

4.7. Lake Hamilton

Background

Physical and chemical characteristics specific to Lake Hamilton are presented here in the context of relevant regulatory criteria and requirements (Table 4-13). Lake Hamilton (WBID 15041), is the terminal lake in the Northern Chain of the WHCL and is hydrologically connected to Lakes Henry and Middle Lake Hamilton via non-navigable constructed canals along the northern shoreline and to Lake Fannie along the western shoreline via a gated constructed canal (Photo 4-7, Figure 4-26). Lake Hamilton has not been identified as impaired; therefore, no TMDL is required. The TP, TN, and chlorophyll *a* geometric mean for Lake Hamilton for the period of 1997 to 2007 and corresponding EPA NNC water quality targets are listed in Table 4-13. Reductions in concentrations of chlorophyll *a*, TN, or TP are not required to comply with the NNC.

A summary of water quality statistics for Lake Hamilton is presented in Table 4-14. Median chlorophyll *a*, TN and TP concentrations do not exceed the NNC targets provided by EPA for Lake Hamilton. Chlorophyll *a* concentrations in Lake Hamilton fluctuate remaining consistently below 20 µg/L (Figure 4-27). A statistically significant trend in chlorophyll *a* concentrations from 1985 to 2007 was not observed (seasonal Kendall-Tau, $p > 0.10$). No water quality improvement projects have been implemented in Lake Hamilton to restore water quality. A few *Hydrilla* infestation eradication projects have been performed in the last ten years, however, treatment occurred to less than one percent of the lake surface area. Lake Hamilton discharges via a gated structure to the Peace Creek Drainage Canal; therefore, improvements in water quality of the lake would result in little benefit farther downstream.

The Lake Hamilton watershed is 2,651 acres in size and includes 909 acres (34 percent) of developed lands compared to 1,742 acres (66 percent) of undeveloped lands. Approximately 21 percent of the land cover within the 500 foot buffer surrounding Lake Hamilton is classified as wetlands using the 2006 FLUCS data. Forested wetlands encompass five percent of the total wetland area, which does not satisfy the recommended forested wetland cover required to maintain color levels above 50 PCU. Lake Henry discharges highly colored water into Lake Hamilton which could explain the elevated colored values recorded in the lake due to the reduced forested wetlands found adjacent to the Lake Hamilton. The hydrologic connection between the forested wetlands and Lake Henry should be preserved to maintain elevated color values. The 2000-2007 median color value (80 PCU) was above 40 PCU indicating the lake is a colored lake. Using the adopted EPA NNC for Florida lakes, characterization of alkalinity or acidity is not necessary based on the colored classification of Lake Hamilton. The lake area, perimeter, water depth, and volume statistics are based on a water level elevation of 121 feet in September 2005. Bathymetry data are available for Lake Hamilton for the September 2005 water level elevation (Figure 4-28). A water level of 119 feet was reported in July 2010, reflecting a 2.0 feet decrease in water elevation when compared to 2005.

Water Quality Restoration Project Selection and Priorities

Based on Lake Hamilton water quality and the surrounding watershed characteristics, no water quality restoration projects were identified using the WHCL WQMP decision key (Figure 4-29).

Lake-Specific Restoration Projects

The decision key presents the factors on which yes/no decisions were based and used to identify and select water quality improvement projects. Continued water quality monitoring is recommended for the ongoing evaluation of water quality status and trends.

Table 4-13. Physical, chemical, and regulatory characteristics of Lake Hamilton.

Physical			
Location in chain	Northern	High infiltration soils (acres)	1,324 (50 percent)
Relation to other lakes	Terminal	Developed land (acres)	909 (34 percent)
Watershed area (acres)	2,651	Undeveloped land (acres)	1,742 (66 percent)
Lake area (acres)*	2,248	Median water depth (feet)*	7.4
Perimeter (feet)*	57,274	Maximum water depth (feet)*	23.4
Surface area: lake volume ratio*	0.12	Volume (acre-feet)*	17,846
Watershed to surface area ratio*	1.18		
Water Chemistry			
Locally-derived: acidic or alkaline	NA	Clear or colored	Colored
Geometric mean chlorophyll <i>a</i> (µg/L)	9	NNC chlorophyll <i>a</i> target (µg/L)	20
Geometric mean TN (mg/L)	1.18	NNC TN target (mg/L)	2.25
Geometric mean TP (mg/L)	0.094	NNC TP target (mg/L)	0.157
Regulatory Data			
Impaired	No	TMDL status	NA
Chlorophyll <i>a</i> trend	No trend**	TP concentration reduction required	NA

*at a water level elevation of 121 feet

**presented in section 5.0

NA=Not applicable

Photo 4-7. View of Lake Hamilton.



Table 4-14. Lake Hamilton water quality summary for 1997 to 2007.

Parameter	N	Minimum	Median	Maximum
Chlorophyll <i>a</i> (µg/L)	30	1	5	31
Color (PCU)	22	30	80	150
Conductivity (µmhos/cm)	27	133	204	341
Dissolved oxygen (mg/L)	27	5.96	7.96	9.93
pH	27	6.31	7.30	8.00
Secchi depth (feet)	30	0.9	2.2	4.2
Total nitrogen (mg/L)	30	0.29	1.09	1.54
Total phosphorus (mg/L)	26	0.054	0.100	0.888

Figure 4-26. Lake Hamilton and associated watershed.

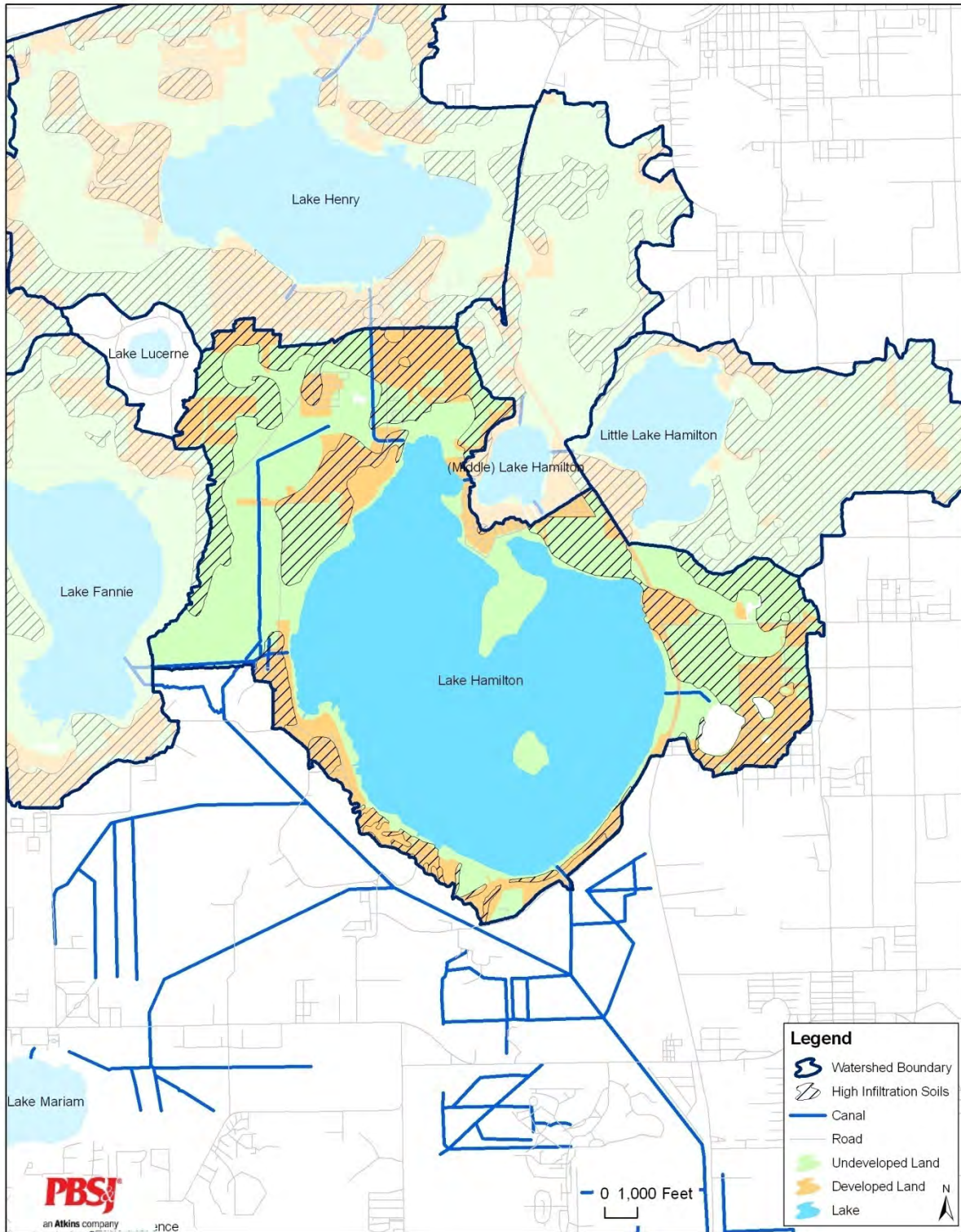


Figure 4-27. Lake Hamilton chlorophyll a concentrations and *Hydrilla* treatment history using available data from 1985 to 2007.

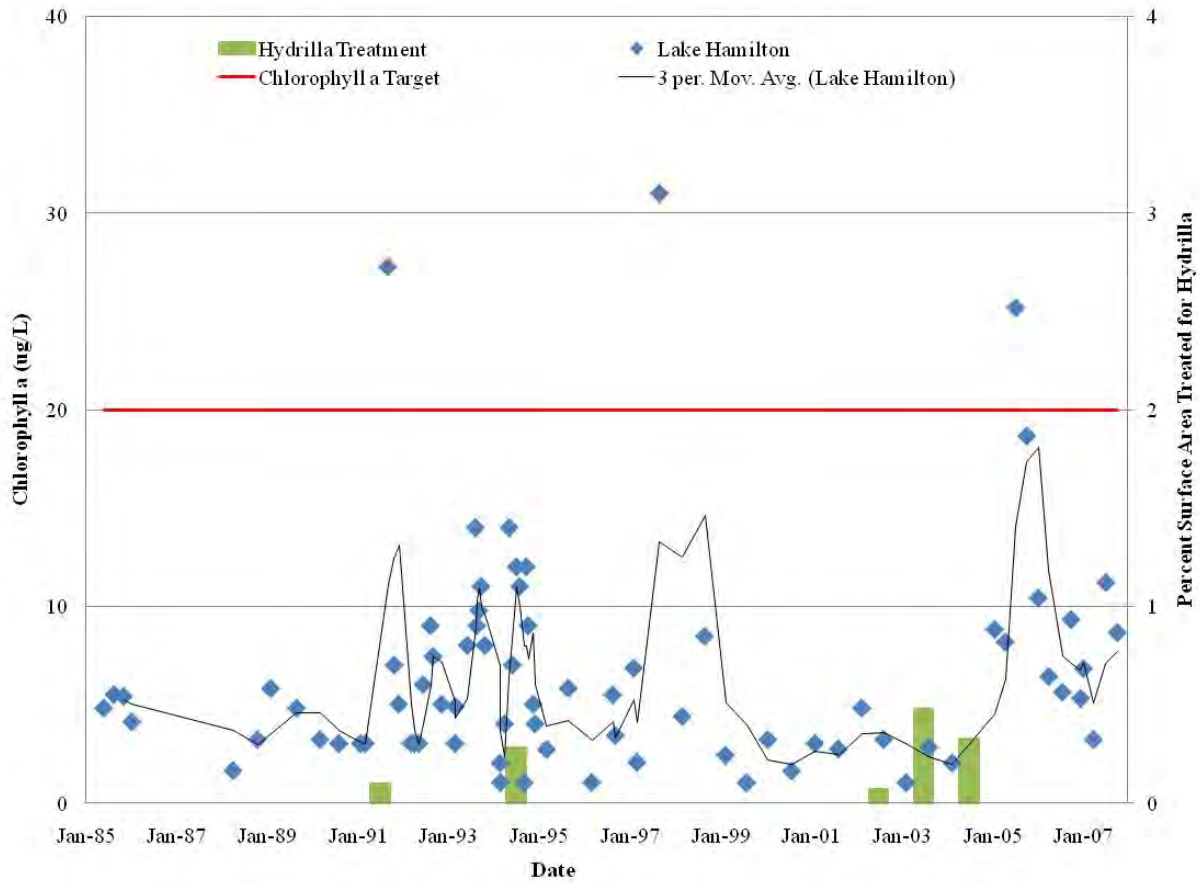


Figure 4-28. Lake Hamilton bathymetry (September 2005) at water level elevation = 121 feet (Polk County Water Atlas).

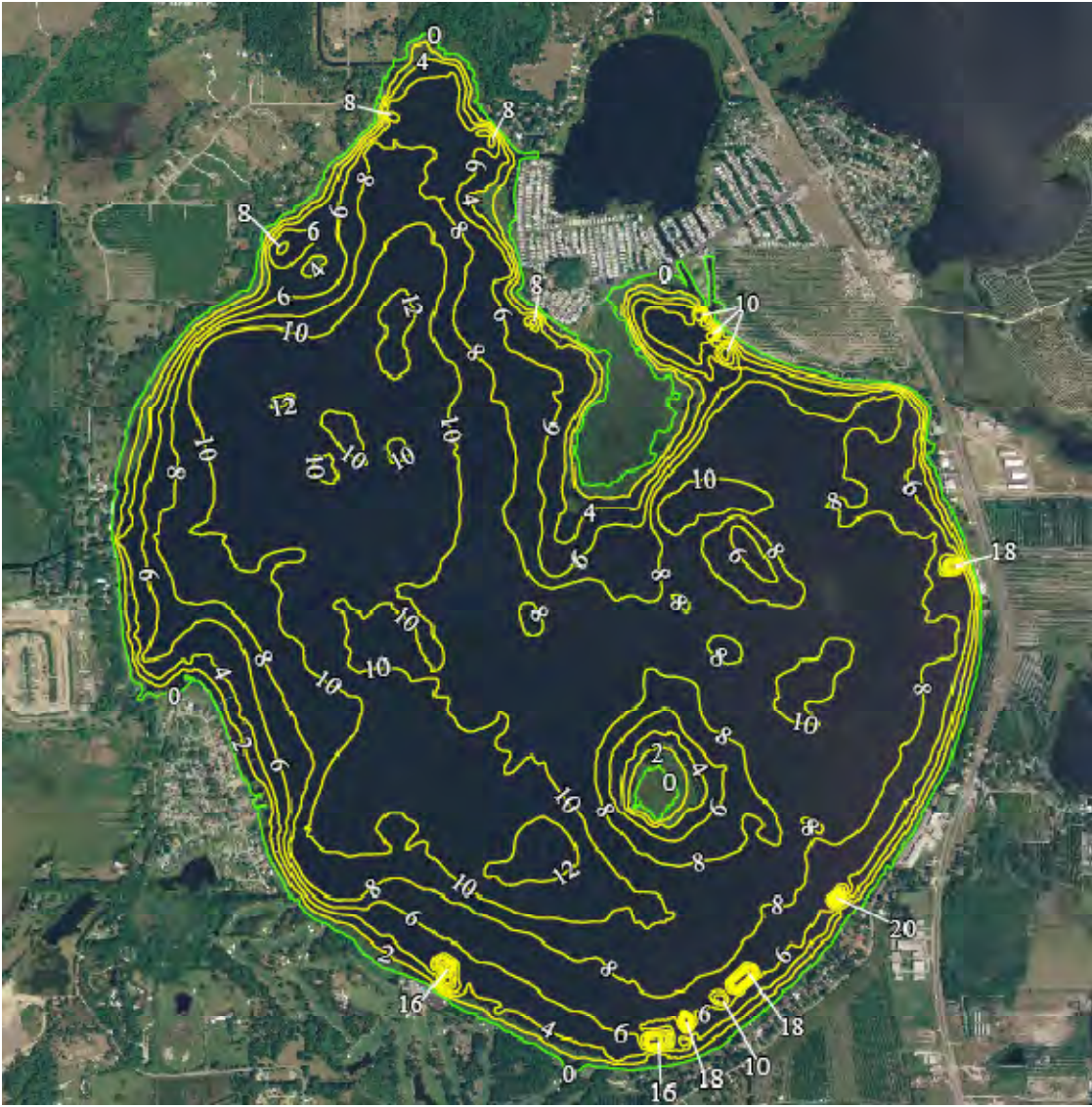
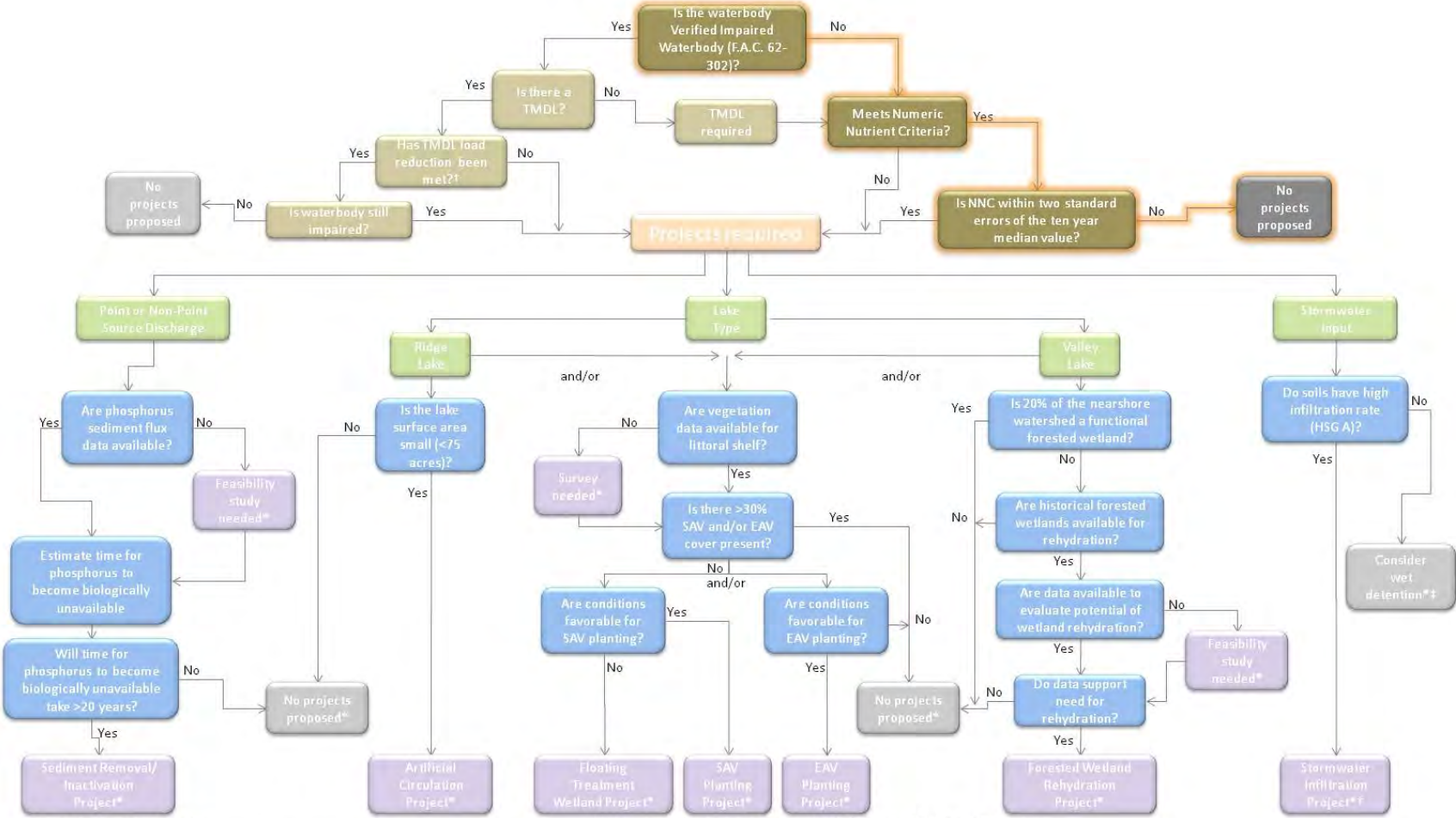


Figure 4-29. Lake Hamilton decision key: highlighted path shows decision process.



*Consider alternative projects
 ‡Wet detention may also be required if sufficient area is unavailable for dry retention

† Stormwater Infiltration projects could satisfy required TMDL Load reduction