February 4, 2003

MEMORANDUM

TO: **File**

FROM: **Doug Leeper, Senior Environmental Scientist**
Resource Conservation and Development Department
Southwest Florida Water Management District

SUBJECT: **Proposed minimum and guidance levels for Cypress Lake**
In Hillsborough County, Florida

Cypress Lake

General Lake Description

Cypress Lake (Figure Cypress-1) is located in the Northwest Hillsborough Basin in Hillsborough County, Florida (Section 24, Township 27S, Range 17E). The area surrounding the lake is categorized as the Land-O-Lakes subdivision of the Tampa Plain in the Ocala Uplift Physiographic District (Brooks 1981); a region of many lakes on a moderately thick plain of silty sand overlying Tampa Limestone. As part of the Florida Department of Environmental Protection's Lake Bioassessment/Regionalization Initiative, the area has been identified as the Keystone Lakes region; an area of numerous slightly acidic, low nutrient, and mostly clear-water lakes (Griffith *et al.* 1997).

The lake has a drainage area of 0.08 square miles (Florida Board of Conservation 1969). An outlet on the southern shore connects the lake to a series of small wetlands that drain to Lake Pretty in the Rocky Creek drainage system (Figure Cypress-2). Culverts along the western shore of the lake drain to the Brooker Creek system during periods of high water. There are no surface water withdrawals from Cypress Lake currently permitted by the District. There are, however, several permitted groundwater withdrawals in the lake vicinity.

The "Gazetteer of Florida Lakes" (Florida Board of Conservation 1969, Shafer et al. 1986) lists the lake area at 17 acres. The United States Geological Survey 1974 (photorevised 1987) 1:24,000 Odessa, Fla. quadrangle topographic map indicates a water level elevation of 45 ft above mean sea level. This elevation corresponds to a lake surface area of 14.5 acres, based on a topographic map of the basin generated in support of minimum levels development (Figure Cypress-3). Data used for production of the topographic map were obtained from field surveys and 1:200 aerial photograph maps containing one-foot contour lines prepared using photogrammetric methods.

Figure Cypress-1. Location of Cypress Lake in Hillsborough County, Florida.

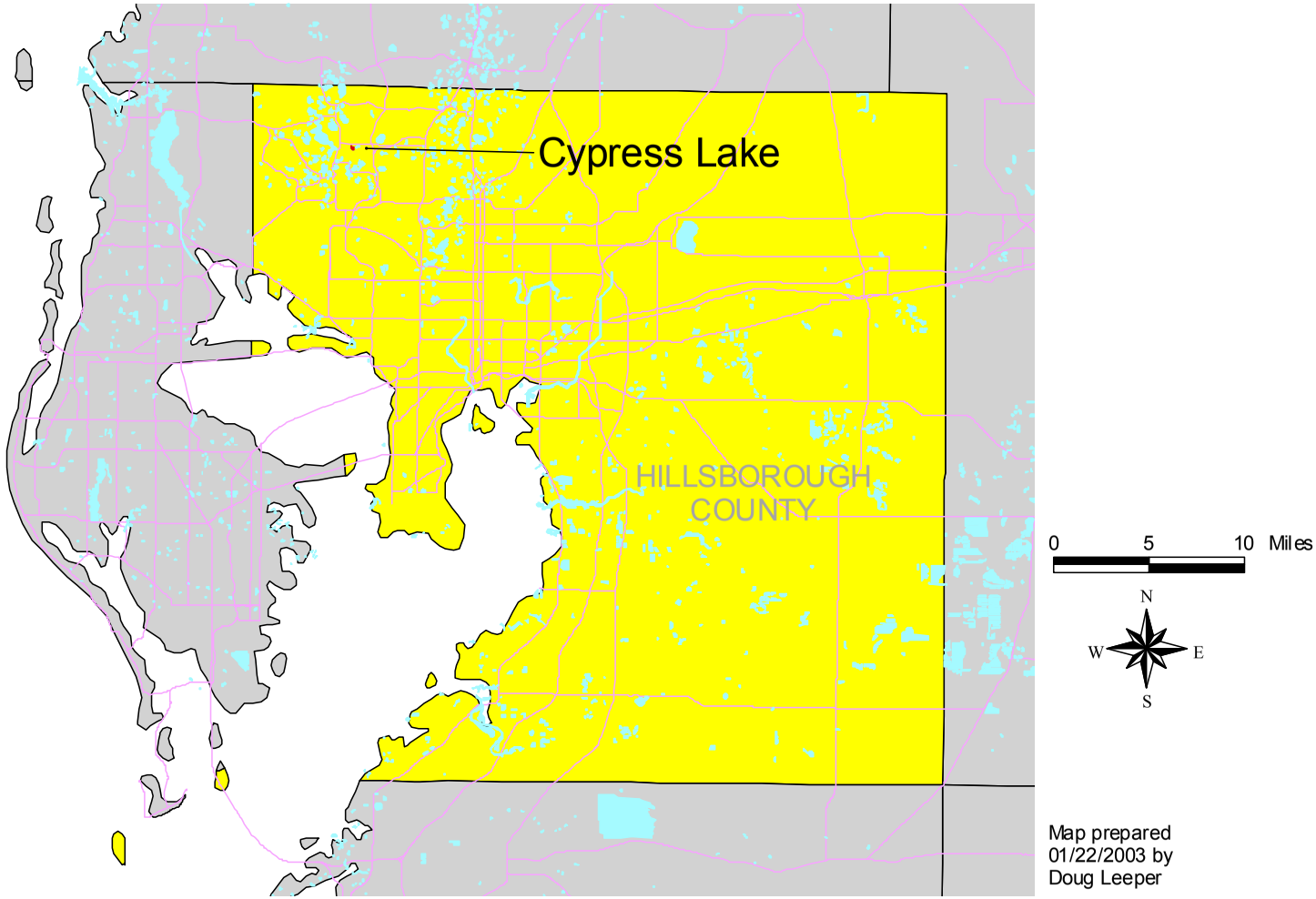


Figure Cypress-2. Location of District lake gauge, outlets and site where hydrologic indicators were measured at Cypress Lake in Hillsborough County, Florida.

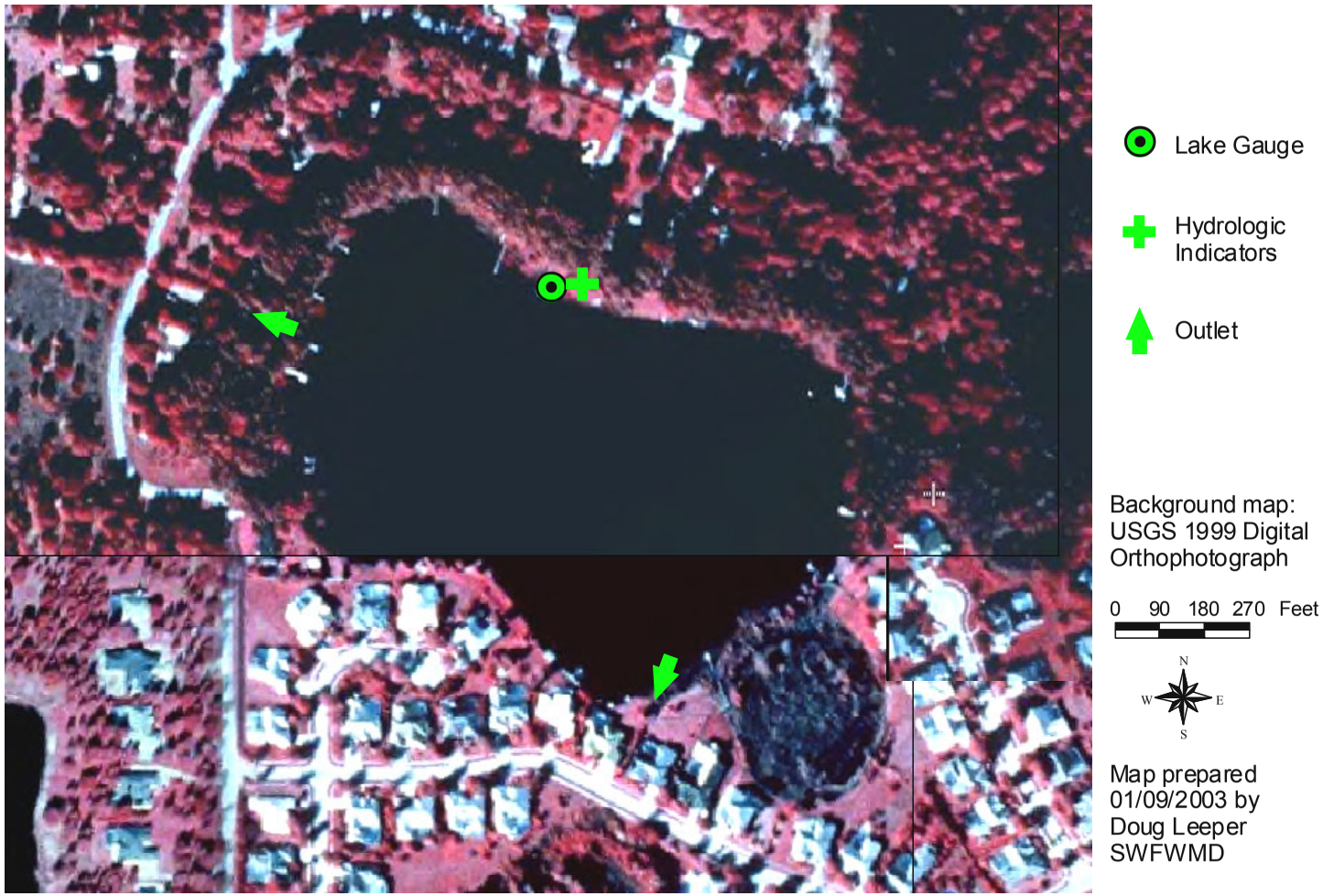
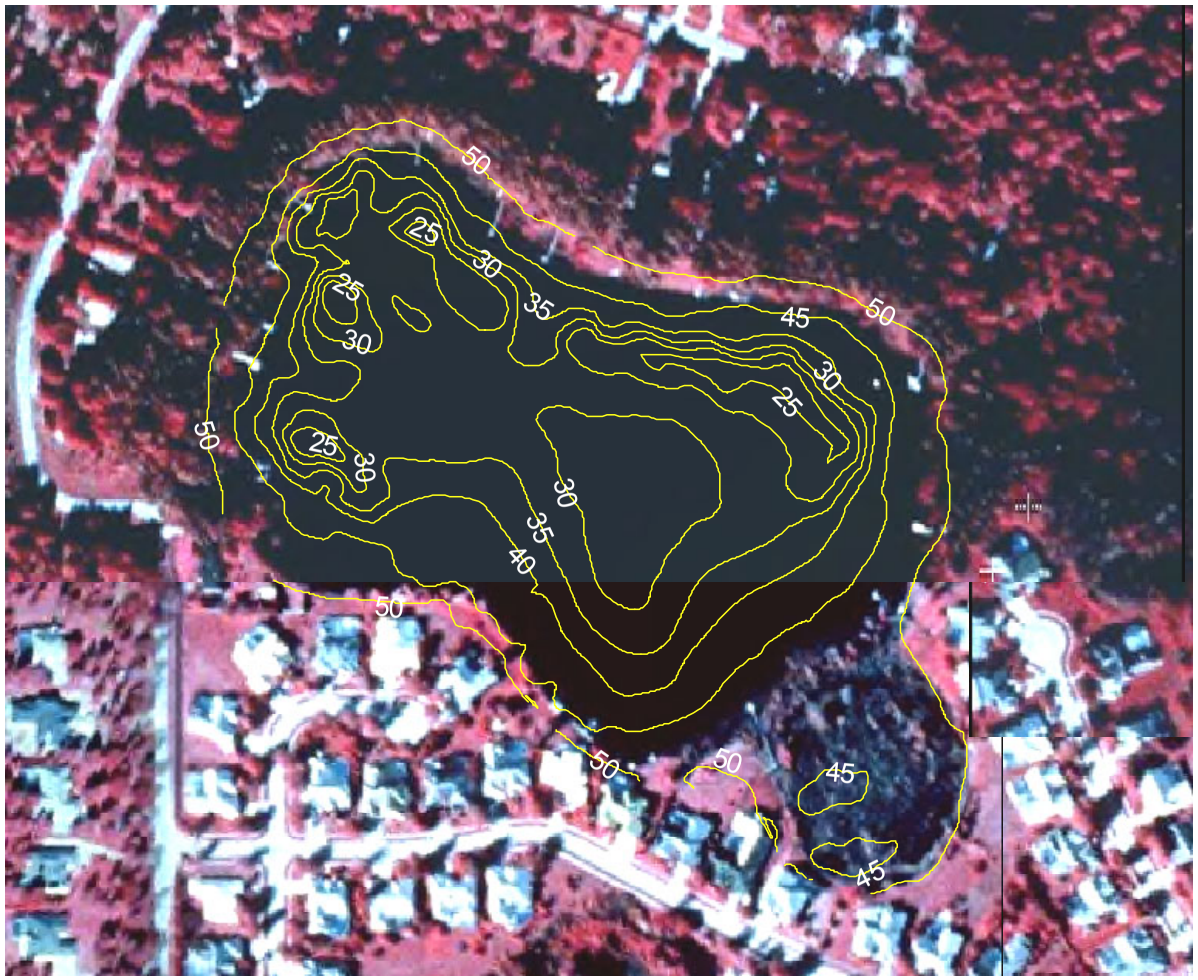


Figure Cypress-3. Five-foot contours within the Cypress Lake Basin, Hillsborough County, Florida. Values shown are elevations, in feet, above the National Geodetic Vertical Datum of 1929.



Previously Adopted Lake Management Levels

The District has not previously adopted management levels for Cypress Lake.

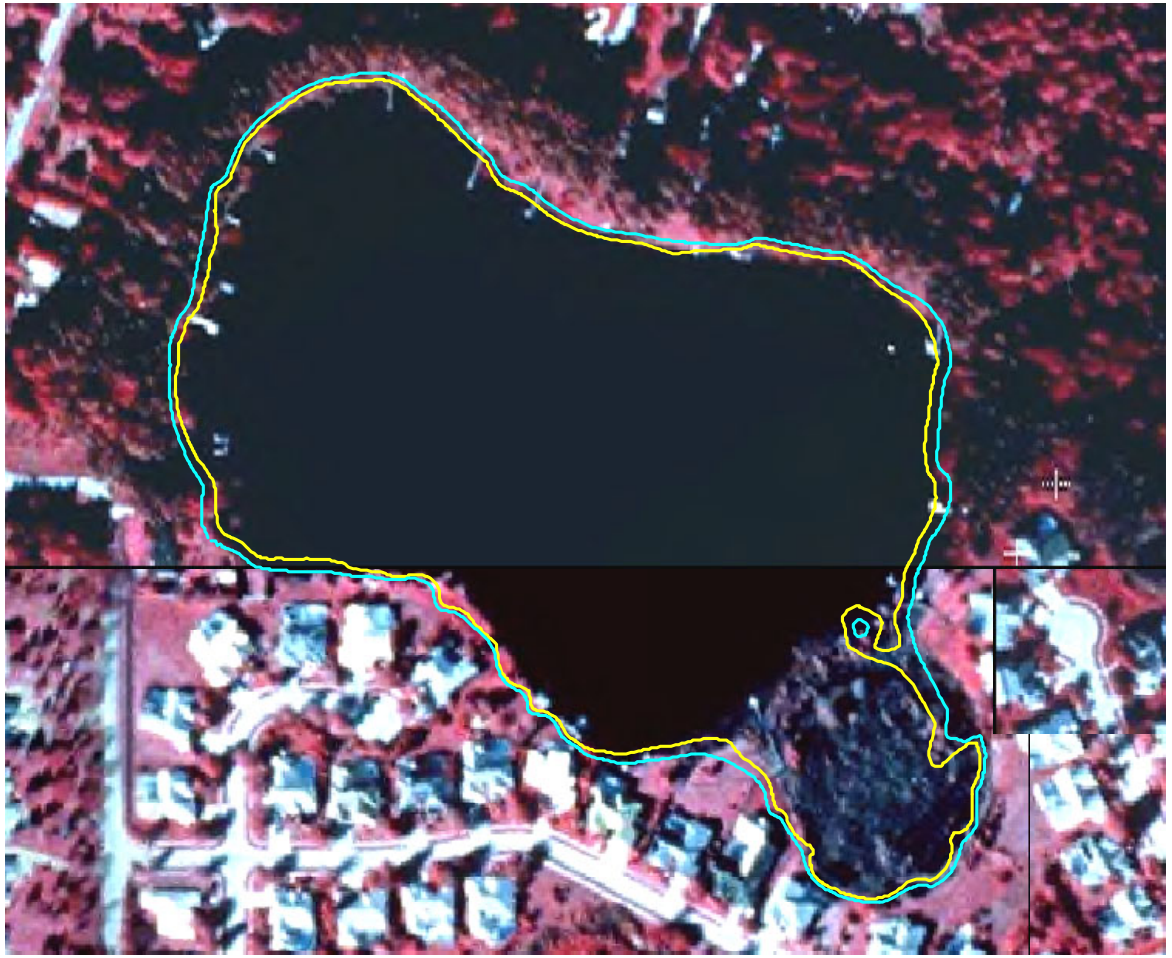
Proposed Minimum and Guidance Levels

Proposed Minimum and Guidance Levels were developed for Cypress Lake using the methodology for Category 3 Lakes described in Leeper *et al.* (2001), in accordance with modifications outlined by Dierberg and Wagner (2001). Proposed levels, along with lake surface area values for each level are listed in Table Cypress-1. The locations of the proposed minimum levels within the lake basin are shown in Figure Cypress-4.

Table Cypress-1. Proposed minimum levels, guidance levels and associated surface areas for Cypress Lake in Hillsborough County, Florida.

Level	Elevation (feet above NGVD)	Total Lake Area (acres)
Ten Year Flood Guidance Level	50.86	23
High Guidance Level	48.89	20
High Minimum Lake Level	48.89	20
Minimum Lake Level	47.89	19
Low Guidance Level	46.79	17

Figure Cypress-4. Approximate location of the proposed Minimum Lake Level (yellow) and the proposed High Minimum Lake Level (blue) for Cypress Lake, Hillsborough County, Florida. Elevations are in feet, relative to the National Geodetic Vertical Datum of 1929.



Proposed Minimum Levels

High Minimum Lake Level = 48.89 ft

Minimum Lake Level = 47.89 ft

Cypress49.shp
Cypress48.shp

Background map:
USGS 1999 Digital Orthophotograph

0 90 180 Feet

N
W E
S

Map prepared
01/09/2003 by
Doug Leeper
SWFWMD

Summary of Data and Analyses Supporting Recommended Minimum and Guidance Levels

Hydrologic data are available for Cypress Lake (District Universal ID Number STA 687 557) for the period from February 1993 through the present date (Figure Cypress-5). For the entire period of record, the hydrologic data are classified as Current data. Data collected through December 2001 were used to calculate the Current P10, P50, and P90 (Table Cypress-2).

The Category 3 Lake Normal Pool elevation (Tables Cypress-2 and Cypress-3) was established at 52.03 ft above NGVD, based on the measurement of cypress (*Taxodium* sp.) buttresses located along the north shore of the lake. 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 (Tables Cypress 2 and Cypress-4, Figure Cypress-6). The Category 3 Lake Normal Pool elevation is above the control point, so the lake is considered to be Structurally Altered.

Based on the relationship between the control point elevation, the Category 3 Lake Normal Pool elevation and the Current P10, the High Guidance Level was established at the control point elevation of 48.89 ft above NGVD (Table Cypress-2). The Historic P50 and Low Guidance Level were determined using the High Guidance Level and the Northern Tampa Bay Region RLWR50 (1.0 ft) and RLWR90 (2.1 ft) statistics (see SWFWMD 1999 for a discussion of the reference lake water regime statistics).

The Ten Year Flood Guidance Level was established for Cypress Lake using the methodology for open basin lakes described in current District Rules (Chapter 40D-8, Florida Administrative Code). The District used an existing hydrologic and hydraulic computer model of the Rocky Creek Watershed developed by Hillsborough County (1998). The Rocky Creek runoff hydrographs were computed using the NRCS Dimensionless Unit Hydrograph method, a 256-shape factor, a 10.0-inch rainfall depth based on NRCS TP-49, and a 72-hour rainfall distribution based on the Florida Modified Type II Distribution. The Rocky Creek conveyance system was simulated with the Hillsborough County modified version of EXTRAN, and the hydrodynamic routing component of the Environmental Protection Agency's Stormwater Management Model (SWMM) v.4.31. District staff modified the EXTRAN input data developed by Hillsborough County to include additional surveyed elements of the Cypress Lake outlet conveyance system. The initial elevation of Cypress Lake was set at the control point elevation of 48.89 ft above NGVD. The modified data set was then used to determine the 10-year flood level based on runoff hydrographs from the 10-year storm event. The Ten Year Flood Guidance Level (50.86 ft above NGVD) has not been exceeded during the period for which lake stage data are available (see Figure Cypress-5). The highest recorded surface elevation for the lake, 49.38 ft above NGVD, occurred on February 24, 1998.

Cypress Lake is not contiguous with any cypress-dominated wetlands of 0.5 or more acres in size and is therefore classified as a Category 3 Lake for the purpose of

minimum levels development. Aquatic macrophytes, including cattail (*Typha* sp.), pickerelweed (*Pontederia cordata*), rush fuirena (*Fuirena scirpoidea*), maidencane (*Panicum hemitomum*), cordgrass (*Spartina bakeri*) and primrose willow (*Ludwigia* sp.) occur throughout the basin.

Dock-Use, Aesthetics, and Species Richness Standards were evaluated for minimum levels development. A Dock-Use Standard for Cypress Lake was established at 48.5 ft above NGVD, based on the Northern Tampa Bay area RLWR5090 (1.1 ft) and a Dock-End Sediment elevation of 45.4 ft, developed from measurement of 14 docks. An Aesthetic-Standard for the lake was established at the Low Guidance Level elevation of 46.79 ft above NGVD. A Species Richness Standard was established at 46.15 ft above NGVD, based on a 15% reduction in lake surface area from that at the Historic P50 elevation. Review of the dynamic ratio for lake stages bounded by the Current P10 and Current P90 elevations and the High and Low Guidance Levels did not indicate that potential changes in basin susceptibility to wind-induced sediment resuspension would be of concern for minimum levels development (Figure Cypress-7). Review of changes in potential herbaceous wetland area associated with change in lake stage, and potential change in area available for aquatic macrophyte colonization did not indicate that use of any of the identified standards would be inappropriate for minimum levels development (Figure Cypress-7).

The Dock-Use Standard, the most conservative of the appropriate standards, exceeded the Historic P50 elevation, so the Historic P50 elevation was substituted for this standard and used to establish the proposed Minimum Lake Level at 47.89 ft above NGVD. The proposed High Minimum Lake Level was established at 48.89 ft above NGVD, an elevation corresponding to the Minimum Lake Level plus the RLWR50 (1.0 ft) for the northern Tampa Bay area. The proposed High Minimum Lake Level is equivalent to the High Guidance Level and is 3.4 ft below the Low Floor Slab elevation and 2.6 ft below the lowest spot on the paved roads in the immediate lake basin.

Figure Cypress-5. Mean monthly surface water elevation, and proposed guidance and minimum levels for Cypress 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 (MLL).

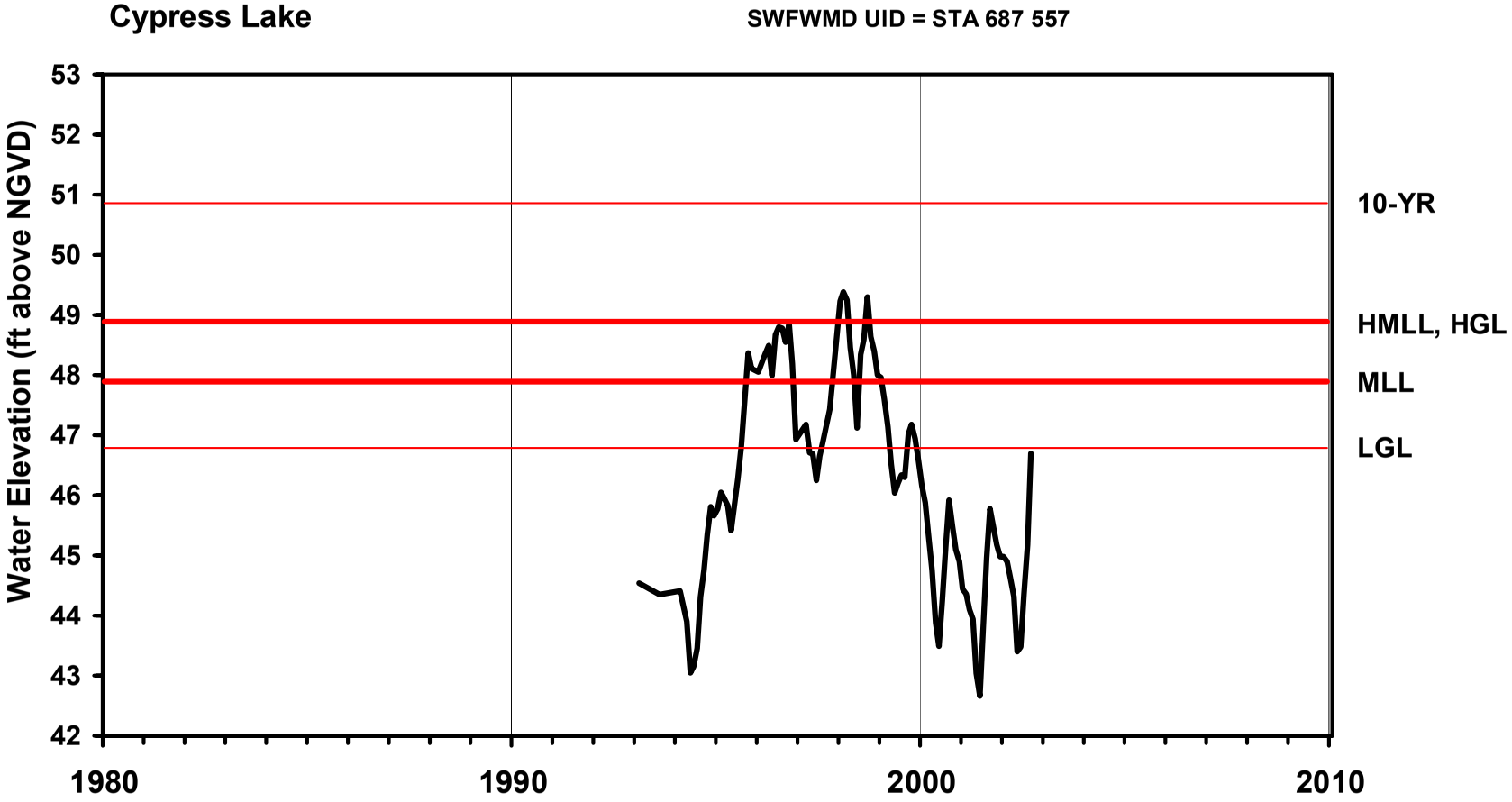


Table Cypress-2. Elevation data and associated area values used for establishing minimum levels for Cypress Lake in Hillsborough County, Florida.

Level or Feature	Elevation (feet above NGVD)	Total Lake Area (acres)
Current P10	48.62	20
Current P50	46.27	16
Current P90	44.00	14
Category 3 Lake Normal Pool	52.03	NA
Low Floor Slab	52.31	NA
Low Road	51.44	NA
Control Point	48.89	20
High Guidance Level	48.89	20
Historic P50	47.89	19
Low Guidance Level	46.79	17
Dock-Use Standard	48.5	20
Species Richness Standard	46.15	16
Aesthetic Standard	46.79	17

NA = not available

Table Cypress-3. Elevation data used for establishing the Category 3 Lake Normal Pool Elevation for Cypress Lake in Hillsborough County, Florida. Data were collected in on May 09, 2002; water level elevation was 43.96 ft above NGVD.

Hydrologic Indicator	Elevation (ft above NGVD)
Cypress buttress (normal pool)	51.80
Cypress buttress (normal pool)	52.78
Cypress buttress (normal pool)	52.78
Cypress buttress (normal pool)	52.66
Cypress buttress (normal pool)	52.91
Cypress buttress (normal pool)	51.41
Cypress buttress (normal pool)	51.45
Cypress buttress (normal pool)	52.25
Cypress buttress (normal pool)	51.30
Cypress buttress (normal pool)	51.71
N	**10**
Mean	**52.11**
Standard Deviation	**0.64**
Median	**52.03**

Table Cypress-4. Summary of structural alteration and control point elevation information for Cypress Lake in Hillsborough County, Florida. Numbers correspond to those shown in Figure Cypress-6.

No.	Description	Elevation (feet above NGVD)
1	Inverts at west end of two 24" reinforced concrete pipes running beneath Brown Road	49.62 and 49.83
2	Inverts at east end of two 24" reinforced concrete pipes running beneath Brown Road	49.79 and 49.85
3	Control point; invert of rectangular slot cut in concrete drop inlet	48.89
4	Invert at north end of 24" corrugated metal pipe running beneath Lake Cypress Drive and connected to concrete drop inlet (No. 3 above)	48.36
5	Invert at south end of 24" corrugated metal pipe running beneath Lake Cypress Drive	46.68

Figure Cypress-6. Outlet conveyance systems for Cypress Lake in Hillsborough County, Florida. Numbered sites are described in table Cypress-4.

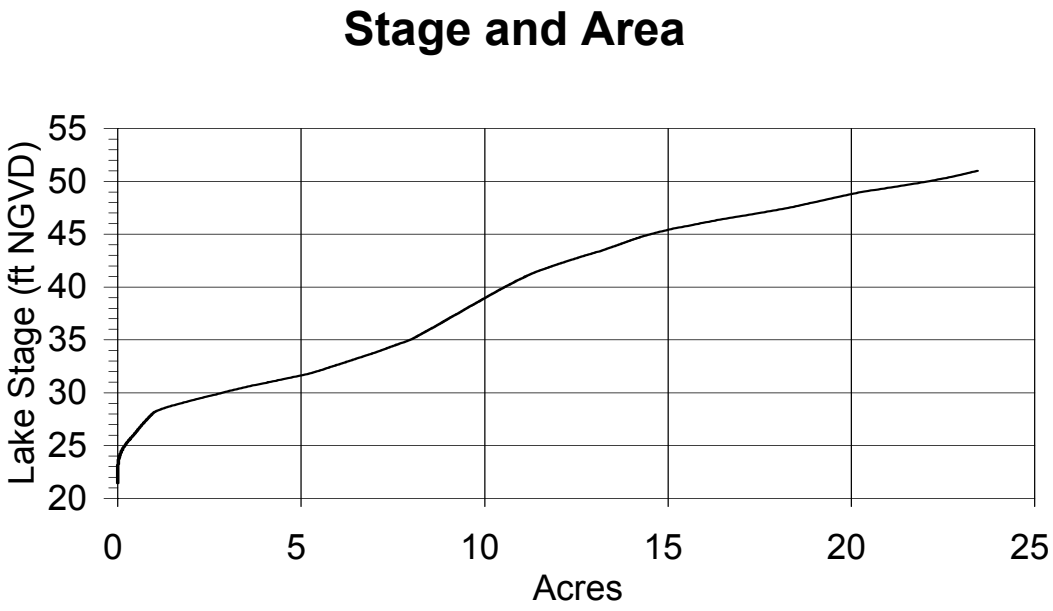
Background map:
USGS 1999 Digital Orthophotograph

0 90 180 Feet

N
W E
S

Map prepared
01/09/2003 by
Doug Leeper
SWFWMD

Figure Cypress-7. Surface area, volume, potential herbaceous wetland area, and dynamic ratio versus lake stage for Cypress Lake in Hillsborough County, Florida.



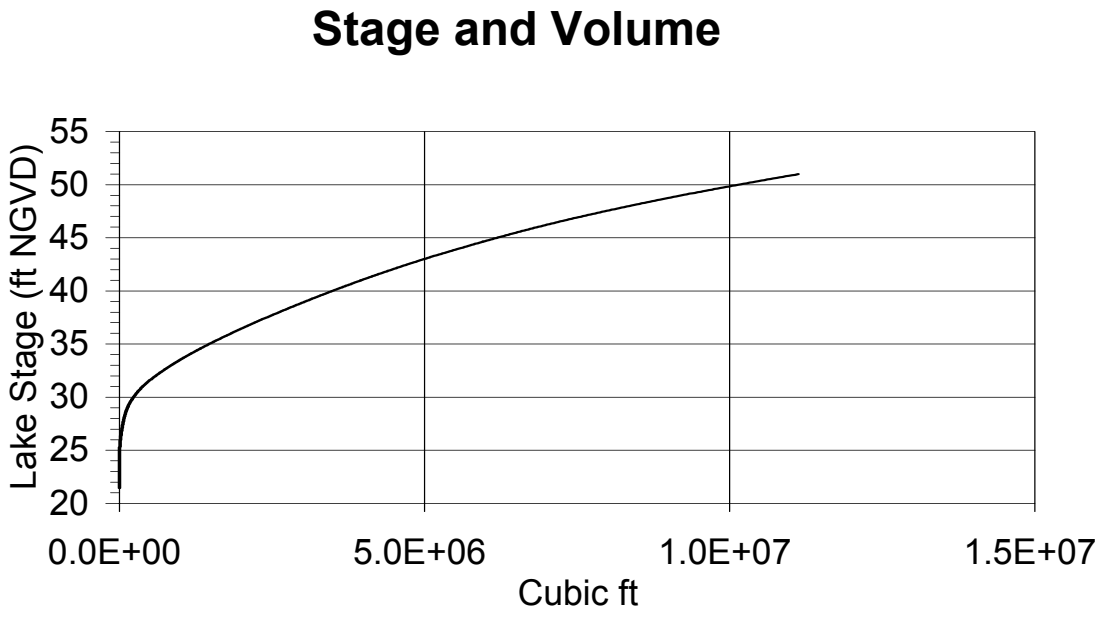
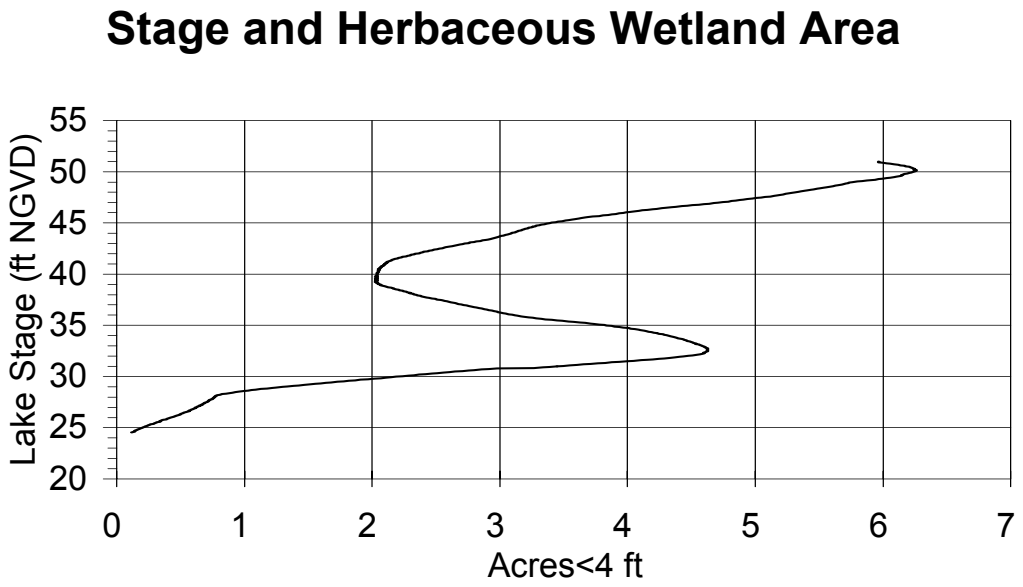


Figure Cypress-7 (continued).



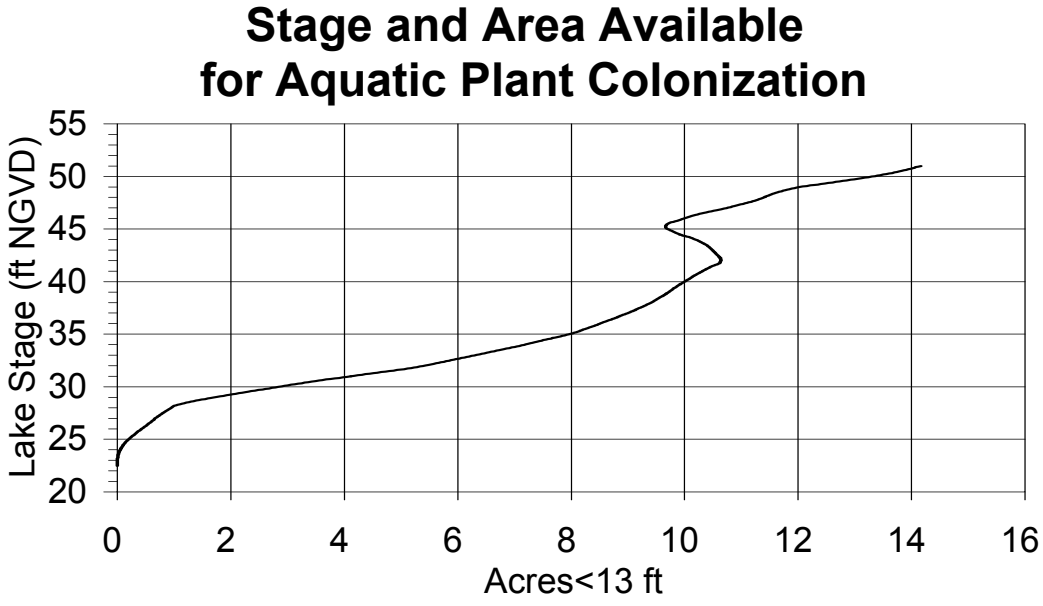
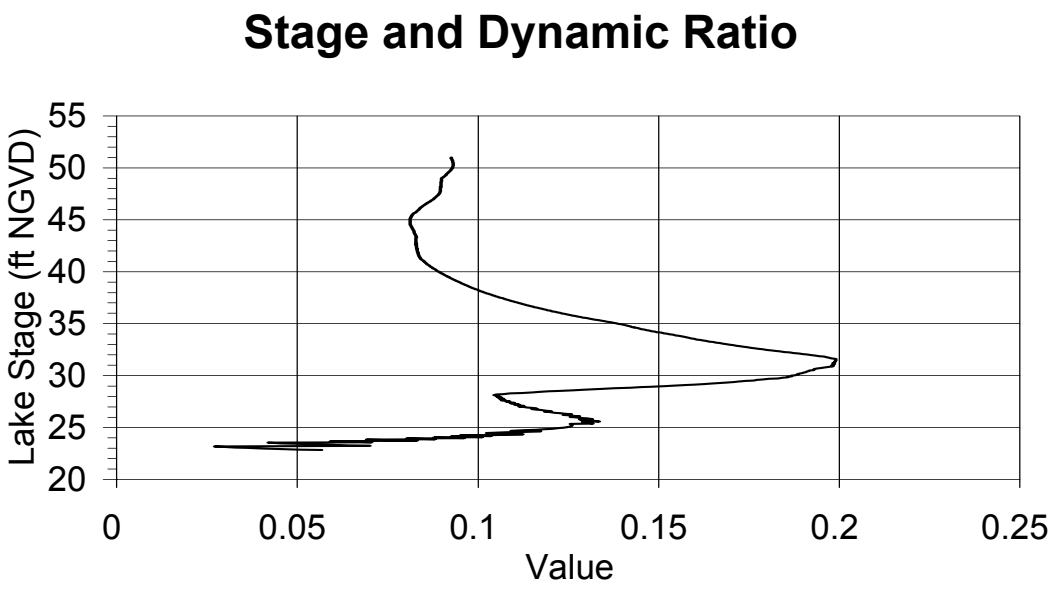


Figure Cypress-7 (continued).



Documents Cited and Reviewed for Development of Proposed Guidance and Minimum Levels for Cypress Lake

Brooks, H. K. 1981. Physiographic divisions of Florida: map and guide. Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, Florida.

Dierberg, F. E. and Wagner, K. J. 2001. A review of "A multiple-parameter approach for establishing minimum levels for Category 3 Lakes of the Southwest Florida Water Management District" June 2001 draft by D. Leeper, M. Kelly, A. Munson, and R. Gant. Prepared for the Southwest Florida Water Management District, Brooksville, Florida.

Florida Board of Conservation. 1969. Florida lakes, part III: gazetteer. Division of Water Resources, Tallahassee, Florida.

Florida Department of Agriculture and Consumer Services. 1938. Aerial photography of the Cypress Lake area, dated January 11, 1939. Tallahassee, Florida.

Florida Lakewatch. 2001. Florida Lakewatch data report 2000. University of Florida Institute of Food and Agricultural Sciences, Department of Fisheries and Aquatic Sciences, Gainesville, Florida.

Griffith, G., Canfield, D., Jr., Horsburgh, C., Omernik, and J. Azevedo, S. 1997. Lake regions of Florida (map). United States Environmental Protection Agency, University of Florida Institute of Food and Agricultural Sciences, Florida Lakewatch, Florida Department of Environmental Protection, and the Florida Lake Management Society.

Hillsborough County Watershed Atlas (web site: hillsborough.wateratlas.usf.edu) 2002. Developed by the Hillsborough County Public Works Department Stormwater Management Section, the University of South Florida Florida Center for Community Design and Research, and the Southwest Florida Water Management District, Tampa and Brooksville, Florida.

Hillsborough County. 1998. Rocky/Brushy Creek area stormwater management master plan. Hillsborough County Public Works Department, Engineering Division, Stormwater Section, Tampa, Florida.

Leeper, D. 2001. Draft memorandum to Marty Kelly (Southwest Florida Water Management District), dated November 21, 2001. Subject: Staff response to written comments on the District's proposed methods for developing minimum levels for Category 3 lakes. Southwest Florida Water Management District, Brooksville, Florida.

Leeper, D., Kelly, M., Munson, A. and Gant, R. 2001. A multiple-parameter approach for establishing minimum levels for Category 3 Lakes of the Southwest Florida Water Management District, June14, 2001 draft. Southwest Florida Water Management District, Brooksville, Florida.

Shafer, M.D., Dickinson, R.E., Heaney, J.P., and Huber, W.C. 1986. Gazetteer of Florida lakes. Publication no. 96, Water Resources Research Center, University of Florida, Gainesville, Florida.

Slonena, D.L. 2001. Letter to Doug Leeper (Southwest Florida Water Management District), dated August 6, 2001. Subject: A multiple-parameter approach for establishing minimum levels for Category 3 lakes of the Southwest Florida Water Management District – June 14, 2002 draft. Pinellas County Utilities, Clearwater, Florida.

Southwest Florida Water Management District. 1989. Northwest Hillsborough Basin northwest re-Map II, aerial photography with contours. Sheet No. 24-27-17. Brooksville, Florida. Prepared by Kucera International, Lakeland, Florida.

Southwest Florida Water Management District. 1999. Establishment of minimum levels for Category 1 and Category 2 lakes, *in* Northern Tampa Bay minimum flows and levels white papers: white papers supporting the establishment of minimum flows and levels for isolated cypress wetlands, Category 1 and 2 lakes, seawater intrusion, environmental aquifer levels, and Tampa Bypass Canal; peer-review final draft, March 19, 1999. Brooksville, Florida.

Southwest Florida Water Management District. 2002. Special purpose survey, Section 23, 24, Township 27 South, Range 17 East, Hillsborough County; Northwest Hillsborough Basin, Minimum Flows & Levels, Cypress Lake. Brooksville, Florida.

United States Geological Survey. 1956. Citrus Park quadrangle, Florida – Hillsborough County, 7.5 minute series (topographic) map; Citrus Park, Fla., 28082-A5-TF-024, 1956, photorevised 1987, DMA 4440 II SE-Series V847. Department of Interior, Washington, D.C.

United States Geological Survey. 1974. Odessa quadrangle, Florida, 7.5 minute series (topographic) map; Odessa, Fla., 28082-B5-TF-024, 1974, photorevised 1988, DMA 4440 II NE-Series V847. Department of Interior, Washington, D.C.