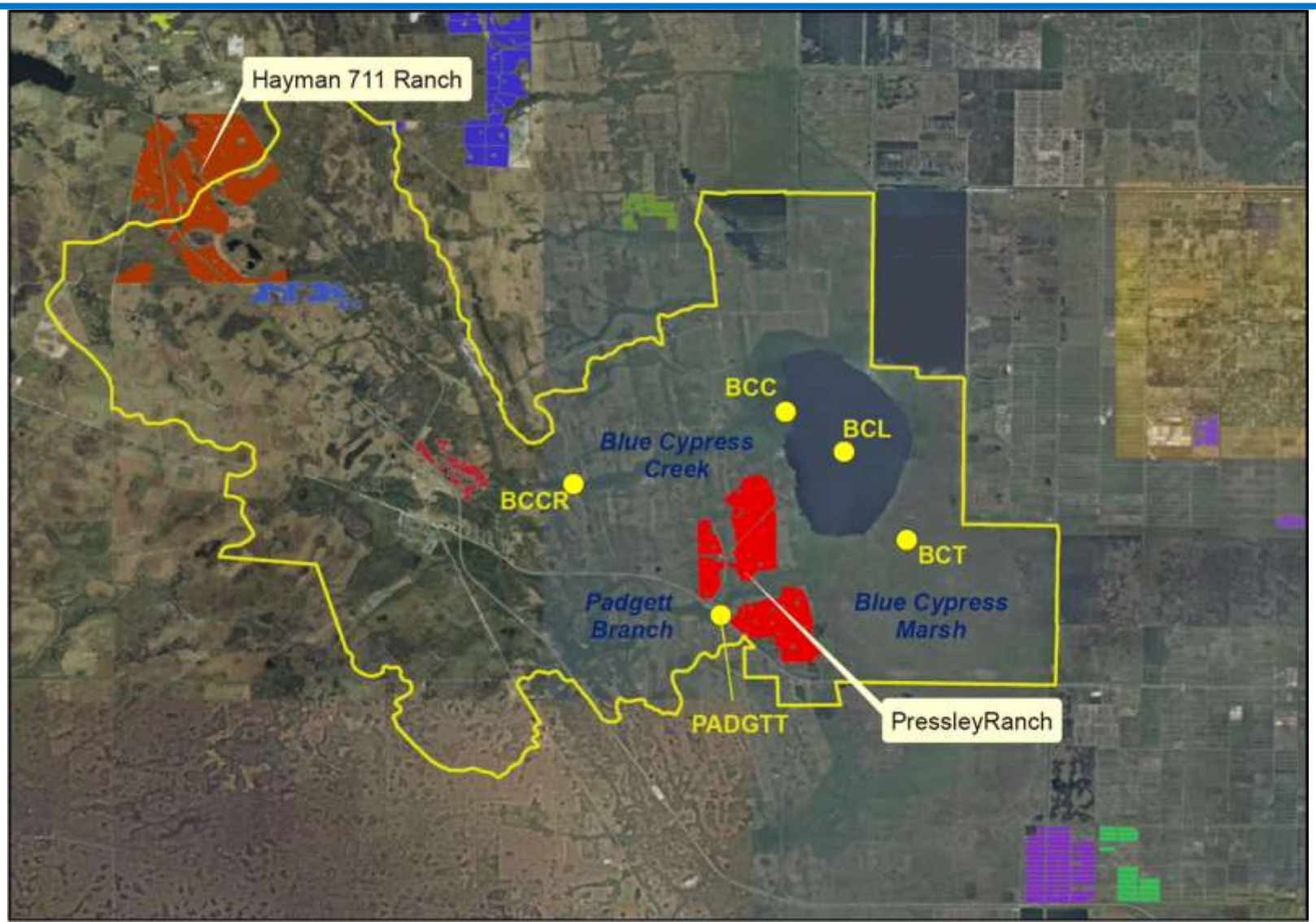
Acknowledgements

- SJRWMD
- Indian River County Utilities
- Janicki Environmental

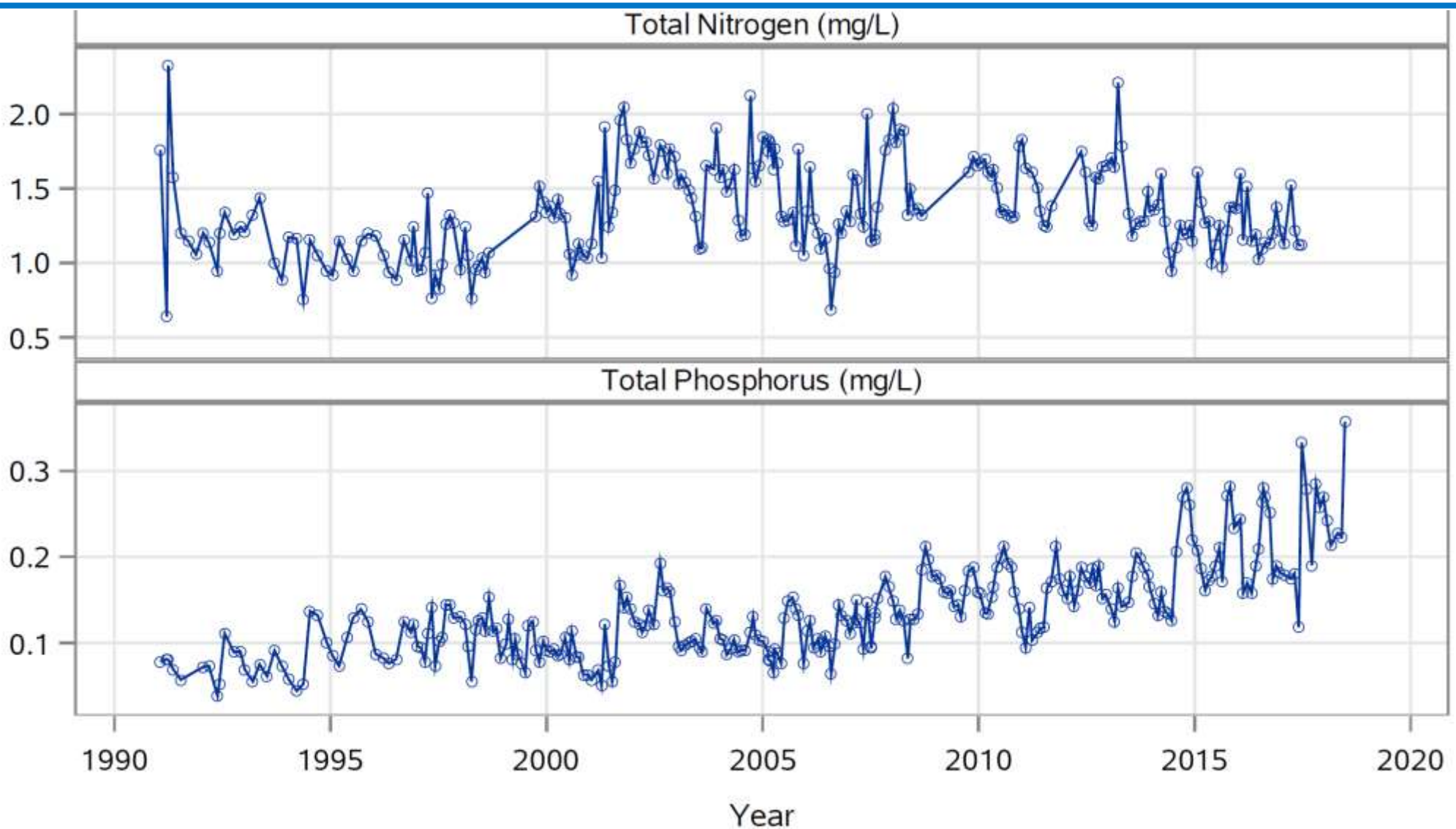
Blue Cypress Lake Watershed



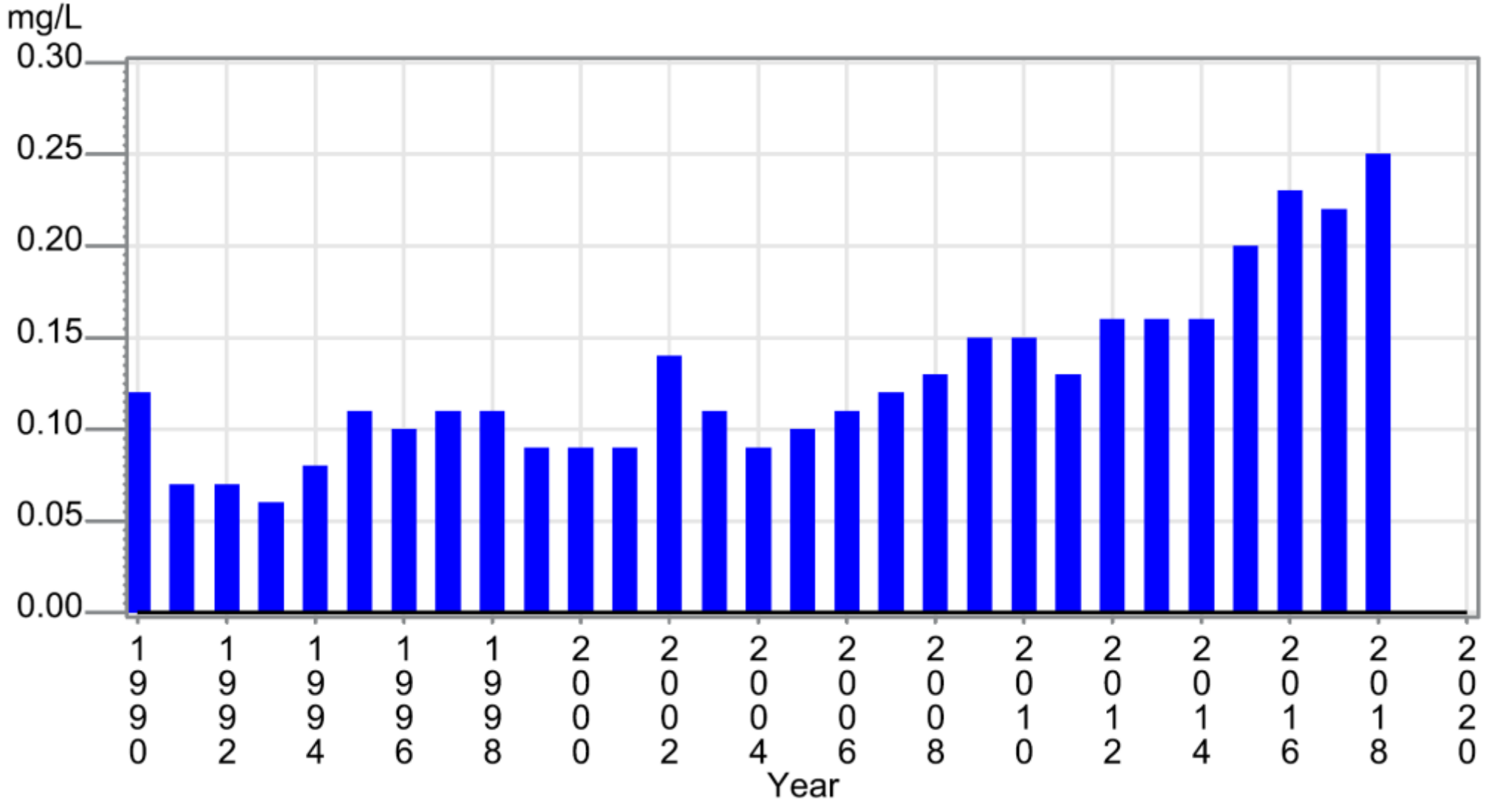
Blue Cypress Lake Watershed



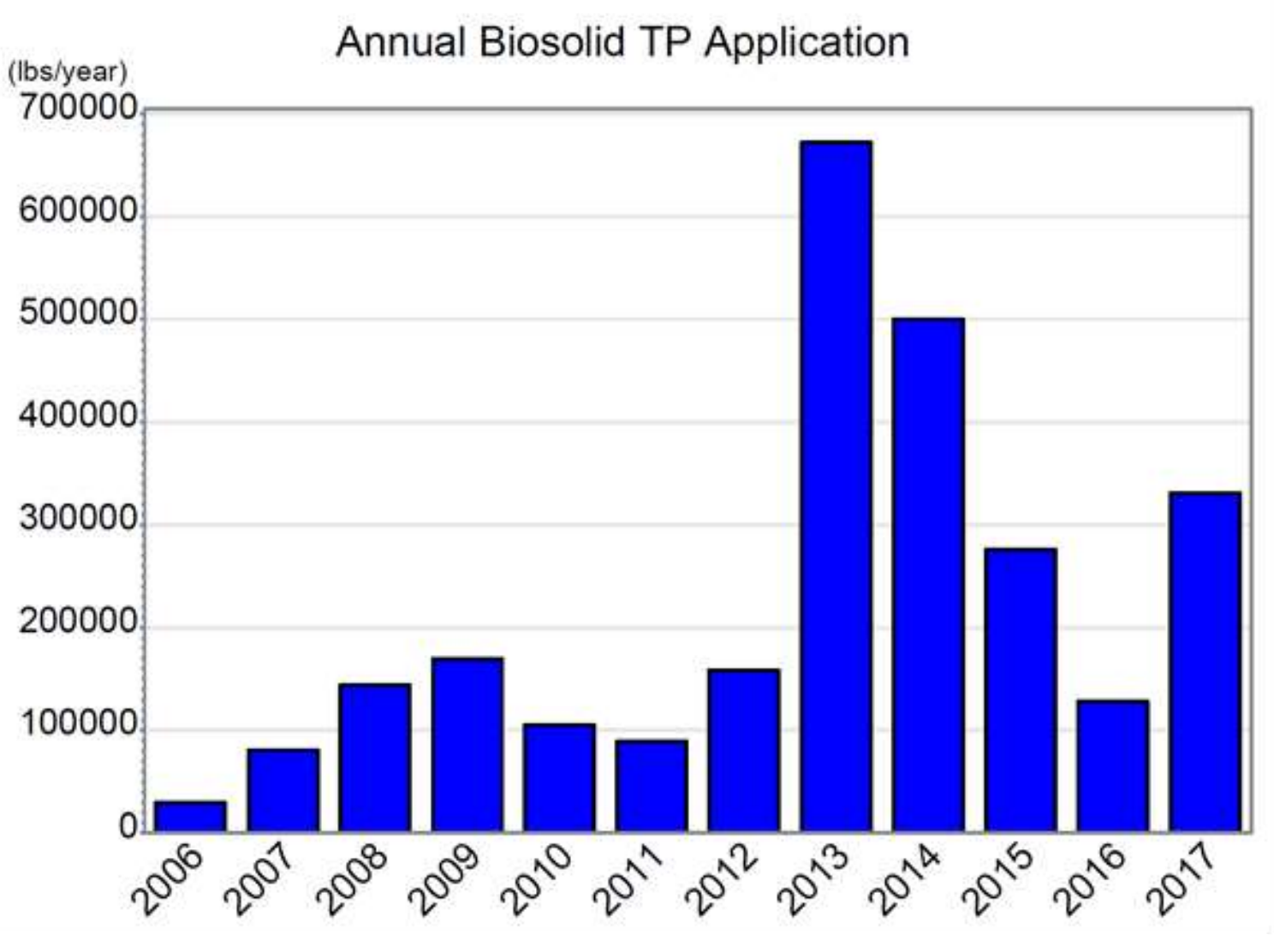
Blue Cypress Lake Nutrient Trends



Blue Cypress Lake TP Annual Geometric Means

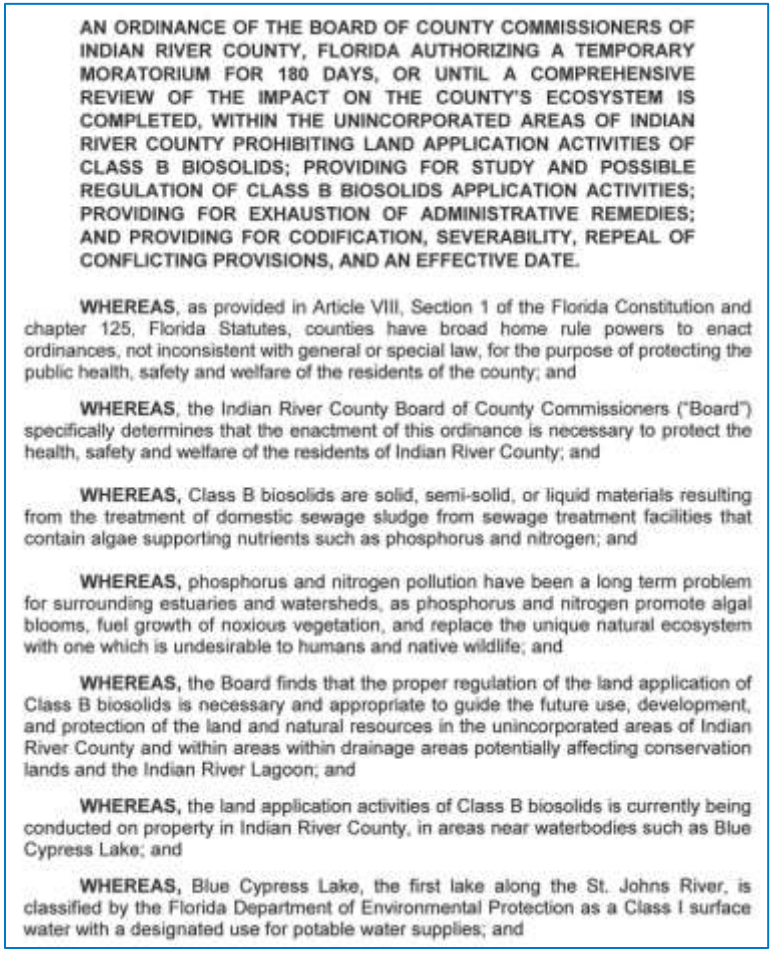


Annual Biosolids Applications in Blue Cypress Lake Watershed



Biosolids Moratoria and Resolutions

- Indian River County (July 2018)
- Treasure Coast Regional Planning Council
- Fellsmere
- St. Lucie County
- Others



AN ORDINANCE OF THE BOARD OF COUNTY COMMISSIONERS OF INDIAN RIVER COUNTY, FLORIDA AUTHORIZING A TEMPORARY MORATORIUM FOR 180 DAYS, OR UNTIL A COMPREHENSIVE REVIEW OF THE IMPACT ON THE COUNTY'S ECOSYSTEM IS COMPLETED, WITHIN THE UNINCORPORATED AREAS OF INDIAN RIVER COUNTY PROHIBITING LAND APPLICATION ACTIVITIES OF CLASS B BIOSOLIDS; PROVIDING FOR STUDY AND POSSIBLE REGULATION OF CLASS B BIOSOLIDS APPLICATION ACTIVITIES; PROVIDING FOR EXHAUSTION OF ADMINISTRATIVE REMEDIES; AND PROVIDING FOR CODIFICATION, SEVERABILITY, REPEAL OF CONFLICTING PROVISIONS, AND AN EFFECTIVE DATE.

WHEREAS, as provided in Article VIII, Section 1 of the Florida Constitution and chapter 125, Florida Statutes, counties have broad home rule powers to enact ordinances, not inconsistent with general or special law, for the purpose of protecting the public health, safety and welfare of the residents of the county; and

WHEREAS, the Indian River County Board of County Commissioners ("Board") specifically determines that the enactment of this ordinance is necessary to protect the health, safety and welfare of the residents of Indian River County; and

WHEREAS, Class B biosolids are solid, semi-solid, or liquid materials resulting from the treatment of domestic sewage sludge from sewage treatment facilities that contain algae supporting nutrients such as phosphorus and nitrogen; and

WHEREAS, phosphorus and nitrogen pollution have been a long term problem for surrounding estuaries and watersheds, as phosphorus and nitrogen promote algal blooms, fuel growth of noxious vegetation, and replace the unique natural ecosystem with one which is undesirable to humans and native wildlife; and

WHEREAS, the Board finds that the proper regulation of the land application of Class B biosolids is necessary and appropriate to guide the future use, development, and protection of the land and natural resources in the unincorporated areas of Indian River County and within areas within drainage areas potentially affecting conservation lands and the Indian River Lagoon; and

WHEREAS, the land application activities of Class B biosolids is currently being conducted on property in Indian River County, in areas near waterbodies such as Blue Cypress Lake; and

WHEREAS, Blue Cypress Lake, the first lake along the St. Johns River, is classified by the Florida Department of Environmental Protection as a Class I surface water with a designated use for potable water supplies; and

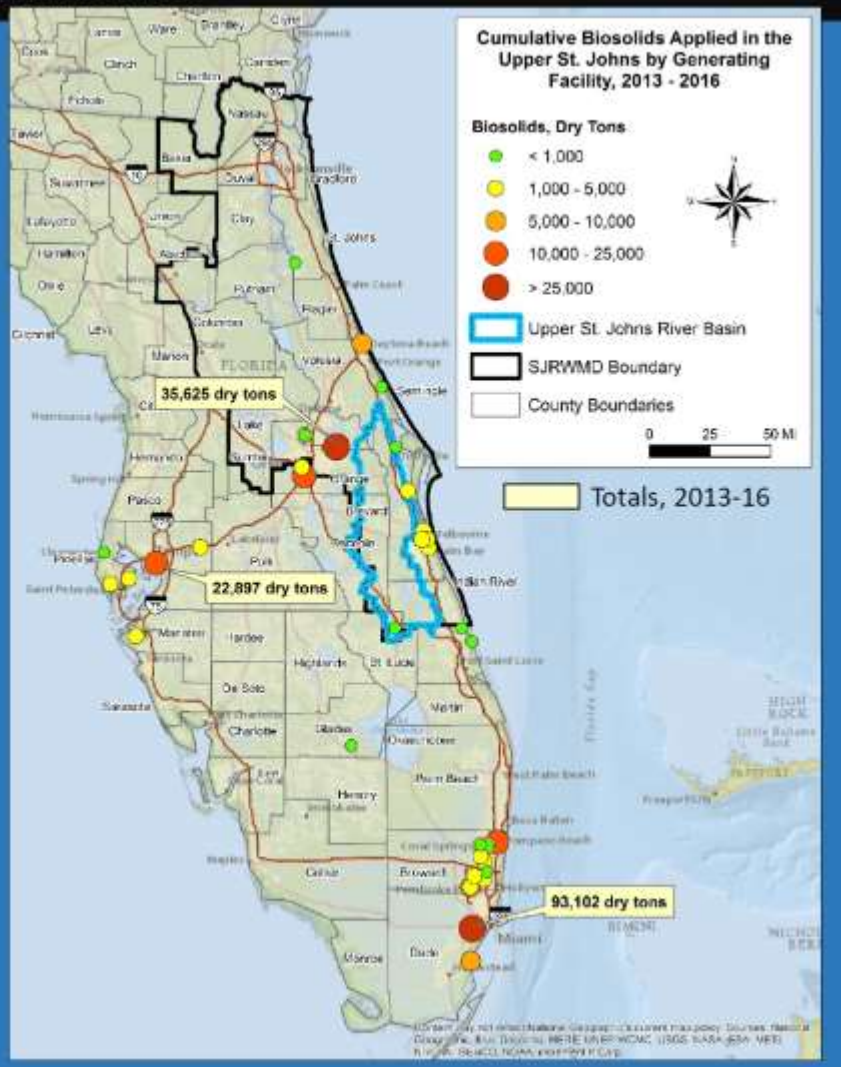
SJRWMD Analyses

St. Johns River Water Management District

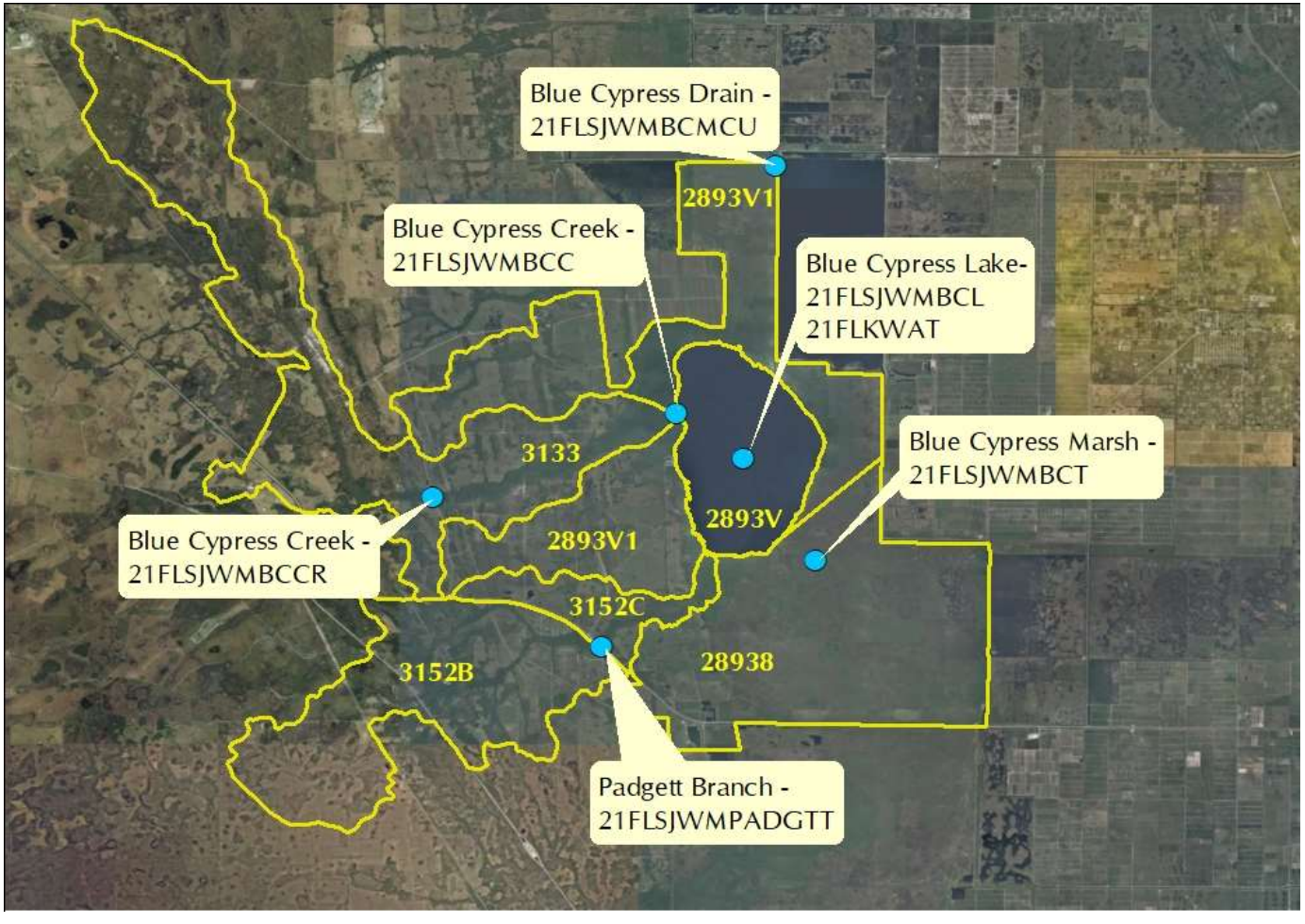
Other Factors Affecting P

- Emphasis on WWTP surface water outfall P reduction partitions more P in solids
- Agronomic N level sets application max, while P assessed by FL P Index
  - Typical biosolids mass N:P ≈ 2-3; Under "high" N rate for pasture[1], with allowance for crop available N, P at ≈ 120 lbs/ac
- Threshold for P capacity index test = 90 mg/kg (MP-3)[2], 2 – 3 times > typical crop sufficiency based on inorganic P

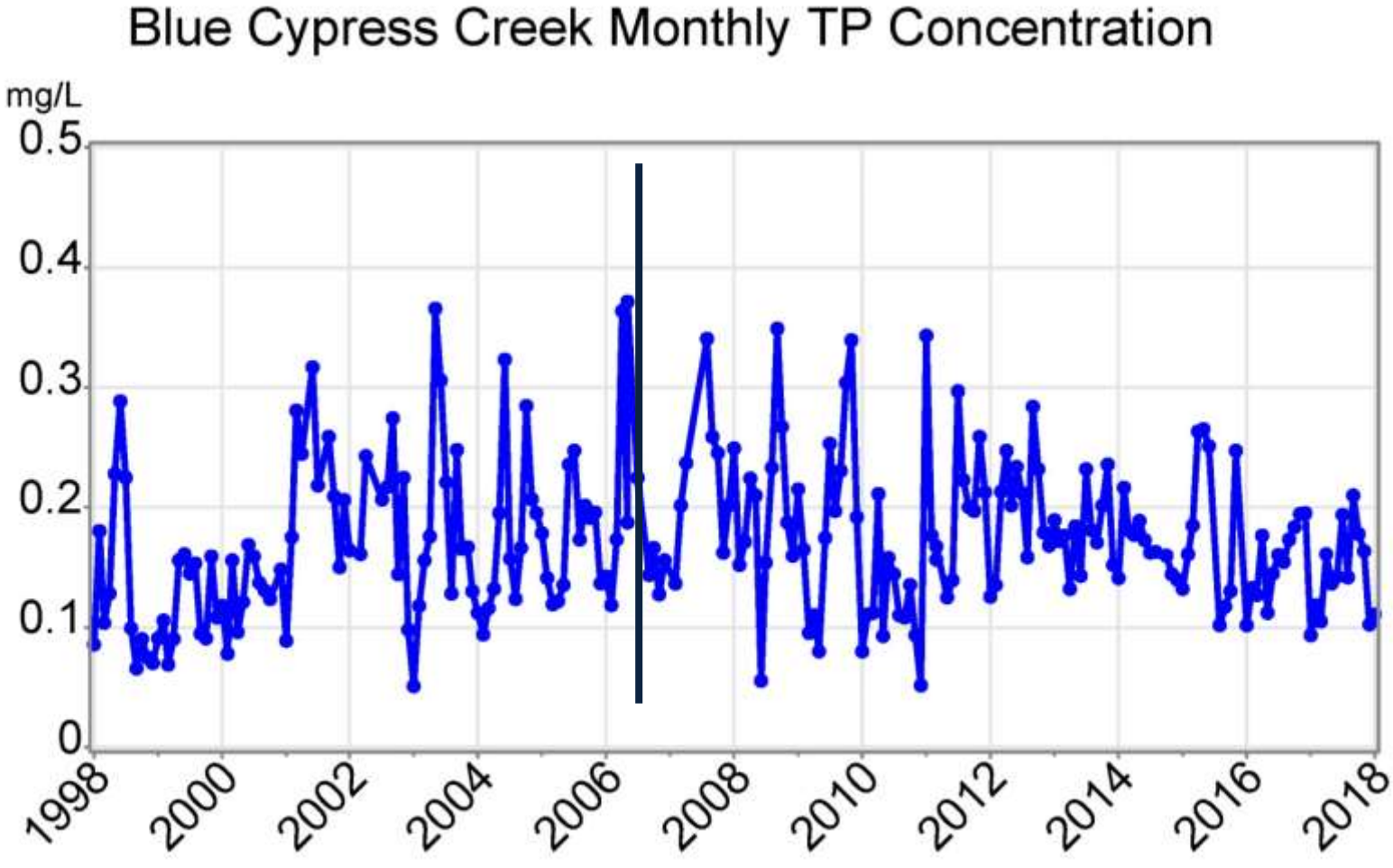
[1]Mylavarapu, R. et al. 2015. IFAS SL129. [2]FDACS, 2017. Florida Cattle BMPs.



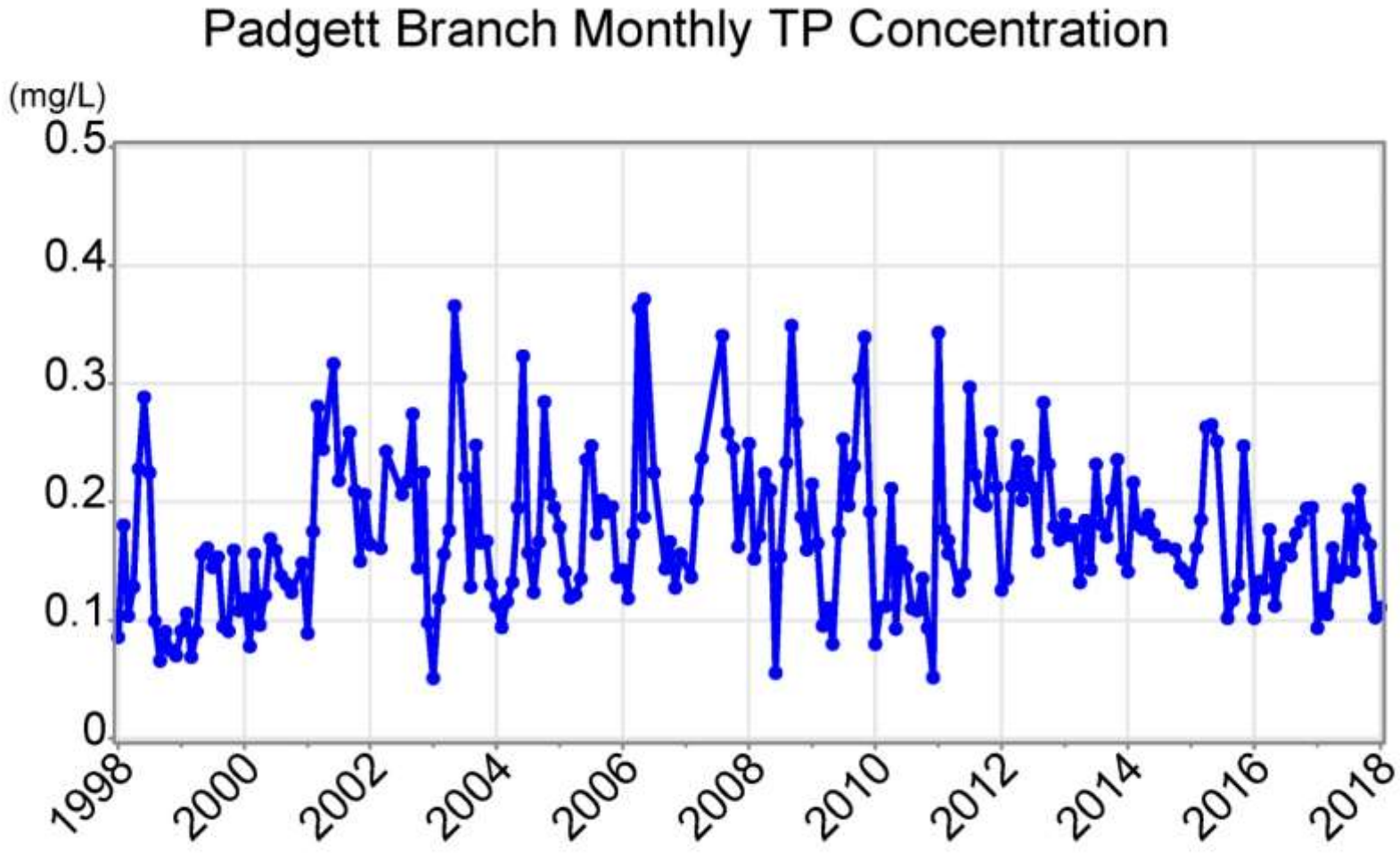
Blue Cypress Lake Water Quality



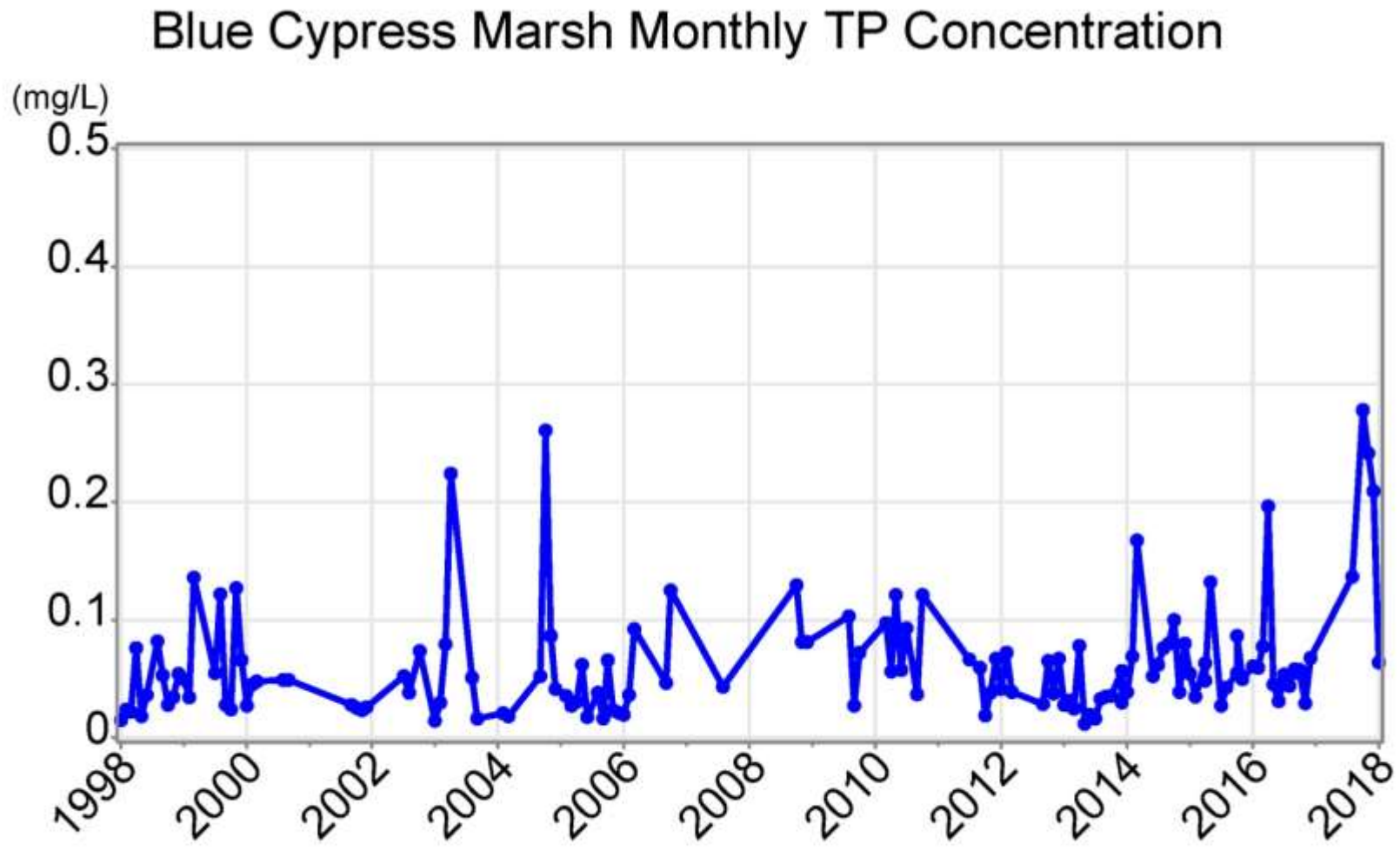
No Trend in Blue Cypress Creek TP



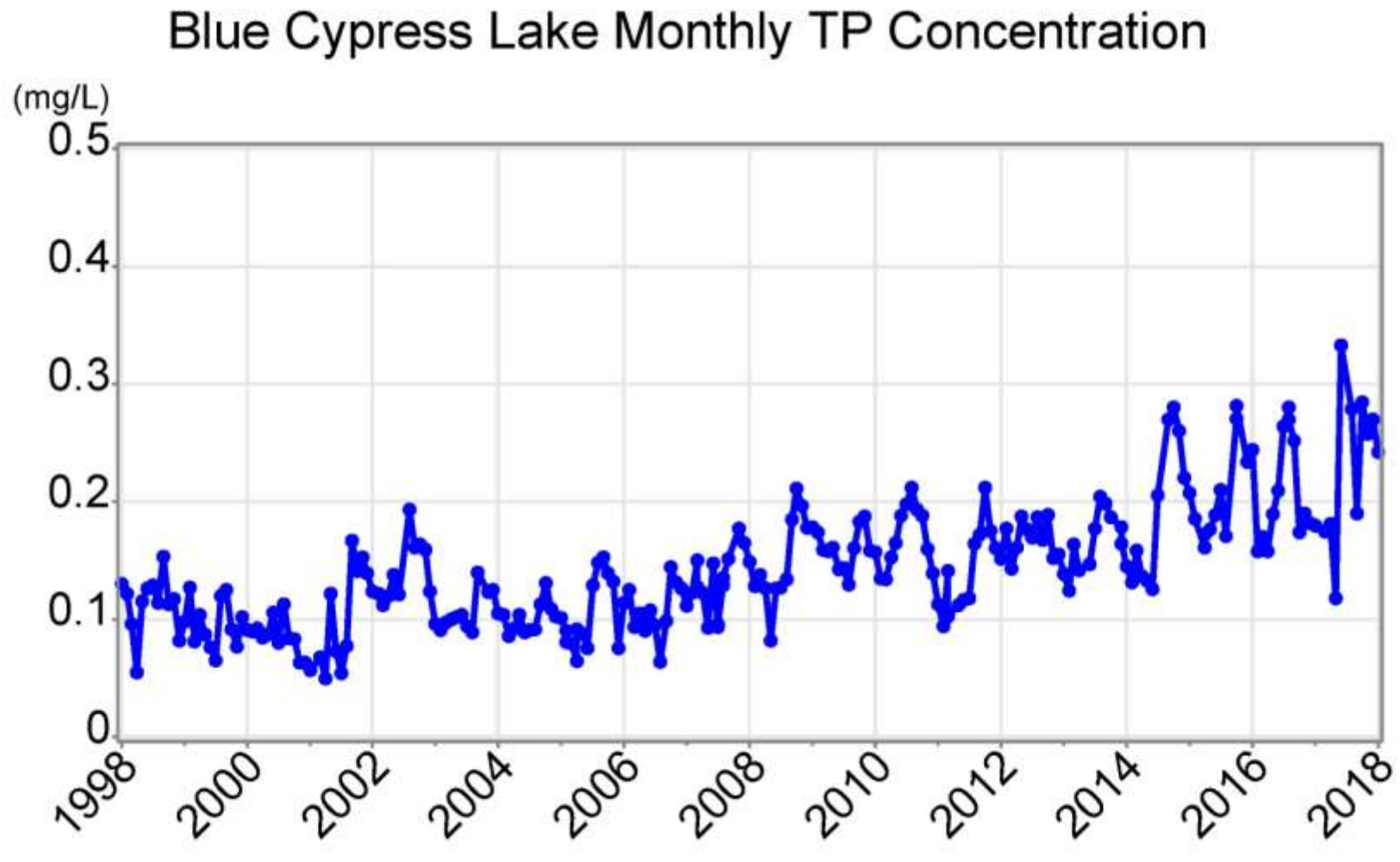
No Trend in Padgett Branch TP



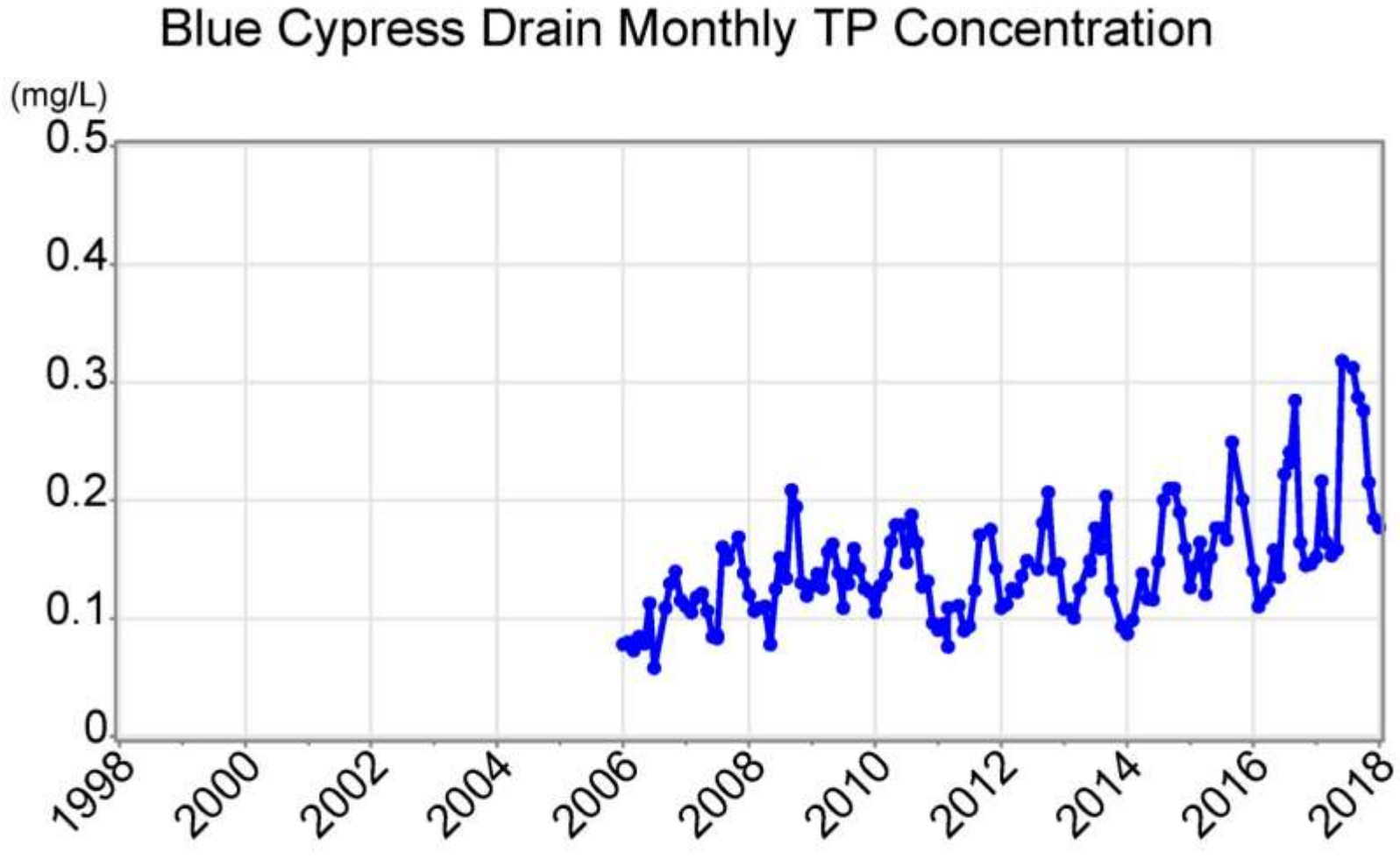
No trend in Blue Cypress Marsh TP



Upward Trend in Blue Cypress Lake TP



Upward Trend in Blue Cypress Lake Outflow TP

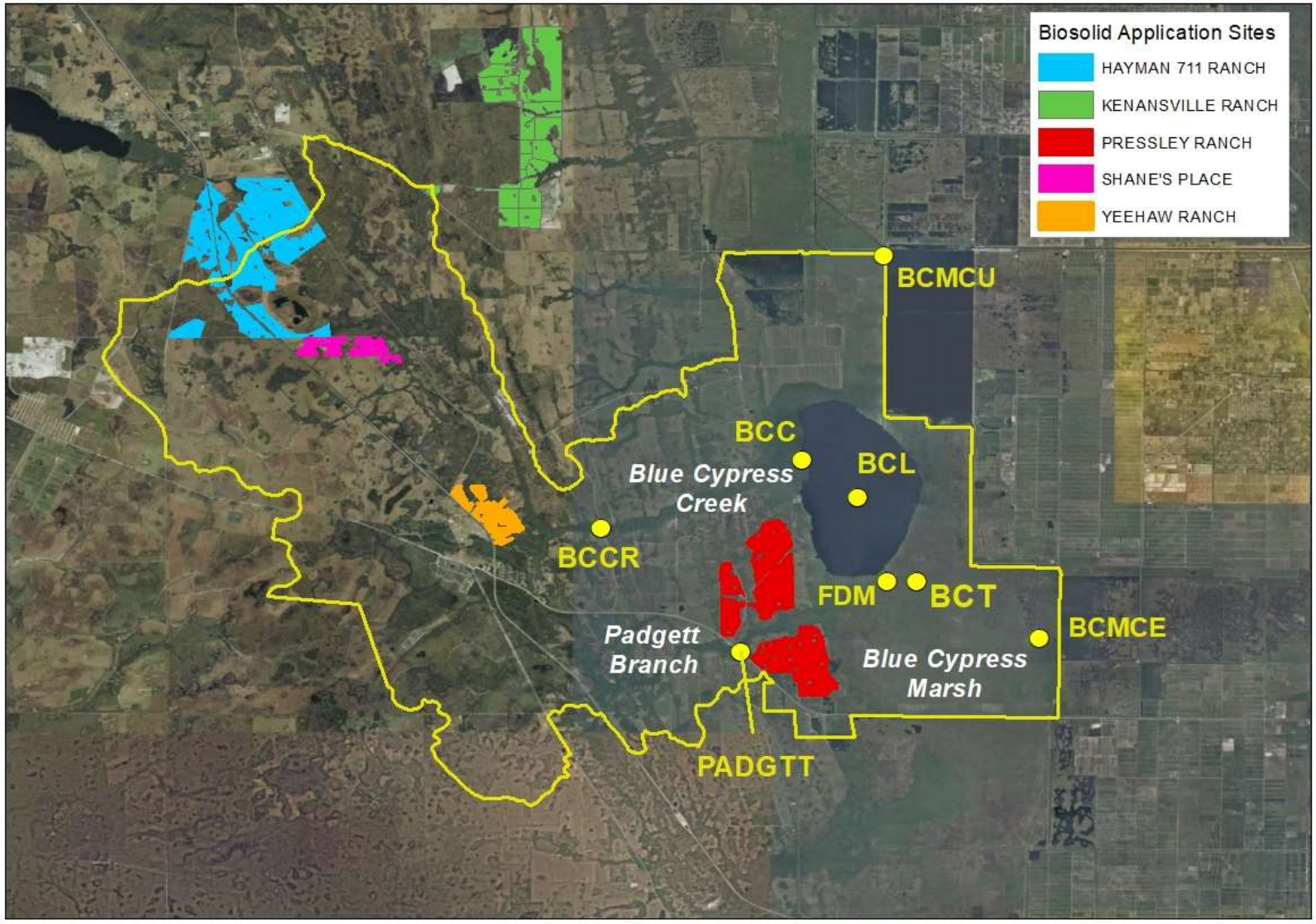


Water Quality Assessment

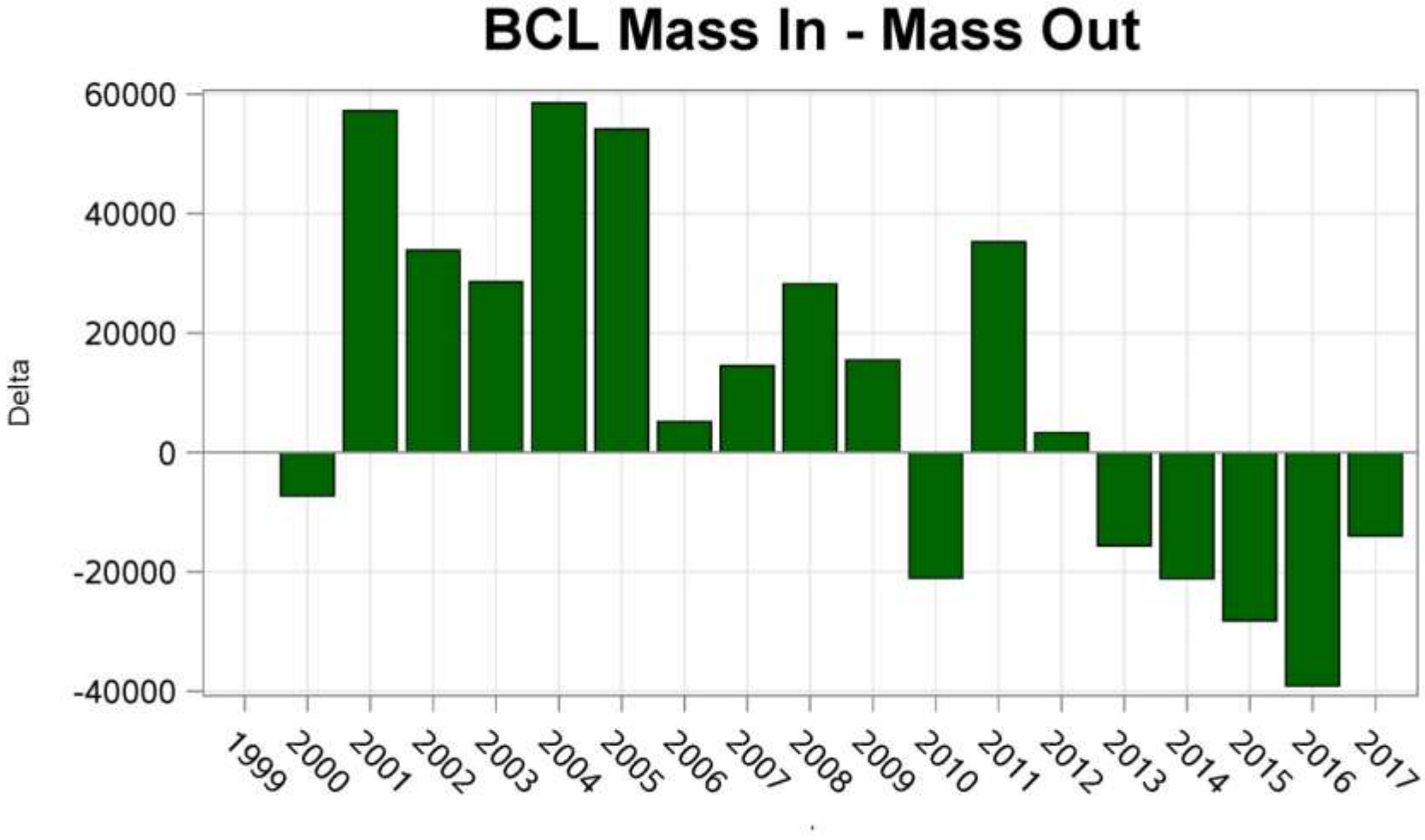
- Currently Blue Cypress Marsh impaired for macrophytes
- Anticipated impairment status of each of the WBIDs

Waterbody	TN	TP	Chlorophyll a	Dissolved Oxygen
Blue Cypress Lake	Not Impaired	Impaired	Not Impaired	Not Impaired
Padgett Branch	Not Impaired	Study List		Study List
Blue Cypress Lake Drain	Not Impaired	Study List		Study List
Blue Cypress Marsh		Not Impaired		Study List
Blue Cypress Creek	Not Impaired	Study List		Study List

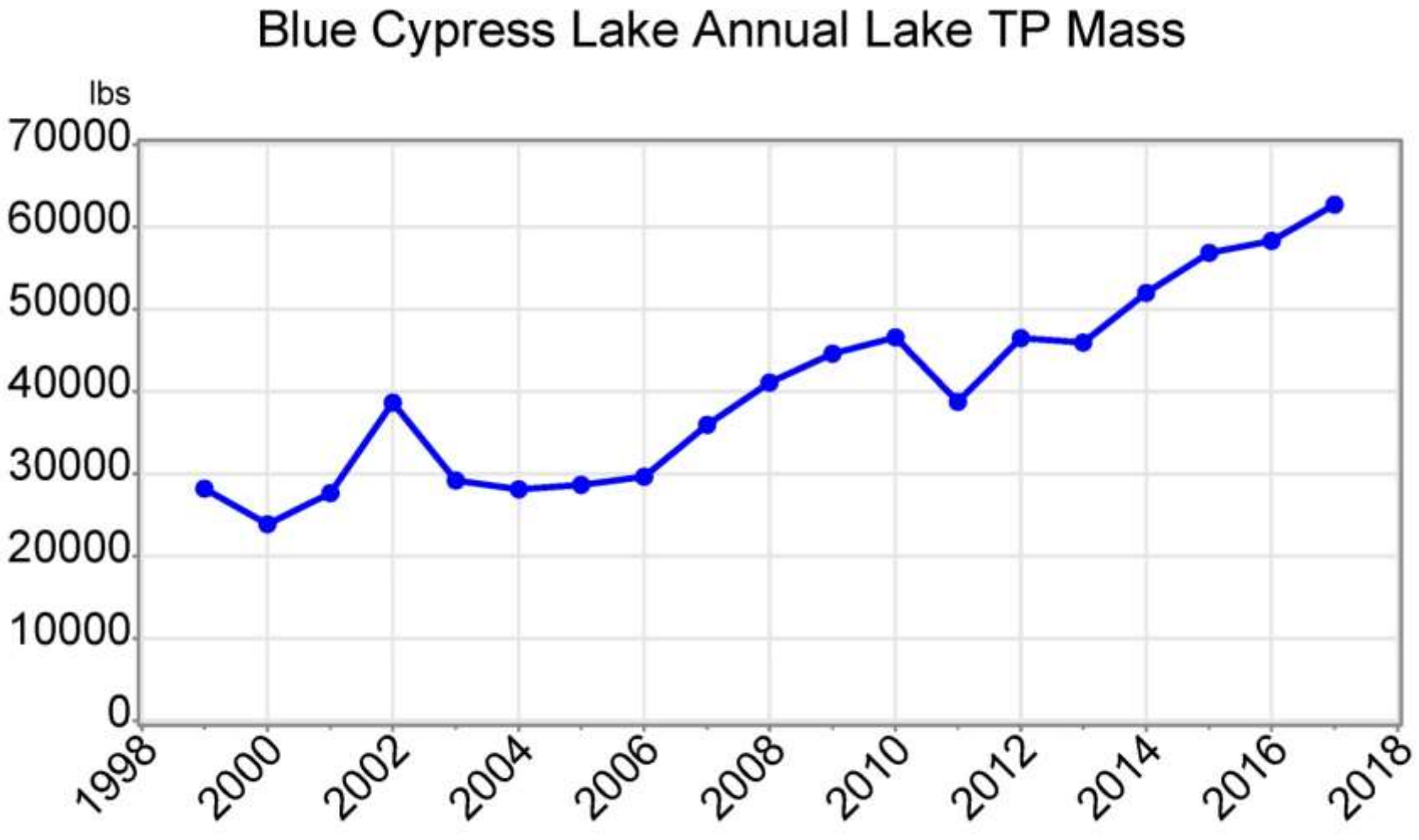
Nutrient Budget



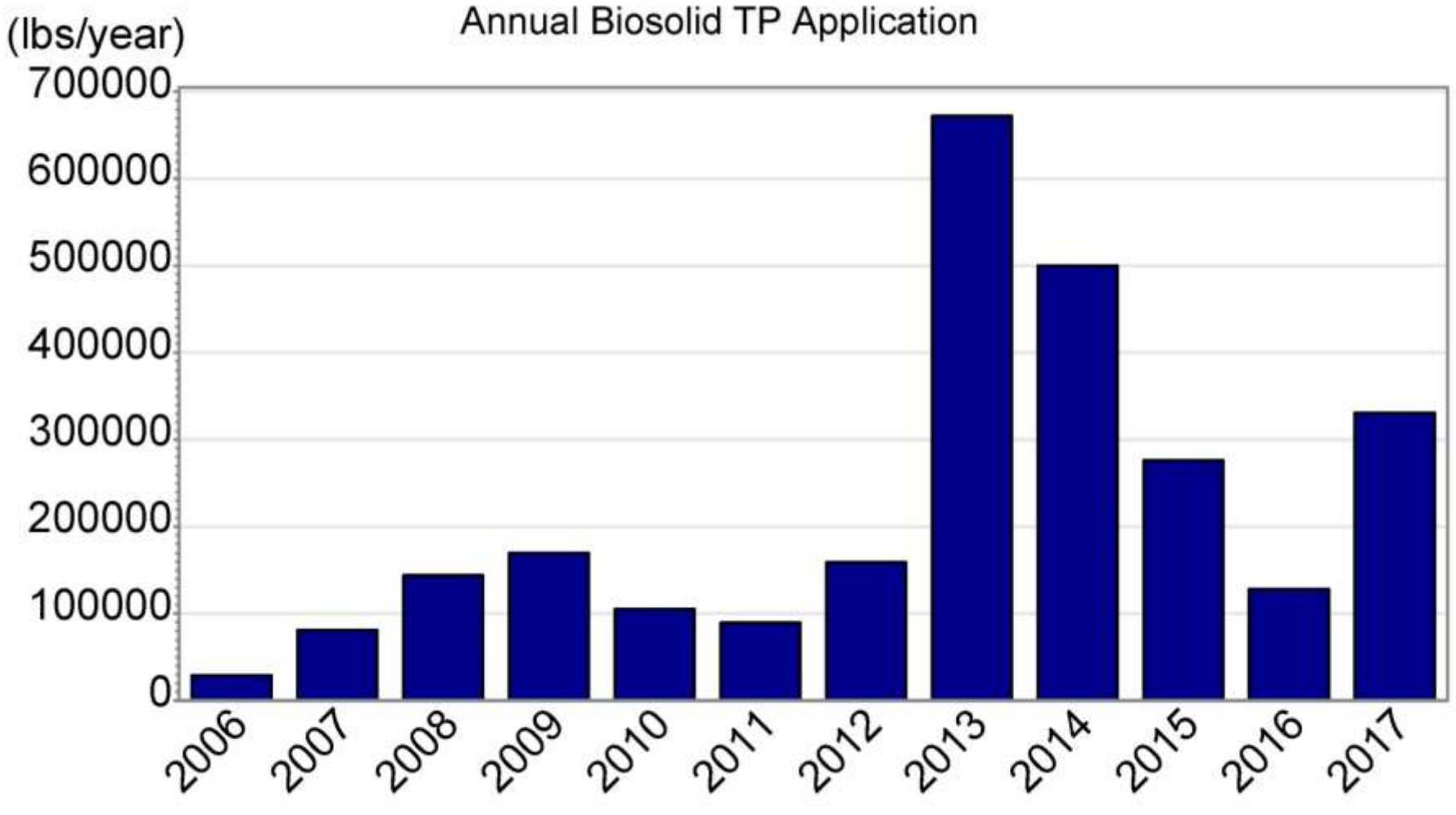
Nutrient Budget



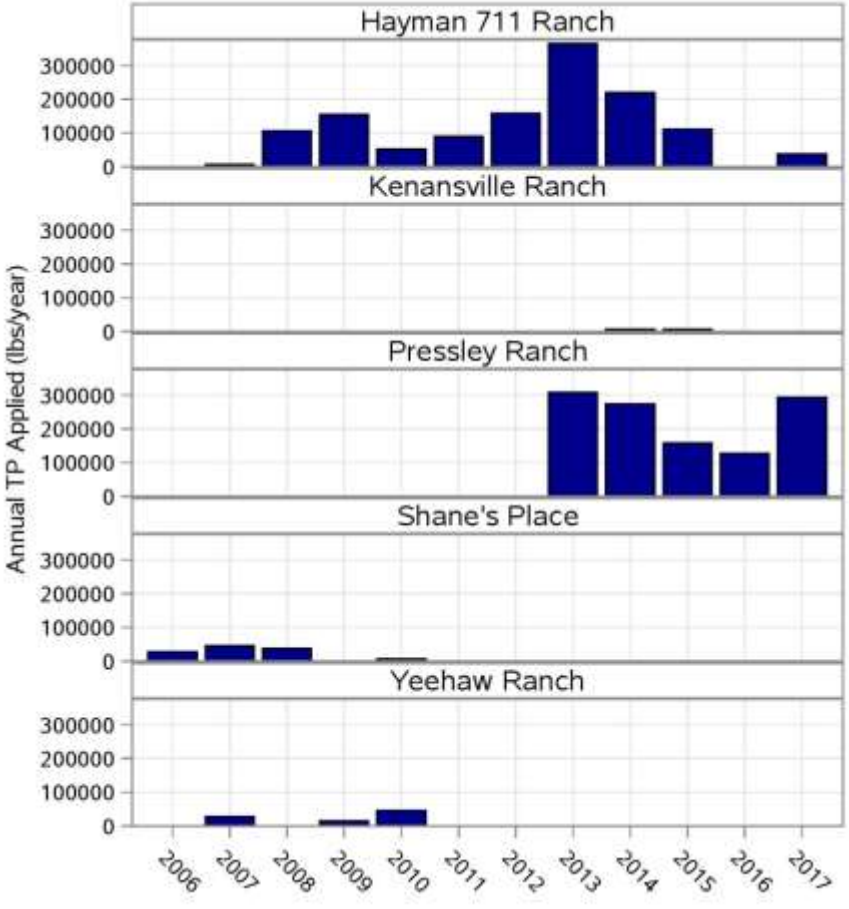
Nutrient Budget



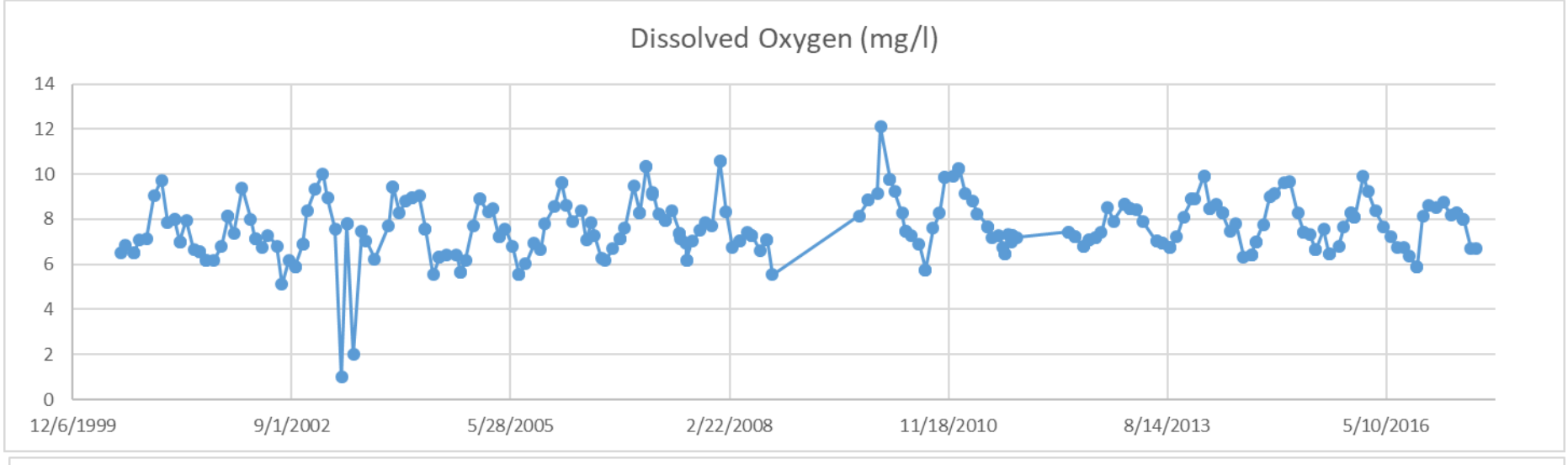
Nutrient Budget

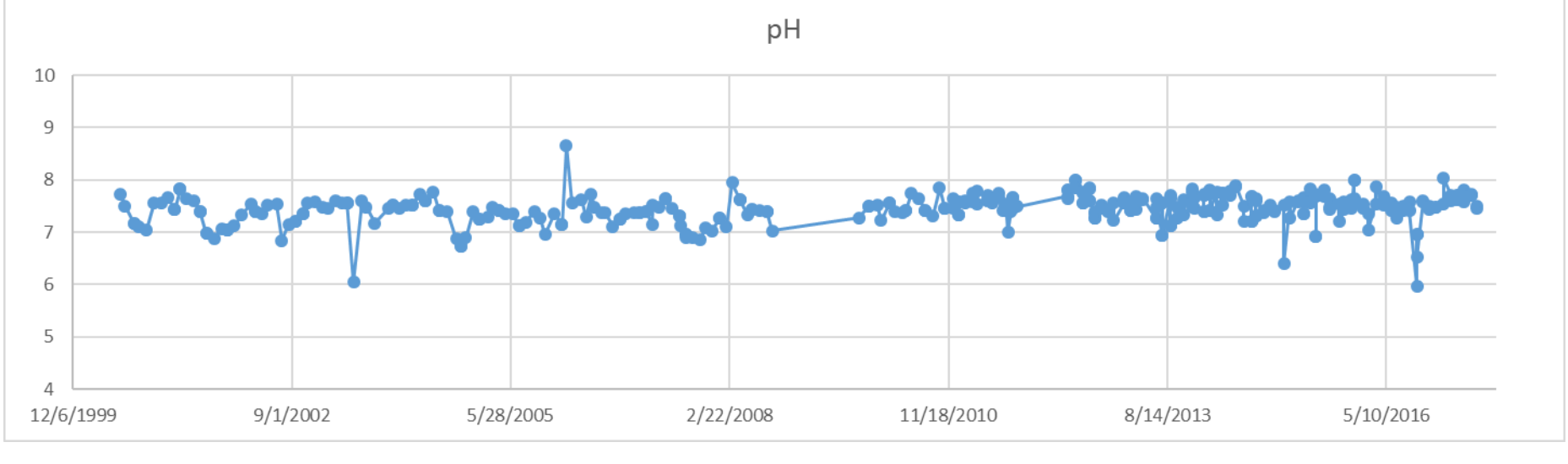


Nutrient Budget



Lake Nutrient Recycling Unlikely

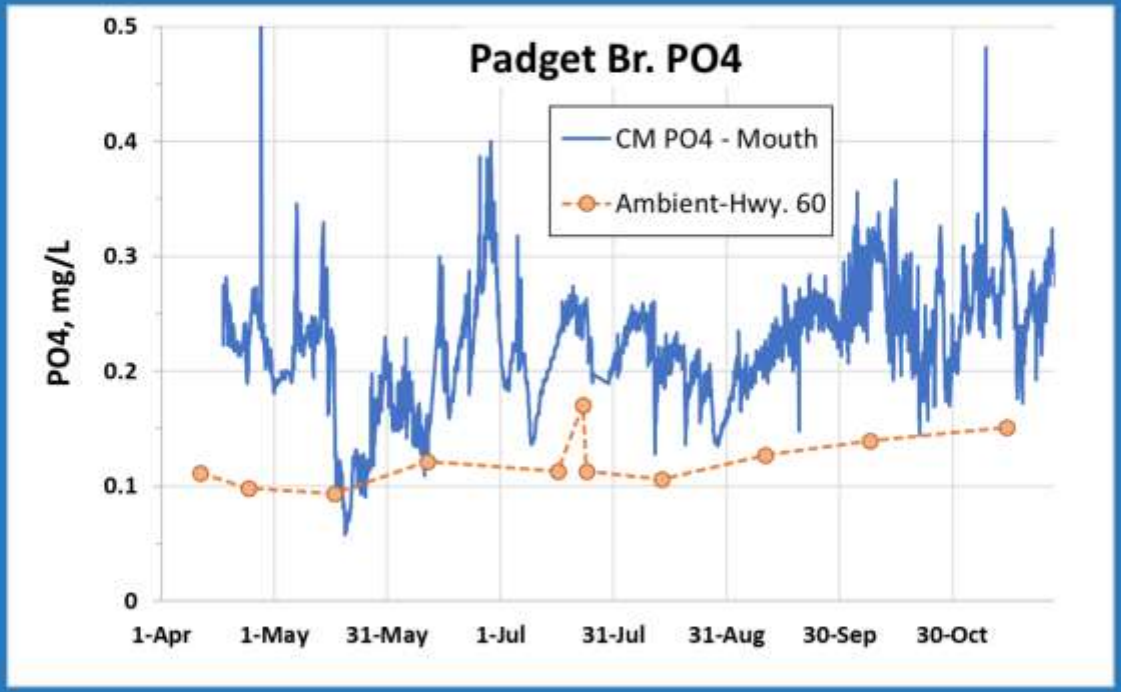




SJRWMD Sampling

St. Johns River Water Management District

Padgett Branch April – November 2018
Mouth PO_4 ≈ twice that measured upstream at Hwy. 60

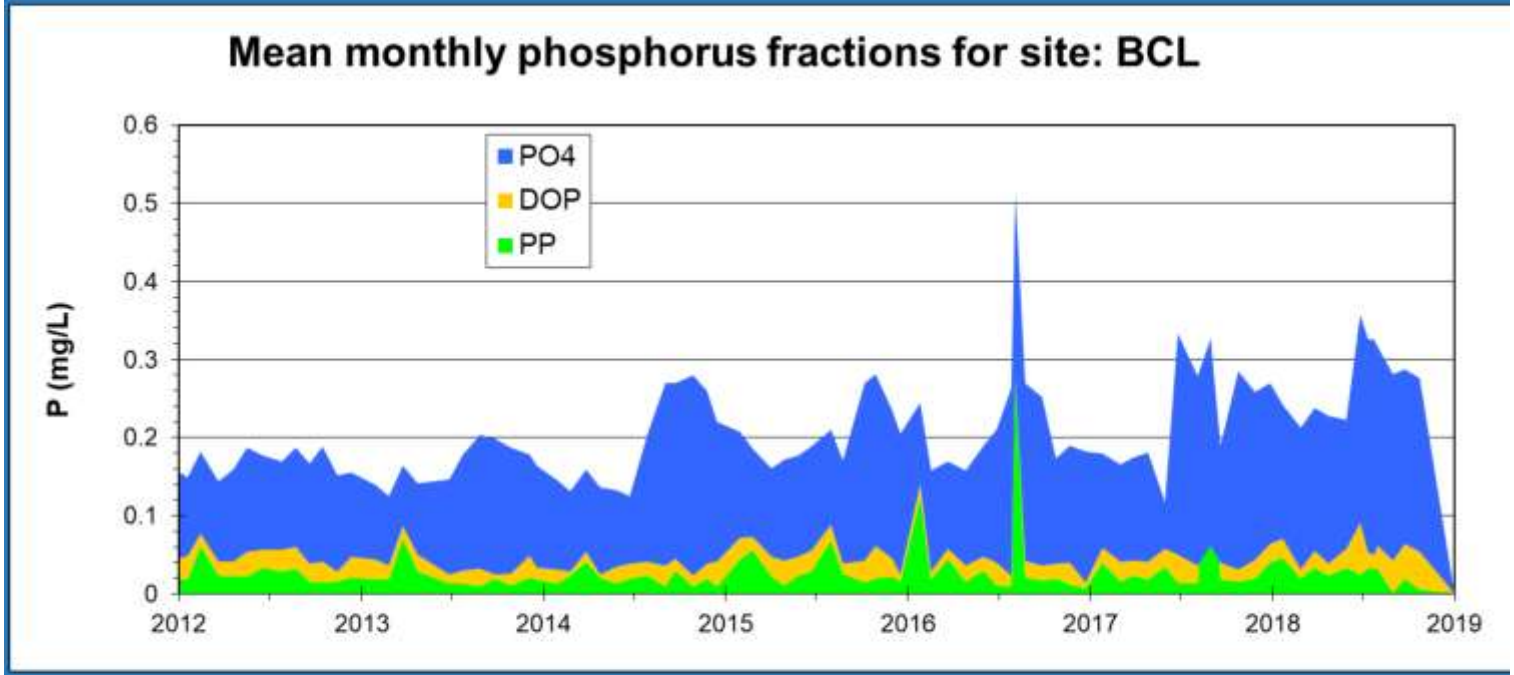


Hwy. 60 – Monthly ambient samples
Mouth – Continuous monitoring platform

Source is Primarily Dissolved Phosphate

St. Johns River Water Management District

Blue Cypress Lake



Recent phosphorus increase is reflected by an increase in dissolved phosphate. Other P fractions remain similar.

High P in soils

St. Johns River Water Management District

New Data

Soil and Tissue Phosphorus

Pressley Ranch permitted fields

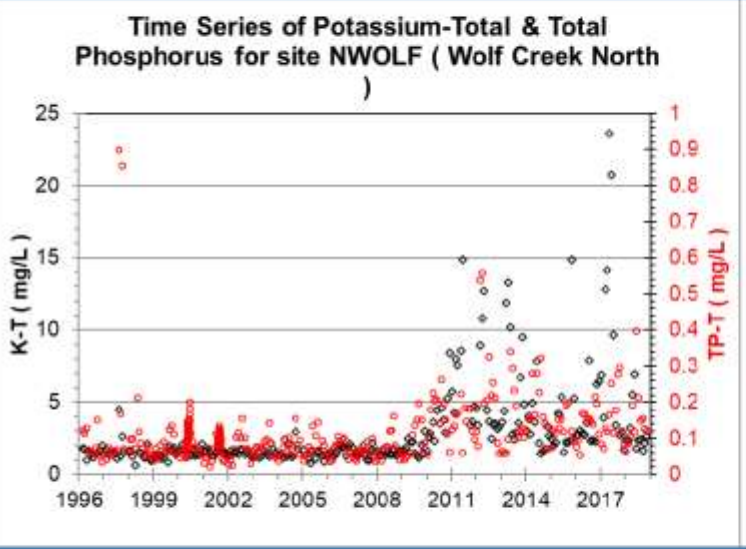
	Soil P (mg/kg)	Tissue %P
Low	10	0.14
	18	0.69
	20	0.39
	22	0.32
	24	0.28
Medium	25	0.49
	27	0.30
	27	0.38
	31	0.43
	34	0.37
	34	0.44
	35	0.43
	43	0.40
	44	0.33
High	47	0.31
	54	0.55
	55	0.37
	68	0.29
	77	0.37
	82	0.38
	84	0.35
	96	0.60

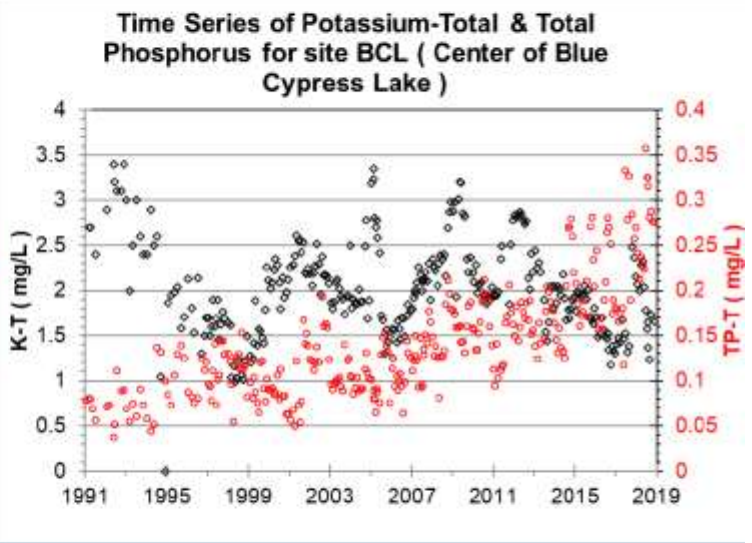
No Correlation with Potassium

St. Johns River Water Management District

Fertilizer Vs. Biosolids

Use of Potassium to Identify Sources?



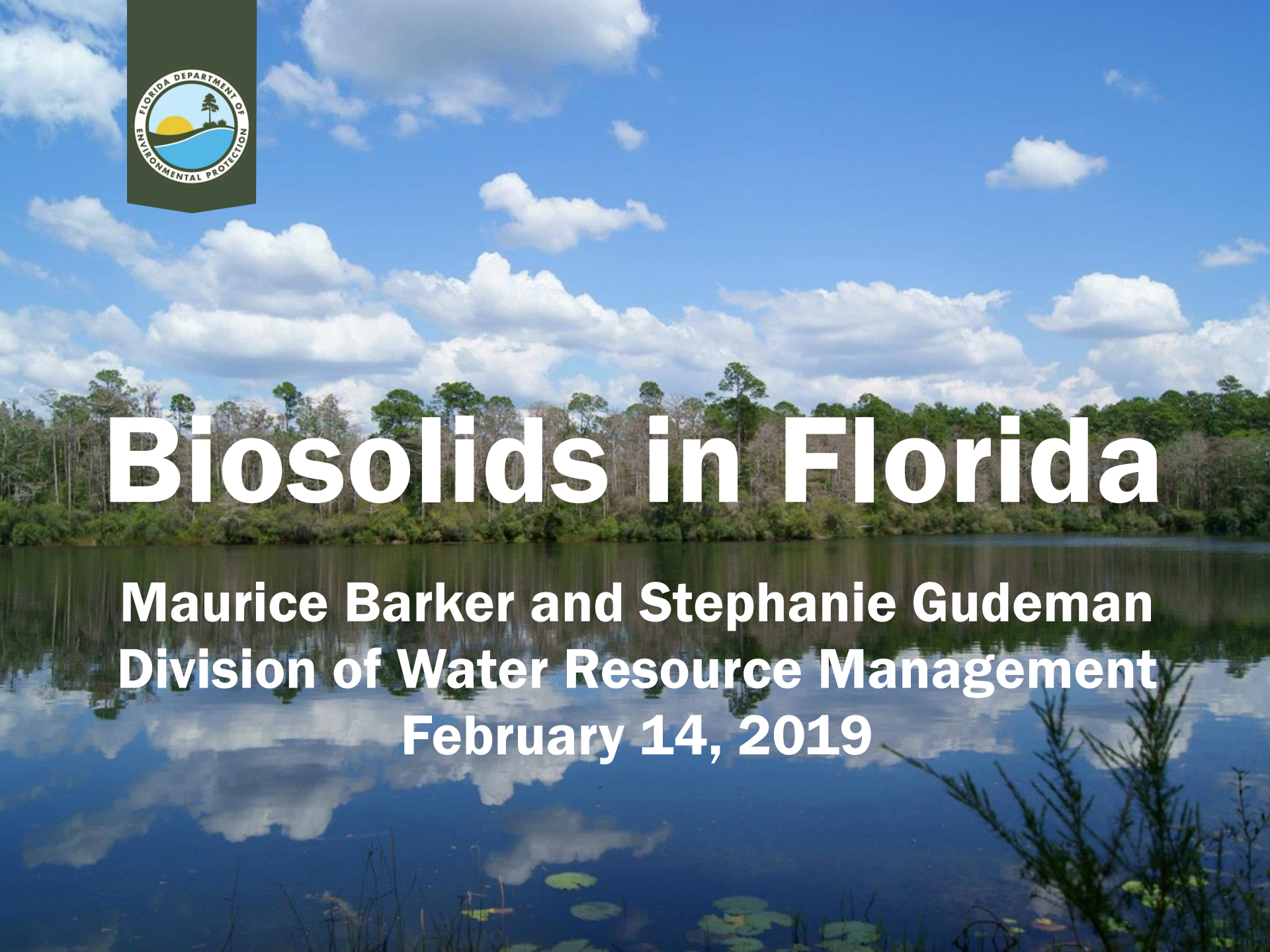


Increase and variance in Potassium (K) is a good indicator of fertilizer source of P.

The lack of positive relationship between K and TP is consistent with non-fertilizer P source such as biosolids.

Other Considerations

- Hauler generally in compliance with permit
- Land owner cooperative
- Caution in extrapolating results



Biosolids in Florida

Maurice Barker and Stephanie Gudeman
Division of Water Resource Management

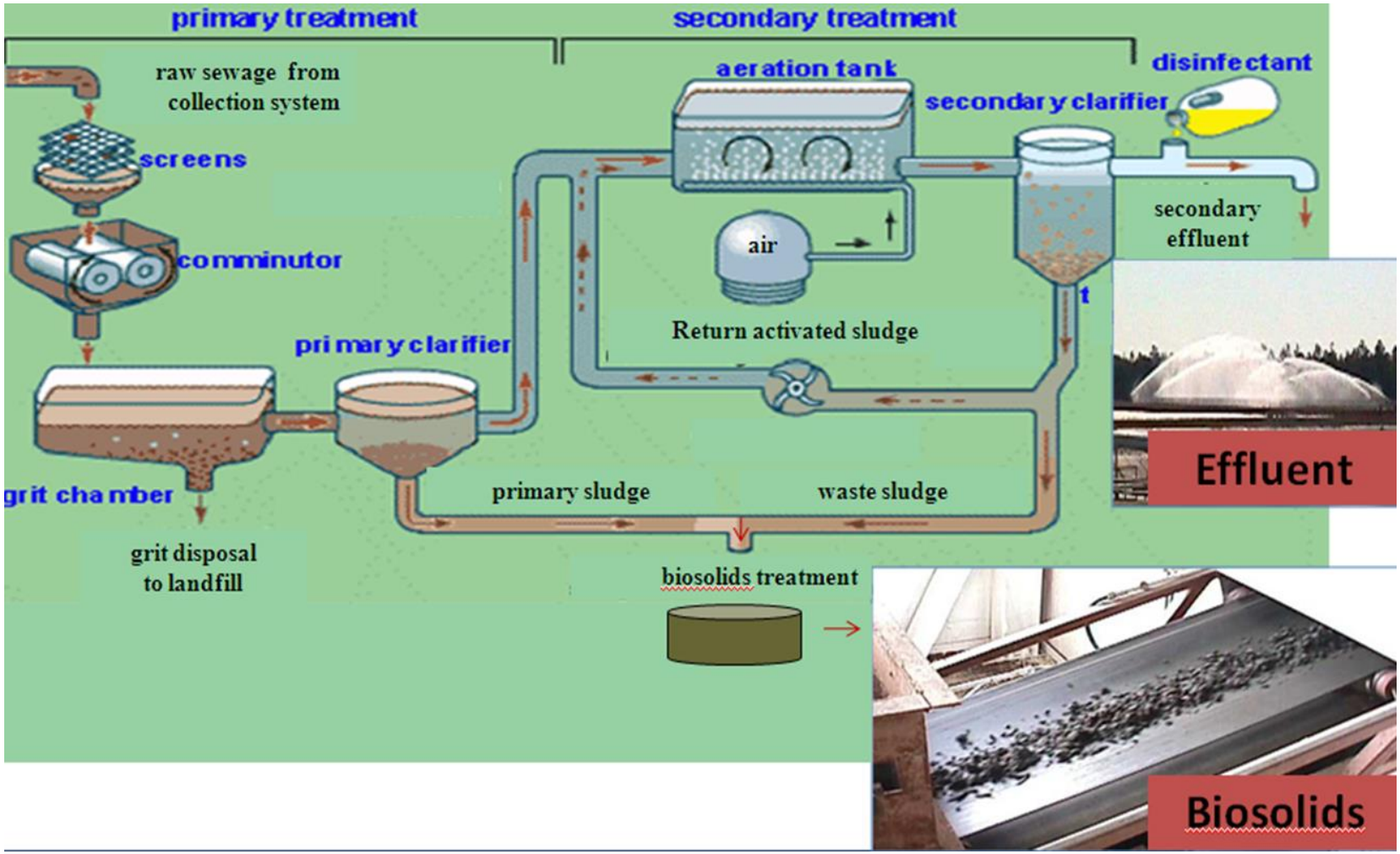
February 14, 2019

Overview

- Biosolids Overview
- Biosolids Management in Florida
- Septage Management Facilities
- Biosolids Technical Advisory Committee

Biosolids Overview

The treatment of domestic wastewater produces two principal end products: effluent and biosolids

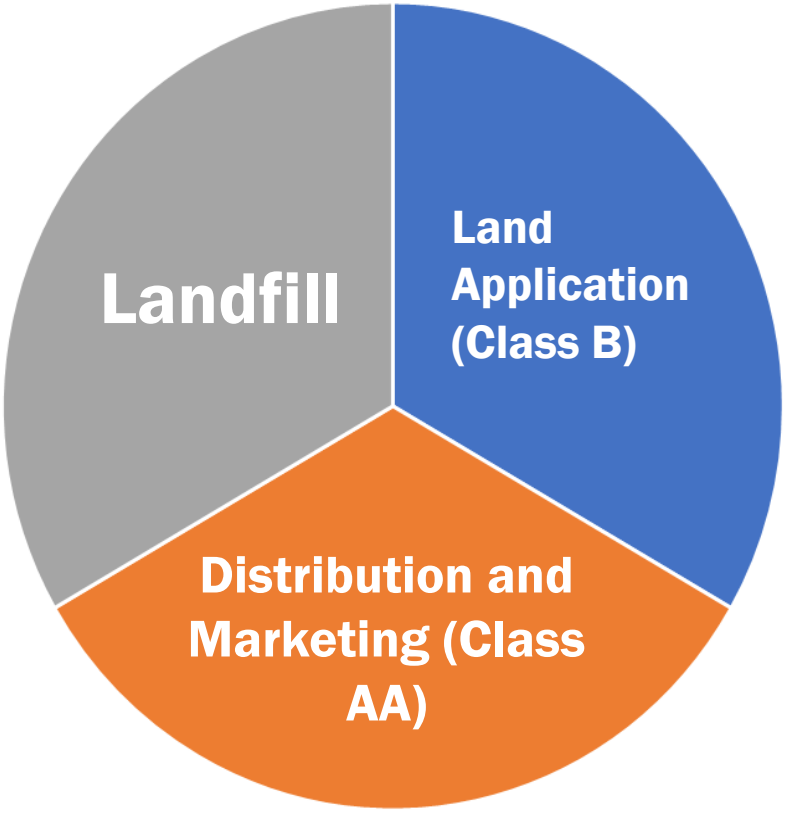


Classes of Biosolids

- Two primary uses:
  - Land application
    - Typically Class B biosolids – minimum quality for beneficial use
  - Distribution and marketing as fertilizer
    - Class AA biosolids – highest quality for beneficial use

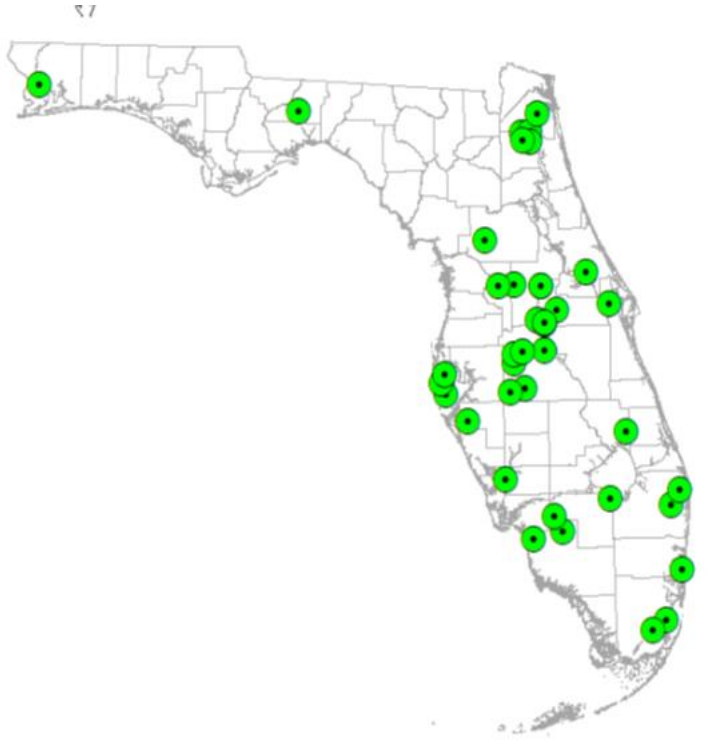
Biosolids Management in Florida

- **Estimated Total Production 340,000 dry tons/year.**
- **Approximately two-thirds are beneficially used and one third is landfilled.**



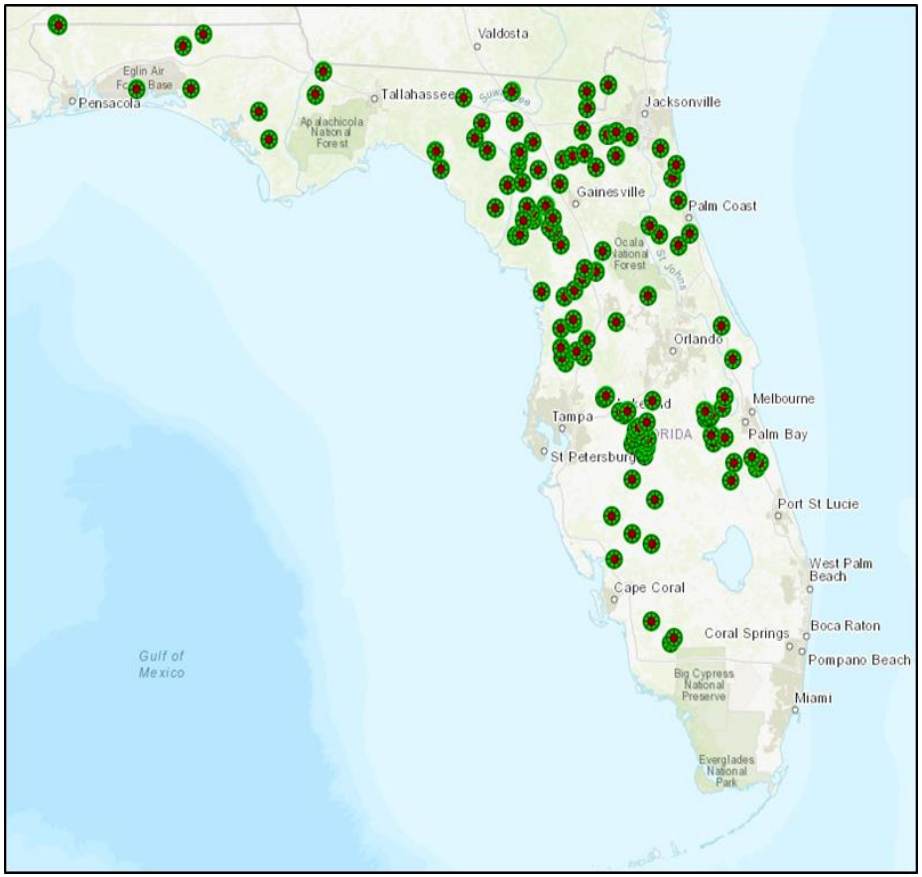
Class AA Biosolids- Distribution and Marketing

- Distributed and marketed as a fertilizer
- Approximately 39 Florida facilities produce Class AA
  - 192,879 dry tons distributed and marketed in Florida
  - 26,717 dry tons distributed and marketed outside of Florida



Class B Land Application

- Approximately 140 permitted land application sites in Florida
- Haulers are the most common site permittees
- Utilities commonly contract with haulers/appliers instead of applying the biosolids themselves



Septage Management Facilities

- The land application of septage under Florida Department of Health (DOH) regulations was prohibited after June 30, 2016, affecting 80-90 entities regulated by DOH
- Under DEP rules, septage is regulated as “biosolids”
- Since 2016, DEP has issued 42 septage management facility permits

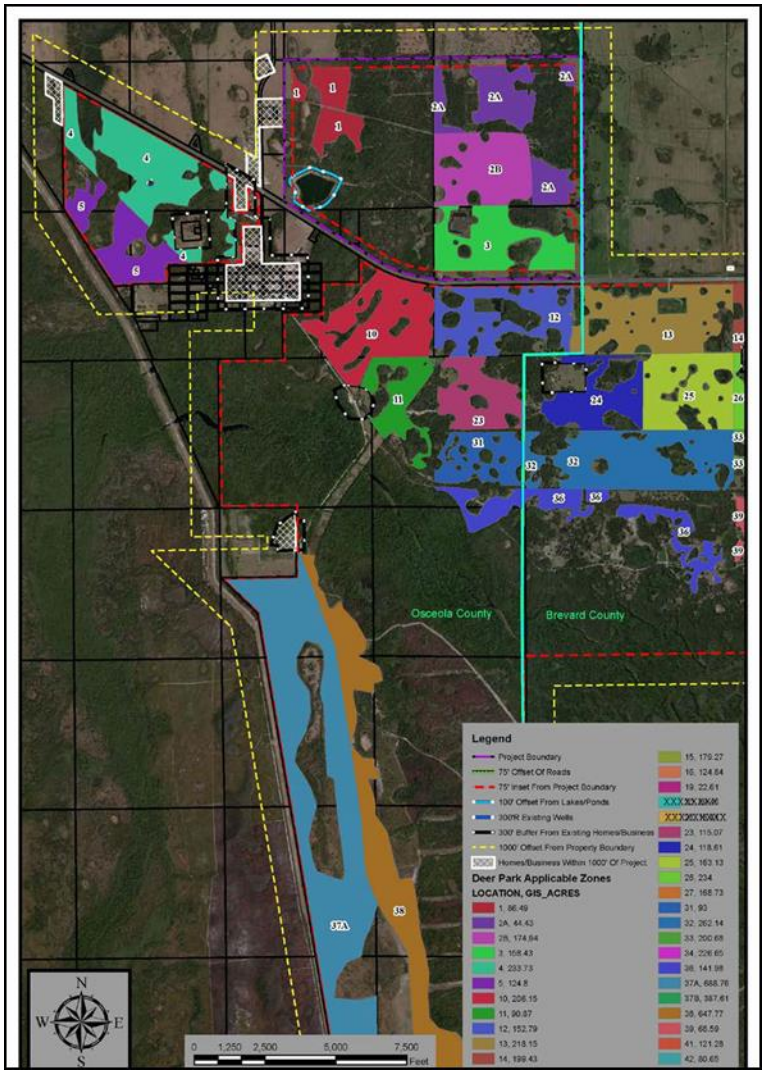
State Regulations Ch 62-640, F.A.C.

Land application permits include:

- Nutrient management plan
- Setback provisions
- Ground water depth provision
- Signage Requirements
- Storage requirements
- Public access, grazing, harvesting restrictions
- Runoff provisions
- Record keeping/reporting requirements

Example Application Site

- Site in Osceola and Brevard Counties, shows the application zones, setbacks, etc.
- This site has 30 application zones covering 5,736 acres
- The odd shapes of the application zones, or fields, primarily result from setback buffers (i.e., wetlands, surface waters, residences, etc.)



Biosolids Technical Advisory Committee

- The Biosolids Technical Advisory Committee (TAC) convened in September 2018 to evaluate biosolids management and explore opportunities to better protect Florida's water resources.
- The TAC members represented stakeholders from environmental and agricultural industry experts, large and small utilities, waste haulers, consultants and academics.
- Each public meeting included an open public comment period, as well as discussion with experts among the TAC members, the audience and the Department

TAC Recommendations

- **Permit biosolids in a manner that minimizes migration of nutrients, specifically phosphorus, to prevent impairment to waterbodies.**
  - **Establish the rate of phosphorus application based on site specifics, such as soil characteristics/phosphorus adsorption capacity, water table, hydrogeology, site use, distance to surface water;**

TAC Recommendations, continued

- Increase DEP inspection rate of land application sites;
- Develop monitoring protocols to detect nutrient migration;
- Develop and conduct biosolid and nutrient management research on nutrient run-off through surface and groundwater flow; and
- Promote innovative technology pilot projects for biosolids processing that could provide a wider range of beneficial end products.

Contact Information

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QUESTIONS?


FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION