

Statement
to
The Public Works Subcommittee
of the
Appropriations Committee
of the
United States Senate
April 13, 1960
in behalf of the
Request of the State of Florida
for a
Reconnaissance Study
of
Flood Control and Water Conservation Needs
of
The Withlacoochee River, The Oklawaha River,
The Peace River, The Hillsborough River, and
Adjacent Watersheds in West Central Florida
by
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Mr. Chairman:

The Florida Congressional Delegation through the Honorable Spessard L. Holland, a member of this committee, and the Honorable George A. Smathers, members of the Senate of the United States from Florida, has already placed before this Subcommittee a request for an appropriation of \$100,000 to pay for a study by the U. S. Army Corps of Engineers of the need for, and the best means by which to accomplish, flood control, water conservation and other water resource benefits in an area of West Central Florida.

The area in which the study is desired is shown on Figure 1 of this statement. It encompasses an area of some 10,823 square miles or approximately 20 percent of the surface area of the State of Florida. The area is defined by the drainage basins of the four major streams stemming from a common, interconnected, system of headwaters known locally as the Green Swamp. The major streams are the Withlacoochee River, the Ocklawaha River, the Hillsborough River and the Peace River. Lying between these major river basins and the shore of the Gulf of Mexico are a number of small streams which have much the same flood and drought problems as their larger neighbors and which experience practically the same weather conditions.

It is proposed, therefore, that the area of study shall be all of that area of Florida lying west and south of the eastern and northern boundaries of the watersheds of the Withlacoochee and Ocklawaha Rivers on the north and the tidal waters of the Gulf of Mexico and its tributaries on the west. The study area shall not include any of the lands presently in the project area of the Central and Southern Florida Flood Control District.

This study had been requested on the basis of the need for water control as demonstrated first by critical lake and stream conditions experienced in these areas during the drought years of 1954-1957 and secondly by severe flood damage experienced during the wet year of 1958 and the unusually wet year of 1959. Since that request was filed, however, and recently as mid-March 1960, a large part of the proposed project area was subjected to the most severe flooding that has ever been recorded in that area.

Flood damage in 1959 was estimated to have exceeded \$5,000,000. These floods resulted from rainfall which, for many stations in this area, exceeded any other 12-month period in the more than 60 years of record. No major tropical storms occurred during 1959. During the mid-March storm of 1960, the area from Tampa Bay to the south of the Suwannee River and extending across the state was subjected to a rainfall of 9 to 15 inches in a three-day period.

Ground water reservoirs and lakes had previously been filled by moderately heavy rainfall in February and early March. The effects of the torrential rains were immediate and devastating. By March 22 the Hillsborough River had crested at a record high, overflowing its banks over a wide area. Thousands of Tampa residents were forced to leave their homes. The poorly drained flatlands lying east of the Withlacoochee River, in an area of many truck farms and cattle ranges, were flooded first by the heavy rainfall then by the overflowing Withlacoochee River.

Lake Apopka in west Orange County, a tributary of the Ocklawaha River, rose 1.3 feet in three days. This was within three inches of the top of the protective dike surrounding the rich Zellwood winter vegetable area. Lakes Minnehaha, Harris, Dora, Bastis and Griffin also in the Ocklawaha River Basin, rose to higher stages than any previously recorded. The Ocklawaha River overflowed its banks throughout its 80-mile length, causing millions of dollars of damage to agriculture.

Estimates of damage are only partially complete, but it is already obvious that they will exceed \$60,000,000. The rural areas of Pasco and Sumter counties have probably suffered the heaviest proportional damage to their economy.

Some knowledge of the geology of West Central Florida is helpful to an understanding of the water problems of the area.

The western section of central Florida is underlain by several thousand feet of limestones, dolomites, marls, clays and sands deposited in the geologic past when Florida was covered by the ocean. These rocks were originally deposited as relatively flat-lying beds, but subsequent differential movement of the earth's crust assisted by erosion has caused them to assume their present rather complex structure. The configuration of land surface throughout west central Florida is controlled by the geology.

The bulk of the material underlying the area consists of the limestones and dolomites of the Floridan aquifer. These rocks, because of their soluble nature, are extremely porous and permeable and are criss-crossed by solution pits, caverns and holes which store and transmit large amounts of water. Solution of these rocks has given rise to the numerous lakes and sinks of the area, many of which have permeable connections with the underlying limestones and dolomites. Water enters the Floridan aquifer in the topographically high area which is centered in the Green Swamp and extends into adjacent areas. Upon entering the aquifer through sinks, lake bottoms, permeable sands or directly where the limestones and dolomites are exposed at the surface, the water moves down gradient under hydrostatic head beneath impervious beds, generally clays. North and east of the Green Swamp recharge area the limestones and dolomites of the Floridan aquifer are relatively close to the surface and in places are exposed in stream banks and around lakes. Toward the south, the limestones and dolomites are covered by great thicknesses of impervious clays and clayey sands.

North of a line drawn roughly through Tampa Bay and the Green Swamp, streams flow, in part, in channels cut in the rocks of the Floridan aquifer, and their low water flow is maintained by discharge from that aquifer in the form of springs and seeps. South of the line the stream channels are separated from the Floridan aquifer by varying thicknesses of impervious clays and, except for isolated instances, low stream flows are maintained only by shallow ground-water seepage from surface sands and marls.

A study of Green Swamp will prove especially fruitful because of the unique nature of the swamp and its relationship to the four major streams and the ground water of Central Florida. The swamp lies in a shallow slightly titled bow-shaped area lying in south Lake County, north Polk County, east Pasco County and south Sumter County (Figure 2). The drainage of the area is affected by a series of parallel sand ridges. These ridges are remnants of beaches, formed by the alternate rise and fall of the ocean during the past geologic formation of peninsular Florida. The aerial photographic mosaic in Figure 3 shows the light-colored beaches running in a north and south direction and separated by the dark-colored swampy runs.

The area in which Green Swamp is located is not only the headwaters of the four major surface streams, but is also the highest artesian pressure area in South Florida. The contours on the lower sketch map of Figure 4 show the elevations to which water will rise in a well cased through the overlying impervious strata into the highly pervious Floridan aquifer. This is defined as the piezometric surface.

A trough in the piezometric surface across Florida north of Ocala prevents the movement of ground water from north Florida into central Florida. Accordingly, the southern half of Florida is dependent wholly on local recharge to the Floridan aquifer to replace ground water lost to the sea or to the surface through wells and springs. The points of major recharge are the high points or mounds in the artesian (piezometric) pressure system. Since the Green Swamp corresponds to the highest pressure mound in South Florida, it follows that this is a major recharge area. Artesian pressure contour lines are shown in Figure 2 in greater detail for the Green Swamp area.

The Floridan aquifer from which most of the towns, cities, industries and agricultural areas of Central Florida obtain their water, receives a major portion of its water through recharge in the Green Swamp area. There are some 200 square miles of wetlands in the 800-square mile Green Swamp area. It has served until now as a natural reservoir. Within the past year some of this advantage has been lost by attempts to drain the wetlands. If this reservoir can be restored under controlled conditions, both flood control and water conservation benefits may be obtained.

It appears to be possible, by means of multiple low-head dams and inter-connecting channels, to store approximately 300,000 acre-feet of water in the swamp area. With suitable channels and controls this stored water can be released to one or all four of the major river basins. Similar measures in the upper watersheds of downstream tributaries and on the main streams should make it possible to prevent grossly overloading the capacity of the receiving streams. This will permit increases in present capacity without danger of overdrainage.

The small coastal streams referred to earlier are limited in capacity by flat slopes, meandering channels and heavy growths of vegetation. During tropical storms they overflow to bring disastrous floods to the areas through which they drain. They also are subject to overdrainage if improper flood control measures are attempted.

A reconnaissance survey would permit the determination of the best approach to a solution of the problems of the entire area. It may well save large sums of money and much loss of time which might otherwise be consumed in a series of studies on individual areas. It will certainly bring encouragement and hope to a thoroughly disheartened and confused segment of an otherwise progressive and rapidly growing state. Your consideration of these factors is solicited.



FIGURE 1
Location of the
Withlacoochee
Peace
and
Hillsboro
Rivers
of
West Central Florida

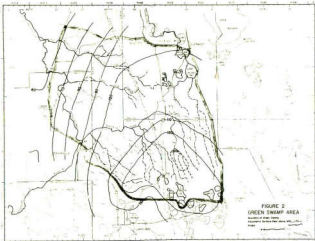




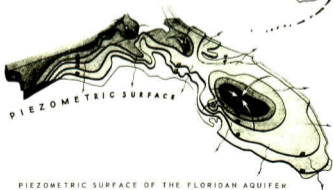
FIGURE 3

Aerial Photograph of Lake County
Showing the Headwater Lakes of the
Oklawaha River.



PRINCIPAL STREAMS OF FLORIDA

FIGURE 4



PIEZOMETRIC SURFACE OF THE FLORIDAN AQUIFER