

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 Round Lake in  
Hillsborough County, Florida

## **Round Lake**

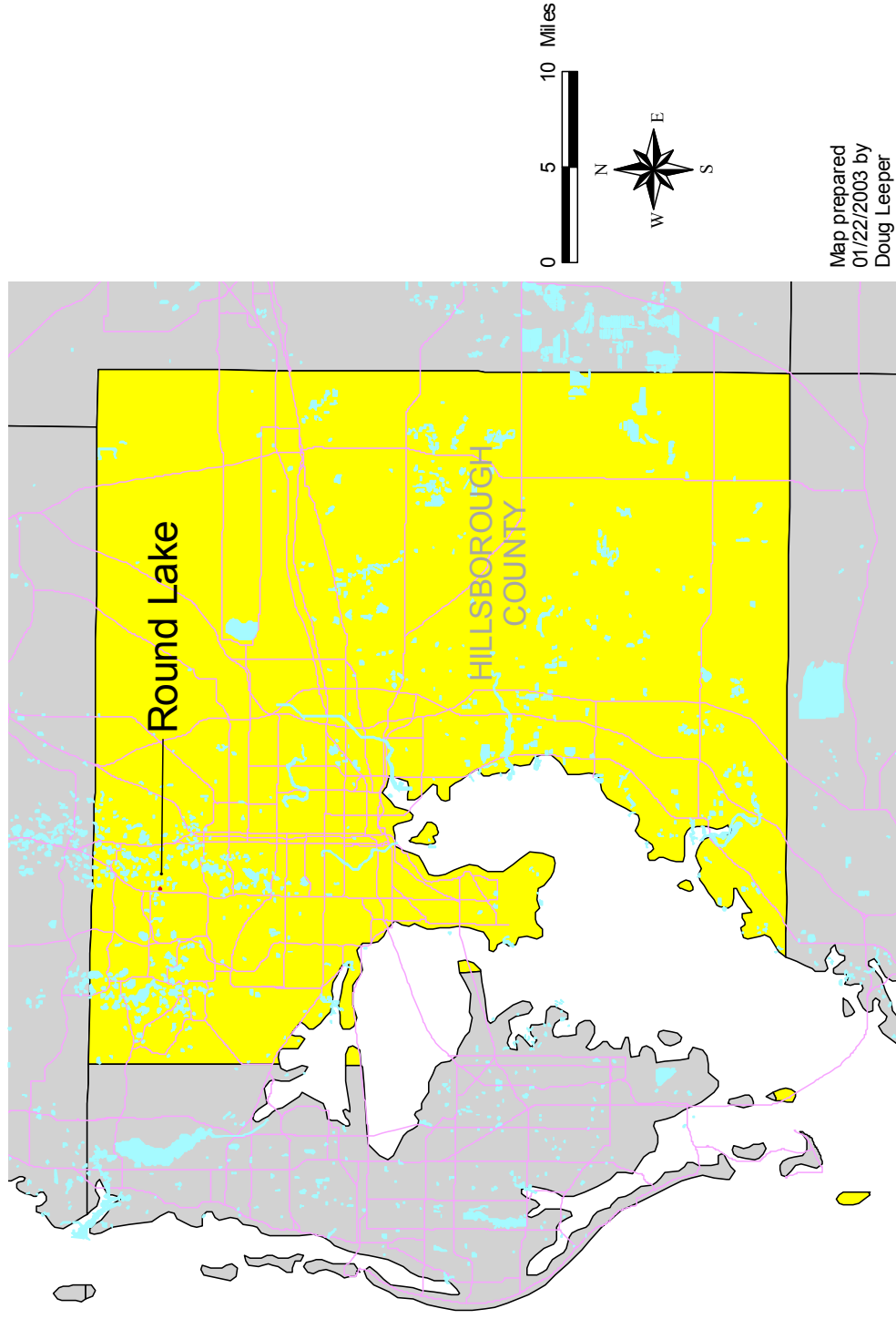
### ***General Lake Description***

Round Lake (Figure Round-1) is located in the Northwest Hillsborough Basin in Hillsborough County, Florida (Sections 21 and 22, 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 0.7 square miles (Florida Board of Conservation 1969). A series of culverts and an open ditch connect Round Lake with Saddleback Lake to the east (Figure Round-2). There are no surface water withdrawals from the lake currently permitted by the District. There are, however, several permitted groundwater withdrawals in the area. Round Lake has been regularly augmented with water pumped from the Floridan Aquifer since the mid-1960s (Stewart and Hughes 1974, SWFMD Water Use Permit No. 2011425).

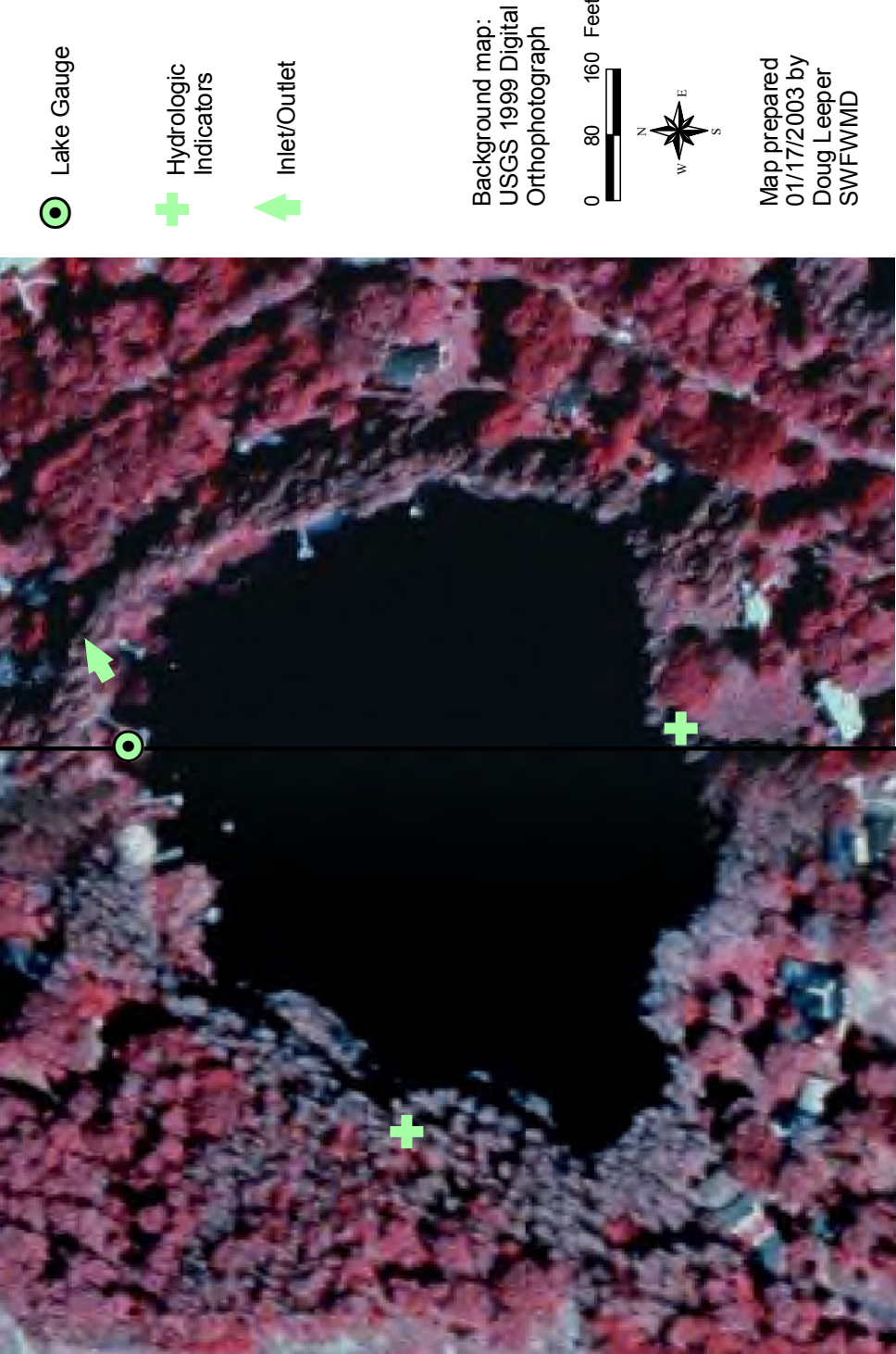
A lake surface elevation is not included on the 1956 United States Geological Survey (photorevised 1987) 1:24,000 Sulphur Springs, Fla. quadrangle map or the 1956 (photorevised 1987) Citrus Park, Fla. quadrangle map. The "Gazetteer of Florida Lakes" (Florida Board of Conservation 1969, Shafer *et al.* 1986) lists the lake area as 11 acres at an elevation of 53 ft above mean sea level. This elevation corresponds to a lake surface area of 10.2 acres, based on a topographic map of the basin generated in support of minimum levels development (Figure Round-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. The basin contains extensive dredged areas.

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

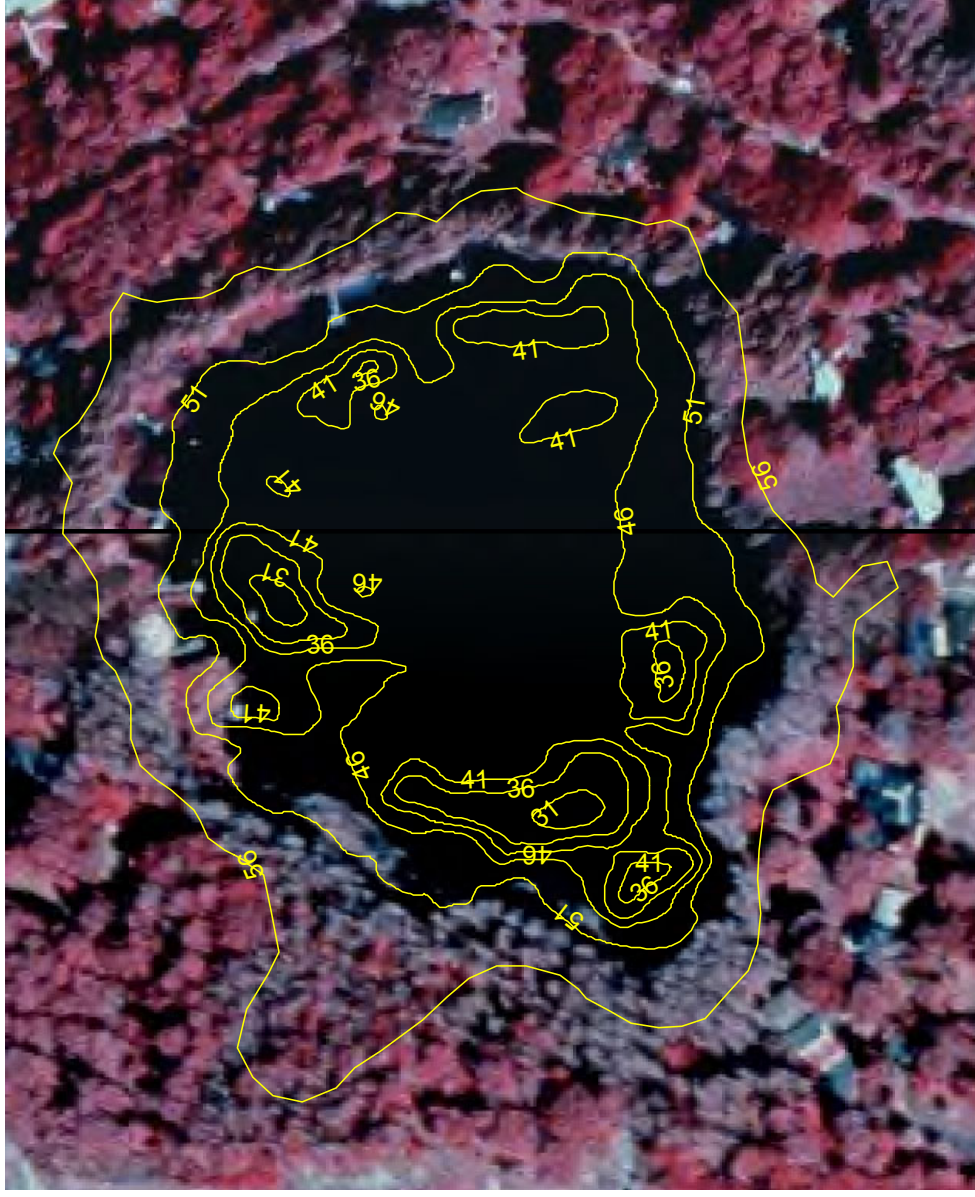


Map prepared  
01/22/2003 by  
Doug Leeper

**Figure Round-2. Location of the lake water level gauge, inlet/outlet, and sites where hydrologic indicators were measured at Round Lake in Hillsborough County, Florida.**



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



### ***Previously Adopted Lake Management Levels***

Management levels have not previously been adopted for Round Lake. An Augmentation Control Elevation of 53 feet above NGVD was developed in the 1990s to support issuance of a water use permit for augmentation of the lake (Mas 1998, SWFWMD 1996).

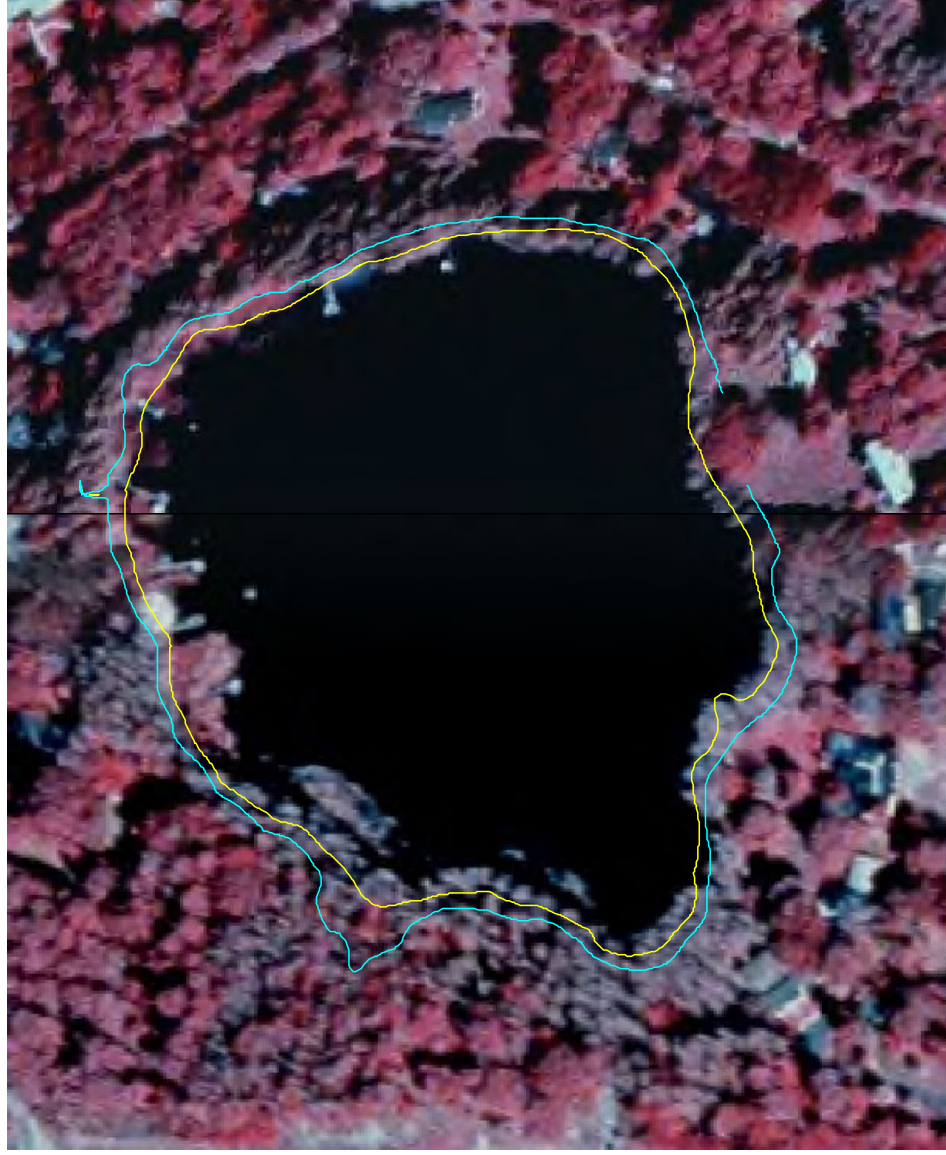
### ***Proposed Minimum and Guidance Levels***

Proposed Minimum and Guidance Levels were developed for Round 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 Round-1. The locations of the proposed minimum levels within the lake basin are shown in Figure Round-4.

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

| <b>Level</b>                  | <b>Elevation<br/>(feet above NGVD)</b> | <b>Lake Area<br/>(acres)</b> |
|-------------------------------|--|------------------------------|
| Ten Year Flood Guidance Level | 56.17                                  | NA                           |
| High Guidance Level           | 55.60                                  | 13.5                         |
| High Minimum Lake Level       | 54.50                                  | 11.8                         |
| Minimum Lake Level            | 53.50                                  | 10.6                         |
| Low Guidance Level            | 53.50                                  | 10.6                         |

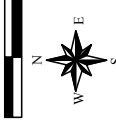
**Figure Round-4. Approximate location of the proposed Minimum Lake Level (yellow) and the proposed High Minimum Lake Level (blue) for Round Lake in Hillsborough County, Florida. Elevations listed are in feet, relative to the National Geodetic Vertical Datum of 1929.**



**Proposed  
Minimum Levels**  
**High Minimum  
Lake Level = 54.50 ft**  
**Minimum  
Lake Level = 53.50 ft**

**Background map:  
USGS 1999 Digital  
Orthophotograph**

**0 70 140 Feet**



**Map prepared  
01/21/2003 by  
Doug Leeper  
SWFWMD**

## **Summary of Data and Analyses Supporting Recommended Minimum and Guidance Levels**

Hydrologic data are available for Round Lake (District Universal ID Number STA 190 190) from January 1965 through September 1967, from July 1971 through September 1981, from January 1982 and September 1985, and from July 1996 through June 1999. (Figure Round-5). For the period of record from January 1974 through the present date, the hydrologic data are classified as Current data. Current data collected through June 1999 were used to calculate the Current P10, P50, and P90 (Table Round-2).

The Category 3 Lake Normal Pool elevation (Table Round-2) was established at 55.85 ft above NGVD, based on buttressing of large cypress trees along the west and south shores of the lake (Table Round-3). 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 Round-2 and Round-4, Figure Round-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 55.6 ft above NGVD (Table Round-2). Although differences between the Current P10 and Current P50 and P90 were less than the Northern Tampa Bay Region RLWR statistics, the RLWR50 (1.0 ft) and RLWR90 (2.1 ft) statistics were used to determine the Historic P50 and Low Guidance Level (see SWFWMD 1999 for a discussion of the reference lake water regime statistics). The RWLWR statistics were used because it is believed that the augmentation schedule for the lake does not permit the range of water level fluctuation that would be expected in the absence of withdrawals.

The Ten Year Flood Guidance Level was established for Round 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 (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 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. The initial elevation of Round Lake was set at the control point elevation of 55.6 ft above NGVD. The District modified data set was used to determine the 10-year flood level based on runoff hydrographs from the 10-year storm event.

The Ten Year Flood Guidance Level (56.49 ft above NGVD) has not been exceeded in

the recent era, based on available stage records (see Figure Round-5). The highest recorded surface elevation for the lake, 56.40 ft above NGVD, occurred on September 25, 1979.

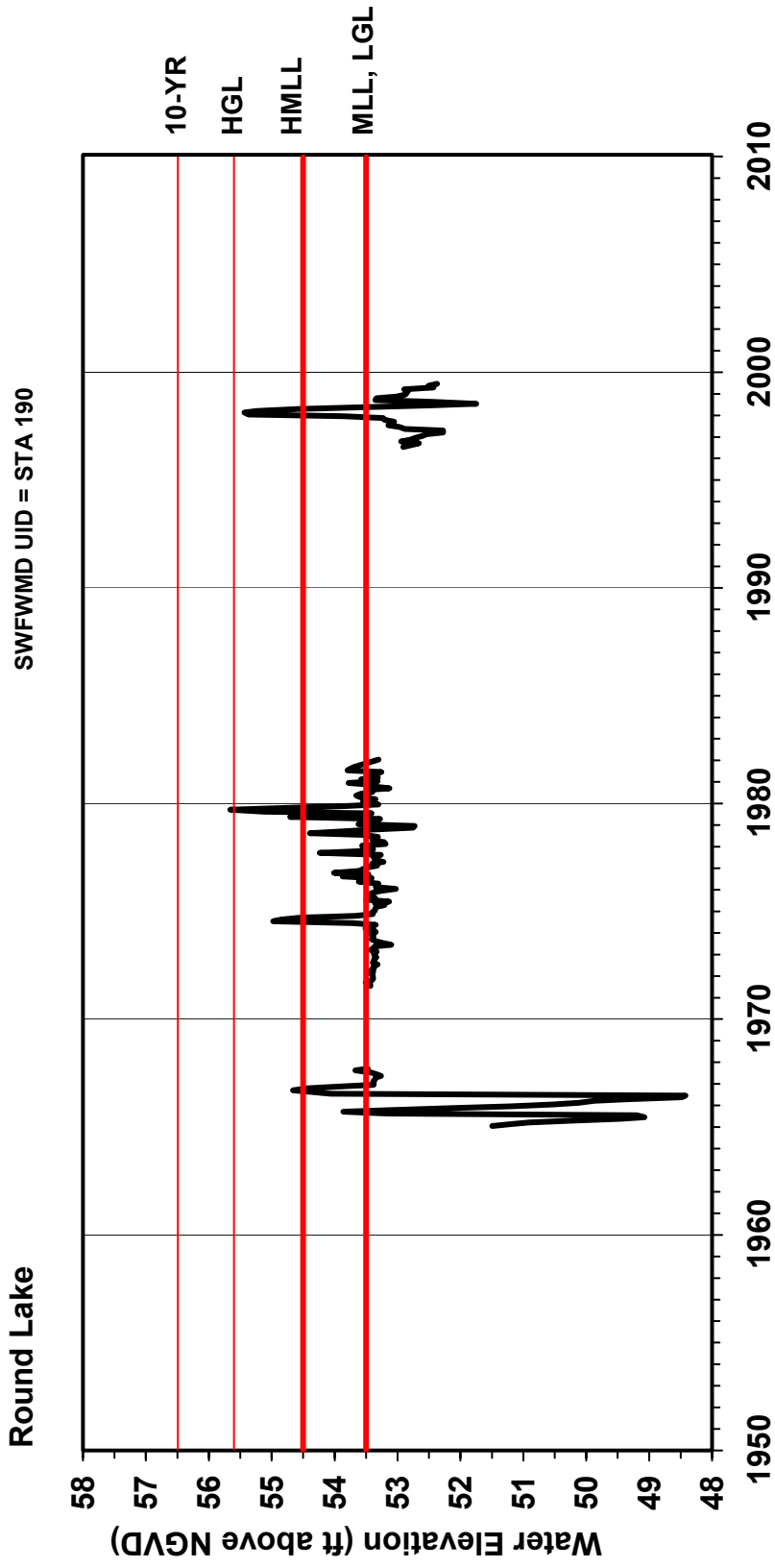
Round Lake is not contiguous with any cypress-dominated wetlands of 0.5 or more acres in size and is therefore classified as a Category 3 Lake for the purpose of minimum levels development. Aquatic macrophytes, including maidencane (*Panicum hemitomum*), cattail (*Typha* sp.), torpedograss (*Panicum repens*), water pennywort (*Hydrocotyle umbellata*), southern naid (*Najas quadelpensis*) and spatterdock (*Nuphar luteum*) occur throughout the basin.

Aesthetics, Dock-Use and Species Richness Standards were evaluated for minimum levels development (Table Round-2). The Aesthetic-Standard for the lake was established at the Low Guidance Level elevation of 53.50 ft above NGVD. The Dock-Use Standard was established at 53.3 ft above NGVD, based on the Northern Tampa Bay area RLWR5090 (1.1 ft) and a Dock-End Sediment elevation of 50.2 ft, developed from measurement of 13 docks. The Species Richness Standard was established at 53.05 ft above NGVD, based on a 15% reduction in lake surface area from that at the Historic P50 elevation. Development of a Recreation/Ski and Basin Connectivity Standards were not appropriate, based on the size and shape of the lake basin. 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 Round-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 Round-7).

The Aesthetics Standard, the most conservative of the appropriate standards, is less than the Historic P50 elevation and was used to establish the proposed Minimum Lake Level at 53.50 ft above NGVD. The proposed High Minimum Lake Level was established at 54.50 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.



Figure Round-5. Mean monthly surface water elevation, and proposed guidance and minimum levels for Round 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 Round-2. Elevation data and associated area values used for establishing minimum levels for Round Lake in Hillsborough County, Florida.**

| <b>Level or Feature</b>     | <b>Elevation<br/>(feet above NGVD)</b> | <b>Lake Area<br/>(acres)</b> |
|-----------------------------|--|------------------------------|
| Current P10                 | 54.25                                  | 11.4                         |
| Current P50                 | 53.38                                  | 10.5                         |
| Current P90                 | 52.75                                  | 10.0                         |
|                             |  |                              |
| Category 3 Lake Normal Pool | 55.85                                  | 13.8                         |
| Low Floor Slab              | 57.86                                  | NA                           |
| Low Other (shed slab)       | 56.26                                  | NA                           |
| Low Road                    | 57.1                                   | NA                           |
| Control Point               | 55.6                                   | 13.5                         |
|                             |  |                              |
| High Guidance Level         | 55.60                                  | 13.5                         |
| Historic P50                | 54.60                                  | 12.0                         |
| Low Guidance Level          | 53.50                                  | 10.6                         |
|                             |  |                              |
| Aesthetic Standard          | 53.50                                  | 10.6                         |
| Dock-Use Standard           | 53.3                                   | 10.5                         |
| Species Richness Standard   | 53.05                                  | 10.3                         |

NA = not applicable

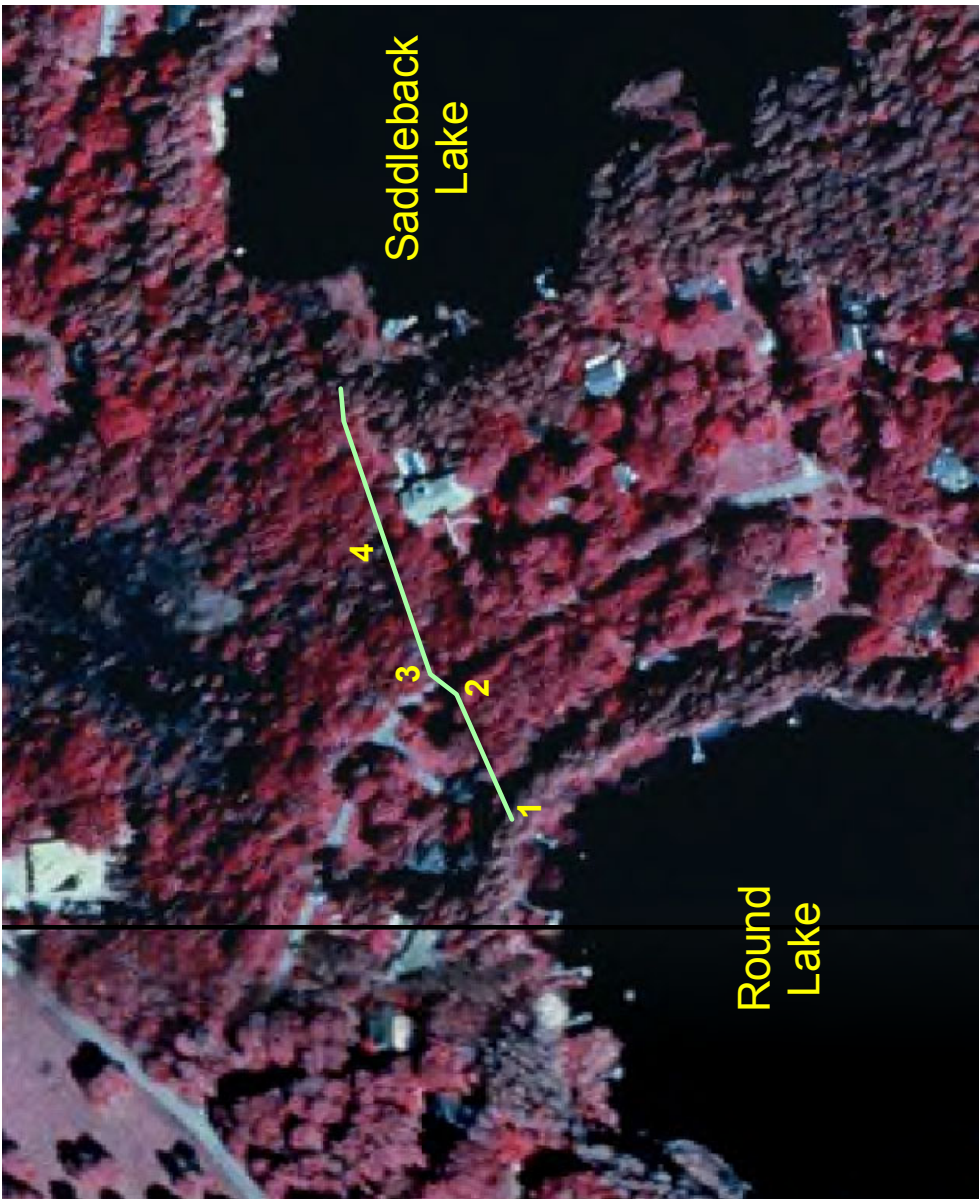
**Table Round-3. Elevation data used for establishing the Category 3 Lake Normal Pool Elevation for Round Lake in Hillsborough County, Florida. Data were collected on June 24, 1999; water level elevation was 52.82 ft above NGVD.**

| <b>Hydrologic Indicator</b>           | <b>Elevation<br/>(feet above NGVD)</b> |
|---------------------------------------|--|
| Normal pool based on cypress buttress | 55.47                                  |
| Normal pool based on cypress buttress | 55.98                                  |
| Normal pool based on cypress buttress | 56.3                                   |
| Normal pool based on cypress buttress | 55.97                                  |
| Normal pool based on cypress buttress | 55.64                                  |
| Normal pool based on cypress buttress | 55.78                                  |
| Normal pool based on cypress buttress | 55.85                                  |
| Normal pool based on cypress buttress | 55.64                                  |
| Normal pool based on cypress buttress | 55.85                                  |
| <b>N</b>                              | <b>9</b>                               |
| <b>Median</b>                         | <b>55.85</b>                           |
| <b>Mean</b>                           | <b>55.83</b>                           |
| <b>Standard Deviation</b>             | <b>0.23</b>                            |

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

| No. | Description   | Elevation<br>(feet above NGVD) |
|-----|---|--------------------------------|
| 1   | Invert at west end of 18" corrugated metal pipe   | 52.91                          |
| 2   | Invert at east end of an 18" corrugated metal pipe (No. 1 above) connected to catch basin with floor elevation of 53.78 ft above NGVD                                 | 53.81                          |
| 3   | Inverts at west and east ends of 18" corrugated metal pipe that runs under Linda Vista Circle; west end of pipe is connected to catch basin identified in No. 2 above | 53.66, 53.72                   |
| 4   | Control point; high spot in open channel to Saddleback Lake   | 55.6                           |

Figure Round-6 Outlet conveyance system for Round Lake in Hillsborough County, Florida. Numbered sites along conveyance system are described in Table Round-4.



Background map:  
USGS 1999 Digital  
Orthophotograph

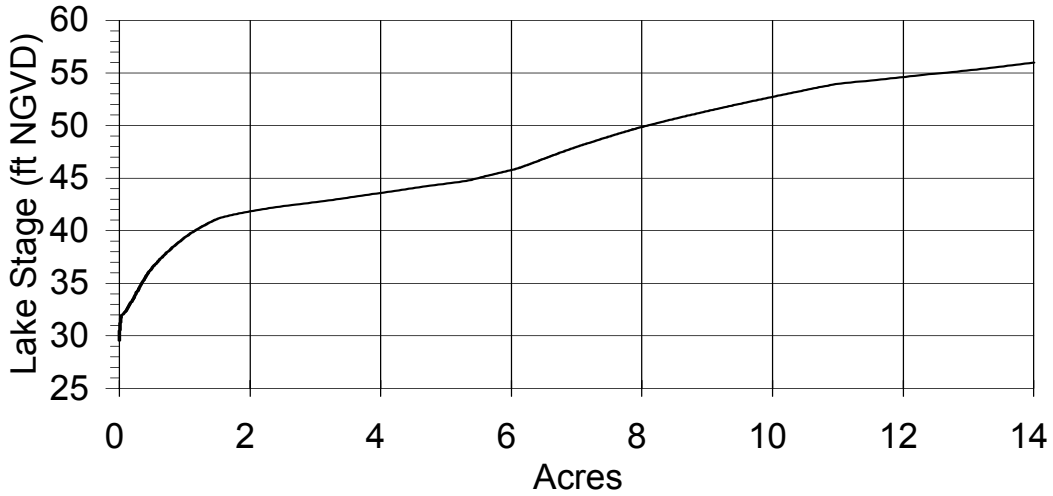
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Map prepared  
01/17/2003 by  
Doug Leeper  
SWFWMD

Figure Round-7. Surface area, volume, potential herbaceous wetland area, area available for aquatic macrophyte colonization, and dynamic ratio versus lake stage for Round Lake in Hillsborough County, Florida.

### Stage and Area



### Stage and Volume

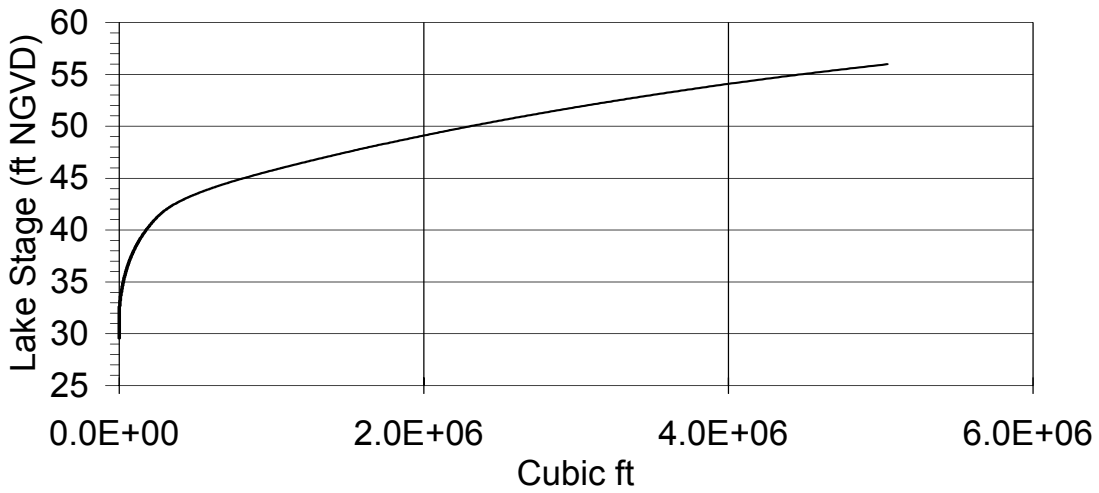
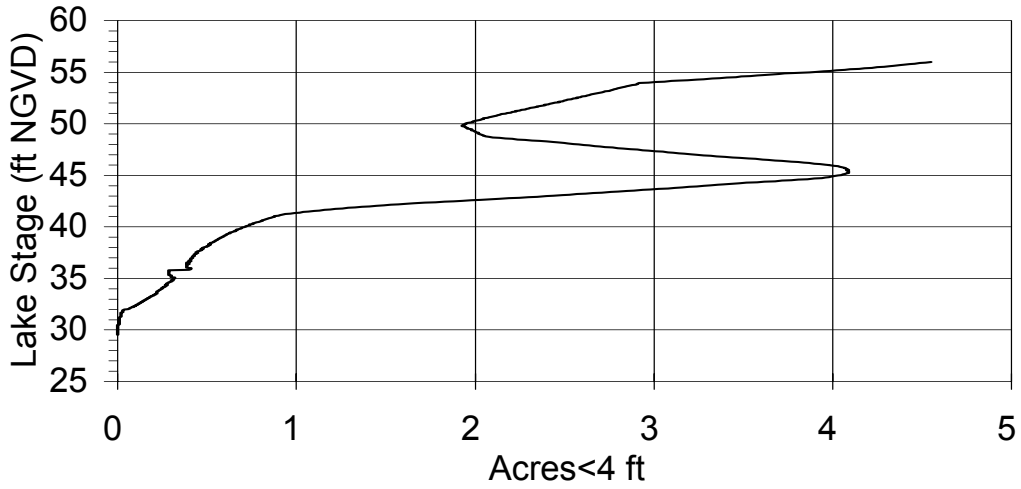


Figure Round-7 (continued).

### Stage and Herbaceous Wetland Area



### Stage and Area Available for Aquatic Plant Colonization

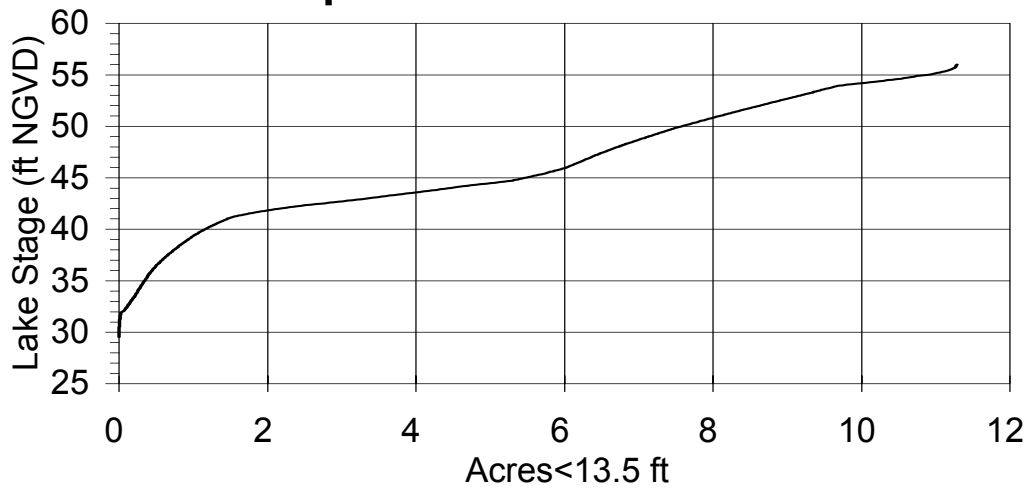
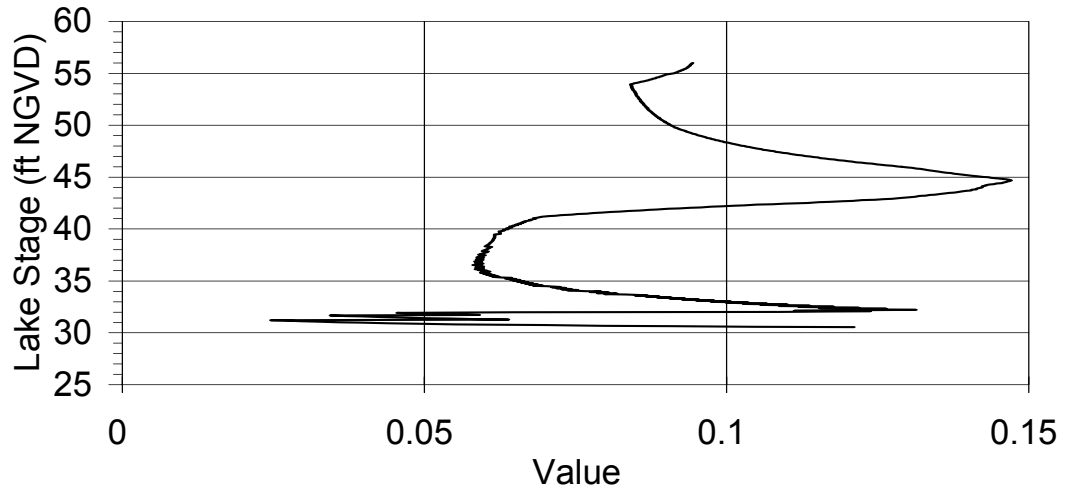


Figure Round-7 (continued).

### Stage and Dynamic Ratio





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