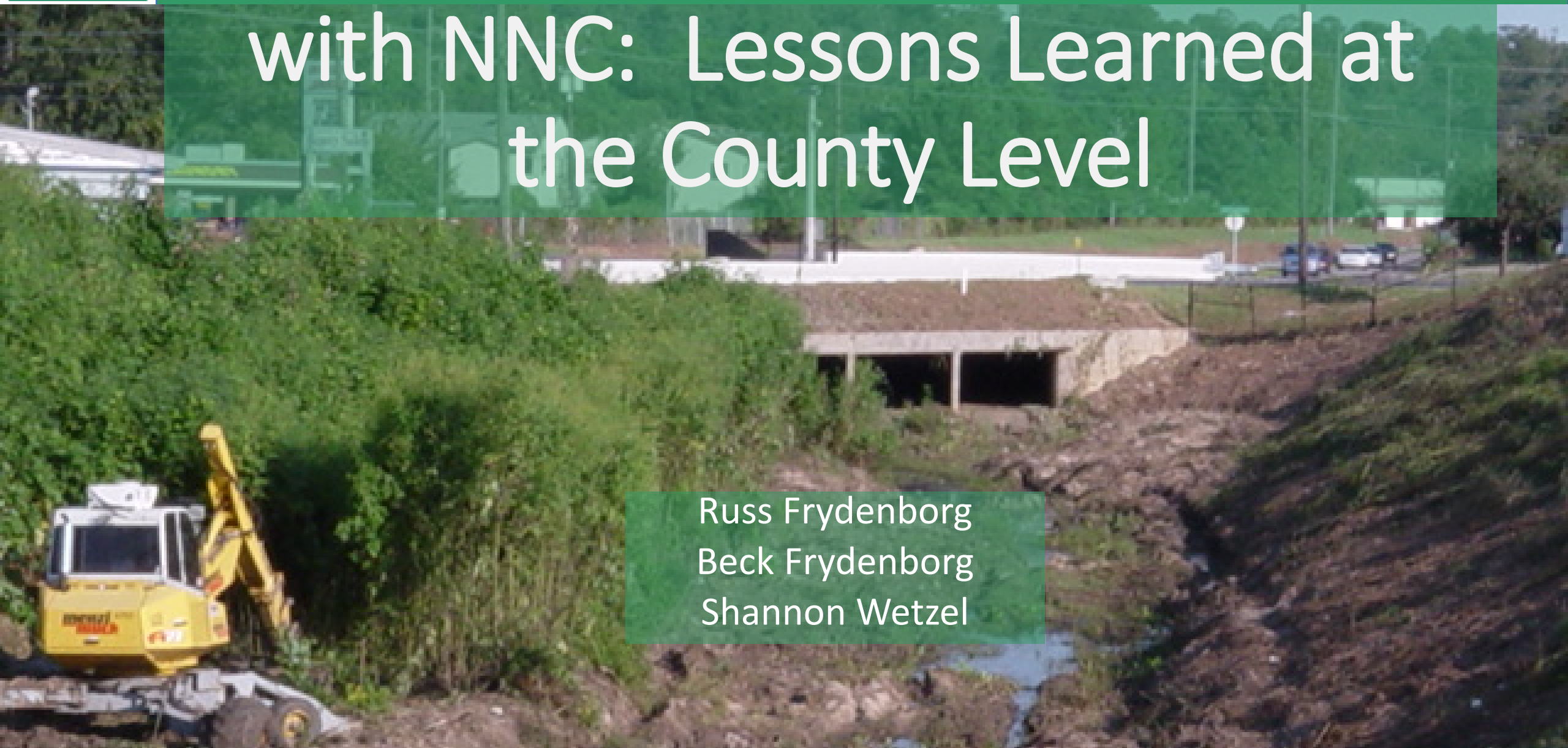
Stormwater Program Compliance with NNC: Lessons Learned at the County Level



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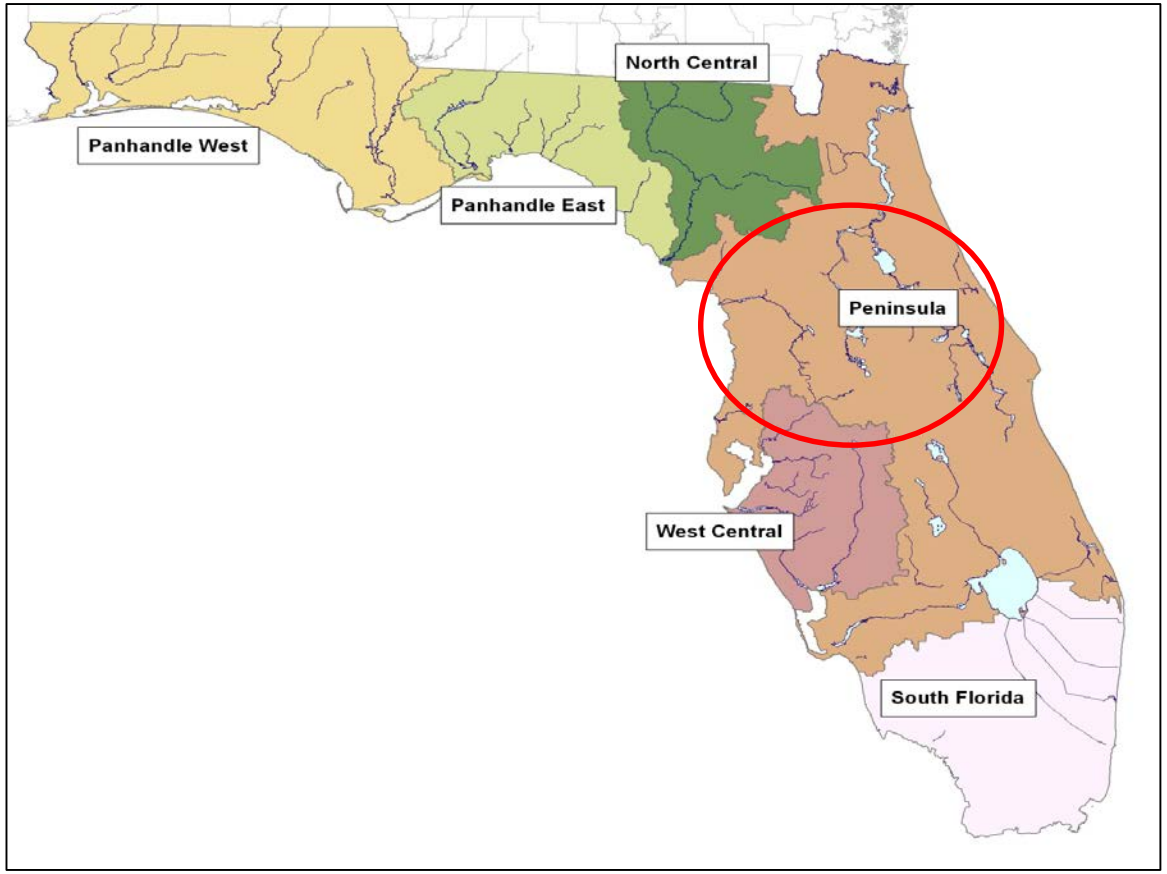
Summary

- Florida NNC was approved by EPA in early 2014
- Stormwater conveyances NOT exempt from NNC (if classified as Waters of the State)
- Seminole County took proactive steps to comply
- Physical, floral, faunal, and nutrient data presented
- Management decisions discussed

Stream Numeric Nutrient Criteria (NNC)

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.	



Review of NNC Requirements

NNC currently attained in receiving water and downstream waters → **Your operations do not cause or contribute to nutrient impairment**

Site-specific Reasonable Assurance demonstration may be:

- **Compliance with Hierarchy 1**
- **Compliance with lakes or springs criteria**
- **Compliance with streams flora and nutrient thresholds or fauna**
- ***Compliance with narrative criterion, where applicable***
- **No reasonable potential for nutrient issues**

NNC Compliance Options

Option 1

- Achieve the stream floral metrics, and either:
  - Achieve the fauna (SCI) metric, or
  - Achieve the reference stream-based nutrient thresholds.
- Usually not feasible: physical disturbance associated with maintenance of stormwater systems often results in poor flora and fauna

NNC Compliance Options

Option 2

- Determine that physical characteristics and ongoing maintenance activities are consistent with the “exception to the streams definition” found in Rule 62-302.200(36), F.A.C.
- Demonstrate that there are no biological imbalances due to nutrients (physical stress may be present)
- Feasible for many stormwater conveyances

NNC Compliance Options

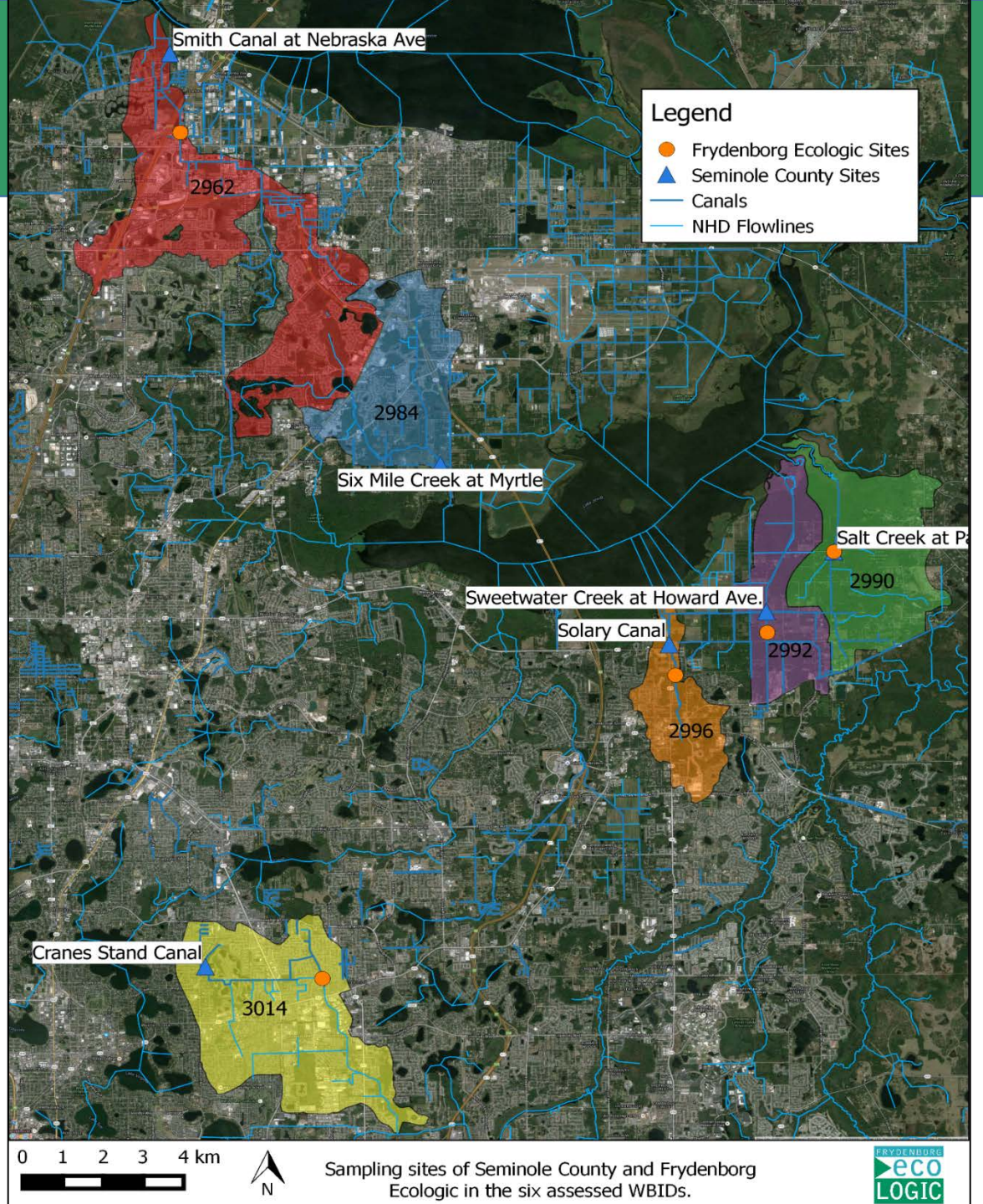
Option 3

- Change the classification of the conveyances from Class III to Class III-Limited
- Reclassification to Class III-Limited is the most expensive, it would require significant public input, and would need a written commitment (resolution) from the City or County Commissions

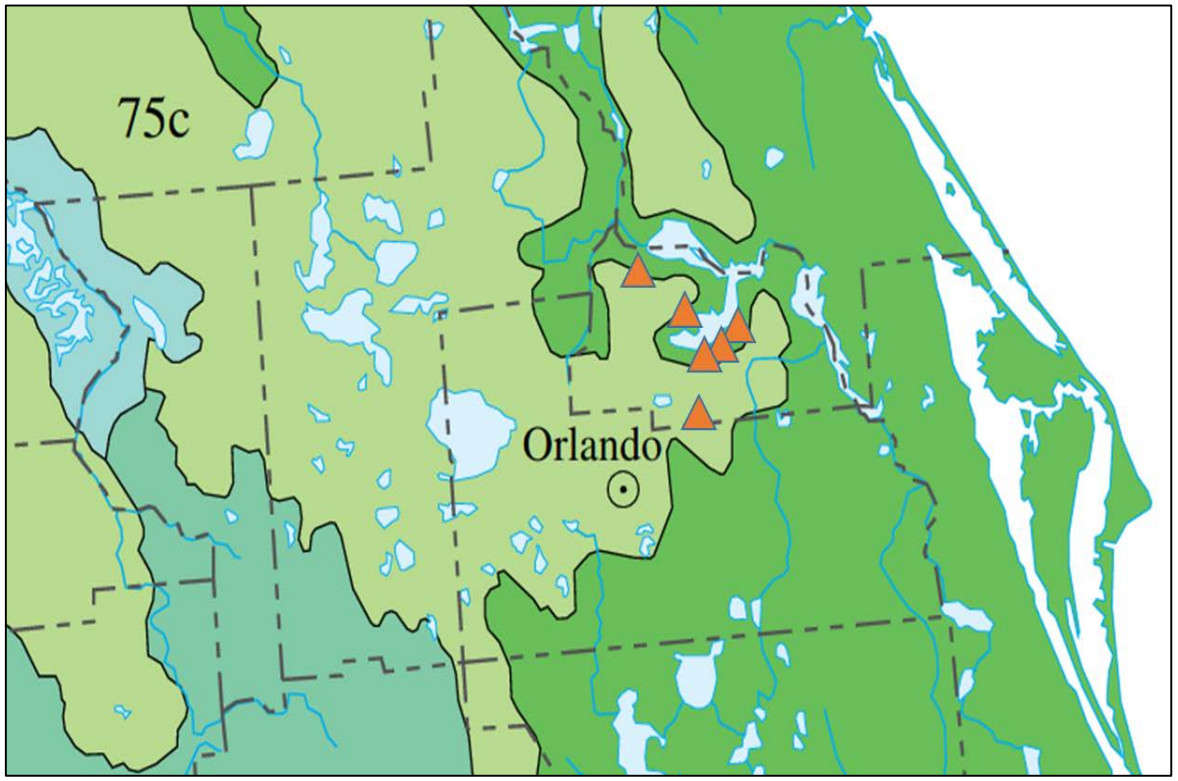
Study Objectives

- Collect the required physical, chemical, and biological information to assess optimum strategies to comply with NNC
- 6 habitat, floral, and BioRecon sites in Seminole County (Stressor ID in Salt Creek)

- Seminole County Sites:
- Little Econlockhatchee, Lake Jesup, and St. Johns Watersheds



Ecological Region

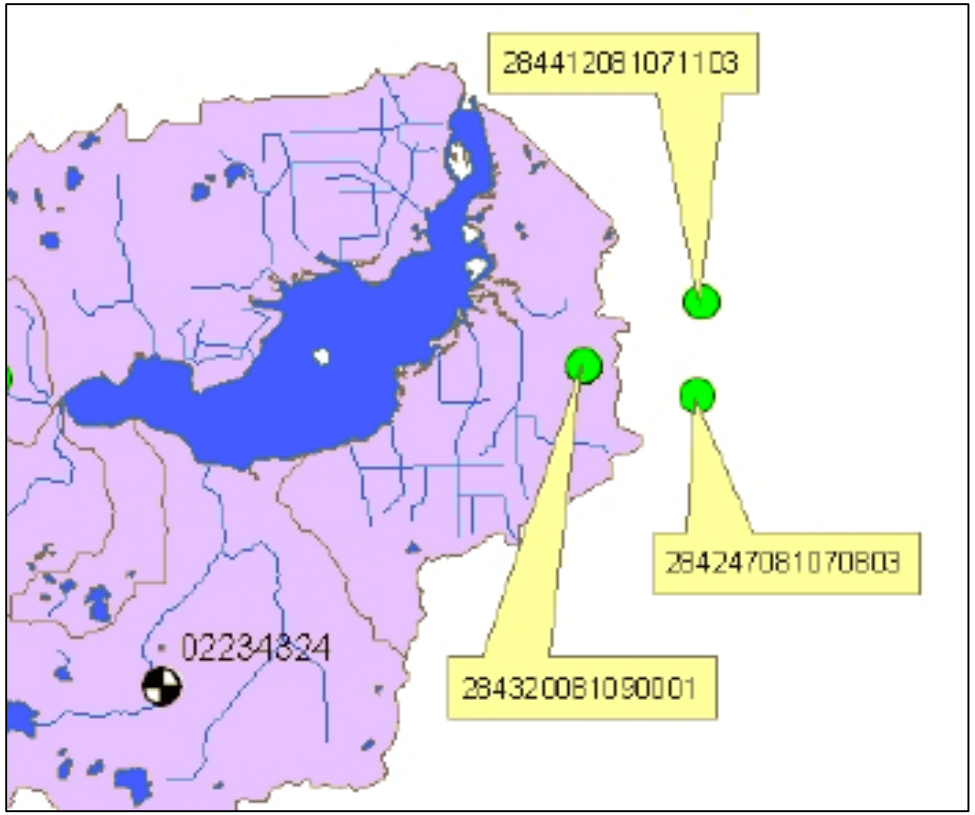


Central Florida Ridges and Uplands (75c) and the Eastern Florida Flatwoods (75d)

Historical Mosquito Control Ditches

1949 Photos of Mosquito Ditch Construction

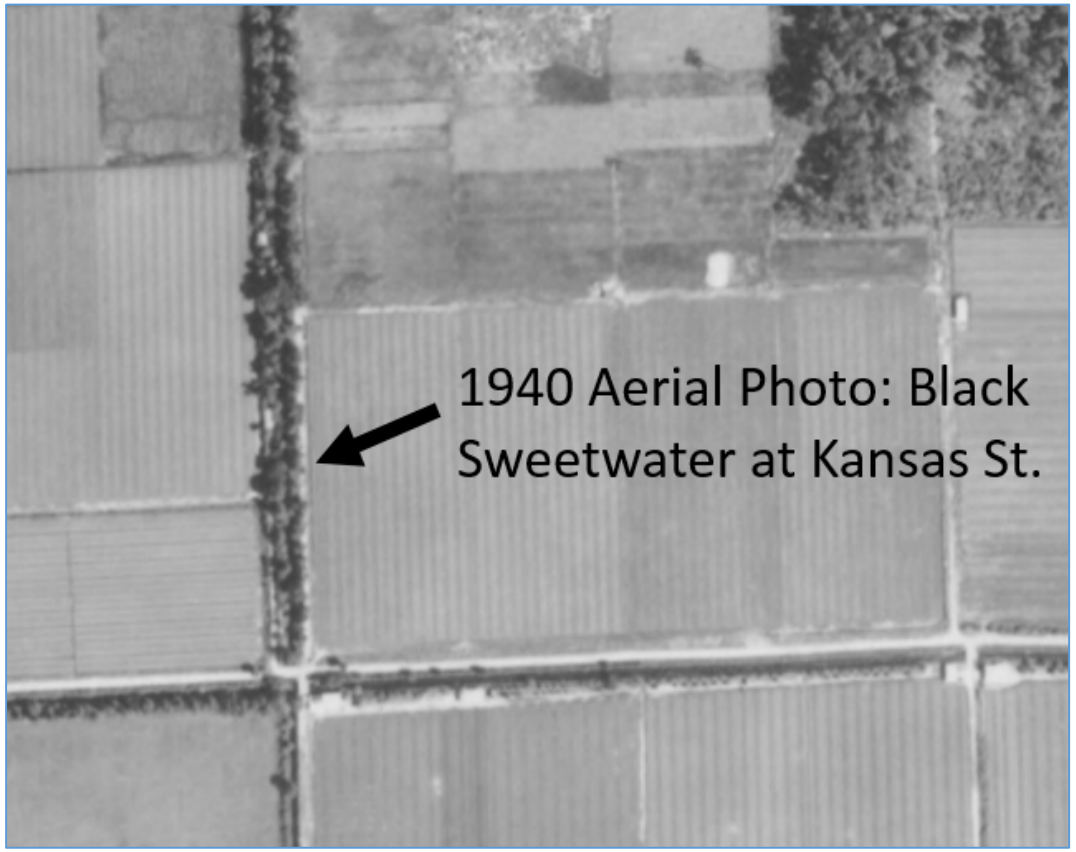
Many of these are now held to natural stream expectations



FDEP Background Well Locations

1935 Photo of Artesian Well in Black Hammock

All Sites Modified Prior to 1975



Streams “Ditch” Exception

“Ditches, canals and other conveyances, or segments of conveyances, that are man-made, or predominantly channelized or predominantly physically altered; and

- Are primarily used for water management purposes, such as flood protection, **stormwater management**, irrigation, or water supply; and
- Have marginal or **poor stream habitat** or habitat components, such as a lack of habitat or substrate that is biologically limited, because the conveyance has cross sections that are predominantly trapezoidal, has armored banks, or is maintained primarily for water conveyance.”

Maintenance Costs

Seminole

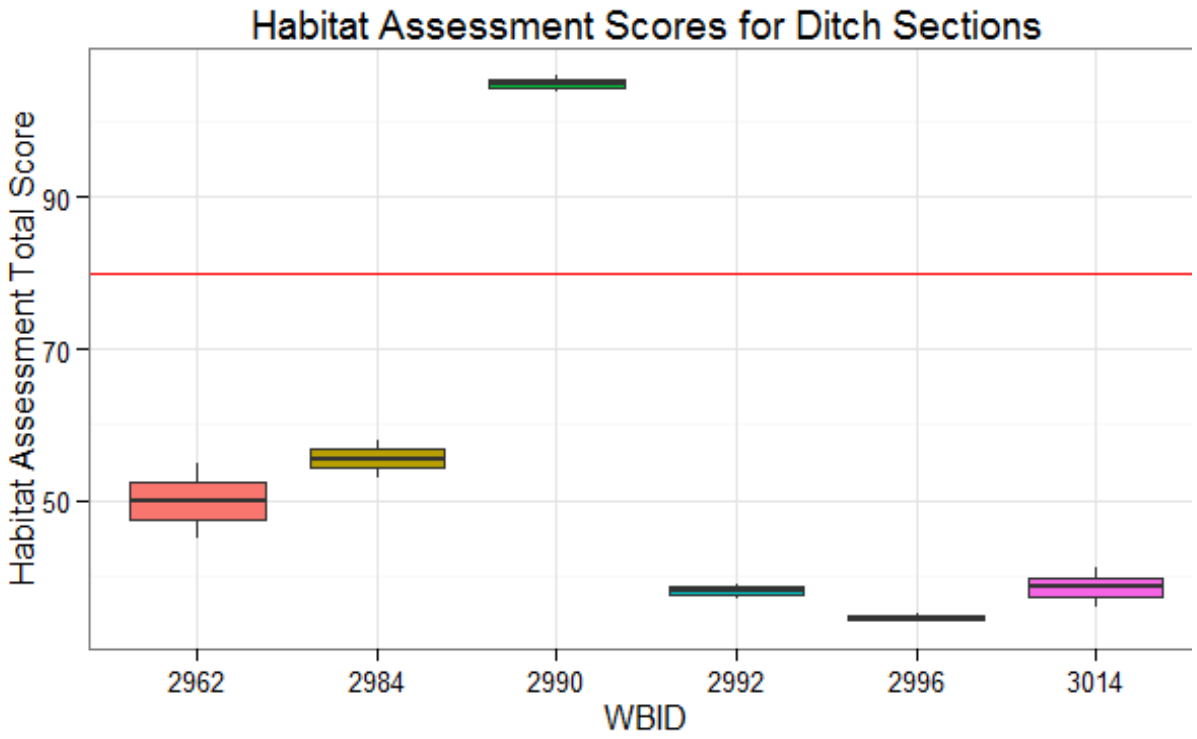
Ditch System	Amount
Crane (includes Eastbrook and Tanglewood)	$966,103.73
Smith	$852,077.67
Six Mile	$78,704.07
Black Sweetwater	$84,507.32
Solary	$8,318.36
Total	$2,059,911.15
Cost per Year	$171,659.26

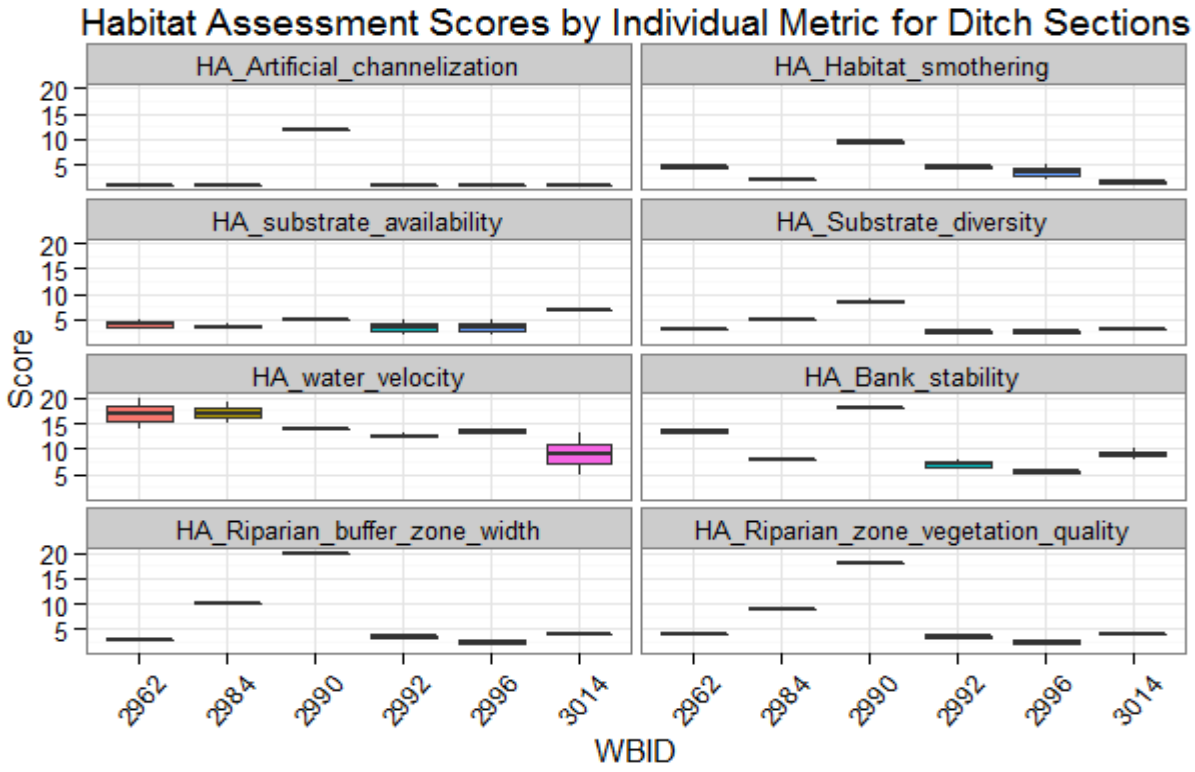
Typical Documented Maintenance

Maintenance Access Roads Are Often Built Adjacent to Conveyances

Seminole County Habitat

Except for Salt Creek, all qualify for ditch exception





Hydrologic Modification

No disturbance 1-2 points	Flow regime as naturally occurs (slow and fairly continual release of water after rains), few impervious surfaces in watershed; high connectivity with ground water and surface features delivering water (e.g., sandhills, wetlands; no ditches, berms)
Slight disturbance 3-4 points	Flow regime minimally changed; some water withdrawals; some wetland drainage, some impervious surfaces in watershed, some ditching
Moderately altered 5-6 points	Flow regime moderately altered; hydrograph moderately flashy (scouring after rain events with subsequent reductions in flow), groundwater pumping evident; much wetland drainage, topographic alterations reduce natural water input; more impervious surfaces throughout watershed, dams/control structures change normal water delivery schedule
Poor 7-8 points	Flow regime highly altered; hydrograph very flashy (scouring after rain events with subsequent reductions in flow, leading to stagnant or dry conditions, related to large amounts of impervious surfaces and/or ditching throughout watershed); water withdrawals & impoundments/control structures severely alter flows, large amounts of impervious surfaces
Very poor **9-10 points**	**Flow regime entirely human controlled; hydrograph very flashy (scouring after rain events with subsequent reductions in flow, leading to stagnant or dry conditions, related to impervious surfaces and ditching throughout watershed); water withdrawals & impoundments fundamentally alter the nature of the ecosystem**

Location	Score
Seminole Average (excluding Salt)	10

Biological Evaluation

- Because the ditch exception was demonstrated (maintained conveyances with poor habitat and hydrologic modification), it is simply required that flora and fauna not be imbalanced due to human alterations in nutrients
- Flora and fauna may be stressed by other, non-nutrient factors
- Graphical analyses and literature used

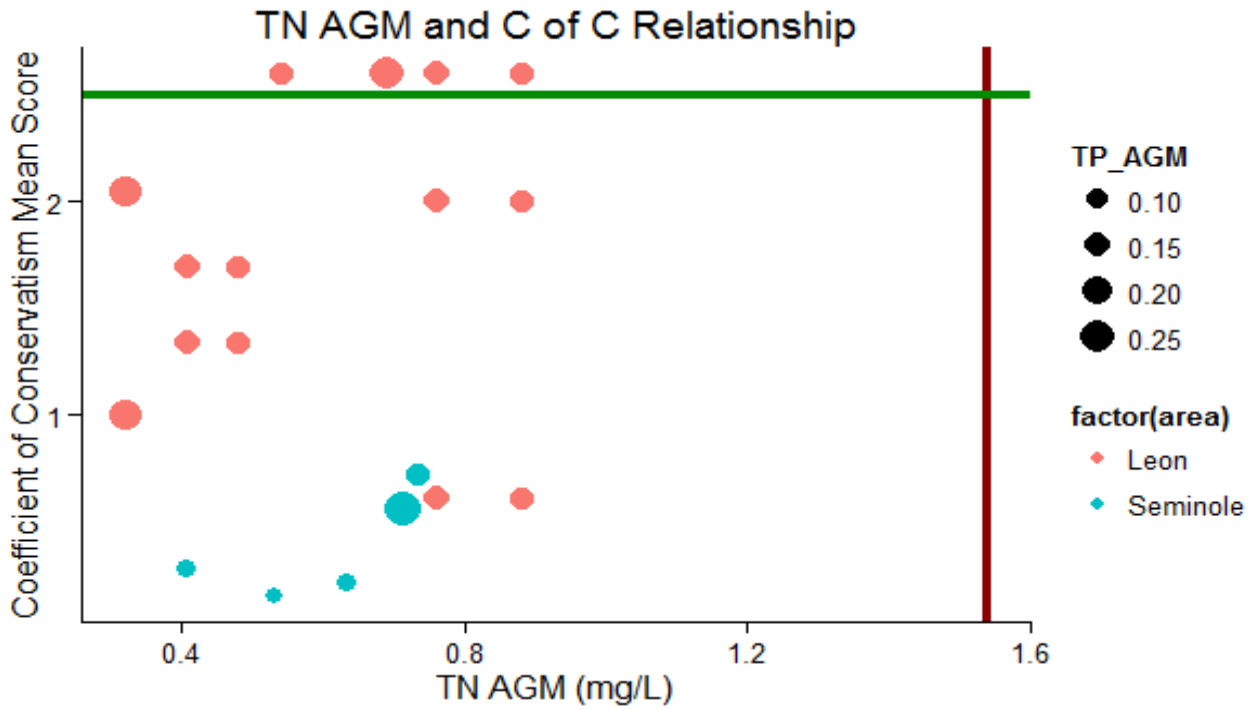
Seminole Rapid Periphyton Survey

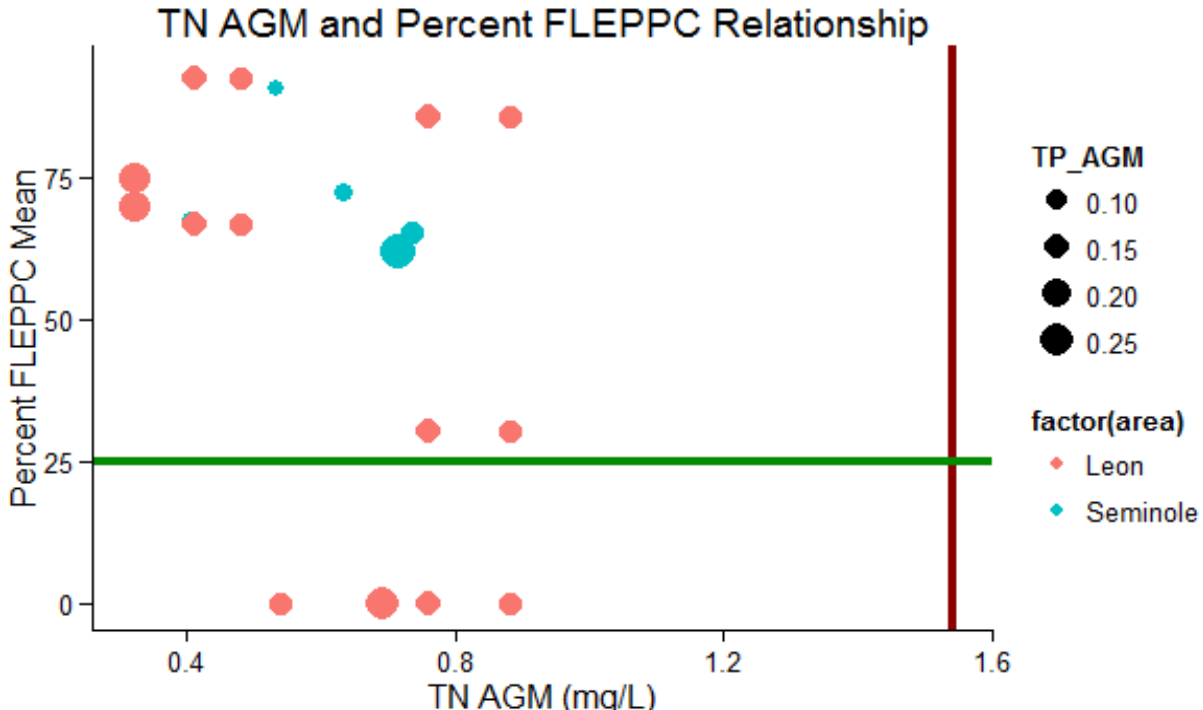
	March 2015		August 2015		Both Samplings
Site	% Rank 4-6	Meet RPS?	% Rank 4-6	Meet RPS?	Meet RPS?
Crane Strand (3014)	17	yes	2	yes	yes
Solary (2992)	0	yes	0	yes	yes
Black Sweetwater (2996)	11	yes	4	yes	yes
Salt (2990)	0	yes	0	yes	yes
Smith (2962)	0	yes	0	yes	yes
Six Mile (2984)	0	yes	0	yes	yes

Seminole Linear Vegetation Survey

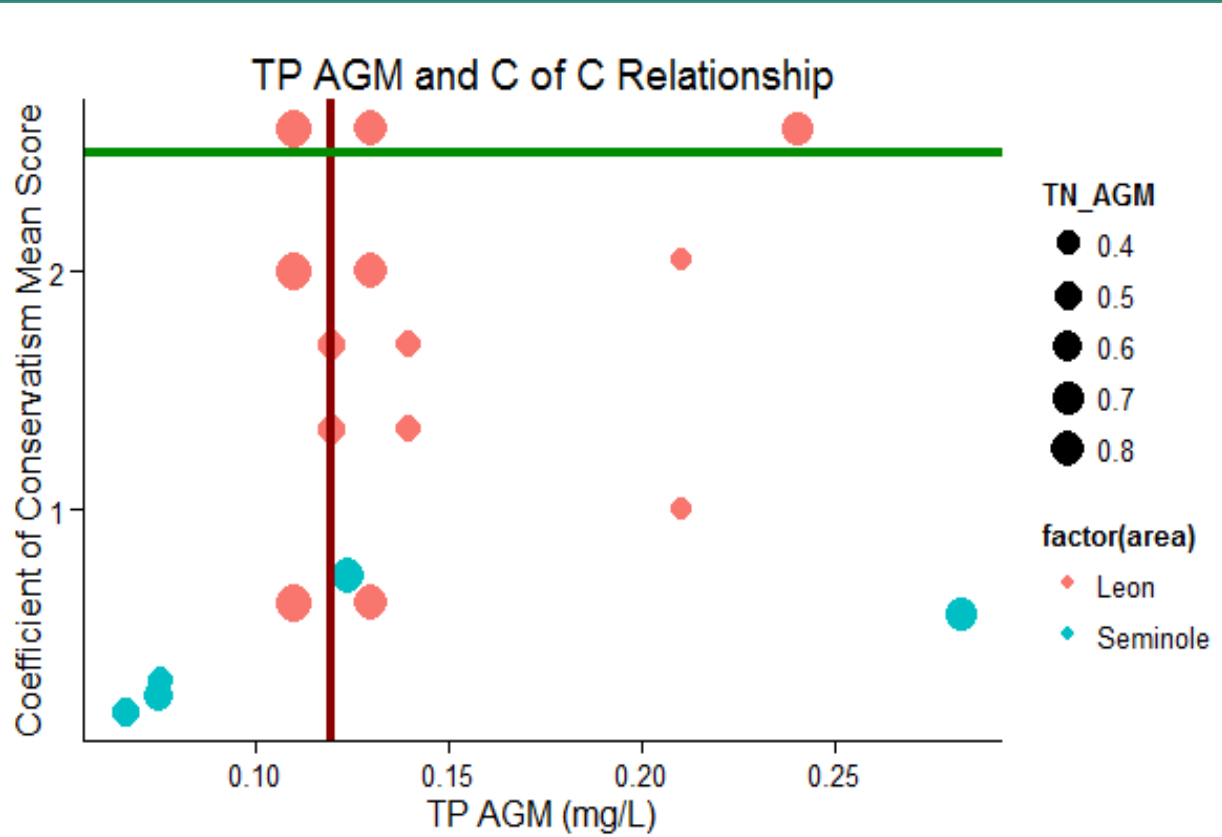
	Sample 1				Sample 2			
Site	<2 m2 plant?	mean C of C	% FLEPPC	Meet LVS?	<2 m2 plant?	mean C of C	% FLEPPC	Meet LVS?
Crane Strand (3014)	no	0.11	95.3	no	no	0.19	85.6	no
Solary (2992)	no	0.73	66.6	no	no	0.71	63.9	no
BlackSweetwater (2996)	no	0.96	57.6	no	no	0.17	66.7	no
Salt (2990)	Yes	NA	NA	yes	Yes	NA	NA	yes
Smith (2962)	no	0,32	60.8	no	no	0.24	73.8	no
Six Mile (2984)	no	0.15	70	no	no	0.28	75	no

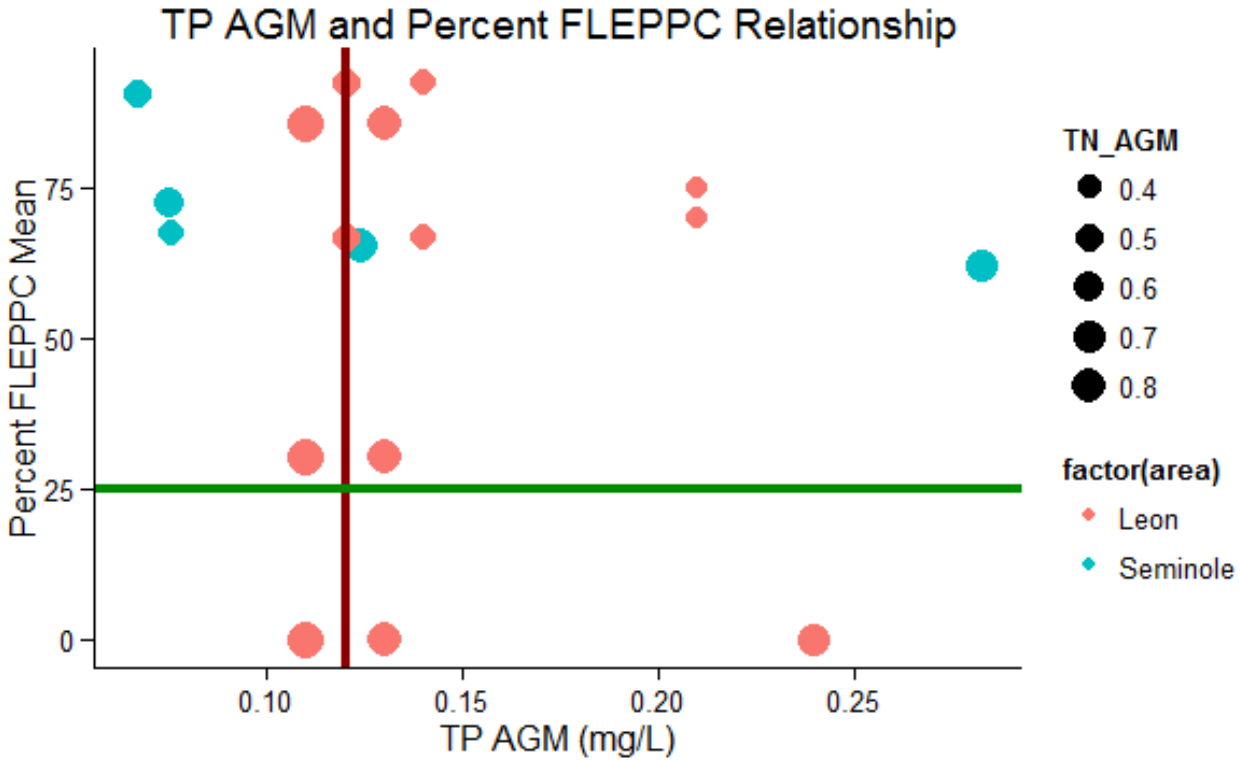
TN vs. LVS Metrics





TP vs. LVS Metrics





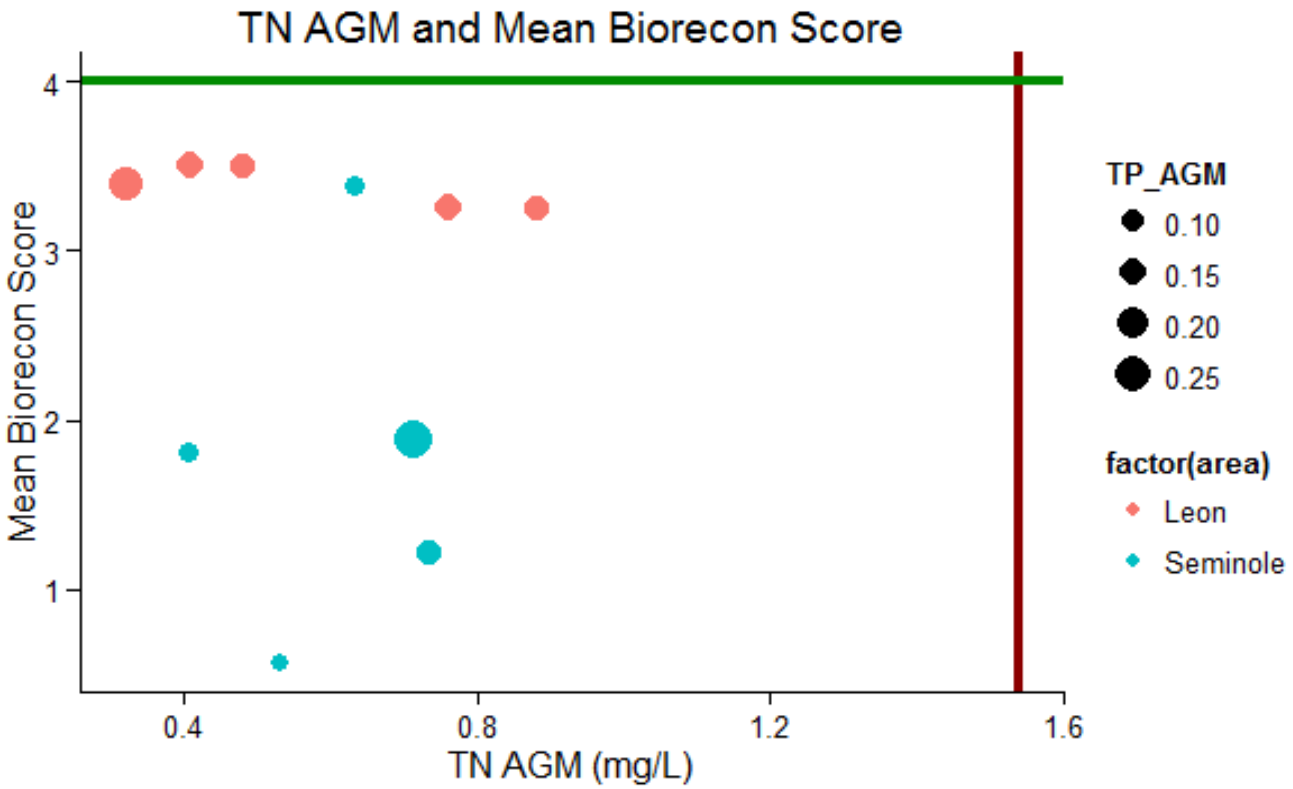
Flora Discussion

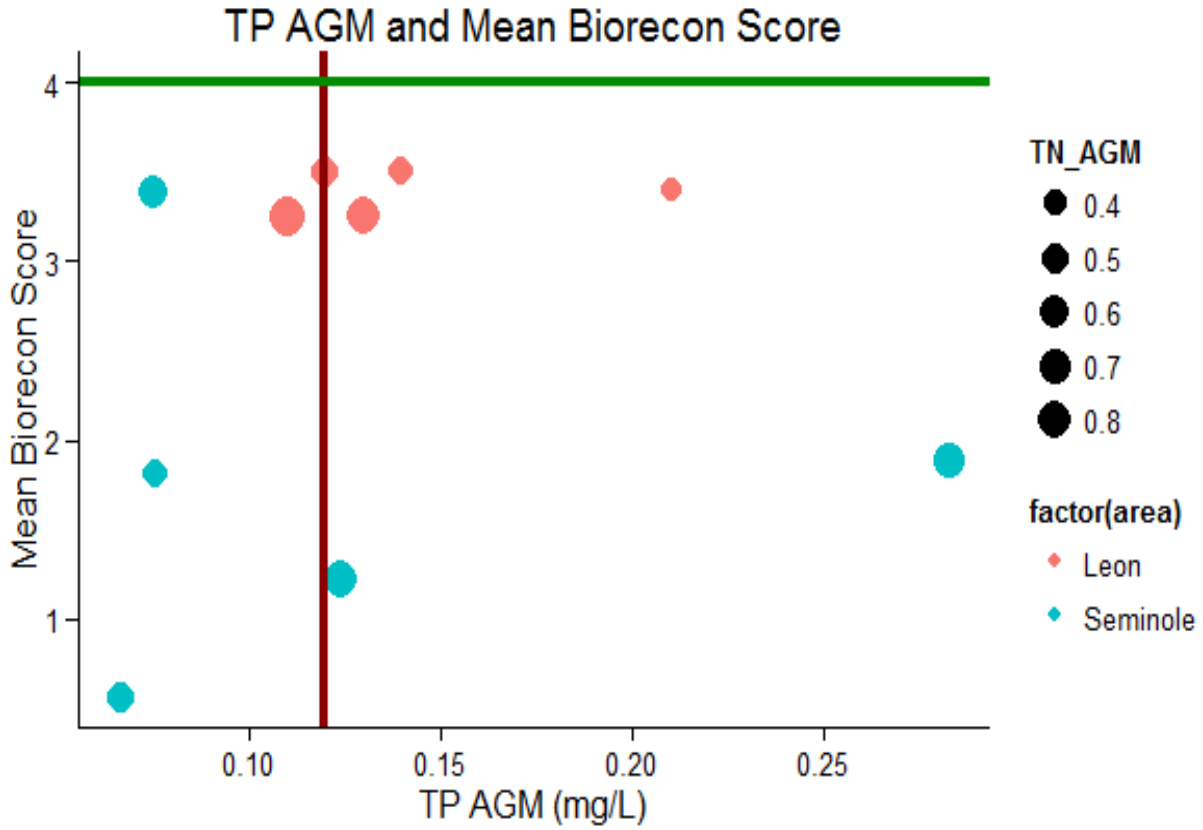
- Because all of the ditch sites meet the ditch exception, the streams LVS and RPS thresholds do not apply
- RPS generally OK
- LVS failures not associated with nutrient concentrations
  - Invasive plants thrive in physically disturbed systems (Bunn and Arthington, 2002, etc.)

❖ Therefore, there were no imbalances due to nutrients

Seminole BioRecon Results

WBID	Site	Sample 1	Sample 2	Average	Meet BioRecon Threshold?
3014	Crane	0.52	0.7	0.61	No
2992	Solary	1.4	0.66	1.03	No
2996	Black Sweetwater	2.1	1.23	1.67	No
2962	Smith	1.85	1.7	1.78	No
2984	Six Mile	3.35	3.5	3.43	No





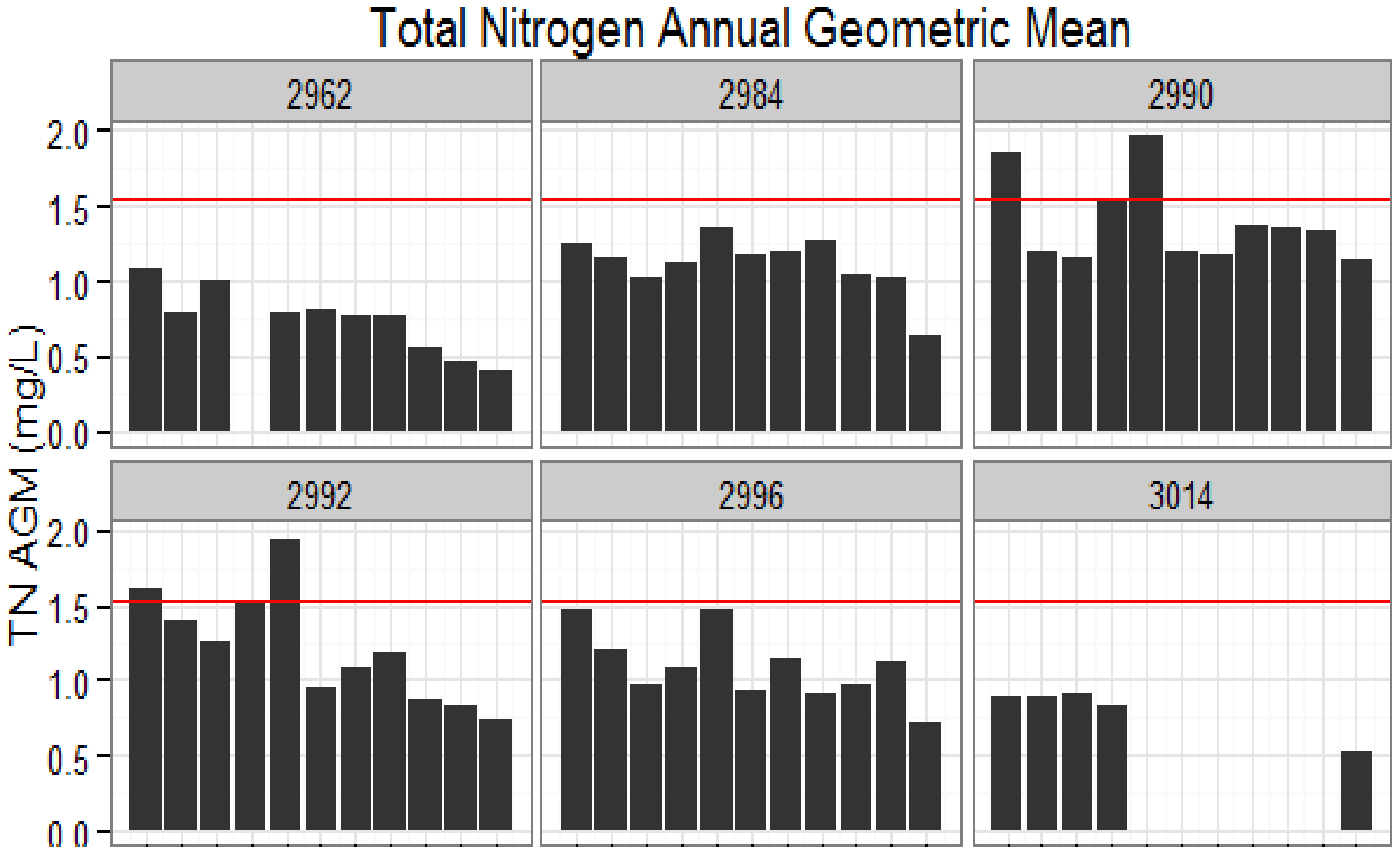
BioRecon and converted SCI (divided by 10) vs. TN, TP

Fauna Discussion

- Because all of the ditch sites meet the ditch exception, the streams SCI and BioRecon numeric thresholds of 40 and 4, respectively, do not apply
- The extreme **channelization**, **habitat limitations**, and **hydrologic modifications** observed in the ditches are analogous to conditions observed where a comprehensive Stressor Identification Analysis was conducted
- These physical stressors were responsible for the low faunal scores in the ditches, and there were no faunal imbalances due to human alterations in nutrients

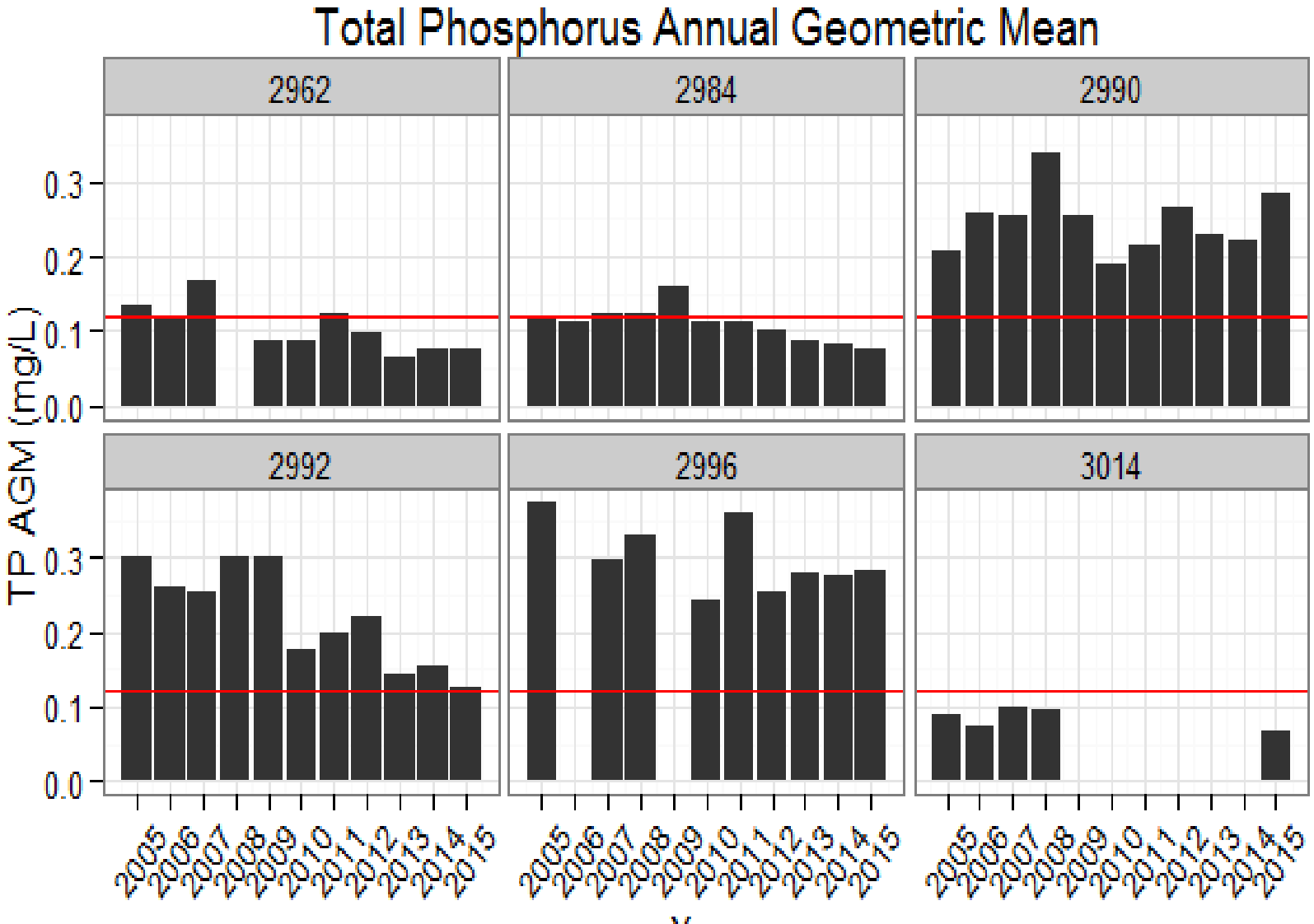
Seminole TN

2962 = Smith
2984 = Six Mile
2990 = Salt
2992 = Solary
2996 = Black Sweetwater
3014 = Crane



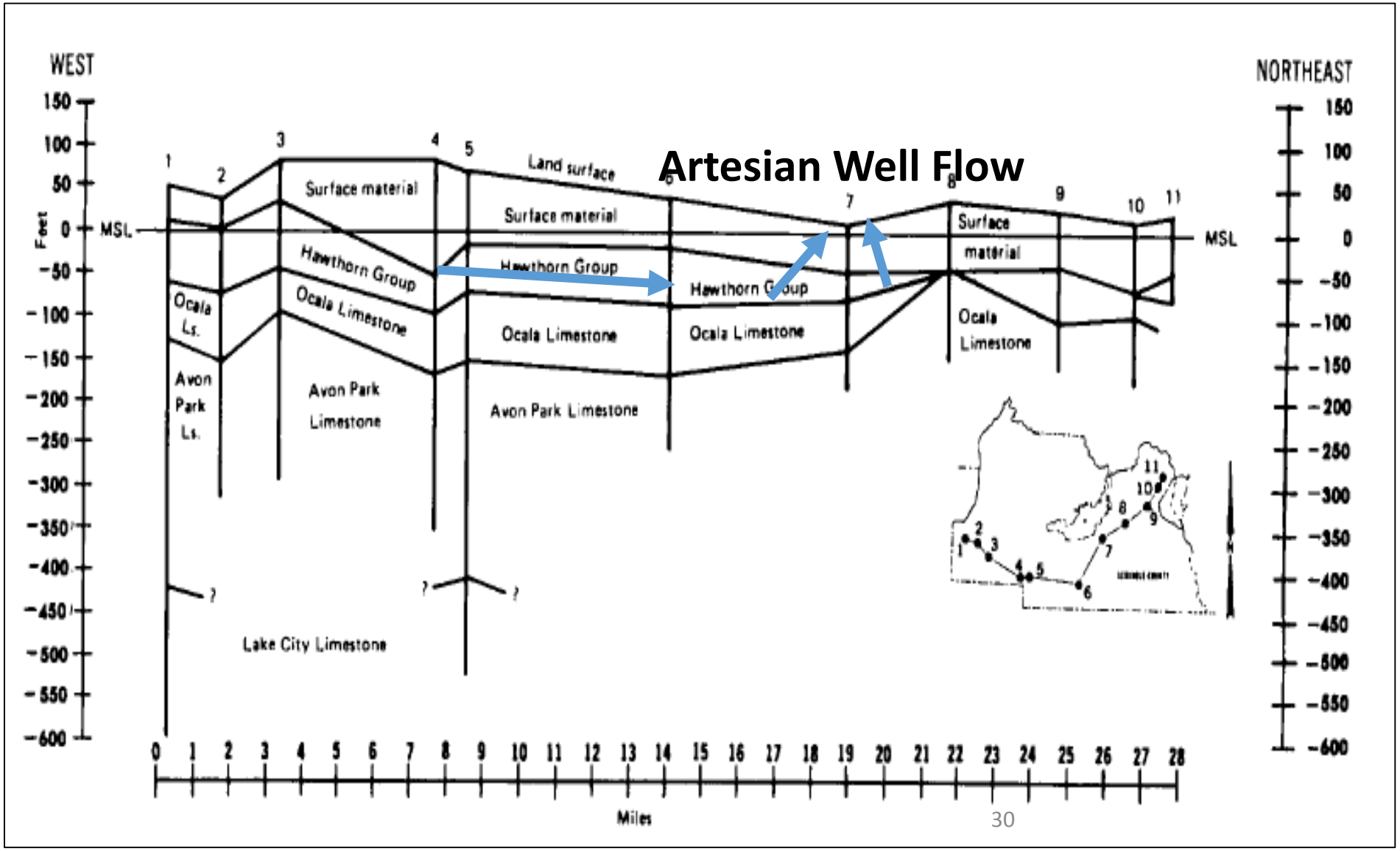
Seminole TP

2962 = Smith
2984 = Six Mile
2990 = Salt
2992 = Solary
2996 = Black Sweetwater
3014 = Crane



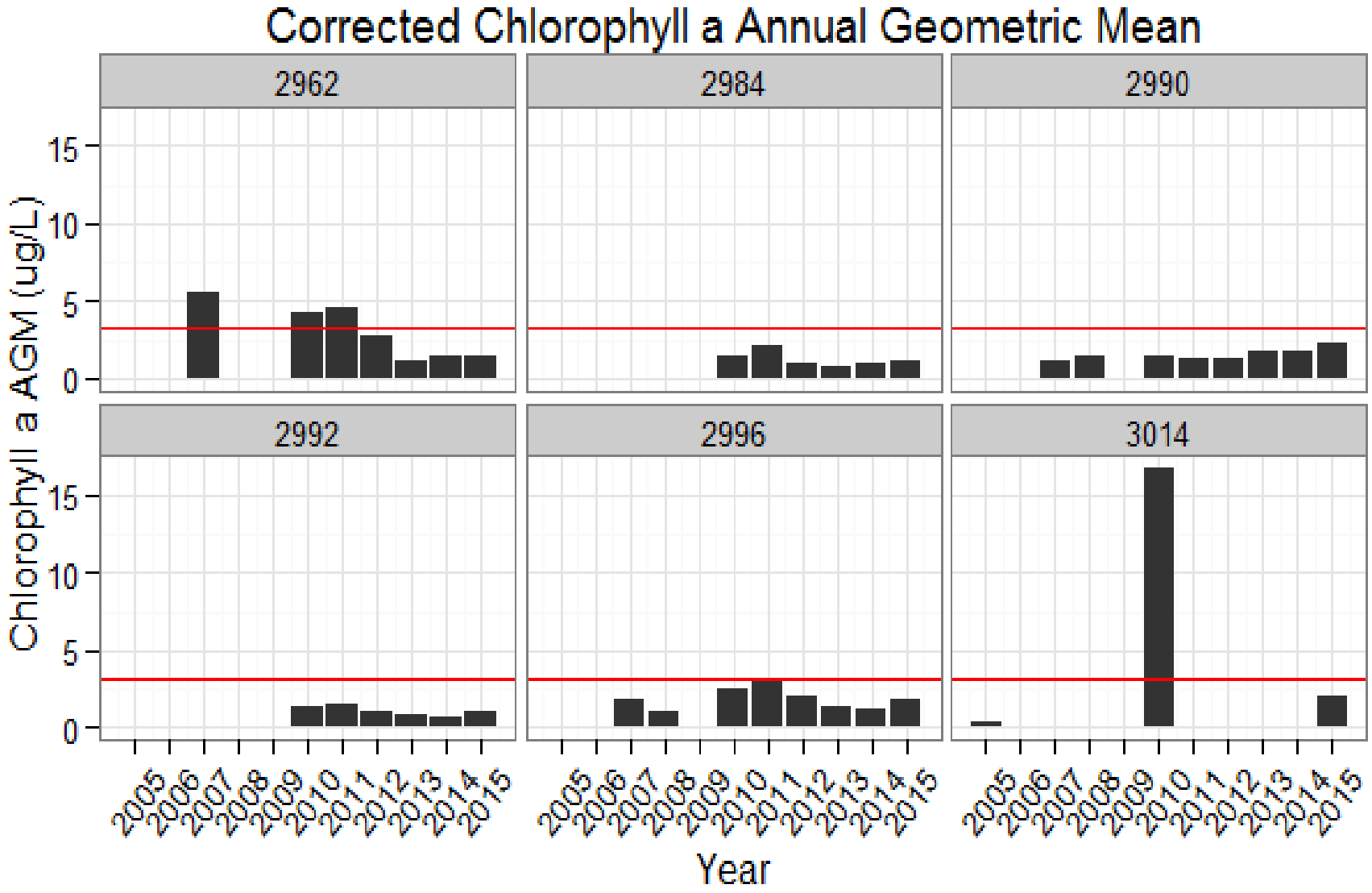
Seminole and Hawthorne Formation

FDEP Background wells in Black Hammock: Mean TP was **0.27 mg/L**, the 75th %ile was **0.31 mg/L**, and 90th %ile was **0.39 mg/L**



Seminole Chlorophyll

2962 = Smith
2984 = Six Mile
2990 = Salt
2992 = Solary
2996 = Black Sweetwater
3014 = Crane



Seminole Nutrient and Chlorophyll

- All sites achieved the TN nutrient threshold (1.54 mg/L)
- Three urbans sites achieved the TP threshold (0.12 mg/L)
- Three Black Hammock sites exceeded the TP threshold, due to natural sources (marine phosphorus deposits)
- AGM chlorophyll at all ditch sites was much less than the impairment threshold (20 µg/L)
- Salt Creek always achieved 3.2 µg/L

Option: Reclassification

Classification System

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

Reclassification Discussion

- Conduct Use Attainability Analysis
- No removal of existing uses
- The uses to be removed would not be attained by BMPs
- Reclassification is clearly in the public interest
- Downstream waters will be fully protected
- One or more of the criteria from Paragraph 62-302.400(11)(c), F.A.C., apply
  - Hydrologic modification would apply

Conclusions

- Maintenance activities and historical aerial photos show that the use of all ditches is consistent with “water management purposes” defined in Rule 62-302.200(36) (b) F.A.C.
- The physical habitat of the ditches was consistent with the water management conveyance exception to NNC (Rule 62-302.200(36) (b), F.A.C.)
- This is clear evidence that the **narrative nutrient criterion should be applied**

Conclusions

- Except for TP in Black Hammock sites (natural TP inputs), nutrients and chlorophyll were not an issue in the ditches
- Channelization, habitat alteration, and hydrologic modifications were responsible for biological stress (except for salt water in Salt Creek)

❖**There were no human alterations of <u>nutrients</u> causing floral or faunal imbalances, therefore the narrative criterion was achieved**

Recommendations

- Since the ditches meet the exception definition in Rule 62-302.200(36) (b) F.A.C. , data showed compliance with the **narrative** nutrient criterion (Chapter 62-302.531, F.A.C.)
- No urgent need to reclassify the ditches to Class III-Limited
- Floral and faunal sampling should be conducted twice within the 5 year IWR assessment period
- TN, TP, and chlorophyll data should be collected five times per year at one representative site per WBID

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