

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 Lake Hobbs in
Hillsborough County, Florida**

Lake Hobbs

General Lake Description

Lake Hobbs (Figure Hobbs-1) is located in the Northwest Hillsborough Basin in Hillsborough County, Florida (Sections 1, 2, 11 and 12, Township 27S, Range 18E). 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 Land-O-Lakes lake region; an area of numerous neutral to slightly alkaline, low to moderate nutrient, clear-water lakes (Griffith *et al.* 1997).

The drainage area for the lake is 0.9 square miles (Florida Board of Conservation 1969). During periods of high water, the lake receives inflow from the north through a wetland located between Lake Hobbs and Little Deer Lake (Figure Hobbs-2). An outlet in a small embayment along the lake's southern shore drains the lake to Cooper Lake. There are no surface water withdrawals from the lake currently permitted by the District. There are, however, several permitted groundwater withdrawals in the area.

The "Gazetteer of Florida Lakes" (Florida Board of Conservation 1969, Shafer *et al.* 1986) lists the lake area as 67 acres. The 1974 United States Geological Survey (photorevised 1987) 1:24,000 Lutz, Fla. quadrangle map indicates a water level elevation of 64 ft above NGVD for the lake basin. This elevation corresponds to a lake surface area of 69 acres, based on a topographic map of the basin generated in support of minimum levels development (Figure Hobbs-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 Hobbs-1. Location of Lake Hobbs in Hillsborough County, Florida.

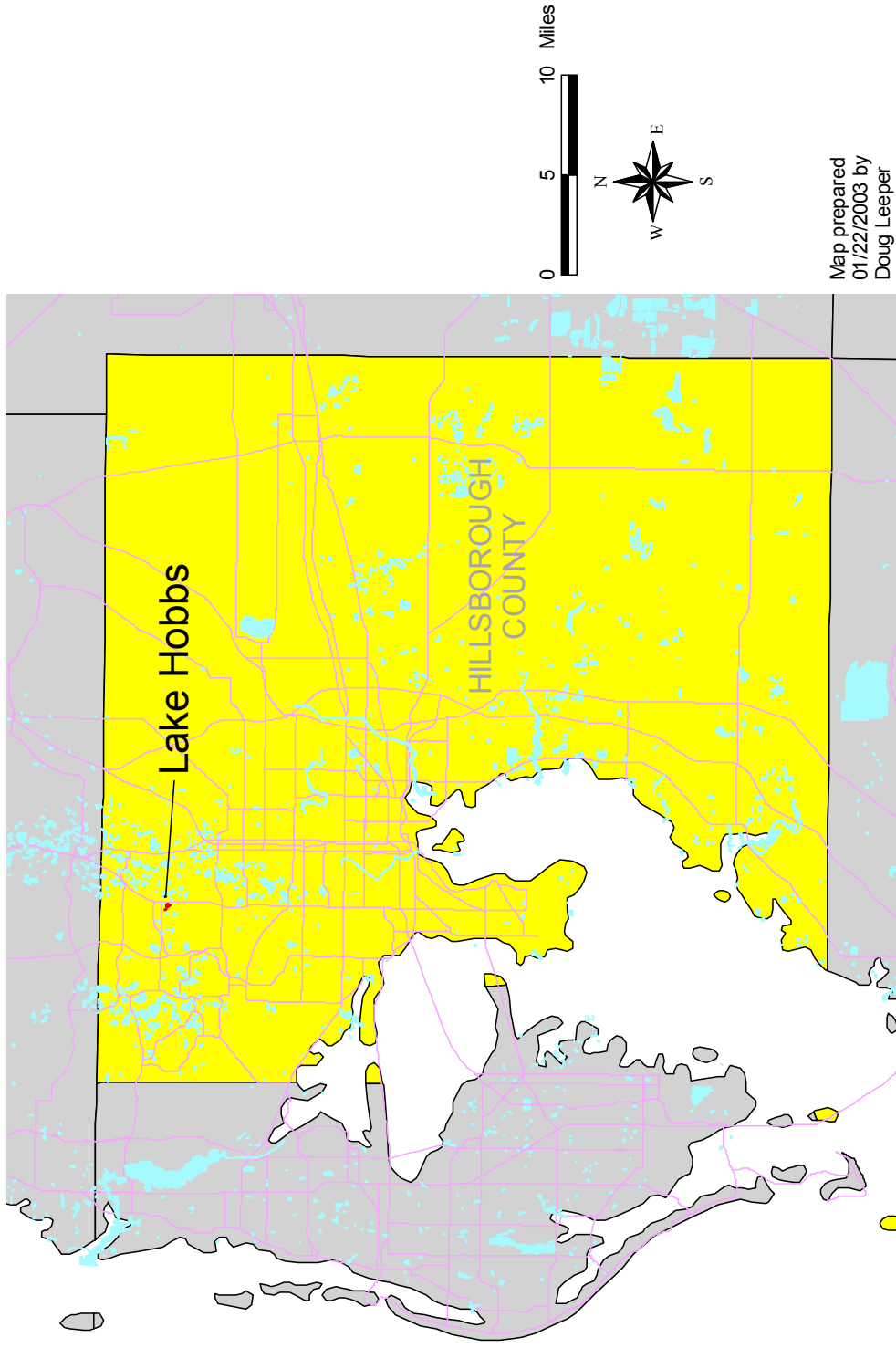


Figure Hobbs-2. Location of District water level gauge, inlets, outlet and site where hydrologic indicators were measured at Lake Hobbs in Hillsborough County, Florida.

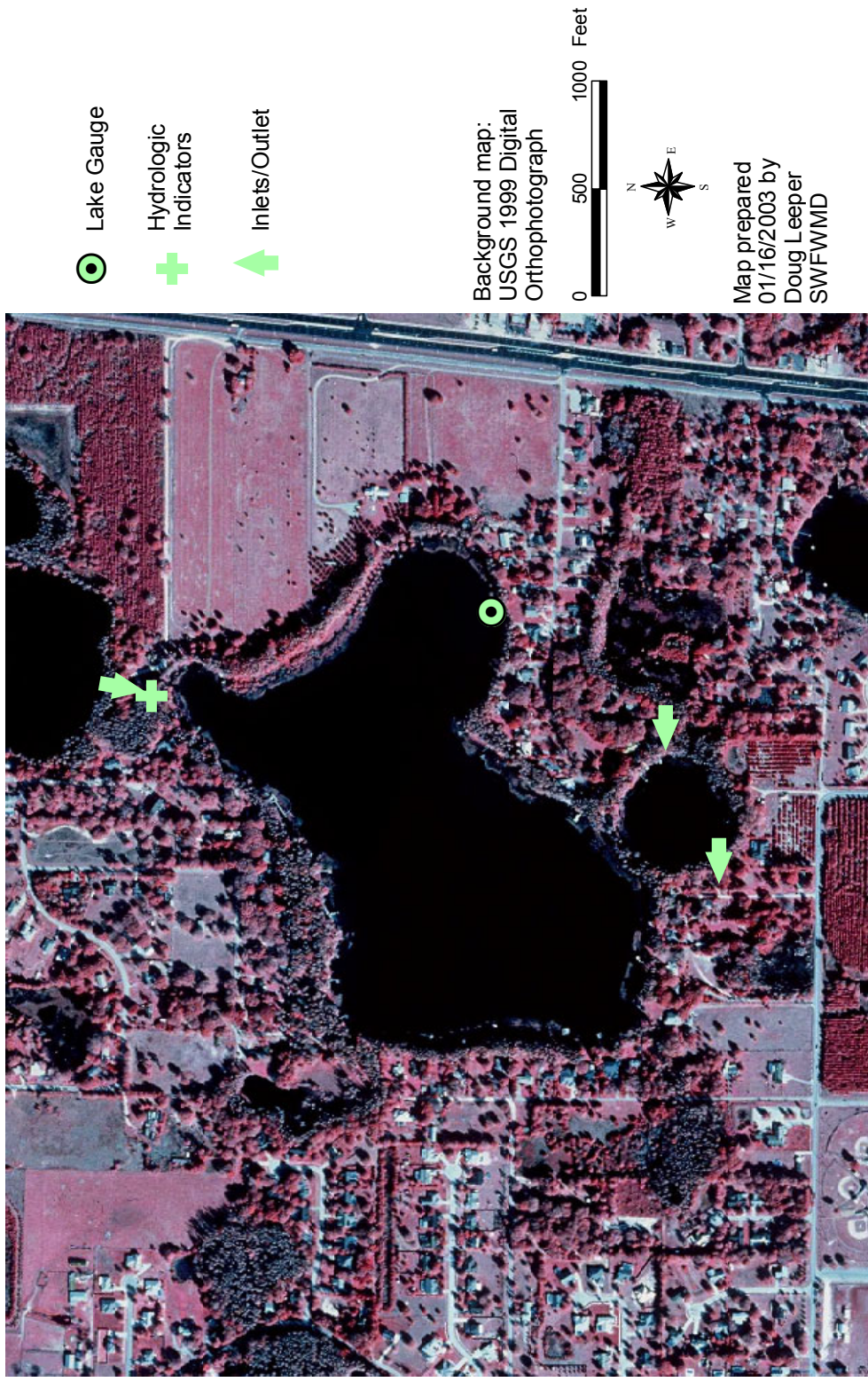
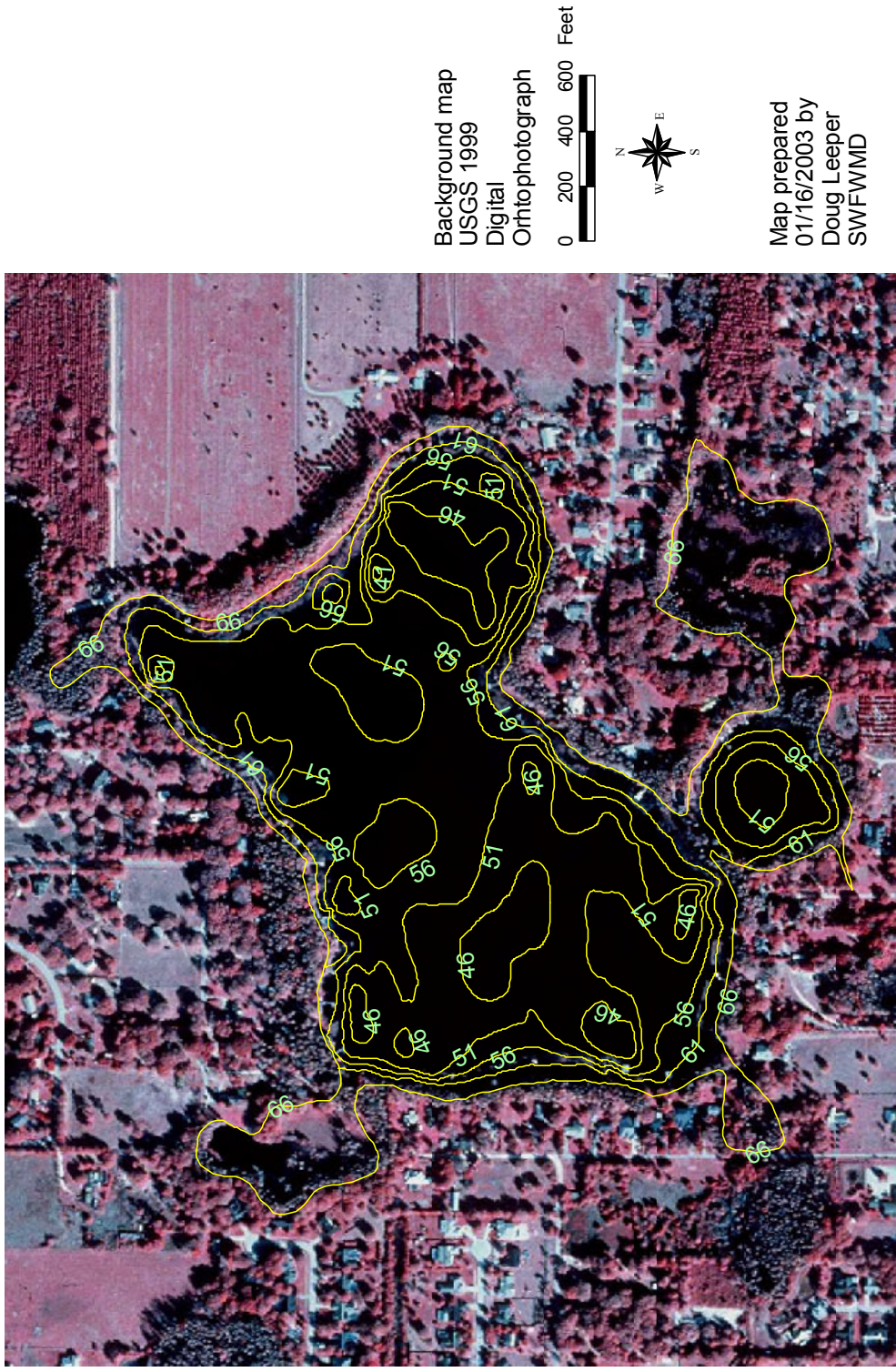


Figure Hobbs-3. Five-foot contours within the Lake Hobbs basin in Hillsborough County, Florida. Values shown are elevations, in feet, above the National Geodetic Vertical Datum of 1929.



Previously Adopted Lake Management Levels

Based on work conducted in 1977 (see SWFWMD 1996), the District Governing Board adopted management levels (currently referred to as Guidance Levels) for Lake Hobbs in September 1980 (Table Hobbs-1). A Maximum Desirable Level of 66.25 ft above NGVD was also developed, but was not adopted by the Governing Board.

Table Hobbs-1. Adopted guidance levels and associated surface areas for Halfmoon Lake in Hillsborough County, Florida.

Level	Elevation (feet above NGVD)	Total Lake Area (acres)
Ten Year Flood Guidance Level	68.20	NA
High Level	66.75	NA
Low Level	63.25	68
Extreme Low Level	61.50	64

NA = not available

Proposed Minimum and Guidance Levels

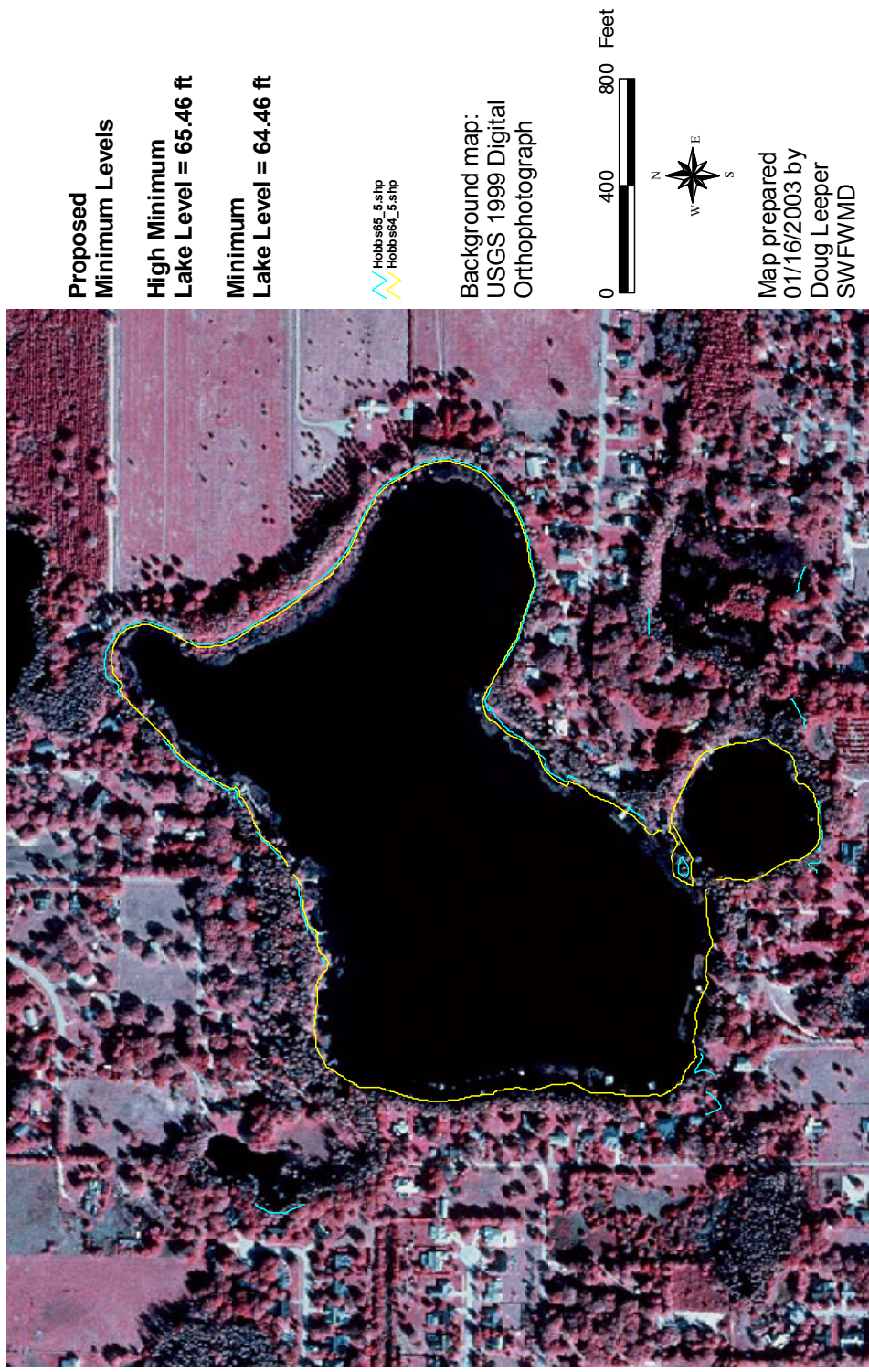
Proposed Minimum and Guidance Levels were developed for Lake Hobbs using the methodology for Category 2 Lakes described in current District rules (Chapter 40D-8, Florida Administrative Code; see also SWFWMD 1999). Proposed levels, along with lake surface area values for each level are listed in Table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

Table Hobbs-2. Proposed minimum levels, guidance levels and associated surface areas for Lake Hobbs in Hillsborough County, Florida.

Level	Elevation (feet above NGVD)	Total Lake Area (acres)
Ten Year Flood Guidance Level	67.75	NA
High Guidance Level	65.46	84
High Minimum Lake Level	65.46	84
Minimum Lake Level	64.46	70
Low Guidance Level	63.36	68

NA = not available

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



Summary of Data and Analyses Supporting Recommended Minimum and Guidance Levels

Hydrologic data are available for Lake Hobbs (District Universal ID Number STA 315 316) from June 1946 through the present date (Figure Hobbs-5). A review of these data indicated that data collected prior to 1963 (a period pre-dating impacts from withdrawals in the region) did not fit the criteria for classification as Historic data. Data from January 1974 to the present could, however, be classified as Current data. Current data through November 2001 were used to calculate the Current P10, P50, and P90 (Table Hobbs-3).

The Normal Pool elevation was established using cypress trees within the swamp along the northeastern shore of the lake (Tables Hobbs-3 and Hobbs-4, Figure Hobbs-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 (Tables Hobbs-3 and Hobbs-5, Figure Hobbs-6). The 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 Normal Pool elevation, and the Current P10, the High Guidance Level was established at the Current P10 elevation of 65.46 ft above NGVD (Table Hobbs-3). 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 Lake Hobbs 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 (Hillsborough County 1998). The Rocky Creek runoff hydrographs were computed using the NRCS Dimensionless Unit Hydrograph, a 256-shape factor, a 10.0-inch rainfall depth based on NRCS TP-49, and a 72-hour rainfall distribution developed by the South Florida Water Management District. 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 Lake Hobbs outlet conveyance system. 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 Initial elevation of Lake Hobbs was set at the control point elevation of 64.40 ft above NGVD. Based on available lake stage data (See Figure Hobbs-5), the Ten Year Flood Guidance Level (67.75 ft above NGVD) was exceeded in 1947, 1953, 1959 and 1960. The highest recorded surface elevation for the lake, 68.4 ft above NGVD, occurred on March 17, 1960.

Lake Hobbs contains abundant stands of aquatic macrophytes, including lemon bacopa (*Bacopa caroliniana*), torpedograss (*Panicum repens*), water lily (*Nymphaea odorata*), pickerelweed (*Pontedaria cordata*), and cattail (*Typha* sp.). The northeast corner of the lake is contiguous with a wetland of more than 0.5 acres in size that is dominated by cypress (*Taxodium* sp.). Based on the presence of this wetland, Lake Hobbs is classified as a Category 1 or 2 Lake for the purpose of minimum levels development. Because the Historic P50 elevation is more than 1.8 feet below the Normal Pool elevation, the lake is classified as a Category 2 Lake. Note that herein, for discussion purposes, the elevation 1.8 ft below the Normal Pool elevation is identified as the Cypress Standard. For Lake Hobbs, this standard is established at 65.17 ft above NGVD. Based on the relationship between the Cypress Standard and Historic P50 elevation, the proposed Minimum Lake Level was established at the Historic P50 elevation (64.46 ft above NGVD), and the proposed High Minimum Lake Level was established at the High Guidance Level (65.46 ft above NGVD). The proposed High Minimum Lake Level is about 2 ft below the Low Floor Slab elevation and 0.53 ft below a concrete slab associated with a patio sited adjacent to a seawall on the lakes southeastern shore.

For comparative purposes, minimum level standards used for establishing the Minimum Lake Level for lakes without fringing cypress wetlands (see Leeper *et al.* 2001) were developed for Lake Hobbs (Table Hobbs-3). A Dock-Use Standard for was established at 64.75 ft above NGVD, based on the Northern Tampa Bay area RLWR5090 (1.1 ft) and a Dock-End Sediment elevation of 61.65 ft, which was developed from measurement of 33 docks. A Basin Connectivity Standard was established at 64.3 ft above NGVD, based on use of powerboats in the lake, a critical high-spot elevation of 61.2 ft and the RLWR5090 for the northern Tampa Bay area. An Aesthetic-Standard for the lake was established at the Low Guidance Level elevation of 63.36 ft above NGVD. A Recreation/Ski Standard was established at 60.1 ft above NGVD, based on a critical ski elevation of 59 ft and the Northern Tampa Bay area RLWR5090. A Species Richness Standard was established at 59.15 ft above NGVD, based on a 15% reduction in lake surface area from that at the Historic P50 elevation.

Figure Hobbs-5. Mean monthly surface water elevation, and proposed guidance and minimum levels for Lake Hobbs 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).

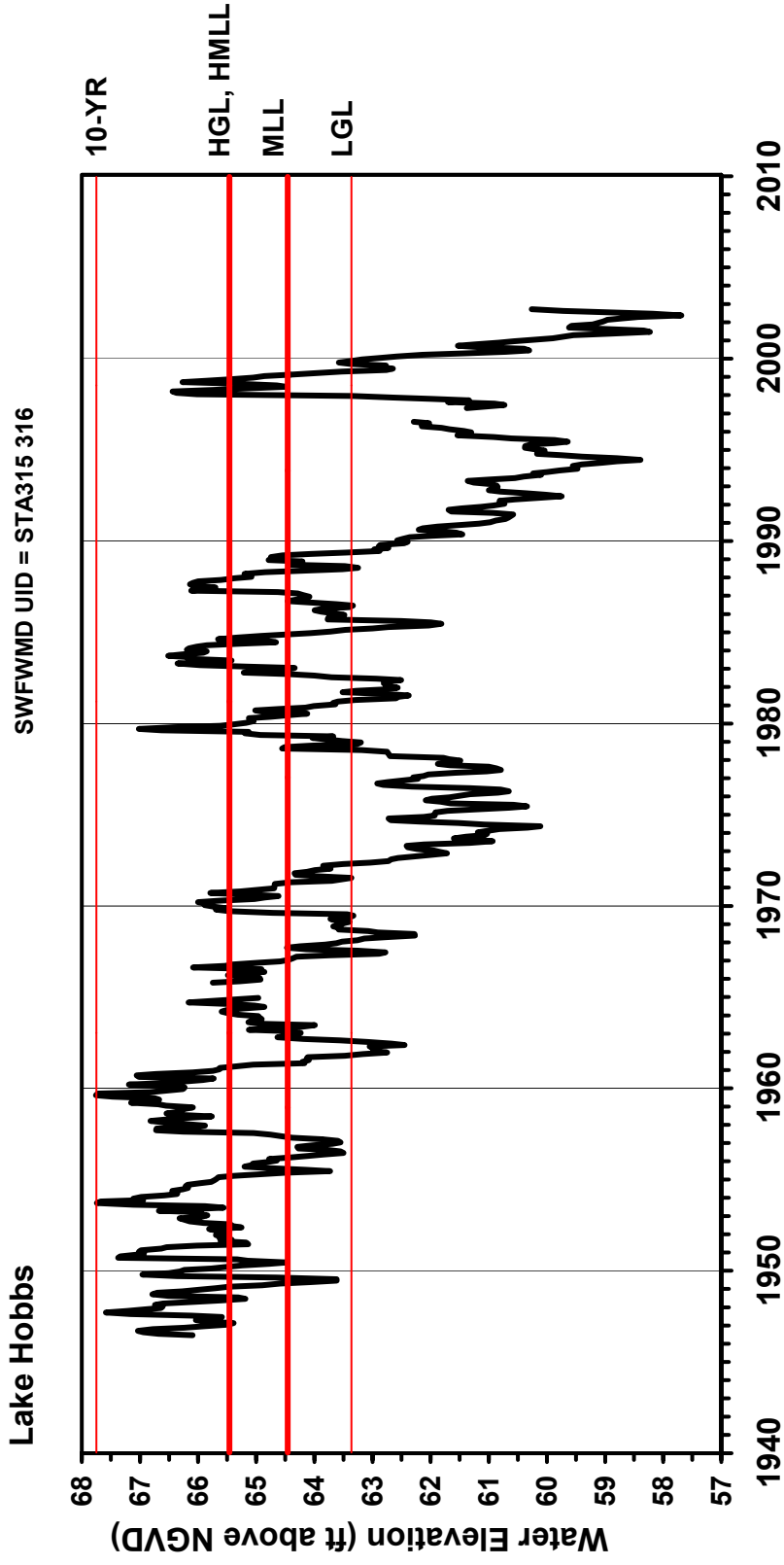


Table Hobbs-3. Elevation data and associated area values used for establishing minimum levels for Lake Hobbs in Hillsborough County, Florida.

Level or Feature	Elevation (feet above NGVD)	Total Lake Area (acres)
Current P10	65.46	84
Current P50	62.59	66
Current P90	60.17	62
Normal Pool	66.97	NA
Low Floor Slab	67.41	NA
Low Other (low patio slab)	65.99	85
Low Road	67.79	NA
Control Point	65.4	84
High Guidance Level	65.46	84
Historic P50	64.46	70
Low Guidance Level	63.36	68
Cypress Standard	65.17	83
Dock-Use Standard ^a	64.75	85
Basin Connectivity Standard ^a	64.3	70
Aesthetic Standard	63.36	68
Recreation/Ski Standard ^a	60.1	62
Species Richness Standard ^a	59.15	60

NA = not available

^a = not applicable; used for developing minimum levels for Category 3 Lakes

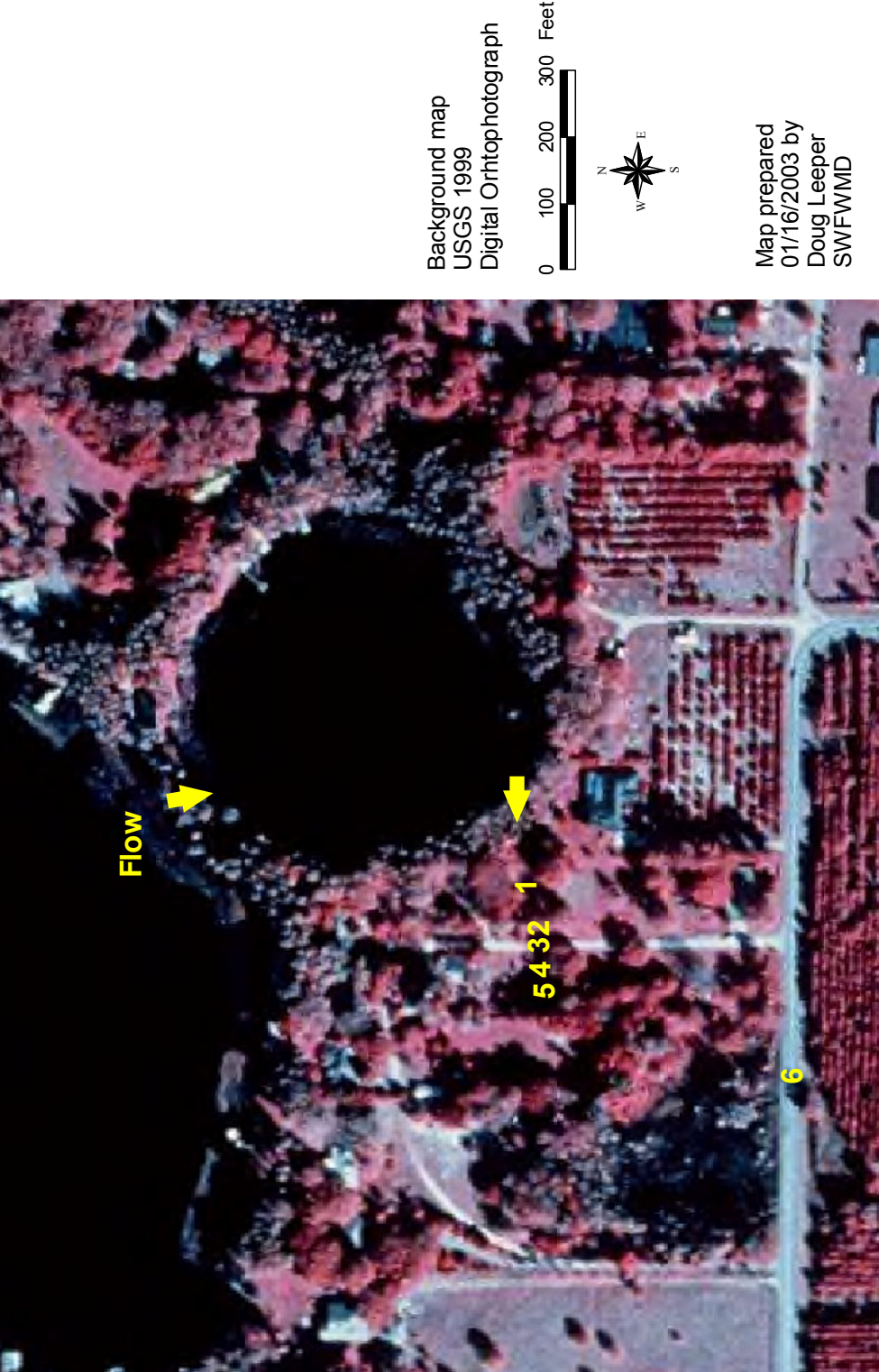
Table Hobbs-4. Elevation data used for establishing the Normal Pool Elevation for Lake Hobbs in Hillsborough County, Florida. Data were collected by Hillsborough County Environmental Protection Commission staff on March 30, 1998^a and SWFWMD staff on December 13, 2000^b. Lake surface elevations were 66.25 and 60.64 ft above NGVD on the respective dates.

Hydrologic Indicator	Elevation (ft above NGVD)
Normal pool based on cypress buttress ^a	67.00
Normal pool based on cypress buttress ^a	66.92
Normal pool based on cypress buttress ^a	67.08
Normal pool based on cypress buttress ^b	66.79
Normal pool based on cypress buttress ^b	67.12
Normal pool based on cypress buttress ^b	66.66
Normal pool based on cypress buttress ^b	66.51
Normal pool based on cypress buttress ^b	67.18
Normal pool based on cypress buttress ^b	67.19
Normal pool based on cypress buttress ^b	67.24
Normal pool based on cypress buttress ^b	66.94
Normal pool based on cypress buttress ^b	66.54
N	13
Median	66.97
Mean	66.93
Standard Deviation	0.24

Table Hobbs-5. Summary of structural alteration/control point elevation information for Lake Hobbs in Hillsborough County, Florida. Numbers correspond to those shown in Figure Hobbs-6.

No.	Description	Elevation (feet above NGVD)
1	Control point; high point in channel	65.4
2	Invert at east and west ends of 36" corrugated metal pipe located east of Calvin Lane	64.10, 64.17
3	Invert at east and west ends of 36" corrugated metal pipe running under Calvin Lane	64.07, 63.93
4	Invert at east end of 36" corrugated metal pipe located west of Calvin Lane; west end of pipe blocked with dirt	63.91
5	Invert at east and west ends of 36" corrugated metal pipe	63.71, 63.78
6	Invert at north and south ends of 25" x 45" elliptical reinforced concrete pipe running under Lutz-Lake Fern Road	60.74, 61.84

Figure Hobbs-6. Outlet conveyance system for Lake Hobbs in Hillsborough County, Florida. Numbered sites are described in Table Hobbs-5.



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