

Blue Cypress Lake – Water Quality Study

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SUBJECT: Water Quality Study Summary
 Jones Edmunds Project No. 08620-002-01

1 INTRODUCTION

The Water Quality Study (Study) objectives were to gather, validate, and assess the water quality data associated with Blue Cypress Lake and its watershed.

The Study was conducted to determine whether anthropogenic influences are a significant causative factor in BCL water quality. The Study determined that the application of biosolids in the tributary watershed discharging to BCL is affecting water quality.

Technical Memorandums summarizing Study activities, findings and recommendations were prepared and submitted separately. This Fact Sheet is prepared to summarize highlights from Water Quality Study for Blue Cypress Lake (BCL).

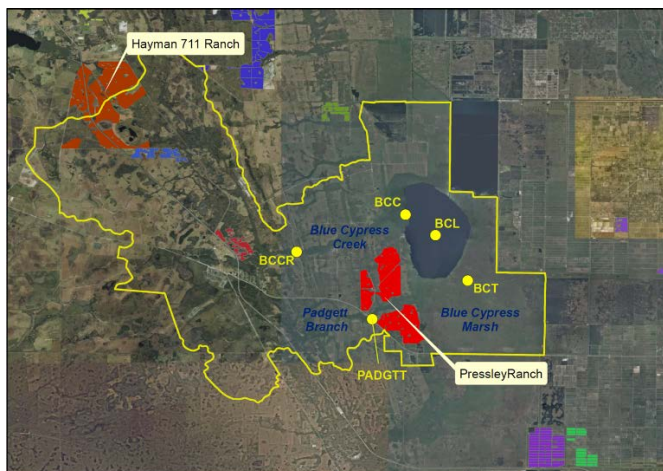


Figure 1 – Study Area

2 CURRENT KNOWLEDGE

1. Blue Cypress Lake has been recognized as relatively pristine as shown by the fact the FDEP identified it as a reference lake used to develop state water quality standards.
2. Blue Cypress Lake and its connecting waterbodies are Class 1 waters designated for potable water use.
3. A sustained upward trend in total phosphorus in Blue Cypress Lake began in approximately 2006 and is not accompanied by upward total nitrogen trends. Since 2014 the upward trend has accelerated.
4. The major processes that deliver phosphorus to the lake include surface runoff, groundwater, point source discharges to the lake, and internal loading.
5. Agriculture is the primary land use and has remained relatively constant for several decades in the Blue Cypress Lake watershed.
6. The use of fertilizers, and more recently biosolids, are the most likely of sources of phosphorus delivered to the lake by these processes.
7. Application of Class B biosolids began in 2006 in the Blue Cypress Lake watershed based on the agronomic needs of nitrogen for hay production. Pressley Ranch biosolids applications began in 2013.
8. Point sources are less than 1 percent of the total phosphorus load to Blue Cypress Lake
9. Water chemistry, in particular dissolved oxygen, was relatively constant before and during the sustained upward trend, suggesting that the internal loading from sediments is unlikely.

3 ANALYSIS RESULTS

10. Tributary water quality data representing the three major surface water sources to Blue Cypress Lake do not show the upward trend in total phosphorus.
11. A phosphorus budget for Blue Cypress Lake based on measured incoming TP concentrations shows and modeled hydrologic fluxes indicates that prior to 2013 the inputs exceeded the outputs from the lake. Since 2013, more phosphorus began leaving the lake than entering the lake which indicates an unaccounted-for source of phosphorus since 2013 source.
12. Beginning in 2013 the annual TP application rate downstream of the water quality sampling stations averaged approximately 200,000 pounds per year (lb/year). That difference means that if only 10 percent of the phosphorus in those biosolids reaches the lake, it would account for all the unaccounted-for phosphorus.
13. Class B biosolids applications in the Blue Cypress Lake watershed are based on the agronomic needs of nitrogen for hay production with an assumption based on site-specific testing that phosphorus could generally be taken up by the crop and retained by the soils. The resulting phosphorus loading averages close to 10 times the agronomic needs.

4 ONGOING DATA COLLECTION

14. The site-specific testing for phosphorus capacity (Mehlic-1) was not done using the method now recommended and used by IFAS in Florida (Mehlic-3).
15. Phosphorus Capacity Index results from 11/6/2018 on the Pressley Ranch biosolids application sites show that the 19 of the 23 sites exceed the phosphorus threshold

for what can be retained in the soils. Three of the remaining four sites are close to the threshold. Testing was done on the top 6 inches of soil to be consistent with permitting procedures.

16. A storm grab sample within the Pressley Ranch biosolids application sites from July 24 of this year had an orthophosphate concentration of 0.86 mg/l. Autosampler orthophosphate concentrations from November 5 of this year ranged from 0.17 mg/l to 0.34 mg/l.
17. Continuous orthophosphate monitoring at the mouth of Padgett Branch from April through October of this year shows a range from approximately 0.05 mg/l to 0.4 mg/l, with an average over 0.2 mg/l.
18. Tracer analyses from one event detected only one of seven tracers. The same event had a total phosphorus concentration of 0.95 mg/l at the Blue Cypress Lake Road culvert.
19. Application rates do not appear to have exceeded permitted rates.

5 REGULATORY AND OTHER CONSIDERATIONS

20. The upward trend in phosphorus in Blue Cypress Lake will result in a new water quality impairment for total phosphorus in the next cycle of DEP's waterbody assessments.
21. Water bodies downstream of Blue Cypress Lake are currently impaired for total phosphorus.
22. Microcystis blooms in Blue Cypress Lake have been observed in recent years. Microcystis can produce Microcystin, which is a toxin in the drinking water supply.