Basin Management Action Plan

UPPER OCKLAWAHA RIVER BASIN

(EXCERPTS)

Developed by the Upper Ocklawaha Basin Working Group
In Cooperation with
The Florida Department of Environmental Protection
Division of Water Resource Management
Bureau of Watershed Management

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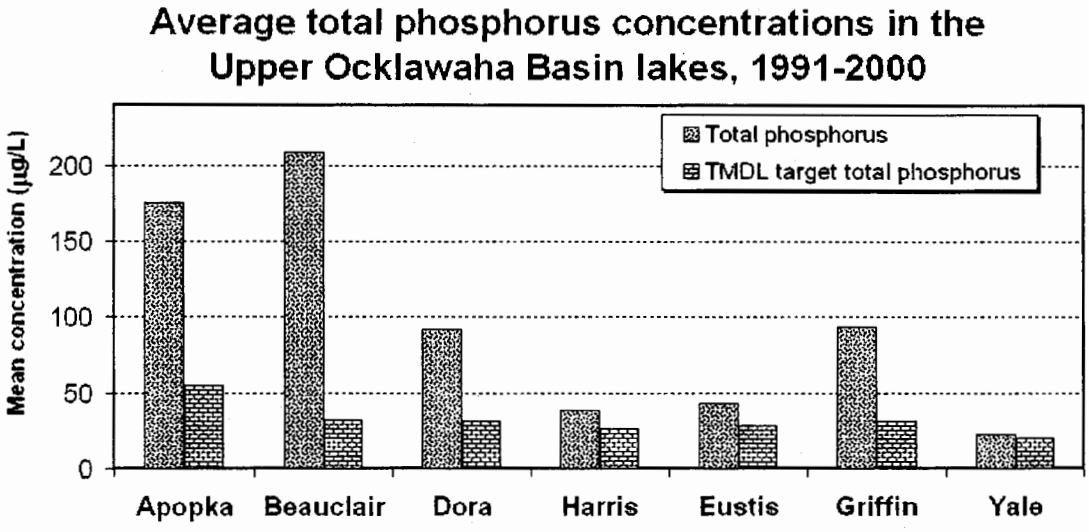
2.4 WATER QUALITY TRENDS *(Move this section before Management Actions)*

2.4.1 Baseline Phosphorus Loadings

The data for establishing TMDLs in the Upper Ocklawaha Basin was taken from the period of 1991-2000. **Figure 10** below shows the phosphorus concentrations in seven of the Upper Ocklawaha Basin lakes based on the 1991-2000 data.

Since that time, water quality improvements have been seen in the basin. Likely causes for improvements in water quality include reduced nutrient discharges from agricultural areas, following purchase and partial restoration, and gizzard shad harvest in Lakes Apopka and Griffin. The greatest improvements are in lakes directly or indirectly affected by these actions (Apopka, Beauclair, Dora, Griffin), with less improvement in lakes expected to be less affected (Eustis, Harris), or unaffected (Yale) by these actions.

FIGURE 10.



As noted in Section 1.5, available evidence indicated that total phosphorus is the primary limitation on algal growth in the basin lakes, as is commonly the case in fresh waters. Reductions in external loading of total phosphorus to the lakes are expected to reduce the frequency and magnitude of algal blooms, although the Upper Ocklawaha lakes are naturally productive enough that occasional algal blooms are expected to occur even if the TMDL targets are met. Reductions in algal blooms will lead to increased water clarity, which will allow re-establishment of aquatic plants (some increases in aquatic plant growth have already been noted in Lakes Apopka and Griffin). Aquatic plant growth will contribute to further improvements in water quality, by using phosphorus that would otherwise be available to fuel algal growth. Also, plant cover reduces re-suspension of bottom sediments, reducing release of phosphorus from the lake bottom and further improving water clarity. As noted in Section 1.3.5, actions taken to reduce total phosphorus are also expected to reduce levels of nitrogen and un-ionized ammonia in the lakes.

Most of the total phosphorus in lake waters will eventually be lost to the lake sediments. Releases in total phosphorus from storage in the bottom sediments can delay recovery of water quality. However, releases from the lake sediments gradually decrease with continued reductions in external loading of phosphorus. Case studies generally show improvements in water quality within a few to several years of external phosphorus load reduction. Water quality improvements have already been seen following partial reduction in external phosphorus loading to Lakes Apopka and Griffin.

The actions described in this BMAP are intended to continue this trend and to maintain water quality improvements in the basin. For more detailed information on water quality in the Upper Ocklawaha Basin, please consult:

- Department of Environmental Protection, October 2003. *Water Quality Assessment Report: Ocklawaha*
- *Fulton, R.S. III, C. Schluter, T.A. Keller, S. Nagid, W. Godwin, D. Smith, D. Clapp, A. Karama, and J. Richmond. 2004. Pollutant Load Reduction Goals for Seven Major Lakes in the Upper Ocklawaha River Basin. Technical Publication SJ2004-5, St. Johns River Water Management District.*

FIGURE 5. TOTAL MAXIMUM DAILY LOADS IN THE UPPER OCKLAWAHA BASIN

Basin	WBID(s)	TMDL	Target Concentration	TMDL Baseline Load	Wasteload Allocation	NPDES Allocation	Nonpoint Source Allocation	Overall Reduction
		(lbs/yr)	(ppb)	(lbs/yr)	(lbs/yr)	(% reduction)	(lbs/yr)	(%)
Lake Apopka	**2835A,C,D**							
Total Phosphorus		35,060	55	136,070	2,470	None	31,223	75.6
Lake Beauclair	2834C							
Total Phosphorus		7,056	32	46,746	None	85	7,056	85
Lake Carlton	**2837B**							
Total Phosphorus		195	32	476	None	59	195	59
Lake Dora	**2831B** 2831A							
Total Phosphorus		13,230	31	39,690	None	67	13,230	67
Lake Eustis	2817B 2817A							
Total Phosphorus		20,286	25	35,500.50	None	43	20,286	43
Palatlakaha River	2839							
BOD		43,042		49,351	None	12.8	43,042	12.8
Total Nitrogen		16,696		17,604	None	5.2	16,696	5.2
Total Phosphorus		2,207		2,377	None	7.2	2,207	7.2
Lake Harris	**2838A/2838B** 2832/2817C							
Total Phosphorus		18,302	26	26,914.70	None	32	18,302	32
Trout Lake	2819A							
Total Phosphorus		521	.028 mg/L	2,603	None	80	521	80
Total Nitrogen		9733	.78 mg/L	24,165	None	60	9733	60
Lake Griffin	2814A							
Total Phosphorus		26,901	32	79,120.60	None	66	26,901	66
Lake Yale	2807A 2807							
Total Phosphorus		2,844	20	3,160.50	None	10	2,844	10

Figure 7. Upper Ocklawaha River Basin Water Quality Issues by Sub-basin

Problems and Issues (historic through 2000)	UORB TMDL Sub-basins									
	Lake Apopka	Lake Beauclair	Lake Carlton	Lake Dora	Lake Eustis	Trout Lake	Lake Harris	Palatlakaha	Lake Yale	Lake Griffin
WBID sub-basins	Lale Apopka-2835D	Lake Beauclair-2834C	Lake Carlton-2837B	Lake Dora-2831B	Lake Eustis-2817B	Trout Lake-2819	Lake Harris-2838A	Palatlakaha River-2839	Lake Yale-2807A	Lake Griffin-2814A
	Gourd Neck Spr-2835C			Dora Canal-2831A	Haines Creek-2817A		Little Lake Harris-2838B		Yale-Griffin Canal-2807	
	Lake Apopka Outlet-2835A						Dead River-2817C			
							Helena Run-2832			
Primary Issues										
Stormwater runoff to lakes	●	●	●	●	●	●	●	●	●	●
Significant inflows from upstream sources		●	●	●	●	●	●			●
Wetland converstion to farmland	●	●			●	●	●			●
Discharges from agricultural lands/restoration areas	●	●			●	●	●			●
Septic tank sources	●	●	●	●	●	●	●	●	●	●
Increased loading from future growth	●	●	●	●	●	●	●	●	●	●
Secondary Issues										
Alteration of natural water levels and flows	●	●	●	●	●	●	●	●	●	●
Point source discharges	●						●		●	●
Soil subsidence from oxidation	●	●			●	●	●			●
Phosphorus storage in lake sediments	●	●	●	●	●	●	●		●	●
More flocculent sediments	●	●	●	●	●	●	●	◊	●	●
Algae shifts/more blooms	●	●	●	●	●	●	●	◊	●	●
Depressed dissolved oxygen levels								●		
Decomposition of rooted and floating vegetation	●	●	●	●	●	●	●	◊	●	●
Fishery shift to rough fish	●	●	●	●	●	●	●		◊	●
Loss of aquatic/wetland habitat	●	●	●	●	●	●	●		●	●
Other Issues										
Elevated nitrates in springs	●					◊	●			
Health issues in alligator population	◊					◊				●
Ground water contamination	◊					◊		●		
Nutrients released from vegetation decay										

TROUT LAKE

Table 21 TMDL Components ('06 version)

WBID	Parameter	WLA		LA (lbs/year)	MOS	TMDL (lbs/year)	Percent Reduction
		Wastewater (lbs/year)	NPDES Stormwater (1)				
2819A	TN	None	60% reduction	9,733	Implicit	9,733	60
2819A	TP	None	80% reduction	521	Implicit	521	80

(1) Required if during development of the City of Eustis MS4 permit it is determined that the Eustis MS4 contributes TN or TP to Trout Lake.