

May 3, 2004

MEMORANDUM

TO: File

FROM: Lisa Henningsen, Environmental Scientist 3
Resource Conservation and Development Department
Southwest Florida Water Management District

SUBJECT: Proposed minimum and guidance levels for Platt Lake in
Hillsborough County, Florida

Platt Lake

General Description

Platt Lake (Figure 1) is located in the Northwest Hillsborough River Basin of the Southwest Florida Water Management District in Hillsborough County, Florida (Section 35, Township 27S, Range 18E). White (1970) classified the area of west-central Florida containing Platt Lake as the Northern Gulf Coastal Lowlands physiographic region. Brooks (1981) characterized the area surrounding the lake as the Land-O-Lakes subdivision of the Tampa Plain in the Ocala Uplift Physiographic District (Brooks 1981). The subdivision has been described as a silty sand plain overlying Tampa Limestone with elevations from 50 to 80 feet and numerous small lakes. As part of the Florida Department of Environmental Protection's Lake Bioassessment/Regionalization Initiative, the area has been identified as the Land-O-Lakes region, and described as a sandy upland with poorly drained soils interspersed. Lakes in the region are typically clearwater, neutral to slightly alkaline systems with low to moderate nutrient concentrations (Griffith *et al.* 1997).

Much of the uplands surrounding Platt Lake have been altered for medium-density residential development (Figure 2). The majority of the shoreline area has also been altered in association with residential development. Other uplands south and southwest of the lake have been converted to citrus. Intact cypress-dominated wetlands, contiguous with the lake, remain along the eastern lake area, extending to the north and east. Cypress also fringe a portion of the southern shoreline. Public access to the lake is not available.

The drainage area for Platt Lake is 9.2 square miles (Florida Board of Conservation 1969). Ditches convey surface water flows to Platt Lake from a wetland system located to the west, and Bird Lake located to the north. Surface water discharges from the lake to the east through an outfall ditch that directs flows southward through a forested wetland system to Lake Magdalene. There are no surface water withdrawals from the

lake currently permitted by the District. One permitted groundwater withdrawal is located within the surrounding area, just southeast of the lake.

The 1956 United States Geological Survey 1:24,000 Sulphur Springs, Fla. quadrangle map (photorevised 1969 and 1987) includes a lake surface elevation of 49 ft above the National Geodetic Vertical Datum of 1929 (NGVD) for Platt Lake. The "Gazetteer of Florida Lakes" (Florida Board of Conservation 1969, Shafer *et al.* 1986) lists the lake area as 63 acres at a water surface elevation of 49 ft above NGVD. A topographic map of the basin generated in support of minimum levels development (Figure 3) indicates that the lake extends just over 66 acres when the water surface is at 49 ft above NGVD. Data used for production of the topographic map were obtained from field surveys and aerial photography maps containing one-foot contour lines prepared using photogrammetric methods.

Figure 1. Location of Platt Lake in Hillsborough County, Florida.

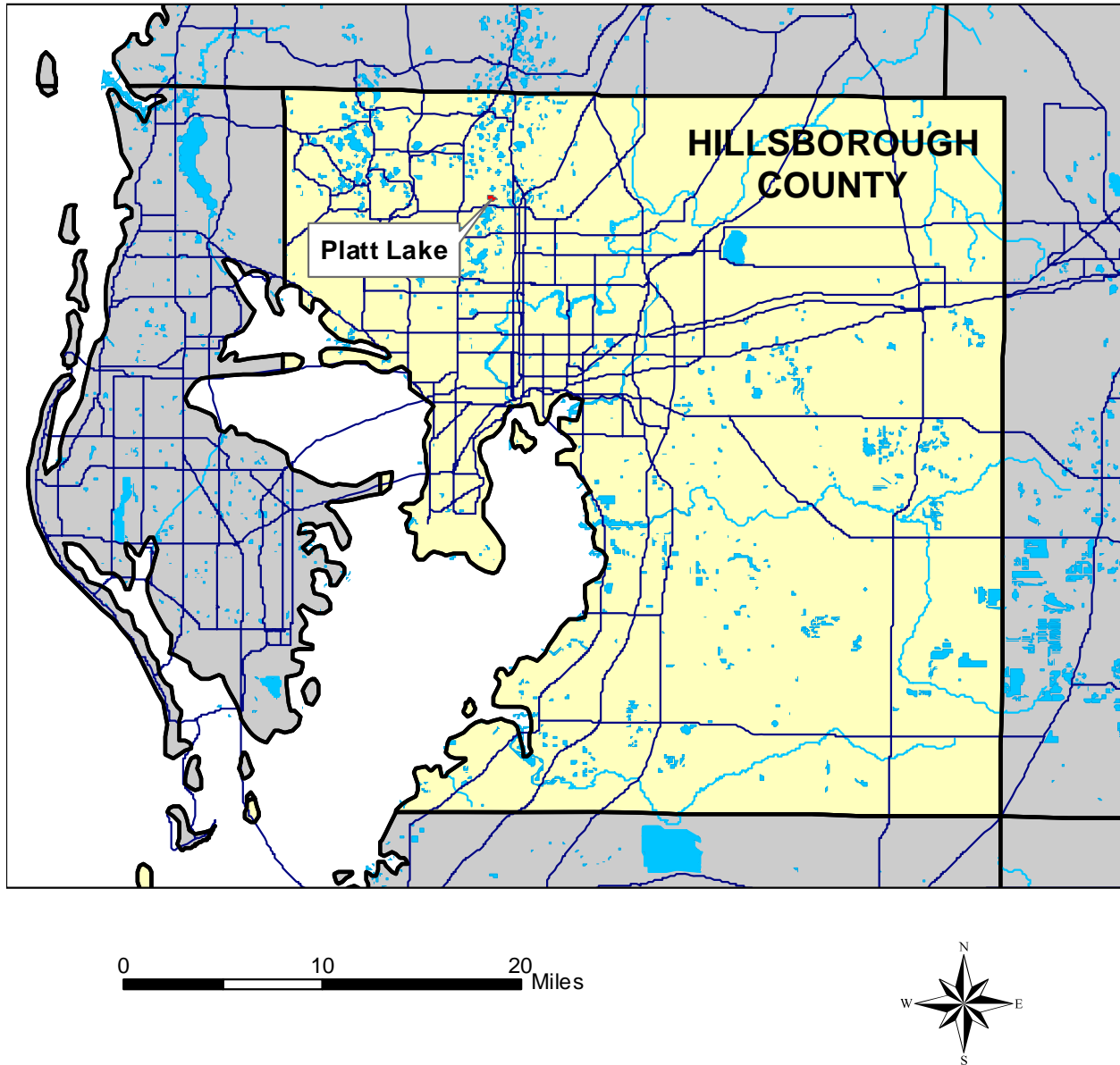





Figure 2. Location of District lake-level gauge, inlets, outlet and lakeshore area where hydrologic indicators were measured at Platt Lake in Hillsborough County, Florida.



Legend

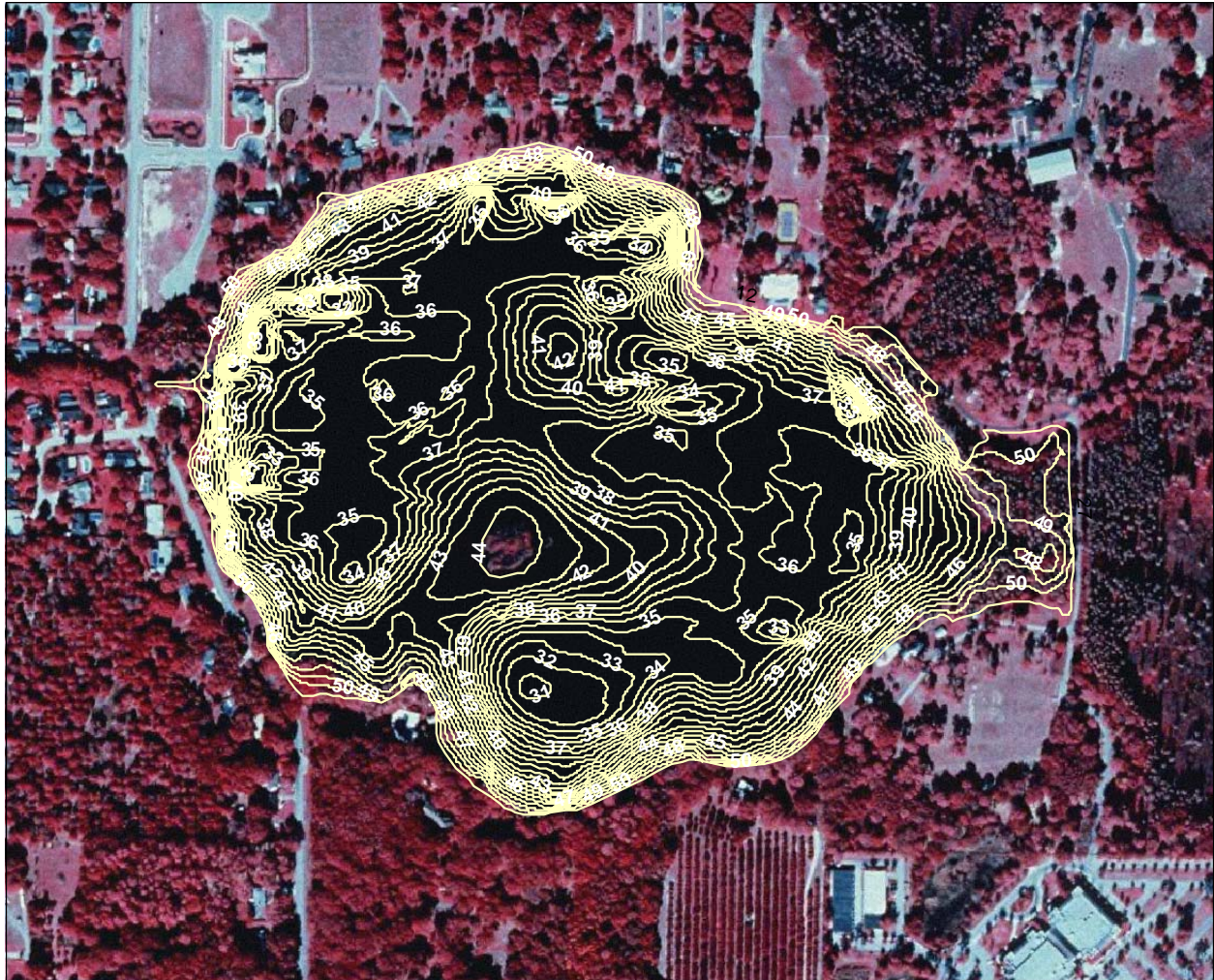
-  Inlets, Outlet
-  Lake Gauge
-  Hydrologic Indicators

0 500 1,000 2,000
Feet



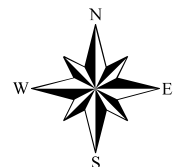
Map prepared December 15, 2003 using 1999 digital ortho photography, and elevation data collected on June 14, 2000 by Hillsborough County Stormwater Section staff for the Hillsborough County Watershed Atlas.

Figure 3. One-foot contours within the Platt Lake basin in Hillsborough County, Florida. Values shown are elevations in feet above the National Geodetic Vertical Datum of 1929.



Map prepared December 4, 2003 using 1999 digital ortho photography, and elevation data collected on June 14, 2000 by Hillsborough County Stormwater Section staff for the Hillsborough County Watershed Atlas.

0 250 500 1,000 Feet



Previously Adopted Lake Management Levels

Based on work conducted in the 1970s (see SWFWMD 1996), the District Governing Board adopted management levels (currently referred to as Guidance Levels) for Platt Lake in September 1980 (Table 1). A Maximum Desirable Level of 50.00 ft above NGVD was also developed, but was not adopted by the Governing Board.

Table 1. Adopted guidance levels and associated surface areas for Platt Lake in Pasco County, Florida.

Level	Elevation (feet above NGVD)	Lake Area (acres)
Ten Year Flood Guidance Level	51.80	NA
High Level	50.00	69
Low Level	47.75	64
Extreme Low Level	45.00	58

Proposed Minimum and Guidance Levels

Proposed Minimum and Guidance Levels were developed for Platt Lake using the methodology for Category 1 Lakes described in SWFWMD (1999) and current District Rules (Chapter 40D-8, Florida Administrative Code). Proposed levels, along with lake surface area values for each level are listed in Table 2. Locations of the proposed minimum levels within the lake basin are shown in Figure 4.

Table 2. Proposed minimum levels, guidance levels and associated surface areas for Platt Lake in Pasco County, Florida.

Level	Elevation (feet above NGVD)	Lake Area (acres)
Ten Year Flood Guidance Level	52.0	NA
High Guidance Level	49.7	68
High Minimum Lake Level	49.5	68
Minimum Lake Level	48.1	65
Low Guidance Level	45.5	59

NA = not applicable

Figure 4. Approximate location of the proposed Minimum Lake Level (yellow) and proposed High Minimum Lake Level (blue) for Platt Lake in Hillsborough County, Florida.



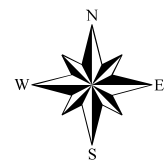
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Platt Minimum Levels

- 48.1 ft above NGVD = MLL
- 49.5 ft above NGVD = HMLL

0 250 500 1,000 Feet

Map prepared December 10, 2003 using 1999 digital ortho photography, and elevation data collected on June 14, 2000 by Hillsborough County Stormwater Section staff for the Hillsborough County Watershed Atlas.



Summary of Data and Analyses Supporting Recommended Minimum and Guidance Levels

Hydrologic data are available from the District Water Management Database for Platt Lake (District Universal ID Number STA 135 135) from May 1946 through the present date (Figure 5; see Figure 2 for current location of the SWFWMD lake-level gauge). The hydrologic data record is not continuous; *i.e.*, there are some months during the period of record when water level data were not recorded. Monthly mean water surface elevations, along with proposed guidance and minimum levels are graphed in Figure 6. For the entire period of record, the hydrologic data are classified as Historic data. Historic data collected through January 2003 were used to calculate the Historic P10, P50, and P90 (Table 3).

The Normal Pool elevation was established at 49.9 ft above NGVD based on elevations associated with the buttressing of cypress (*Taxodium* sp.) trees along the eastern and southern shore of the lake (Table 4, Figure 2). The low floor slab elevation, extent of structural alteration and the control point elevation were determined using available one-foot contour interval aerial maps and field survey data collected in August 2003 and February, March and April 2004 (Table 3). The control point was established at 49.1 ft above NGVD, which is the elevation of the top of the east gate for the Lake Magdalene water control structure (Figure 7). Because the Normal Pool elevation is higher than the control point elevation, the lake is considered to be Structurally Altered.

Based on the availability of Historic hydrologic data for Platt Lake, the High Guidance Level was established at the Historic P10 elevation of 49.7 ft above NGVD. The Historic P50 and Low Guidance Level were established at 48.3 and 45.5 ft above NGVD, respectively, using the Historic P50 and Historic P90 elevations (Table 3).

The Ten Year Flood Guidance Level for Platt Lake was established at 52.0 ft above NGVD using the methodology for open basin lakes described in current District Rules (Chapter 40D-8, Florida Administrative Code). For the analysis, Hillsborough County's modified version of the Environmental Protection Agency's Stormwater Management Model (SWMM), version 4.31C, (Hillsborough County 2000) was used. Model input was based on a ten-year storm event with a 120-hour duration and an 11.3 inch rainfall depth. Based on available lake stage data, the Ten Year Flood Guidance Level has not been exceeded during the past 57 years (Figures 5 and 6). The highest elevation for Platt Lake recorded in the District Water Management Data Base, 51.88 ft above NGVD, occurred on September 28, 1979. The low of record, 42.53 ft above NGVD, occurred on June 27, 2001.

Aquatic macrophytes and other hydrophytes, including cypress (*Taxodium* sp.), maidencane (*Panicum hemitomon*), red maple (*Acer rubrum*), bladderwort (*Utricularia* spp.), torpedo grass (*Panicum repens*), and cattails (*Typha latifolia*), and spatterdock (*Nuphar luteum*), occur along the shoreline or in shallow areas throughout the lake basin. The lake is contiguous with a cypress-dominated wetland greater than 0.5 acre in size, so it is classified as a Category 1 or 2 Lake for the purpose of minimum levels

development. Because the Historic P50 elevation is higher than 1.8 feet below the Normal Pool elevation, the lake is classified as a Category 1 Lake. Note that herein, for discussion purposes, the elevation 1.8 ft below the Normal Pool elevation is identified as the Cypress Standard. For Platt Lake, this standard is established at 48.1 ft above NGVD.

Based on the relationship between the Cypress Standard and the Historic P50 elevation, the proposed Minimum Lake Level was established at the Cypress Standard elevation (48.1 ft above NGVD). The proposed High Minimum Lake Level was established at 49.5 ft NGVD, an elevation 0.4 ft below the Normal Pool elevation. The proposed High Minimum Lake Level is 2.2 ft below the low spot of an asphalt road located just east of Platt Lake, and 1.6 ft below the floor slab of a covered picnic area, which represents the elevation of the lowest structure/building that is not a residence.

For comparative purposes, minimum level standards used for establishing Minimum Lake Levels for lakes without fringing cypress wetlands (see current District rules and Leeper *et al.* 2001) were developed for Platt Lake (Table 3). The Recreation/Ski Standard would be established at 50.8 ft NGVD, based on the sum of the elevation at which the lake could contain a safe skiing area (48.0 ft NGVD) and the difference between the Historic P50 and Historic P90 elevations (2.8 ft). The Dock-Use Standard would be established at 50.2 ft NGVD, based on the sum of the P10 elevation of sediments at the end of 15 docks at the lake (45.4 ft above NGVD), a 2 ft clearance based on use of powerboats at the lake, and the difference between the Historic P50 and Historic P90 elevations (2.8 ft). The Aesthetic Standard for the lake would be established at the Low Guidance Level elevation of 45.5 ft above NGVD. The Species Richness Standard would be established at 43.4 ft above NGVD, based on limiting reduction in lake surface area to less than a 15% decrease from the lake area at the Historic P50 elevation. The Basin Connectivity Standard would be established at 42.5 ft NGVD, based on the sum of the elevation that insures connectivity among lake sub-basins (37.7 ft NGVD), a 2 ft clearance for movement of biota and use of powerboats in the lake, and the difference between the Historic P50 and Historic P90 elevations (2.8 ft). Review of dynamic ratio values (see Bachmann *et al.* 2000) for various lake stages indicated that potential changes in basin susceptibility to wind-induced sediment re-suspension would be of concern for minimum levels development at a Mixing Standard elevation of 36.7 ft above NGVD (Table 3, Figure 8).

Figure 5. Surface water elevation at Platt Lake in Hillsborough County, Florida. Data through January 2003 are shown.

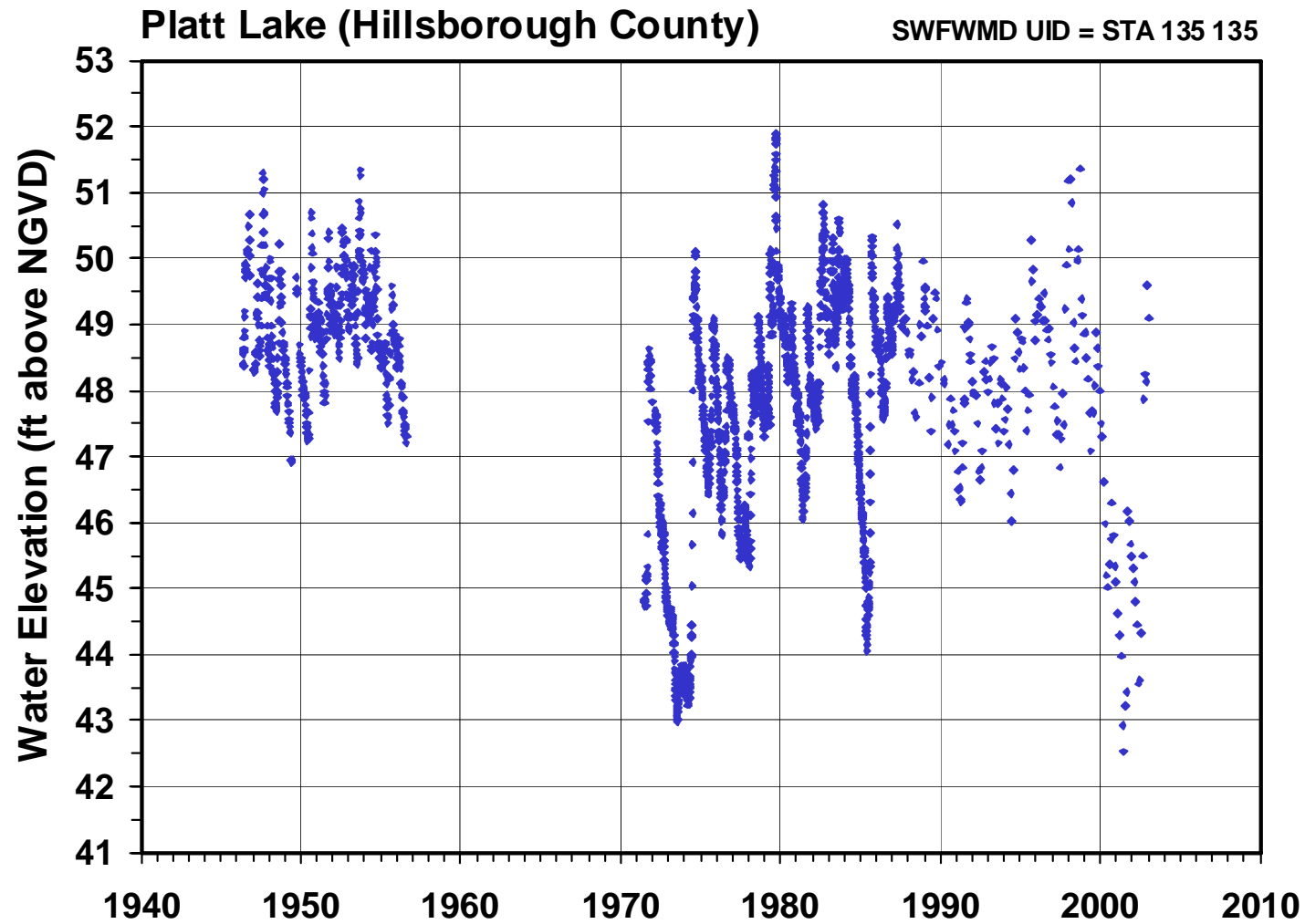


Figure 6. Mean monthly surface water elevation through January 2003, and proposed guidance and minimum levels for Platt Lake in Hillsborough County, Florida. Proposed levels include the Ten Year Flood Guidance Level (10-YR), High Guidance Level (HGL), Low Guidance Level (LGL), High Minimum Lake Level (HMLL), and Minimum Lake Level.

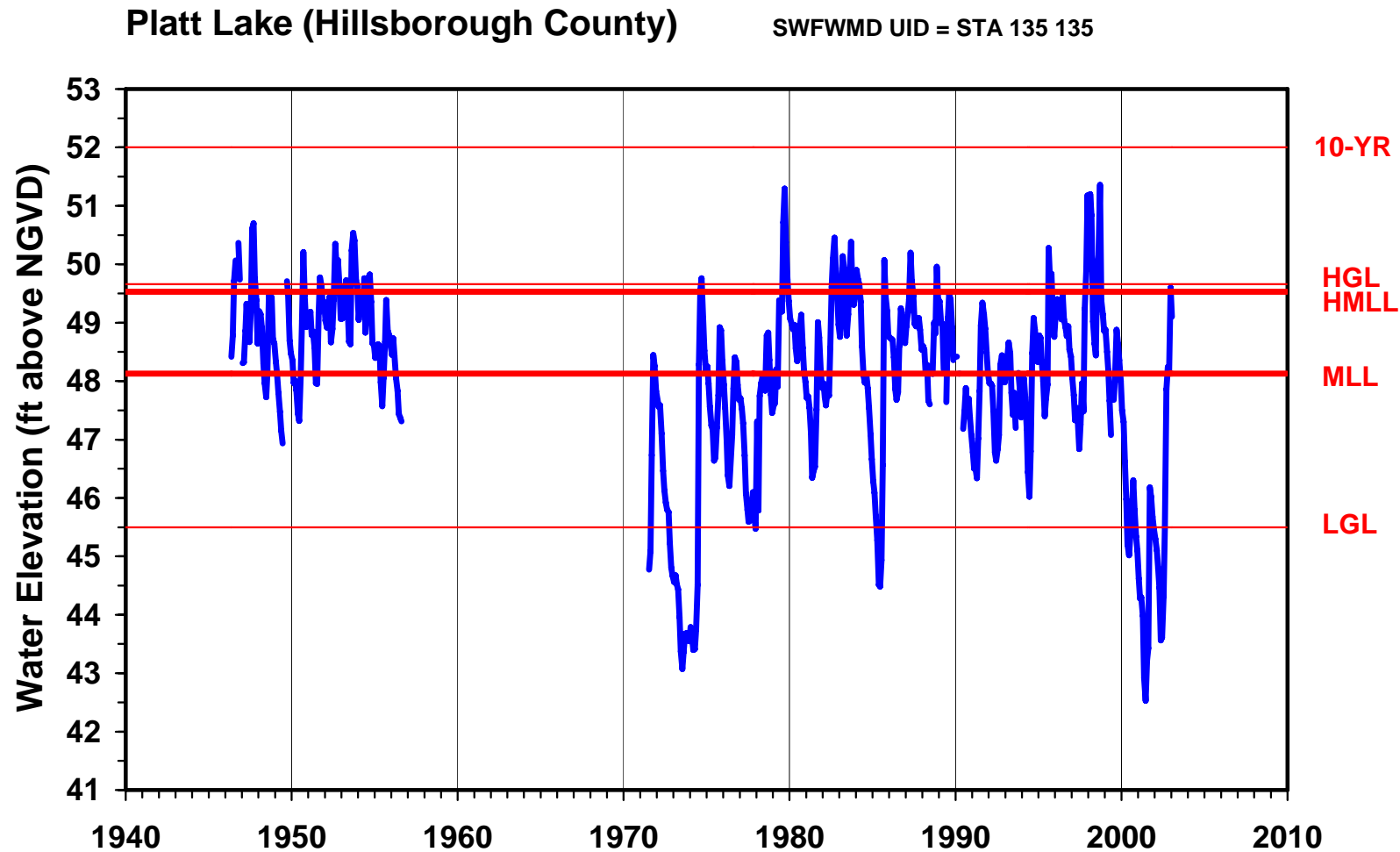


Table 3. Elevation data and associated area values used for establishing minimum levels for Platt Lake in Hillsborough County, Florida.

Level or Feature	Elevation (feet above NGVD)	Lake Area (acres)
Historic P10	49.66	68
Historic P50	48.33	65
Historic P90	45.50	59
Normal Pool	49.9	69
Low Floor Slab	52.5	NA
Low Other (covered picnic area)	51.1	NA
Low Other (screened building)	51.8	NA
Low Road	51.7	NA
Control Point (Lk. Mag. Structure)	49.1	67
High Guidance Level	49.7	68
Historic P50	48.3	65
Low Guidance Level	45.5	59
Cypress Standard	48.1	65
*Recreation/Ski Standard	50.8	71
*Dock-Use Standard	50.2	70
*Aesthetic Standard	45.5	59
*Species Richness Standard	43.4	55
*Connectivity Standard	42.5	51
*Mixing Standard	36.7	26

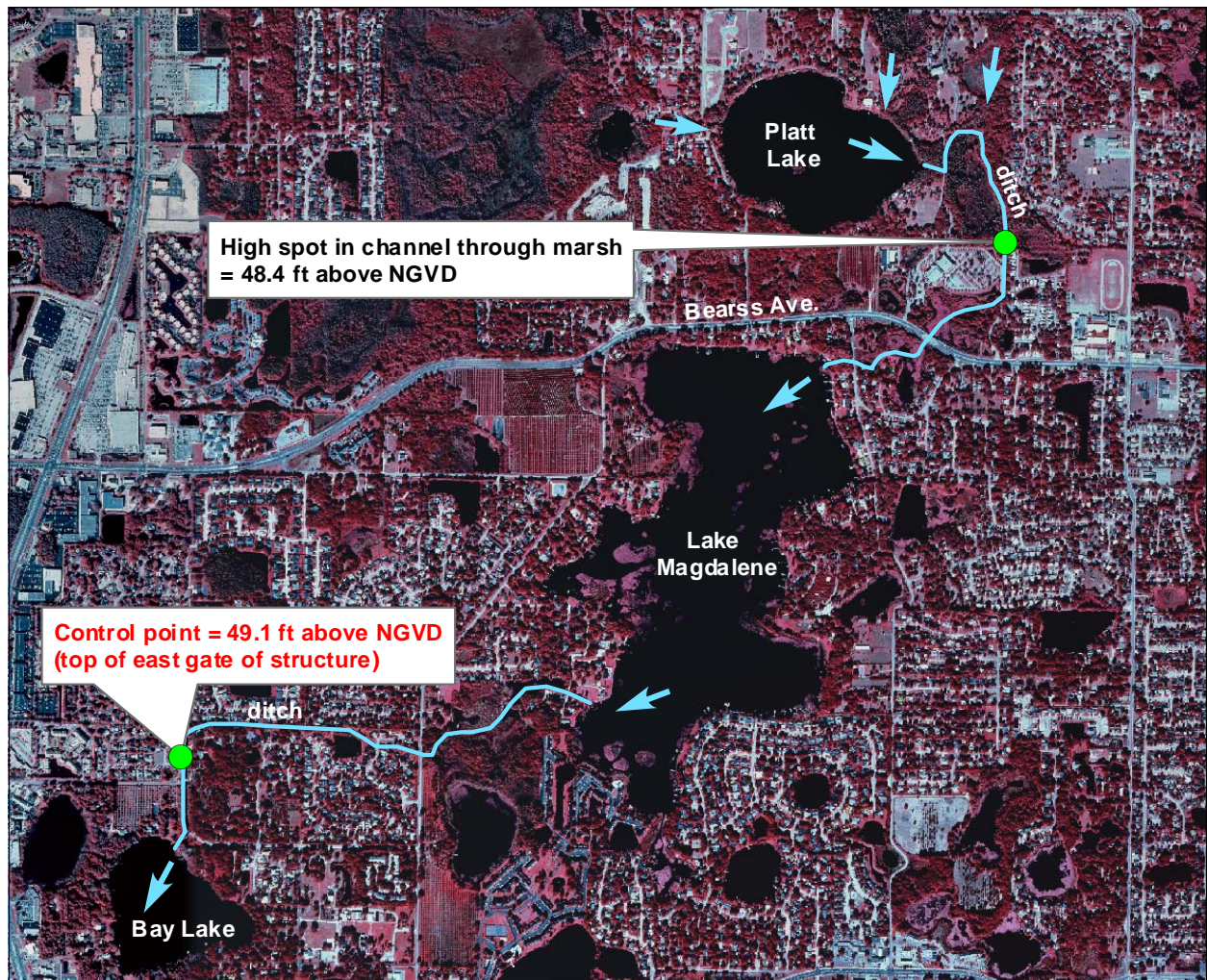
NA = not applicable/not available

*Category 3 Lake Standards developed for comparative purposes only.



Table 4. Elevation data used for establishing the Normal Pool Elevation for Platt Lake in Hillsborough County, Florida. Data were collected by SWFWMD staff on September 29, 2002.

Hydrologic Indicator	Elevation (feet above NGVD)
Normal pool based on cypress buttress	49.78
Normal pool based on cypress buttress	50.18
Normal pool based on cypress buttress	49.88
Normal pool based on cypress buttress	50.08
Normal pool based on cypress buttress	49.61
Normal pool based on cypress buttress	49.93
Normal pool based on cypress buttress	50.03
Normal pool based on cypress buttress	49.83
Normal pool based on cypress buttress	49.68
Normal pool based on cypress buttress	49.93
Normal pool based on cypress buttress	50.03
Normal pool based on cypress buttress	49.88
Normal pool based on cypress buttress	50.03
Normal pool based on cypress buttress	49.95
N	14
Median	49.9
Mean	49.9
Standard Deviation	0.16

Figure 7. Outlet conveyance system and control point for Platt Lake in Pasco County, Florida. Blue line indicates ditched flow path.



Legend

-  Inlets, Outlet
-  Flow path



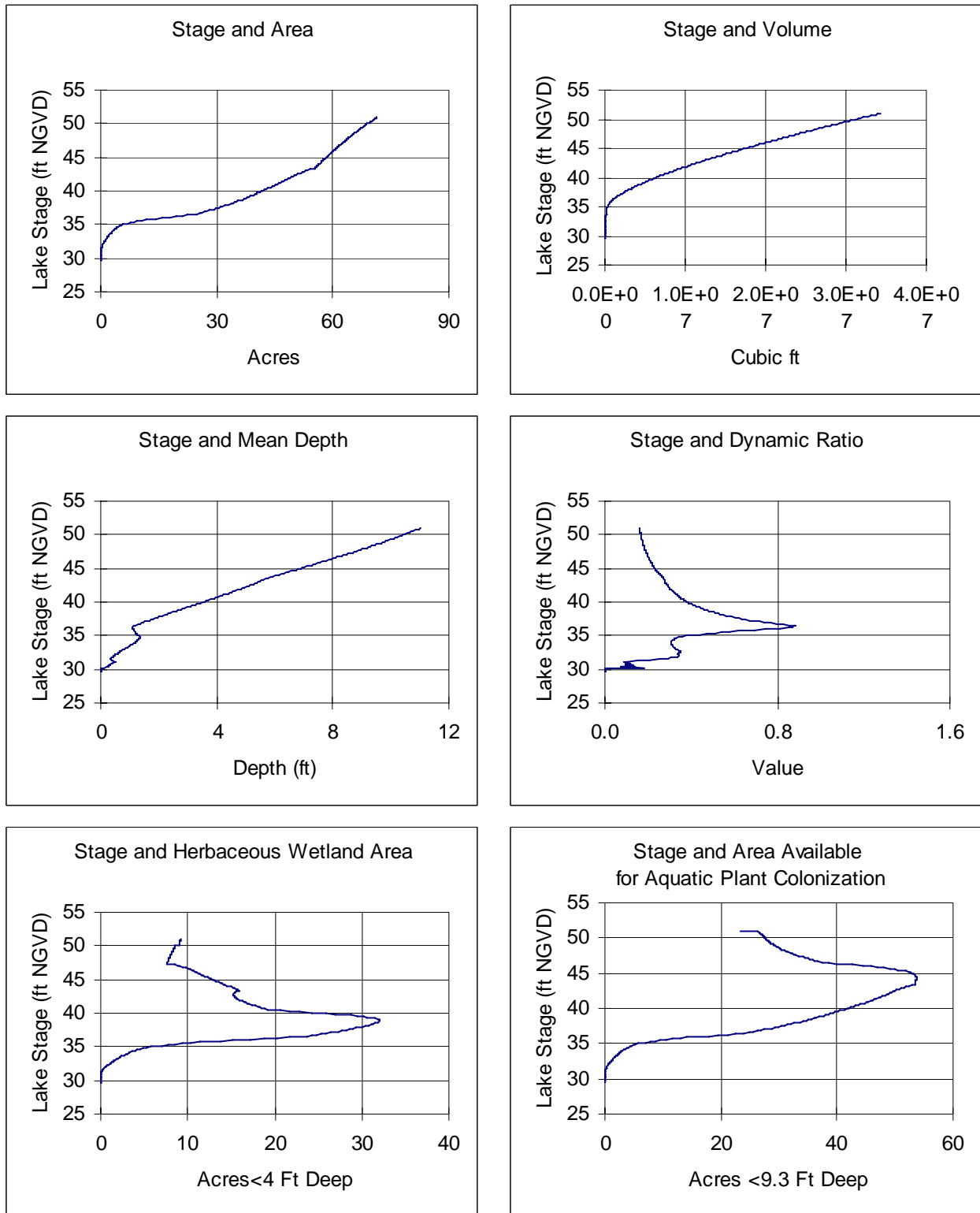
0 1,000 2,000 4,000
Feet

Map prepared April 5, 2004 using 1999
digital ortho photography.

Table 5. Summary statistics for elevations associated with docks (n = 15) at Platt Lake in Hillsborough County, Florida, based on data collected by SWFWMD staff on September 12, 2002. Percentiles (P10, P50, P90) represent elevations exceeded by 10, 50, and 90 percent of the docks.

Statistic	Elevation of Sediments at Waterward End of Docks (feet above NGVD)	Elevation of Dock Platforms (feet above NGVD)
Mean (SD)	42.2 (1.2)	49.1 (0.7)
P10	45.4	50.7
P50	43.5	50.5
P90	42.4	50.1
Maximum	45.7	50.7
Minimum	38.9	49.7

Figure 8. Surface area, volume, mean depth, dynamic ratio (basin slope), potential herbaceous wetland area, and area available for aquatic macrophyte colonization versus lake stage for Platt Lake in Hillsborough County, Florida.



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