

4.9. Lake Henry

Background

Physical and chemical characteristics specific to Lake Henry are presented here in the context of relevant regulatory criteria and requirements (Table 4-17). Lake Henry (WBID 1504A) is located in the Northern Chain of the WHCL and is hydrologically connected to Lake Hamilton via a constructed non-navigable canal and control structure along the southern shoreline, however water control structures regulate the passage of water through the canals and Lake Henry receives water from Lake Haines through a flow through wetland (Photo 4-10, Figure 4-34). Lake Henry has not been identified as impaired, therefore, no TMDL is required. The TP, TN, and chlorophyll *a* geometric mean for Lake Henry for the period of 1997 to 2007 and corresponding EPA NNC water quality targets are listed in Table 4-17. Reductions in concentrations for chlorophyll *a*, TN, or TP are not required to comply with the NNC.

A summary of water quality statistics for Lake Henry is presented in Table 4-18. Median chlorophyll *a*, TN and TP concentrations do not exceed the NNC targets provided by EPA for Lake Henry. Chlorophyll *a* concentrations in Lake Henry have consistently remained below 20 µg/L (Figure 4-35). However, a statistically significant increase in chlorophyll *a* concentrations from 1990 to 2007 was observed (seasonal Kendall-Tau, $p=0.06$). No water quality improvement projects have been implemented in Lake Henry to restore water quality and *Hydrilla* infestations have not been problematic. Lake Henry is adjacent to a terminal lake; therefore, improvements in water quality within the Lake could result in benefits to one downstream lake (Lake Hamilton).

The Lake Henry watershed is 2,810 acres in size and includes 1,124 acres (40 percent) of developed lands compared to 1,686 acres (60 percent) of undeveloped lands. The 2000-2007 median color value (200 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 Fannie. The lake area, perimeter, water depth, and volume statistics are based on a water level elevation of 125 feet in October 2006. Bathymetry data are available for Lake Fannie for the October 2006 water level elevation (Figure 4-36). A water level of 130 feet was reported in August 2010, reflecting a 5.0 foot increase in water elevation when compared to 2006.

The water level elevations throughout the WHCL are monitored and managed by the Lake Region Lakes Management District (LRLMD). In October 2010, the SWFWMD requested that the LRLMD reduce water levels in Lake Henry to 125.5 feet, 6 inches below the 126 feet maximum desirable level established in 1981. The request was initiated by the Sweetwater community residents based on the flooding of an adjacent golf course. An extensive portion of Lake Henry's shoreline is comprised of healthy forested wetlands. Approximately 42 percent of the land cover within the 500 foot buffer surrounding Lake Henry is classified as wetlands using the 2006 FLUCS data. Forested wetlands encompass 30 percent of the total wetland area which satisfies the recommended forested wetland cover required to maintain color levels above 50 PCU. Due to the inundation of the adjacent forested wetlands, increased tannin levels are observed throughout the lake which inhibits phytoplankton production. Effort should be taken to maintain sufficient inundation frequency and duration within the Lake Henry forested wetlands

Lake-Specific Restoration Projects

to maintain elevated color levels to avoid adverse impacts to water quality within the lake. Therefore, changes to the management in water levels in Lake Henry should be evaluated based on the impact to the forested wetlands.

Water Quality Restoration Project Selection and Priorities

Based on Lake Henry water quality and the surrounding watershed characteristics, no water quality restoration projects were identified using the WHCL WQMP decision key (Figure 4-37). The decision key presents the factors on which yes/no decisions were based and used to identify and select water quality improvement projects. Because Lake Henry has displayed increasing trends in chlorophyll *a* concentrations and its water quality depends on high color resulting from the hydrologic connection with the forested wetland shoreline, continued monitoring of water quality, lake levels and wetland connections is recommended for the ongoing evaluation of water quality status and trends. It may be that future projects for wetland reconnections would be necessary if chlorophyll *a* trends continue to increase.

Table 4-17. Physical, chemical, and regulatory characteristics of Lake Henry.

Physical			
Location in chain	Northern	High infiltration soils (acres)	1,360 (48 percent)
Relation to other lakes	Adjacent to Terminal	Developed land (acres)	1,124 (40 percent)
Watershed area (acres)	2,810	Undeveloped land (acres)	1,686 (60 percent)
Lake area (acres)*	861	Median water depth (feet)*	3.0
Perimeter (feet)*	33,051	Maximum water depth (feet)*	78.4
Surface area: lake volume ratio*	0.16	Volume (acre-feet)*	5,546
Watershed to surface area ratio*	3.26		
Water Chemistry			
Locally-derived: acidic or alkaline	NA	Clear or colored	Colored
Geometric mean chlorophyll <i>a</i> (µg/L)	5	NNC chlorophyll <i>a</i> target (µg/L)	20
Geometric mean TN (mg/L)	1.06	NNC TN target (mg/L)	2.25
Geometric mean TP (mg/L)	0.111	NNC TP target (mg/L)	0.157
Regulatory Data			
Impaired	No	TMDL status	NA
Chlorophyll <i>a</i> trend	Increasing**	TP concentration reduction required	NA

*at a water level elevation of 125 feet

**presented in section 5.0

NA= not applicable

Photo 4-10. View of northwestern portion of Lake Henry.



Table 4-18. Lake Henry water quality summary for 1997 to 2007.

Parameter	N	Minimum	Median	Maximum
Chlorophyll <i>a</i> (µg/L)	129	1	5	19.5
Color (PCU)	19	20	200	350
Conductivity (µmhos/cm)	21	128	162	262
Dissolved oxygen (mg/L)	21	5.5	8.3	10.2
pH	21	5.71	6.88	7.71
Secchi depth (feet)	135	0.65	1.7	2.7
Total nitrogen (mg/L)	135	0.70	1.00	1.65
Total phosphorus (mg/L)	134	0.048	0.116	0.208

Figure 4-34. Lake Henry and associated watershed.

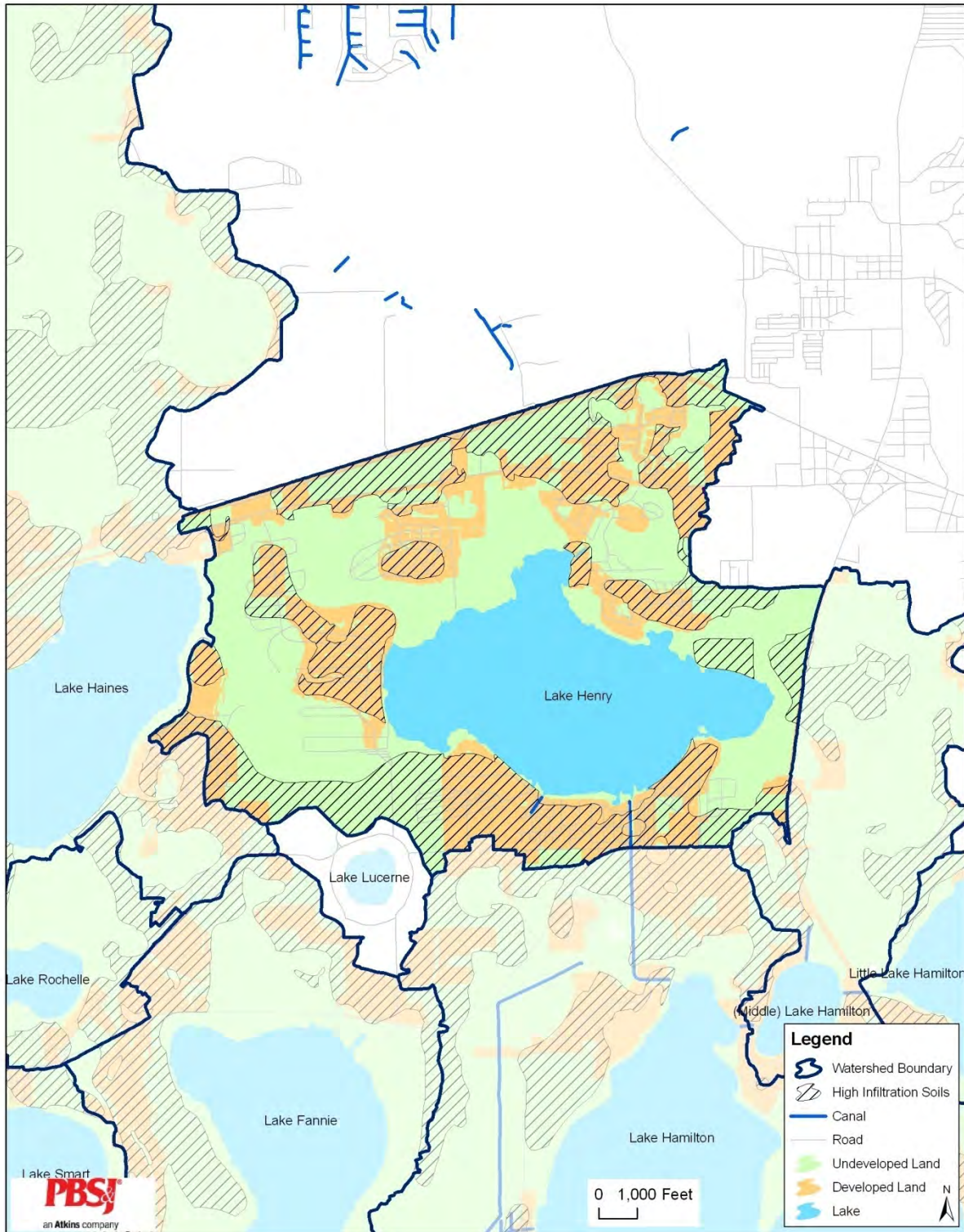


Figure 4-35. Lake Henry chlorophyll a concentrations with available data from 1990 to 2007.

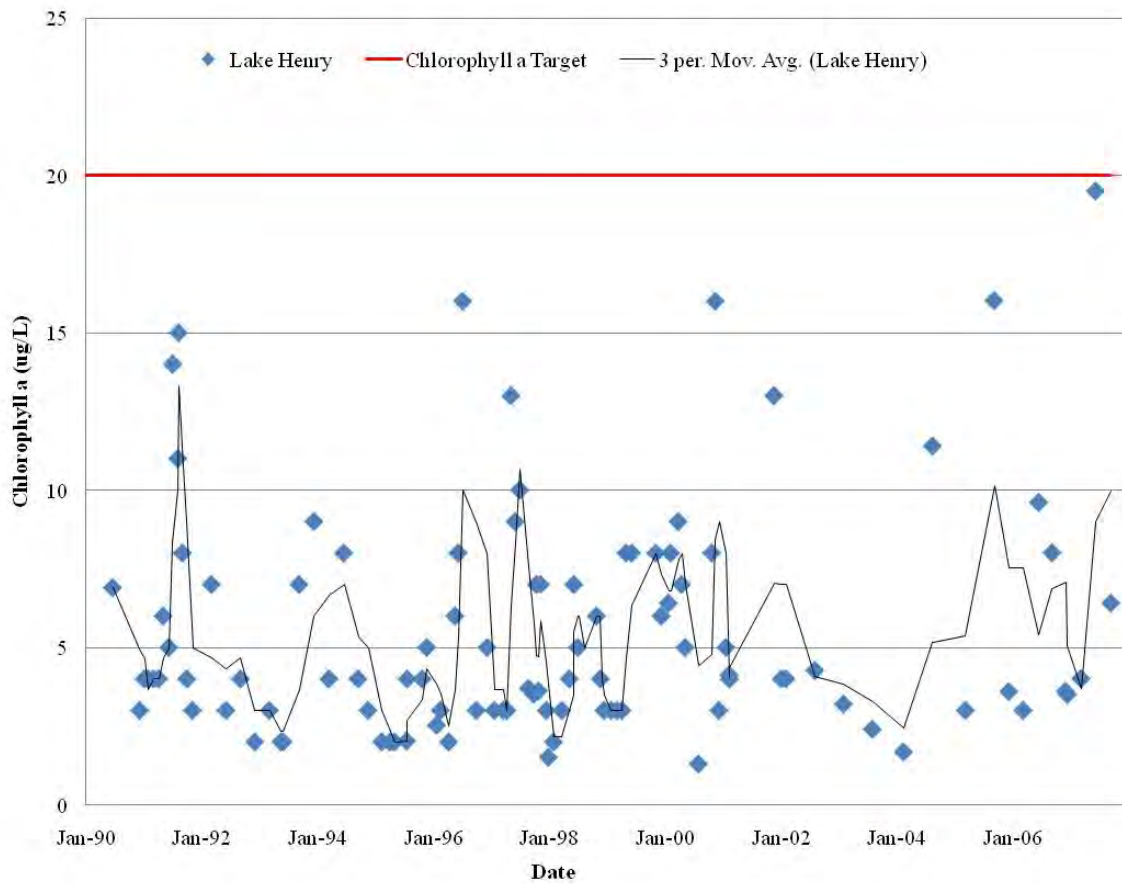


Figure 4-36. Lake Henry bathymetry (October 2006) at water level elevation = 125 feet (Polk County Water Atlas).

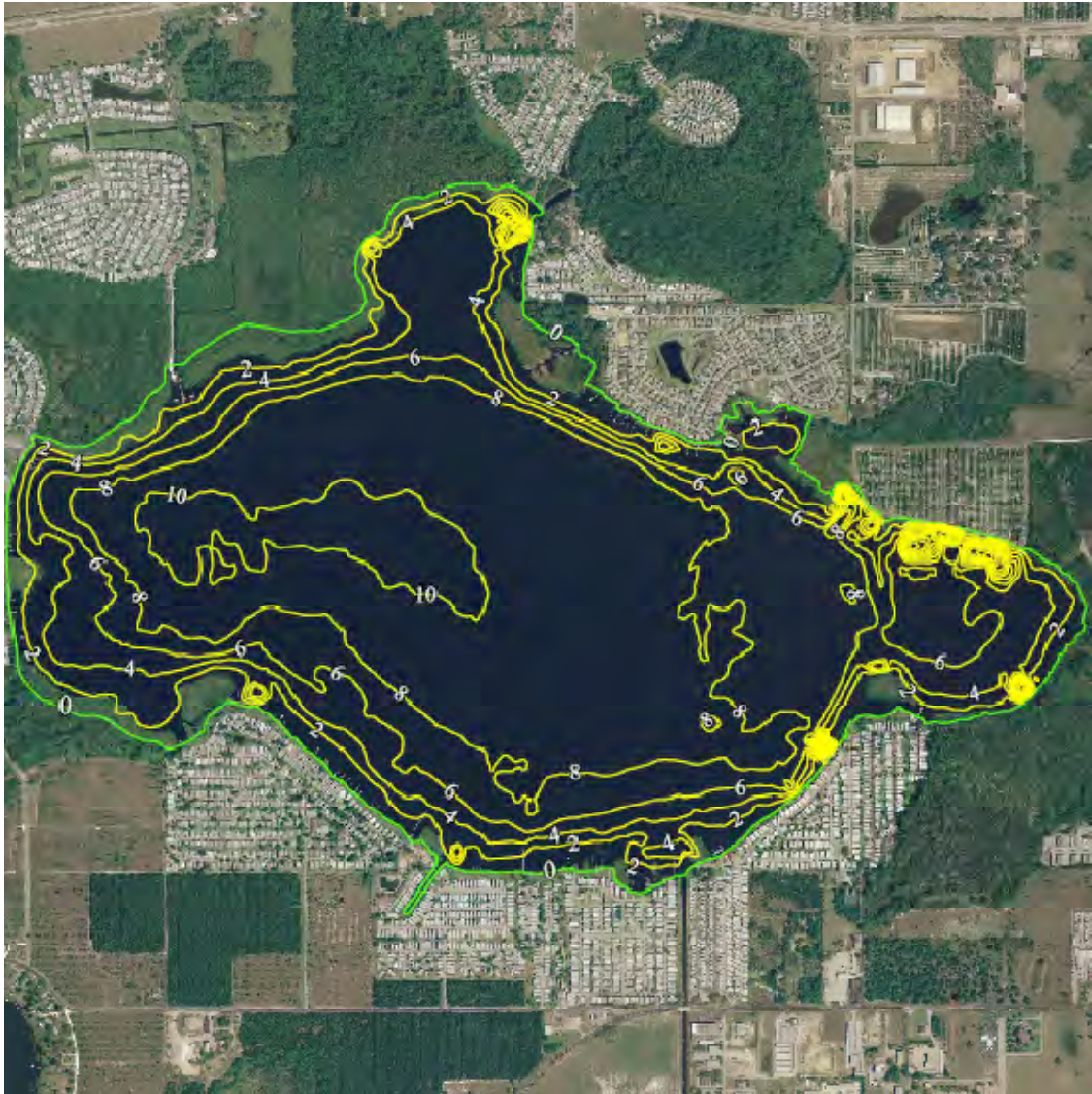
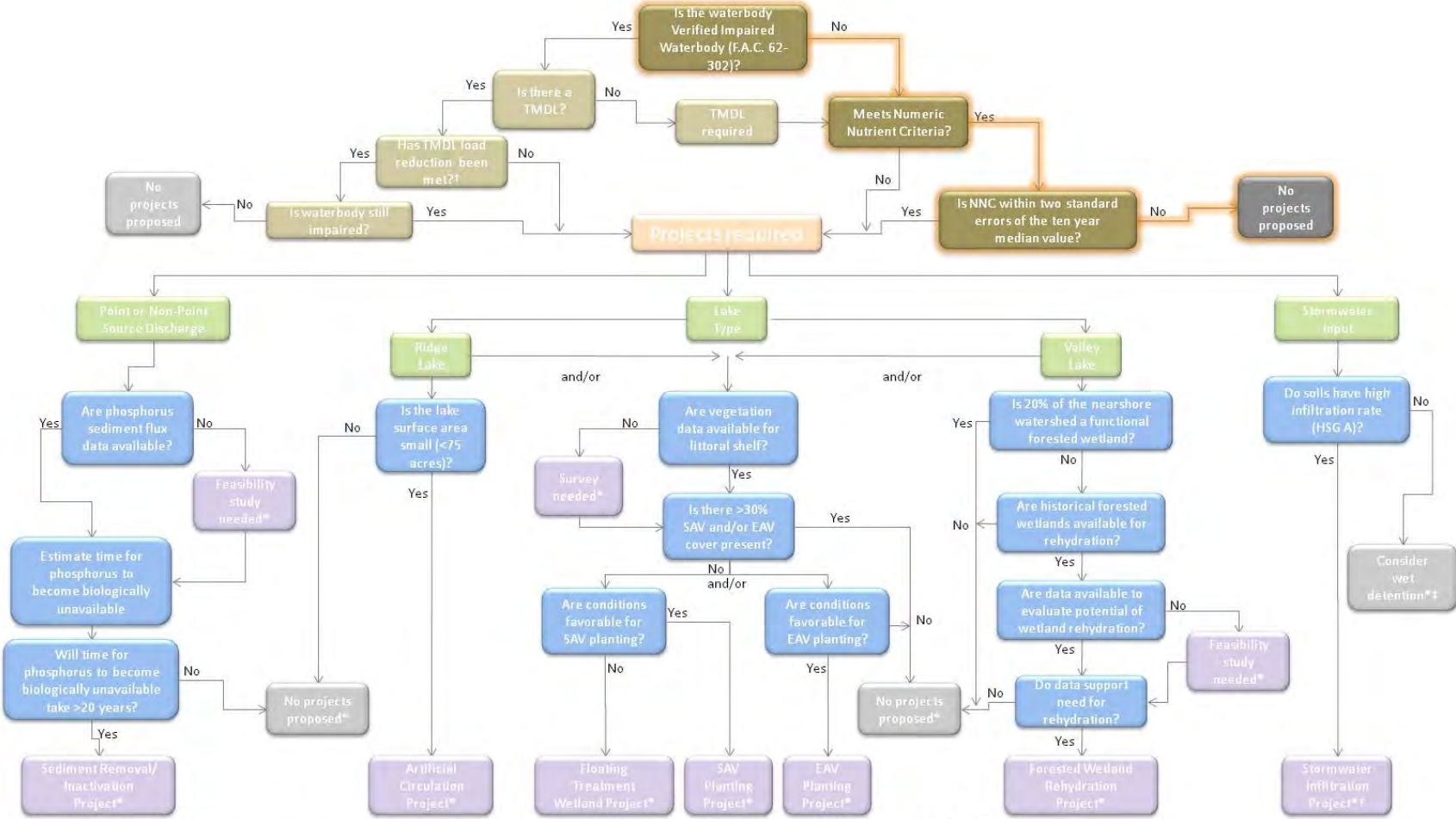


Figure 4-37. Lake Henry decision key: highlighted path shows decision process.



*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