DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Prepared in cooperation with the
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

MISCELLANEOUS INVESTIGATIONS SERIES
MAP I-1134

Base generalized from U.S. Geological Survey 7.5′ quadrangles (see fig. 3)

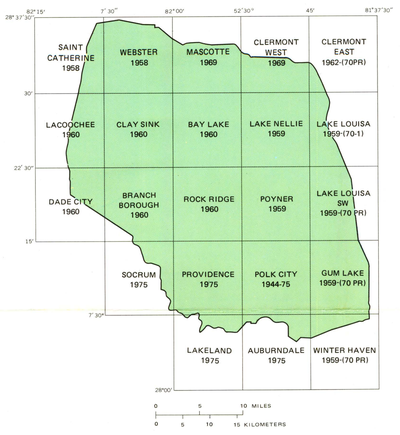

Figure 3.–Index map of Green Swamp showing U.S. Geological Survey quadrangles.

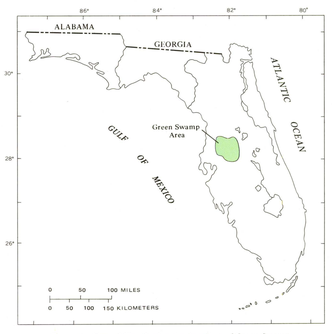

Figure 1.–Map of Florida showing location of Green Swamp.

SCALE 1:63 360

1 ½ 0 1 2 3 4 5 MILES

1 5 0 1 2 3 4 5 6 7 KILOMETERS

NATIONAL GEODETIC VERTICAL DATUM OF 1929

INTRODUCTION

The Green Swamp area in central Florida (fig. 1) has recently been designated by the State of Florida as an Area of Critical State Concern. The designation is based on the importance of natural resources in the area and their statewide importance. The natural resources, including wetlands, wildlife, and water, are threatened by rapid growth and development (Division of State Planning, 1974).

To manage and protect the Green Swamp area, detailed maps of its natural resources and land use are needed. The purpose of this map is to provide detailed information on the vegetative and wetland resources of the area. Vegetative and other land-cover categories were delineated using aerial photographs and ground surveys. The map covers about 870 square miles. The boundaries of the map are those of Pride, Meyer, and Cherry (1966).

The Green Swamp area includes several drainage basins. The eastern boundary of the Green Swamp area is U.S. Highway 27. The southern and southwestern boundaries generally coincide with the divides separating drainage northward to the Big Creek and Withlacoochee River basins from drainage southward to the Peace and Hillsborough River basins. The western boundary is U.S. Highway 301. The northern boundary extends from St. Catherine eastward along the Little Withlacoochee River basin divide to State Highway 50 and along State Highway 50 eastward to Clermont.

GENERAL DESCRIPTION OF THE GREEN SWAMP

The Green Swamp area, in central Florida, occupies approximately 870 square miles of swampy flatland and sandy ridges. The altitude of the land ranges from 200 feet in the eastern part to about 75 feet in the western part. Five major drainage systems originate within or near the Green Swamp and the streams in them flow in several directions to the sea. The Withlacoochee River and its tributaries drain more than 80 percent of the swamp area. The water of the Oklawaha, the Hillsborough River, the headwaters of the Kissimmee River, and the Peace River,drain from the remaining area.

The Green Swamp is not a continuous expanse of swamp but a composite of swamps and marshes interspersed among low ridges, hills, and flatlands. Several large and many small lakes of sinkhole origin rim the southeastern and northeastern parts of the swamp. Low ridges that trend north-northwest are prominent in the eastern part of the swamp. The central part of the swamp is flat. In the western part, low rolling hills become the dominant land feature.

The Green Swamp area is underlain by a solution-riddled limestone, the Floridan aquifer. In part of the area, the aquifer is exposed at the land surface, but in most of the area it is overlain by sand and clay layers that vary in thickness from place to place. The Floridan aquifer has excellent water-bearing characteristics, and is an important source of artesian ground water in the State.

Both surface and subsurface drainage in the Green Swamp area are poor. Much of the land surface is inundated after heavy rainfall. Ground-water levels in the interior remain near the land surface most of the time, indicating that recharge to the Floridan aquifer there is slight. Ground-water levels fluctuate over a greater range in the ridges near the eastern, southern, and western boundaries. The wide range of ground-water fluctuation indicates a better recharge potential in these ridges than in the interior flatlands.

The climate of the Green Swamp is warm and humid. The average temperature is 81°F in summer and 61°F in winter. Average annual rainfall is about 53 inches of which 60 percent occurs during the wet season, June through September. During 11 of the 13 years from 1961 through 1973 rainfall in the swamp was below normal (Division of State Planning, 1974).

The Green Swamp is sparsely populated, but urban development is encroaching into the area, particularly in the south. Land use in the area is chiefly agricultural. Most of the upland areas have been cleared for citrus groves or cattle raising. Parts of the flatlands are cleared for pasture; in other parts, trees are periodically cut and planted for lumber. Very little land is cultivated. Although many attempts have been made to drain the land, as seen in the miles of small drainage ditches, the low flatlands are still generally too wet for agriculture.

The cutting of cypress was once an important industry, but now practically all the large trees have been removed. Pine is still actively harvested over much of the northwestern part of the area.

A small amount of phosphate mining is carried out in the Green Swamp area. Extensive phosphate deposits lie just south of the area.

WATER LEVELS AND VEGETATION IN THE GREEN SWAMP

Much of the Green Swamp is inundated after heavy rainfall. Bay heads, mesic hammocks, pine forests, and pasture lands are all periodically flooded, often for weeks or more during a year. Swamps, cypress forests, and marshes generally are flooded even longer and deeper. In swamps and forests, water is usually deepest and inundation is usually greatest where cattail, arrowhead, pickerelweed or white waterlily flourish.

Water levels in the Green Swamp have been lower during the past 14 years ending in 1975 than during the previous 17 years. At Lake Minnehaha, in the northeast corner of the swamp, water-level altitudes declined to less than 95 feet in only 5 of the years between 1945 and 1961, but dropped below this level in 12 years of the 14-year span, 1962-75. Also, water-level altitudes were higher than 98 feet in 5 of the 17 years between 1945 and 1961, but never rose above this level between 1963 and 1975 (fig. 2).

The relatively low water level in the Green Swamp over the past 14 years reflects a below normal rainfall, and probably also the effects of greater irrigation of citrus in this period, The Green Swamp area was deficient in rainfall by more than 95 inches from 1961 through 1973 (Division of State Planning, 1974).

Among the factors that govern the distribution of plant communities in the Green Swamp, the period and depth of flooding are of prime importance. For example, a lowered water level would tend to favor terrestrial plant communities over semi-aquatic ones.

There are some indications that plant communities in parts of the Green Swamp are becoming less aquatic. In the southeastern part of the swamp, bay and pine trees, both of which thrive on somewhat drier land than cypress, apparently have invaded some cypress forest. Also, in the southeast, plants indicative of relatively dry conditions have presumably colonized land formerly occupied by the more aquatic marsh plants.

Some small lakes and ponds in the Green Swamp apparently have decreased in size or disappeared over the past 20 to 30 years. Some of these lakes probably have become marshes or bay heads.

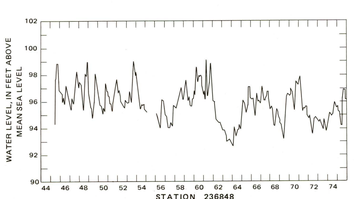

Figure 2.–Hydrograph of Lake Minnehaha, 1945-75.

METHODS AND MATERIALS

The land cover map was made with the aid of aerial photographs in conjunction with ground surveys. The basic photographs used were color-infrared taken in February and March 1975 at 10,000 feet altitude. These photographs were useful because of their great resolution. High-altitude (40,000 feet) color-infrared photographs taken in December 1972 and 1974 were used to supplement the low-altitude photographs. These high-altitude photographs, because they were taken in early winter, were of special benefit in distinguishing deciduous forests from evergreen forests. They also provided a better overview of large features.

U.S. Geological Survey 1:24,000 quadrangle maps (fig. 3) were used as control for the features drawn on the map. The location of roads, trails, and structures were taken directly from the quadrangle maps. Ground surveys were made in October 1973, January 1975, and July 1975. A helicopter was used to survey most of the swamp during several days in July 1975.

Categories of vegetation and other land cover were modified from a land-use classification system developed by Anderson, Harde, and Roach (1972). This system is based on levels of classification. At level I, land is classified into several basic categories. At succeeding levels, land is classified in increasing detail. On this map, the categories built-up land, water bodies, and rangeland correspond to Level I: pasture, citrus groves, and stripped land correspond to Level II; the other categories are Level III classification.

REFERENCES

Anderson, J. R., Harde, E. E., and Roach, J. T., 1972, A land-use classification system for use with remote-sensor data. U.S. Geol. Survey Circular 671, 16 p.

Division of State Planning, Department of Administration, and Bureau of Land Planning. 1974, Final report and recommendation for the proposed Green Swamp area of Critical State Concern, Lake and Polk Counties, Florida: Florida Department of Administration, Tallahassee, Florida, 50 p.

Pride, R. W., Meyer, F. W., and Cherry, R. N., 1966, Hydrology of Green Swamp area in central Florida: Florida Geol. Survey Rept. Inv. 42, 137 p.

DESCRIPTION OF MAP UNITS

C CYPRESS FOREST: Generally rounded "heads" or elongate "strands," with cypress trees (*Taxodium* sp.) as dominant overstory. Understory variable. In the southwest, bay trees *(Gordonia lasianthus, Magnolia virginiana, Persea palustris,* and *P. borbonia)* are common and may dominate cypress in some heads and strands. Common understory plants include waxmyrtle *(Myrica cerifera)*, St. Johnswort *(Hypericum* sp.*)*, slash pine *(Pinus elliottii)*, red maple *(Acer rubrum)*, dahoon *(Ilex cassine)*, blackgum *(Nyssa biflora)*, and swamp fern *(Blechnum serrulatum)*. Forests flood for variable periods during the year depending on rainfall and local drainage activities. Typically the forests are flooded June through October, during and after the rainy season.

S RIVER BOTTOM SWAMP: Swamps bordering rivers and creeks. Typically deepwater swamps dominated by cypress, blackgum, and pop ash *(Fraxinus caroliniana)*. Other common trees include red maple, sweetgum *(Liquidambar styraciflua)*, elm *(Ulmus floridana)*, willow *(Salix caroliniana)*, and laurel oak *(Quercus laurifolia)*. On much of the slightly higher land bordering rivers and creeks, large oaks and bay trees are often common. River Bottom Swamp reaches its greatest size along the Withlacoochee River north of Rock Ridge.

H MESIC HAMMOCK FOREST: Dense forests of trees, shrubs, vines, ferns, and epiphytes. Largest stands occur along the Withlacoochee River where they merge with River Bottom Swamp or border the river. Common plants include laurel oak, live oak *(Quercus virginiana)*, red bay, cabbage palm *(Sabel palmetto)*, dahoon, white bay *(Magnolia virginiana)*, wild coffee *(Psychotria undata)*, and slash pine. Soil is often damp, and the forest may flood periodically during heavy rainfall.

M MIXED SWAMP FOREST: Forest with a mixture of swamp trees, or with a dominant tree other than cypress. Common trees include red maple, sweetgum, elm, laurel oak, waxmyrtle, slash pine, bay, cypress, and blackgum. Where bay trees dominate, the forest is called a bay head. Bay heads are common in the east and southeast parts of the swamp. Bay heads are generally on slightly higher land than nearby marshes.

P PINE FLATWOODS: Relatively open forests of slash pine, or less commonly, longleaf pine *(Pinus palustris)*, or mixtures of the two. Common understory plants include saw-palmetto *(Serenoa repens)*, gallberry *(Ilex glabra)*, wire grass *(Aristida stricta)*, waxmyrtle, lyonia *(Lyonia lucida)*, broomsedge *(Andropogon virginicus)*, and blackberry *(Rubus trivialis)*. Live oak and laurel oak are sometimes understory trees. In places pines have been planted so densely that understory plants are largely absent. Patterned areas indicate densely planted pine.

SU SANDHILL UPLANDS: Relatively open forests of turkey oak *(Quercus laevis)*, and longleaf pine with an understory of broomsedge, wire grass, and a variety of other grasses, composites, scrub oaks, and other low growing plants. In places small oaks such as the bluejack oak *(Q. incana)*, Chapman's oak *(Q. chapmanii)*, myrtle oak *(Q. myrtifolia)*, and sand live oak *(Q. virginiana* var. *geminata)* may dominate and form a dense scrub forest. The uplands are sandy, well-drained areas and have a good potential for providing aquifer recharge.

OAK LIVE OAK STANDS: Usually areas of relatively small size in which large live oak trees and other hardwoods have been left standing. Stands are common on higher land surrounding lakes and marshes.

MA MARSHES AND WET PRAIRIES: Wetlands in which herbaceous vegetation dominates over shrubs and trees. Common plants include sawgrass *(Cladium jamaicensis)*, arrowhead *(Sagittaria latifolia; Sagittaria* sp.*)*, pickerelweed *(Pontederia lanceolata)*, maidencane *(Panicum hemitomon)*, bulrush, *(Scirpus* sp.*)*, *Ludwigia* sp., cattail, *(Typha* sp.*)*, white waterlily, *Nymphaea odorata*, hatpins *(Eriocaulon* sp.*)*, and beak rush *(Rhynchospora* sp.*)*. Sometimes small trees and shrubs such as buttonbush *(Cephalanthus occidentalis)*, willow, and primrose willow *(Ludwigia peruviana)* are mixed with the herbaceous plants.

Some marshes in the southeastern part of the Green Swamp (near Lake Lowery), visited in July 1975, had plants representative of relatively dry conditions. Dogfennel *(Eupatorium capillifolium)*, broomsedge *(Andropogon* sp.*)*, saltbush *(Baccharis* sp*)*, and waxmyrtle were dominant. Typical marsh plants such as sawgrass, pickerelweed, and arrowhead were sparse and patchy in distribution. The soil was dry at the surface.

R RANGELAND or CLEARCUT AREAS: Mostly land that was originally Pine Flatwoods but that has been partly cleared so that tree crown cover is less than 10 percent. Plants are similar to those of the Pine Flatwoods.

I PASTURE: Land largely cleared of its native plants. Much of this land was originally Pine Flatwoods.

I+ UPLAND PASTURE: Land largely cleared of its native plants except in places where large live oaks were retained and serve as shade trees for cattle. Much of this land was originally Sandhill Uplands.

Cit CITRUS GROVES: Citrus trees planted in rows primarily on the Sandhill Uplands. Groves are on well-drained land that is important in aquifer recharge.

Dis STRIPPED LAND: Land in which vegetation is largely removed and bare earth is exposed or in which the earth has been recently colonized by "weeds." Includes land drained and cleared for residential development, or land stripped for mining or other activities.

Res BUILT-UP LAND: Land used for residential, commercial, or transportation purposes where structures exceed four per acre over 10 acres. Includes land built up for expressways.

W WATER BODIES: Rivers, canals, lakes, ponds, and borrow pits. On this map the area of lakes and ponds reflects low water levels that existed during the dry season when the aerial photographs were made. Undoubtedly, during periods of heavy rainfall, shallow ponds and lakes greatly increase in area as waters flood over the nearby marshland.

Some ponds and lakes that appear on the 1:24,000 topographic quadrangle maps are not shown,or are smaller in area, on this map.On the topographic maps these water bodies and their shorelines were based on a normal or average water level, whereas on this map, they were based on photographs made when water levels were low. Generally, with respect to ponds and lakes, areas of difference between the topographic maps and this map are delineated as Marsh on this map.

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LAND COVER MAP OF THE GREEN SWAMP AREA, CENTRAL FLORIDA

By
Benjamin F. McPherson

1979

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