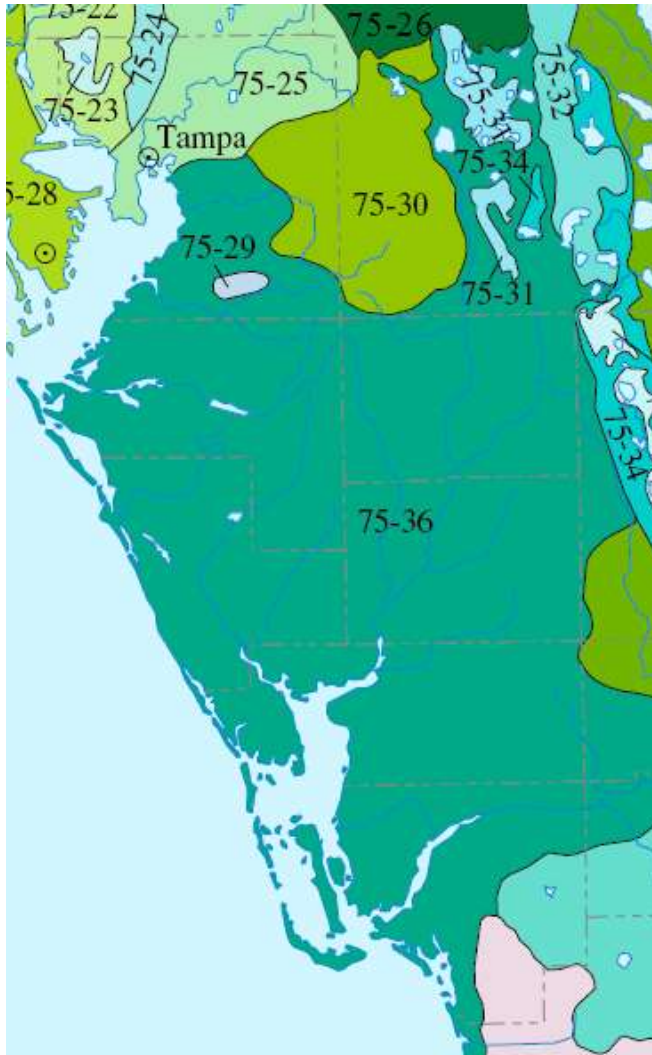


# Lake Regions of the Charlotte Harbor Estuary Program Study Area

Excerpted from "Lake Regions of Florida", Griffith et al, U.S. EPA, 1997



## 75-26 Green Swamp

The Green Swamp is a distinctive feature of the central Florida peninsula. It is an extensive area of flatland and swampland at a relatively high elevation, 75-150 feet, and it contains the headwaters of the Withlacoochee, Oklawaha, Hillsborough, Peace, and Kissimmee rivers. It is not a continuous expanse of swamp, but a composite of many swamps interspersed with low ridges, hills, and flatlands (Pride et al, 1966). Our Green Swamp region includes the Webster Limestone Wet Plain in the west that overlies the Eocene Ocala limestone, as well as the Green Swamp area to the east above the Miocene Hawthorn Group sediments. The overlying layer of clastic deposits of sand and clay are thinner to the west (Pride et al, 1966). The vegetation includes cypress in the swampy areas, pine flatwoods, and some pine and oak in the upland, better-drained areas. The water table is at or near the surface in much of the region, with large areas of standing water after heavy rainfall. Surface waters are generally colored and acidic, but there are few, if any, natural lakes. Mill Stream Swamp was sampled under the Lakewatch program.

75-26 Green Swamp Lake Values

| Lake              | pH (lab) | Total Alkalinity (mg/l) | Conductivity (µS/cm @ 25°C) | Total Phosphorus (µg/l) | Total Nitrogen (µg/l) | Chlorophyll_a (µg/l) | Color (pcu) | Secchi (m) |
|-------------------|----------|-------------------------|-----------------------------|-------------------------|-----------------------|----------------------|-------------|------------|
| Mill Stream Swamp | -        | -                       | -                           | 46                      | 1346                  | 33                   | -           | -          |

## 75-30 Lakeland/Bone Valley Upland

The lake region includes the Lakeland Ridge, the Bone Valley Uplands, and part of the Bartow Embayment physiographic subdistricts of Brooks (1981b; 1982). The Lakeland Ridge consists of sand hills near 200 feet in elevation with many solution depression lakes; the Bone Valley Uplands and the Bartow Embayment, within White's (1970). Polk Upland physiographic region, tend to be more poorly drained flatwoods areas. All of these areas are covered by phosphatic sand or clayey sand from the Miocene-Pliocene Bone Valley Member of the Peace River Formation in the Hawthorn Group (Scott 1992; Scott and MacGill 1981). The region generally encompasses the area of most intensive phosphate mining, but phosphate deposits and mining activities are also found south of this region. As one might

expect, the dominant characteristic of all lakes in this region is high phosphorus, along with high nitrogen and chlorophyll-a values. The lakes are alkaline, with some receiving limestone-influenced groundwater.

### 75-30 Lakeland/Bone Valley Upland Lake Values

| Mean Value         | pH (lab) n=17 | Total Alkalinity (mg/l) n=17 | Conductivity (µS/cm @ 25°C) n=17 | Total Phosphorus (µg/l) n=18 | Total Nitrogen (µg/l) n=18 | Chlorophyll_a (µg/l) n=18 | Color (pcu) n=17 | Secchi (m) n=13 |
|--------------------|---------------|------------------------------|----------------------------------|------------------------------|----------------------------|---------------------------|------------------|-----------------|
| Minimum            | 7.3           | 22.7                         | 101                              | 59                           | 1276                       | 40                        | 15               | 0.3             |
| 25 <sup>th</sup> % | 7.5           | 24.0                         | 152                              | 120                          | 1703                       | 79                        | 18               | 0.6             |
| Median             | 8.0           | 50.8                         | 163                              | 344                          | 1852                       | 91                        | 28               | 0.7             |
| 75 <sup>th</sup> % | 9.1           | 66.0                         | 197                              | 526                          | 2420                       | 136                       | 33               | 0.9             |
| Maximum            | 9.8           | 143.7                        | 408                              | 965                          | 4493                       | 252                       | 40               | 1.0             |

(Note: In this and the tables following, n represents the number of lakes sampled.)

### 75-31 Winter Haven/Lake Henry Ridges

This upland karst area, 130-170 feet in elevation, has an abundance of small to medium sized lakes. Candler-Tavares-Apopka is the dominant soil association of the well-drained upland areas, with longleaf pine and xerophytic oak natural vegetation. Pliocene quartz pebbly sand and the phosphatic Bone Valley Member (Peace River Formation) of the Hawthorn Group comprise the underlying geology. The lakes can be characterized as alkaline, moderately hardwater lakes of relatively high mineral content, and are eutrophic.

### 75-31 Winter Haven/Lake Henry Ridges Lake Values

| Mean Value         | pH (lab) n=25 | Total Alkalinity (mg/l) n=25 | Conductivity (µS/cm @ 25°C) n=25 | Total Phosphorus (µg/l) n=44 | Total Nitrogen (µg/l) n=43 | Chlorophyll_a (µg/l) n=44 | Color (pcu) n=26 | Secchi (m) n=40 |
|--------------------|---------------|------------------------------|----------------------------------|------------------------------|----------------------------|---------------------------|------------------|-----------------|
| Minimum            | 6.6           | 3.2                          | 147                              | 8                            | 358                        | 1.5                       | 8                | 0.3             |
| 25 <sup>th</sup> % | 7.5           | 31.0                         | 191                              | 21                           | 695                        | 13                        | 12               | 0.8             |
| Median             | 7.8           | 37.6                         | 275                              | 26                           | 870                        | 24                        | 20               | 1.1             |
| 75 <sup>th</sup> % | 8.0           | 59.4                         | 331                              | 39                           | 1312                       | 40                        | 26               | 1.8             |
| Maximum            | 9.0           | 87.0                         | 417                              | 470                          | 1997                       | 105                       | 57               | 3.7             |

### 75-32 Northern Lake Wales Ridge

This narrow ridge forms the topographic crest of central Florida, with our lake region extending south from the Clermont Uplands in Lake County to the Livingston Creek drainage in Highlands County. Elevations are generally 100-300 feet. An unnamed unit of non-marine coarse clastic sediments of Miocene age (poorly sorted quartz sands and pebbles imbedded in kaolinic clay) form the ridge (Scott 1980). Although the Iron Mountains (Brooks 1981b) are shown as the Miocene Hawthorn Formation, Interlachen facies, other parts of this region are classified as Pleistocene beach and dune sand and Pliocene undifferentiated sand (Brooks 1981a). The well-drained sandy soils are dominated by the Candler-Tavares-Apopka association, covered by citrus groves, pasture, and urban and residential development. The lakes are mostly alkaline, low to moderate nutrient, clearwater lakes. Nitrogen values tend to be high. These lakes are richer in nutrients than lakes in the Southern Lake Wales Ridge (75-33), although the cause of this is not readily apparent. Citrus production and land cover appear similar in both regions.

### 75-32 Northern Lake Wales Ridge Lake Values

| Mean Value         | pH (lab) n=15 | Total Alkalinity (mg/l) n=15 | Conductivity (µS/cm @ 25°C) n=15 | Total Phosphorus (µg/l) n=20 | Total Nitrogen (µg/l) n=18 | Chlorophyll_a (µg/l) n=18 | Color (pcu) n=15 | Secchi (m) n=16 |
|--------------------|---------------|------------------------------|----------------------------------|------------------------------|----------------------------|---------------------------|------------------|-----------------|
| Minimum            | 6.0           | 0.2                          | 79                               | 3                            | 331                        | 1                         | 6                | 0.5             |
| 25 <sup>th</sup> % | 7.2           | 15.2                         | 125                              | 8                            | 632                        | 4                         | 7                | 1.0             |
| Median             | 7.9           | 35.0                         | 192                              | 16                           | 1015                       | 11                        | 10               | 1.9             |
| 75 <sup>th</sup> % | 8.3           | 56.5                         | 291                              | 22                           | 1760                       | 20                        | 17               | 2.6             |
| Maximum            | 8.9           | 130.6                        | 425                              | 38                           | 5970                       | 52                        | 96               | 7.5             |

### 75-34 Lake Wales Ridge Transition

This lake region includes the ridge margin or transition lakes that are darker-colored with higher nutrients than the lakes found on the Southern Lake Wales Ridge (75-33). Elevations are 70-130 feet, and there are more extensive areas of poorly-drained soils, such as the Satellite and Basinger series. Peaty muck Samsula soils border many of the lakes. The lake region also includes the narrow Bombing Range Ridge on the east. This is a narrow, 20-mile long sand ridge located in the Avon Park Bombing Range between Lake Kissimmee and Lake Istokpoga. Elevations reach near 150 feet. The ridge may have been an offshore sand bar associated with and created together with the Lake Wales Ridge (Lane et al, 1980). The sand pine- and scrub-covered ridge contains soils of the Satellite-Archbold-Pomella association, similar to the edges of the Lake Wales Ridge where the more colored lakes are located. There are several very small lakes on this ridge, but little is known about them. About ten small lakes are shown within Bombing Range Ridge on the Bartow 1:100, ODD-scale topographic map with two named lakes: Submarine Lake and Little Lake. The Lake region also includes a small area of upland soils near Lake Buffum on the west. Most of the lakes in the region are acidic, although about one-third of them tend to be alkaline. They have low to moderate nutrients, and are slightly to moderately colored.

**75-34 Lake Wales Ridge Transition Lake Values**

| Mean Value         | pH (lab) n=28 | Total Alkalinity (mg/l) n=28 | Conductivity (µS/cm @ 25°C) n=28 | Total Phosphorus (µg/l) n=27 | Total Nitrogen (µg/l) n=25 | Chlorophyll_a (µg/l) n=25 | Color (pcu) n=28 | Secchi (m) n=30 |
|--------------------|---------------|------------------------------|----------------------------------|------------------------------|----------------------------|---------------------------|------------------|-----------------|
| Minimum            | 4.4           | 0.0                          | 50                               | 0                            | 279                        | 4                         | 5                | 0.1             |
| 25 <sup>th</sup> % | 5.8           | 2.3                          | 76                               | 14                           | 517                        | 6                         | 22               | 0.8             |
| Median             | 6.6           | 4.9                          | 93                               | 19                           | 810                        | 11                        | 41               | 1.1             |
| 75 <sup>th</sup> % | 7.8           | 26.6                         | 189                              | 42                           | 977                        | 23                        | 68               | 1.5             |
| Maximum            | 8.9           | 96.0                         | 346                              | 148                          | 2940                       | 75                        | 250              | 3.4             |

### 75-36 Southwestern Flatlands

This lowland lake region includes barrier islands, Gulf coastal flatlands and valleys, and gently sloping coastal plain terraces at higher elevations. The elevations range from sea level to 150 feet. Much of the pine flatwoods and wet and dry grassland prairies have been converted to extensive areas of pasture, rangeland, and young citrus groves. Urban areas are growing rapidly near the coast. Lakes in this region can range from slightly acidic to alkaline, but almost all are eutrophic and have dark colored water. Some lakes near the Lake Wales/Winter Haven area appear more similar to the Lake Wales Ridge Transition (75-34) lakes, that is, with more moderate levels of nutrients and color, such as in South, Crooked, Myrtle, and Lowery lakes in Polk County. The larger number of lakes shown in the phosphorus, nitrogen, chlorophyll-a, and Secchi columns in the table below are mostly from small ponds and waterbodies on Sanibel Island and from a small area south of Punta Gorda sampled in the Lakewatch program.

**75-36 Southwestern Flatlands Lake Values**

| Mean Value         | pH (lab) n=17 | Total Alkalinity (mg/l) n=17 | Conductivity (µS/cm @ 25°C) n=17 | Total Phosphorus (µg/l) n=44 | Total Nitrogen (µg/l) n=42 | Chlorophyll_a (µg/l) n=39 | Color (pcu) n=16 | Secchi (m) n=37 |
|--------------------|---------------|------------------------------|----------------------------------|------------------------------|----------------------------|---------------------------|------------------|-----------------|
| Minimum            | 5.4           | 1.8                          | 82                               | 16                           | 618                        | 3                         | 23               | 0.2             |
| 25 <sup>th</sup> % | 6.6           | 4.8                          | 121                              | 54                           | 1245                       | 11                        | 60               | 0.4             |
| Median             | 6.7           | 1.2                          | 167                              | 101                          | 1662                       | 34                        | 91               | 0.7             |
| 75 <sup>th</sup> % | 7.3           | 30.3                         | 201                              | 219                          | 2182                       | 52                        | 125              | 1.2             |
| Maximum            | 8.6           | 70.6                         | 319                              | 564                          | 3686                       | 190                       | 390              | 2.8             |

### 75-37 Immokalee Rise

This area of slightly elevated land, with elevations of 25-35 feet, includes the Immokalee Rise, Corkscrew Swamp, and Devils Garden physiographic subdistricts Brooks (1981b; 1982). Pine flatwoods and wet

prairies are dominant natural vegetation types. Geologic formations include Miocene-age Tamiami Formation sands and clays, and Pleistocene age calcareous shelly sand of the Caloosahatchie Formation and clastic and shell deposits of the Fort Thompson Group (Brooks 1981a; Vernon and Puri 1964). Lake Trafford is the largest lake in the region. It was characterized as an alkaline, hardwater lake of high mineral content (Canfield 1981). There are few other lakes in the region, and these would tend to be small, swampy, and seasonal.

#### 75-36 Immokalee Rise Lake Values

| Lake     | pH (lab) | Total Alkalinity (mg/l) | Conductivity ( $\mu\text{S}/\text{cm}$ @ 25°C) | Total Phosphorus ( $\mu\text{g}/\text{l}$ ) | Total Nitrogen ( $\mu\text{g}/\text{l}$ ) | Chlorophyll_a ( $\mu\text{g}/\text{l}$ ) | Color (pcu) | Secchi (m) |
|----------|----------|-------------------------|--|---|---|--|-------------|------------|
| Trafford | 8.5      | 111                     | 225  | 65  | 1270                                      | 28                                       | 48          | 1.0        |

#### 76-02 Big Cypress

The Big Cypress is a flat region, 5 to 30 feet in elevation and slightly higher than the Everglades, covered by pine flatwoods, open scrub cypress, prairie type grasslands, and extensive marsh and wetlands. Poorly drained soils overlie limestone, calcareous sandstones, marls, swamp deposit mucks, and algal muds. Lakes are absent from the region.