Reference Lakes Status Update

Biocriteria Meeting
November 5, 2019
Palatka, FL

Outline

- Objectives
- Sampling progress
- 2016-2019 data
- Next steps

Otter Lake, Wakulla Co.
Photo credit: Ashley O'Neal

Objectives

- Obtain data from minimally disturbed lakes (LDI < 2 & minimal human disturbance)
- Establish water quality and plant community expectations for Florida lake regions
- If different expectations are found between regions, recalibrate LVI to

2016-2019*

- 71 total reference sites
- 52 reference sites sampled from 2016-2019 (73%)
  - One sample: 29
  - 2 samples: 13
  - 3 samples: 7
  - 4 samples: 3
- 25 total lake regions represented, and 21 regions sampled (at least 1 site) from 2016-2019

*2019 data through 9/6/2019

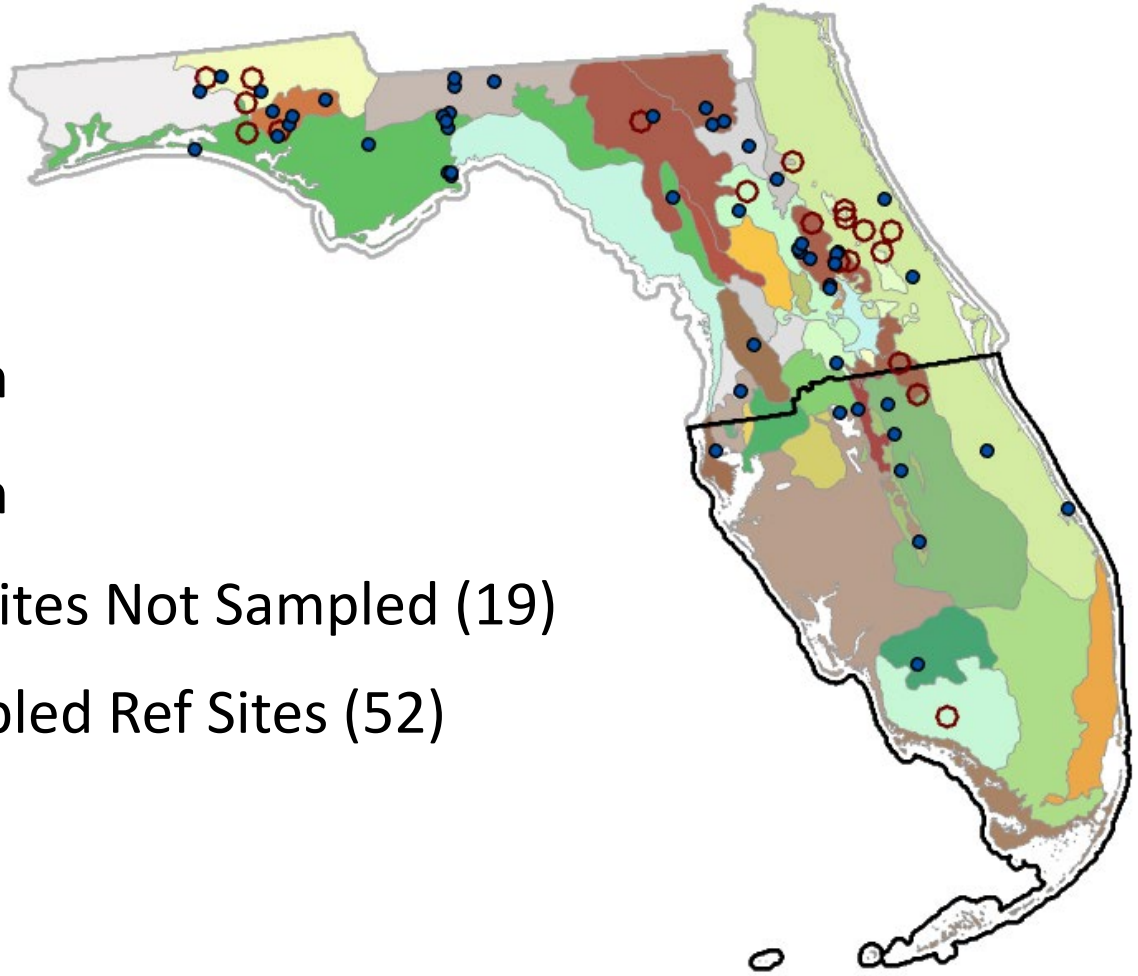
Sampling Progress - sites

ROC	2016	2017	2018	2019	Total
CE (19 sites)	32%	21%	5%	16%	63%
NE (15 sites)	47%	0%	7%	27%	60%
NW (13 sites)	46%	8%	0%	15%	62%
S (3 sites)	67%	0%	0%	0%	67%
SE (2 sites)	100%	0%	100%	0%	100%
SW (7 sites)	57%	71%	86%	14%	100%
AEQAS (12 sites)	33%	92%	75%	58%	100%

Sampling Progress – lake regions

ROC	2016	2017	2018	2019	Total
CE (8 regions)	63%	38%	13%	38%	75%
NE (8 regions)	75%	0%	13%	38%	75%
NW (4 regions)	75%	25%	0%	50%	100%
S (3 regions)	67%	0%	0%	0%	67%
SE (1 region)	100%	0%	100%	0%	100%
SW (6 regions)	67%	83%	83%	17%	100%
AEQAS (4 regions)	50%	100%	100%	75%	100%

Reference LVI Sites



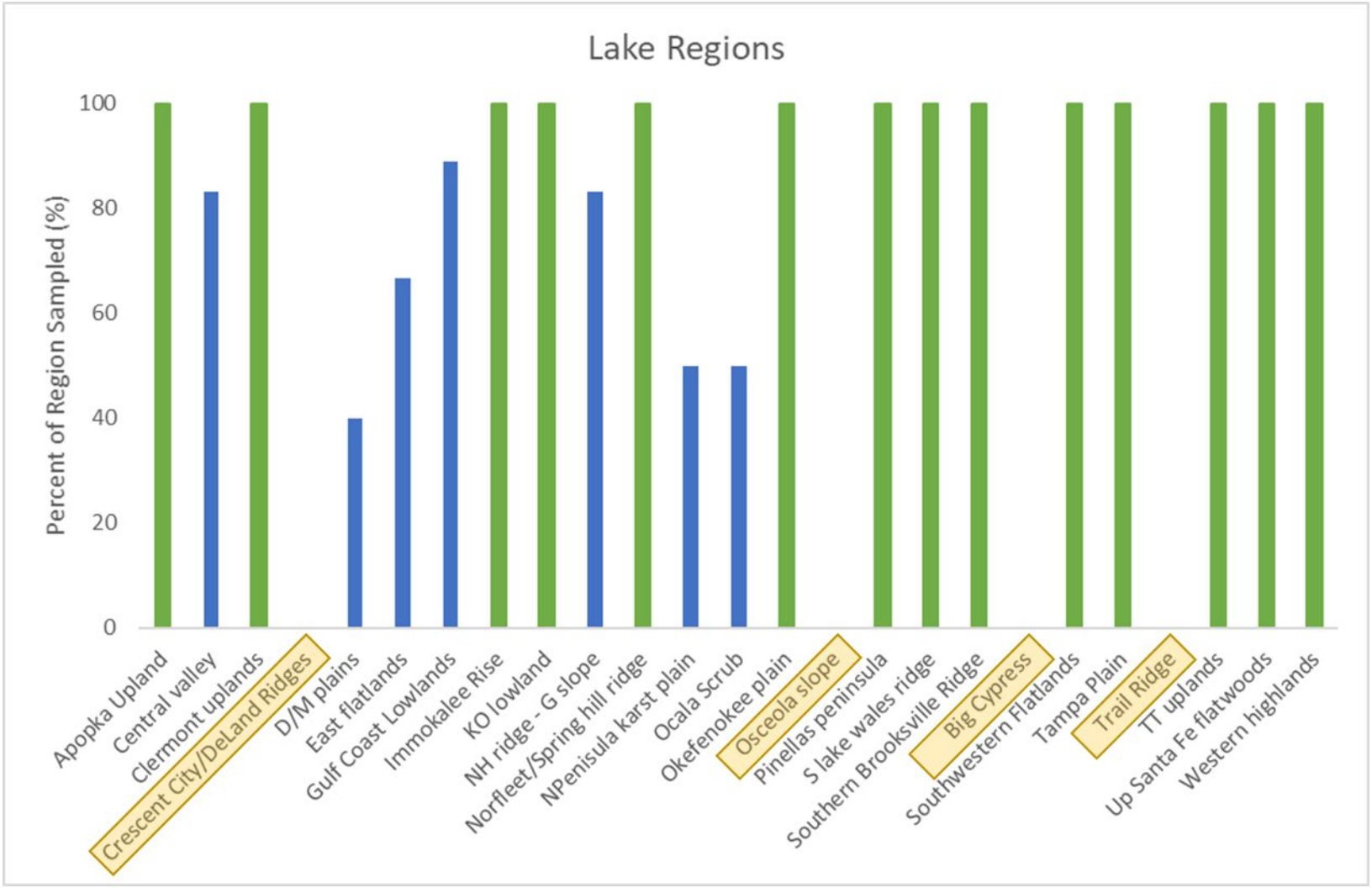
North LVI Region

South LVI Region

2016-2019 Ref Sites Not Sampled (19)

2016-2019 Sampled Ref Sites (52)

Lake Regions



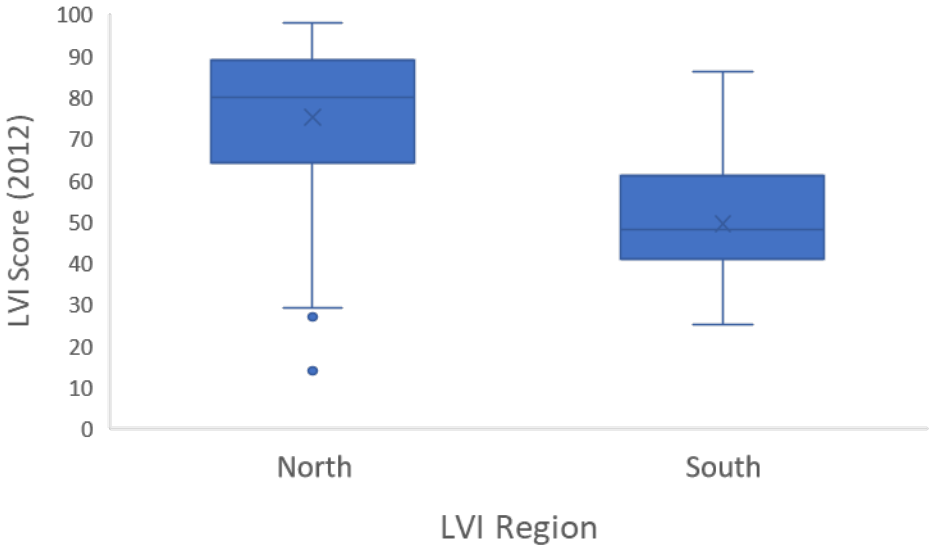
Low Scoring Lakes

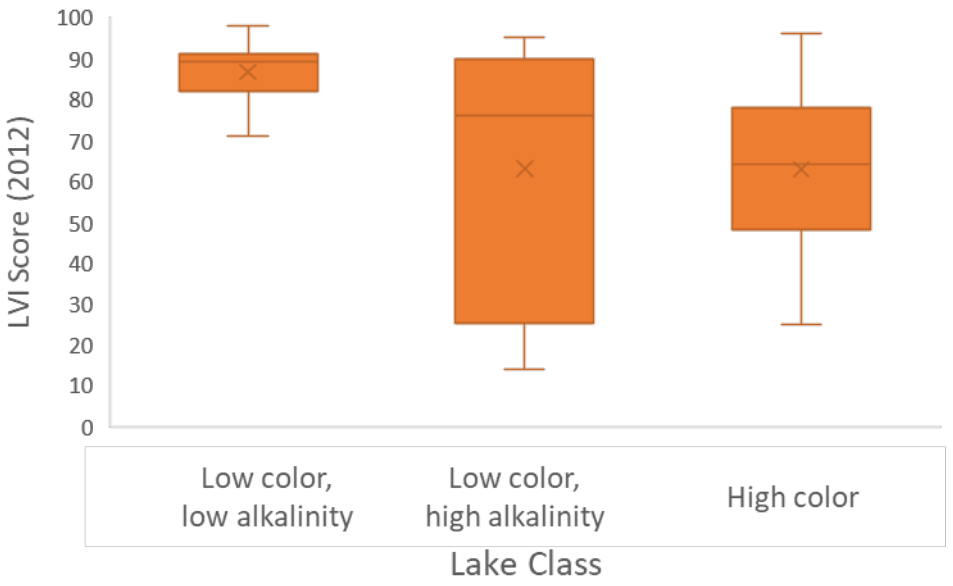
- 19 samples, 12 sites have LVI scores less than 50
  - Blue Cypress (East flatlands) 43, 48
  - Charles Lake (Central valley) 49
  - Clear Lake (Tampa plain) 14, 29
  - Hammock Lake (SW flatlands) 48
  - Lake Arbuckle (KO lowland) 25, 41
  - Lake Ashby (East flatlands) 36
  - Lake Eaton (Central valley) 27
  - Lake Eden (East flatlands) 35
  - Lake Mattie (Southwestern flatlands) 41
  - Lake Rosalie (East flatlands) 26, 43, 45
  - Lake Trafford (Immokalee Rise) 48
  - McKethan Lake (Southern Brooksville Ridge) 45, 48, 48
- Do these lakes qualify as minimally disturbed?

Lake regions and classes

- LVI Regions (2):
  - North
  - South
- Lake Regions (25):
  - Apopka upland
  - Big Cypress
  - Central valley
  - Clermont uplands
  - Crescent City/DeLand Ridges
  - D/M plains
  - East flatlands
  - Gulf Coast lowlands
  - Immokalee Rise
  - KO lowland
  - NH ridge-G slope
  - Norfleet/Spring hill ridge
  - N Peninsula karst plain
  - Ocala scrub
  - Okefenokee plain
  - Osceola slope
  - Pinellas peninsula
  - S lake wales ridge
  - Southern Brooksville ridge
  - Southwestern flatlands
  - Tampa plain
  - Trail ridge
  - TT uplands
  - Up Santa Fe flatwoods
  - Western highlands
- Lake Classes (3):
  - Low color, low alkalinity
  - Low color, high alkalinity
  - High color

LVI Scores


LVI Score (2012)
100
90
80
70
60
50
40
30
20
10
0
North
South
LVI Region


LVI Score (2012)
100
90
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40
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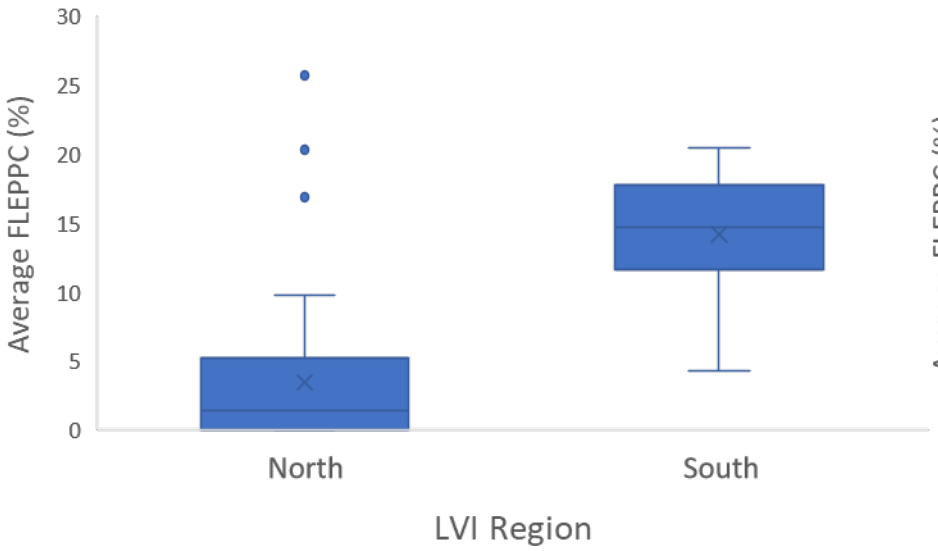
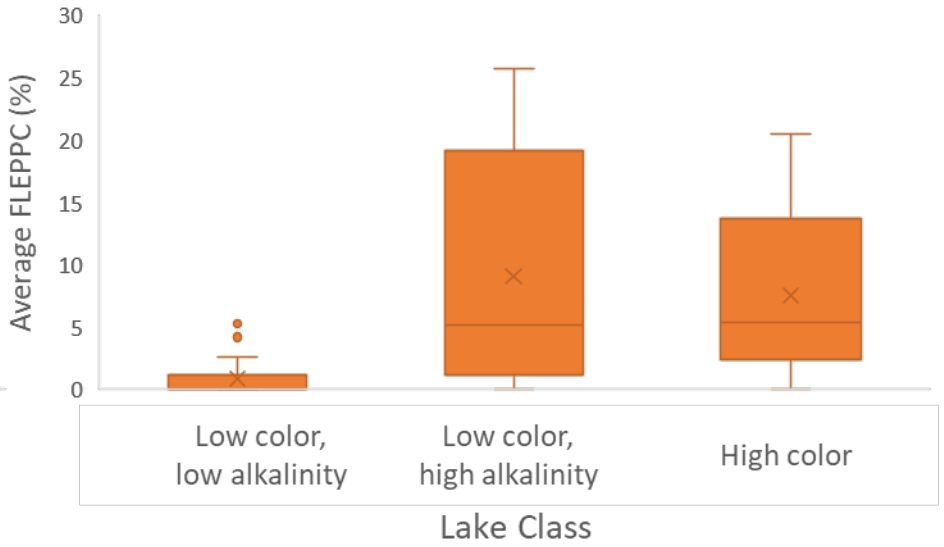
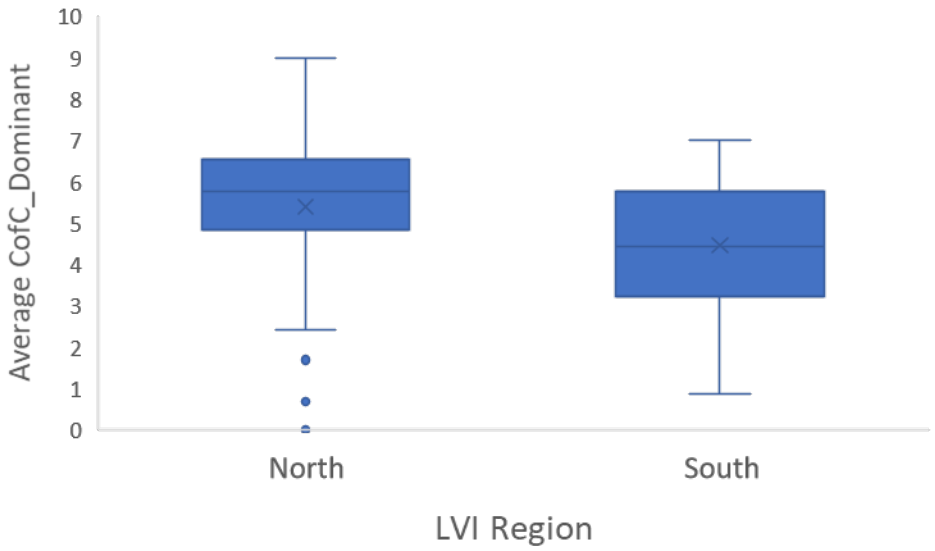
Low color, low alkalinity
Low color, high alkalinity
High color
Lake Class

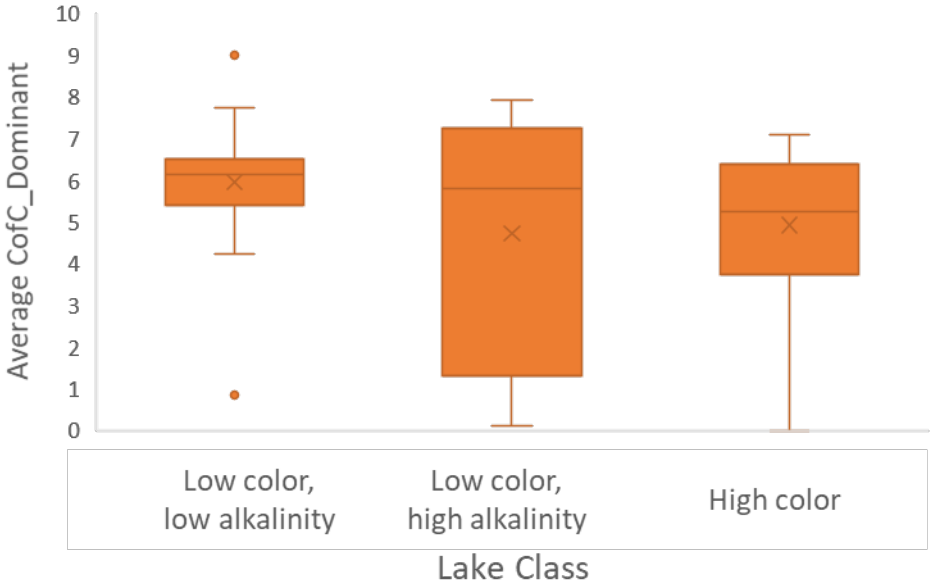
Florida Exotic Pest Plant Council (FLEPPC)



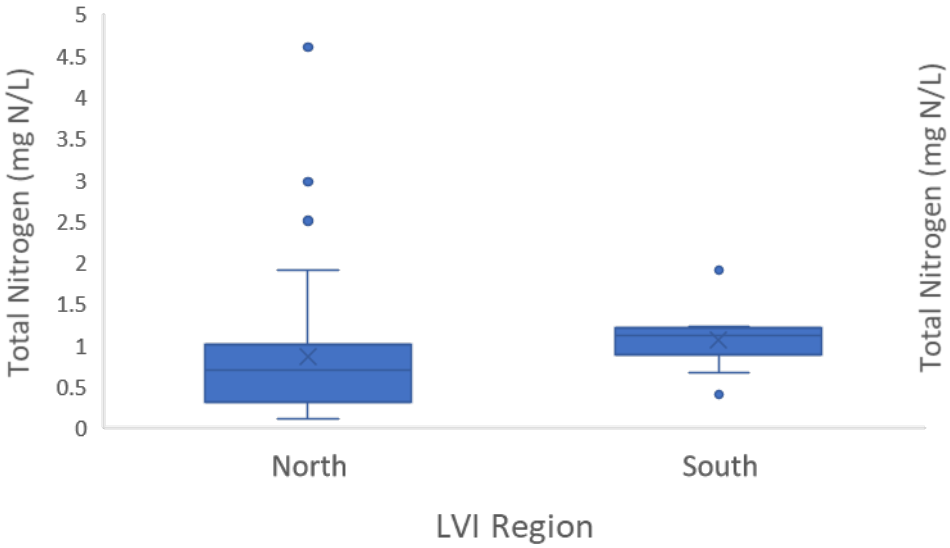


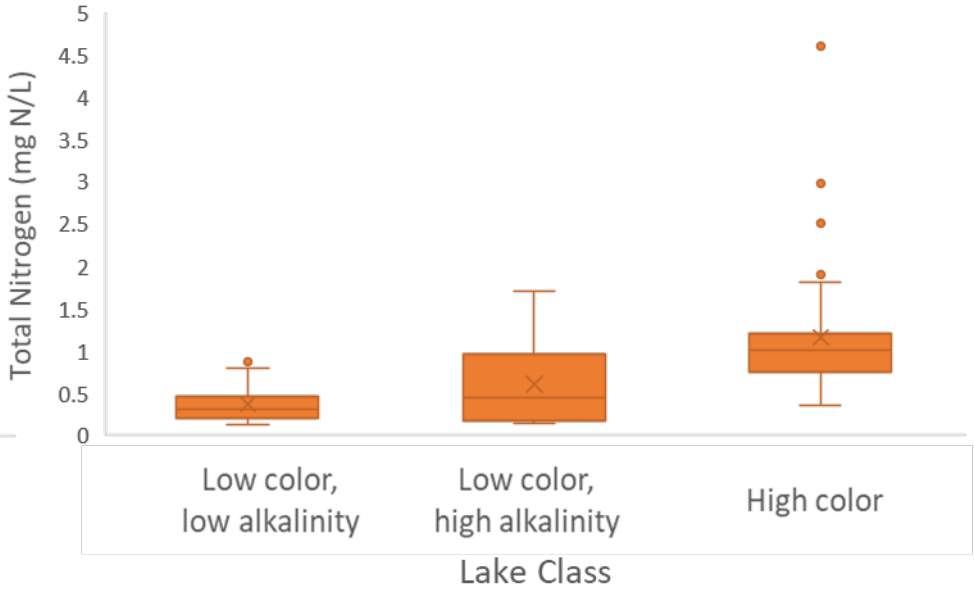
Coefficient of Conservatism of Dominant Taxa



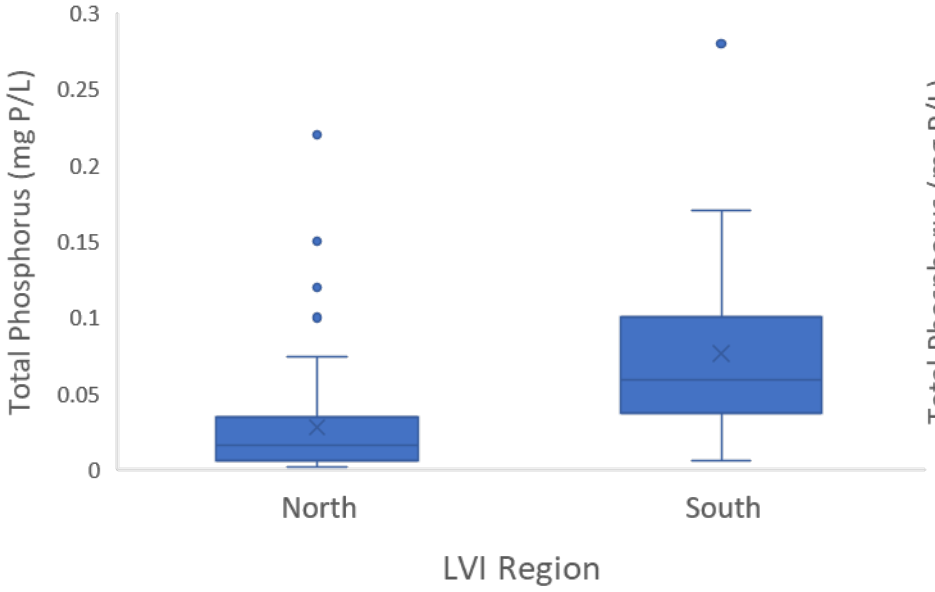


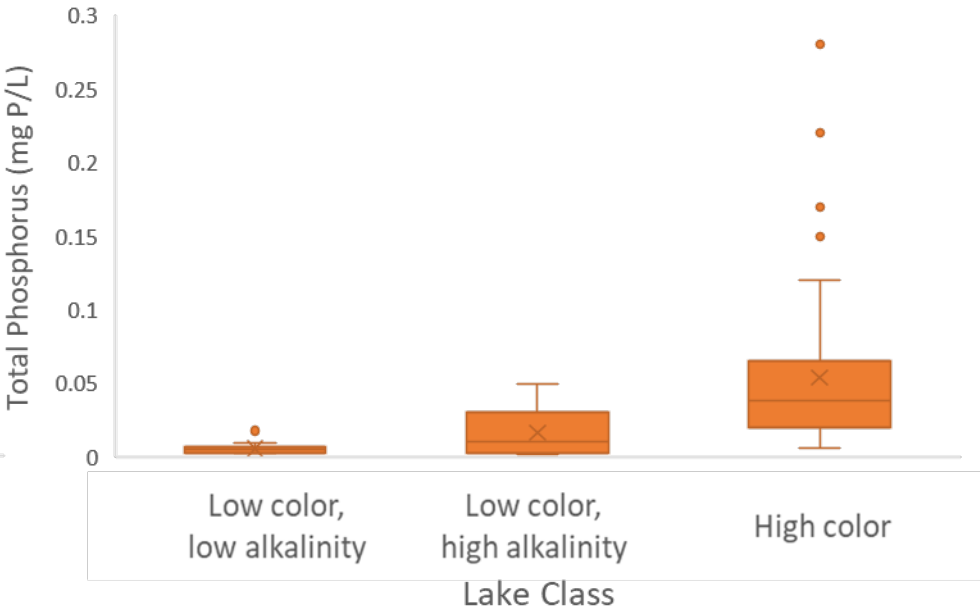
Total Nitrogen



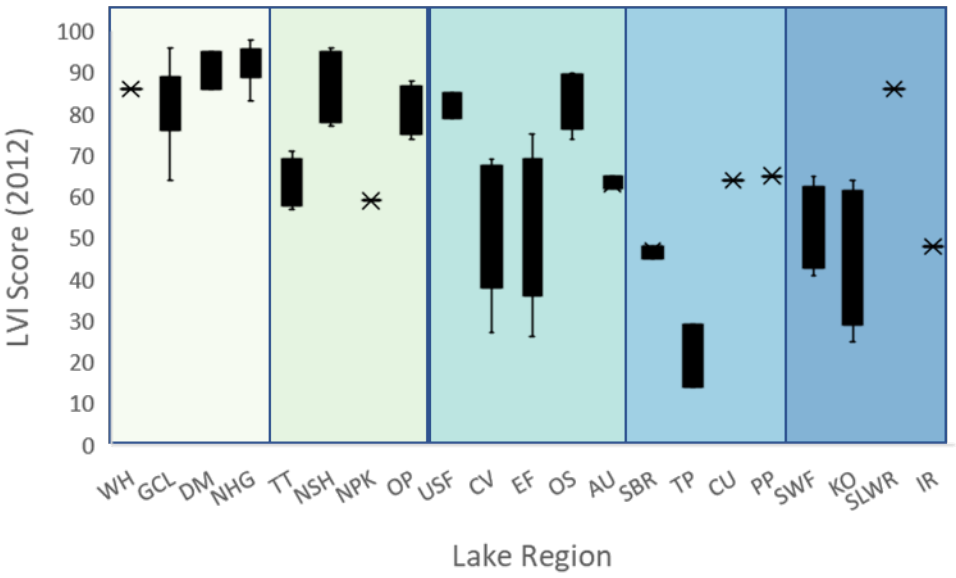


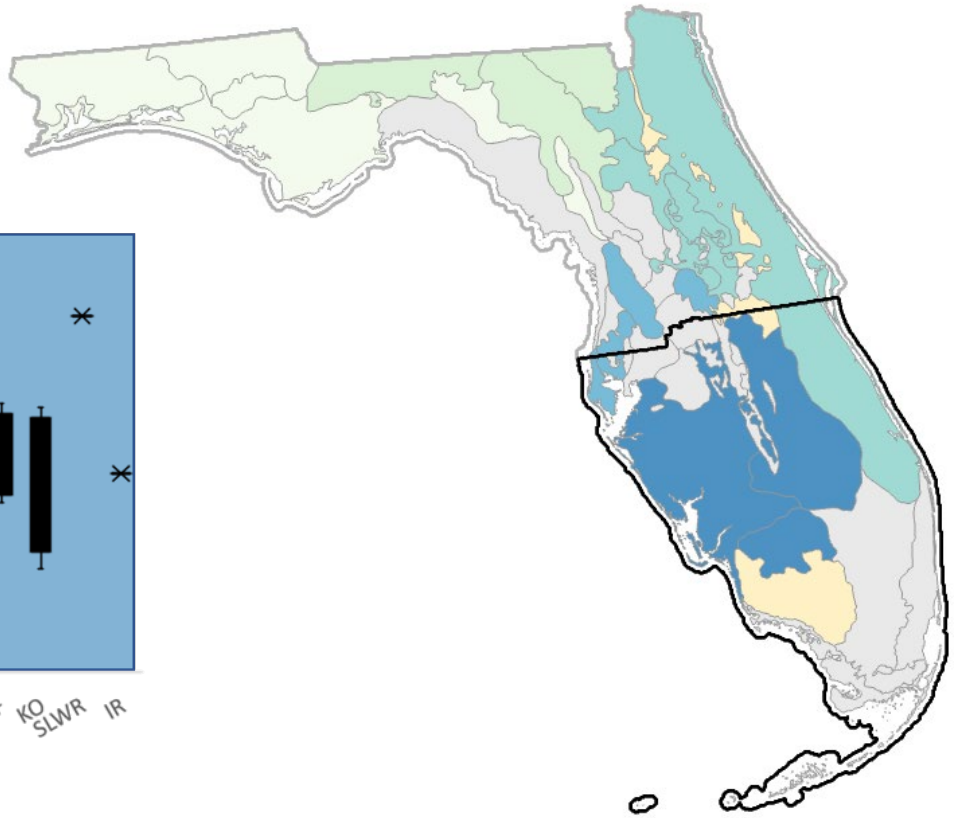
Total Phosphorus





LVI Scores

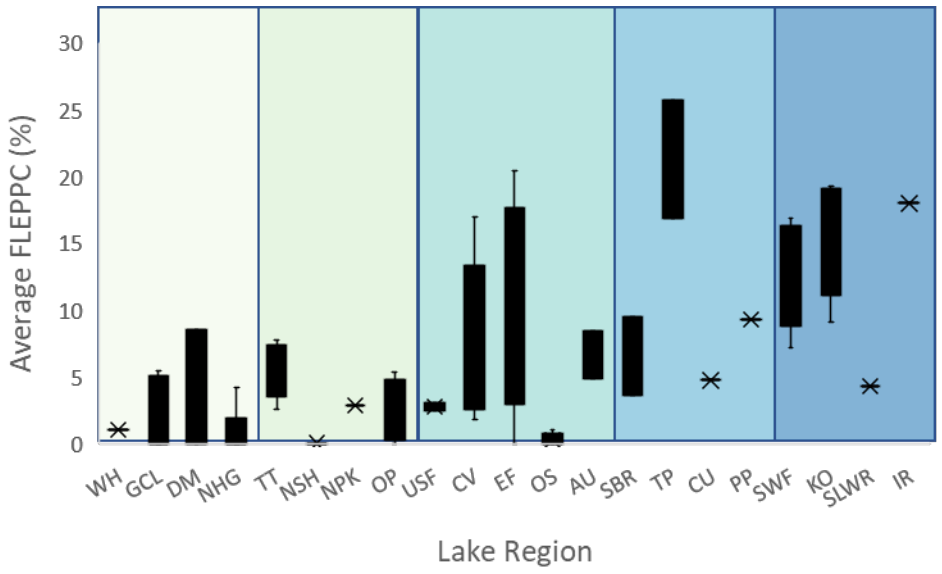


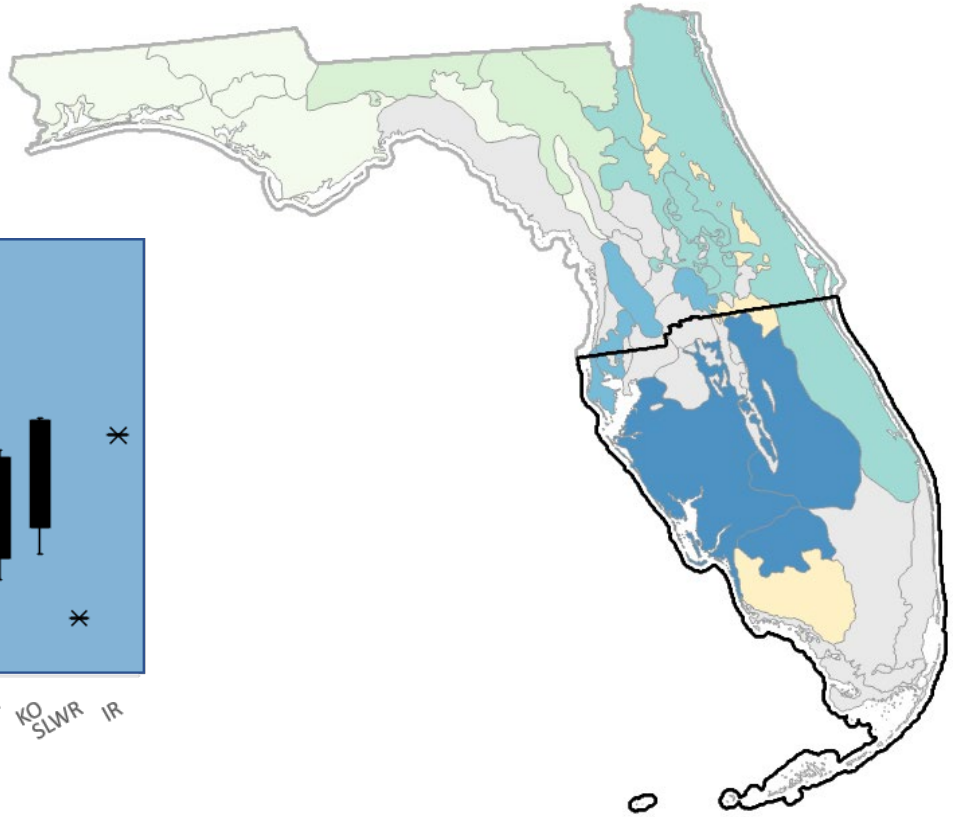


Lake regions with no reference lakes identified

Lake regions with no sample set

Florida Exotic Pest Plant Council (FLEPPC)





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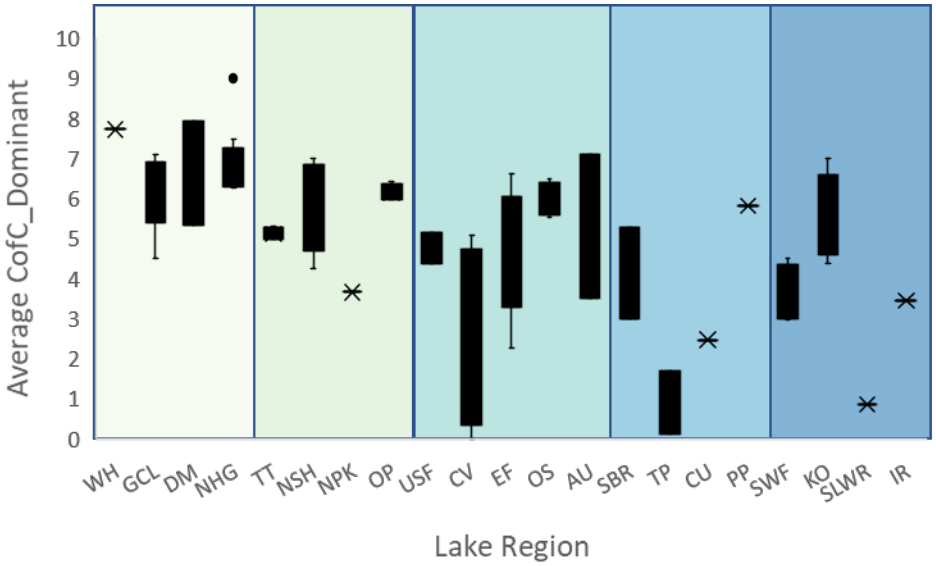

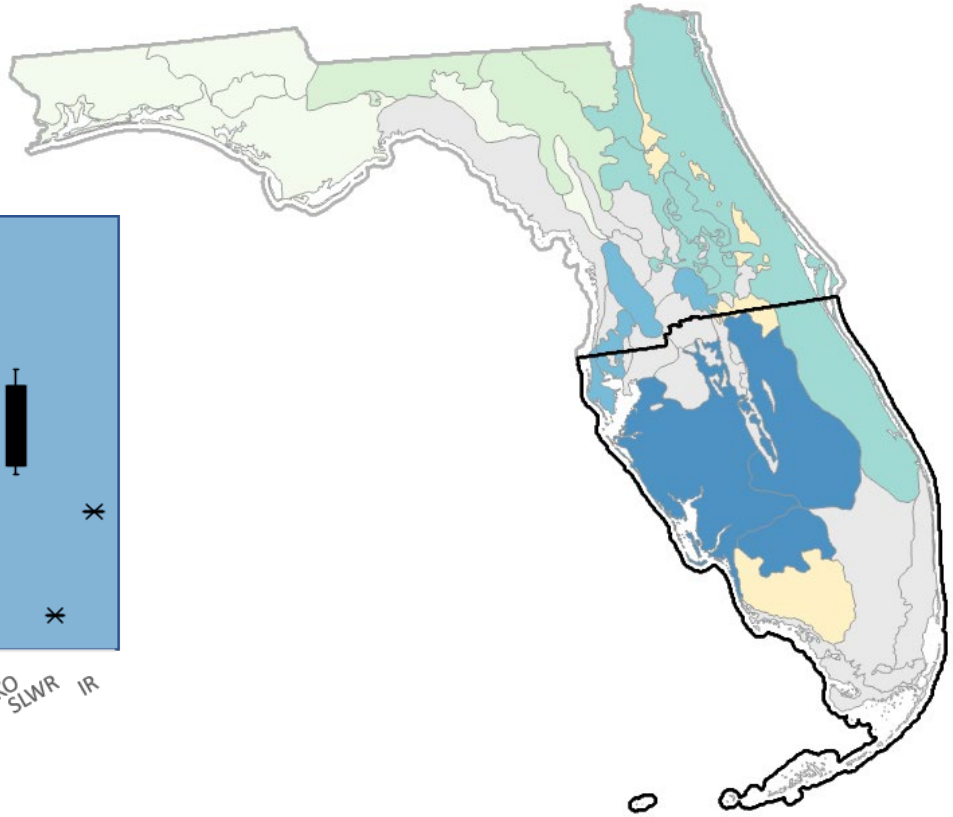

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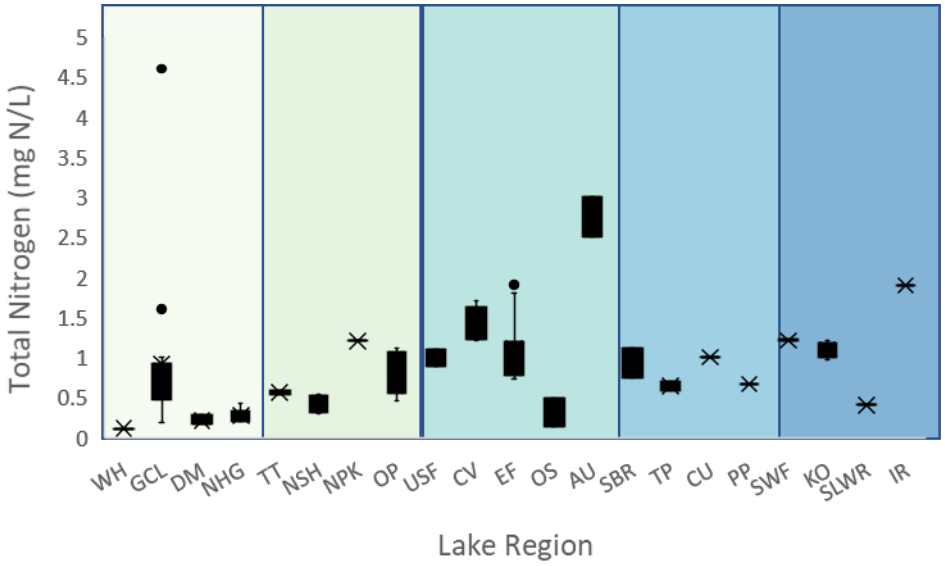

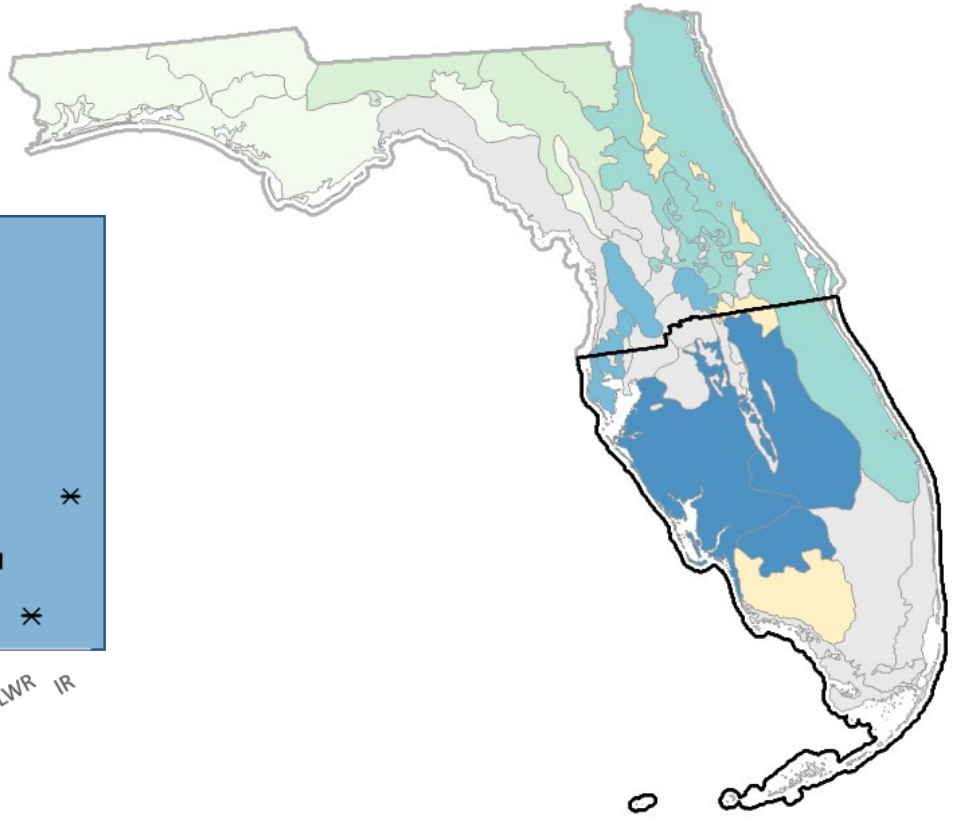

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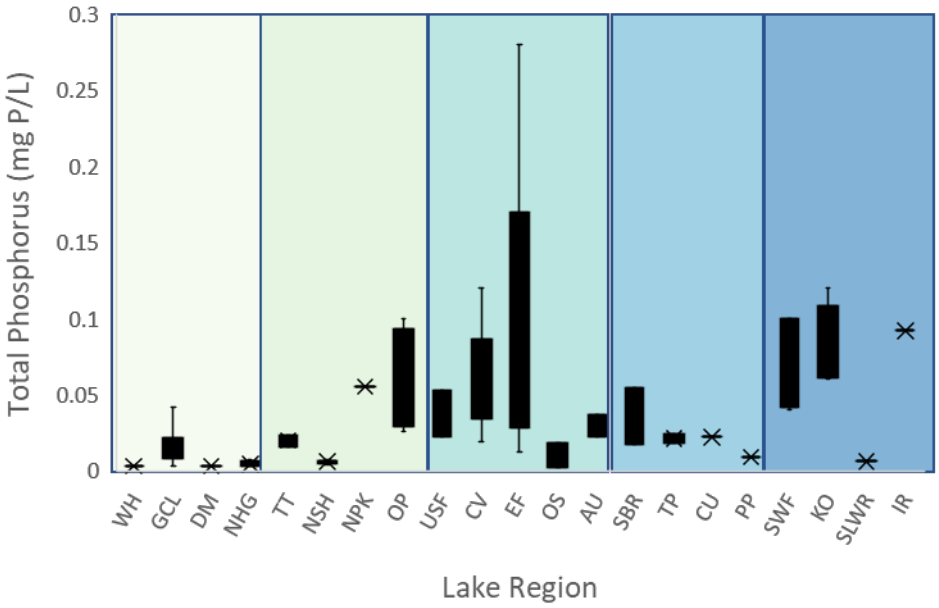

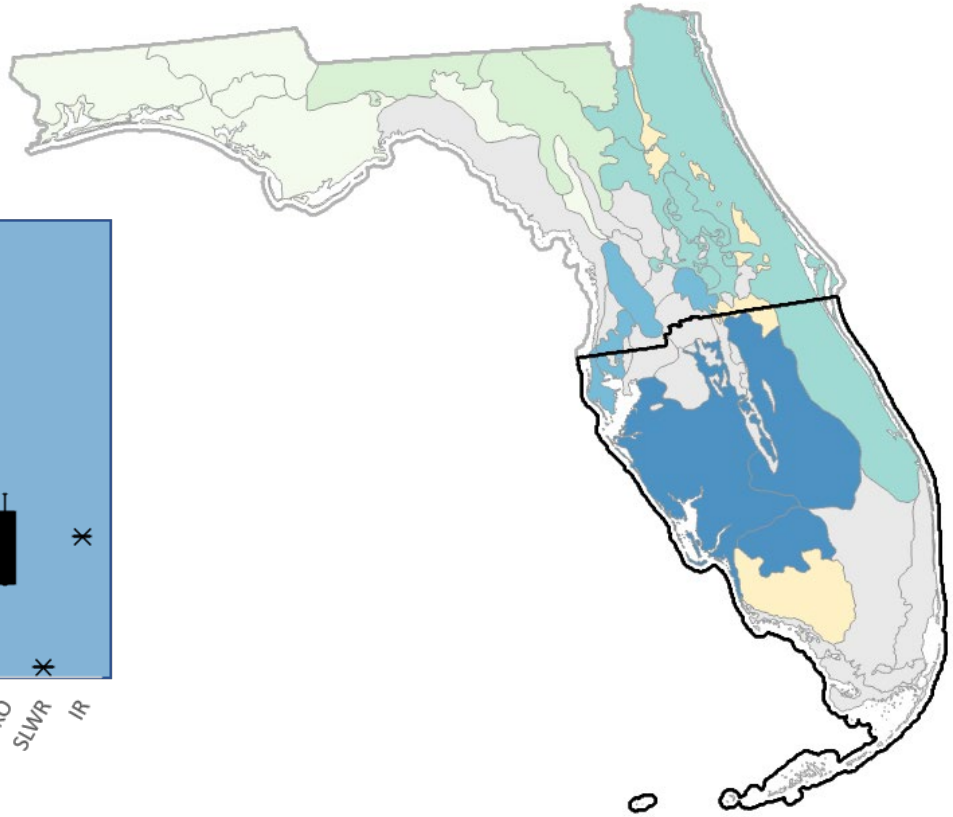

Lake regions with no reference lakes identified

Lake regions with no sample set

Conclusions

- LVI scores higher in North/Panhandle and in low color, low alkalinity lakes
  - C of C follows same trend, but not as pronounced
  - Higher percentage of FLEPPC taxa in South/Peninsula and in low color, high alkalinity and high color lakes
- Lower TN and TP concentrations in North/Panhandle and in low color, low alkalinity lakes
- **Overall, most pronounced differences between North and South LVI regions**
- **Additional data needed for determining WQ and plant community expectations for lake regions**

Next Steps

Moore Lake, Leon Co.

- Review and update reference lake sites
- Prioritize lakes in regions with no data
  - Lake Regions with no sample set (6):

Crescent City/DeLand Ridges	Lake Stella (Putnam), Unnamed (Volusia)
Osceola Slope	Brick Lake (Osceola), Mud Lake (Orange)
Big Cypress	Deep Lake (Collier)
Trail Ridge	Georges Lake (Putnam)

  - Lake Regions with incomplete sample set (13):

Central Valley	Newnans Lake (Alachua)
D/M Plains	Kolmetz Pond (Washington), Unnamed (Walton), Unnamed (Washington)
East Flatlands	Unnamed (Volusia), Lake Disston (Flager), Unnamed (Putnam)
Gulf Coast Lowlands	Still Pond (Washington)
NH Ridge-G Slope	Shirt-Tail Lake (Washington)
Npeninsula Karst Plain	Sand Pond (Suwannee)
Ocala Scrub	Dillard Pond (Lake), Unnamed (Lake), Unnamed (Marion)

- Continue sampling lakes as time and resources permit

Questions?