

July 7, 2004

MEMORANDUM

TO: File

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

**SUBJECT: Proposed minimum and guidance levels for Lake Parker (Ann) in
Pasco County, Florida**

Lake Parker (Ann)

General Description

Lake Parker (Ann) is located in Pasco County, Florida (Section 35, Township 26S, Range 17E) in the Pinellas-Anclote River basin of the Southwest Florida Water Management District (Figure 1). 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). This subdivision has been described as a plain with elevations between 50 and 80 feet with many small lakes despite the fact that the silty sand overlying the limestone is moderately thick. As part of the Florida Department of Environmental Protection's Lake Bioassessment/Regionalization Initiative, the area has been identified as the Keystone Lakes region, and described as well-drained, sandy upland with numerous slightly acidic, clear-water lakes with low nutrient levels (Griffith *et al.* 1997).

Public access to the lake is not available. Uplands surrounding Lake Parker (Ann) are dominated by residential development (Figure 2). Like the uplands, most of shoreline area has been altered in association with residential development. Intact cypress-dominated wetlands, contiguous with the lake, remain along the northern lake area and extend north. Cypress fringe most of the remaining lakeshore.

The drainage area for Lake Parker (Ann) is 3.09 square miles (SWFWMD 1981). Navigable canals and ditches convey surface water flows from surrounding lakes to Lake Parker (Ann). Lakes discharging to Lake Parker (Ann) include Lake Fishing and Bass (Holiday) Lake to the north, Lake Minniola and Lake Geneva to the northeast, and Lake Seminole and Lake Hiawatha to the southeast. An outfall ditch conveys flows from Lake Parker (Ann) to the northeast through a forested wetland system and under S.R. 54. Discharge from the lake is controlled by a manually-operated structure, which is owned and operated by the District. Stop logs are added to or removed from the structure inlet as necessary to maintain the surface water levels of Lake Parker (Ann)

within the currently adopted management levels. The crest elevation of the structure is 48.25 ft NGVD (SWFWMD 2003). A manual, stop log structure controls flow into Lake Parker (Ann) from Lake Minniola and Lake Geneva (Figure 2). There are no surface water withdrawals from the lake currently permitted by the District. There are, however, permitted groundwater withdrawals and one surface water withdrawal in the surrounding area.

The "Gazetteer of Florida Lakes" (Florida Board of Conservation 1969, Shafer *et al.* 1986) lists the lake area as 93 acres at a water surface elevation of 50 ft above NGVD. The 1974 United States Geological Survey 1:24,000 Odessa quadrangle map includes a lake surface elevation of 48 ft NGVD for Lake Parker (Ann). A topographic map of the basin generated in support of minimum levels development (Figure 3) indicates that the lake extends just under 97 acres when the water surface is at 48 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 Lake Parker (Ann) in Pasco County, Florida.

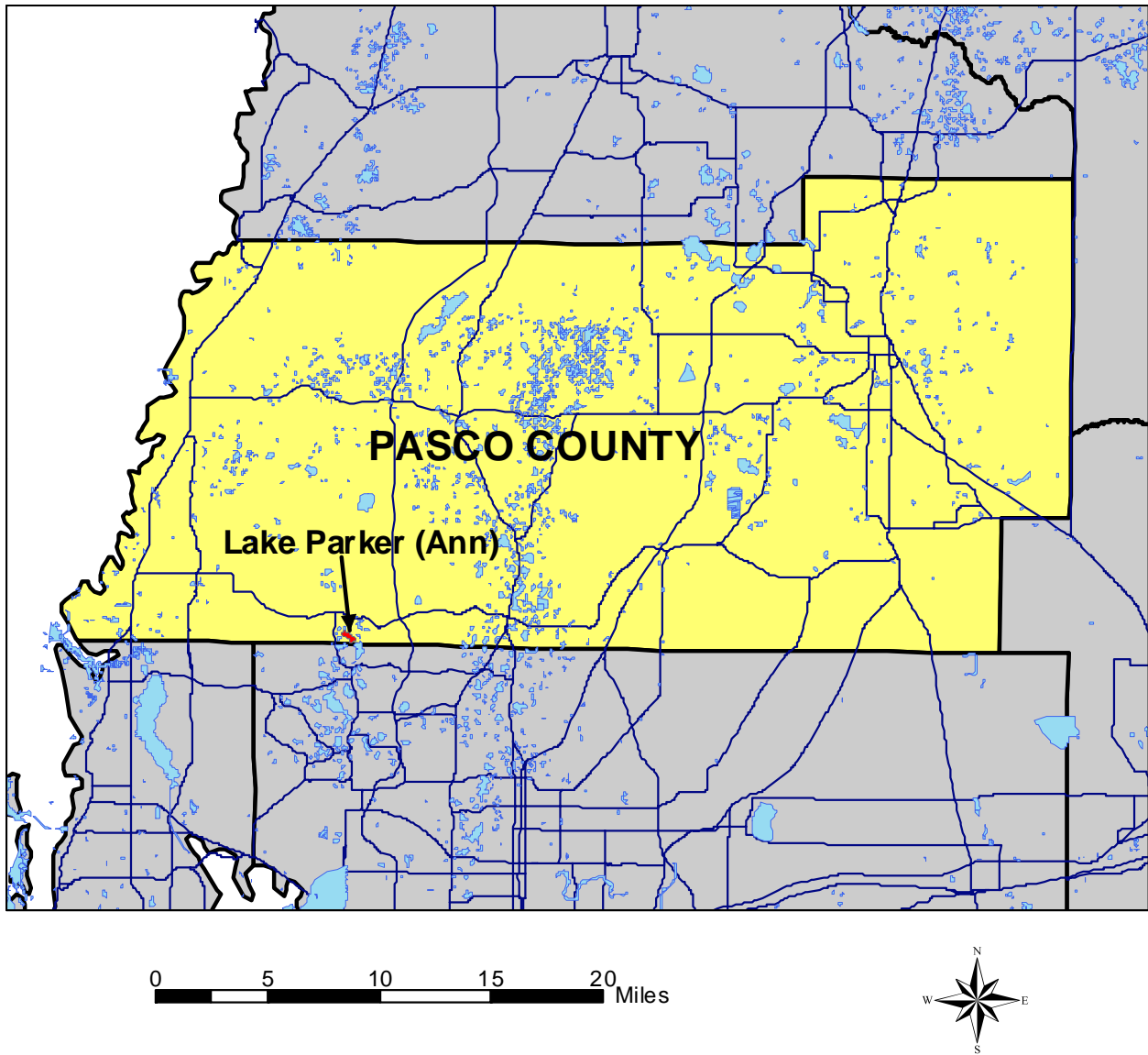
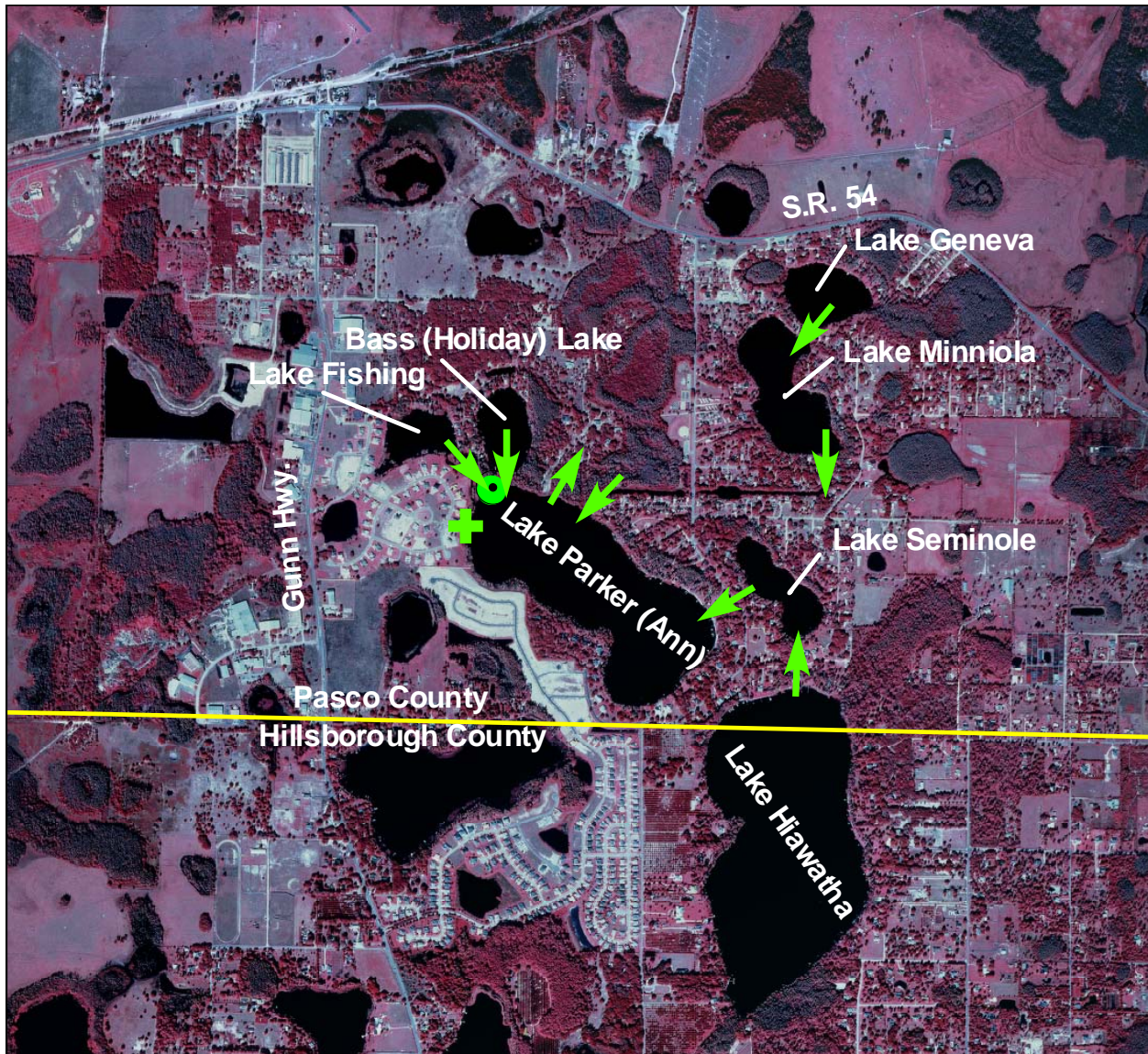




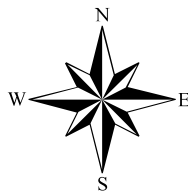


Figure 2. Location of District lake-level gauge, inlets, outlet and lakeshore area where hydrologic indicators were measured at Lake Parker (Ann) in Pasco County, Florida.



Legend

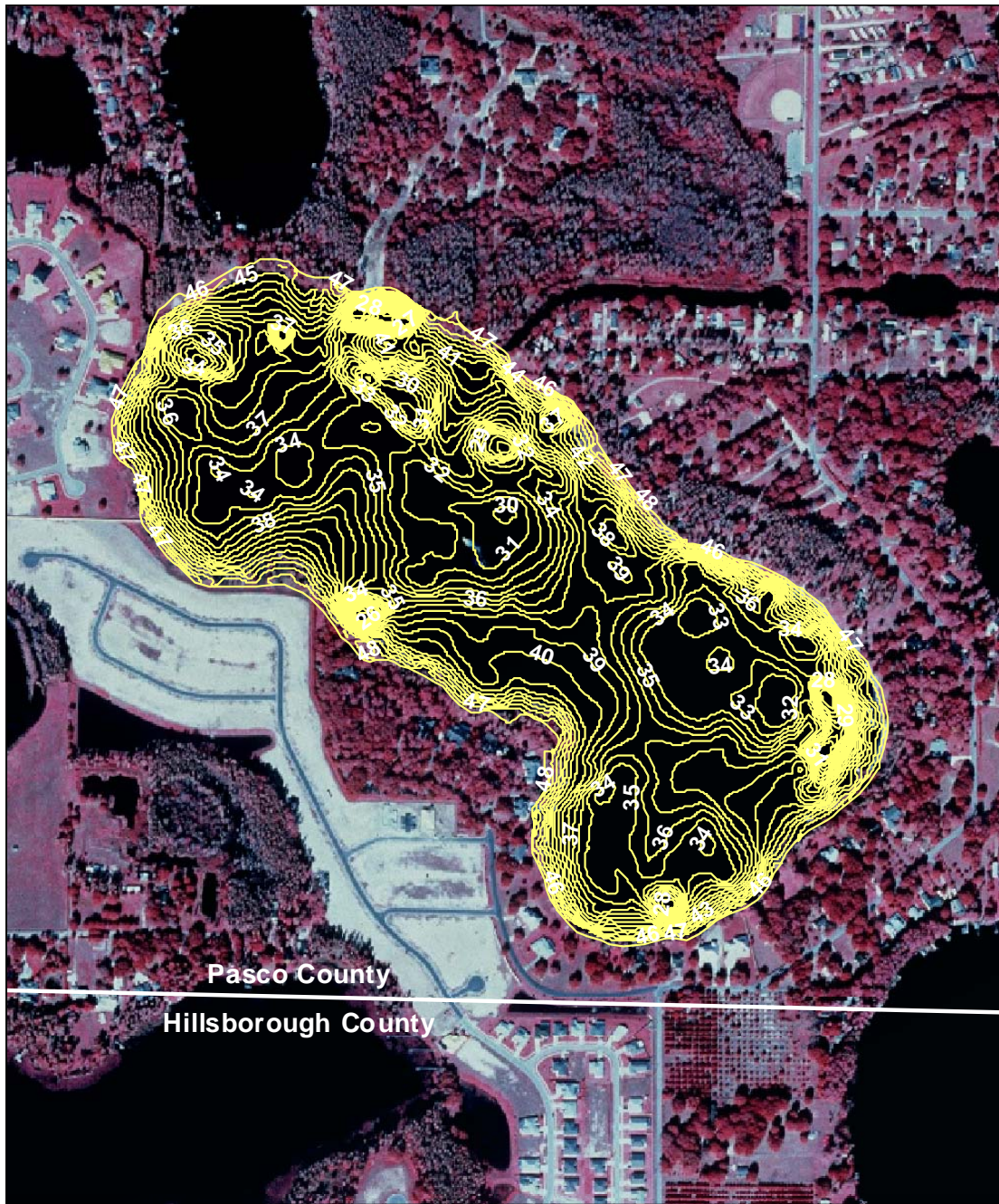
-  County line
-  Inflows, outflows
-  Lake gauge
-  Indicators



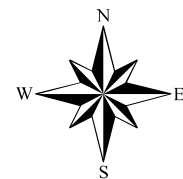
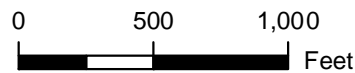
Aerial photography from 1999
Digital Orthophotographs

Map prepared October 2, 2003

Figure 3. One-foot contours within the Lake Parker (Ann) basin in Pasco County, Florida. Values shown are elevations, in feet above the National Geodetic Vertical Datum of 1929.



Map prepared November 12, 2003 using 1999 digital ortho photography, elevation data from 1981 SWFWMD aerial photography with contours maps (Sheet Nos. 35-26-17 and 34-26-17), and elevation data collected by SWFWMD staff on April 24, 2002.



Previously Adopted Lake Management Levels

Based on work conducted in the 1980s (see SWFWMD 1996), the District Governing Board adopted management levels (currently referred to as Guidance Levels) for Lake Parker (Ann) in September 1980 (Table 1). A Maximum Desirable Level of 48.25 ft above NGVD was also developed, but was not adopted by the Governing Board.

Table 1. Adopted guidance levels and associated surface areas for Lake Parker (Ann) in Pasco County, Florida.

| Level | Elevation (feet above NGVD) | Lake Area (acres) |
|-------------------------------|--|------------------------------|
| Ten Year Flood Guidance Level | 48.80 | 98 |
| High Level | 48.75 | 98 |
| Low Level | 45.75 | 92 |
| Extreme Low Level | 45.00 | 90 |

Proposed Minimum and Guidance Levels

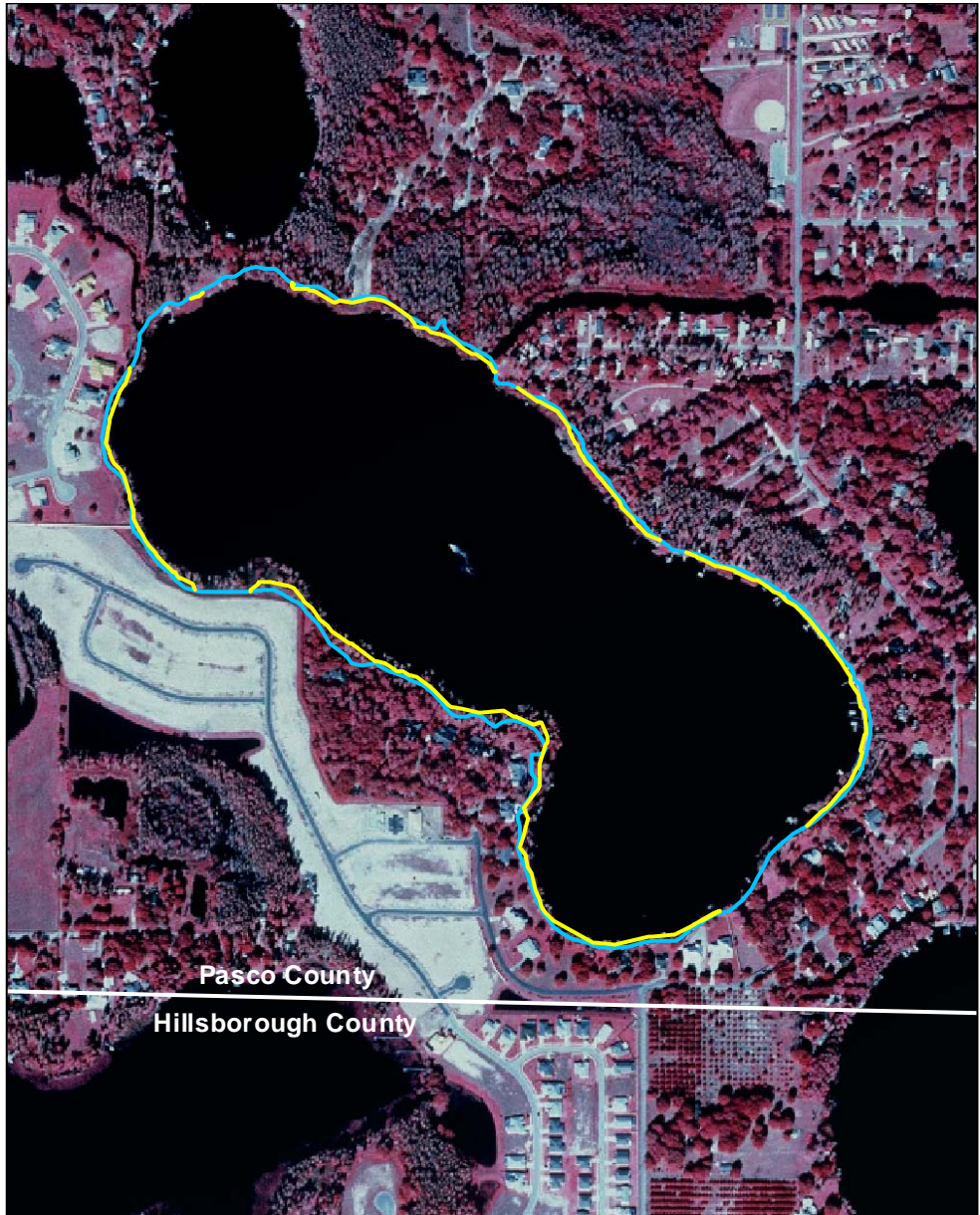
Proposed Minimum and Guidance Levels were developed for Lake Parker (Ann) using the methodology for Category 1 and 2 Lakes described in SWFWMD (1999) and current District Rules (Chapter 40-D8, Florida Administrative Code). Additional lake-level information was developed using methods outlined in Leeper *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 2. Location 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 Lake Parker (Ann) in Pasco County, Florida.

| Level | Elevation (feet above NGVD) | Lake Area (acres) |
|-------------------------------|--|------------------------------|
| Ten Year Flood Guidance Level | 49.5 | NA |
| High Guidance Level | 48.3 | 97 |
| High Minimum Lake Level | 48.1 | 97 |
| Minimum Lake Level | 46.7 | 95 |
| Low Guidance Level | 46.2 | 94 |

NA = not available

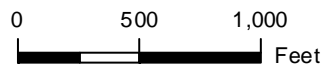
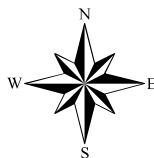
Figure 4. Approximate location of the proposed Minimum Lake Level (yellow) and proposed High Minimum Lake Level (blue) for Lake Parker (Ann) in Pasco County, Florida. Elevations listed are in feet above the National Geodetic Vertical Datum of 1929. Contour shown for the High Minimum Lake Level is 48.0 ft above NGVD. The actual elevation is 48.1 ft above NGVD.



Legend

Minimum Levels

- 46.7 ft NGVD = MLL
- 48.1 ft NGVD = HMLL



Map prepared November 12, 2003 using 1999 digital ortho photography, elevation data from 1981 SWFWMD aerial photography with contours maps (Sheet Nos. 35-26-17 and 34-26-17), and elevation data collected by SWFWMD staff on April 24, 2002.

Summary of Data and Analyses Supporting Recommended Minimum and Guidance Levels

Hydrologic data are available from the District Water Management Database for Lake Parker (Ann) (District Universal ID Number STA 340 341) from October 1969 through the present date (Figure 5, see Figure 2 for current location of the SWFWMD lake-level gauge). Note that 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. Historic data are not available. For the period of record from January 1964 through the present, the hydrologic data are classified as Current data. Current data collected through January 2003 were used to calculate the Current P10, P50, and P90 (Table 3).

The Normal Pool elevation was established at 48.5 ft above NGVD based on elevations associated with the buttressing of cypress (*Taxodium* sp.) trees along the northwest 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 October 2003 (Table 3). The control point elevation was established at 48.3 ft NGVD, which is the crest elevation of the District's water control structure located within the outfall ditch (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 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 48.3 ft above NGVD (Table 3). The Historic P50 and Low Guidance Level were established at 47.3 and 46.2 ft above NGVD, respectively, 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 for Lake Parker (Ann) was established at 49.5 ft above NGVD using the methodology for open basin lakes described in current District Rules (Chapter 40D-8, Florida Administrative Code). For the analysis, the NETWORK flood routing model 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 38 years (Figures 5 and 6). The highest elevation for Lake Parker (Ann) recorded in the District Water Management Data Base, 49.29 ft above NGVD, occurred on September 24, 1979. The low of record, 43.28 ft above NGVD, occurred on June 26, 2001 and June 12, 2002.

Aquatic macrophytes, including torpedograss (*Panicum repens*), spatterdock (*Nuphar luteum*), maidencaine (*Panicum hemitomum*), and willow (*Salix* sp.) occur 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 Lake Parker (Ann) this standard is established at 46.7 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 (46.7 ft above NGVD). The proposed High Minimum Lake Level was established at 48.1 ft NGVD, an elevation 0.4 ft below the Normal Pool elevation. The proposed High Minimum Lake Level is 0.3 ft below the low spot of nearby Chisholm Lane, and 1.0 ft below the floor slab of an enclosed porch, 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 Level for lakes without fringing cypress wetlands (see Leeper et al. 2001) were developed for Lake Parker (Ann) (Table 3). The Aesthetic Standard for the lake would be established at the Low Guidance Level elevation of 46.2 ft above NGVD. The Species Richness Standard would be established at 42.3 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 40.7 ft NGVD, based on the sum of the elevation that ensures connectivity among lake sub-basins (37.6 ft NGVD), a 2 ft clearance for movement of biota and use of powerboats in the lake, and the Northern Tampa Bay area RLWR5090 (1.1 ft). Based on basin morphology, a Mixing Standard for preventing potential resuspension of sediments would not be applicable to this lake (Figure 8). The Dock-Use Standard would be established at 46.8 ft NGVD, based on the sum of the P10 elevation of sediments at the end of the 48 docks at the lake (43.7 ft NGVD), a clearance of 2 feet based on use of powerboats in the lake, and the Northern Tampa Bay area RLWR5090 (1.1 ft). The Recreation/Ski Standard would be established at 45.1 ft NGVD, based on the sum of the elevation at which the lake could contain a safe skiing area (44.0 ft NGVD) and the Northern Tampa Bay area RLWR5090 (1.1 ft). Review of changes in potential herbaceous wetland area associated with change in lake stage did not indicate that use of any of the identified standards would be inappropriate for minimum levels development (Figure 8).

Figure 5. Surface water elevation at Lake Parker (Ann) in Pasco County, Florida. Data through January 2003 are shown.

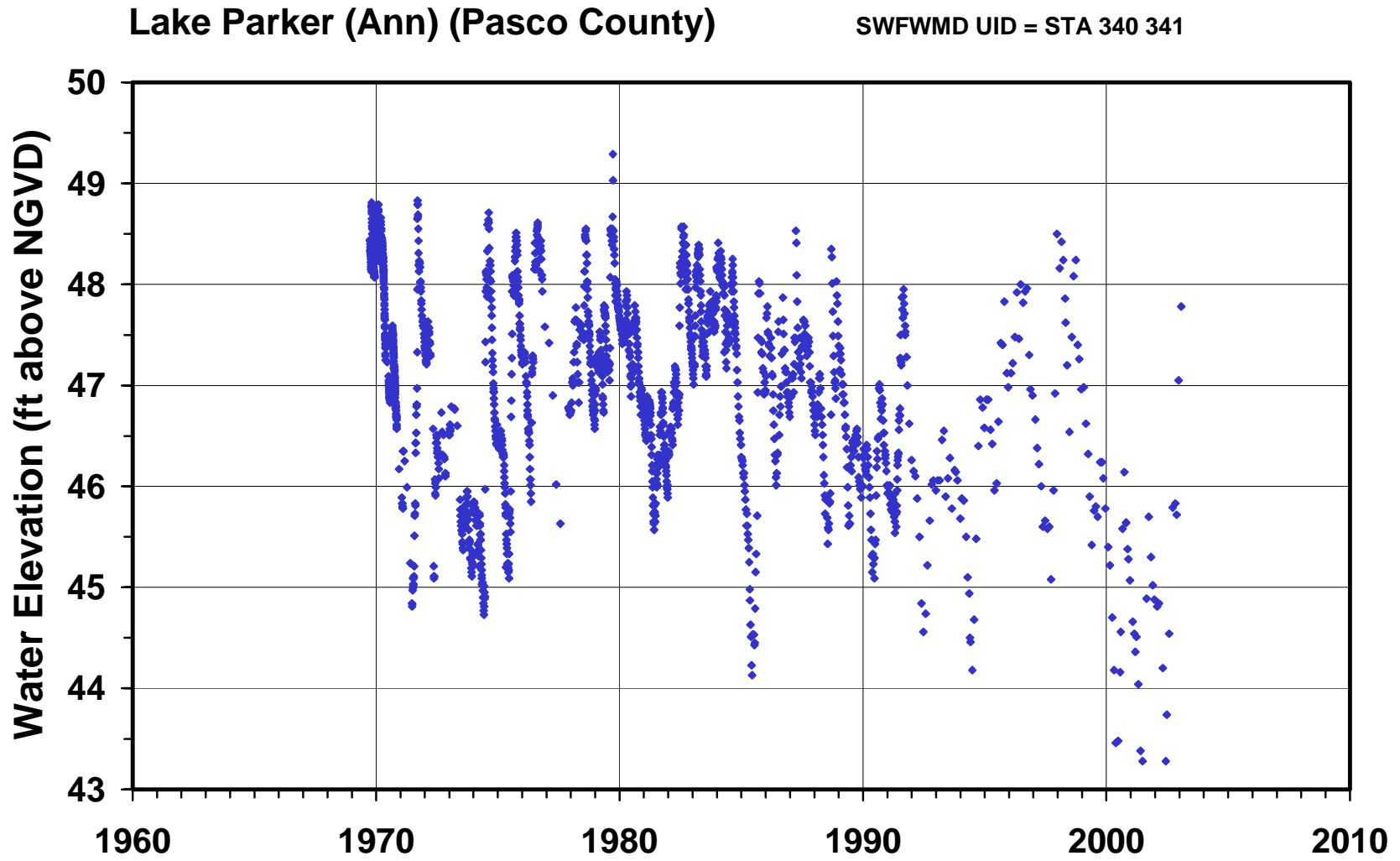


Figure 6. Mean monthly surface water elevation through January 2003, and proposed guidance and minimum levels for Lake Parker (Ann) in Pasco County, Florida. Proposed levels include the Ten Year Flood Guidance Level (10-YR), High Guidance Level (HGL), Low Guidance Level (LGL), High Minimum Lake Level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

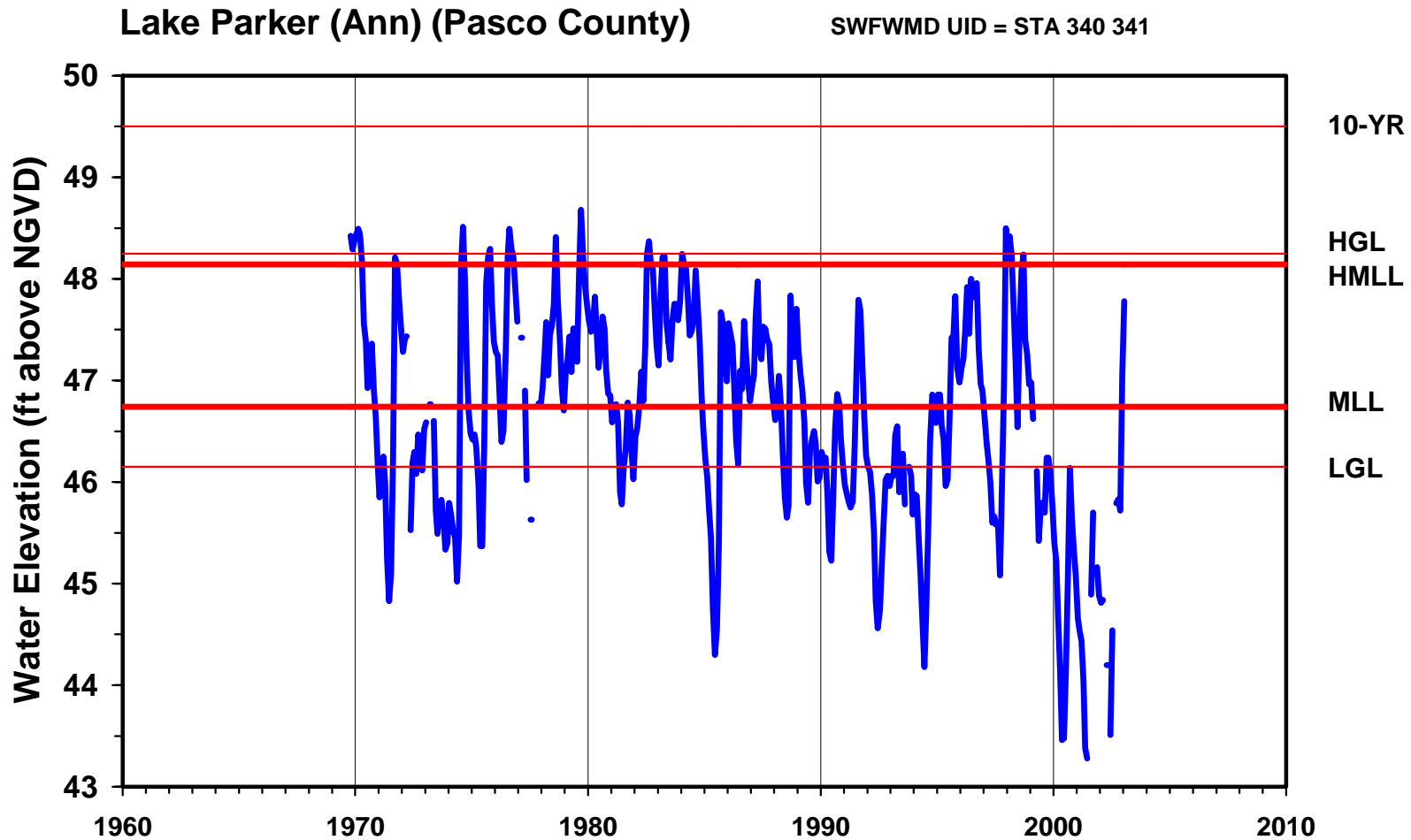


Table 3. Elevation data and associated area values used for establishing minimum levels for Lake Parker (Ann) in Pasco County, Florida.

| Level or Feature | Elevation (feet above NGVD) | Lake Area (acres) |
|----------------------------|--|------------------------------|
| Current P10 | 47.98 | 97 |
| Current P50 | 46.74 | 95 |
| Current P90 | 45.26 | 91 |
| | | |
| Normal Pool | 48.5 | 97 |
| Low Floor Slab | 49.3 | NA |
| Low Other (enclosed porch) | 49.1 | NA |
| Low Road | 48.4 | NA |
| Control Point | 48.3 | 97 |
| | | |
| High Guidance Level | 48.3 | 97 |
| Historic P50 | 47.3 | 96 |
| Low Guidance Level | 46.2 | 94 |
| | | |
| Cypress Standard | 46.7 | 95 |
| *Dock-Use Standard | 46.8 | 95 |
| *Recreation/Ski Standard | 45.1 | 91 |
| *Aesthetic Standard | 46.2 | 94 |
| *Species Richness Standard | 42.3 | 82 |
| *Connectivity Standard | 40.7 | 76 |
| *Mixing Standard | NA | NA |

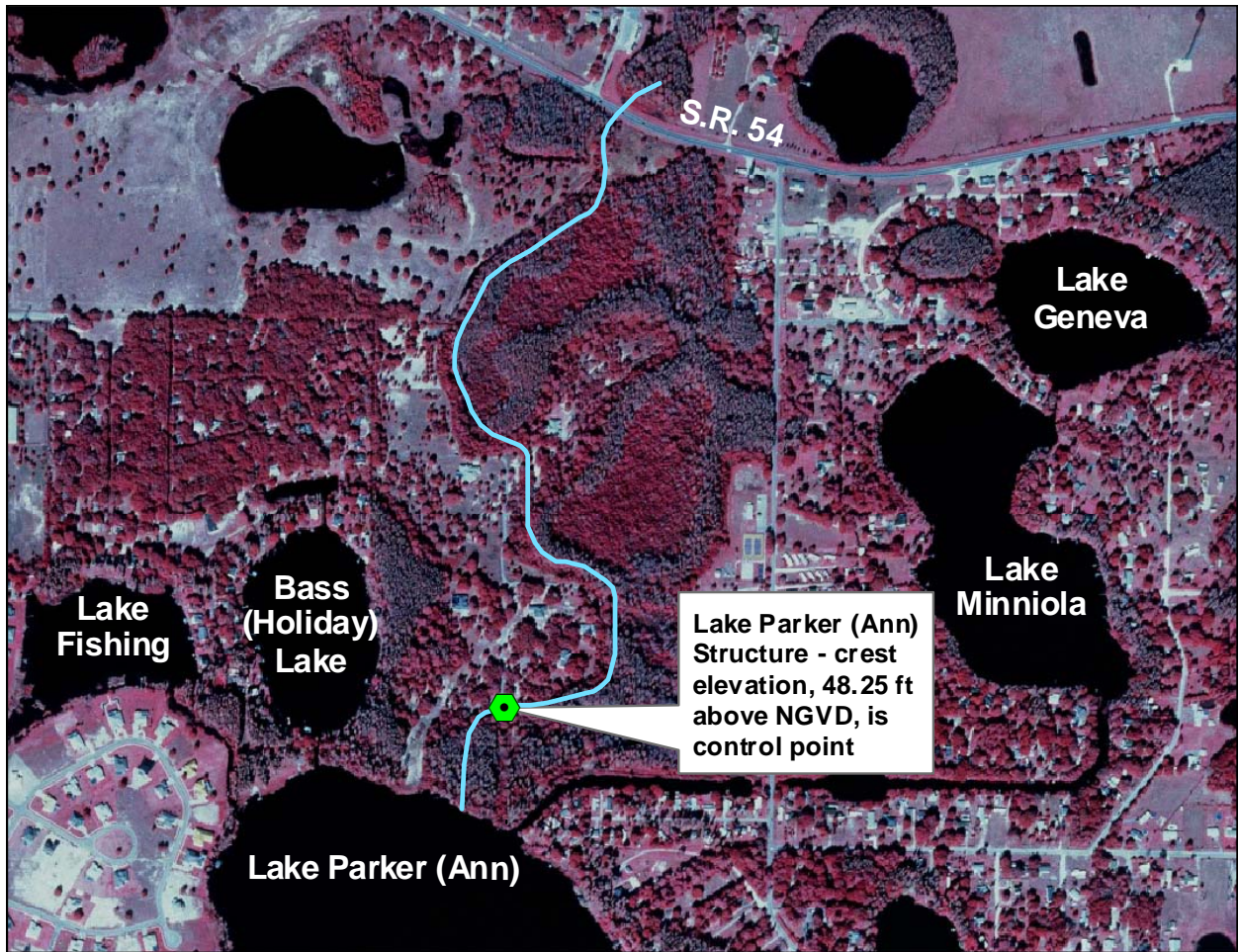
NA = not applicable/not available

*Category 3 Lake Standards developed for comparative purposes only.

Table 4. Elevation data used for establishing the Normal Pool Elevation for Lake Parker (Ann) in Pasco County, Florida. Data were collected by SWFWMD staff on April 24, 2002.

| Hydrologic Indicator | Elevation (feet above NGVD) |
|---------------------------------------|--|
| Normal pool based on cypress buttress | 48.09 |
| Normal pool based on cypress buttress | 48.49 |
| Normal pool based on cypress buttress | 48.19 |
| Normal pool based on cypress buttress | 48.49 |
| Normal pool based on cypress buttress | 48.19 |
| Normal pool based on cypress buttress | 48.39 |
| Normal pool based on cypress buttress | 49.39 |
| Normal pool based on cypress buttress | 48.39 |
| Normal pool based on cypress buttress | 48.59 |
| Normal pool based on cypress buttress | 48.59 |
| Normal pool based on cypress buttress | 48.59 |
| Normal pool based on cypress buttress | 48.99 |
| Normal pool based on cypress buttress | 48.69 |
| Normal pool based on cypress buttress | 48.59 |
| N | 14 |
| Median | 48.54 |
| Mean | 48.55 |
| Standard Deviation | 0.33 |

Figure 7. Outlet conveyance system for Lake Parker (Ann) in Pasco County, Florida. Ditched flow path is indicated by the blue line.



Map prepared December 9, 2003 using 1999 USGS digital ortho photography.

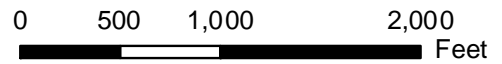
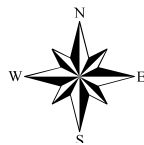
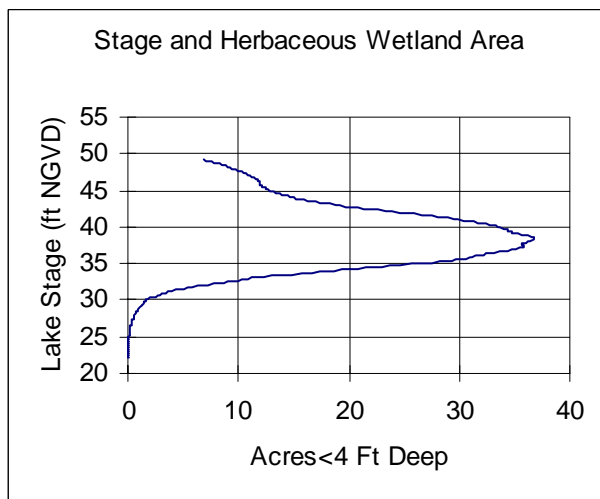
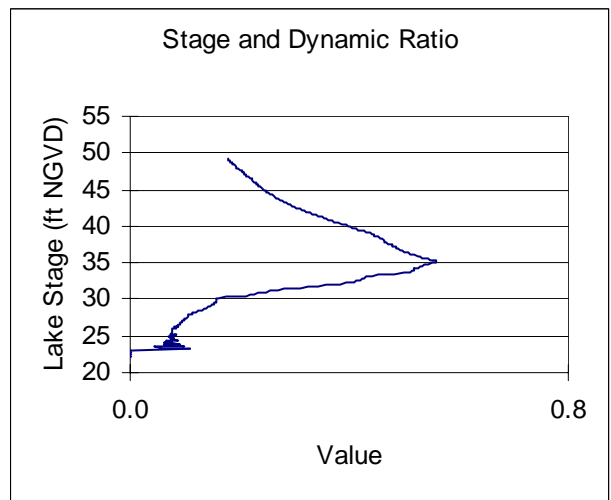
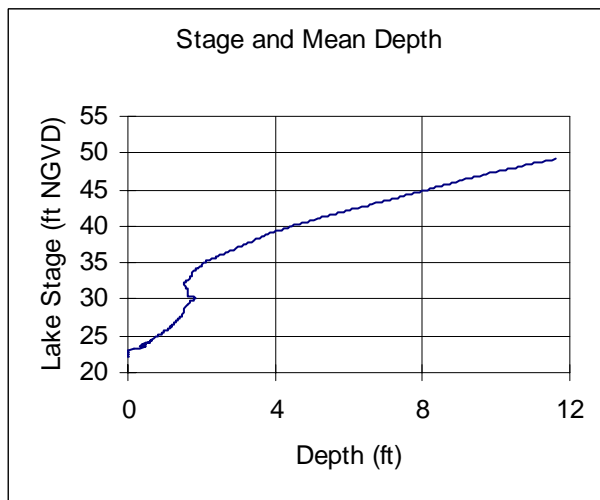
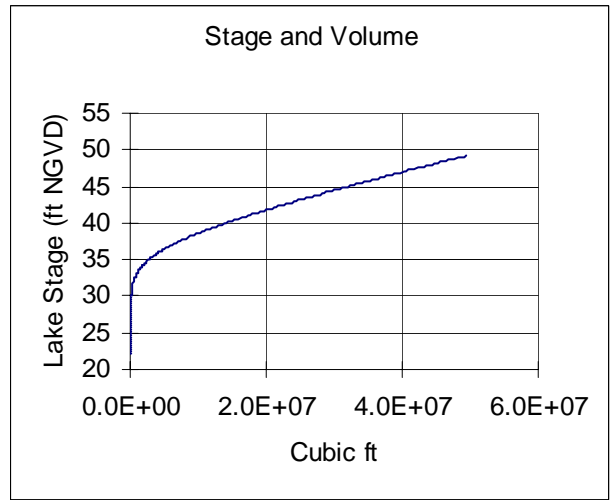
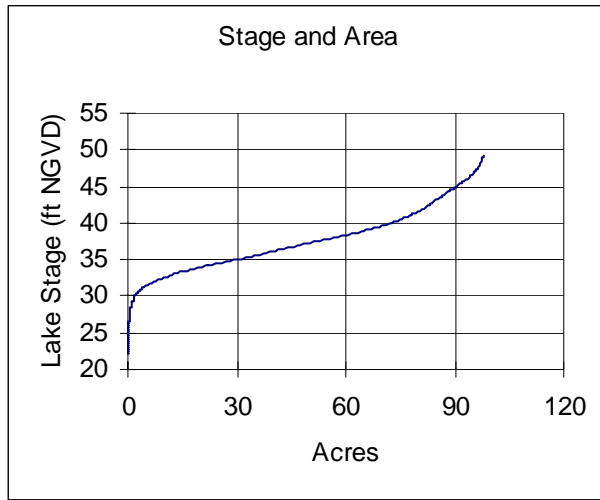


Table 5. Summary statistics for elevations associated with docks (n = 48) at Lake Parker (Ann) in Pasco County, Florida, based on data collected by SWFWMD staff on April 9, 2002. Percentiles (P10, P50, P90) represent elevations exceeded by 10, 50, and 90 percent of the docks.

| 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 | 43.7 | 50.0 |
| P50 | 42.3 | 49.1 |
| P90 | 40.8 | 48.2 |
| Maximum | 44.3 | 50.4 |
| Minimum | 39.8 | 47.3 |

Figure 8. Surface area, volume, mean depth, dynamic ratio (basin slope), and potential herbaceous wetland area versus lake stage for Lake Parker (Ann) in Pasco County, Florida.



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