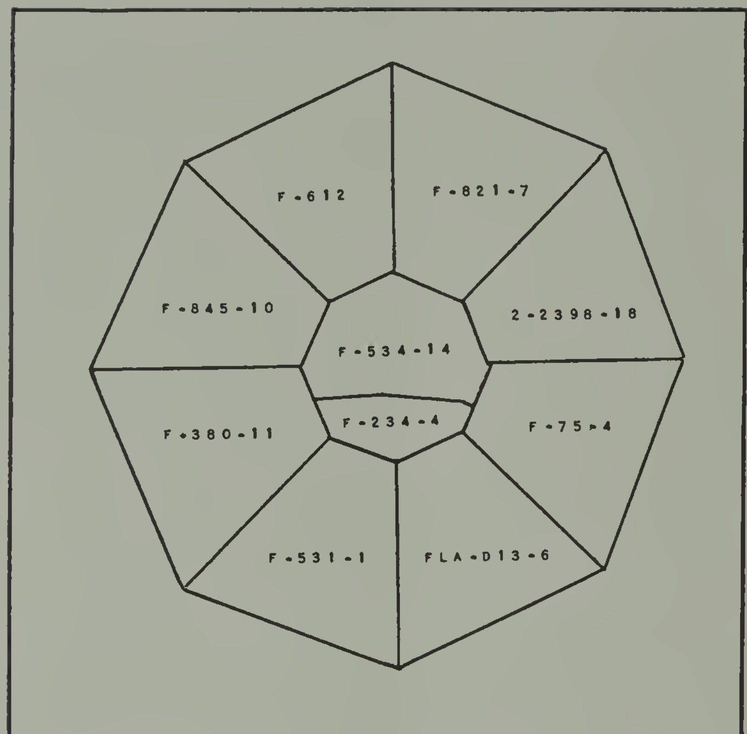
Report

R AND RELATED LAND RESOURCES

FLORIDA WEST COAST TRIBUTARIES

U. S. DEPARTMENT OF AGRICULTURE
RIVER BASIN INVESTIGATIONS



COVER PHOTOGRAPHS

WATER AND RELATED LAND RESOURCES

FLORIDA WEST COAST TRIBUTARIES

United States Department of Agriculture
In Cooperation With
The Division of Water Resources and Conservation
Florida State Board of Conservation

1965

P R E F A C E

The Florida State Board of Conservation has begun an inventory of the water and related land resources of the State. The inventory will provide information and data for use in administering and planning the physical aspects of development, management, and use of water and related land resources by major drainage basins, or river basin groups. To insure broad and adequate coverage, the Florida State Board of Conservation requested the assistance of the U. S. Department of Agriculture in making an investigation and preparing a summary report covering the agricultural phases of the water and related land resources of the Florida West Coast Tributaries area. Cooperation in such endeavors is authorized under Section VI of Public Law 566.

The data contained in the United States Department of Agriculture's report will be summarized and coordinated with data collected by the State for the overall comprehensive report covering all major aspects of the development of water and related land resources. The assembly of information and data, and the preparation of the U.S.D.A.'s report was under the leadership of the U. S. Soil Conservation Service with the cooperation of the U. S. Forest Service and the Economic Research Service.

Acknowledgement is made of the fine cooperation received from the Florida Agricultural Extension Service, Florida Agricultural Experiment Stations, Soil and Water Conservation Districts, Southwest Florida Water Management District and Basin Boards, Agricultural Stabilization and Conservation Service, Farmer's Home Administration, County Commissioners, County and City Planning Organizations, the Phosphate and Citrus Industries, Florida Forest Service, Southeastern Forest Experiment Station, Florida Game and Fresh Water Fish Commission, Florida Outdoor Recreation Planning Committee, Florida Park Service, and other agencies, organizations and individuals, who have aided in the collection and development of data used in this report.

FLORIDA WEST COAST TRIBUTARIES BASIN

SUMMARY

The Florida West Coast Tributaries Basin covers an area of 10,080 square miles of land and water. There are 670 square miles of fresh water streams, lakes and impoundments, and salt or brackish water. Agricultural and forestry enterprises occupy 8,400 square miles of land. Non-agricultural uses, including urban, industrial, rights-of-way, and miscellaneous uses occupy 1,010 square miles.

The Basin population in 1963 was estimated at approximately 1,400,000 people. More than 75 percent lived in Hillsborough, Pinellas and Polk Counties.

The 8,400 square miles of agricultural and forestry enterprises of the Basin include approximately 300,000 acres of citrus, 50,000 acres of vegetables, 100,000 acres of other crops (general field crops, hay and seed crops, nuts, fruit crops other than citrus, etc.), 750,000 acres of improved pasture, 1,500,000 acres of unimproved pasture (range), 2,400,000 acres of woodland, and 250,000 acres of miscellaneous agricultural uses (including rural homesites, idle land, open wildlife areas).

In 1963, 526,000 acre feet of water was used for agricultural purposes. The daily use for rural household, livestock, and rural lawns and gardens was 171,680,000 gallons, or about 192,300 acre feet per year. Of the total 333,700 acre feet of water used for irrigation, 88 percent, or 293,000 acre feet, came from underground sources, with the remainder, 40,700 acre feet, coming from surface sources.

It was assumed there would be adequate water available for agricultural uses to satisfy needs as projected in this report. There is however a need for better distribution. There is evidence that the total water supply in the West Coast Tributaries is adequate to meet forseeable needs through the year 2015. It is recognized that in certain locations critical problems may occur with respect to water quality. There is not sufficient data available at this time to predict the extent and location of these shortages.

Excess water is a major limitation in the development of the land resources for optimum use. This hazard existed on 66 percent of the agricultural land in 1963.

Projections to 1980 and 2015 were based on the most logical patterns of future changes in land and water use. These changes include substantial intensification in utilization of the resources, urban growth, expanded production of citrus and vegetables coupled with an increased orientation of the agriculture of the Basin toward the needs of the population for milk, eggs, poultry, beef, and greenhouse and nursery products. Production of many of these agricultural products is believed to be responsive to rising local population and demand.

Projections for the year 2015 indicate that the fresh water area will increase by 310 square miles. The land area devoted to agriculture will decrease by 1,830 square miles, while the non-agricultural area will increase by 1,520 square miles.

The 6,570 square miles available for agriculture in 2015 is estimated to include 700,000 acres of citrus, 60,000 acres of vegetables, 130,000 acres of other crops, 1,500,000 acres of improved pasture, 200,000 acres of native rangeland, 1,400,000 acres of woodland and 170,000 acres in miscellaneous agricultural uses.

With the development of land and water resources in the Basin in response to growing demand for products, value of agricultural and forestry production will rise. Values will be added, usually off the farm, through the handling,packing, shipping,and processing of raw materials. Increases in net agricultural income are reflected in producers' consumption expenditures or capital accumulation. Expenditures for farm inputs create jobs, payrolls, business profits, and add to the level of economic activity.

In 1963, the farm value of agricultural production was estimated at 195 million dollars and the stumpage value of forest products harvested at 2 million dollars. By 1980, value of production is expected to reach an estimated 255 million dollars with the stumpage value increasing to approximately 2.3 million dollars. Farm values are expected to reach 502 million dollars by 2015; stumpage values for harvested wood products are expected to be nearly 4 million dollars.

Major cash inputs of agriculture in the Basin in 1963 are estimated at 132 million dollars. Cash inputs are expected to increase to 190 million dollars by 1980, and will probably reach 370 million dollars by 2015. In reaching the level of production of wood products indicated for the projection period, it is estimated an average of 1.2 million dollars annually will be spent for forest protection, management, and treatment.

Potential flood prevention and agricultural water management works of improvement evaluated under 1963 land use conditions indicate 28 of 64 planning units would have a benefit to cost ratio of at least 1 to 1. The total installation cost for the 28 units would be 22.8 million dollars with the annual cost being 1.1 million dollars. Works of improvement for flood prevention and agricultural water management would benefit 324,400 acres of citrus, vegetables, other crops, improved pasture, and woodland. The annual benefits would be 1.7 million dollars. Evaluations under projected 1980 land use conditions show 36 units equal or exceed a 1 to 1 benefit to cost ratio. The area benefited would be 553,000 acres with an annual benefit of 3.2 million dollars. The total installation costs are estimated to be 33.8 million dollars with the annual cost being 1.7 million dollars.

Projected agricultural water use by 2015 will be approximately six times the amount used in 1963 or 2,976,000 acre feet per year. The daily use for rural household, livestock, and rural lawns and gardens would amount to some 354,000,000 gallons, or about 397,000 acre feet per year. Water used for irrigation would amount to 2,579,000 acre feet annually. It is estimated that surface supplies will provide 209,000 acre feet with the remainder, 2,370,000 acre feet, coming from underground sources. Potential water impoundments included in this report could provide 44,300 of the 209,000 acre feet from surface sources.

Potential water impoundment projects represent segments that would contribute to the development of the resources of the Basin. Twenty-two sites were found to be economically feasible for development of irrigation water supply and recreational activities. The combined storage capacity at these sites would amount to 156,000 acre feet, with a surface area of 24,600 acres.

In addition to 44,300 acre feet of water provided for irrigation at the 22 sites, 111,700 acre feet would be available for recreational purposes, fish and wildlife, and low flow augmentation. In conjunction with the water area, an additional adjacent land area of 6,450 acres would be developed for recreational use. This land and water area would provide 4,770,000 annual user-days of recreation, including boating, swimming, picnicking, camping, fishing and hunting. Average annual benefits from these developments are estimated to be 9.0 million dollars. The installation costs would be 32.3 million dollars with the average annual costs being 2.5 million dollars.

FLORIDA WEST COAST TRIBUTARIES BASIN

Use and Development of Land and Water Resources for Agriculture

CONTENTS

PHOTOGRAPH CREDITS

Figure Number	Furnished by:
2.6	Florida Agricultural Extension Service
2.8	U. S. Soil Conservation Service
2.14	U. S. Soil Conservation Service
2.15	Florida Agricultural Extension Service
2.17	Florida Agricultural Extension Service
2.18	U. S. Soil Conservation Service
2.20	U. S. Forest Service
2.21	U. S. Forest Service
2.26	U. S. Forest Service
2.27	U. S. Forest Service
2.29	U. S. Soil Conservation Service
2.31	U. S. Soil Conservation Service
2.32 (2 photos)	U. S. Soil Conservation Service
2.33	U. S. Soil Conservation Service
2.34	U. S. Soil Conservation Service
2.35	U. S. Soil Conservation Service
4.1 (2 photos)	U. S. Forest Service
4.2 (Upper)	Florida Forest Service
4.2 (Lower)	U. S. Forest Service
4.4 (Upper)	U. S. Soil Conservation Service
4.4 (Lower)	Florida Forest Service
4.6	U. S. Soil Conservation Service
4.7	U. S. Soil Conservation Service
4.10 (2 photos)	U. S. Soil Conservation Service
4.11 (2 photos)	U. S. Soil Conservation Service
4.12 (2 photos)	U. S. Soil Conservation Service
4.13	U. S. Soil Conservation Service
4.15	U. S. Soil Conservation Service

SECTION I

INTRODUCTION

The Florida West Coast Tributaries Basin includes the drainage areas of all streams and intervening areas which drain into the Gulf of Mexico between the Suwannee River on the north and the Caloosahatchee River on the south. It contains approximately 10,080 square miles, encompassing all of eight counties and portions of ten other counties. (Figure 1.1)

Problems affecting the Basin are intensified by a rapidly increasing population. These problems involve the selection of suitable lands for the orderly expansion of urban, industrial, agricultural, forestry, wildlife and recreational enterprises to meet requirements for products of the land. Also involved is the solution of problems associated with watershed protection, flood prevention, and agricultural water management at justifiable costs. Problems of equal magnitude, and whose solution is prerequisite to optimum land and water resource use, involve the conservation, utilization and management of water, both surface and subsurface.

The objectives of the study were to:

a. Determine the extent and location of present agricultural resources and resource development of the Basin.

b. Suggest a desireable pattern of land use and treatment for agriculture recognizing the demands for additional area for non-agricultural purposes, for two target dates - 1980 and 2015.

c. Determine the projected water requirements for agriculture.

d. Evaluate the feasibility of works of improvement for upstream watershed protection, flood prevention, and agricultural water management.

e. Locate water impoundment sites and evaluate their potential for flood prevention; beneficial water use, including water for irrigation, recreation, and fish and wildlife; and for low flow augmentation.

f. Evaluate the economic impacts resulting from projected 1980 and 2015 agricultural land use changes.

This report suggests land use compatible with the capabilities of the soil resources of the Basin and should be of value in the selection and treatment of suitable land to provide for the orderly expansion of urban, industrial, agricultural, forestry, wildlife, and recreational enterprises to help meet the needs of a rapidly growing population. Needs are based on Basin population projections for two target dates - 1980 and 2015. Problems associated with soil limitations, erosion, and excess water were considered in projecting quantitative amounts of land needed to produce agricultural and forestry products, and for multipurpose recreational developments and activities. It contains an economic evaluation of potential works of improvement for flood prevention and water management under present and projected 1980 agricultural conditions. Evaluations were made of water impoundment sites for irrigation water, recreation, and fish and wildlife. The projected water requirements for rural domestic, livestock, lawns and gardens, and irrigation are presented for 1980 and 2015. The report also contains an analysis of the economic impacts resulting from the projected land use changes and expanded agricultural base.

The appendix to this report contains procedures employed in making this study, references, detailed tabular data, and pertinent details of impoundment structures and sample planning units.

RIVER BASIN INVESTIGATIONS

FLORIDA WEST COAST TRIBUTARIES

1. Peace River Study Area
2. Tampa Bay Region Study Area
3. Waccasassa - Withlacoochee - Homosassa Study Area

0 10 20 30 Miles

Figure 1.1

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-126

S E C T I O N II

PRESENT RESOURCES OF THE BASIN

Economic Conditions

Farsighted management of the land and water resources of the Basin is especially important since future development depends greatly upon the positive inducements offered to people and to capital to become a part of a high income economy. The diverse natural resources, people and economic activity of the area provide the basis for substantial economic contributions from agriculture, manufacturing, vacation business, migration of affluent retirees and all the accompanying activities such as trades, services, transportation, construction, and government. Decisions of agriculturalists, manufacturers, vacationers, retirees and others will be strongly influenced by the environment established in the Basin and the amenities and facilities available to them.

The diversity in resources and economic activity are reflected in the statistical picture of the economy, including characteristics and growth of the population, labor force, employment, and levels and sources of personal income.

Population

The population of the Basin in 1960 totaled about 1.22 million persons. Growing rapidly, it had reached an estimated 1.35 million by 1963.

By location, the population was concentrated in the vacation, retirement, trade and manufacturing centers in the Tampa Bay area (Figure 2.1). In 1960, some 35-40 percent of the people lived in the cities of Tampa and St. Petersburg. More than 75 percent lived in three counties, namely, Hillsborough, Pinellas and Polk.

The distribution of beach areas and other factors resulted in different patterns of population distribution. In the counties to the south of the Tampa Bay area, natural beaches are found. Here the population is located mainly along the Gulf Coast with only a limited number of small towns in the interior which is largely agricultural. To the north of the metropolitan area, natural beaches are scarce. Here most of the small cities and towns are located inland in agricultural areas and relatively more people lived in the open country in 1960. East of the Tampa urbanized area, population is moderately dense in central Hillsborough and Polk counties with substantial economic activities in agriculture, mining, manufacturing and trade.

Population Growth

The decade of the 1950's was one of rapid population growth in the Basin (Table 2.1). The ten-year increase amounted to 80-85 percent compared to 40-45 in the previous decade. Relative rates of growth were especially high in the Gulf Coast counties of Sarasota, Pinellas, Charlotte, Manatee, and Pasco (Figure 2.2). However, the larger absolute increases in population continued to occur in metropolitan Pinellas and Hillsborough counties. While population in Florida is estimated to have increased 13.9 percent from 1960 to 1963, three counties in the Basin were above the State average. In Charlotte county, the increase was 49 percent and in Citrus and Sarasota counties 17 percent each. Other counties, although increasing, were below the State average.

Age Distribution

The strong attraction of the Basin as a retirement area is reflected in the age composition of the population. In 1960, the age group 65 years and older made up 16.3 percent of the total population compared with 11.0 percent for all of Florida and 9.1 percent for the United States. (Figure 2.3) The percentage in the age group 55-64 years in the Basin was likewise above the State and National averages in 1960. The median age of population was above the State average of 31.2 years in seven of nine major cities in the Basin and in eight of the counties. Between 1950 and 1960, the median age of population increased substantially in the resort cities and coastal counties but declined or held steady in Hillsborough, Polk, and Hardee counties and in the cities of Tampa, Plant City and Bartow. Low median ages probably are associated with favorable employment opportunities among younger workers.

Labor Force

In 1960, the labor force in the Basin area was nearly 439,000. More than three-fifths was located in the Tampa - St. Petersburg Standard Metropolitan Statistical Area. (Table 2.1) The ratio of non-workers to workers was generally high throughout the Basin area, averaging 1.80 compared to 1.62 in the State. High ratios may have been due to large numbers of young people or to large numbers of elderly people not in the labor force, or to both. Levy, Sumter,

POPULATION BY CENSUS COUNTY DIVISIONS, GENERAL AREA OF FLORIDA WEST COAST TRIBUTARIES BASIN, 1960.

Legend

Each dot represents 5,000 people.

Shaded areas:

St. Petersburg and lower Boca Ciega divisions 203,222 persons.

Tampa, Port Tampa and Temple Terrace divisions 291,208 persons.

Based on U. S. Department of Commerce, Bureau of Census, "Census of Population, 1960". Small census county divisions were grouped in the more densely populated area.

Figure 2.1

TABLE 2.1
SELECTED POPULATION AND EMPLOYMENT STATISTICS
FOR FLORIDA AND SELECTED AREAS IN THE
FLORIDA WEST COAST TRIBUTARIES BASIN

Item	Florida	Florida West Coast Tributaries Area			
		13 Counties	Tampa-St. Petersburg SMSA	Urbanized Areas: Tampa	Urbanized Areas: St. Petersburg
Population (1,000) 1/					
1940	1,897.4	471.6	272.0	N. A.	N. A.
1950	2,771.3	675.4	409.1	114.6	179.3
1960	4,951.6	1,230.0	772.5	324.8	301.8
1963 2/	5,639.9	1,359.7	848.0	N. A.	N. A.
Percentage Increase in Population 1950-63	104	101	107	184 3/	68 3/
1960					
Labor Force, (14 yrs. & older) (1,000)	1,886.8	438.6	275.6	118.9	105.1
Non-worker - worker ratio 4/	1.62	1.80	1.80	1.54	2.09
Percentage employed persons in:					
Manufacturing	13.1	N. A.	15.4	17.8	11.4
White Collar occupations 5/	42.5	N. A.	43.6	42.7	48.5

TABLE 2.1 (Cont'd)

1/ Population and employment estimates are from U.S. Department of Commerce, Bureau of the Census, except as indicated.

2/ Webb, John N. "Provisional Estimates of the Population of Florida Counties, July 1, 1963," Bulletin 3 Population Series Bureau of Economic and Business Research, College of Business Administration, University of Florida, Gainesville, Florida, November, 1963.

3/ Change from 1950 to 1960.

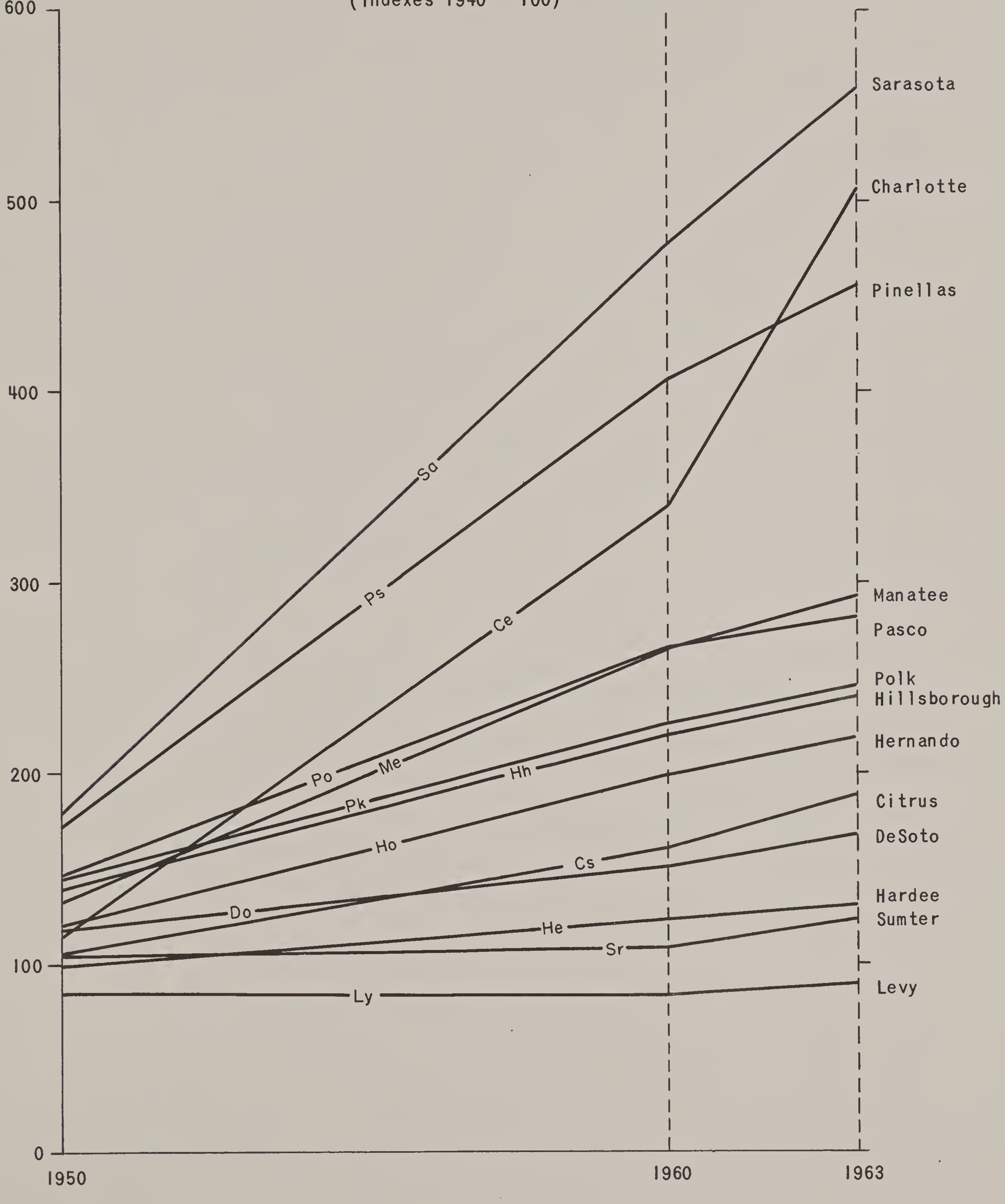
4/ Ratio of persons not in labor force (including children under 14) to labor force.

5/ Professional, managerial (except farm), clerical and sales.

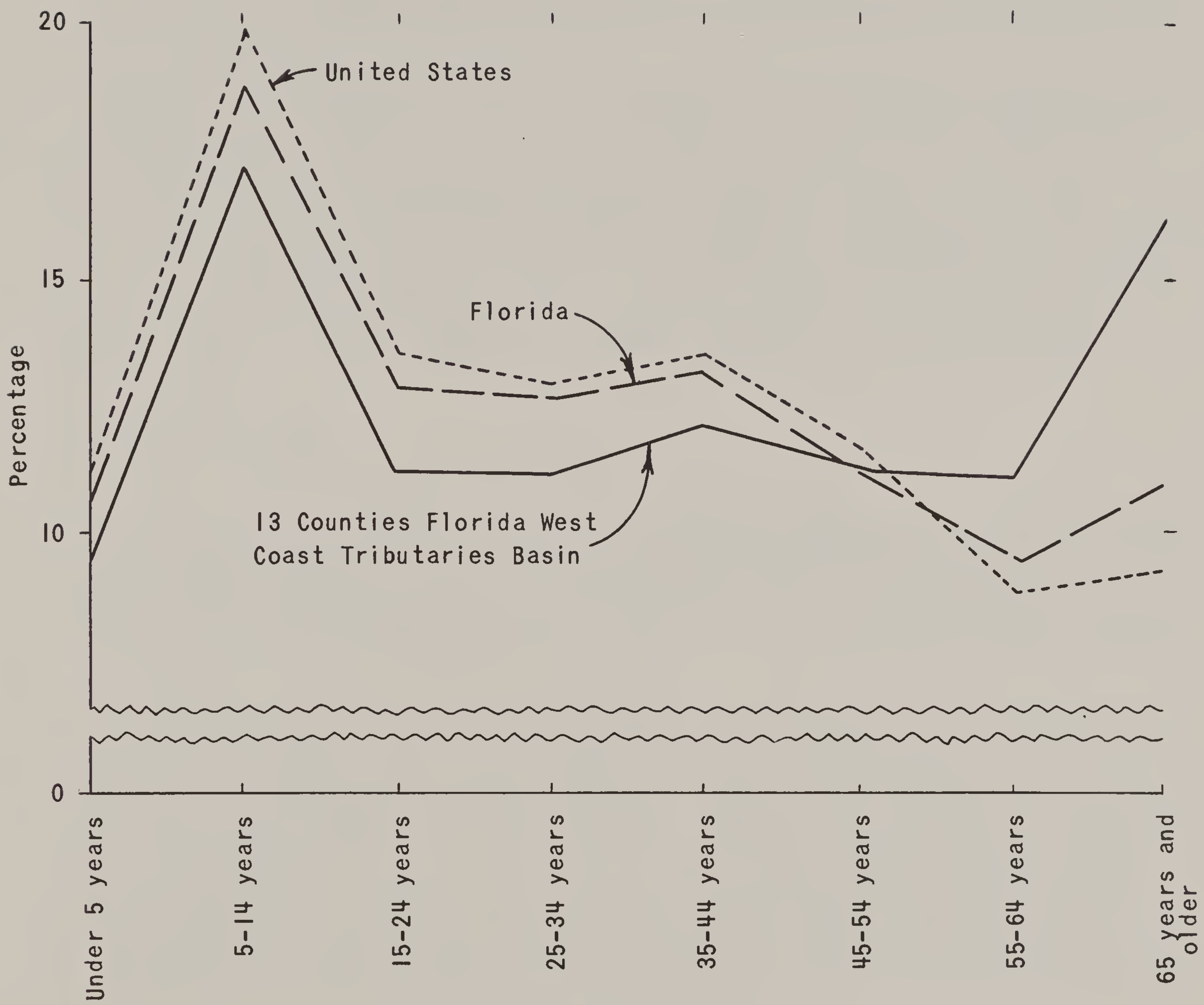
SMSA - Standard Metropolitan Statistical Area

INDEXES OF POPULATION, THIRTEEN COUNTIES LOCATED MAINLY WITHIN THE FLORIDA WEST COAST TRIBUTARIES BASIN, 1950, 1960, AND 1963

(Indexes 1940 = 100)



PERCENTAGE DISTRIBUTION OF POPULATION BY AGE, THIRTEEN COUNTIES LOCATED MAINLY WITHIN FLORIDA WEST COAST TRIBUTARIES BASIN, FLORIDA AND UNITED STATES, 1960



Polk, Hernando, Hardee, and Hillsborough counties ranked high in percentage of population below 14 years of age. Pinellas, Manatee, Charlotte, Pasco, and Sarasota counties ranked high in percentage of population over 64 years of age. Citrus County is slightly above average in ratio of non-workers to workers and proportions of population under 14 years of age and over 64 years of age. The relatively large institutional population in DeSoto County contributes to its above average ratio of non-workers to workers.

Employed Persons in Manufacturing and in White Collar Occupations

Employment in manufacturing was above the 13.1 percent average for Florida in only 3 counties in the Basin area, namely, Hillsborough, Polk, and Pasco. Tampa, Pinellas Park and Plant City were notable local centers of manufacturing employment. Levels in Citrus, Charlotte, Sumter, Hardee, Hernando, and Sarasota counties were far below the State average. Employment in white collar occupations was relatively high in St. Petersburg, Clearwater, Lakeland and Sarasota. It was especially low in Plant City and in Hardee, Sumter, DeSoto, Pasco, Levy and Hernando counties.

Personal Income

Personal income in 1962 has been estimated at more than 2.6 billion dollars or about 23 percent of the total personal income in Florida (Table 2.2). Hillsborough and Pinellas counties account for 64 percent of the total and together with Polk County account for nearly 81 percent.

Median family income was below the State average of 4,722 dollars in 1960, in all 13 counties studied in the Basin area. Among the cities and towns, Bartow, Clearwater, Lakeland, and Sarasota were above State averages. Income in adjoining suburban areas averaged higher than those in the city area of Tampa and St. Petersburg. The proportion of families with incomes below 3,000 dollars in 1960 was equal to or below the State average of 28.4 percent, in Sarasota and Hillsborough counties and in Bartow, Clearwater, Lakeland, Sarasota and Tampa.

Personal income increased more than 50 percent in the three-year period 1956 through 1958 followed by an increase of 19 percent in the three-year period 1959-62.

During the period 1958-62, about 65 percent of personal income was classified as non-agricultural production income, 6 percent as agricultural production income and 29 percent as other personal income (rent, dividends, interest, transfer payments, and military pay). The proportion of income from these "other" sources increased slightly during the period 1958-62. (Figure 2.4)

TABLE 2.2
ESTIMATED PERSONAL INCOME FOR FLORIDA AND FOR SELECTED AREAS, CITIES, TOWNS AND COUNTIES IN FLORIDA - 1962

Place	Personal Income: Total (Mil. Dol.)	Personal Income: Distribution (Percent)	Income of Families: Median (Dollars)	Income of Families: With income below $3,000 (Percent)
Florida	11,158	-	4,722	28.4
Florida West Coast Tributaries Basin:				
Tampa-St. Petersburg SMSA	1,680	64.5	4,490	30.0
Urbanized area:				
Tampa	700	26.9	4,749	27.3
St. Petersburg	700	26.9	4,332	31.7
13 - Counties	2,605	100.0	N.A.	N.A.

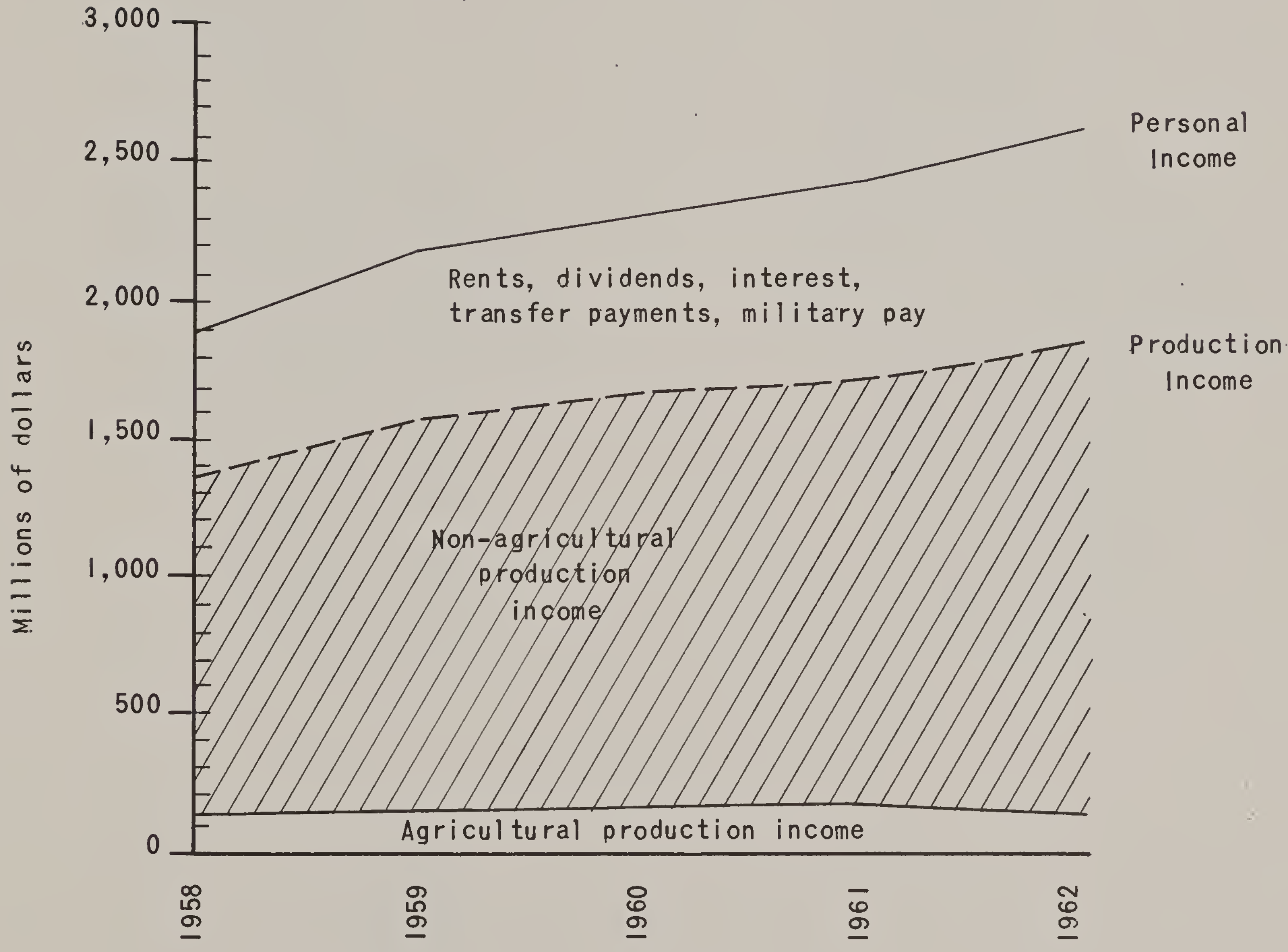
State and county data are from the Bureau of Economic and Business Research, University of Florida. Allocations to SMSA, urbanized areas and cities and towns are based on income distribution shown in the U.S. Department of Commerce, Bureau of the Census, Census of Population, 1960 modified on the basis of trends in income by counties from 1959 to 1962

SMSA - Standard Metropolitan Statistical Area.

Personal income from production in agriculture in 1962 was an estimated 133 million dollars. Polk County had nearly 40 percent of the total and Hillsborough County had 23 percent. The other counties ranged from 0.8 percent in Citrus County to 7.5 percent in Pasco County.

Production income from agriculture in 1962 ranged from about one million dollars in Citrus County to 53 million dollars in Polk County. It ranged from a low of 0.7 percent of all personal income in Pinellas county to 38.8 percent of all personal income in Hardee County. It exceeded ten percent of all personal income in 7 out of 13 counties.

PERSONAL INCOME BY MAJOR GROUPS OF SOURCES, THIRTEEN COUNTIES LOCATED MAINLY IN FLORIDA WEST COAST TRIBUTARIES BASIN, 1958-62



(BASED ON DATE OF BUREAU OF ECONOMIC AND BUSINESS RESEARCH, UNIVERSITY OF FLORIDA)

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-206

Figure 2.4

Agricultural production income of county as percentage of 13 county total

Agricultural production income in county as percentage of total personal income of county

Legend - Percent

30.0 - 39.9

20.0 - 29.9

10.0 - 19.9

0.0 - 9.9

AGRICULTURAL PRODUCTION INCOME - DISTRIBUTION AND RELATIVE IMPORTANCE BY COUNTIES, 13 COUNTIES IN FLORIDA WEST COAST TRIBUTARIES BASIN.

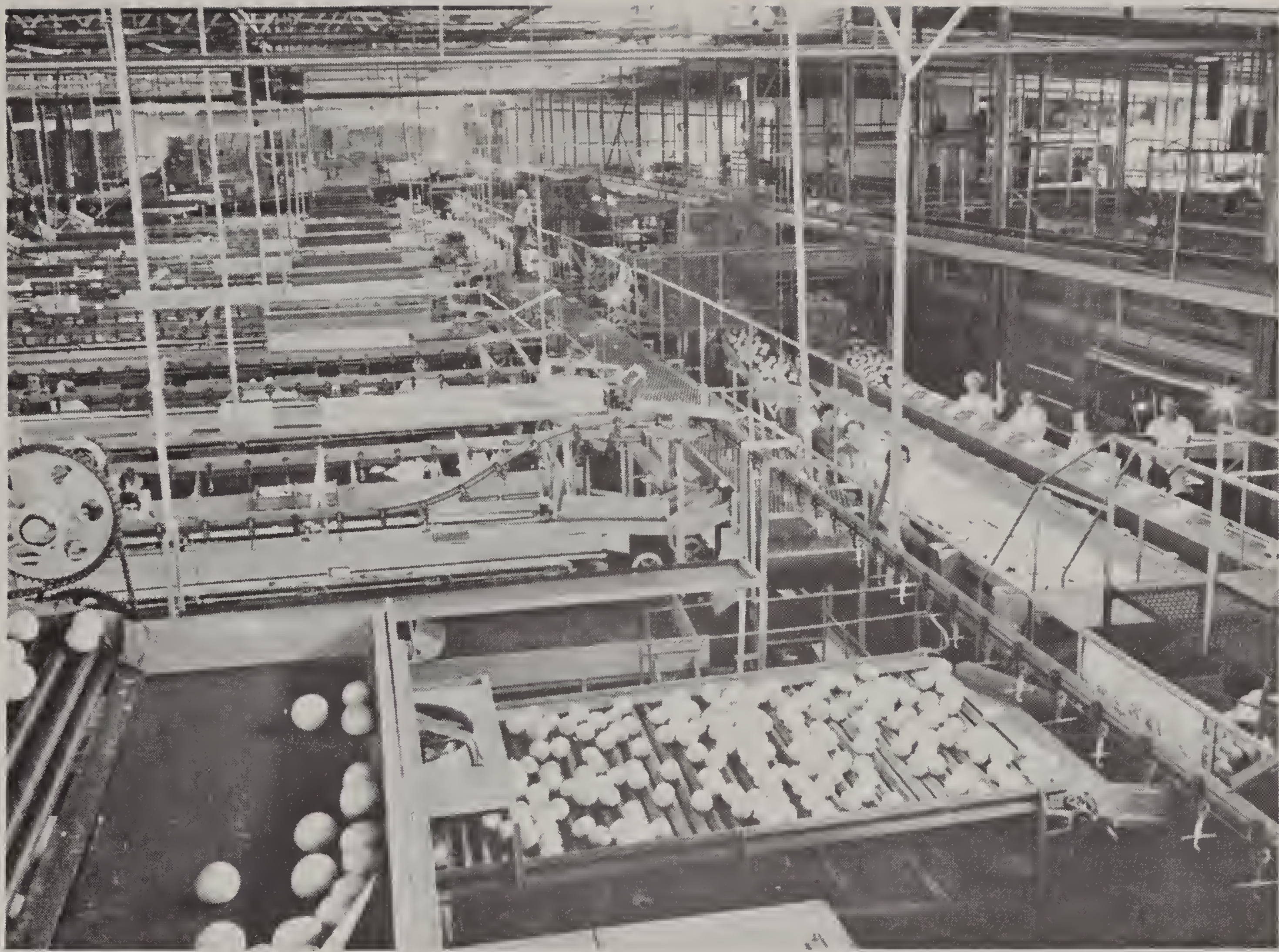


Figure 2.6 Agribusiness Adds To The Basin's Economy

Value of agricultural production at farm prices in Florida was nearly 1.5 times the personal income from agricultural production in 1962. Applied to the Basin area, cash farm receipts from marketings and government payments of more than 200 million dollars are indicated for 1962.

Agriculture, manufacturing, the vacation business and migration of affluent retirees, the major segments of the Florida economy, are sustained by natural endowments of land, water and climate and by the efforts of the populace. Economic growth occurs in the face of acknowledged limitations such as low soil fertility, absence of iron and coal deposits and distance to markets. Under these conditions there is need to give careful attention to the proper development of all resources, agricultural and non-agricultural, in order to augment income, maintain diversity and enhance the attractiveness of the Basin area as a place to live and work.

Climate and Rainfall

The climate of the Basin varies from temperate in the northern part to sub-tropical in the central and southern parts with the 25 degree average annual minimum temperature line being the approximate divide between the two temperature zones. The northern portion of the Basin is subject to considerably lower temperatures than is the southern part. The temperature during the summer months tends to be rather uniform from north to south over the Basin with the areas along the coast having less extreme heat due to the moderating effect of the Gulf of Mexico. The average annual temperature is 72.6 degrees, based on fifteen stations located throughout the Basin with at least thirty years of record each. January is the coldest month with an average temperature of 61.9 degrees, and August is the hottest with an average temperature of 82.0 degrees. The highest recorded temperature in the Basin is 105 degrees at Bushnell and the lowest recorded temperature is 14 degrees, also at Bushnell. There probably have been lower temperatures in the northern part of the Basin but reliable records are not available in this area. The lowest temperature recorded at Ocala, which is just outside the Basin is 11 degrees.

The average annual rainfall for selected stations varies from 51 to 58 inches with the average over the Basin being about 54 inches. Approximately sixty percent of the mean annual rainfall occurs during June, July, August, and September. Bradenton has the lowest recorded annual rainfall amount, with 29.45 inches, and Bradenton Experiment Station has the highest with a recorded 92.28 inches.

Rainfall during the summer months is usually from thunderstorms while winter rains are normally associated with frontal activity. The Basin area has the highest incidence of thunderstorms of any place in the United States with 100 or more thunderstorms occurring in the Tampa Bay area in an average year.

On the average, Florida experiences approximately one storm of hurricane intensity per year, however, over a given period of time many of the years may pass without a storm of hurricane intensity. The Basin area has had twelve hurricanes since 1900, an average of approximately one every five years. Of those twelve storms, seven have entered from the Gulf, and five have crossed the State from the southeast. The chances are one in twenty that winds of hurricane force will hit the Tampa-St. Petersburg area in any given year.[1/]

[1/] Climates of the States - Florida, November, 1962, U.S. Weather Bureau.

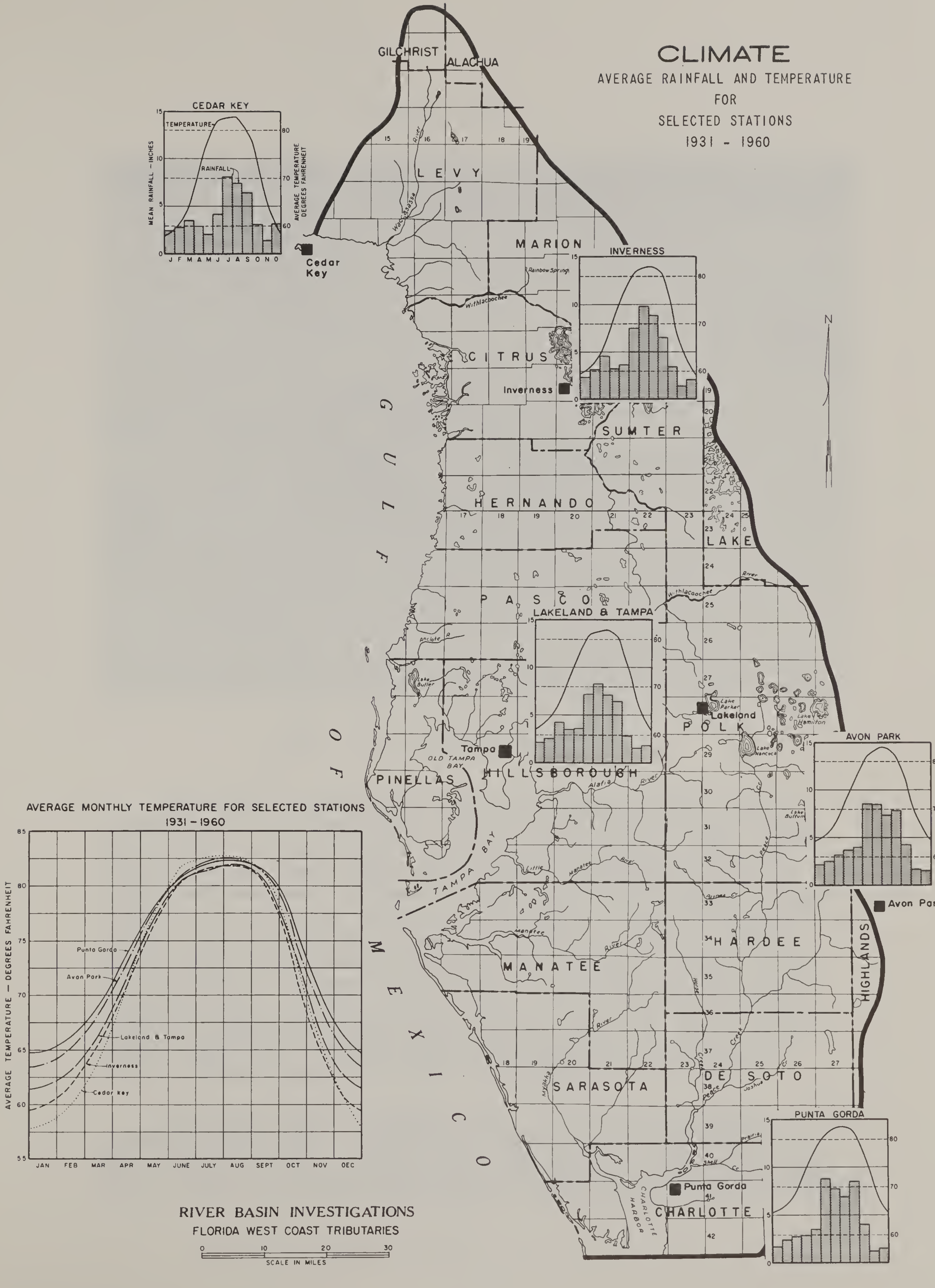
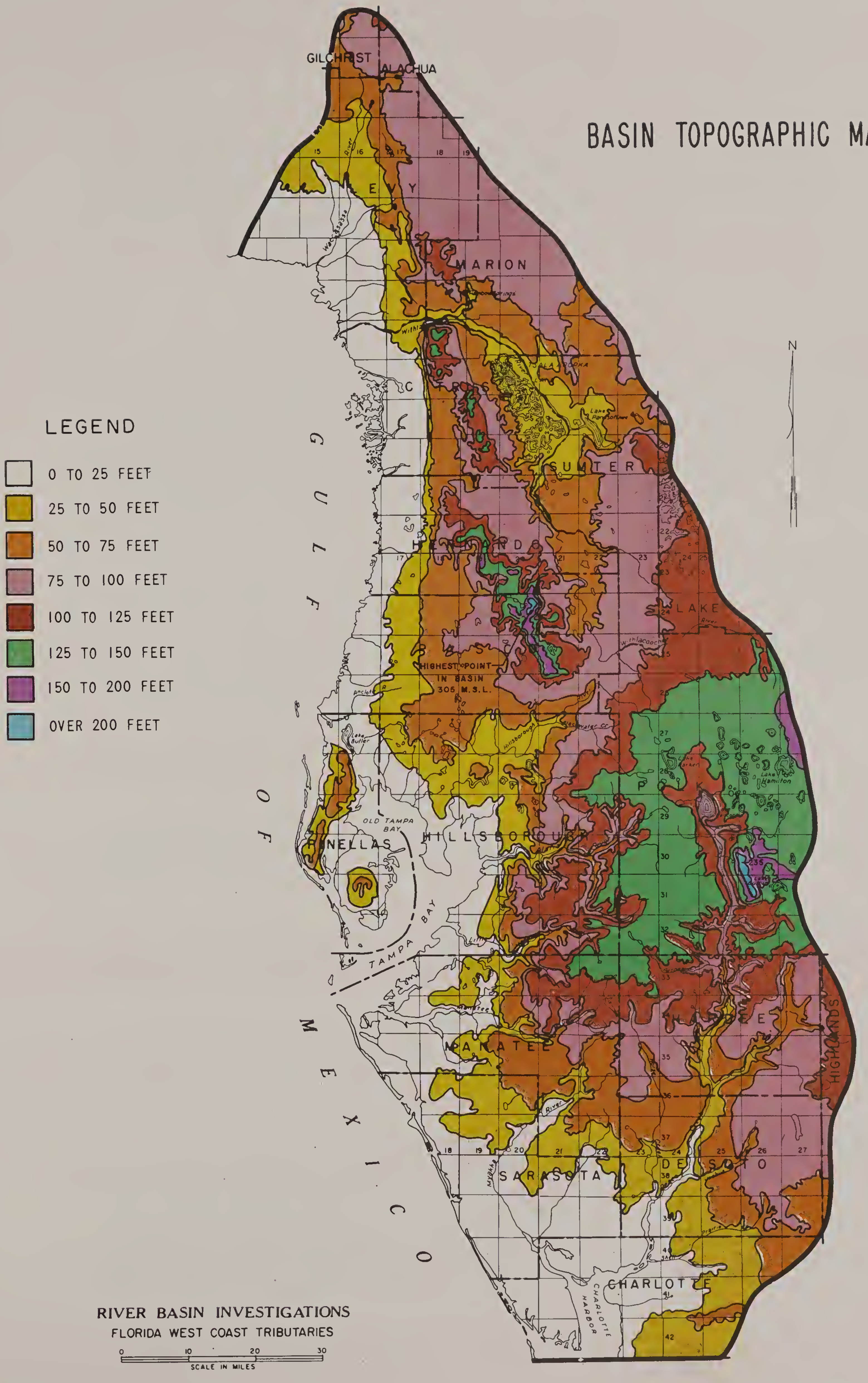

CLIMATE
AVERAGE RAINFALL AND TEMPERATURE
FOR
SELECTED STATIONS
1931 - 1960
CEDAR KEY
TEMPERATURE
RAINFALL
MEAN RAINFALL - INCHES
AVERAGE TEMPERATURE DEGREES FAHRENHEIT
J F M A M J J A S O N D
INVERNESS
LAKELAND & TAMPA
AVON PARK
PUNTA GORDA
AVERAGE MONTHLY TEMPERATURE FOR SELECTED STATIONS
1931 - 1960
AVERAGE TEMPERATURE - DEGREES FAHRENHEIT
Punta Gorda
Avon Park
Lakeland & Tampa
Inverness
Cedar Key
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
GILCHRIST
ALACHUA
LEVY
MARION
CITRUS
SUMTER
HERNANDO
LAKE
PASCO
PINELLAS
HILLSBOROUGH
POLK
MANATEE
HARDEE
HIGHLANDS
SARASOTA
DE SOTO
CHARLOTTE
Cedar Key
Inverness
Tampa
Lakeland
Avon Park
Punta Gorda
Withlacoochee
Rainbow Springs
Anclote R.
Lake Butler
OLD TAMPA BAY
TAMPA BAY
Alafia
Little Manatee River
Manatee River
Myakka River
Peace Creek
Lake Parker
Lake Hamilton
Lake Hancock
Lake Buffum
CHARLOTTE HARBOR
Shell Cr.
GULF OF MEXICO
N
RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES
SCALE IN MILES

Figure 2.8 Land and Water

The Basin is made up of low, nearly level plains; gently undulating to rolling areas; numerous intermittent ponds, swamps and marshes; and many lakes and perennial streams. Elevations range from sea level along the coast to approximately 300 feet above mean sea level northwest of Blanton in Pasco County (Figure 2.9). Some areas are characterized by many ridges and depressions without any well defined systems of surface streams or outlets. One of these areas, about 271,000 acres in size, in the vicinity of Brooksville, extends into portions of Citrus, Hernando, and Pasco counties. Another area of more than 400,000 acres extends south and southeast from Alachua County into Levy, Marion, and Sumter counties. The above described areas are indicated on Figure 2.28 as "Areas of Little or No Runoff."

The total area of land and water in the Basin amounts to 10,080 square miles. In 1963, the land area accounted for 6,016, 800 acres with water occupying 430,100 acres. Of the total land area in 1963, 5,373,400 acres were in agricultural uses, and 643,400

BASIN TOPOGRAPHIC MAP



RIVER BASIN INVESTIGATIONS

FLORIDA WEST COAST TRIBUTARIES

0 10 20 30
SCALE IN MILES

USDA-SCS-SPARTANBURG, S. C. 1965

MR65

Figure 2.9

acres were utilized for non-agricultural purposes. The water area included 186,800 acres of fresh water, and 243,300 acres of salt water in bays and inlets and considered as part of the overall county acreages. (Figure 2.10)

Land

Based on primary uses, the land resources of the basin were divided into two major categories - agricultural and non-agricultural. In 1963, which is considered "present" for purposes of this report, the non-agricultural area amounted to 643,400 acres with primary uses being urban, industrial, commercial, highway and railroad rights-of-way, airports, golf courses, and other miscellaneous non-agricultural purposes.

The agricultural land area comprises approximately 5,373,400 acres with primary uses being for citrus, vegetables, field crops, improved pasture, rangeland, woodland and miscellaneous agricultural uses such as farm steads, farm roads, wildlife areas, etc. These uses, both present and projected future, and the physical limitations of the agricultural land area are discussed in more detail in succeeding sections of this report.

Geology and Soils

Geologic formations occurring at or near the surface, in the study area, represent the Eocene, Oligocene, Miocene, and Pliocene epochs of the Tertiary period, and the Pleistocene and Recent epochs of the Quartenary period.

These geologic time frames represent all but the Paleocene Epoch of the Cenozoic Era. The calendar age of this era has been estimated as being about fifty million years.

Although fifty million years is a relatively short span of time in geologic history, surface soils derived from parent material differing in age by several million years might be expected to have quite different qualities or characteristics.

Of considerable significance are events occurring during the Pleistocene Epoch, known as "The Great Ice Age." During this time, sea levels fluctuated in such a manner that a number of marine terraces were formed. This oscillation of sea level was caused by alternate withdrawal and return to the sea of great quantities of water that, in frozen form, composed the great ice caps that occupied the upper latitudes.

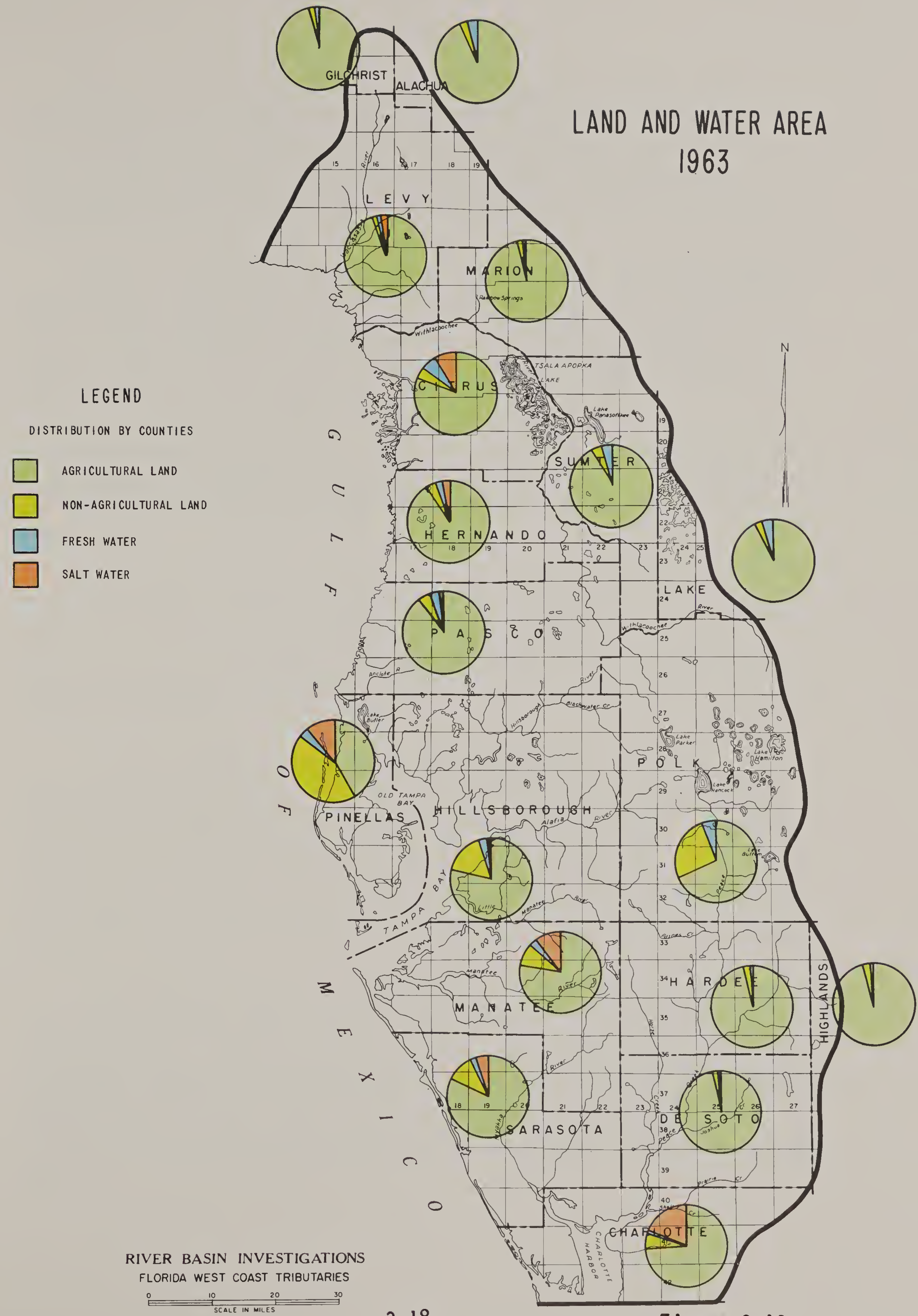


Figure 2.10

USDA-SCS-SPARTANBURG S. C. 1965

MR65-90

Remmants of several of these old marine terraces have been identified in the study area and their presence complicates the classification and interpretation of soils. Some soil material was laid down during the times when sea levels were rising while some was deposited when the seas were receding. Horizonation, important in soil classification, may be geologic or may be a result of soil forming processes.

The final recession of the seas, to approximately their present levels, marked the end of the Pleistocene Epoch and the beginning of the Recent Epoch, which extends to the present time. During the late Pleistocene and the Recent Epochs, the general drainage patterns were forming. Soil erosion by wind and water, coupled with the formation of lakes and depressions in the surface, gave rise to the present pattern of topography.

While these changes were taking place certain characteristics were imparted to the surface mantle that determine to some degree the kind and pattern of occurrence of land resources in the study area.

Soil conditions in the Basin are relatively complex. Detailed classification involves a large number of soil series and a greater number of soil types and phases regularly considered in soil mapping. They vary widely in characteristics and qualities and in their capabilities or limitations for specific uses. All extensive land use and management programs must deal in some way with this diversity of soil conditions.

A large acreage in the Basin has been mapped in detail. Modern standard surveys cover all of Hillsborough and Sarasota counties and significant areas in other counties throughout the Basin. Standard surveys in Marion County are currently in progress and lower intensity surveys are available for Highlands, Manatee, and Pinellas counties and cover extensive areas elsewhere. Detailed surveys of individual farms and sample plots, specifically selected for expansion of soils data, are common in each county and provide a basis for extension of facts based on documented soils information.

From these extensive investigations, it has been established that the available land resources are adequate to support an expanding population and land use program. Many of the natural limitations, restrictions or hazards to desired use can be corrected or overcome by proper treatment and management. This makes possible a comparatively wide range of uses. Significant differences in character and quality, however, make it necessary to discriminate among the many soils available in planning programs that are expected to result in optimum use.

For the purposes of this Basin investigation, it has not been considered practicable to handle the complex soil conditions in detail and base results on a variety of interpretive groupings designed for determining specific kinds of use. Instead, it has been necessary to rely on a more general organization of soils into resource areas and yet use the land capability classification of detailed soil units as the single kind of interpretation on the basis of existing surveys and supplemental field study. It has been possible to obtain reliable information on identity of detailed soils in the land resource areas and establish capability classification. Conclusions based on land quality are drawn from this interpretation.

For simplification, the complex soil conditions in the Basin can be grouped or organized into a number of meaningful systems. For individual counties or small watersheds, which were considered here, the most useful groupings are soil associations.

Soil associations are broad-area generalizations usually covering several thousand acres. They often include several quite different kinds of soil that occur in close geographical association. These variations make it necessary to rely on existing soil surveys, expanded sample survey data and supplemental field studies to determine the kind and proportionate extent of component soils, and to establish land facts adequate for the proper evaluation of the resources of the study area. This procedure assures a high degree of reliability in broad scale interpretation for various uses, although it obviously places a limit on reliability at any specific point.

The procedure outlined above formed the basis for determining the kind and extent of important soils, and identifying the land capability classes and sub-classes involved. Capability groupings reflect the potentialities and limitations of the soils and the risk of excessive damage or deterioration when they are used for continuing agricultural production. The capability classes and sub-classes are defined below.

Class I - Soils in class I have few limitations that restrict their use.

Class II - Soils in class II have some limitations that reduce the choice of plants or require moderate conservation practices.

Class III - Soils in class III have severe limitations that reduce the choice of plants or require special conservation practices, or both.

Class IV - Soils in class IV have very severe limitations that restrict the choice of plants and require very careful management.

Class V - Soils in class V have little or no erosion hazard but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover.

Class VI - Soils in class VI have severe limitations that make them generally unsuited for cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.

Class VII - Soils in class VII have very severe limitations that make them unsuited for cultivation and that restrict their use largely to grazing, woodland, or wildlife.

Class VIII - Soils and land forms in class VIII have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, water supply, or aesthetic purposes.

Subclasses are groups of capability units within classes that have the same kinds of dominant limitations for agricultural use. Some soils are subject to erosion if they are not protected, while others are naturally wet and must be drained if crops are to be grown. Some soils are shallow or droughty, or have other soil deficiencies. The three kinds of limitations recognized at the subclass level are: risks of erosion, designated by the symbol (e); wetness, drainage, or overflow (w); and root-zone limitations (s).

Subclass (e) erosion is made up of soils where the susceptibility to erosion is the dominant problem or hazard in their use. Erosion susceptibility and past erosion damage are the major soil factors for placing soils in this subclass.

Subclass (w) excess water is made up of soils where excess water is the dominant hazard or limitation in their use. Poor soil drainage, wetness, high water table, and overflow are the criteria for determining which soils belong in this subclass.

Subclass (s) soil limitations in the root zone is made up of soils where root-zone limitations are the dominant hazard or limitation in their use. These limitations are the results of such factors as shallow soils, stoniness, low mositure-holding capacity, or low fertility difficult to correct.

The capability grouping of the soils with the dominant limitations or hazards fairly well established makes possible a broad generalization in the interpretation of the potentialities, and treatment needs of the land resources of the Basin. Many of the natural limitations or hazards can readily be corrected or overcome by proper treatment and management.

The extent of capability classes in the Basin is shown on Figure 2.11 with the distribution by counties on Figure 2.12.

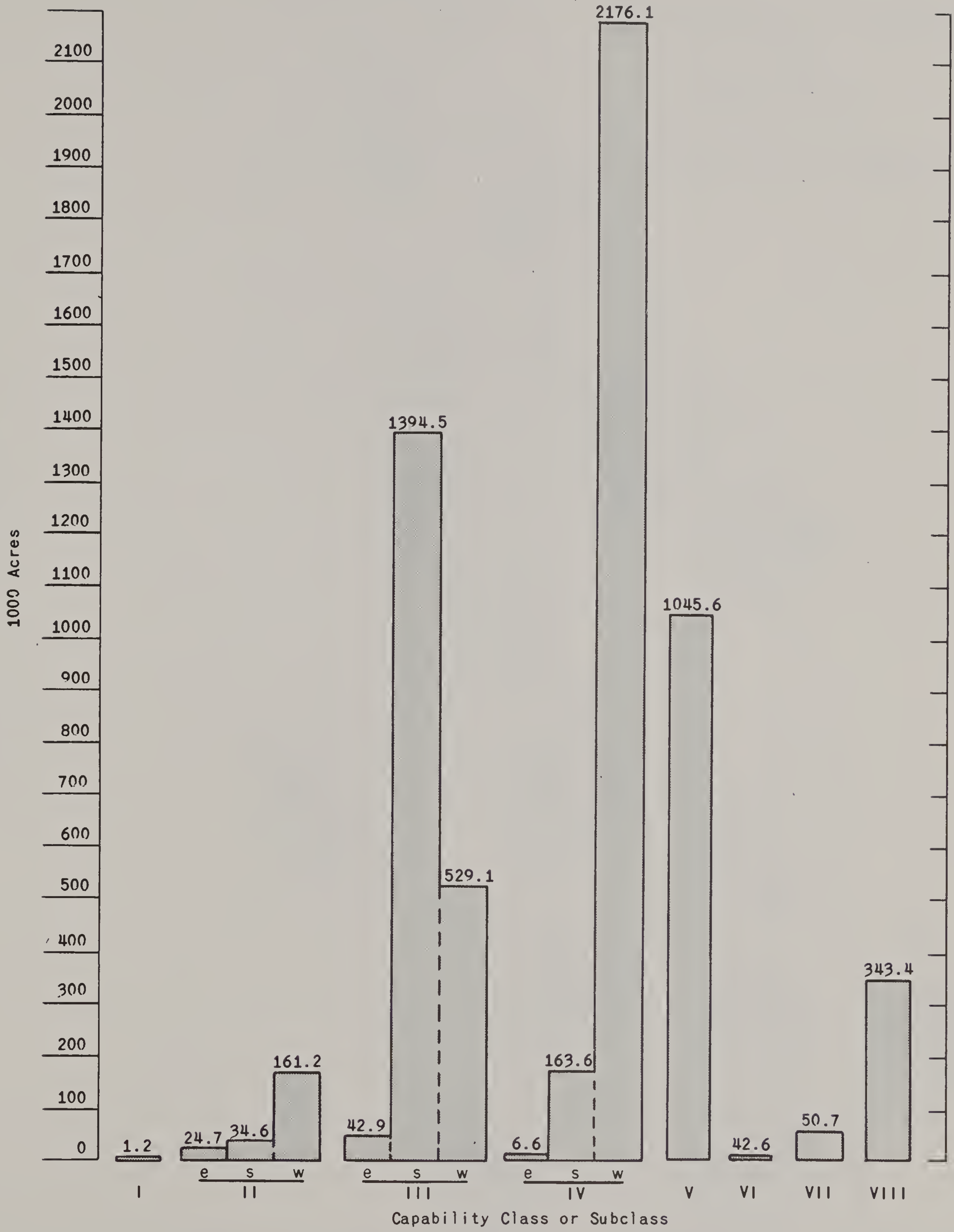
Agricultural Situation and Trends

Major Uses of Agricultural Land - 1963

The Basin makes a vital contribution to Florida's production of agricultural commodities - especially citrus, beef, and vegetables. There are six major vegetable producing areas located wholly or partially within the Basin, producing a variety of vegetables including tomatoes, cucumbers, peppers, potatoes, celery, snap beans, lima beans, sweet corn, green leafy vegetables, melons, and strawberries. The area devoted to vegetable production is 48,600 acres. Over 40 percent, or 313,200 acres of Florida's citrus is currently produced within the Basin - primarily in the counties located south of Hernando County. Production of general field crops such as corn and peanuts is limited mainly to the counties at the extreme northern end of the Basin. Considerable acreages are utilized throughout the Basin for the production of hay, seed, and temporary grazing crops. This acreage, including general field crops amounts to 107,900 acres.

Most counties in the Basin have large areas of improved pasture for beef production with smaller areas devoted to dairying, or horse pastures on farms whose main enterprises are the breeding of purebred race horses. Total improved pasture is estimated at 754,100 acres. Native range is a major land use in the counties in the lower half of the Basin. Basin wide, it occupies 1,515,700 acres.

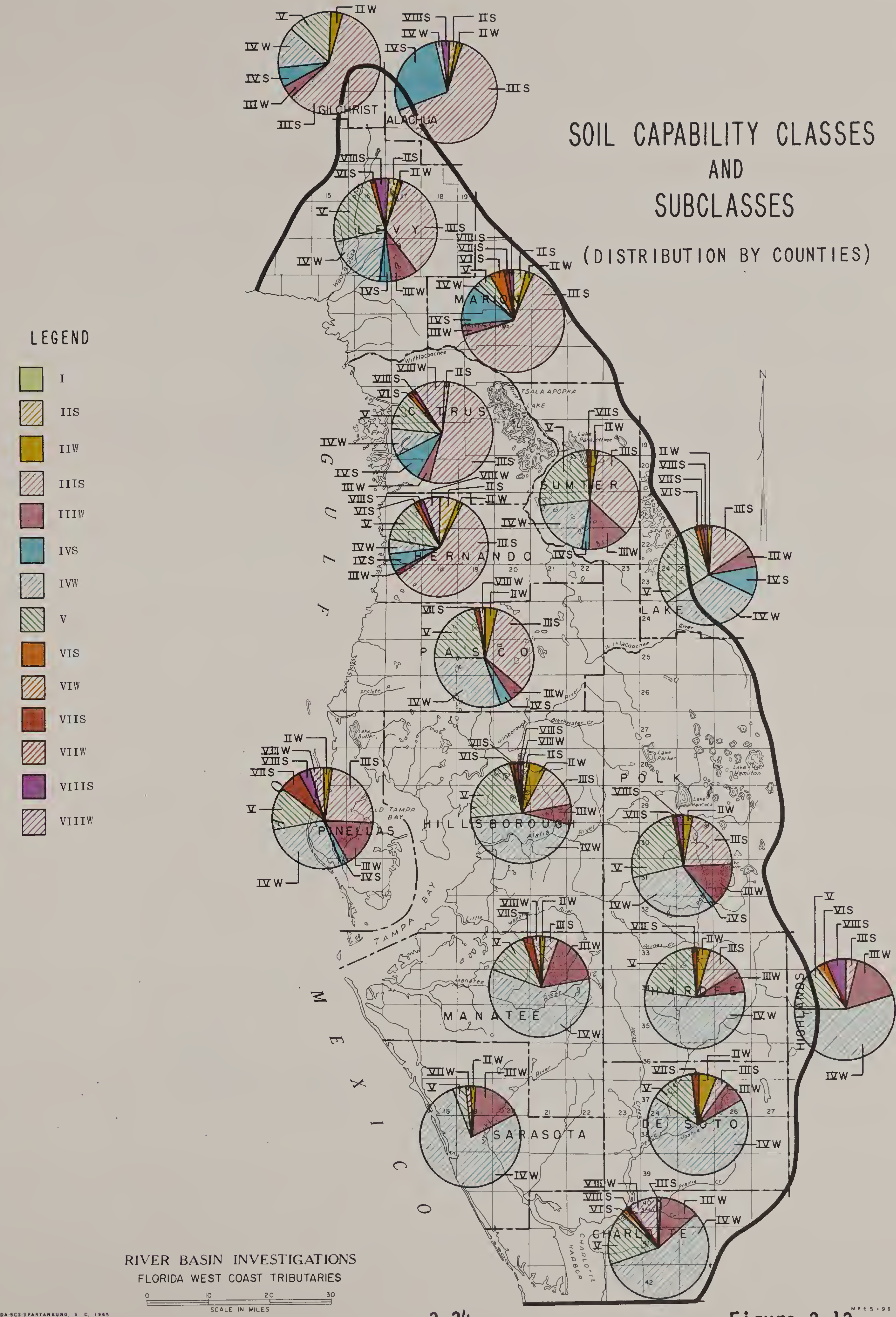
TOTAL LAND AREA BY CAPABILITY CLASSES
(Basin Total)



USDA-SCS-SPARTANBURG, S. C. 1965

MR65-190 REV.

Figure 2.11

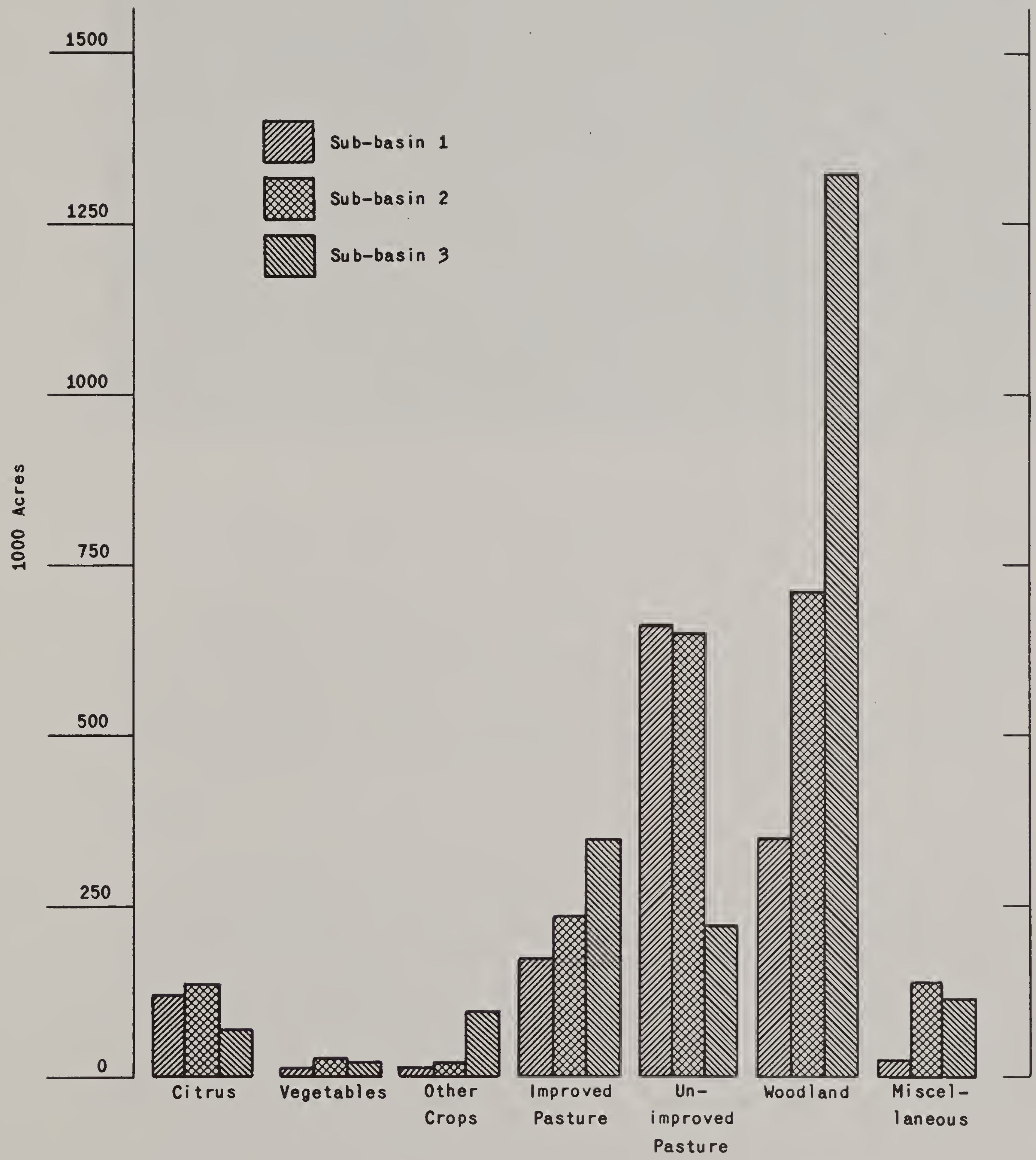


USDA-SCS-SPARTANBURG, S. C. 1965

M R 65-96

Figure 2.12

AGRICULTURAL LAND USE - 1963
(Acres)



USDA-SCS-SPARTANBURG, S. C. 1965

MR65-191 REV.

Figure 2.13

Figure 2.14 Improved Grass-Clover Pasture

Woodland, including non-commercial types, comprises slightly over one-third of the total land area of the Basin, or 2,382,200 acres; however, the majority of the commercial timber is located north of Manatee County. Much of the woodland in the southern portion of the Basin is cut-over pine land, poorly stocked, and utilized more for grazing than for timber production.

Citrus

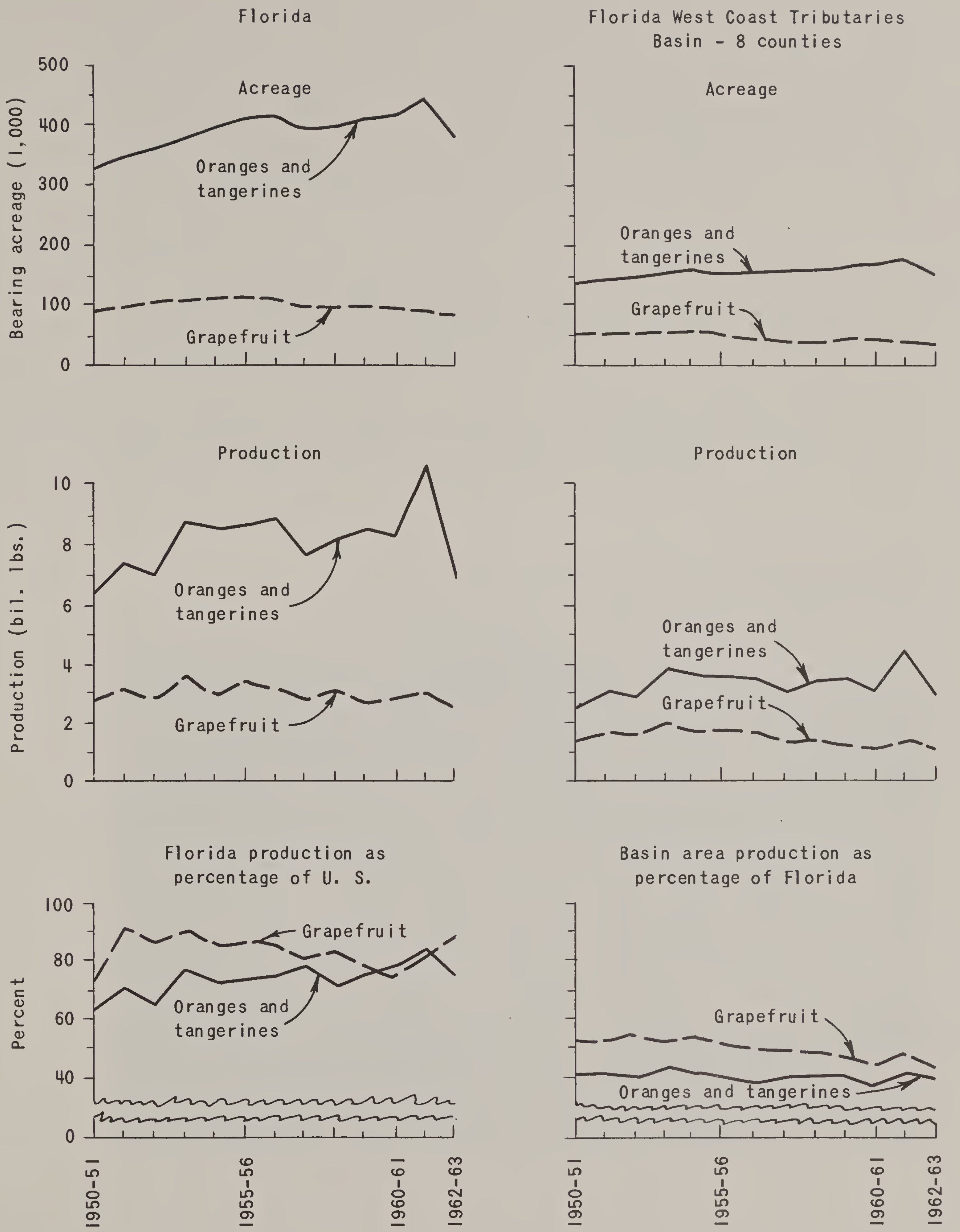
The production of citrus in Florida and in the United States in recent times has been greatly affected by freezes which have reduced yields and substantially reduced bearing acreages in certain areas in certain years. Population and per capita disposable income have increased steadily and sustained the demand for citrus and citrus products while supply has fluctuated sharply. U. S. per capita production of oranges has been fairly well maintained while production of grapefruit has had a downward trend. Consumption of oranges as frozen concentrate has increased while usage of fresh

Figure 2.15 Young Bearing Citrus Grove

fruit has declined. Total usage of grapefruit has declined mainly through decreased use of canned and blended juices.

Bearing acreages and production of oranges in Florida increased fairly steadily during the early 1950's (Figure 2.16). During the period 1955-56 through 1962-63, the bearing acreage of oranges and tangerines averaged more than 406,000 acres and that of grapefruit nearly 98,000 acres. During this period, Florida produced nearly 77 percent of all U. S. oranges and tangerines and nearly 83 percent of all grapefruit. Florida's share of U. S. production of oranges and tangerines increased during the period 1950-51 through 1962-63 while her share of U. S. grapefruit production declined somewhat. In Florida, recent price-cost relationships have favored orange production as compared to grapefruit production and favored seedless grapefruit as compared to seedy types.

The Florida West Coast Tributaries Basin, as represented by data for eight counties, did not quite maintain its relative position in the State as a production area for citrus during the period 1950-51 through 1961-62 (Figure 2.16). There are some 3,500 grove



TRENDS IN CITRUS BEARING ACREAGE, PRODUCTION AND SHARE OF PRODUCTION, FLORIDA AND FLORIDA WEST COAST TRIBUTARIES BASIN, 1950-51 THROUGH 1962-63

units in the Basin including large commercial units as well as small commerical, part-time and residential farms. These citrus farms currently sell fruit valued at some 100-110 million dollars per year and make cash expenditures of 50-60 million dollars. Expenditures include some 18 million dollars for hired labor, 18 million dollars for fertilizer and 9 million dollars for machine hire. Grovelands in the Basin represent a capital value for land and buildings of some 700-750 million dollars.

Vegetables

From 1950 to 1962, U.S. per capita civilian consumption of all vegetables, watermelons and potatoes held between 318 and 331 pounds. Increases in the consumption of canned and frozen vegetables offset a decline in consumption of potatoes and fresh vegetables.

Vegetable production is one of the major industries in the agriculture of Florida. Production has been principally for the fresh market with processing substantially limited to the role of salvaging the portion of the crop not required by the fresh market.

Figure 2.17 Vegetable Crop

During the period 1958-61, Florida contributed 13 percent, by volume, of the vegetables (not including potatoes) produced in the United States for the fresh market, and less than one percent of that produced for processing.

The seasons of the year in which Florida produces its principal vegetable crops run mainly from late fall to early spring. For some crops in some seasons, Florida is the only domestic producer.

During the period 1951-62, premium unit prices generally prevailed for production for the fresh market as compared to production for processing, for production for the fresh market in the Florida seasons as compared to other seasons of the year, and for production in Florida as compared to other seasonally competitive areas.

Florida's share of domestic production varied greatly between crops and from year to year during the period 1950-62. Downward trends are indicated during 1950-62 for lima beans and cabbage. Upward trends are indicated for sweet corn, tomatoes and watermelons. Snap beans, cucumbers, celery, and peppers maintained, more or less, their respective shares of the national market.

Reports of vegetable production by general areas of the State permit an approximation of the trends in acreage devoted to vegetables in the Florida West Coast portion of the State. This portion of the State has been an especially important contributor to the production of lima beans, cucumbers, green peppers, tomatoes and watermelons. Snap beans, cabbage, celery, and corn are produced in smaller shares relative to total Florida production. In recent years, the area has failed to maintain its former share of the total acreage of sweet corn, cucumbers, green peppers, celery and tomatoes.

More than a third of all farms producing vegetables for sale in 1959 in Florida were specialized vegetable farms. These vegetable farms accounted for 95 percent of the value of all vegetables sold that year. Sales per vegetable farm averaged more than 45,000 dollars compared with less than 1,400 dollars for the other farms selling vegetables. However, the vegetable farms include a small number of large, specialized commercial farms and a large number of small units.

In the Basin, nearly 1,400 farms sold vegetables in 1959, with nearly 26 acres of vegetables harvested per farm and per farm sales of less than 7,000 dollars. A large number of farms not highly specialized in vegetable production was included especially in Hillsborough, Sumter, Levy and Polk counties. Not more than half of the farms were classified as "vegetable farms," and many of these were small in size.

With some 48,000 acres of vegetables in 1963, vegetable sales in the Basin area amounted to some 22 million dollars. Cash expenditures of approximately 20 million dollars per year including nearly 10 million dollars for hired labor and more than 5 million dollars for fertilizers are indicated. At 400 dollars per acre, the value of land and buildings used in vegetable production amounts to nearly 20 million dollars.

Field Crops and Miscellaneous Crops

Field crops grown in the Basin include corn, peanuts, seed crops, sweet potatoes, velvet beans, wheat, oats, and hay.

Pecan and tung nuts are produced in small quantities in the upper part of the Basin. Farther south, strawberries, avocados, and other minor fruits are grown. Among these, only strawberries have been a major source of revenue. In the past, strawberries have been a major crop in the Plant City area, but, in recent times, production has moved to the Lower East Coast.

The farm value of field and miscellaneous crops in the Basin in 1963, is estimated at 6 million dollars. Perhaps two-thirds of this production is marketed through livestock. This includes the value of corn, oats, hay, wheat not harvested for grain, peanuts not picked and threshed and the grazing provided by sizable areas of cropland not in citrus or vegetable production.

Livestock and Livestock Products

Cash receipts from marketings of livestock and livestock products in Florida in 1962, amounted to about 209 million dollars. Beef production in Florida depends mainly upon local production of feedstuffs. In much of Central and South Florida, the principal feed now available is grass and in some areas, mixed grass and clover pastures. Locally produced citrus pulp and molasses have been available for purchase as concentrate feeds.

In recent years, there has been substantial improvement in the land, forage crops and herds which comprise the Florida cattle industry. These changes are reflected in trends in Florida's share of the total industry in the United States.

There were some 1,500 commercial livestock ranches in Florida in 1959. Ranches averaged 4,000-5,000 acres in size, and sold nearly 30,000 dollars in products per ranch. Those in Economic Class I averaged more than 20,000 acres in size and had sales in

Figure 2.18 Beef Cattle

excess of 160,000 dollars. Purchase of livestock, feed, labor, and fertilizer were among the important cash expenses on the livestock ranches.

There were some 500 livestock ranches in the Basin area in 1959. In addition, there were nearly 1,000 general livestock farms, many of which sold cattle and calves, and more than 2,000 farms other than livestock farms selling small numbers of cattle and calves.

Dairy Farms - Data for 1959 indicate that there were about 280 farms selling milk or cream and located in the Basin area. Two hundred fifty of these were classified as commercial dairy farms. Of these, 214 were located in four counties, namely, Hillsborough, Polk, Manatee, and Pasco. Dairy farms averaged nearly one section of land in size, sold dairy products valued at 60,000-65,000 dollars and incurred heavy expenses for feed, hired labor, and the purchase of livestock.

Poultry Farms - Commercial market egg poultry farms dominate the poultry industry in the Basin. Broiler production is concentrated mainly to the north and outside of the Basin.

Farm business records of 23 poultry farms in the Basin area obtained by the Florida Agricultural Extension Service in 1960 revealed averages as follows: Capital 32,000 dollars, receipts 52,000 dollars, and cash expenses 31,000 dollars including feed costs of 23,000 dollars. Farms varied greatly in size of operations.

There were 600-700 commercial poultry farms in the Basin in 1959 along with 400-500 other farms selling some poultry or poultry products. More than 500 of the commercial poultry farms were located in four counties, namely, Hillsborough, Pasco, Polk, and Hernando. The value of production of poultry and poultry products in the Basin area in 1963 is estimated at 15 million dollars.

Floriculture and Nursery Products

Production of flower and nursery plants has expanded rapidly in Florida in recent years. Sales were estimated at more than 60 million dollars in 1963 compared to 20 million dollars in 1949. Very little land is required by the industry but capital requirements for houses, equipment and operations are substantial.

More than 700 farms in the Basin reported sales of nursery products valued at 4.2 million dollars in 1959, an average of 6,000 dollars per unit. One hundred seventy-three farms reported sales of cut flowers and related products valued at 3.6 million dollars, an average of more than 21,000 dollars per unit. The value of sales for the year 1963 is estimated at 10 million dollars.

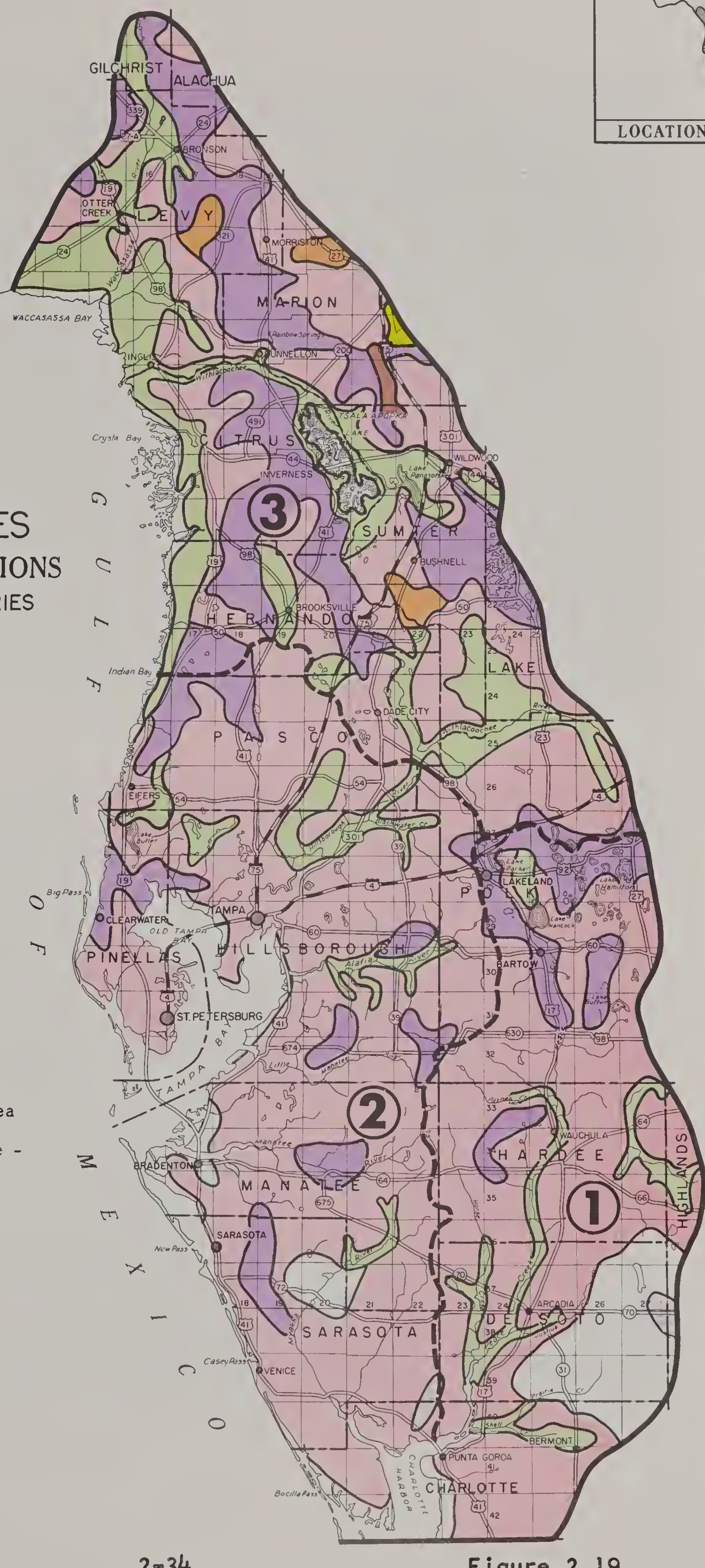
Timber Resources

Commercial forest land in the Basin totals 2,339,500 acres. In addition, there are 42,700 acres of woodland reserved for uses other than timber production, such as parks, developed recreation areas, and historical sites.

Many areas formerly in timber have been cut over and are presently being used for grazing. Good areas of timber are found interspersed with open, prairie type, native range and cut over areas. Seventy-three percent, or 1,707,000 acres, of the commercial forest land in the Basin is grazed.

The major forest types in the Basin are pine, oak-pine, and hardwood. (Figure 2.19) Of the total area of woodland, 45 percent is pine type, 4 percent oak-pine type, and 51 percent hardwood type. Figures 2.22 and 2.23 show the percent of woodland by major forest types, degree of stocking, and site quality for the Basin. The same information by sub-basins is shown on Figures 2.24 and 2.25.

MAJOR FOREST TYPES
RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES



0 10 20 30 Miles

LEGEND

- Oak - Gum - Cypress
- Oak - Hickory
- Oak - Pine
- Longleaf - Slash Pine
- Loblolly Pine
- Sand Pine
- Palms
- Prairie or Marsh
- (1) Peace River Study Area
- (2) **Tampa Bay Region Study Area**
- (3) Waccasassa - Withlacoochee - Homosassa Study Area

Figure 2.19

USDA-SCS-SPARTANBURG, S. C. 1965

M-65-212

Figure 2.20 Farm Woodland Has The Lowest Growth Rate

Figure 2.21 Timber Growth Is Highest On Land Owned By Forest Industries

Over one-half the total acreage of woodland is poorly stocked. The better stocked stands are found in Sub-Basin 3. Only about one-half of the woodland acres has a fair site quality, the better sites being in Sub-Basins 2 and 3.

Six percent of the area is growing timber classified as large sawtimber, 18 percent as small sawtimber, and 28 percent as pole-size timber. The remaining acreage of woodland is growing stands of smaller size.

The total volume of growing stock on commercial forest land in the Basin is 1,006.1 million cubic feet of which 67 percent is sawtimber and 33 percent is other products. The average volume of growing stock per acre is 430 cubic feet.

The total net annual growth of growing stock is 37.0 million cubic feet, consisting of 64 percent sawtimber and 36 percent other products. The average net annual growth is 15.8 cubic feet per acre.

If forest growth is to be increased, it is essential that woodland owners improve their timber stands. The average net growth on farm woodland and that of miscellaneous private ownership are 13 and 14 cubic feet per acre per year respectively.

The average annual net growth on public land is 17 cubic feet per acre and 22 cubic feet per acre on forest industry land.

Average attainable net annual growth on all commercial forest land is estimated to be 43 cubic feet per acre.

Timber products harvested from commercial forest land in the Basin during 1963, included sawlogs, pulpwood, poles and piling, veneer logs, miscellaneous industrial wood, fence posts, and fuelwood. The total volume harvested was 23,693,000 cubic feet.

Of this total,83 percent of the volume was softwood and 17 percent was hardwood. Forty-seven percent of the volume cut was pulpwood and 27 percent was sawtimber, with other products listed above making up the remainder. Income to landowners from these products was approximately 2,200,000 dollars. Management and harvesting activities furnished employment for 900 persons and added approximately 1,400,000 dollars to the Basin economy.

Stumpwood for naval stores is an important product in the Basin. Three wood naval store companies operating in the Basin in 1963 extracted 193,600 tons of stumpwood having a stumpage value of 290,000 dollars. Management and harvesting added 180,000 dollars to the economy of the Basin and furnished employment for 125 workers.

COMMERCIAL FOREST LAND BY MAJOR FOREST TYPES AND STOCKING

FLORIDA WEST COAST TRIBUTARY BASINS

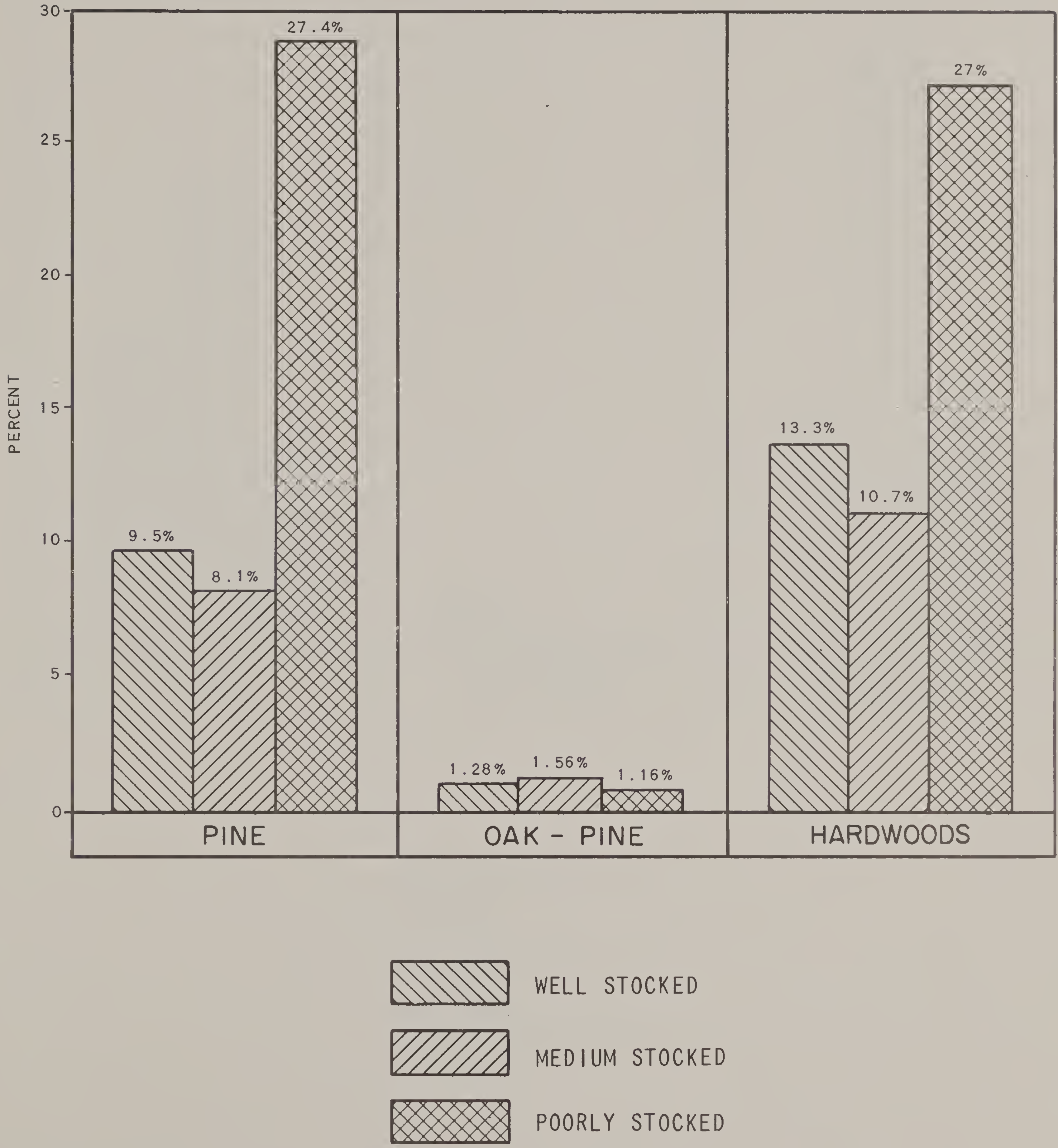


Figure 2.22

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-77

COMMERCIAL FOREST LAND BY MAJOR FOREST TYPES AND SITE QUALITY

FLORIDA WEST COAST TRIBUTARY BASINS

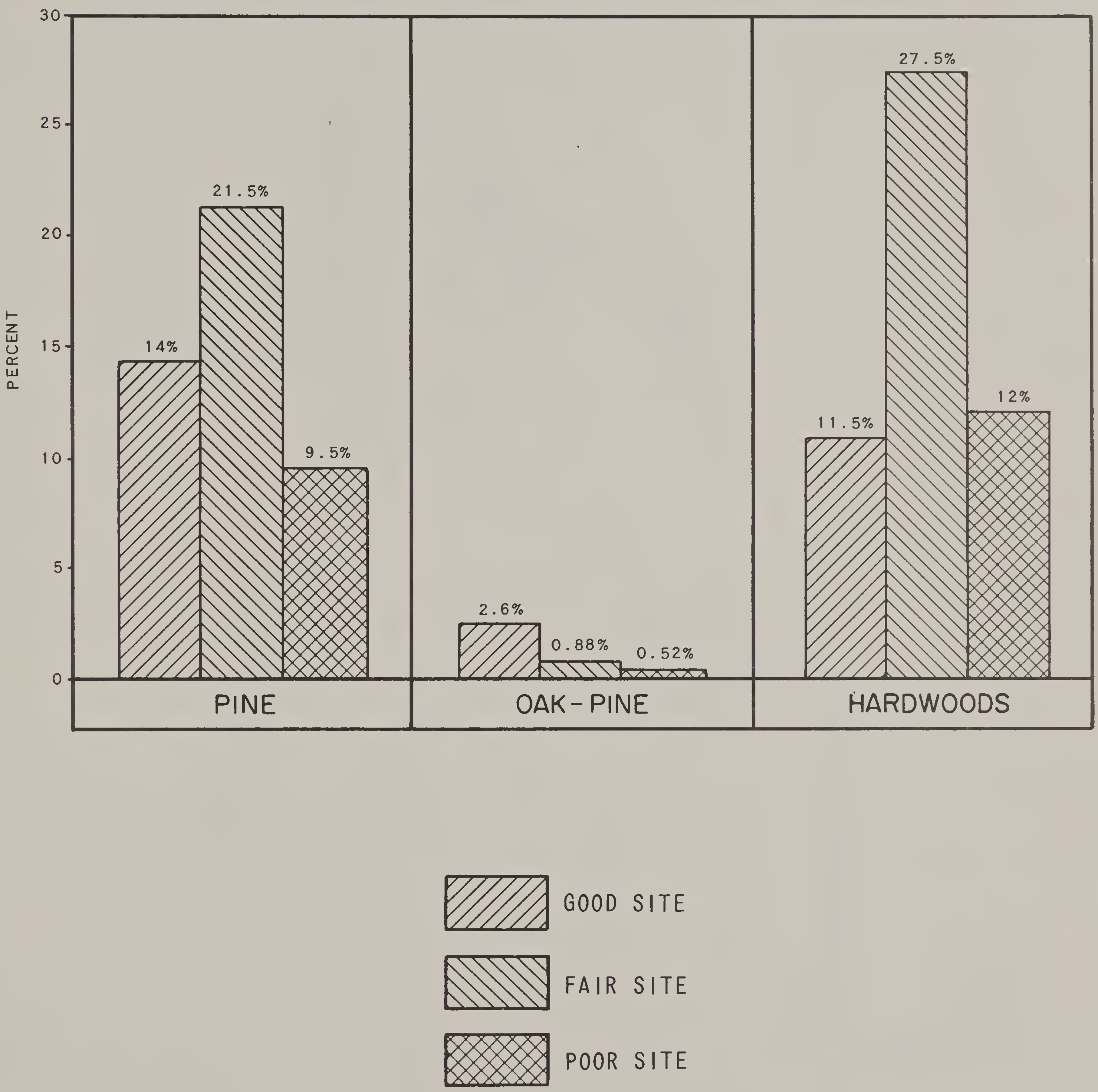
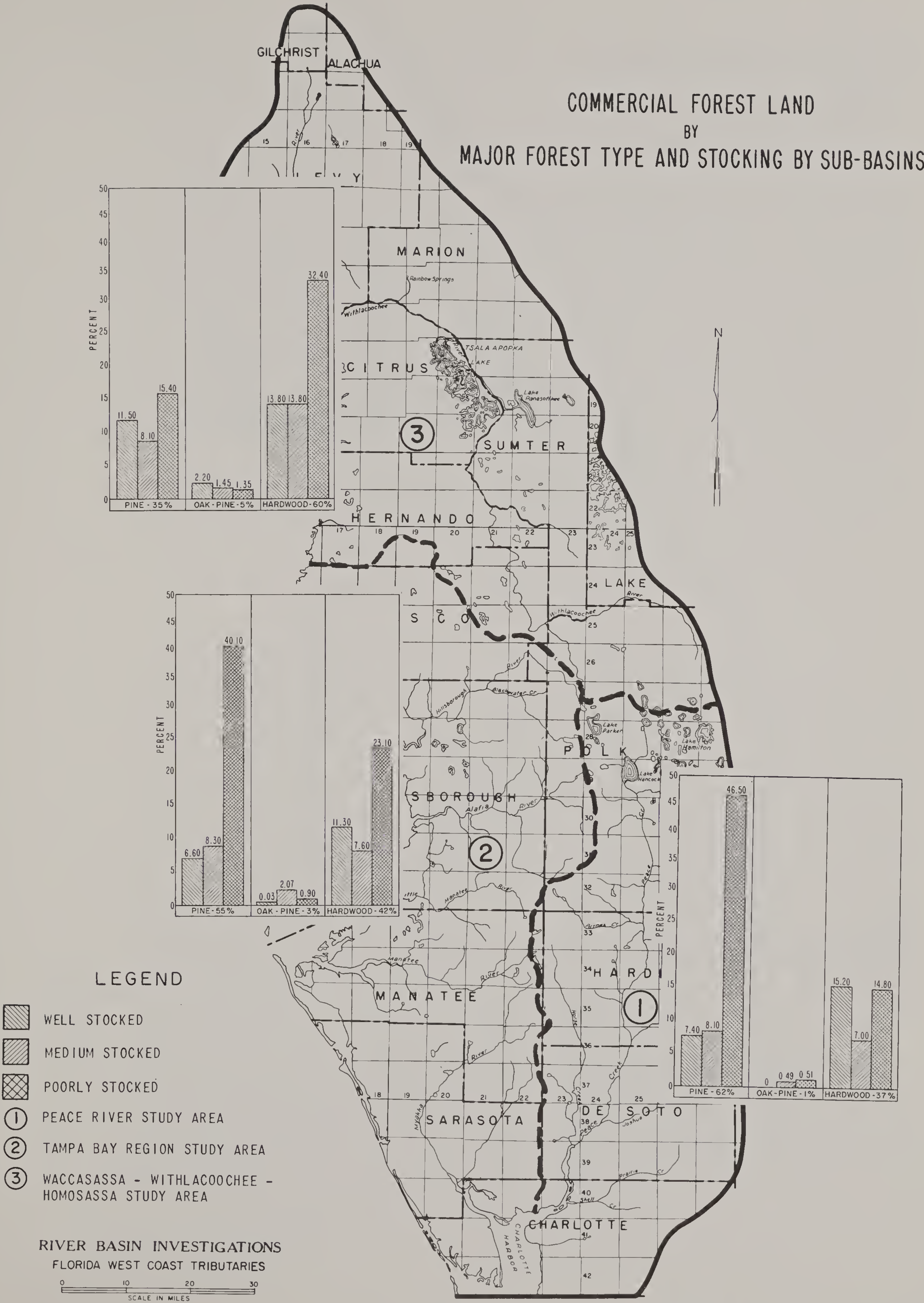


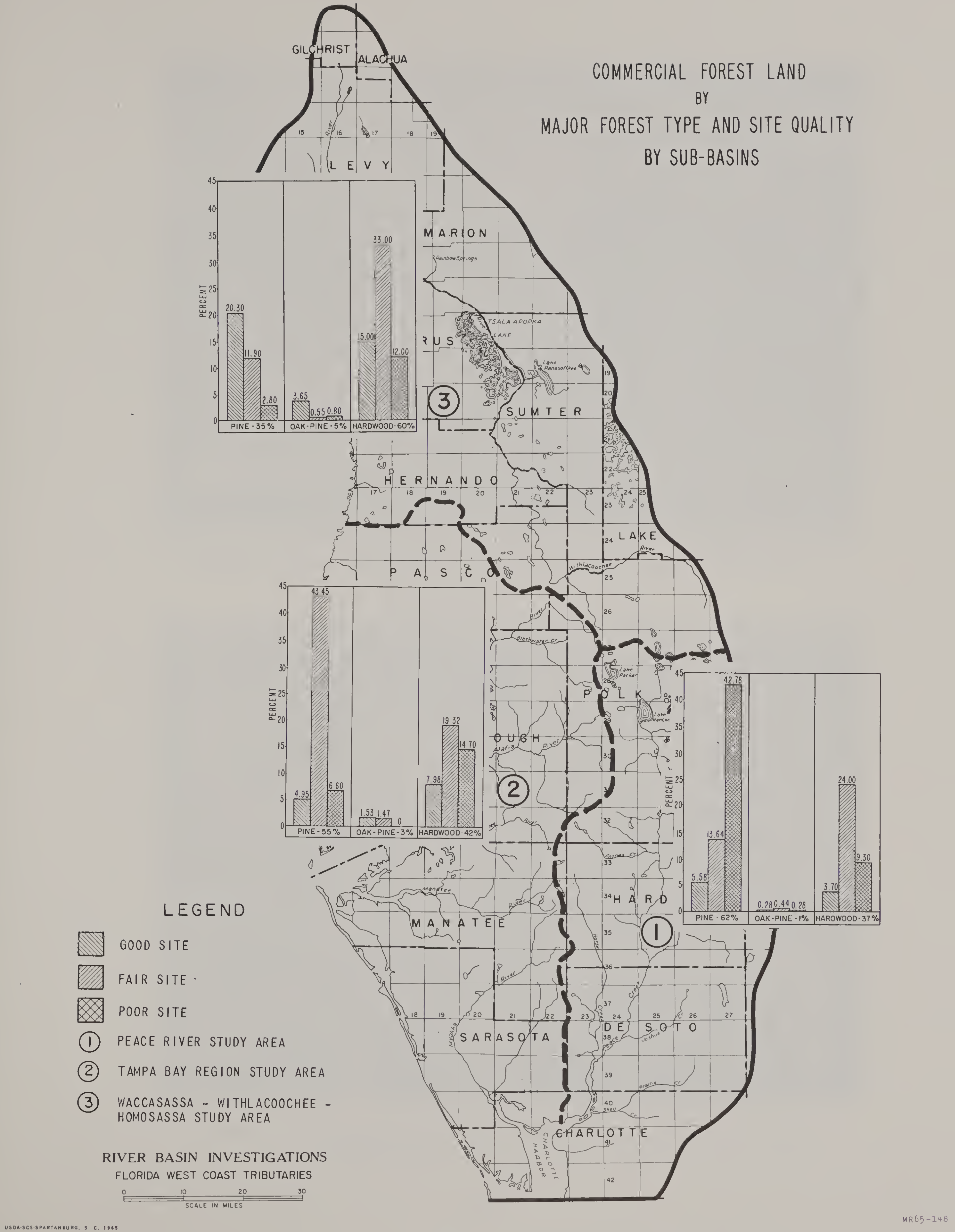
Figure 2.23

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-78

COMMERCIAL FOREST LAND BY MAJOR FOREST TYPE AND STOCKING BY SUB-BASINS





COMMERCIAL FOREST LAND
BY
MAJOR FOREST TYPE AND SITE QUALITY
BY SUB-BASINS
GILCHRIST
ALACHUA
LEVY
MARION
SUMTER
HERNANDO
PASCO
LAKE
POLK
MANATEE
SARASOTA
DE SOTO
CHARLOTTE
CHARLOTTE HARBOR
PERCENT
20.30
11.90
2.80
3.65
0.55
0.80
33.00
15.00
12.00
PINE - 35%
OAK-PINE - 5%
HARDWOOD - 60%
43.45
4.95
6.60
1.53
1.47
0
19.32
7.98
14.70
PINE - 55%
OAK-PINE - 3%
HARDWOOD - 42%
42.78
5.58
13.64
0.28
0.44
0.28
24.00
3.70
9.30
PINE - 62%
OAK-PINE - 1%
HARDWOOD - 37%
LEGEND
GOOD SITE
FAIR SITE
POOR SITE
1 PEACE RIVER STUDY AREA
2 TAMPA BAY REGION STUDY AREA
3 WACCASASSA - WITHLACOOCHEE - HOMOSASSA STUDY AREA
RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES
SCALE IN MILES
USDA-SCS-SPARTANBURG, S. C. 1965
MR65-148

Figure 2.25

Figure 2.26 Forty-seven percent of the timber harvested is for pulpwood.

Figure 2.27 Stumpwood is an important source of rosin and turpentine.

A small quantity of gum naval stores is produced in the Withlacoochee State Forest and on woodlands owned by phosphate mining companies.

Sixty-five percent of the volume of timber harvested was cut in Sub-Basin 3. Sub-Basin 2 furnished 24 percent and 11 percent was cut in Sub-Basin 1.

All timber harvested in Sub-Basin 1 was softwood. Eighty-four percent of the volume was pulpwood and 12 percent was sawtimber.

Sub-Basin 2 yielded 93 percent softwood and 7 percent hardwood. The cut of pulpwood and sawtimber was about evenly divided and accounted for 89 percent of the total volume.

Seventy-six percent of the volume cut in Sub-Basin 3 was softwood and 24 percent was hardwood. Pulpwood made up 40 percent of the volume cut and sawtimber 25 percent. Nine percent of the volume was cut for veneer logs and 14 percent for miscellaneous wood for charcoal, excelsior and crates. Small amounts of poles and piling, fence posts, and fuelwood were cut in all three sub-basins, softwood and hardwood ties were cut only in Sub-Basin 3.

The Basin's primary wood using plants in operation during 1963 consisted of: 35 sawmills, 3 veneer and crate plants, 4 wood treating plants, 5 miscellaneous plants, and 1 wood distillation plant.

One hundred sixty-six operators cut wood products from the Basin during 1963.

The stumpage value of the timber harvested in 1963 was over 2 million dollars.

Sixty-four percent of the total net annual growth of growing stock was harvested in 1963. Less than one-half the net growth of hardwood was cut. The drain was more intensive on the softwood growing stock.

Using weighted average prices, the present volume of timber - 1,006.1 million cubic feet of growing stock - has a stumpage value of over 93 million dollars.

Water

Some portions of the Basin have many lakes and streams, while others are almost completely lacking in natural surface water supplies. The streams more widely recognized are the Waccasassa, Withlacoochee, Crystal, Homosassa, Pithlachascotee, Anclote, Hillsborough, Alafia, Little Manatee, Manatee, Braden, Myakka, and Peace Rivers. The combined length of these streams is in excess of 600 miles. The Peace, Hillsborough, and Withlacoochee Rivers all originate in or near the Green Swamp area of Polk County at elevations ranging from 75 to 140 feet and flow for 120, 54, and 160 miles with an average fall of 1.0, 1.5, and 0.8 feet per mile respectively.

Runoff

The average annual runoff varies from 10 to 20 inches for most streams in the Basin. (Figure 2.28) The weighted average annual runoff for all gaged areas in the Basin is approximately 13 inches, the minimum and maximum being 2.91 and 38.47, respectively for selected major streams. (Table 2.3) There are two large areas that have little or no surface runoff.

Of the many factors that affect runoff, the amount and intensity of rainfall has the greatest influence and the most variability. In the water year 1956, (October 1955 thru September 1956) the rainfall stations for Tampa, Inverness, and Arcadia, considered as representative stations for the Basin, recorded an average rainfall of 32.2 inches, which is approximately 22 inches below normal. The runoff as recorded at various stream gages in the vicinity of the above stations varied from two inches to six inches. The 1960 water year was one of the wettest years of record, with an average of approximately 76.3 inches of rainfall at the three previously mentioned rainfall gaging stations, and this resulted in runoff that varied from approximately 27 inches to 38 inches.

Only a brief resume of some of the runoff data has been included in this report. The Surface Water Branch of U. S. Geological Survey is preparing a special report which will be presented in another part of an overall summary report to be prepared by the Water Resources and Conservation Division of the Florida State Board of Conservation.

Generally, stream channels are inadequate to carry runoff from storms occurring in the Basin without overbank flooding. Flood peaks vary greatly from one stream to another with the Alafia,

TABLE 2.3
ANNUAL RUNOFF 1/ FOR SELECTED STREAMS IN BASIN

Stream Gage Location	Drainage Area	Minimum 2/ Runoff	Maximum 3/ Runoff	Average 4/ Runoff
	Sq. Mi.	Inches	Inches	Inches
Peace River at Arcadia	1,367	3.91	25.55	12.80
Myakka River near Sarasota	235	4.23	33.42	15.52
Manatee River near Bradenton	80	6.06	34.26	18.82
Little Manatee River near Wimauma	149	3.77	38.47	17.30
Alafia River At Lithia	335	5.53	34.83	15.59
Hillsborough River near Tampa	650	2.91	36.84	13.73
Withlacoochee River near Holder	1,710	2.66	26.86	9.24

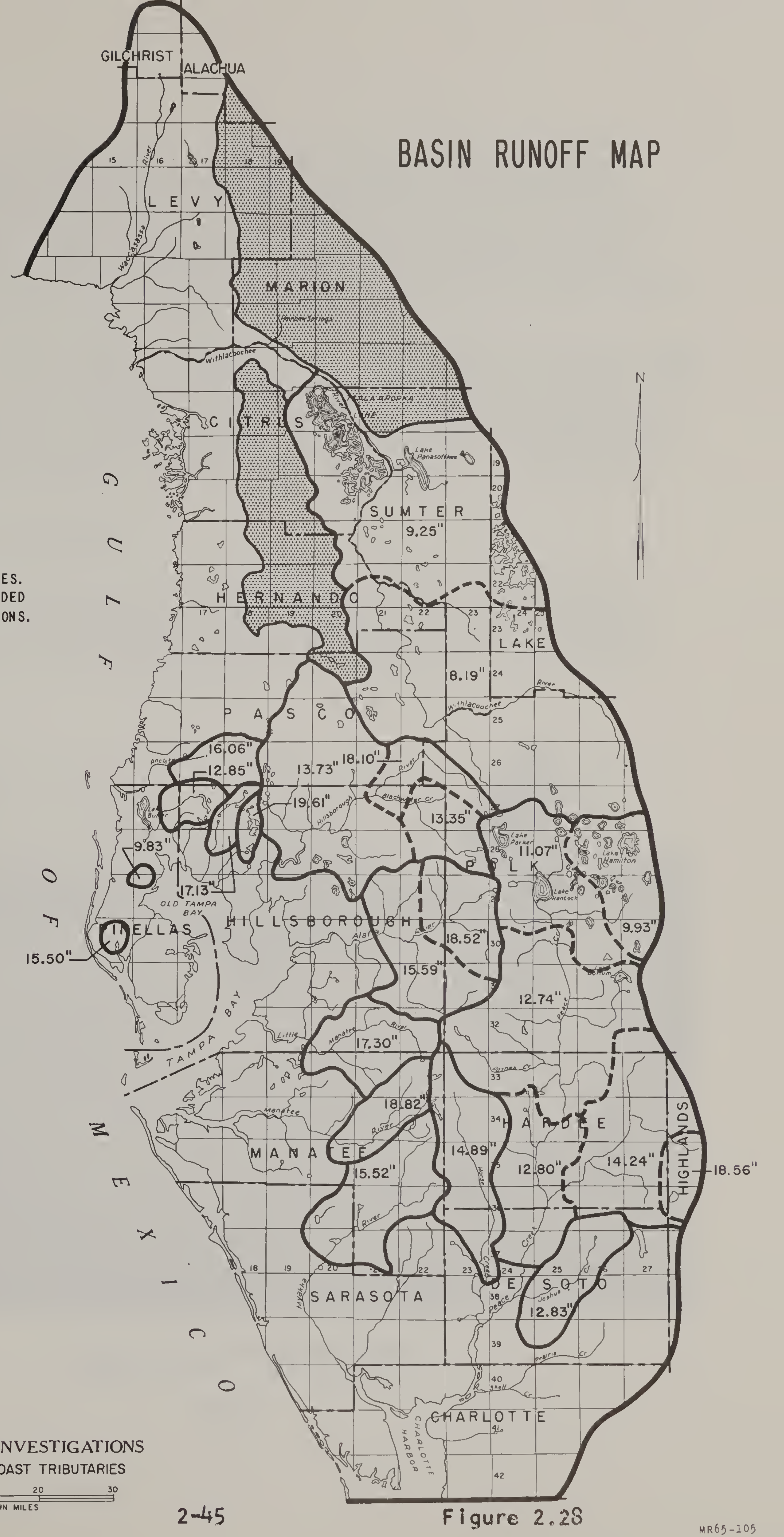
1/ Based on water years, October - September.

2/ All minimum values occurred during water year 1956.

3/ Maximum values for Myakka, Manatee and Little Manatee Rivers occured in water year 1959, all others occurred in water year 1960.

4/ Average computed on total length of record through water year 1963.

BASIN RUNOFF MAP



MAP SHOWS AVERAGE ANNUAL RUNOFF IN INCHES. AREAS UPSTREAM (DASHED LINES) ARE INCLUDED IN THE RUNOFF VALUES OF THE LOWER STATIONS.

AREAS OF LITTLE OR NO RUNOFF

RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES

0 10 20 30
SCALE IN MILES

Figure 2.28

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-105

Manatee and Little Manatee Rivers having the highest peaks per square mile of drainage area. The flood peaks usually occur within 24 hours after the center of mass of rainfall on these streams. The Withlacoochee River with its flat gradient, large area of lakes, swamps, and woods in the upper reaches of the watershed, requires a much longer time to peak after a storm than any other stream in the Basin.

Most of the larger streams in the study area have a fair base flow, with the exception of Myakka River. The Myakka River is subject to little or no flow during periods of prolonged drought. Even though many streams continue to flow during dry weather, the majority of the smaller streams have insufficient flows to meet needs during dry periods.

Lakes and Impoundments

Some of the more significant named lakes in the Basin are Alfred, Hamilton, Hancock, Mattie, Parker, Tarpon, Panasoffkee, Tsala Apopka, and Eloise. Many lakes are isolated, requiring development before their potential for beneficial uses can be utilized.

Figure 2.29 A Managed Lake

Most of them have a wide range of fluctuation due to irregular rainfall, fluctuations in the surrounding ground water table, loss through under water sinks, and other causes. The majority of these lakes could be improved by the installation of control structures at the outlets so as to prevent excessive outflow during periods of prolonged drought. The structures could be provided with sufficient capacity to remove excess water during high rainfall periods. With control structures installed, it would be possible to store at least an additional two or more feet on many of the lakes. This additional storage on all lakes larger than 40 acres in the Basin would amount to over 200,000 acre feet of additional fresh water. Better control on the natural lakes is considered the most logical means of increasing the surface water supply in the Basin, since suitable artifical reservoir sites are limited.

There are very few impoundment type reservoirs in the Basin. The Inglis Dam on the Withlacoochee River is by far the largest with over 3,700 acres in the permanent pool. Among other impoundments in the area are the Tampa City Dam on the Hillsborough River, the Braden River Dam on the Braden River, and an impoundment in the Myakka State Park on the Myakka River. An additional site for storage has been developed on Shell Creek just east of Punta Gorda.

Good possibilities exist for considerable fresh water storage in the numerous pits remaining after phosphate mining has been completed. With proper planning, these pits could offer excellent recreational opportunities as well as a source of water for other useful purposes.

Agricultural Water Use

The water use evaluations were made as they apply to uses for agricultural purposes. Some of these uses are consumptive and others return the water to either the surface or ground water supplies.

The agricultural water use for the base period, 1963, amounted to 526,000 acre feet. Of this amount, 333,700 acre feet was used for irrigation. The greater portion, 293,000 acre feet, was obtained from underground supplies with the remainder, 40,700 acre feet coming from surface supplies. The daily water requirements for rural household use, livestock, and rural home lawns and gardens amounted to 171,680,000 gallons or about 192,300 acre feet per year.

Irrigation to supplement periods of deficient rainfall is important in the Basin as a means of maintaining or increasing agricultural yields. The uneven distribution of rainfall throughout most of the growing season makes irrigation a necessity for many of the crops grown in certain years. Present indications are that

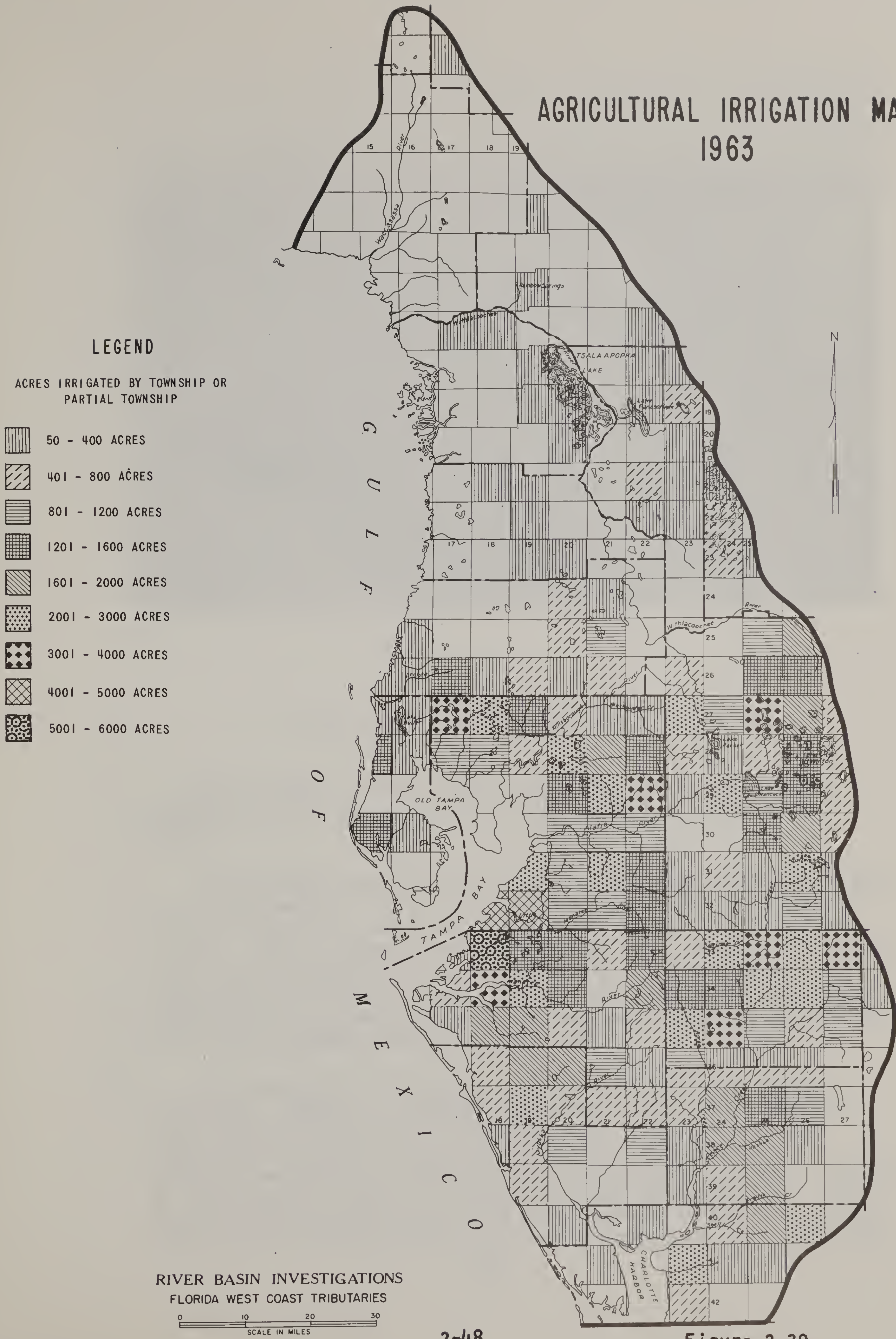


Figure 2.30

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-89

Figure 2.31 Citrus Irrigation

irrigation water is often applied too late, or in insufficient quantities for optimum growth, or for maximum benefits to the grower.

During 1963, most of the irrigation was done during the winter and spring months. This is usually the dry season in the Basin, and corresponds to the growing season for winter vegetables and clover. Lack of adequate moisture during this period can seriously affect the blooming and fruit setting qualities of citrus. The approximately 185,000 acres of citrus, improved pasture, vegetables, and other crops presently irrigated represents some 15 percent of the total acreages devoted to these uses.

The methods of irrigation generally include some form of sprinkler, seepage, or surface application. Sprinkler methods were used on 63 percent of the total area irrigated with the remaining 37 percent being by seepage or surface methods. Sprinkler methods were used for 94 percent of the citrus, 1 percent of the improved pasture, and 26 percent of the vegetables. Seepage or surface methods were used for 6 percent of the citrus, 99 percent of the improved pasture, and 74 percent of the vegetables.

Figure 2.32 Sprinkler Methods of Irrigation

Figure 2.33 Seepage Irrigation

Twelve percent of the irrigation water applied in 1963 was from surface supplies and 88 percent was from subsurface sources. Lakes and streams supplied 39,400 acre feet of irrigation water for citrus, 1,000 acre feet for improved pasture, and 300 acre feet for vegetables. Subsurface supplies furnished 182,000 acre feet for citrus, 90,300 acre feet for improved pasture, 19,200 acre feet for vegetables and 1,500 acre feet for general field crops.

Figure 2.34 Surface Water Supply

Figure 2.35 Subsurface Water Supply

S E C T I O N   III

PROJECTED RESOURCE USE AND NEEDS

Guidelines and Projections

The preparation of plans for management and development of land and water resources requires the adoption of a set of basic economic assumptions and projections. The assumptions and projections concerning the national economy, used in this study, are those suggested for uniform use among the several federal agencies engaged in resource planning. Under the adopted assumptions and projections, satisfying the needs of the population for goods and services becomes the objective of the planning procedure.

Numerous sources of information were considered, as applicable and as required, in the economic analyses. These included national policy guides, economic handbooks, manuals and procedural statements of agencies, published and unpublished historical data and projections of federal, state and private agencies. Beneficial use was made of the periodic census of agriculture and population of the Bureau of the Census, United States Department of Commerce and publications of the Statistical Reporting Service, United States Department of Agriculture. Area population estimates and projections were provided by the Division of Water Resources and Conservation. Published and unpublished data from the Florida Agricultural Experiment Station, and judgments obtained in consultations with members of its staff, especially the recent work in Operation DARE,[1/] were given important consideration.

Projections of population growth and per capita utilization of resources for various purposes are key determinants in estimating the future size and characteristics of the economy.

National Economic Guidelines

Among the adopted assumptions may be listed the following: (1) An international scene marked by no widespread outbreak of hostilities and with sufficient economic and political stability to permit an upward trend in international trade. (2) A domestic scene marked by no major depression and by continuing economic

1/ Developing Agriculture Resources Effectively, University of Florida.

progress under existing economic and political systems. (3) A stable general price level. (4) Federal - non-federal cooperation to encourage economic progress for all segments of society. (5) Progress in education, training,technology, capital accumulation, and resource development. (6) Reduction of institutional barriers to economic progress. (7) Production of goods and services in accordance with effective demand at satisfactory levels of returns to producers and at projected price levels. (8) Constant per capita utilization of agricultural products in the United States beyond 1980. (9) That current and projected trends in regional and area production patterns reflect the comparative advantage of competing areas. (10) That the decisions of producers concerning physical and economic feasibility and profitableness of alternative uses of resources reflect their evaluation of comparative advantage including limitations in the availability of land, water, labor, management, and capital.

A growing and increasingly prosperous and productive population is anticipated. More capital per worker, continued technological innovation and higher levels of skill and training are assumed to offset a decline in length of work week and result in expanding output per man. Selected components of the national economic framework for 1960, the base period 1962-63, and projected 1980 and 2015 are shown in Table 3.1. The amount of detail provided is not intended to imply comparable accuracy in either historical data or projections.

Basin Economic Guidelines

Application of national economic projections to a small basin area requires heavy reliance upon historical trends and relationships. Uncertainties increase as the size of the area decreases. Data are not available presently for determining relative efficiencies of competing areas. However, as has been indicated, data concerning trends, regional shifts, production records of the Basin, and internal changes underway reflect the decisions of producers and others concerning physical and economic feasibility and profitableness of alternative uses of resources.

Some of the specific economic assumptions concerning the Basin follow: (1) Due to its favorable climate, the Basin area will continue to attract new residents, part-time residents, and tourists from other states. (2) Despite growing local demand, the production of the major commodities of citrus, vegetables, and beef in the Basin will continue to be largely in response to demand and prices prevailing in external markets. This is true likewise of tobacco, peanuts, corn and other field crops which are minor commodities in the Basin. Production of milk and eggs will be fitted increasingly to local consumption requirements.

TABLE 3.1
SELECTED COMPONENTS OF THE NATIONAL ECONOMIC FRAMEWORK FOR USE IN RIVER BASIN ECONOMIC INVESTIGATIONS, UNITED STATES, 1960 1962-63, WITH PROJECTIONS TO 1980 & 2015[1/]

Item	1960	Base Period 1962-63	Projected 1980	Projected 2015
1. Population, mil.	180.7	188.0	254.1	463
2. Labor force, mil.	73.1	76.0	104.5	190
3. Employment, mil.	69.2	71.0	99.8	182
4. Unemployment, mil.	3.9	4.0	4.7	8
5. Gross national product, (1962 dollars) bil. dol.	517	548	1,097	3,842
(a) Per capita, dol.	2,861	2,915	4,317	8,298
6. Disposable income[2/] (1962 dollars) bil. dol.	372	395	790	2,766
(a) Per capita, dol.	2,059	2,101	3,109	5,974
7. Per capita consumption:				
Citrus, lbs.	73.5	74.8	92	92
Vegetables (farm weight) lbs.	212	214.1	226	226
Melons, lbs.	25.7	23.5	17	17
Potatoes, White, lbs.	102	110	109	109
Beef, carcass weight, lbs.	85.2	92	113	113
Beef, equiv. liveweight, lbs.	154	166	204	204
Pork, (carcass weight) lbs.	65.2	64.4	61	61
Chicken (carcass weight) lbs.	28.2	30.4	32.5	32.5
Eggs, lbs.	42.1	41.8	34	34
Dairy products, lbs.[3/]	653	636	570	570
Wood products, cu. ft.[4/]	62.5	62.7	52.7	45.5
8. Total consumption requirements: (Billion pounds)				
Citrus	13.3	14.1	23.4	42.6
Vegetables	38.3	40.3	57.4	104.6

TABLE 3.1 (cont'd)

Item	1960	Base Period 1962-63	Projected 1980	Projected 2015
Melons	4.6	4.4	4.3	7.9
Potatoes, White	18.4	20.7	27.7	50.5
Beef (carcass weight)	15.4	17.3	28.7	52.3
Beef equiv. liveweight	27.8	31.2	51.8	94.5
Pork (carcass weight)	11.8	12.1	15.5	28.2
Chicken (carcass weight)	5.1	5.7	8.3	15.0
Eggs	7.6	7.9	8.6	15.7
Dairy products 3/	118.0	119.6	144.8	263.9
Wood products, Bil. cu. ft.	11.3	11.8	13.4	21.1

1/ Based principally upon "National Economic Growth Projections 1980, 2000, 2020," Economic Task Group of the Ad Hoc Water Resources Council Staff, Mimeo, Washington, D. C., undated, and "Agriculture and the Years Ahead" an abstract of a presentation by R. F. Daly to the Association of Southern Agricultural Workers, Atlanta, Georgia, February 3, 1964. Mimeo, Price level adjustment ratio 1954 to 1962 equals 1.174.

2/ Seventy-two percent of GNP. (Gross National Product)

3/ Total milk equivalent, fat solids basis.

4/ Round Wood Equivalent, USDA Misc. Pub. No. 953 and "Timber Trends in U.S." USFS, June, 1964.

(3) There will be adequate investment capital, managerial talent and entrepreneurship available to accomplish the projected levels of resource development and economic activity.

Normalized prices were used in calculations for the base period. (Table 3.2)

Basin Economic Projections

In recognition of the relationship of the agricultural economy of the Basin to the economy of the Country, especially in terms of the citrus, vegetable and beef industries, special economic studies were made of these individual commodities. In these studies, National, State and Basin trends were considered and judgments made concerning prospective needs for land for purposes of producing these products. Also, a special economic study was made of the future needs for land for urban and built-up areas for the projected populations of 1980 and 2015. Concurrently, field studies were made, taking into account the judgments of informed local agricultural leaders concerning anticipated land use shifts in their assigned geographic areas of work. The special economic studies and local opinion were integrated into final judgments concerning future needs for land for various uses in the several portions of the Basin.

Projected long-term prices for agricultural commodities were used in calculating value of products in 1980 and 2015. (Table 3.2)

Land and Water

The land use projections and proposals for resource development for 1980 and 2015 reflect the needs of rapidly growing U.S., and Basin populations for non-agricultural areas, as well as for agricultural and forestry products, and for outdoor recreation facilities.

The 1960 Census shows a population of 1,437,072 in the 18 counties wholly or partially within the area, and it is estimated that 1,221,900 lived within the Basin boundaries. The Basin population is expected to increase to 6,800,000 by 2015 with 2,600,000 people in the Basin in 1980. These increases in numbers of people will necessitate many land use changes from agricultural to urban and industrial use and land use shifts of agricultural enterprises to other locations.

TABLE 3.2
NORMALIZED PRICES RECEIVED BY PRODUCERS FOR SELECTED CROPS AND LIVESTOCK FOR BASE PERIOD (1962) AND FOR PROJECTED LONG-TERM, FLORIDA WEST COAST TRIBUTARIES BASIN

Commodity	Unit	Normalized Unit Prices for Base Period(1962)[1/] (Dollars)	Projected Long-Term Prices[2/] (Dollars)
Fruits:			
Grapefruit	Box	0.90	0.90
Oranges:			
Early and mid-season	Box	2.15	1.26
Late type	Box	2.50	1.25
Vegetables:			
Beans, lima	Bushel	3.60	2.74
Beans, snap, fresh	Bushel	3.00	2.62
Cabbage	Crate(50 lbs.)	1.50	1.07
Celery	Crate(60 lbs.)	2.10	2.14
Corn	Crate (42 lbs.)	2.10	1.43
Cucumbers	Bushel	3.35	3.62
Eggplant	Bushel	2.10	1.27
Lettuce	Cwt.	5.60	4.21
Peppers, green	Bushel	3.10	2.77
Potatoes, Irish	Cwt.	3.00	2.83
Squash	Bushel	3.25	1.95
Strawberries	Pound	0.35	0.28
Tomatoes, fresh	Crate (60 lbs.)	5.00	5.01
Watermelons	Cwt.	1.75	1.68

TABLE 3.2 (cont'd)

Commodity	Unit	Normalized Unit Prices for Base Period (1962) 1/ (Dollars)	Projected Long-Term Prices 2/ (Dollars)
Livestock and livestock Products:			
Broilers	Pound	0.15	0.14
Chickens, other	Pound	0.12	0.10
Cattle	Cwt.	19.00	13.94
Calves	Cwt.	21.00	15.71
Eggs	Dozen	0.39	0.35
Hogs	Cwt.	16.00	16.20
Milk, wholesale	Cwt.	6.50	6.35

1/ Based on unweighted averages of annual data for Florida for 1958-62 from Statistical Reporting Service, USDA.

2/ Based on "Agricultural Price and Cost Projections---," USDA, ARS and AMS, Washington, D. C., September 1957. Prices of commercial vegetables for fresh market are based on U.S. index of long-term projected prices of 220 (Jan. 1910 - Dec. 1914 - 100). Florida long-term projected prices of cattle and calves were modified to reflect broader market price information.

The projected 2015 use of the Basin's resources is expected to involve the following changes: Fresh water area will increase from 186,800 to 384,700 acres; non-agricultural land area will increase from 643,400 to 1,618,600 acres; and agricultural land area will decrease from 5,373,400 to 4,200,300 acres. Figure 3.1 shows the expected changes in land and water area that will take place by the year 2015, by counties, in the Basin.

Land Use

The projected increases in areas of fresh water, and for non-agricultural uses, indicate a reduction of approximately 1,173,000 acres in the area devoted to agriculture, by 2015. This loss of agricultural lands to other uses plus the projected increase in demand for agricultural and forestry products will bring about substantial changes in land use within the agricultural area. The increase in demand will be supplied in part by improved technology and more efficient operations. In addition, a greater portion of the agricultural area will be utilized for production of the more intensive crops and improved pasture, the location of which will tend to shift to the more productive, less hazardous soils, at the expense of rangeland and woodland. (Figure 3.2)

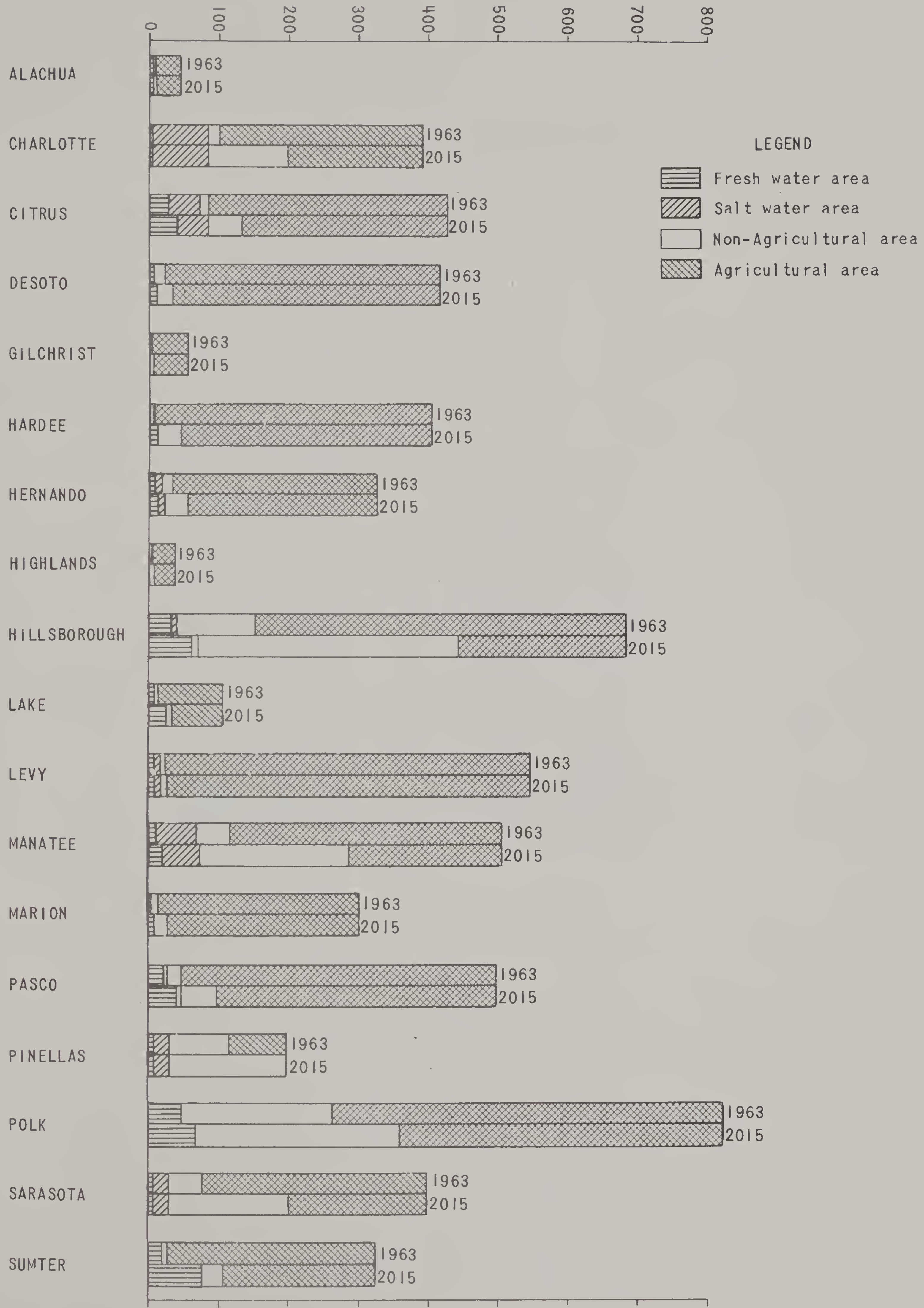
It is expected that the loss of agricultural area to other uses will have an affect on all agricultural and forestry enterprises and will occur in all capability classes of land. New plantings will be necessary to recover losses to other uses, as well as to obtain increases necessary to reach the projected 2015 acreage needs. Indications are that these new plantings will require additional areas in excess of 400,000 acres for citrus, 30,000 acres for vegetables, 60,000 acres for other crops, and 800,000 acres for improved pasture.

Projected 1980 acreages of the major agricultural uses are: citrus 415,000, vegetables 45,000, other crops 96,900, improved pasture 900,000, unimproved pasture 1,001,100, woodland 2,036,100, and miscellaneous uses 263,500 acres. The corresponding acreages for 2015 are: citrus 700,000, vegetables 62,000, other crops 134,000, improved pasture 1,520,000, unimproved pasture 222,000, woodland 1,389,900, and miscellaneous uses 172,400 acres.

The trend toward efficiencies in production, resulting from competitive market and price situations; increased knowledge of soil capabilities as related to crop production; better control of soil borne diseases, permitting the use of a given area for longer periods of time for a specific crop; and other factors, all contribute

LAND AND WATER AREA BY COUNTIES

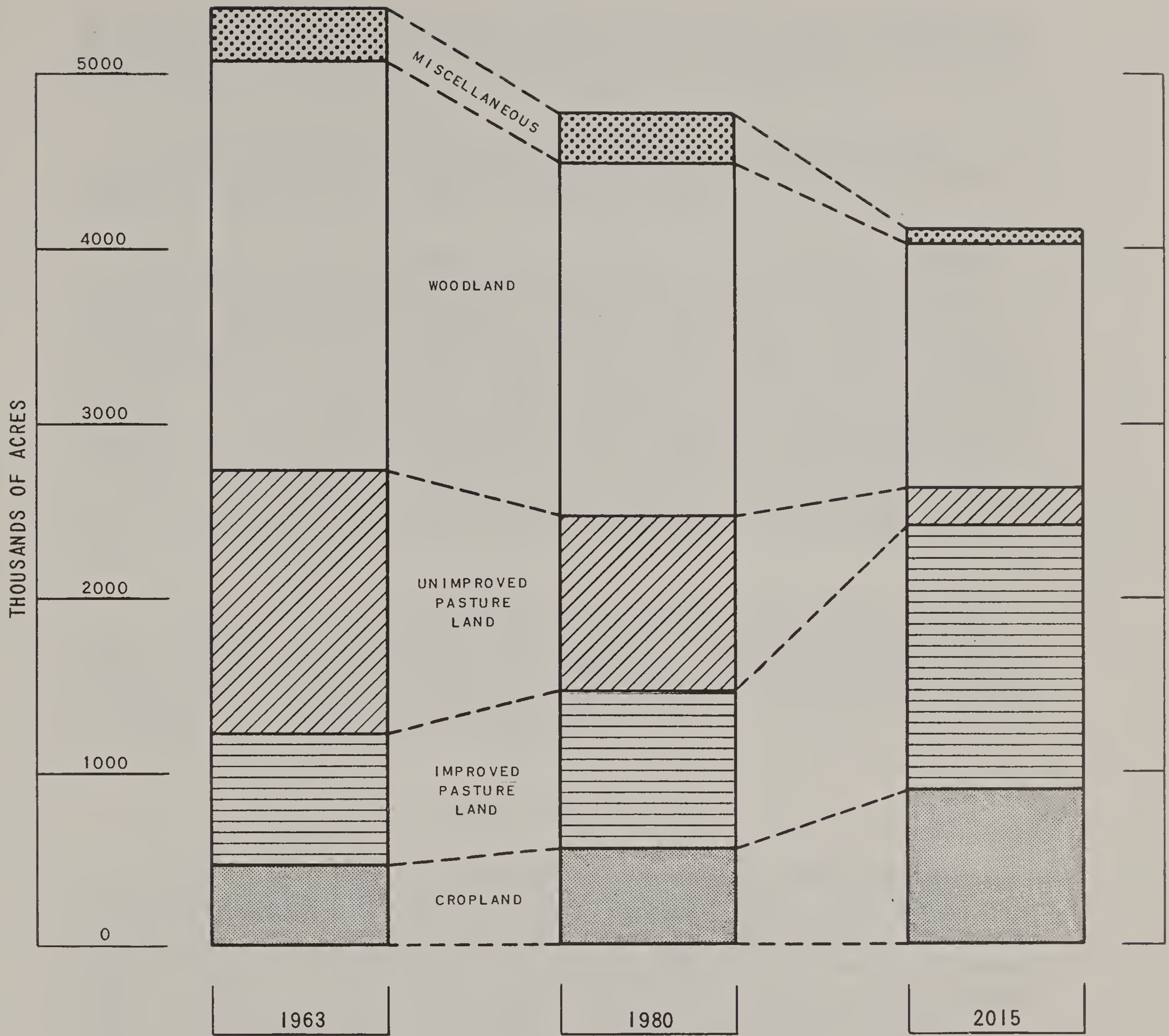
(1000 Acres)



USDA-SCS-SPARTANBURG, S. C. 1965

MR65-194

Figure 3.1



MAJOR USES OF AGRICULTURAL LAND, 1963,
PROJECTED 1980 AND PROJECTED 2015

Figure 3.2

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-130

to the shifting of agricultural uses to soils of best suitability which are available, bearing in mind that soil and water problems will continue to exist in varying degrees of severity.

Projected land use changes indicate a reduction of the commerical forest land from 2,382,200 acres in 1963 to 2,036,100 acres by 1980 and to 1,389,900 acres by 2015.

No significant changes are expected in the present acreage (427,000 acres) of commercial forest land now in public, forest industry, and phosphate mining company ownership. Site quality and management are generally better on these lands than on lands in other ownerships, giving them a higher potential for increased growth. Land use changes by 1980 and 2015 will result in smaller acreages of woodland in farm and miscellaneous private ownership, leaving approximately 1,609,000 acres by 1980 and 963,000 acres by 2015. Net growth is low on these lands at present and increasing their productivity is the greatest problem to be overcome in the next three decades.

In 1963, the Basin produced 25 percent of the 84.6 million cubic feet of wood products it consumed. Projected demands for 1980 and 2015 are 134.4 and 307.1 million cubic feet respectively. The Basin is expected to supply 18 percent of its projected demand for 1980, and 14 percent for 2015.

Water Use

Agricultural water requirements, including rural household, lawns and gardens, livestock, and irrigation uses, will continue to increase substantially during the projection period. The projected Basin requirements for 2015 are almost six times the amount used in 1963, with the 1980 projection being over two and one-half times the requirements for 1963. The 2015 requirements amount to enough water to cover the land area of the Basin to a depth of almost six inches. The majority of this water must come from underground sources, since existing and potential surface storage sites will be unable to supply more than a token amount of the total requirement. When compared to the average annual rainfall, six inches amounts to about 11 percent; however, most of the annual rainfall is lost as a source of surface supply through run-off, deep percolation or evapotranspiration. Approximately 13 inches, or 24 percent, flows to the Gulf in the form of surface runoff, or ground water return. (Figure 2.28) A majority of the annual streamflow results from rain which falls during the summer months. Since this season corresponds to the period of lowest supplemental agricultural water requirements, most of this streamflow is lost due to the lack of suitable sites for storing appreciable quantities for later use.

A comparison of agricultural water use for 1963, 1980, and 2015 is shown in Table 3.3 by sub-basins and for the Basin. These uses are expressed in terms of depth, in inches, over the total land area. Sub-Basins 1 and 2 are quite similar in their agricultural water use for all three time periods, with Sub-Basin 3 using a much lower amount for each of the three periods.

The water requirements for rural domestic uses and for livestock, accounted for approximately 36 percent of the total agricultural water use in 1963. These uses are expected to comprise 21 percent and 13 percent of the 1980 and 2015 agricultural water requirements respectively. The rural domestic and livestock water requirements are estimated to increase from 192,000 acre feet in 1963 to 397,000 acre feet by the year 2015 (Figure 3.3), with the projected increase in irrigation requirements being at a much faster rate - from 334,000 acre feet in 1963 to 2,579,000 acre feet by the year 2015. (Figure 3.4)

TABLE 3.3
COMPARISON OF PRESENT AND PROJECTED
AGRICULTURAL WATER USE

Depth (In Inches) Over Land Area of the Basin

	Sub-Basin			
Year	1	2	3	Basin Average
1963	1.31	1.59	0.32	1.05
1980	3.64	3.33	1.29	2.64
2015	8.71	7.16	2.84	5.94

Economic impacts

The development of land and water resources in the Basin will bring about a change in volume of goods and services produced. With growing demand, the farm value of agricultural production rises. Values are added, usually off of the farm, through the handling, packing , shipping, and processing of raw materials. Increases in net agricultural income are reflected in producer's consumption expenditures or capital accumulation. Expenditures for farm inputs such as hired labor, fertilizer, machinery, gasoline, oil, insecticides, etc., create jobs, payrolls, business profits and add to the level of economic activity.

AGRICULTURAL WATER USE

RURAL DOMESTIC

(Million Gallons per Day)

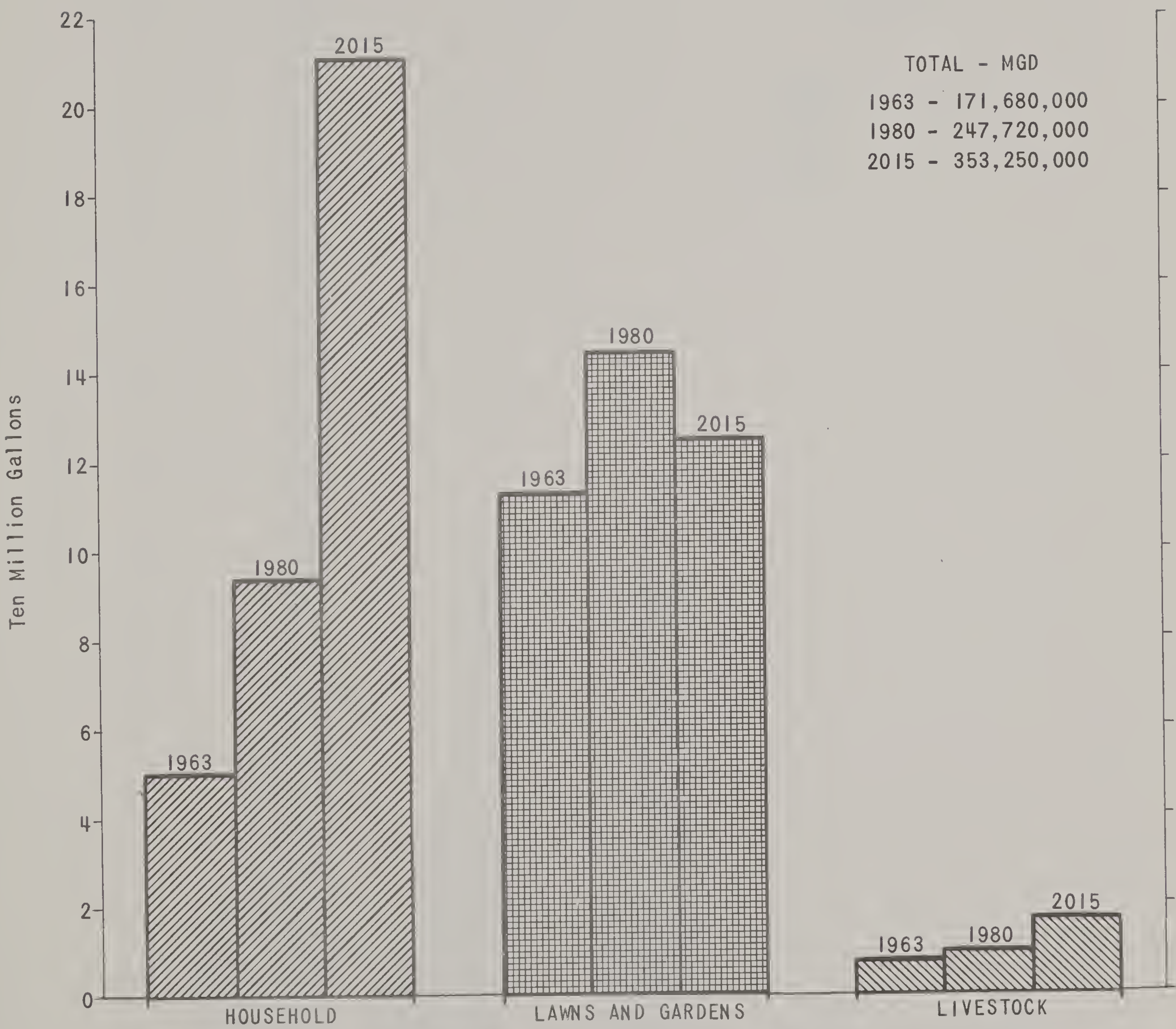


Figure 3.3

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-193

AGRICULTURAL WATER USE

IRRIGATION

(Acre-Feet)

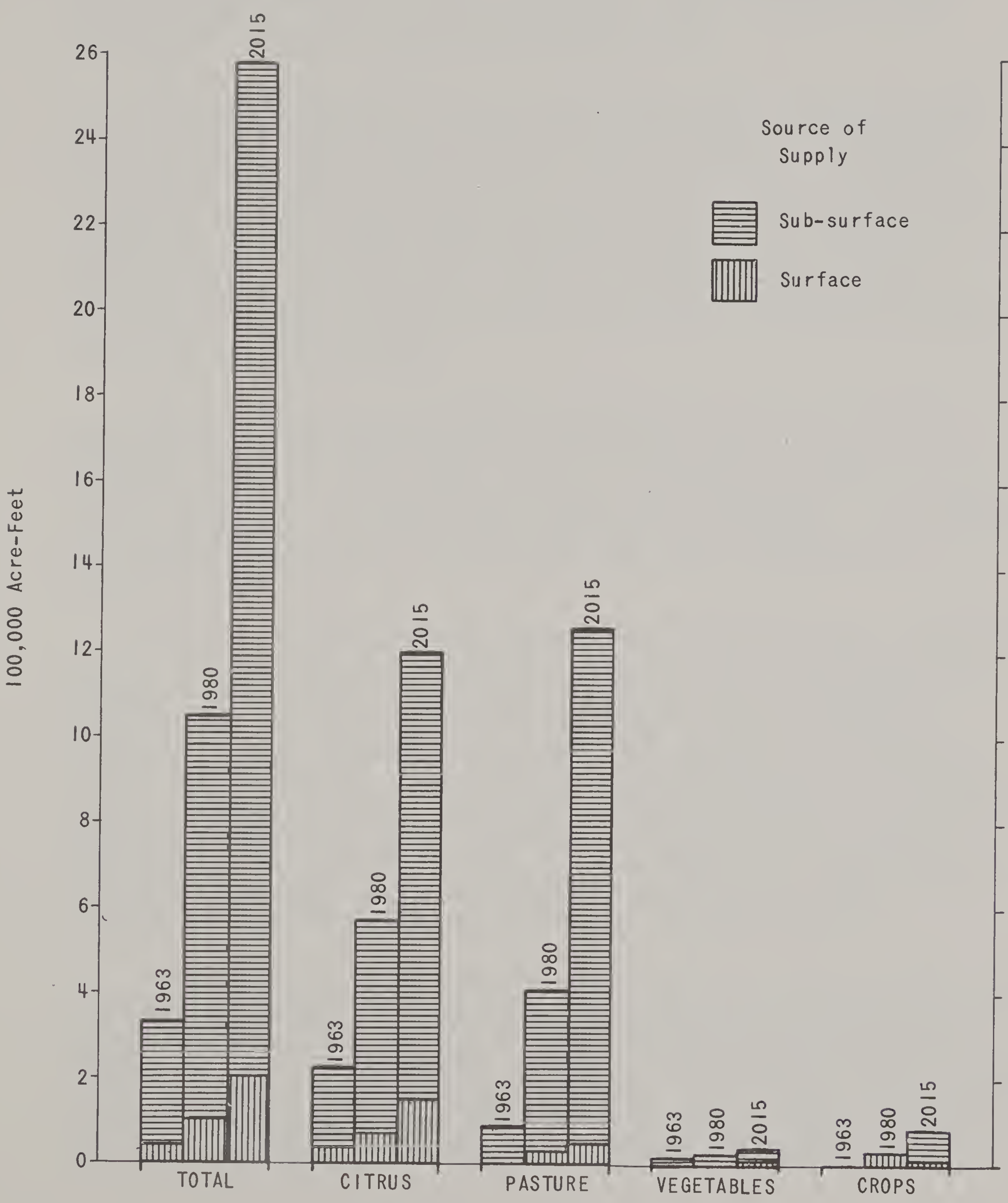


Figure 3.4

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-192

The farm value of agricultural production in the Basin during the base period is estimated at 195 million dollars. Values fluctuate considerably from year to year as yields and prices of citrus and vegetables are very sensitive to supply. By 1980, value of production is expected to increase nearly one-third, reaching an estimated 255 million dollars. Between 1980 and 2015, values are expected to nearly double, reaching a level of 502 million dollars at the end of the period (Table 3.4).

The growth of agriculture in the Basin during the projection period results largely from expanding production of citrus, beef, dairy, poultry, and greenhouse and nursery products. Vegetable production has been on the decline in the Basin, but is expected to expand as increasing demand stimulates production in the period 1980-2015. Field crops and miscellaneous crops are expected to remain stable. The allotted crops of tobacco and peanuts are expected to expand moderately while the less intensive crop uses are forced downward because of the competition from more valuable crops and improved pasture.

The net effect of the future changes will be an increased orientation of the agriculture of the Basin toward the needs of the population for milk, eggs, poultry, beef and greenhouse and nursery products. Production of most of these products is believed to be responsive to rising local population and demand. Among the cultivated crops, citrus is the only one that is expected to expand substantially.

The value of agricultural production at farm prices, previously shown, includes the net income of producers. The larger share of producer's net farm income presumably is used for consumption expenditures and the balance for investment. Local secondary benefits of equal magnitude presumably arise from unit additions to net farm income as from unit additions to the cost of farm inputs. Although non-cash items such as charges for land, management and depreciation are often treated as residuals and not readily measured, it is possible to estimate the approximate magnitudes of the major cash expenses of agricultural production, exclusive of charges for interest, taxes, management and depreciation.

Major cash inputs of agriculture in the Basin area in 1963 are estimated at 132 million dollars. Cash inputs are expected to increase to 190 million dollars by 1980, and possibly 370 million dollars by 2015. (Table 3.5) Changes in labor inputs can be related closely to local employment opportunities. For example, the increase in farm labor costs of 15 million dollars between 1963 and 1980 is equivalent to nearly 4,200 jobs at 3,600 dollars yearly earning.

TABLE 3.4
FARM VALUES BY MAJOR GROUPS OF FARM PRODUCTS,
FLORIDA WEST COAST TRIBUTARIES BASIN,
1963 AND PROJECTED 1980 AND 2015[1/]

(Million Dollars)

	Farm Value		
	1963	Projected 1980	Projected 2015
Citrus	104	115	202
Vegetables, melons, potatoes, and strawberries	22	24	36
Field Crops	4	3	5
Other Crops	1	1	2
ALL CROPS	131	143	245
Livestock and livestock products	54	92	212
Greenhouse, nursery	10	20	45
TOTAL	195	255	502

1/ Based on Basin share of Florida production. Not corrected for field crops fed to livestock.

TABLE 3.5
ESTIMATED PRODUCTION EXPENSES, FLORIDA WEST COAST TRIBUTARIES BASIN, 1963 AND PROJECTED 1980 AND 2015 1/

(Million Dollars)

Item	Estimated 1963	Projected 1980	Projected 2015
Hired Labor	42	57	108
Fertilizer	28	37	68
Feed	20	36	80
Gasoline, Oil, Fuel	3	3	5
Purchase of Livestock and Poultry 2/	6	11	24
Machine Hire 3/	9	13	22
Seeds, Bulbs, Plants and Trees 4/	3	4	6
Other	21	29	57
TOTAL	132	190	370

1/ Based on available cost records and ratios of receipts and various expenditures by type of farm shown in the Census of Agriculture, 1959.

2/ Does not include substantial interranch sales of livestock.

3/ Principally for citrus production. Included in "Other" inputs for other products.

4/ Principally for production of vegetable, greenhouse and nursery products. Included in "Other" inputs for other products.

The increase from 1980 to 2015 is equal to an additional 14,200 jobs at the same rate of pay or 7,100 jobs at double the pay scale shown.

As has been indicated, the composition of agricultural production in the Basin is expected to change with greater expansion in the citrus, livestock, and greenhouse industries than in vegetables and field crops. These changes in the production mix result in some shift in the character of inputs. Labor remains the largest item during the projection period, but declines slightly in relative importance. Feed costs and purchase of livestock and poultry increase greatly in absolute and relative importance. To the extent that agriculture can provide the feed and livestock for purchase within the industry, it has an opportunity to become less dependent upon non-farm segments of the economy for required inputs.

Intensified use of land and water in the Basin area, inherent in the projected land use shifts, will require substantial initial inputs of capital for purposes of clearing rangeland and woodland and for developing grovelands, vegetable farms, general cropland and improved pasture land. The capital outlay, exclusive of the value of the land, during the period 1963-2015 is estimated at nearly 300 million dollars, equivalent to about 6 million dollars annually. (Table 3.6) More than two-thirds share will be required to develop new citrus groves and more than a fourth for development of improved pastures.

Agribusiness values reflect the economic activities generated by agriculture when the products are evaluated at stages beyond the boundaries of the farm or more strictly speaking, beyond the level of farm prices. Agribusiness values used here are based on product values at the time they cross the state line as they are shipped out or their retail value if sold in Florida. The data are presented not as precise measurements of the impact of agricultural production beyond the farm but rather to illustrate and affirm the presence of a substantial impact upon the economy.

Agribusiness values are estimated at more than 119 million dollars in 1963, 158 million dollars in 1980 and 313 million dollars in 2015. (Table 3.7) Because citrus and vegetables are major products in Florida and are sent to national markets, agribusiness values beyond the border of Florida are possibly equal to the off-farm values in Florida.

The present and projected growth on commercial forest land in the Basin is not sufficient to support an additional pulp mill.

TABLE 3.6
CAPITAL REQUIREMENTS FOR LAND DEVELOPMENT,
FLORIDA WEST COAST TRIBUTARIES BASIN,
1963-2015

Land Use	Capital Investment Million Dollars	Percentage
Citrus 1/	204.3	68.2
Vegetables	4.9	1.6
Other Crops	6.0	2.0
Improved Pastures 1/	84.4	28.2
TOTAL	299.6	100.0

1/ Includes Planting.

TABLE 3.7
OFF-FARM AGRIBUSINESS VALUES BY MAJOR GROUPS OF FARM PRODUCTS,
FLORIDA WEST COAST TRIBUTARIES BASIN,
1963 AND PROJECTED 1980 AND 2015
(Million Dollars)

	Off-Farm Agribusiness Value in Florida[1/]		
	1963	Projected 1980	Projected 2015
Citrus	52	57	101
Vegetables, melons, potatoes, and strawberries	22	24	36
Field Crops	2	1	3
Other Crops	1	1	2
ALL CROPS	77	83	142
Livestock and livestock products	32	55	126
Greenhouse, nursery	10	20	45
TOTAL	119	158	313

[1/] Estimated values at the time product crosses the state line in shipment or the value at retail if sold in Florida, less farm value, based on "Florida Agribusiness, the State's Biggest Business," Department of Agriculture, State of Florida, Tallahassee, Florida, January, 1963.

At current stumpage prices, the stumpage value of the 1980 projected cut is 2.3 million dollars. Management and harvesting activities will furnish employment for 1,000 workers and add 1.4 million dollars to the Basin economy.

Stumpage value of the 2015 projected cut is estimated at 4 million dollars. Management and harvesting activities will furnish employment for about 1,700 workers and add approximately 2.5 million dollars to the economy.

SECTION IV

CONSERVATION PROGRAMS

General Programs

Forestry

The United States Department of Agriculture, Florida Forest Service, forest industries, and phosphate mining companies have active forest conservation and utilization programs in the Basin. These programs are designed to assist landowners in protecting and managing their woodland to obtain the maximum continuous supply of wood products. Assistance with marking, measuring and marketing timber is included to help the landowner get the best return for his products.

Technical management assistance is available to all landowners in the Basin from Farm Foresters of the Florida Forest Service. These professional foresters, upon request, inspect a landowner's timberland and recommend the best forest management practices to follow. Technical assistance is given on measuring and marketing timber products, timber stand improvement, fire protection, site preparation, planting, and forest insect and disease control.

The Soil Conservation Service provides interpretive information from soil surveys to guide landowners for use in planning the development and treatment of their woodland resources. Tree planting, timber stand improvement, and firebreak construction are cost-sharing practices included in the Agricultural Conservation Program. During 1963, cost-sharing on these projects amounted to 10,000 dollars in the Basin.

During the 1962-63 planting season, 6,041,000 seedlings were planted in the Basin. Most of these seedlings were slash pine with small amounts of red cedar, Arizona cypress, and sand pine planted for Christmas trees. Since 1928, approximately 122,000 acres have been planted with pine in the Basin. Seedlings are furnished landowners at cost plus transportation, by the Florida Forest Service which operates four nurseries in the State. Herrin Nursery near Punta Gorda is within the Basin and Andrews Nursery near Chiefland is adjacent to the Basin.

The Florida Forest Service makes an aerial survey of the State annually to determine forest insect activity. Where insect activity is detected, the landowners are notified and request to check their forest land for insect damage.

Advice on insect control is furnished to landowners, upon request, by Farm Foresters. Method of control is explained and materials needed are specified. To control small amounts of insect damage, the landowner is responsible for furnishing the materials. Equipment to treat the area may be loaned by the Florida Forest Service, when needed.

Serious forest insect epidemics necessitate a cooperative control program administered and financed by state and federal agencies and forest industries.

Farm Foresters carry on an active information and education program by demonstrating and explaining good forest management practices. In addition to contacting farmers they work with local groups such as Civic Clubs, Garden Clubs, Future Farmers, 4-H Clubs, and Boy Scouts.

Knowledge acquired from research projects being carried on jointly by the Florida Forest Service, forest industries, and the U.S. Forest Service will be useful in improving forest management techniques and the production of wood products on woodland areas of the Basin in future years. These projects are as follows: (1) Tropical Forestry Project, located in Fort Myers, where trees from all over the world are being researched to determine which species will grow well in South Florida, and which will be suitable for pulp, for shade and shelter for cattle, and for furniture making; (2) Stand conversion experiments to determine methods of eliminating worthless scrub oak and replacing it with pine; (3) Lake City Research Center, developing improved methods for gum naval stores operations; (4) Faster growing pines of better quality resulting from "superior tree" seed orchards; (5) Effective and economical methods of direct seeding to supplement natural regeneration of timber stands; (6) Florida National Forests' Administrative Study, installed in 1961 in cooperation with the Southeastern Forest Experiment Station and Soil Conservation Service, to study the effects of water control on tree growth and regeneration.

This last study was initiated to determine the changes in the productivity of wet pinelands when the water level is lowered by different intensities of water control. The data obtained will serve as a guide to land managers in appraising water control techniques on similar soils when planning projects. It is not implied that lowering the water table is beneficial on all woodland areas, for in some cases it has adverse effects.

Study Area Trees Before Water Control

The Same Trees Three Years Later

Figure 4.1 Appearance of Slash Pine Study Trees Improved After Water Control

The Withlacoochee State Forest, containing 113,000 acres is the largest acreage of land in public ownership in the Basin. It is under a lease-purchase agreement with the Federal Government and is managed by the Florida Forest Service. Timber management for sustained production is one of the basic objectives of the state forest. An active tree planting program will eventually bring the entire area into full production. Other uses of the land are for grazing, recreation, and wildlife. The area has a high potential for all of these uses.

Phosphate companies are managing approximately 82,000 acres of woodland in the Basin. Small forest landowners can get a limited amount of technical assistance from the land managers of these companies.

The Basin area is protected from wildfire with the exception of Citrus, Pasco, Hardee, and DeSoto counties (Figure 4.3). The portions of the Withlacoochee State Forest in Citrus and Pasco counties are under fire protection, resulting in a total of 4,759,000 acres (74%) under protection and 1,687,900 acres (26%) unprotected. Rangeland, pastureland, and improvements such as corrals, fences, and buildings as well as woodland are protected in counties where fire protection has been established by popular vote. Towns and cities are given assistance upon request. County, State, and Federal governments share the cost.

Over 30 percent of the unprotected areas suffer annual damage by wildfires, while less than one percent of the protected areas burn annually.

The Florida Forest Service is responsible for fire protection in protected counties and is doing an effective job with a well-organized, well-trained, and well-equipped organization. In addition to the actual suppression of fires, fire lines that help check wildfire damage are plowed for landowners at a small hourly cost. Construction of firebreaks is recognized as a cost-sharing practice administered by the Agricultural Stabilization and Conservation Service. County Rangers and Farm Foresters assist landowners with prescribed burning to reduce the rough on their land, and for other management practices. Damage to growing timber is noticeably greater in counties where burning is done without technical assistance.

Eighty-five percent of the forest land in the Basin is owned by individuals who do not depend upon timber for their main source of income. (Figure 4.3) Farmers own over 800 thousand acres, and the remaining acreage in this category is in miscellaneous private ownership. The ownership of forest land by sub-basins is shown on Figure 4.3.

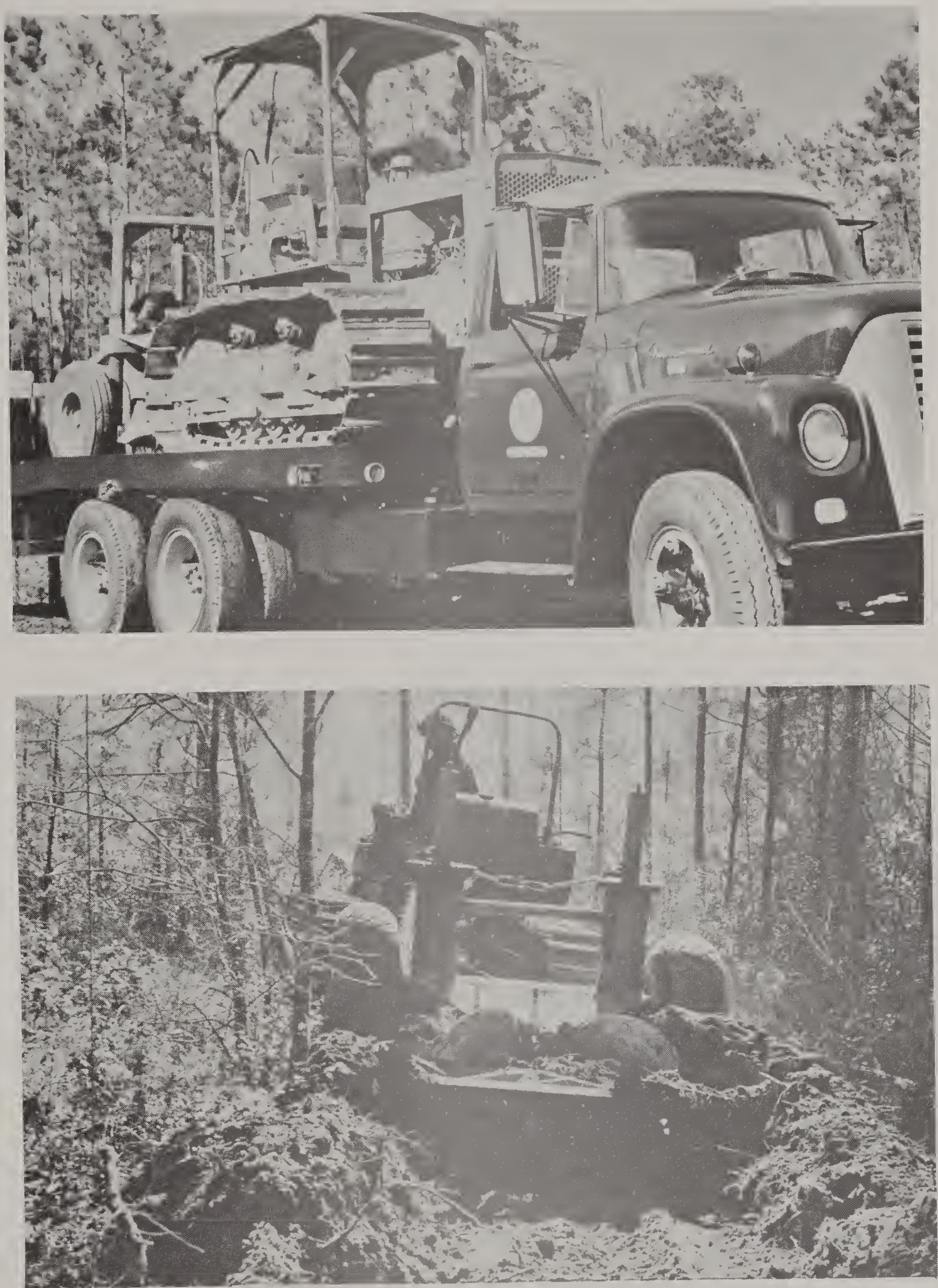
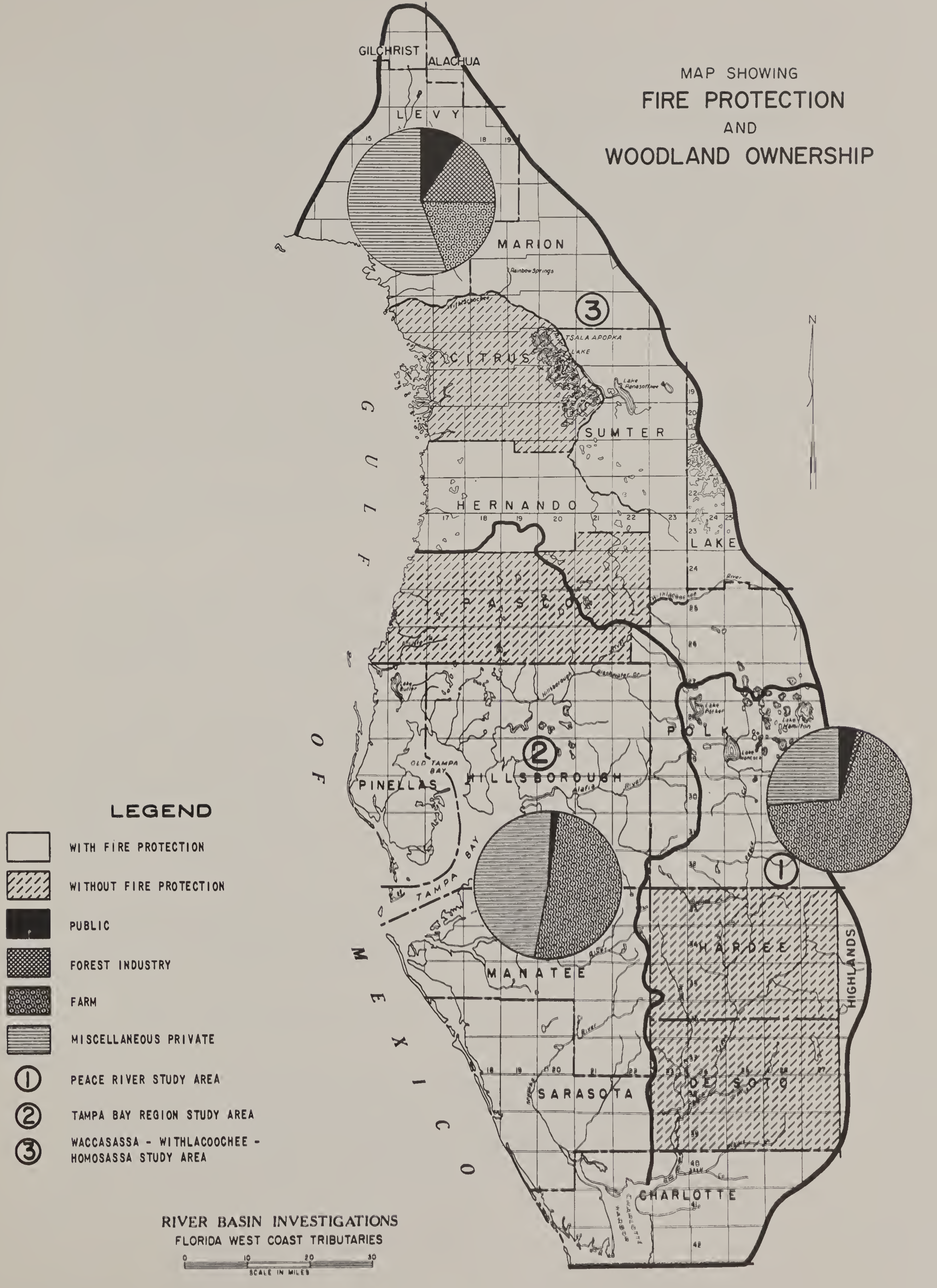


Figure 4.2 An Effective Fire Control Job is Done With This Modern Equipment



MAP SHOWING
FIRE PROTECTION
AND
WOODLAND OWNERSHIP
GILCHRIST
ALACHUA
LEVY
MARION
CITRUS
SUMTER
HERNANDO
LAKE
PASCO
PINELLAS
HILLSBOROUGH
POLK
MANATEE
HARDEE
HIGHLANDS
SARASOTA
DE SOTO
CHARLOTTE
GULF OF MEXICO
TAMPA BAY
OLD TAMPA BAY
N
LEGEND
WITH FIRE PROTECTION
WITHOUT FIRE PROTECTION
PUBLIC
FOREST INDUSTRY
FARM
MISCELLANEOUS PRIVATE
1 PEACE RIVER STUDY AREA
2 TAMPA BAY REGION STUDY AREA
3 WACCASASSA - WITHLACOOCHEE - HOMOSASSA STUDY AREA
RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES
0 10 20 30
SCALE IN MILES

Figure 4.3

Under the present level of forest management, projected cut for 1980 can be supplied from annual growth; however, by 1995, the projected cut will exceed projected growth. (Figure 4.4) A program of more intensive forest management initiated now will increase the rate of growth and supply the projected cut for 1995 and 2015. Planting, under-planting, and stand improvement will improve the stocking of forest areas. Measures to reduce mortality losses will result in a net growth more in line with growth capability. Better management of commercial forest land resulting in increased production of wood products can be accomplished if the following actions are initiated:

(1) By 1995, plant 526,000 acres with seedlings. Apply stand improvement measures on 232,000 acres to remove undesireable species and underplant where necessary.

(2) Between 1995 and 2015, plant 340,000 acres and apply stand improvement measures on 150,000 acres, underplanting where necessary.

(3) Intensify the program of technical assistance to small woodland owners. Eighty-two percent of the commercial forest land is in farm and miscellaneous private holdings. Seven additional Farm Foresters are needed to provide technical forest management assistance in the Basin.

(4) Extend fire protection to unprotected areas of the Basin. (Figure 4.3) Multiple use of all forest land including uses for timber, water, recreation, wildlife, and forage makes this essential. Develop an action plan to combine the efforts of Federal, State, industry, and landowner equipment and manpower to reduce or eliminate damage to resources in case of major disasters such as large fires, insect or disease epidemics, hurricanes or floods.

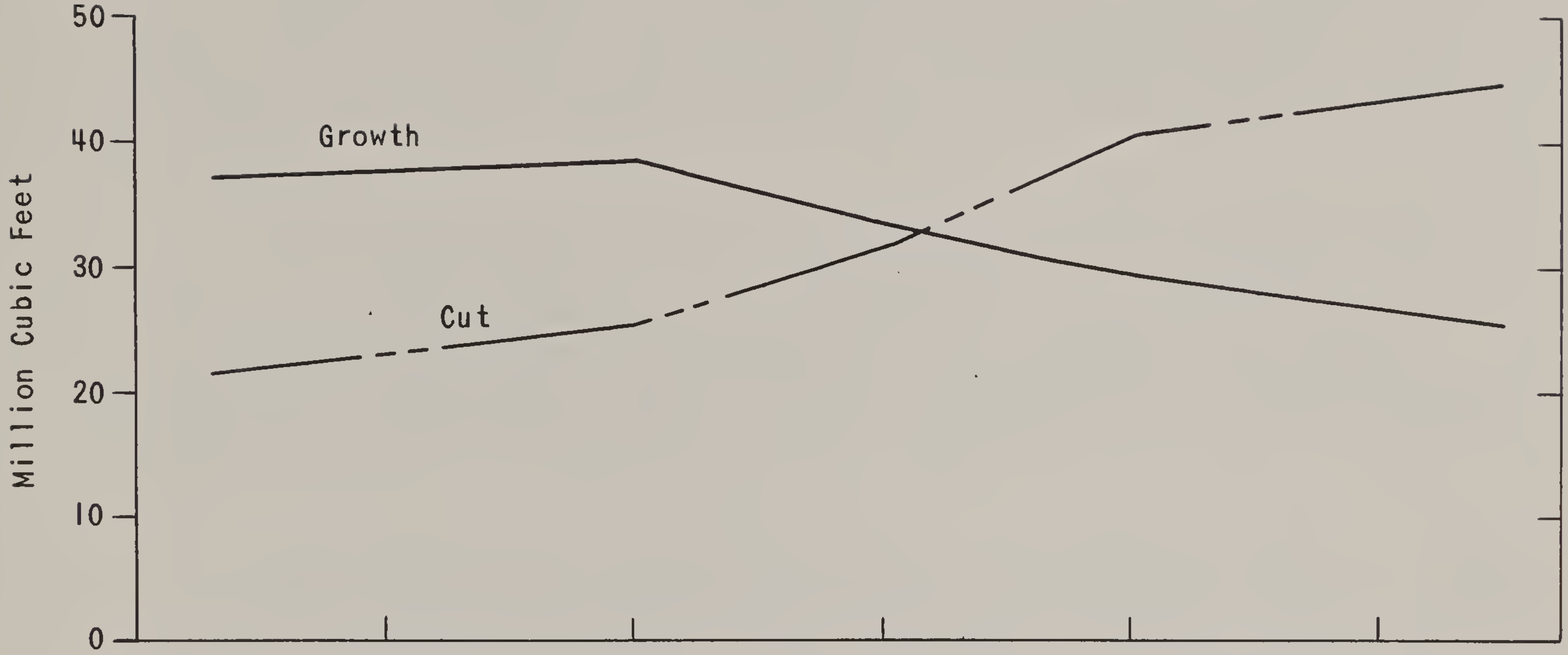
(5) Intensify the Information and Education Program to reduce damage to timber and loss to outdoor recreation uses, soil, water wildlife and aesthetic values. During 1963, there were 1,495 fires that burned 21,032 acres.

(6) Continue research in tropical forestry, water control and other research efforts.

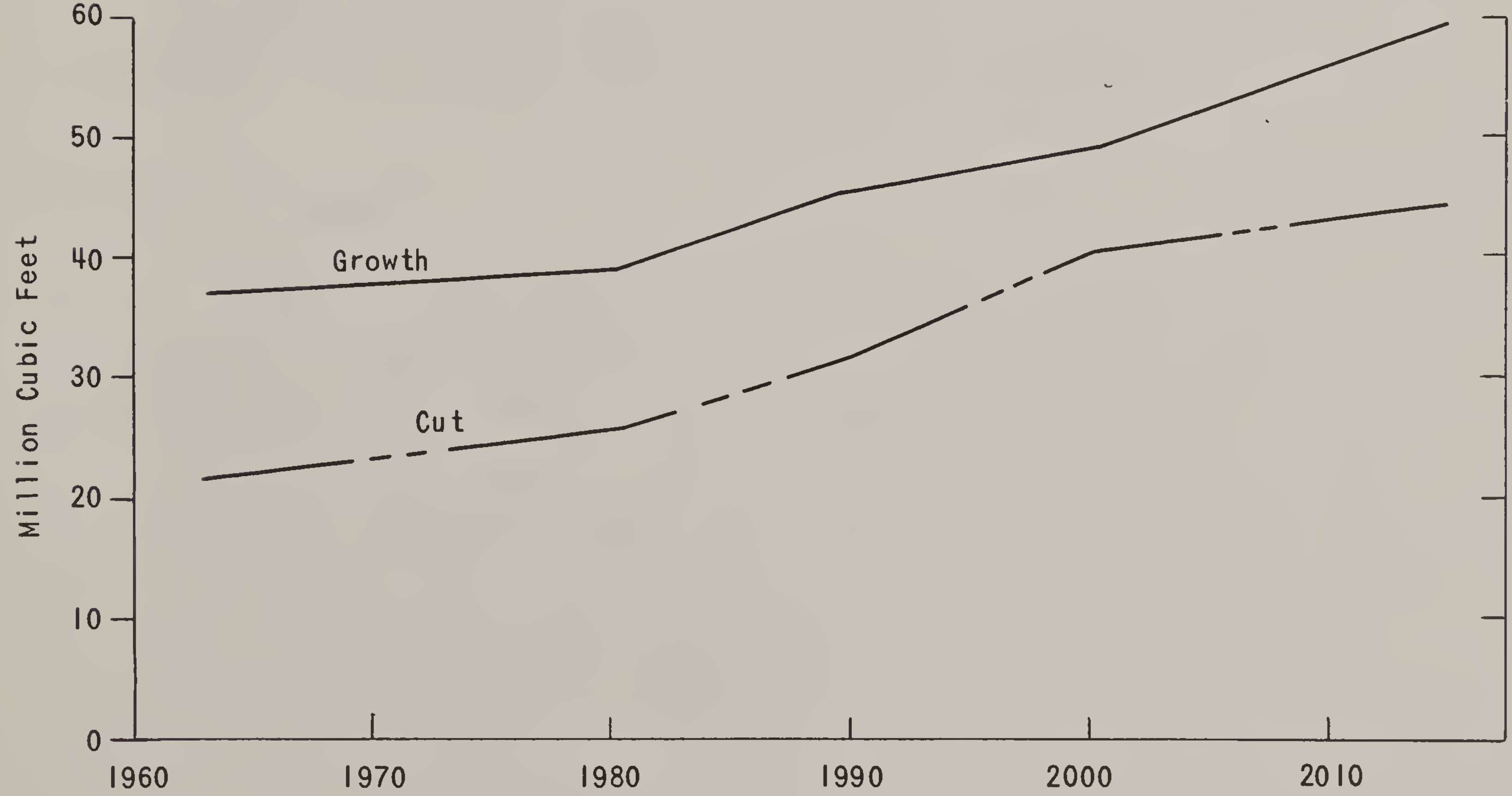
(7) Extend water control to woodland areas where benefits from growth, regeneration, and accessibility can be obtained. Channels constructed by project works of improvement for flood prevention and agricultural water management will afford outlets for land where excess water is a problem.

Figure 4.4 More Planting and Timber Stand Improvement Are Needed To Increase Total Timber Growth.

PROJECTED GROWTH AND CUT UNDER PRESENT LEVEL OF FOREST MANAGEMENT



PROJECTED GROWTH AND CUT UNDER INTENSIVE FOREST MANAGEMENT



USDA-SCS-SPARTANBURG, S. C. 1965

MR65-210

Figure 4.5

The estimated annual cost of item (4) is 400,000 dollars. Personnel to carry out items (3) and (5) will cost about 700,000 dollars per year.

Projected growth for 1980 is 38.8 million cubic feet or 19.1 cubic feet per acre. It is assumed that net annual growth will increase to 27 cubic feet per acre on public and industry land and 17 cubic feet per acre on farm and miscellaneous private woodland by 1980.

The regeneration and stand improvement work needed by 1995 will cost approximately 14 million dollars. It is assumed that total net annual growth will be 45.4 million cubic feet,70 percent of which will furnish the projected cut. By 1995, net annual growth on public and industry land will be 33 cubic feet per acre and farm and miscellaneous private woodland will yield 22 cubic feet per acre.

Regeneration and stand improvement work between 1995 and 2015 will cost approximately 8 million dollars. Total net annual growth will by 59.7 million cubic feet, 74 percent of which will supply the projected cut for 2015. Net annual growth will have reached 43 cubic feet per acre on all areas remaining in woodland.

Effective and economical methods of direct seeding and more efficient methods of timber stand improvement, developed by research, can be expected to reduce the present costs of regeneration and stand improvement. Better specimens of trees resulting from "Superior Tree" seed and species of exotic trees suitable for South Florida, discovered through research, may make possible a higher rate of growth and greater total production.

Soil and Water

The Soil Conservation Service, through its soil and water conservation program authorized by Public Law 46, cooperates with local groups and governing bodies, such as Soil and Water Conservation Districts, Water Conservation and Management Districts, County Commissioners, etc; as well as with other federal agencies in the development and implementation of soil and water conservation programs. These programs serve individual, private, and public interests in the protection, use, and improvement of soil and water resources, for the sustained production of high quality agricultural commodities and for the preservation and improvement of recreation and wildlife resources. A portion of this program is devoted to the procurement of essential data through soil surveys and to the interpretation of these data for non-agricultural as well as for agricultural purposes.

The Agricultural Conservation Program was authorized by the Soil Conservation and Domestic Allotment Act of 1936 and amended in 1937 to furnish cost-share assistance to farmers and ranchers in carrying out needed soil, water, woodland, and wildlife conservation practices on their land. This vital assistance is furnished in all counties and in 1963 amounted to some 434,000 dollars. Twenty-eight hundred farms participated in the application of one or more of the following conservation practices in the Basin area: Establishment of permanent vegetative cover of self-reseeding annuals in orchards for control of erosion; establishment of permanent vegetative cover for soil protection or as a needed land-use adjustment; treatment of farmland with lime or rock phosphate to permit the use of legumes and grasses for soil improvement and protection; improvement of established vegetative cover for soil or watershed protection, establishment of permanent sod to dispose of excess water; and construction and enlarging permanent drainage systems.

The Farmers Home Administration of the U. S. Department of Agriculture makes water development and soil conservation loans to eligible individual farmers and to groups of farmers and rural residents to develop water supply systems for irrigation, household and livestock use; to drain farmland, and to carry out soil conservation practices. Each loan is scheduled for repayment in accordance with the borrower's ability to repay, over a period not exceeding 40 years. In addition to loans to individuals and groups, loans are also made to local organizations to help finance projects and develop land and water resources in small watersheds planned under authority of Public Law 566. Eligible local organizations include soil conservation districts, irrigation districts, drainage districts, and similar organizations which have authority under State law to carry out, maintain, and operate works of improvement. These watershed loans are repayable over periods up to 50 years.

The entire Basin is served by Soil and Water Conservation Districts. In 1963, there were some 7,200 District Farm Plans in the Basin covering 48 percent of the farm operating units. These plans were made by the farmers with technical assistance furnished by the Soil Conservation Service. This technical assistance, along with cost-sharing assistance from the Agricultural Stabilization and Conservation Service and assistance in forest management provided by the Florida Forest Service, constitutes means for reducing hazards and limitations in the use of the land and water resources. Assistance is furnished for land planned for both agricultural use and outdoor recreation.

Of the 5,373,000 acres of land in the Basin used primarily for agriculture in 1963, 1,567,800 acres (29 percent) are on soils that are well drained to moderately well drained, but which have problems of inherent low fertility, erosion, or root-zone limitations due to shallow soils, stoniness, or low moisture-holding capacity. (Table 4.1)

TABLE 4.1
AGRICULTURAL USE OF SOILS WITH DOMINANT PROBLEMS OF EROSION AND ROOT-ZONE LIMITATIONS - 1963
(1,000 Acres)

Land Use	Sub-Basin 1	Sub-Basin 2	Sub-Basin 3	Basin Total
Citrus	72.0	68.7	52.3	193.0
Vegetables	0.8	3.4	15.7	19.9
Other Crops	0.7	4.0	79.9	84.6
Improved Pasture	14.9	32.8	256.3	304.0
Unimproved Pasture	18.9	42.3	77.5	138.7
Woodland	29.9	113.1	659.1	802.1
Miscellaneous	3.8	6.3	15.4	25.5
TOTAL	141.0	270.6	1,156.2	1,567.8

Projected shifts in the utilization of the land resources for more intense use will necessarily result in increases in the use of soils with erosion problems and conditions that limit optimum root development. (Table 4.2)

The increased use of soil improving crops should be encouraged as a means of partially offsetting adverse soil conditions such as low fertility and low moisture holding capacity. Cover

Figure 4.6 Soils With Erosion Hazards

TABLE 4.2
AGRICULTURAL USE OF SOILS WITH DOMINANT PROBLEMS OF EROSION AND ROOT-ZONE LIMITATIONS - 2015
(1,000 Acres)

Land Use	Sub-Basin 1	Sub-Basin 2	Sub-Basin 3	Total Basin
Citrus	96.8	117.0	107.9	321.7
Vegetables	-	0.3	11.5	11.8
Other Crops	1.5	4.7	82.4	88.6
Improved Pasture	3.6	16.4	467.3	487.3
Unimproved Pasture	-	1.4	8.6	10.0
Woodland	3.0	25.7	344.2	372.9
Miscellaneous	4.2	5.7	16.3	26.2
TOTAL	109.1	171.2	1,038.2	1,318.5

crops and vegetative windbreaks should be utilized to their fullest in the reduction of erosion damage resulting from wind and water.

Figure 4.7 Soils With Excess Water Hazards

Agricultural lands on which the dominant problems are due to excess water comprise 3,561,500 acres, or 66 percent of the total agricultural acreage.

A summarization of the agricultural use of soils with limitations or hazards due to excess water is shown in Table 4.3.

TABLE 4.3
AGRICULTURAL USE OF SOILS WITH DOMINANT PROBLEMS OF EXCESS WATER - 1963
(1,000 Acres)

Land Use	Sub-Basin 1	Sub-Basin 2	Sub-Basin 3	Basin Total
Citrus	41.6	63.7	10.5	115.8
Vegetables	6.4	18.8	3.0	28.2
Other Crops	2.5	9.0	10.3	21.8
Improved Pasture	156.3	197.1	89.7	443.1
Unimproved Pasture	625.6	586.8	125.4	1,337.8
Woodland	299.8	565.7	623.5	1,489.0
Miscellaneous	7.2	82.8	35.8	125.8
TOTAL	1,139.4	1,523.9	898.2	3,561.5

The projected increases in acreages of citrus, vegetables, other crops, and improved pasture, in the reduced area of land available for agriculture, will require an increase in the development of the land and water resources. In 1963, 37 percent of the citrus acreage; 58 percent of the vegetables; 20 percent of the other crops; 59 percent of the improved pasture; 88 percent of the unimproved pasture; 63 percent of the woodland; and 50 percent of the miscellaneous uses were on soils subject to excess water damage. By 1980, the projected percentages will be citrus 46, vegetables 64, other crops 18, improved pasture 67; unimproved pasture 91, woodland 61 and miscellaneous uses 46 percent. This trend toward more intensive use of soils limited by excess water will continue. By 2015, 54 percent of the citrus acreage will be on soils with these limitations, 79 percent of the vegetables, 34 percent of the other crops, and 68 percent of the improved pasture. Sixty-four percent of the total projected agricultural area of the Basin will consist of soils with limitations due to excess water. (Table 4.4) In order for these soils to be used to their full potential, and to reduce damages caused by excess water, the water management program for flood prevention and drainage must be intensified.

TABLE 4.4
AGRICULTURAL USE OF SOILS WITH DOMINANT PROBLEMS OF EXCESS WATER - 2015
(1,000 Acres)

Land Use	Sub - Basin 1	2	3	Total Basin
Citrus	190.5	157.5	30.3	378.3
Vegetables	18.1	24.4	6.7	49.2
Other Crops	15.2	18.8	11.4	45.4
Improved Pasture	434.0	408.8	188.6	1,031.4
Unimproved Pasture	113.9	51.1	23.6	188.6
Woodland	228.6	222.7	480.2	931.5
Miscellaneous	14.8	33.4	21.8	70.0
TOTAL	1,015.1	916.7	762.6	2,694.4

Water management in the form of individual farm drainage systems has been installed on 151,600 acres. The location and extent of drainage, by township is shown on Figure 4.8.

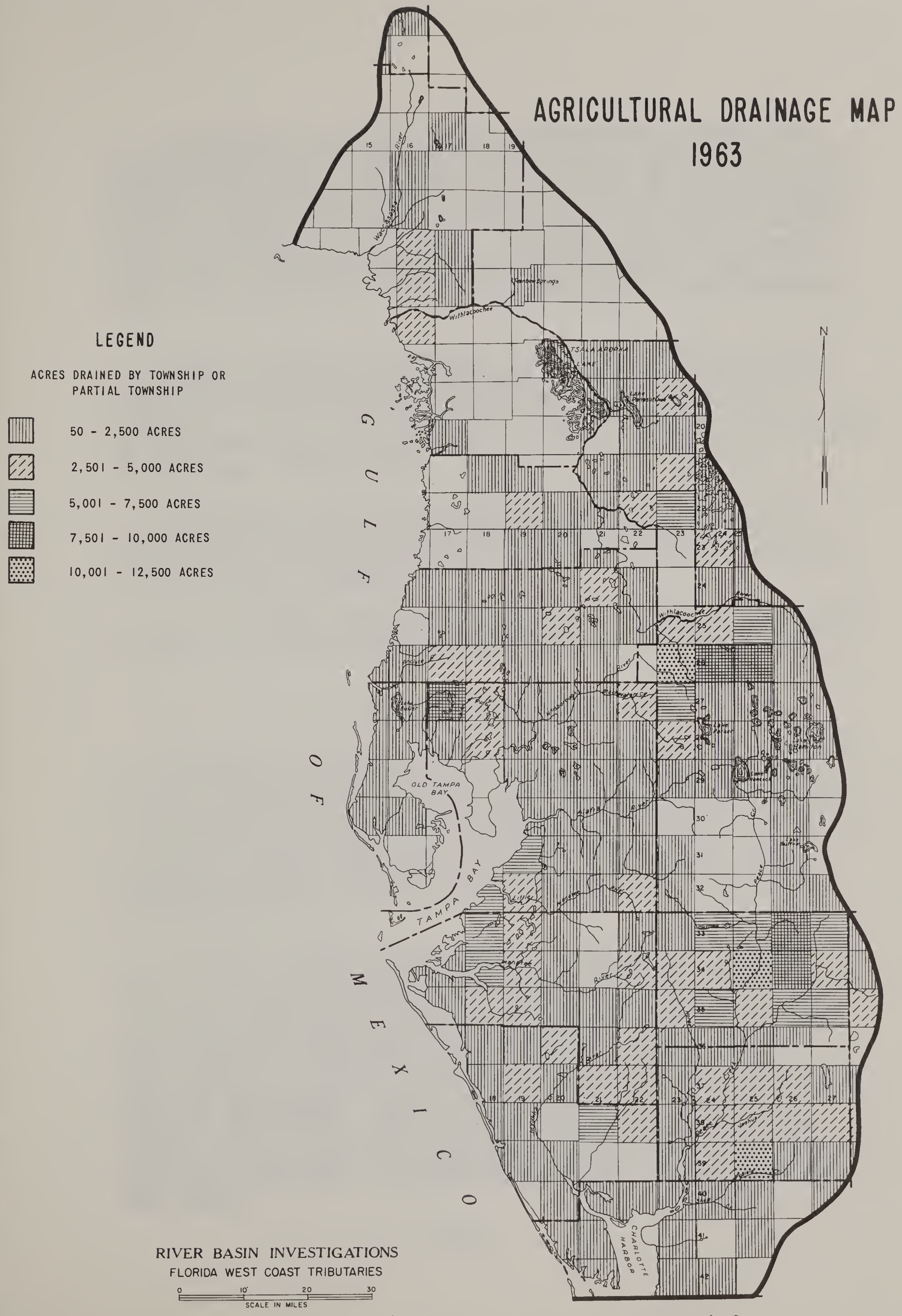

AGRICULTURAL DRAINAGE MAP
1963
LEGEND
ACRES DRAINED BY TOWNSHIP OR PARTIAL TOWNSHIP
50 - 2,500 ACRES
2,501 - 5,000 ACRES
5,001 - 7,500 ACRES
7,501 - 10,000 ACRES
10,001 - 12,500 ACRES
N
GULF OF MEXICO
OLD TAMPA BAY
TAMPA BAY
CHARLOTTE HARBOR
TSALA APOPKA LAKE
Withlacoochee
Rainbow Springs
RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES
0 10 20 30
SCALE IN MILES

Figure 4.8

In addition to the Soil Conservation District program, the Soil Conservation Service also is authorized to cooperate with local organizations (which have authority under State law to carry out, maintain, and operate works of improvement), in planning and implementing works of improvement for flood prevention, and for conservation, development, utilization, and disposal of water in watershed areas of 250,000 acres or less. This program is authorized under Public Law 566, the Watershed Protection and Flood Prevention Act.

Plans for works of improvement for flood prevention and water management through project action under authority of Public Law 566, have been approved for 586,500 acres on planning units, numbered 21, 29, 31, 40, 43, and 45, with preliminary plans completed for two additional units numbered 15a, and 44, encompassing 84,700 acres. (Figure 4.9)

In addition to the area treated by planned project action and through the efforts of individual landowners, a problem of excess water still exists on 2.9 million acres of land being used for agricultural purposes.

It is contemplated that existing individual and project action programs will continue and additional programs will be initiated.

Flood Control and Navigation Projects

The Corps of Engineers have studies, investigations, and works of improvement in the Basin area for flood control, water conservation, navigation and other purposes. Their works of improvement for navigation completed-channels and harbors - include improvements at Charlotte Harbor, New Pass (Sarasota), Manatee River, St. Petersburg Harbor, Clearwater Pass (Little Pass), Ozona (Channel and Turning Basin), Anclote River, Homosassa River, Crystal River, and Cedar Keys Harbor.

Projects underway for navigation include works of improvement for the Intra-Coastal Waterway, Caloosahatchee River to Anclote River, Cross-Florida Barge Canal from St. Johns River to the Gulf of Mexico, Tampa Harbor, and the Withlacoochee River. There are also two authorized projects for the Hudson River and Pass-A-Grille Pass Channels. A multiple purpose project, Four River Basins, has been authorized for planning and the eventual installation of works of improvement. Three of the basins in this project are included in the West Coast Tributaries Basin, namely, the Hillsborough, Withlacoochee and Peace Rivers, along with three smaller West Coast Watersheds - Pithlachascotee Rivers, Anclote River and Lake Tarpon.

The improvements consist primarily of stream improvements and a system of canals, reservoirs, and auxiliary water control structures designed to prevent a recurrence of the disastrous flooding experienced in the past and to permit storage of excess water for later beneficial use.

The 1961 session of the Florida Legislature created the Southwest Florida Water Management District to represent local interests in the Four River Basins Project.

Potential Projects

Planning Units

The development of soil and water resources on a planning unit (small watershed) basis offers communities an excellent opportunity to solve soil and water problems on a coordinated basis, compatible with a basin-wide program of development, conservation, and management.

The Basin was divided into planning units, identified by number and name in Table 4.5 and by location on Figure 4.9.

TABLE 4.5
INDEX OF PLANNING UNIT NAMES

Planning Unit Name	Number	Planning Unit Name	Number
Saddle Creek	1	Oak-Hickory Branch	10
Peace Creek	2	Limestone Creek	11
Six Mile Creek	3	Charlie Creek	12a
Whidden Creek	4	Little Charlie Bowlegs Creek	12b
Bowlegs Creek	5	Oak Creek	12c
Payne Creek	6	Joshua Creek	13
Little Charlie Creek	7	Shell Creek	14
Horse Creek	8a	Peace River	15
Brushy Creek	8b	Alligator-Hickory Branch	15a
Troublesome Creek	9	East Charlotte Harbor	16

TABLE 4.5 (cont'd)

Planning Unit Name	Number	Planning Unit Name	Number
Pithlachascotee River	17	Myakka River	30
Cypress Creek	18a	Big Slough	31
Upper Hillsborough River	18b	Deer Prairie	32
Blackwater Creek	18c	West Charlotte Harbor	33
Hollomans Branch	18d	Gulf Hammock	34a
Pemberton Creek	18e	Waccasassa River	34b
Hillsborough River	18f	Wekiva River & Cow Creek	34c
Anclote River	19	Blue Run	35a
Pinellas	20	North of Cross-Florida Canal	35b
Brooker Creek	20a	Withlacoochee River	36
Upper Tampa Bay	21	South of Cross-Florida Canal	37
Turkey Creek	22a	Crystal River	38a
Upper Alafia River	22b	Chassahowitzka Swamp	38b
Fishhawk Creek	22c	Brooksville	39
Alafia River	22d	Big Four	40
Bullfrog Creek	23	South Lake Panasoffkee	41
Little Manatee River	24	Warm Springs Hammock	42
Frog Creek	25	Jumper Creek	43
Manatee River	26	Big Prairie	44
Braden River	27	South Sumter	45
Northwest Sarasota	28	North Polk	46
Sarasota West Coast	29	Mattie-Lowery	47

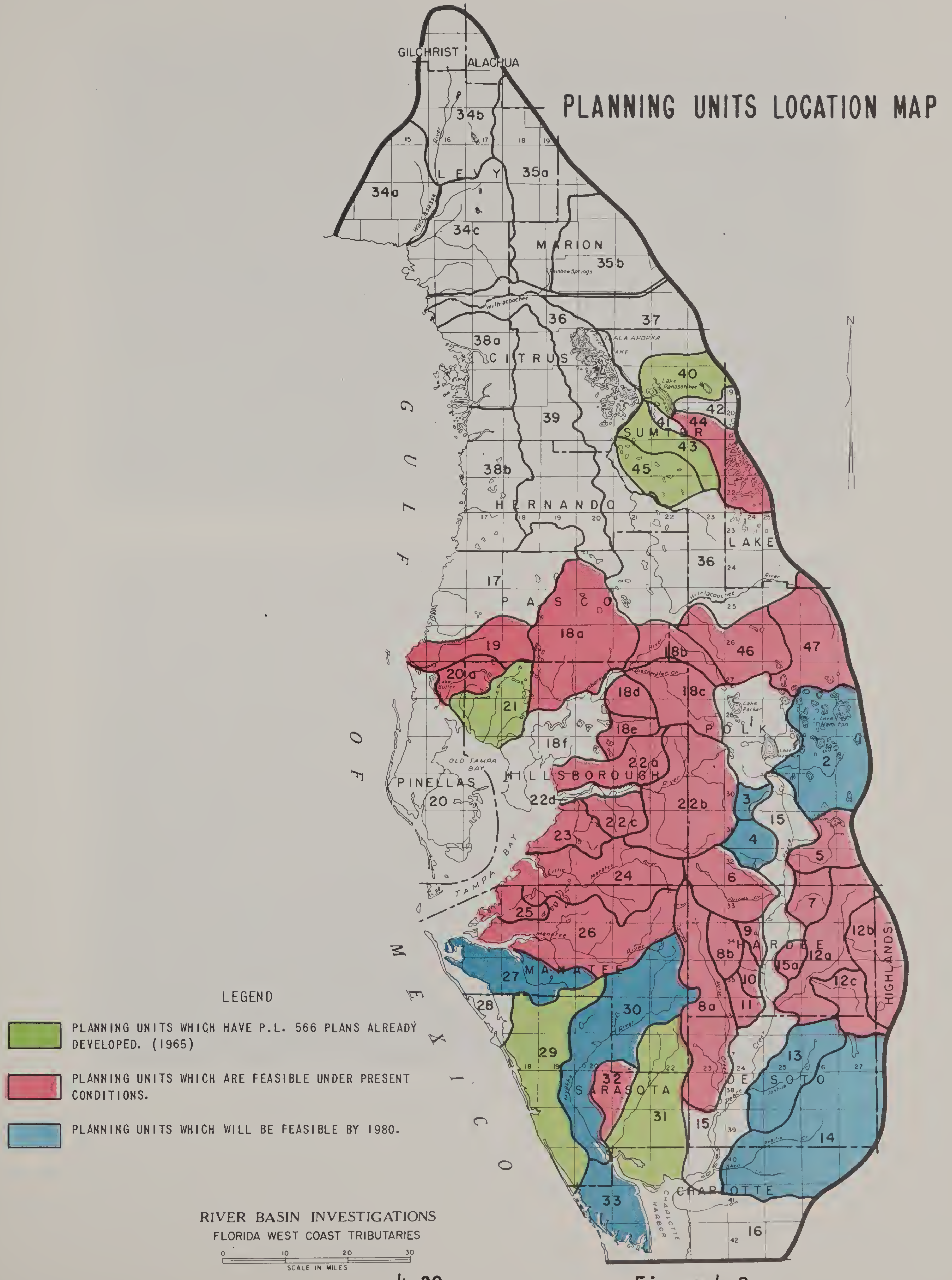

PLANNING UNITS LOCATION MAP
GILCHRIST
ALACHUA
LEVY
MARION
CITRUS
SUMTER
HERNANDO
LAKE
PASCO
POLK
PINELLAS
HILLSBOROUGH
MANATEE
HARDEE
HIGHLANDS
SARASOTA
DE SOTO
CHARLOTTE
GULF OF MEXICO
OLD TAMPA BAY
TAMPA BAY
CHARLOTTE HARBOR
Rainbow Springs
Withlacoochee
Lake Panasoffkee
Lake Parker
Lake Hamilton
Lake Butler
Blackwater Cr.
Manatee
Peace
Shell
Prairie Cr.
Myakka
LEGEND
PLANNING UNITS WHICH HAVE P.L. 566 PLANS ALREADY DEVELOPED. (1965)
PLANNING UNITS WHICH ARE FEASIBLE UNDER PRESENT CONDITIONS.
PLANNING UNITS WHICH WILL BE FEASIBLE BY 1980.
RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES
0 10 20 30
SCALE IN MILES
USDA-SCS-SPARTANBURG S C 1965
M R 65-88

Figure 4.9

Figure 4.10 Damaging Floods

All of the planning units are less than 250,000 acres and would meet the size limitation imposed by P.L. 566, except the main stem of Peace River (No. 15); the main stem of the Withlacoochee including the Cross Florida Barge Canal (No. 36); and an area without a well defined pattern of surface drainage, from which there is little or no surface runoff (No. 39).

Among the major problems encountered in developing a program for the conservation, use and management of the water and related land resources are flood damage and the lack of drainage of soils used for agricultural production and for non-agricultural uses.

The soil resources of the Basin were grouped by use of the criteria established for the Soil Capability Classification. It was found that 3.6 million acres of the agricultural land in 1963 were made up of soils having excess water as the dominant hazard or limitation in their use. The projected agricultural area for 1980 and 2015 indicates that 3.1 million and 2.7 million acres, respectively, would be subject to the same type limitation of excess water.

Much of the area in the southern part of the Basin is relatively flat with poorly defined natural drainage ways and interspersed with intermittent ponds. During periods of high intensity rainfall or rains of long duration, the watercourses and intermittent ponds are filled to capacity and flood waters spread over the adjacent lands. The natural removal rate is extremely slow, and although the depth of inundation is relatively small the duration of flooding creates extensive damage to row crops, citrus and improved pasture.

Solution of the problem generally requires carrying out a comprehensive water management program involving both flood prevention and drainage affecting relatively large areas. For this reason, the individual landowner is usually unable to solve his excess water problems since the needed water management facilities may extend considerable distance downstream from his property. Often problems of flooding, caused by surplus surface waters, and inadequate drainage caused by excess water in the soil profile are closely associated and occur on the same land, making evaluations of improvement measures by purpose, very difficult.

The same land that suffers from flooding and inadequate drainage during periods of excess rainfall may also be seriously affected by drought during periods of low rainfall. With approximately sixty percent of the total annual rainfall occurring within a four month period, the control and disposal of excess water during the rainy season, and maintaining a proper soil-mositure balance during periods of drought, become the most pressing problems facing agriculture in the Basin.

It is not considered feasible to provide facilities that will eliminate all flooding, but rather to remove the flood water within a period of time compatible with the tolerance of the crop being grown. As a general rule for Florida conditions, the following approximate durations of flooding can be tolerated before significant damage takes place: truck crops - 24 hours; citrus - 36 to 48 hours; grass-clover pasture - three days; and grass pasture five to ten days. The channels are usually designed to remove the runoff from a specific frequency storm within the time period dictated by the tolerance of the crop to be protected.

The extent of land uses on lands with excess water hazards, as indicated by an evaluation of "w" subclasses, was tabulated. The portion having adequate facilities to remove excess water was subtracted to obtain estimates of acres needing additional facilities. These acres, by land use, became the basis for estimating flood prevention and agricultural water management needs in the evaluation of forty-nine of the 64 Planning Units (Figure 4.9 and Table 4.5) in the Basin. These units were evaluated to determine, as nearly as possible, the technical and economic feasibility of providing works of improvement for the reduction of damages caused by excess water on agricultural lands.

The remaining 15 units were not included in the evaluation since six of these units, numbered 21, 29, 31, 40, 43, and 45, have approved Public Law 566 Work Plans; 2 units, numbered 15a and 44 have preliminary Public Law 566 Plans. The remaining 7 units, numbered 15, 18f, 20, 22d, 28, 36, and 39, were excluded from the evaluations because they are either the main stem of major streams, predominantly in urban or industrial areas, or in areas of little or no surface runoff. (Figure 4.9)

As a means of determining the degree of local interest in project action in the planning units, a number of local groups, organizations and prominent landowners were contacted. Included in these groups and organizations were the concerned Soil and Water Conservation District Supervisors, the County Commissioners, the governing board of the Southwest Florida Water Management District and the basin board members of some of the sub-basins within the Water Management District.

In each case, there was considerable interest shown, along with assurances of cooperation in working with watershed sponsors in the development of plans and in the construction, operation, and maintenance of needed and feasible works of improvement.

The evaluations were made, taking into account conditions as they exist at present (1963), and under projected land use conditions that are expected to exist by 1980.

Evaluations were not made for the year 2015 since it is considered doubtful that conditions could be projected with a sufficient degree of accuracy to make the data meaningful for areas as small or smaller than 250,000 acres. However, it is reasonable to expect that many of the planning units in the marginal category in the 1980 evaluation will reach the feasible stage by 2015 and a majority of those in the nonfeasible category will progress to marginal or feasible.

Some of the planning units evaluated as feasible in 1963 or 1980 will likely not be eligible by the year 2015 under present criteria, due to the expansion of residential, industrial, or other non-agricultural uses into these units. Principally among these are units that include significant acreages owned or under long term lease by phosphate mining companies.

It was found that 28 of the 49 planning units evaluated are feasible, while 6 were considered marginal and 15 not feasible under present conditions. (Table 4.6)

TABLE 4.6
PLANNING UNITS
COSTS AND BENEFITS - 1963
POTENTIAL WORKS OF IMPROVEMENT FOR FLOOD
PREVENTION AND AGRICULTURAL WATER MANAGEMENT

Planning Unit Number	Costs		Annual Benefits - 1963			Ratio Benefits to Costs
	Total[1/]	Annual[2/]	Primary[3/]	Secondary[4/]	Total	
	(1,000 Dollars)					
1	1,366	68.4	24.4	4.6	29.0	0.4:1
2	1,479	74.1	41.0	7.9	48.9	0.7:1
3	202	10.1	4.5	0.9	5.4	0.5:1
4	485	24.3	18.5	3.8	22.3	0.9:1
5	482	24.1	22.6	4.5	27.1	1.1:1
6	995	49.9	51.6	10.4	62.0	1.2:1
7	416	20.8	27.5	5.7	33.2	1.6:1
8a	1,567	78.5	99.5	21.2	120.7	1.5:1

TABLE 4.6 (cont'd)

Planning Unit Number	Costs Total[1/]	Costs Annual[2/]	Annual Benefits - 1963 Primary[3/] (1,000 Dollars)	Annual Benefits - 1963 Secondary[4/]	Annual Benefits - 1963 Total	Ratio Benefits to Costs
8b	352	17.6	29.7	6.1	35.8	2.0:1
9	162	8.1	11.9	2.6	14.5	1.8:1
10	156	7.8	11.3	2.3	13.6	1.7:1
11	257	12.9	19.6	4.2	23.8	1.8:1
12a	1,189	59.6	94.8	19.8	114.6	1.9:1
12b	813	40.7	36.1	7.1	43.2	1.1:1
12c	504	25.3	35.3	7.2	42.5	1.7:1
13	1,071	53.6	38.8	8.1	46.9	0.9:1
14	2,940	147.3	110.7	22.3	133.0	0.9:1
15	Main stem of Peace River					
15a	Preliminary Public Law 566 Plan					
16	1,382	69.2	35.5	6.7	42.2	0.6:1
17	2,133	106.7	64.1	10.4	74.5	0.7:1
18a	2,037	102.0	112.2	20.3	132.5	1.3:1
18b	567	28.2	34.2	6.1	40.3	1.4:1
18c	662	33.1	39.0	9.5	48.5	1.5:1
18d	235	11.8	25.1	6.2	31.3	2.7:1
18e	276	13.8	22.3	5.4	27.7	2.0:1
18f	Main stem Hillsborough River and Tampa Complex					
19	913	45.7	43.6	6.8	50.4	1.1:1
20	Urban Complex - Pinellas County					
20a	320	16.0	21.2	4.4	25.6	1.6:1
21	Public Law 566 Work Plan					

TABLE 4.6 (cont'd)

Planning Unit Number	Costs Total[1/]	Annual[2/]	Annual Benefits - 1963 Primary[3/]	Secondary[4/]	Total	Ratio Benefits to Costs
	(1,000 Dollars)					
22a	855	42.8	70.8	17.5	88.3	2.1:1
22b	2,269	113.7	106.2	24.6	130.8	1.2:1
22c	485	24.3	47.2	11.9	59.1	2.4:1
22d	Main stem of Alafia River					
23	692	34.6	42.2	9.7	51.9	1.5:1
24	1,877	94.0	164.6	39.5	204.1	2.2:1
25	299	15.0	12.9	2.5	15.4	1.0:1
26	2,023	101.4	89.8	18.4	108.2	1.1:1
27	1,435	71.9	51.4	10.6	62.0	0.9:1
28	Sarasota Complex					
29	Public Law 566 Work Plan					
30	2,293	115.3	64.2	26.9	91.1	0.8:1
31	Public Law 566 work plan					
32	456	22.9	25.0	4.9	29.9	1.3:1
33	1,005	50.3	22.9	4.2	27.1	0.5:1
34a	1,552	77.7	55.3	6.0	61.3	0.8:1
34b	2,735	137.0	46.1	6.2	52.3	0.4:1
34c	2,045	102.4	45.4	4.5	49.9	0.5:1
35a	2,024	101.4	8.1	1.2	9.3	0.1:1
35b	1,667	83.5	8.2	1.5	9.7	0.1:1
36	Main stem of Withlacoochee River					
37	1,215	60.9	17.9	3.1	21.0	0.3:1
38a	1,778	89.0	16.1	2.1	18.2	0.2:1

TABLE 4.6 (cont'd)

Planning Unit Number	Costs Total[1/]	Costs Annual[2/]	Annual Benefits - 1963 Primary[3/]	Annual Benefits - 1963 Secondary[4/]	Annual Benefits - 1963 Total	Ratio Benefits to Costs
	(1,000 Dollars)					
38b	1,868	93.6	23.3	3.1	26.4	0.3:1
39	Area without surface streams					
40	Public Law 566 Work Plan					
41	119	6.0	2.7	0.5	3.2	0.5:1
42	100	5.0	3.1	0.5	3.6	0.7:1
43	Public Law 566 Work Plan					
44	Preliminary Public Law 566 Plan					
45	Public Law 566 Work Plan					
46	957	47.9	55.4	10.7	66.1	1.4:1
47	1,024	51.3	53.1	9.6	62.7	1.2:1
TOTAL	53,734	2,691.5	2,106.9	434.2	2,541.1	

1/ Total initial installation cost, including construction, engineering services, contract administration, and rights-of-way.

2/ Amortized installation cost plus annual operation, maintenance, and replacement costs.

3/ Benefits to growers, based on increased net income.

4/ Includes local benefits resulting from transporting, marketing, and processing goods which produce primary benefits, as well as benefits to suppliers of farm equipment and materials.

Figure 4.11 Channel and Grade Stabilization Structure

Evaluations made under conditions that will likely exist in 1980 indicate that 36 planning units will be feasible, 4 marginal, and 9 not feasible. Under the projected 1980 land use conditions, the 36 feasible units (benefit to cost ratios of at least 1.0 to 1), have a combined drainage area of 4,392,000 acres, of which at least 553,000 acres of citrus, vegetables, crops, pasture, and woodland would benefit from installation of works of improvement. The average annual benefits for the 36 planning units would amount to 3,212,000 dollars including 2,670,000 dollars of primary benefits and 542,000 dollars of local secondary benefits. The total estimated installation cost would amount to 33,750,000 dollars with the average annual cost, including operation, maintenance, and replacement being 1,691,000 dollars. (Table 4.7) Costs and benefits for 22 proposed impoundment structures are not included in the above figures, but are shown in Table 4.12.

Recommended works of improvement for 13 units - numbers, 5, 6, 7, 8a, 12a, 12c, 13, 22b, 22c, 23, 24, 26, and 30 - encompass both channel improvements with grade stabilization structures and impoundment structures for flood prevention, agricultural water management (including irrigation water supply), recreation, fish and wildlife, and low flow augmentation. The recommended works of improvement for the other 23 units - numbers 2, 3, 4, 8b, 9, 10, 11, 12b, 14, 18a, 18b, 18c, 18d, 18e, 19, 20a, 22a, 25, 27, 32, 33, 46, and 47 - consist of channel improvements, including grade stabilization structures, for flood prevention and agricultural water management. Physical data for the 36 units are shown in Table 4.8.

TABLE 4.7
PLANNING UNITS
COSTS AND BENEFITS - 1980
POTENTIAL WORKS OF IMPROVEMENT FOR FLOOD
PREVENTION AND AGRICULTURAL WATER MANAGEMENT

Planning Unit Number	Costs		Annual Benefits - 1980			Ratio Benefits to Costs
	Total[1/]	Annual[2/]	Primary[3/]	Secondary[4/]	Total	
	(1,000 Dollars)					
1	1,366	68.4	40.0	8.2	48.2	0.7:1
2	1,479	74.1	72.3	15.0	87.3	1.2:1
3	202	10.1	9.9	2.2	12.1	1.2:1
4	485	24.3	26.0	4.3	30.3	1.3:1
5	482	24.1	32.5	6.7	39.2	1.6:1

TABLE 4.7 (cont'd)

Planning Unit Number	Costs		Annual Benefits - 1980			Ratio Benefits to Costs
	Total 1/	Annual 2/	Primary 3/	Secondary 4/	Total	
			(1,000 Dollars)			
6	995	49.9	83.1	17.5	100.6	2.0:1
7	416	20.8	39.8	8.2	48.0	2.3:1
8a	1,567	78.5	150.0	31.2	181.2	2.3:1
8b	352	17.6	64.7	12.0	76.7	4.4:1
9	162	8.1	19.7	4.0	23.7	2.9:1
10	156	7.8	17.5	3.6	21.1	2.7:1
11	257	12.9	38.1	7.6	45.7	3.5:1
12a	1,189	59.6	136.8	28.1	164.9	2.8:1
12b	813	40.7	81.0	16.8	97.8	2.4:1
12c	504	25.3	54.2	11.1	65.3	2.6:1
13	1,071	53.6	75.4	15.6	91.0	1.7:1
14	2,940	147.3	188.4	38.9	227.3	1.5:1
15	Main stem of Peace River					
15a	Preliminary Public Law 566 Plan					
16	1,382	69.2	52.9	11.6	64.5	0.9:1
17	2.133	106.7	81.3	13.5	94.8	0.9:1
18a	2,037	102.0	144.2	25.0	169.2	1.7:1
18b	567	28.2	48.5	9.0	57.5	2.0:1
18c	662	33.1	60.5	13.1	73.6	2.2:1
18d	235	11.8	29.4	6.4	35.8	3.0:1
18e	276	13.8	28.9	6.4	35.3	2.7:1
18f	Main stem Hillsborough River and Tampa Complex					
19	913	45.7	53.6	8.5	62.1	1.2:1
20	Urban Complex - Pinellas County					

TABLE 4.7 (cont'd)

Planning Unit Number	Costs Total[1]	Costs Annual[2]	Annual Benefits - 1980 Primary[3] (1,000 Dollars)	Annual Benefits - 1980 Secondary[4]	Annual Benefits - 1980 Total	Ratio Benefits to Costs
20a	320	16.0	17.7	3.4	21.1	1.3:1
21	Public Law 566 Work Plan					
22a	855	42.8	95.5	21.1	116.6	2.7:1
22b	2,269	113.7	132.9	28.9	161.8	1.4:1
22c	485	24.3	56.1	12.6	68.7	2.8:1
22d	Main stem Alafia River					
23	692	34.6	57.0	12.3	69.3	2.0:1
24	1,877	94.0	208.8	44.8	253.6	2.7:1
25	299	15.0	23.1	4.6	27.7	1.9:1
26	2,023	101.4	182.8	36.9	219.7	2.2:1
27	1,435	71.9	102.2	19.8	122.0	1.7:1
28	Sarasota Complex					
29	Public Law 566 Work Plan					
30	2,293	115.3	241.3	47.4	288.7	2.5:1
31	Public Law 566 Work Plan					
32	456	22.9	36.5	6.7	43.2	1.9:1
33	1,005	50.3	41.6	8.8	50.4	1.0:1
34a	1,552	77.7	66.1	7.1	73.2	0.9:1
34b	2,735	137.0	75.2	9.3	84.5	0.6:1
34c	2,045	102.4	45.0	4.5	49.5	0.5:1
35a	2,024	101.4	12.1	1.9	14.0	0.1:1
35b	1,667	83.5	12.0	1.9	13.9	0.2:1
36	Main stem Withlacoochee River					

TABLE 4.7 (cont'd)

Planning Unit Number	Costs		Annual Benefits - 1980			Ratio Benefits to Costs
	Total[1/]	Annual[2/]	Primary[3/]	Secondary[4/]	Total	
			(1,000 Dollars)			
37	1,215	60.9	19.5	3.2	22.7	0.4:1
38	1,778	89.0	18.8	2.5	21.3	0.2:1
38b	1,868	93.6	22.3	3.0	25.3	0.3:1
39	Area without surface streams					
40	Public Law 566 Work Plan					
41	119	6.0	3.1	0.6	3.7	0.6:1
42	100	5.0	3.7	0.7	4.4	0.9:1
43	Public Law 566 Work Plan					
44	Preliminary Public Law 566 Plan					
45	Public Law 566 Work Plan					
46	957	47.9	85.6	17.6	103.2	2.2:1
47	1,024	51.3	56.4	10.7	67.1	1.3:1
TOTAL	53,734	2,691.5	3,244.0	634.8	3,878.8	

1/ Total initial installation cost, including construction, engineering services, contract administration, and rights-of-way.

2/ Amortized installation cost plus annual operation, maintenance, and replacement costs.

3/ Benefits to growers, based on increased net income.

4/ Includes local benefits resulting from transporting, marketing, and processing goods which produce primary benefits, as well as benefits to suppliers of farm equipment and materials.

Figure 4.12 Water Impoundment

TABLE 4.8
PLANNING UNITS
PHYSICAL DATA
POTENTIAL WORKS OF IMPROVEMENT FOR FLOOD
PREVENTION AND AGRICULTURAL WATER MANAGEMENT

Planning Unit Number	Drainage Area (Sq. Mi.)	Channel Improvement (Miles)	Grade Stabilization Structures (Number)	Side Inlets (Pipe) (Number)	Excavation (Earth) (1,000 cu.yds)
*2	192.5	26	9	51	875
3	26.3	7	2	15	245
4	63.1	18	5	37	587
*5	62.7	11	1	22	199
*6	129.5	32	13	63	731
*7	54.1	14	4	28	201
8a	203.9	57	16	120	1,896
*8b	45.8	25	9	50	683
*9	21.1	6	1	12	88
*10	20.3	8	2	17	129
*11	33.4	17	3	32	390
*12a	154.7	13	7	66	716
*12b	105.8	30	4	60	865
*12c	65.6	30	8	60	571
*13	139.4	57	10	114	1,330
14	382.5	106	30	225	3,557
*15a	Preliminary Public Law 566 Plan				
18a	265.0	73	21	156	2,465
18b	73.8	20	6	43	686
18c	86.1	24	7	51	800
18d	30.6	9	2	18	285
18e	35.9	10	3	21	334
19	118.8	33	9	70	1,105

TABLE 4.8 (cont'd)

Planning Unit Number	Drainage Area (Sq. Mi.)	Channel Improvement (Miles)	Grade Stabilization Structures (Number)	Side Inlets (Pipe) (Number)	Excavation (Earth) (1,000 cu.yds)
20a	41.6	12	3	24	287
*21	Public Law 566 Work Plan				
22a	111.3	31	9	65	1,035
22b	295.3	82	23	173	2,746
22c	63.1	18	5	37	587
23	90.0	25	7	53	837
24	244.2	68	19	143	2,271
25	38.9	11	3	23	362
26	263.3	73	21	155	2,449
27	186.7	52	15	110	1,736
*29	Public Law 566 Work Plan				
*30	298.4	24	2	48	482
*31	Public Law 566 Work Plan				
32	59.4	17	5	35	552
33	130.8	36	10	77	1,216
*40	Public Law 566 Work Plan				
*43	Public Law 566 Work Plan				
*44	Preliminary Public Law 566 Plan				
*45	Public Law 566 Work Plan				
*46	124.5	53	5	106	1,451
47	133.3	37	10	78	1,240

*Data from these units were used to develop structural data and cost estimates per square mile of drainage area for expansion to other units evaluated in the Basin.

Figure 4.13 Water Impoundment for Irrigation And Recreation

Potential Water Impoundment

In the development of the resources of the Basin, good quality water is of utmost importance. To help meet the projected needs of the expanding population for water and for products and services, sites located within the upstream tributary areas were considered for potential water impoundments.

Twenty-two sites appear feasible (Figure 4.14). The combined storage in these 22 sites would amount to 156,000 acre feet, with a surface area of 24,620 acres. (Table 4.10) A two foot drawdown of the permanent pool would supply 44,300 acre feet of water for irrigation, leaving 111,700 acre feet for recreational and other purposes. In conjunction with the water area of 24,620 acres, an additional adjacent land area of 6,455 acres would be developed for recreational use. (Figure 4.17) This area of land and water would support annually 4,770,000 user-days for recreation, including fishing and hunting. (Table 4.11)

RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES

0 10 20 30
SCALE IN MILES

TABLE 4.10
POTENTIAL WORKS OF IMPROVEMENT FOR WATER IMPOUNDMENT FOR AGRICULTURAL WATER MANAGEMENT, RECREATION, AND FISH AND WILDLIFE

Planning Unit Number	Structure Number	Drainage Area (sq. mi.)	Pool Area Normal (Acres)	Pool Area Minimum (Acres)	Storage Capacity Total (1,000 ac. ft.)	Storage Capacity Irrigation Water (1,000 ac. ft.)
5	P-5-1	69	790	660	5.4	1.5
	P-5-2	45	1,160	750	5.2	2.1
6	P-6-1	67	910	700	5.5	1.5
	P-6-2	35	420	350	3.5	0.8
7	P-7-1	38	420	300	2.6	0.8
8a	P-8a-1	136	4,120	3,350	22.9	7.8
12a	P-12a-1	216	4,810	2,500	16.7	7.0
12c	P-12c-1	63	1,160	850	6.6	2.1
13	P-13-1	86	470	350	2.5	0.8
22b	T-22b-4	259	1,790	1,440	13.4	3.2
	T-22b-5	76	1,570	1,300	13.7	3.1
	T-22b-6	127	1,600	1,350	14.2	3.2
22c	T-22c-3	27	470	430	4.5	0.9
23	T-23-1	37	180	130	1.1	0.3
24	T-24-1	139	2,030	1,700	20.2	4.1
	T-24-2	28	360	320	3.2	0.7
	T-24-3	16	250	200	1.7	0.5
	T-24-4	30	390	270	1.6	0.7
26	T-26-2	62	880	720	6.8	1.7
	T-26-3	17	380	290	2.3	0.7
	T-26-4	15	180	130	0.8	0.3
30	T-30-1	26	280	220	1.6	0.5
TOTAL	22	1,514	24,620	18,310	156.0	44.3

TABLE 4.11
POTENTIAL WORKS OF IMPROVEMENT FOR WATER IMPOUNDMENT FOR AGRICULTURAL WATER MANAGEMENT, RECREATION, AND FISH AND WILDLIFE

Structure Number	Site Number 1/	Recreation - Fish and Wildlife: Area: Water (Acres)	Area: Adjacent Land (Acres)	Use: Peak-Day (1,000 User-days)	Use: Annual (1,000 User-days)
P-5-1	82	660	250	2.4	184.7
P-5-2	81	750	100	1.0	73.9
P-6-1	84	700	250	2.4	184.7
P-6-2	83	350	150	1.4	110.8
P-7-1	85	300	100	1.0	73.9
P-8a-1	64,65	3,350	1,100	10.6	812.9
P-12a-1	60,61	2,500	800	7.7	591.2
P-12c-1	86	850	300	2.9	221.7
P-13-1	87	350	150	1.4	110.8
T-22b-4	47	1,440	500	4.8	369.5
T-22b-5	49	1,300	400	3.8	295.6
T-22b-6	45, 46	1,350	400	3.8	295.6
T-22c-3	72	430	200	1.9	147.8
T-23-1	71	130	130	1.2	96.1
T-24-1	74	1,700	750	7.2	554.2
T-24-2	76	320	100	1.0	73.9
T-24-3	75	200	75	0.7	55.4
T-24-4	73	270	150	1.4	110.8
T-26-2	79	720	300	2.9	221.7
T-26-3	77	290	100	1.0	73.9
T-26-4	78	130	50	0.5	36.9
T-30-1	80	220	100	1.0	73.9
TOTAL		18,310	6,455	62.0	4,769.9

1/ Figure 4.16

The installation cost for the 22 potential impoundments and related land areas would amount to 32.3 million dollars with the average annual costs being 2.5 million. The average annual benefits would be 9.0 million dollars, of which 8.1 million would be primary benefits. (Table 4.12)

TABLE 4.12
POTENTIAL WORKS OF IMPROVEMENT FOR WATER IMPOUNDMENT FOR AGRICULTURAL WATER MANAGEMENT, RECREATION, AND FISH AND WILDLIFE
(1,000 Dollars)

Structure Number	Costs[1/]		Annual Benefits[2/]		
	Installation	Annual	Primary	Secondary	Total
P-5-1	1,195	93	311	36	347
P-5-2	955	59	169	24	193
P-6-1	1,428	105	314	36	350
P-6-2	868	63	187	21	208
P-7-1	646	45	122	15	137
P-8a-1	4,623	370	1,375	163	1,538
P-12a-1	3,972	296	984	121	1,105
P-12c-1	1,648	120	376	44	420
P-13-1	872	64	186	21	207
T-22b-4	2,727	200	609	71	680
T-22b-5	1,909	149	507	61	568
T-22b-6	2,143	159	504	61	565
T-22c-3	1,030	78	255	27	282
T-23-1	673	53	151	16	167
T-24-1	3,158	258	959	109	1,068
T-24-2	584	43	128	15	143
T-24-3	462	33	95	11	106

TABLE 4.12 (cont'd)

Structure Number	Costs[1/]		Annual Benefits[2/]		
	Installation	Annual	Primary	Secondary	Total
T-24-4	726	56	179	20	199
T-26-2	1,293	105	372	43	415
T-26-3	520	40	122	15	137
T-26-4	319	23	64	7	71
T-30-1	513	40	122	14	136
TOTAL	32,264	2,452	8,091	951	9,042

1/ Installation costs include costs of construction of the dams and for development of recreation facilities, as well as engineering and rights-of-way costs. Annual costs include amortized installation costs and the cost of annual operation, maintenance, and replacement.

2/ Primary benefits include agricultural benefits based on increased net income due to irrigation, and recreation benefits accruing to users of facilities.

3/ Secondary benefits are local benefits resulting from transporting, processing, and marketing goods and services which produce primary benefits; and from increases in net income of suppliers of equipment and materials required to achieve increased production made possible by the improvements.

Figure 4.15 Income Producing Recreation

Recreation

Recreation covers the broad category of outdoor recreational activities dependent on land and water resources, except for golf courses, playgrounds, coastal beaches, and salt water fishing.

The land area ranges from wild undeveloped and underdeveloped scrub oak highlands, swamps, highland hammocks, pine and palmetto forest to the highly developed agricultural areas used for vegetables, citrus, and ranch operations. Available land and water areas in the Basin suitable for outdoor recreation are limited. Many of the lakes and most of the land are in private ownership and therefore are not open to the public for recreational activities, including hunting and fishing. There is a limited number of private recreation developments operated as income producing enterprises.

Faced with limited resources, and a seemingly unlimited human requirement for outdoor recreation, (Tables 4.13 and 4.14) every effort should be made to develop the present public outdoor recreation areas to their full potential, and to acquire additional sites where practicable. Figure 4.16 indicates locations of potential sites for development. Site location numbers 1 through 70 were selected by the Southwest Florida Water Management District and discussed in their report to the Outdoor Recreation Development Council entitled "Outdoor Recreation Plan."

TABLE 4.13
PROJECTED TOTAL DEMAND FOR OUTDOOR RECREATION
BY RESIDENTS AND TOURISTS - 2015
(1,000 User-Occasions)

	User-Occasions[1/]	
	Peak Day Demand	Total Demand
Hunting	357	12,110
Fishing, saltwater	1,502	78,630
Fishing, freshwater	992	55,400
Camping	305	14,880
Picnicking	1,113	81,830
Hiking	127	6,830
Boating	1,886	122,440
Swimming, saltwater	7,066	401,500
Swimming, freshwater	3,371	186,230
Water skiing	1,072	52,550
Visits to historical and archaeological sites	299	26,670
Nature study	333	25,220
Pleasure driving	3,460	356,700

[1/] Data furnished by Florida Outdoor Recreational Planning Committee for the Florida West Coast Tributaries Basin.

TABLE 4.14
OUTDOOR RECREATION RESOURCES NEEDED TO MEET TOTAL PEAK-DAY DEMAND BY THE YEAR 2015[1/]

Resource Required	Unit of Measure	Quality
For hunting:		
game habitat	acres	32,900,000
For saltwater fishing:		
boat access sites	each	2,604
shoreline	miles	768
For fresh water fishing:		
water habitat	acres	609,000
For camping:		
family campsites	each	7,626
wilderness area	acres	2,750,000
For picnicking:		
family picnic sites	each	93,000
For hiking:		
hiking trail	miles	15,875
hiking area	acres	397,000
For boating:		
boat access points	each	4,715
water area	acres	2,430,000
For saltwater swimming:		
beach frontage	miles	6,691
beach area	acres	81,000
For freshwater swimming:		
shoreline	miles	1,338
beach area	acres	16,000
For water skiing:		
boat access points	each	268
water area	acres	67,000
For viewing historical and archaeological sites:		
area	acres	343

TABLE 4.14 (cont'd)

Resource Required	Unit of Measure	Quantity
For nature study: natural area	acres	1,670,000
For pleasure driving: scenic roadway	miles	55,400

1/ Data furnished by Florida Outdoor Recreational Planning Committee for the Florida West Coast Tributaries Basin.

"Outdoor Recreation Plan - a report to the OUTDOOR RECREATION DEVELOPMENT COUNCIL - prepared by the Southwest Florida Water Management District." Numbers 45, 46, 47, 49, 60, 61, 64, and 65 are duplicated areas, in that additional proposals for expansion of the recreation areas and facilities are included in the Florida West Coast Tributaries Report. The potential areas for development of recreation facilities in conjunction with 22 multi-purpose water impoundment sites include opportunity for both land and water based outdoor recreation facilities for 4,770,000 user-days of activities annually. Seven of these impoundments would have adjacent areas developed for one or more hunting sites; 22 would have sites for picnicking; 12 would have sites for hiking and nature study; 22 would be provided with boat access sites; 22 would have swimming areas; and 6 would provide opportunities for water skiing. (Table 4.15) The facilities mentioned in connection with proposed impoundment sites are in addition to those contained in other reports. Opportunities are excellent for development of private recreational enterprises to help meet projected outdoor recreational demands.

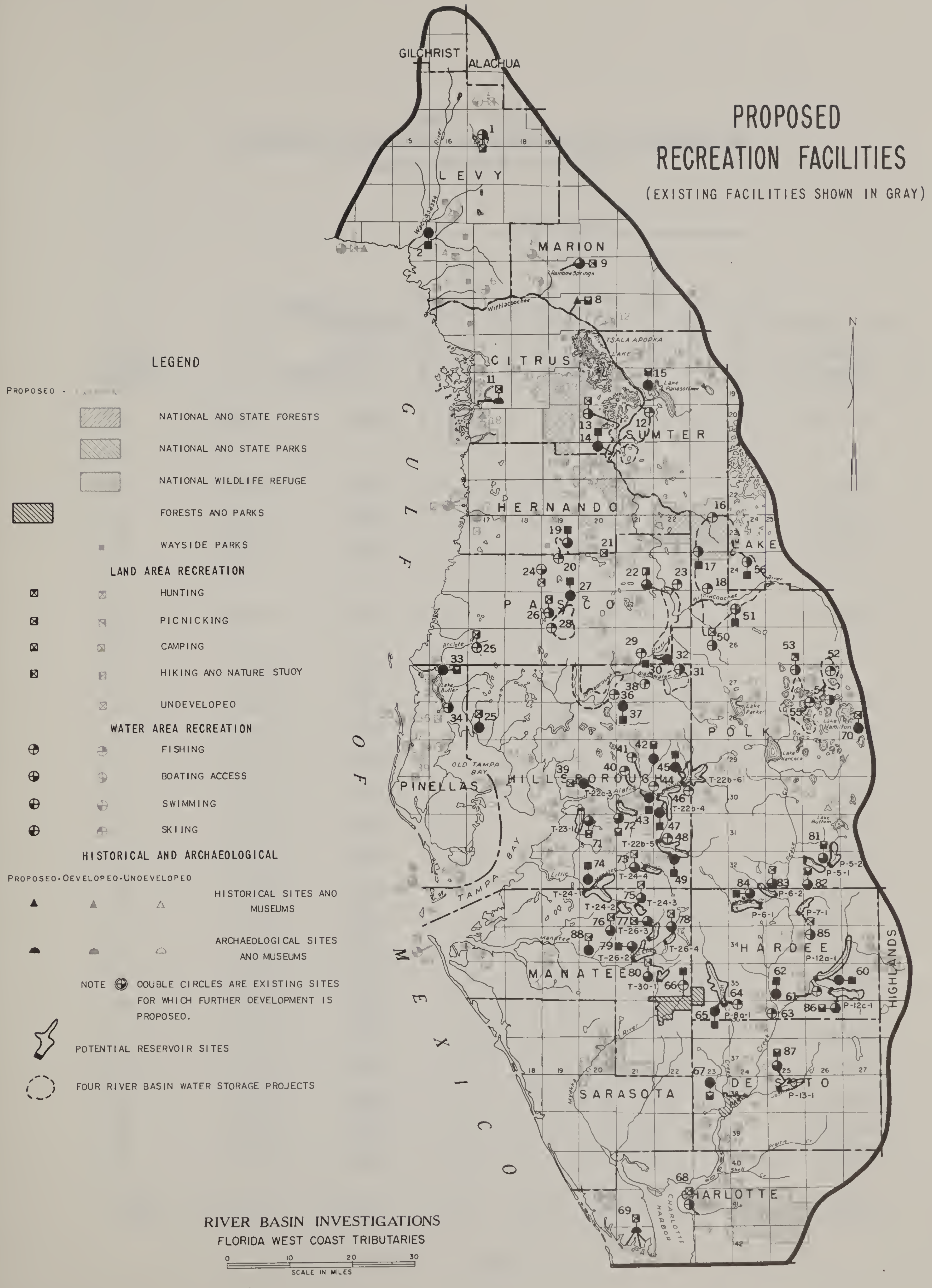

PROPOSED
RECREATION FACILITIES
(EXISTING FACILITIES SHOWN IN GRAY)
LEGEND
PROPOSED -
NATIONAL AND STATE FORESTS
NATIONAL AND STATE PARKS
NATIONAL WILDLIFE REFUGE
FORESTS AND PARKS
WAYSIDE PARKS
LAND AREA RECREATION
HUNTING
PICNICKING
CAMPING
HIKING AND NATURE STUDY
UNDEVELOPED
WATER AREA RECREATION
FISHING
BOATING ACCESS
SWIMMING
SKIING
HISTORICAL AND ARCHAEOLOGICAL
PROPOSED-DEVELOPED-UNDEVELOPED
HISTORICAL SITES AND MUSEUMS
ARCHAEOLOGICAL SITES AND MUSEUMS
NOTE DOUBLE CIRCLES ARE EXISTING SITES FOR WHICH FURTHER DEVELOPMENT IS PROPOSED.
POTENTIAL RESERVOIR SITES
FOUR RIVER BASIN WATER STORAGE PROJECTS
GILCHRIST
ALACHUA
LEVY
MARION
CITRUS
SUMTER
HERNANDO
LAKE
PASCO
PINELLAS
HILLSBOROUGH
POLK
MANATEE
HARDEE
HIGHLANDS
SARASOTA
DE SOTO
CHARLOTTE
GULF OF MEXICO
TSALA APOPKA LAKE
Withlacoochee
OLD TAMPA BAY
TAMPA BAY
CHARLOTTE HARBOR
Rainbow Springs
Lake Panasoffkee
Lake Parker
Lake Hamilton
Lake Hancock
Lake Buffum
Lake Butler
Anclote
N
RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES
0 10 20 30
SCALE IN MILES
USDA-SCS-SPARTANBURG, S. C. 1969
MR65-102

Figure 4.16

TABLE 4.15
POTENTIAL WORKS OF IMPROVEMENT FOR RECREATION, AND FISH AND WILDLIFE

Site Number	Area: Water (Acres)	Area: Adjacent Land (Acres)	Activity: Hunting	Activity: Picnicking	Activity: Camping	Activity: Hiking & Nature study	Activity: Fishing	Activity: Boat Access	Activity: Swimming	Activity: Skiing	Annual user-days (1,000)
45	1,350	400	x	x	x	x	x	x	x	x	295.6
46	-	-					x				
47	1,440	500	x	x	x	x	x	x	x	x	369.5
49	1,300	400	x	x	x	x	x	x	x	x	295.6
60	2,500	800	x	x	x	x	x	x	x	x	591.2
61	-	-					x				
64	3,350	1,100	x	x	x	x	x	x	x	x	812.9
65	-	-					x				
71	130	130		x		x	x	x	x		96.1
72	430	200		x	x		x	x	x		147.8
73	270	150		x			x	x	x		110.8
74	1,700	750	x	x	x	x	x	x	x	x	554.2
75	200	75		x			x	x	x		55.4
76	320	100		x			x	x	x		73.9
77	290	100		x			x	x	x		73.9
78	130	50		x			x	x	x		36.9
79	720	300	x	x	x	x	x	x	x		221.7
80	220	100		x			x	x	x		73.9
81	750	100		x	x	x	x	x	x		73.9
82	660	250		x	x	x	x	x	x		184.7
83	350	150		x			x	x	x		110.8
84	700	250		x	x	x	x	x	x		184.7
85	300	100		x			x	x	x		73.9
86	850	300		x	x	x	x	x	x		221.7
87	350	150		x	x		x	x	x		110.8
TOTAL	18,310	6,455	7	22	13	12	25	22	22	6	4,769.9


TYPICAL RECREATION SITE
LEGEND
NORMAL WATER ELEV
WOODLAND
MAINTENANCE YARD
PICNICKING
SHELTER
REST ROOMS
PARKING
ROAD
PLAYFIELDS
TRAIL
PATH
WALK
PARK ENTRANCE
GATE
SIGN
ONE WAY
REST ROOM
RAMP
DOCK
BOAT LAUNCHING
LAKE
USDA SCS SPARTANBURG S C 1965

Figure 4.17

SECTION V

CONCLUSIONS

1. Need for Comprehensive Planning -

   There is a primary need for comprehensive and coordinated planning, participated in by all interests and at all levels, from local communities to Basin-wide considerations, for rural, industrial, and urban land and water resource uses. Agriculture concurrently faces problems of relocation, and need for expansion to satisfy product needs, in an environment where there is a growing competition for resource use.

2. Need for an Increase in the Rate of Installation of Works of Improvement for Management of Excess Water -

   The availability of sufficient land to meet the level of production required to supply the Basin's projected share of agricultural commodities is dependent upon careful selection of areas for the various uses and an increase in the installation of works of improvement for the management of excess water. The projected expansion of citrus and other intensive agricultural uses, as well as non-agricultural uses, to areas having excess water problems will overtax present waterways and developments, thereby increasing the need for improved individual and project-type water control systems on a coordinated basis.

3. Need for the Development of all Economically Feasible Sites for Storage of Fresh Water -

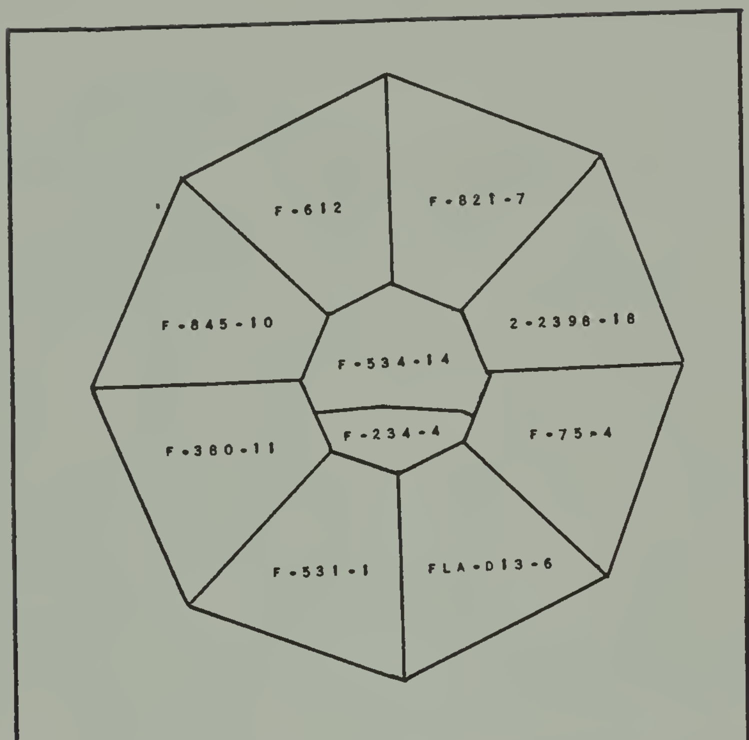
   The projected tremendous increases in fresh water uses by both agricultural and non-agricultural interests, including recreational uses, make it imperative that all available sites for the impoundment of fresh water be developed. Even with such developments, ground water will continue to be the major source of fresh water supply. It appears that more investigation and research are needed to determine sustained ground water yields for specific locations.

4. <u>Need for Full Development of Woodlands for Timber Production and Recreational Activities</u> -

Present and proposed public outdoor recreation facilities in the Basin will not meet the overwhelming demand for these facilities. Private income-producing recreation developments will be needed to offset a portion of this deficiency. Woodland areas need to be protected from fire and managed for maximum production of wood products along with multiple use for hunting, hiking, nature study, and other forms of outdoor recreational activities.

Appendix
ER AND RELATED LAND RESOURCES
FLORIDA WEST COAST TRIBUTARIES

U. S. DEPARTMENT OF AGRICULTURE
RIVER BASIN INVESTIGATIONS



COVER PHOTOGRAPHS

APPENDIX TO THE

REPORT OF

RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES

Prepared by

U. S. DEPARTMENT OF AGRICULTURE

1965

APPENDIX TO THE REPORT OF THE

FLORIDA WEST COAST TRIBUTARIES BASIN

CONTENTS

Material included in this appendix supplements the Report of the Florida West Coast Tributaries Investigation. It gives a resume of procedures used in the study and an analysis of data pertaining to the inventory of present (1963) use and developments and the potential use and development of the land and water resources of the Basin for two target dates - 1980 and 2015.

The Basin is subdivided into three sub-basins (Figure 1) to facilitate study, collection, and analysis of data. Each of the sub-basins had advisory committees to assist the Division of Water Resources and Conservation, Florida State Board of Conservation in the collecting of data and to advise Division personnel of problems regarding water resources.

The material is organized under broad categories of subject matter to facilitate use. References are cited under appropriate subject matter headings in six parts as follows:

P A R T 1

P A R T 2

PART 3

PART 4

P A R T 4 (Cont'd)

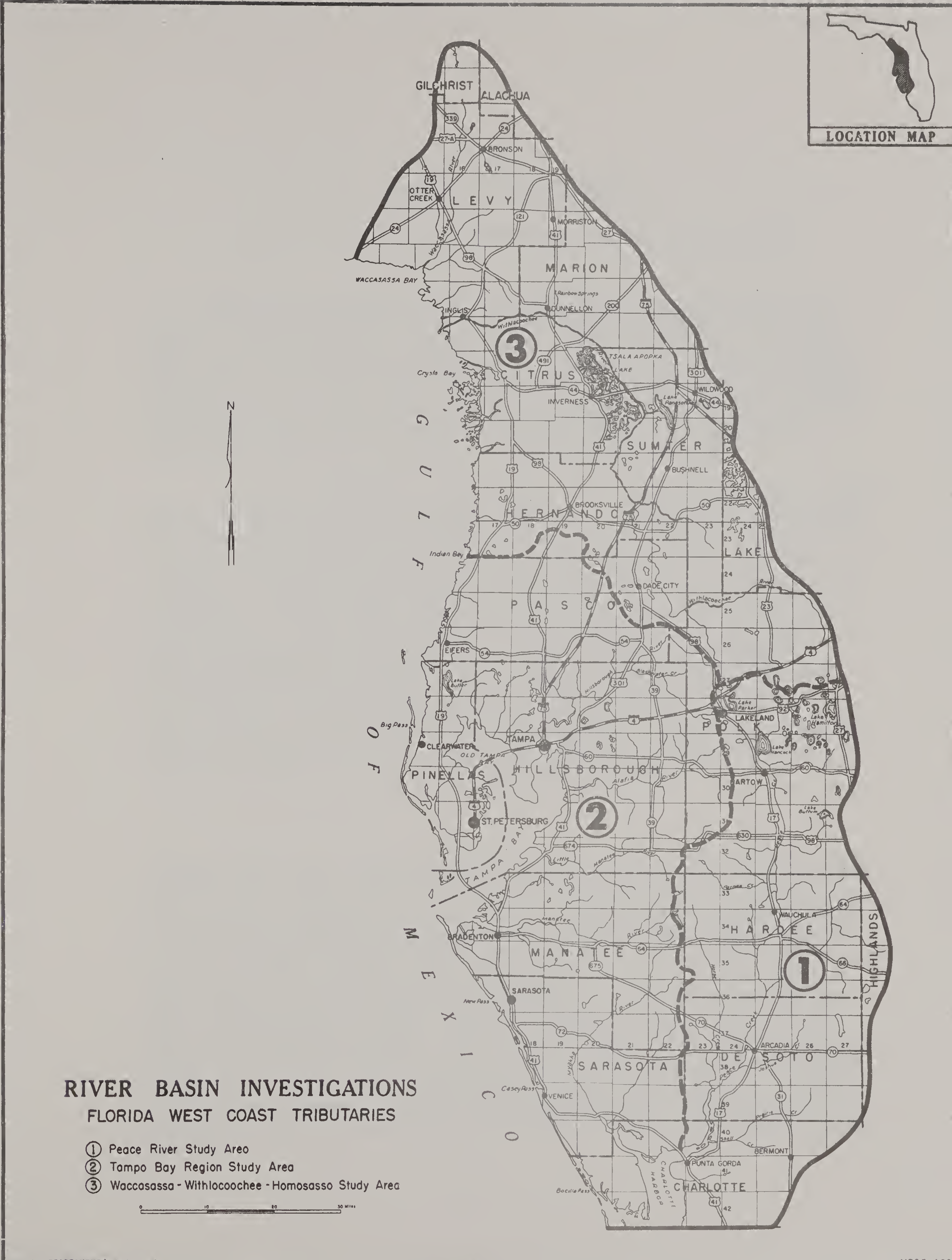
P A R T 5

WATER STORAGE RESERVOIRS

PART 5 (Cont'd)

PART 6

AGRICULTURAL WATER



RIVER BASIN INVESTIGATIONS

FLORIDA WEST COAST TRIBUTARIES

1. Peace River Study Area
2. Tampa Bay Region Study Area
3. Waccasassa - Withlacoochee - Homosassa Study Area

USDA-SCS-SPARTANBURG, S. C. 1965

Figure 1

P A R T I

ECONOMIC INVESTIGATIONS

General Methodology, References and Acknowledgements

The preparation of plans for management and development of land and water resources requires the adoption of a set of basic economic assumptions and projections. The assumptions and projections concerning the national economy, used in this study, are those suggested for uniform use among the several federal agencies engaged in water resource planning. Under the adopted assumptions and projections, satisfying the needs of the population for goods and services becomes the objective of the planning procedure.

Numerous sources of information were considered, as applicable and as required, in the economic analyses. These included national policy guides, economic handbooks, manuals and procedural statements of agencies, published and unpublished historical data and projections of federal, state and private agencies. 1/ Beneficial use was made of the periodic census of agriculture and population by the Bureau of the Census, United States Department of Commerce and the publications of the Statistical Reporting Service, United States Department of Agriculture. Area population estimates and projections were provided by the Division of Water Resources and Conservation. Published and unpublished data from the Florida Agricultural Experiment Station, and judgments obtained in consultations with members of its staff, especially the recent work in Operation DARE, were given important consideration.

1/ Among these were the following: Senate Document 97, 87th Congress, 2nd Session, 1962, entitled "Policies, Standards and Procedures in Formulation, Evaluation and Review of Plans for Use and Development of Water and Related Land Resources," prepared under the direction of the President's Water Resources Council; "Land and Water Resources - A Policy Guide," United States Department of Agriculture, 1962; "Agricultural Price and Cost Projections--," United States Department of Agriculture, 1957; "National Economic Growth Projections 1980, 2000, 2020" Economic Task Group of the Ad Hoc Water Resources Council, Washington D. C. undated; and, "Agriculture and the years Ahead" an abstract of a presentation to the Association of Southern Agricultural Workers, Atlanta, Georgia, February, 1964, and other publications and materials prepared by R. F. Daly, Economic Research Service.

Projections of population growth and per capita utilization of resources for various purposes are key determinants in estimating the future size and characteristics of the economy. Because much pertinent data is lacking and projection techniques are imperfect, it must be recognized that projections are, at best, assumed points of reference. Projections become more arbitrary and subject to error as the length of the period covered becomes greater and as the size of the geographic unit decreases. This is borne out by economic history which is full of changes that were not anticipated.

Population and Urban and Built-up Areas

Projections of urban and built-up areas were based upon a special economic study and the judgments of local agricultural leaders. Consideration was given to population densities by size of place in the United States and in Florida, the trend from rural to urban population in Florida, the historical increase in density of population with increase in population in Florida, and the current and projected distribution of population by size of place in the Basin area.

The population of the Basin area, as estimated by the Florida Board of Conservation, was projected to increase from about 1.4 million in 1963 to 2.6 million in 1980 and 6.8 million in 2015.

Urban lands and built-up areas were defined as those areas which include space for housing, business, industry, highways, roads, railroads, other rights-of-way, golf courses, airports, cemeteries, and city parks. Rights-of-way located in open country were not included. It is recognized that the area devoted to housing rural farm people may have been included as "other agricultural land." However, because only about 2 percent of the population is classified now as rural farm and the proportion is expected to decrease rapidly between 1963 and the year 2015, it is believed that this does not seriously impair the estimates of current and projected urban and built-up areas and other agricultural land.

The projected annual rate of increase in the population of the Basin from 1963 to 1980 is 5.2 percent and from 1980 to 2015 it is 4.7 percent. Comparable projected rates of increase in urban and built-up areas are 3.7 and 2.5 percent respectively. Urban and built-up area per capita was estimated at 0.27 acres in 1963 and projected to 0.24 acres in 1980 and 0.17 acres in 2015, decreasing as population increases. Intensity of use of lands, in terms of population per square mile of urban and built-up area, is expected to increase in all sub-basins but especially in Area 2 which includes the Tampa Bay area of expanding population.

Citrus

In the special economic study of production requirements for citrus, U. S. per capita production of oranges, tangerines, and grapefruit (85 pounds) in the crop season 1961-62, a season relatively unaffected by a freeze, was used to represent national requirements in the base period. Per capita production was projected at levels of 92 pounds in 1980 and 2015. Florida's share of national production of the same fruits in the same crop-season, 85 percent, was used to represent the base period and was projected at the same levels in the years 1980 and 2015. The Basin area's share of Florida production of the same fruits in the same crop season, 44 percent, was used to represent the base period. However, due to the movement of new citrus planting to southeastern parts of the state, projected Basin shares in 1980 and 2015 were 42 and 40 percent respectively.

It was assumed that the increase in plantings of citrus on flatwoods land would tend to minimize yield increases during the projection period.

The projections of needs for citrus lands in the Basin area in the years 1980 and 2015 implicitly assume (1) unchanged relationships between domestic utilization and net exports prevailing in 1961-62, and (2) unchanged relationship between the extent of bearing acreage and non-bearing acreage existing during the period 1957-61. Obviously, different assumptions would have resulted in different projected values.

Vegetables

The economic study of vegetables in the Basin area considered the unique nature of the Florida vegetable industry, particularly its high degree of specialization in fresh vegetables for the fall, winter and early spring markets with accompanying premium in prices received. Per capita consumption of vegetables in the United States is expected to increase slightly from 1963 to 1980 and then hold steady through the year 2015. With projected increases in population, total national requirements would increase more than one-third between 1963 and 1980 and then nearly double between 1980 and 2015. The share of national requirements produced in Florida is expected to increase 6.5 percent in 1963 to 6.8 percent in the year 2015. However, the share of Florida's production coming from the Basin area has been declining in recent years, a trend which is expected to continue during the projection period. The Basin share of Florida's production was estimated at 12.3 percent in 1963 and projected at 9.8 percent in 1980 and 7.7 percent in 2015.

Livestock

Because this study is oriented toward major changes in use of land and water, primary emphasis was placed upon the need for beef production. The dairy, swine, poultry and horse enterprises are not extensive users of land relative to the amount of land utilized for beef cattle. This relationship is not expected to change greatly during the projection period. With expanding population and demand for livestock and livestock products, the acreage of improved pastures is expected to increase, using land now classified as native rangeland. Florida's share of national production requirements is expected to increase modestly, coming in part from increased production from improved pastures and in part from more feeding of concentrate feeds, particularly in feedlot operations. The Basin's share of Florida production is expected to either hold steady or decline slightly during the projection period as competition increases for use of land for the more intensive uses such as urban and built-up areas, citrus, and vegetables.

Field Crops

The Basin includes a substantial acreage of cropland other than citrus and vegetables. There are great differences in the intensity of use of this land. Small acreages are devoted to high value crops such as strawberries and the allotted crops, tobacco and peanuts. Much land is used for hay and considerable areas are idle or fallow. The major production area of strawberries has been shifting away from the Plant City section of the Basin to the Florida Lower East Coast. Allotted peanut and tobacco acreages have declined in the past decade. For these reasons some decline in average value of product per acre of cropland other than citrus and vegetables is expected during the projection period.

TABLE 1.1
FRAMEWORK DATA AND CALCULATIONS RELATIVE TO PROJECTED
ACREAGES OF CITRUS LAND 1980 & 2015,
FLORIDA WEST COAST TRIBUTARIES BASIN

Item	Base Period 1963	Projected 1980	Projected 2015
1. United States			
a. Population, mil.	188	250	460
b. Citrus production			
1. Per capita, lbs.	85 1/	92 2/	92 2/
2. Total, mil. lbs.	16,000 1/	23,000 2/	42,300 2/
2. Florida			
a. Share of U. S. citrus production, percent	85 1/	85	85
b. Citrus production, mil. lbs.	13,600 1/	19,500	36,000
3. Florida West Coast Tributaries Basin			
a. Share of Florida citrus production, percent	44 1/	42	40
b. Citrus production, mil.lbs.	6,000 1/	8,200	14,400
c. Citrus yield, lbs. per acre	19,200	19,800	20,600
d. Citrus acreage	313,000	415,000	700,000

1/ Approximate level in 1961-62.

2/ Consumption rather than production.

TABLE 1.2
FRAMEWORK DATA AND CALCULATIONS RELATIVE TO PROJECTED ACREAGES USED FOR VEGETABLES, WATERMELONS AND POTATOES, 1980 & 2015, FLORIDA WEST COAST TRIBUTARIES BASIN

Item	Base Period 1963	Projected 1980	Projected 2015
1. United States			
a. Population, mil	188	250	460
b. Consumption, per capita			
(1) Vegetables, lbs.	214	226	226
(2) Watermelons, lbs.	15	11	11
(3) Potatoes, lbs.	110	109	109
TOTAL LBS.	339	346	346
c. Consumption, total			
(1) Vegetables, mil. lbs.	40,230	56,500	103,960
(2) Watermelons, mil. lbs.	2,820	3,000	5,060
(3) Potatoes, mil. lbs.	20,680	27,250	50,140
TOTAL MIL. LBS.	63,730	86,750	159,160
2. Florida			
a. Production as a share of U.S. requirements of vegetables, melons, and potatoes, percent	6.5 1/	6.6	6.8
b. Production, mil. lbs.	4,140 1/	5,725	10,820
3. Florida West Coast Tributaries Basin			
a. Share of Florida production, percent	12.3	9.8	7.7
b. Production, mil. lbs.	510	562	837
c. Yield, lbs. per acre	10,500	12,500	13,500
d. Acreage	48,600	45,000	62,000

1/ Normalized base period.

TABLE 1.3
FRAMEWORK DATA AND CALCULATIONS RELATIVE TO PROJECTED ACREAGE OF IMPROVED PASTURES USED FOR BEEF PRODUCTION, 1980 & 2015, FLORIDA WEST COAST TRIBUTARIES BASIN

Item	Base Period 1963	Projected 1980	Projected 2015
1. United States.			
a. Population, mil.	188	250	460
b. Consumption of beef			
(1) Per capita, lbs.(carcass wt.)	92	113	113
(2) Total, mil. lbs. (carcass wt.)	17,300	28,500	52,000
(3) Total, mil.lbs.(live wt)	31,300	51,100	94,000
2. Florida.			
a. Share of U.S. requirements of beef, percent	0.9	1.2	2.0
b. Production, mil.lbs.(live wt.)	281 1/	613 2/	1,880 2/
c. Beef production attributed to improved pastures			
(1) Share of Florida production, percent	71	60	50
(2) Total, mil. lbs.	200	370	940
3. Florida West Coast Tributaries Basin			
a. Beef production from improved pastures, mil. lbs.	48	89	225
b. Share of Florida's beef production from improved pastures, percent	24	24	24
c. Yield per acre, lbs.	76	122	184
(1) Grass-clover pastures	(175)	(300)	(335)
(2) Improved grass pastures	(66)	(85)	(125)
d. Acreage of improved pastures for beef production	629,000	730,000	1,220,000
(1) Grass-clover pastures	(59,000)	(124,000)	(345,000)
(2) Improved grass pastures	(570,000)	(606,000)	(875,000)

1/ Exclusive of 60 million pounds of beef produced in dairy industry. Inclusive of 81 million pounds of beef attributed to forage crops, purchased concentrates and supplemental feeds.

2/ Excludes beef produced in dairy industry.

TABLE 1.4

FRAMEWORK DATA AND CALCULATIONS RELATIVE TO PROJECTED PRODUCTION OF MILK, 1980 & 2015, FLORIDA WEST COAST TRIBUTARIES BASIN

Item	Base Period 1963	Projected 1980	Projected 2015
1. United States			
a. Population, mil.	188	250	460
b. Consumption of dairy products total milk equivalent, fat solids basis:			
(1) Per capita, lbs.	636	570	570
(2) Total mil. lbs.	120,000	142,500	262,200
2. Florida			
a. Production of dairy product, total milk equivalent, fat solids basis:			
(1) Mil. lbs.	1,320	2,000	4,800
(2) Share of U.S. production percent	1.10	1.40	1.83
3. Florida West Coast Tributaries Basin			
a. Production of dairy products total milk equivalent, fat solids basis			
(1) Mil. lbs.	350	520	1,200
(2) Share of Florida production, percent	27	26	25
b. Acreage of improved pasture land used in dairying			
(1) Grass-clover pastures	15,000	26,000	75,000
(2) Improved grass pastures	35,000	44,000	75,000
TOTAL	50,000	70,000	150,000

TABLE 1.5
FRAMEWORK DATA AND CALCULATIONS RELATIVE TO PROJECTED PRODUCTION OF EGGS, 1980 and 2015, FLORIDA WEST COAST TRIBUTARIES BASIN

Item	Base Period 1963	Projected 1980	Projected 2015
1. United States			
a. Population, mil.	188	250	460
b. Consumption of eggs			
(1) Per capita, dozen	27	22	22
(2) Total, mil. dozen	5,076	5,500	10,120
2. Florida.			
a. Production of eggs mil. doz.	100	240	500
b. Share of U.S. Production, percent	2.0	4.4	5.0
3. Florida West Coast Tributaries Basin			
a. Share of Florida production percent	40	40	40
b. Production of eggs, mil. doz.	40	96	200

TABLE 1.6
FRAMEWORK DATA AND CALCULATIONS RELATIVE TO PROJECTED PRODUCTION
OF FARM CHICKENS, 1980 & 2015, FLORIDA WEST COAST TRIBUTARIES BASIN

	Base Period 1963	Projected 1980	Projected 2015
1. United States.			
a. Population, mil.	188	250	460
b. Production of farm and non-farm chickens			
(1) Total, mil. lbs.	853	900	1,656
(2) Per capita, lbs.	4.5	3.6	3.6
2. Florida.			
a. Production of farm and non-farm chickens			
(1) Total, Mil. lbs.	13	48	100
3. Florida West Coast Tributaries Basin			
a. Share of Florida production of farm and non-farm chickens, percent	40	40	40
b. Production of farm and non-farm chickens, mil. lbs.	5	19	40

TABLE 1.7
FRAMEWORK DATA AND CALCULATIONS RELEVANT TO PROJECTED PRODUCTION OF SWINE, 1980 & 2015, FLORIDA WEST COAST TRIBUTARIES BASIN

Item	Base Period 1963	Projected 1980	Projected 2015
1. United States.			
a. Population, mil.	188	250	460
b. Production of hogs, live-weight, mil. lbs.	20,300	26,750	49,220
(1) Per capita, lbs.	108	107	107
2. Florida.			
a. Production of hogs, live-weight, mil. lbs.	83	78	70
b. Share of U.S. production, percent	0.41	0.29	0.14
3. Florida West Coast Tributaries Basin			
a. Share of Florida production, percent	10	9	8
b. Production of hogs, live-weight, mil. lbs.	8.0	7.0	5.6

TABLE 1.8
FARM VALUES, FLORIDA, 1962-63 AND PROJECTED 1980 AND 2015

Item	1962-63	Projected 1980	Projected 2015
	(Million Dollars)		
Crops:			
Citrus	248 1/	275 2/	500 3/
Vegetables, melons, potatoes, strawberries	189 4/	244 5/	460 6/
Field crops	104 7/	129	170
Sugarcane for sugar	(36.8)	(40.0)	-
Tobacco	(27.6)	(27.6)	-
Corn for grain	(13.1)	(40.0)	-
Peanuts, picked and threshed	(6.4)	(8.4)	-
Hay	(4.7)	(3.0)	-
All other	(15.4)	(10.0)	-
Other crops (pecan, tung, avocados, peaches)	6 7/	6	6
All crops	547	654	1,136
Livestock and Livestock products	210 7/	336	798
Dairy products	(86)	(127) 8/	(305) 9/
Cattle and Calves	(67)	(101) 10/	(288) 11/
Eggs	(36) 12/	(84) 13/	(175) 14/
Broilers	(6)	(7)	(9)
Farm Chickens	(2)	(5)	(10)
Hogs	(13)	(12)	(11)
Greenhouse and nursery products	59 7/	100	200
TOTAL	816	1,090	2,134

TABLE 1.8 (Cont'd)
AGRIBUSINESS VALUES, FLORIDA[15], 1962-63 AND PROJECTED
1980 AND 2015

Item	Percentage of farm value (Percent)	1962-63	Projected 1980	2015
			(Million Dollars)	
Crops:				
Citrus	150	372	412	750
Vegetables, melons, potatoes, strawberries	200	378	488	920
Field Crops	150	156	194	255
Sugarcane for sugar	-	-	-	-
Tobacco	-	-	-	-
Corn for grain	-	-	-	-
Peanuts, picked & threshed	-	-	-	-
Hay	-	-	-	-
All other	-	-	-	-
Other crops (pecan, tung, avocados, peaches)	200	12	12	12
All crops	168 - 171	918	1,106	1,937
Livestock and livestock products	160	336	536	1,273
Dairy products	175	(150)	(222)	(534)
Cattle & calves	150	(100)	(152)	(432)
Eggs	150	(54)	(126)	(262)
Broilers	150	(9)	(10)	(14)
Farm chickens	150	(3)	(8)	(15)
Hogs	150	(20)	(18)	(16)
Greenhouse and nursery products	200	118	200	400
TOTAL	168 - 169	1,372	1,842	3,610

TABLE 1.8 (Cont'd)

1/ U.S.D.A. Statistical Reporting Service. "Florida Agricultural Statistics, Citrus Summary 1964 Issue" Orlando, Florida. Value of sales of 9,478 mil. pounds or 106.9 mil. boxes valued at 2.6¢ per pound or $2.32 per box. Normalized sales are estimated at 135 million boxes valued at approximately $175 million.

2/ Based on production of 19,500 mil. pounds valued at 1.4¢ per pound.

3/ Based on production of 36,000 mil. pounds valued at 1.4¢ per pound.

4/ Based on "Florida Agricultural Statistics, Vegetable Summary, 1963 Issue," Department of Agriculture, State of Florida, Tallahassee, Florida. Represents production of some 4,400 mil. lbs. valued at 4.26¢ per lb. Normalized production in the base period is estimated at 41.4 mil. cwt. valued at $176 million.

5/ Based on production of 5,725 mil. lbs. valued at 4.26¢ per pound.

6/ Based on production of 10,820 mil. lbs. valued at 4.26¢ per pound.

7/ Based on "Florida Agricultural Statistics, Field Crops, Specialty Crops, Forestry and General Information, 1963 Issue" Department of Agriculture, State of Florida, Tallahassee, Florida.

8/ Based on 2,000 mil. lbs. valued at $6.35 per cwt.

9/ Based on 4,800 mil. lbs. valued at $6.35 per cwt.

10/ Based on 679 mil. lbs. valued at $14.82 per cwt.

11/ Based on 1,946 mil. lbs. valued at $14.82 per cwt.

12/ Based on 100 mil. dozen valued at 36¢ per dozen.

13/ Based on 240 mil. dozen valued at 35¢ per dozen.

14/ Based on 500 mil. dozen valued at 35¢ per dozen.

15/ Based on "Florida Agribusiness, the State's Biggest Business" Department of Agriculture, State of Florida, Tallahassee, Florida, January 1963. Estimated values at time product crosses the state line in shipment or the value at retail if sold in Florida.

TABLE 1.9
FARM VALUES, FLORIDA WEST COAST TRIBUTARIES BASIN,
1962-63 AND PROJECTED 1980 & 2015

Item	1962-63	Projected 1980	Projected 2015
		(Million Dollars)	
Crops:			
Citrus	104[1/]	115[2/]	202[3/]
Vegetables, melons potatoes, strawberries	22[4/]	24	36
Field crops[5/]	4	3	5
Sugarcane for sugar	(0.0)	(0.0)	-
Tobacco	(0.1)	(0.1)	-
Corn for grain	(0.4)	(0.8)	-
Peanuts, picked and threshed	(0.3)	(0.3)	-
Hay	(1.2)	(0.8)	-
All other	(2.0)	(1.0)	-
Other crops (pecan, tung, avocados, peaches	1	1	2
All Crops	131	143	245
Livestock and livestock products	54	92	212
Dairy products	(22)	(33)[6/]	(76)[7/]
Cattle & calves	(15)[8/]	(22)[9/]	(61)[10/]
Eggs	(14)[11/]	(34)[12/]	(70)[13/]
Broilers	-	-	-
Farm chickens	(1)	(2)	(4)
Hogs	(2)	(1)	(1)
Greenhouse and nursery products	10[14/]	20	45
TOTAL	195	255	502

TABLE 1.9 (Cont'd)
AGRIBUSINESS VALUES, FLORIDA WEST COAST TRIBUTARIES BASIN[15/]
1962-63 AND PROJECTED 1980 & 2015

Item	Percentage of farm value (Percent)	1962-63	Projected 1980	Projected 2015
Crops:				
Citrus	150	156	172	303
Vegetables, melons, potatoes, strawberries	200	44	48	72
Field crops	150	6	4	8
Sugarcane for sugar	-	-	-	-
Tobacco	-	-	-	-
Corn for grain	-	-	-	-
Peanuts, picked and threshed	-	-	-	-
Hay	-	-	-	-
All other	-	-	-	-
Other crops (pecan, tung, avocados, peaches)	200	2	2	4
All Crops	158-159	208	226	387
Livestock and livestock products	159-160	86	147	338
Dairy products	175	(38)	(58)	(133)
Cattle & calves	150	(22)	(33)	(92)
Eggs	150	(21)	(51)	(105)
Broilers	-	-	-	-
Farm chickens	150	(2)	(3)	(6)
Hogs	150	(3)	(2)	(2)
Greenhouse and nursery products	200	20	40	90
TOTAL	161-162	314	413	815

TABLE 1.9 (Cont'd)

1/ Based on reports of Statistical Reporting Service for eight West Coast Counties. Equivalent to about 4,000 million pounds at 2.6¢ per pound. Normalized production estimated at 5,300 million pounds valued at 1.47¢ per pound or a total of $78 million.

2/ Based on production of 8,200 million pounds valued at 1.4¢ per pound.

3/ Based on production of 14,400 million pounds valued at 1.4¢ per pound.

4/ Based on estimated production of 510 mil. pounds in 1963, 562 mil. pounds in 1980 and 837 mil. pounds in 2015 valued at 4.26¢ per pound.

5/ Based on "Florida Agricultural Statistics, Field Crops, Specialty Crops, Forestry and General Information, 1963 Issue." Department of Agriculture, State of Florida, Tallahassee, Florida, reports of SRS and Census of Agriculture.

6/ Based on 520 million pounds valued at $6.35 per cwt.

7/ Based on 1,200 million pounds valued at $6.35 per cwt.

8/ Based on 79 million pounds valued at $19.60 per cwt.

9/ Based on 150 million pounds valued at $14.82 per cwt.

10/ Based on 410 million pounds valued at $14.82 per cwt.

11/ Based on 40 million dozen valued at 36¢ per dozen.

12/ Based on 96 million dozen valued at 35¢ per dozen.

13/ Based on 200 million dozen valued at 35¢ per dozen.

14/ Based on value of sales of nursery products and cut flowers reported in the Census of Agriculture, 1959 for Florida and for 13 West Coast Counties.

15/ Based on "Florida Agribusiness, the State's Biggest Business" Department of Agriculture, State of Florida, Tallahassee, Florida, January 1963. Estimated values at time product crosses the state line in shipment or the value at retail if sold in Florida.

TABLE 1.10
ESTIMATED CASH INPUTS BY TYPE OF INPUT AND BY AGRICULTURAL COMMODITY GROUP, FLORIDA, 1963
(Million Dollars)

	Commodity Group							
	Citrus	Vegetables	Beef	Dairy	Poultry	Greenhouse, Nursery	Other 1/	TOTAL
Total	134.5	189.3	53.6	65.3	35.2	35.5	86.6	600.0
Hired Labor	43.0	91.2	13.4	12.9	3.2	21.3	51.0	236.0
Fertilizer	43.0	37.9	10.7	2.0	*	7.1	16.3	117.0
Gasoline, oil, fuel	*	22.4	*	*	*	*	0.6	23.0
Feed	*	*	13.4	32.8	22.9	*	0.9	70.0
Purchase of livestock & poultry	*	*	5.4	9.8	5.9	*	0.9	22.0
Machine hire	21.5	*	*	*	*	*	0.5	22.0
Seeds, bulbs, plants and trees	*	17.2	*	*	*	3.6	0.2	21.0
Other	27.0	20.6	10.7	7.8	3.2	3.5	16.2	89.0

* Included in "other" inputs, where applicable.

1/ Includes additions necessary to bring totals to even millions of dollars.

TABLE 1.11
ESTIMATED CASH INPUTS BY TYPE OF INPUT AND BY AGRICULTURAL COMMODITY GROUP, FLORIDA WEST COAST TRIBUTARIES BASIN - 1963
(Million Dollars)

	Commodity Group							
	Citrus	Vegetables	Beef	Dairy	Poultry	Greenhouse, Nursery	Other 1/	TOTAL
Total	56.3	22.0	12.0	16.7	12.0	6.0	7.0	132.0
Hired labor	18.0	10.6	3.0	3.3	1.1	3.6	2.4	42.0
Fertilizer	18.0	4.4	2.4	0.5	*	1.2	1.5	28.0
Gasoline, oil, fuel	*	2.6	*	*	*	*	0.4	3.0
Feed	*	*	3.0	8.4	7.8	*	0.8	20.0
Purchase of livestock & poultry	*	*	1.2	2.5	2.0	*	0.3	6.0
Machine hire	9.0	*	*	*	*	*	*	9.0
Seeds, bulbs, plants and trees	*	2.0	*	*	*	0.6	0.4	3.0
Other	11.3	2.4	2.4	2.0	1.1	0.6	1.2	21.0

*Included in "other" inputs, where applicable.

1/ Includes additions necessary to bring totals to even millions of dollars.

TABLE 1.12
ESTIMATED CASH INPUTS BY TYPE OF INPUT AND BY AGRICULTURAL COMMODITY GROUP, FLORIDA WEST COAST TRIBUTARIES BASIN
PROJECTED 1980
(Million Dollars)

	Commodity Group							
	Citrus	Vegetables	Beef	Dairy	Poultry	Greenhouse, Nursery	Other 1/	TOTAL
Total	76.4	24.0	18.0	24.8	29.0	12.0	5.8	190.0
Hired Labor	24.4	11.5	4.5	5.0	2.6	7.2	1.8	57.0
Fertilizer	24.5	4.8	3.6	0.7	*	2.4	1.0	37.0
Gasoline, oil, fuel	*	2.9	*	*	*	*	0.1	3.0
Feed	*	*	4.5	12.4	18.9	*	0.2	36.0
Purchase of livestock & poultry	*	*	1.8	3.7	4.9	*	0.6	11.0
Machine hire	12.2	*	*	*	*	*	0.8	13.0
Seeds, bulbs, plants, and trees	*	2.2	*	*	*	1.2	0.6	4.0
Other	15.3	2.6	3.6	3.0	2.6	1.2	0.7	29.0

*Included in "other" inputs, where applicable.

1/ Includes additions necessary to bring totals to even millions of dollars.

TABLE 1.13
ESTIMATED CASH INPUTS BY TYPE OF INPUT AND BY AGRICULTURAL COMMODITY GROUP, FLORIDA WEST COAST TRIBUTARIES BASIN
PROJECTED 2015
(Million Dollars)

	Commodity Group							
	Citrus	Vegetables	Beef	Dairy	Poultry	Greenhouse, Nursery	Other 1/	TOTAL
Total	134.4	36.0	49.0	57.1	59.0	27.0	7.5	370.0
Hired Labor	43.0	17.3	12.3	11.4	5.3	16.2	2.5	108.0
Fertilizer	43.0	7.2	9.8	1.7	*	5.4	0.9	68.0
Gasoline, oil, fuel	*	4.3	*	*	*	*	0.7	5.0
Feed	*	*	12.2	28.5	38.4	*	0.9	80.0
Purchase of livestock & poultry	*	*	4.9	8.6	10.0	*	0.5	24.0
Machine hire	21.5	*	*	*	*	*	0.5	22.0
Seeds, bulbs, plants, and trees	*	3.2	*	*	*	2.7	0.1	6.0
Other	26.9	4.0	9.8	6.9	5.3	2.7	1.4	57.0

*Included in "other" inputs, where applicable.

1/ Includes additions necessary to bring totals to even millions of dollars.

TABLE 1.14
FRAMEWORK DATA AND CALCULATIONS RELATIVE TO DOLLAR INPUTS IN CITRUS PRODUCTION, 1962-63, PROJECTED 1980 AND 2015, FLORIDA WEST COAST TRIBUTARIES BASIN [1/]

Item	1962-63	Projected 1980	Projected 2015
Bearing & non-bearing acreage	313,000	415,000	700,000
Yield, boxes per acre	216	222	231
Production, mil. boxes	67.4	92.1	161.8
Value of product, mil. dol.	104	115	202
Cash inputs, mil. dol.	56.3	76.4	134.4
Per acre, dollars	180	184	192
Per box, dollars	0.83	0.83	0.83
As percentage of value of product	54	66	67
Distribution of cash inputs by type:		Million Dollars	
Hired labor (32%)	18.0	24.4	43.0
Fertilizer (32%)	18.0	24.5	43.0
Gasoline, oil, fuel (*%)	*	*	*
Machine hire (16%)	9.0	12.2	21.5
Seeds, bulbs, plants, trees (*%)	*	*	*
Other (20%)	11.3	15.3	26.9
TOTAL	56.3	76.4	134.4

1/ Based on "Florida Agribusiness, the States Biggest Business," Department of Agriculture, State of Florida; available cost records and 1959 Census data on expenditures by type of farm.

* Included in "other" inputs.

TABLE 1.15

FRAMEWORK DATA AND CALCULATIONS RELATIVE TO DOLLAR INPUTS IN VEGETABLE PRODUCTION, 1962-63, PROJECTED 1980 AND 2015, FLORIDA WEST COAST TRIBUTARIES BASIN 1/

Item	1962-63	Projected 1980	Projected 2015
Acreage	48,600	45,000	62,000
Yield, lbs. per acre	10,500	12,500	13,500
Production, mil. lbs.	510	562	837
Value of product, mil. dol.	22	24	36
Cash inputs, mil. dol.	10	11	16
Per acre, dollars	200	238	256
Per cwt., dollars	1.90	1.90	1.90
As percentage of value of product	45	46	44
Distribution of Cash inputs by type:		Million Dollars	
Hired labor (48%)	10.6	11.5	17.3
Fertilizer (20%)	4.4	4.8	7.2
Gasoline, oil, fuel (12%)	2.6	2.9	4.3
Machine hire (* %)	*	*	*
Seeds, bulbs, plants, trees (9%)	2.0	2.2	3.2
Other (11%)	2.4	2.6	4.0
TOTAL (100.0%)	22.0	24.0	36.0

1/ Based on expenditures on vegetable farms from Census of Agriculture 1959 and "Florida Agribusiness, the States Biggest Business" Department of Agriculture, State of Florida.

* Included in "other" inputs.

TABLE 1.16
FRAMEWORK DATA AND CALCULATIONS RELATIVE TO DOLLAR INPUTS IN BEEF PRODUCTION, 1963, PROJECTED 1980 AND 2015, FLORIDA WEST COAST TRIBUTARIES BASIN [1]

Item	1963	Projected 1980	Projected 2015
Beef production, mil. lbs.[2]	79	150	410
Value of product, mil. dol.	15	22	61
Cash inputs, mil. dol.	12	18	49
Per pound, cents	15	12	12
As percentage of value of product	77	81	81
Distribution of cash inputs by type:		Million Dollar	
Hired labor (25%)	3.0	4.5	12.3
Fertilizer (20%)	2.4	3.6	9.8
Gasoline, oil, fuel (* %)	*	*	*
Feed (25%)	3.0	4.5	12.2
Purchase of livestock and poultry (10%) [3]	1.2	1.8	4.9
Machine hire (* %)	*	*	*
Seeds, bulbs, plants, trees (* %)	*	*	*
Other (20%)	2.4	3.6	9.8
TOTAL (100.0%)	12.0	18.0	49.0

[1] Based on available cost records and census data concerning expenditure on livestock ranches 1959.

[2] Includes contributions of forage crops and purchased feeds.

[3] Interfarm sales are largely excluded here.

* Included in "other" inputs.

TABLE 1.17
FRAMEWORK DATA AND CALCULATIONS RELATIVE TO DOLLAR INPUTS IN DAIRY PRODUCTION, 1963, PROJECTED 1980 AND 2015, FLORIDA WEST COAST TRIBUTARIES BASIN 1/

Item	1963	Projected 1980	Projected 2015
Production of dairy products, total milk equivalent, fat solids basis, mil. lbs.	350	520	1,200
Value of product, mil. dol.	22	33	76
Cash inputs, mil. dol.	16.7	24.8	57.1
Per pound, cents	4.76	4.76	4.76
As percentage of value of product	75	75	75
Distribution of cash inputs by types:		Million Dollars	
Hired labor (20%)	3.3	5.0	11.4
Fertilizer (3%)	0.5	0.7	1.7
Gasoline, oil, fuel (* %)	*	*	*
Feed (50%)	8.4	12.4	28.5
Purchase of livestock and poultry (15%)	2.5	3.7	8.6
Machine hire (* %)	*	*	*
Seeds, bulbs, plants, trees(*%)	*	*	*
Other (12%)	2.0	3.0	6.9
TOTAL (100.0%)	16.7	24.8	57.1

1/ Based on available cost records and census data concerning expenditures on dairy farms in 1959.

*Included in "other" inputs.

TABLE 1.18

FRAMEWORK DATA AND CALCULATION RELATIVE TO DOLLAR INPUTS IN PRODUCTION OF FARM CHICKENS AND EGGS 1963, PROJECTED 1980 AND 2015, FLORIDA WEST COAST TRIBUTARIES BASIN [1/]

Item	1963	Projected 1980	Projected 2015
Value of product, mil. dol.	15	36	74
Cash inputs, mil. dol.	12	29	59
As percentage of value of product	80	80	80
Distribution of cash inputs by type:		Million Dollars	
Hired labor (9%)	1.1	2.6	5.3
Fertilizer (* %)	*	*	*
Gasoline, oil, fuel (* %)	*	*	*
Feed (65%)	7.8	18.9	38.4
Purchase of livestock and poultry (17%)	2.0	4.9	10.0
Machine hire (* %)	*	*	*
Seeds, bulbs, plants, trees (* %)	*	*	*
Other (9%)	1.1	2.6	5.3
TOTAL (100.0%)	12.0	29.0	59.0

[1/] Based on available cost records and census data concerning expenditures on poultry farms in 1959.

* Included in "other" inputs.

TABLE 1.19

FRAMEWORK DATA AND CALCULATION RELATIVE TO DOLLAR INPUTS IN PRODUCTION OF GREENHOUSE AND NURSERY PRODUCTS, 1963, PROJECTED 1980 AND 2015, FLORIDA WEST COAST TRIBUTARIES BASIN [1/]

Item	1963	Projected 1980	Projected 2015
Value of product, mil. dol.	10	20	45
Cash inputs, mil. dol.	6	12	27
As percentage of value of product	60	60	60
Distribution of cash inputs by type:		Million Dollars	
Hired labor (60%)	3.6	7.2	16.2
Fertilizer (20%)	1.2	2.4	5.4
Gasoline, oil, fuel (* %)	*	*	*
Machine hire (* %)	*	*	*
Seeds, bulbs, plants, trees (10%)	0.6	1.2	2.7
Other (10%)	0.6	1.2	2.7
TOTAL (100.0%)	6.0	12.0	27.0

[1/] Based on available cost records and census data concerning expenditures on poultry farms in 1959.

* Included in "other" inputs.

PART 2

LAND USE

Procedure used in developing 1963 land use data

Using county maps containing land resource (soil association) area delineations, each land resource area was measured and the data tabulated on a key sheet. Soil Conservation Service technicians aided in estimating the major land uses for each of the measured areas, using the best available data, such as photographs, land atlases, field checks, and in consultation with other local agricultural workers. This information was summarized by land resource areas and by counties, and the county totals were then checked against known, or published data, where available. County acreages were adjusted as necessary to agree with official Census county area, of land and water, for all counties entirely within the Basin. Water areas were separated into fresh and salt water. Salt water includes coastal bays, inlets, and downstream portions of rivers having salty or brackish water.

Major agricultural land uses, by land capability classes and subclasses, were determined for each county, using information contained in the Conservation Needs Inventory as the basis.

Projected Land Use Adjustments

County agricultural groups and individuals were contacted to obtain estimates of approximate acreages and locations of future agricultural enterprises. This information was evaluated and reconciled with the projected acreages which were developed by uses or commodities on the basis of projected population requirements and in terms of the Basin's ability to maintain its proportionate share of the state and national production of agricultural products. This projected land use data was compared to the uses of the land resources in 1963 by capability classes and subclasses.

The projected increase in use of the land resources for non-agricultural purposes and the increase in area of fresh water were subtracted from the 1963 agricultural land base. It was assumed that this decrease in the agricultural base would affect all agricultural uses and all capability classes and subclasses.

Some of the factors influencing assumptions and probable land use shifts are: predictions indicate that citrus will expand in the Peace River and Tampa Bay area sub-basins and that new citrus plantings will be largely on soils having problems of excess water; increases in fresh water area will probably be along the Withlacoochee and Hillsborough Rivers and along the tributary streams of Peace River and Tampa Bay area sub-basins; the continued expansion of urban and industrial area will probably be greatest in the Tampa Bay area with the Peace River area next; and the more intensive agricultural uses will be on soils in capability classes I through IV.

TABLE 2.1
LAND AND WATER AREA BY COUNTIES - 1963
(1,000 Acres)

County	Water: Fresh	Water: Salt	Land: Non-Agricultural	Land: Agricultural	Basin Total
Alachua	3.3	-	1.5	39.1	43.9
Charlotte	1.0	81.3	20.2	285.4	387.9
Citrus	27.2	42.3	13.5	340.0	423.0
DeSoto	2.7	-	6.9	405.0	414.6
Gilchrist	0.4	-	0.9	49.2	50.5
Hardee	0.8	-	7.4	395.0	403.2
Hernando	8.6	8.4	14.2	293.9	325.1
Highlands	-	-	2.7	36.0	38.7
Hillsborough	33.0	2.2	115.9	528.6	679.7
Lake	5.6	-	2.8	93.3	101.7
Levy	3.9	11.9	4.4	523.7	543.9
Manatee	12.8	53.8	49.7	386.1	502.4
Marion	1.1	-	8.4	286.4	295.9
Pasco	20.2	1.6	23.3	449.0	494.1
Pinellas	5.3	22.4	87.2	82.9	197.8
Polk	42.1	-	219.1	559.8	821.0
Sarasota	3.3	19.4	53.4	320.7	396.8
Sumter	15.5	-	11.9	299.3	326.7
TOTAL	186.8	243.3	643.4	5,373.4	6,446.9

TABLE 2.2
PROJECTED LAND AND WATER AREA BY COUNTIES - 1980
(1,000 Acres)

County	Water		Land		
	Fresh	Salt	Non-Agricultural	Agricultural	Total Basin
Alachua	3.3	-	1.9	38.7	43.9
Charlotte	1.2	81.3	91.0	214.4	387.9
Citrus	39.7	42.3	39.5	301.5	423.0
DeSoto	4.0	-	12.7	397.9	414.6
Gilchrist	0.4	-	1.1	49.0	50.5
Hardee	1.2	-	21.8	380.2	403.2
Hernando	10.6	8.4	25.6	280.5	325.1
Highlands	-	-	6.4	32.3	38.7
Hillsborough	58.0	2.2	204.0	415.5	679.7
Lake	28.1	-	3.5	70.1	101.7
Levy	4.1	11.9	8.5	519.4	543.9
Manatee	16.2	53.8	99.0	333.4	502.4
Marion	7.5	-	14.0	274.4	259.9
Pasco	41.7	1.6	38.1	412.7	494.1
Pinellas	5.3	22.4	133.7	36.4	197.8
Polk	61.0	-	222.8	537.2	821.0
Sarasota	3.3	19.4	139.3	234.8	396.8
Sumter	73.5	-	24.0	229.2	326.7
TOTAL	359.1	243.3	1,086.9	4,757.6	6,446.9

TABLE 2.3
PROJECTED LAND AND WATER AREA BY COUNTIES - 2015
(1,000 Acres)

County	Water: Fresh	Water: Salt	Land: Non-Agricultural	Land: Agricultural	Basin Total
Alachua	3.3	-	2.7	37.9	43.9
Charlotte	1.2	81.3	117.2	188.2	387.9
Citrus	39.7	42.3	49.3	291.7	423.0
DeSoto	4.5	-	25.4	384.7	414.6
Gilchrist	0.4	-	1.2	48.9	50.5
Hardee	13.0	-	29.8	360.4	403.2
Hernando	10.6	8.4	36.0	270.1	325.1
Highlands	-	-	6.8	31.9	38.7
Hillsborough	66.2	2.2	371.6	239.7	679.7
Lake	28.1	-	5.1	68.5	101.7
Levy	4.1	11.9	11.8	516.1	543.9
Manatee	18.5	53.8	215.6	214.5	502.4
Marion	7.5	-	18.2	270.2	295.9
Pasco	41.7	1.6	52.8	398.0	494.1
Pinellas	5.3	22.4	170.1	-	197.8
Polk	63.8	-	296.0	461.2	821.0
Sarasota	3.3	19.4	176.7	197.4	396.8
Sumter	73.5	-	32.3	220.9	326.7
TOTAL	384.7	243.3	1,618.6	4,200.3	6,446.9

TABLE 2.4
TOTAL LAND AREA BY CAPABILITY CLASSES
(1,000 Acres)

Capability Class	Sub - Basin 1	2	3	Basin Total
I	-	-	1.2	1.2
IIe	-	0.9	23.8	24.7
IIs	-	8.3	26.3	34.6
IIw	54.1	74.9	32.2	161.2
IIIe	-	0.9	42.0	42.9
IIIs	115.4	330.7	948.4	1,394.5
IIIw	134.2	231.6	163.3	529.1
IVe	-	-	6.6	6.6
IVs	1.8	26.0	135.8	163.6
IVw	772.6	1,065.4	338.1	2,176.1
V	266.3	384.3	395.0	1,045.6
VI	7.5	6.5	28.6	42.6
VII	9.4	34.2	7.1	50.7
VIII	126.3	126.0	91.1	343.4
TOTAL	1,487.6	2,289.7	2,239.5	6,016.8

TABLE 2.5
AGRICULTURAL LAND USE - 1963
(1,000 Acres)

Use	Sub - Basin 1	Sub - Basin 2	Sub - Basin 3	Basin Total
Citrus	114.6	134.2	64.4	313.2
Vegetables	7.2	22.6	18.8	48.6
Other Crops	3.2	13.3	91.4	107.9
Improved Pasture	171.6	232.3	350.2	754.1
Unimproved Pasture	658.3	644.7	212.7	1,515.7
Woodland	346.7	709.1	1,326.4	2,382.2
Miscellaneous	18.2	125.5	108.0	251.7
TOTAL	1,319.8	1,881.7	2,171.9	5,373.4

TABLE 2.6
PROJECTED AGRICULTURAL LAND USE - 1980
(1,000 Acres)

Use	Sub - Basin 1	Sub - Basin 2	Sub - Basin 3	Basin Total
Citrus	167.2	174.1	73.7	415.0
Vegetables	6.9	20.9	17.2	45.0
Other Crops	2.3	14.9	79.7	96.9
Improved Pasture	246.5	290.1	363.4	900.0
Unimproved Pasture	505.2	378.1	117.8	1,001.1
Woodland	293.0	516.8	1,226.3	2,036.1
Miscellaneous	34.8	143.6	85.1	263.5
TOTAL	1,255.9	1,538.5	1,963.2	4,757.6

TABLE 2.7
PROJECTED AGRICULTURAL LAND USE - 2015
(1,000 Acres)

Use	Sub - Basin 1	2	3	Basin Total
Citrus	287.3	274.5	138.2	700.0
Vegetables	18.1	24.7	19.2	62.0
Other Crops	16.7	23.5	93.8	134.0
Improved Pasture	437.9	425.3	656.8	1,520.0
Unimproved Pasture	123.3	58.9	39.8	222.0
Woodland	243.3	259.7	886.9	1,389.9
Miscellaneous	30.6	69.8	72.0	172.4
TOTAL	1,157.2	1,136.4	1,906.7	4,200.3

TABLE 2.8
PROJECTED CHANGES IN USE - 1963 to 2015
BASIN TOTAL
(1,000 Acres)

Capability Classes	CITRUS To be Established	CITRUS Loss	CITRUS Net Change	VEGETABLES To be Established	VEGETABLES Loss	VEGETABLES Net Change
I	-	-	-	1.0	-	+ 1.0
IIe	2.6	-	+ 2.6	-	0.4	- 0.4
IIs	6.6	-	+ 6.6	1.7	0.4	+ 1.3
IIw	24.8	2.0	+ 22.8	7.7	-	+ 7.7
IIIe	4.8	0.3	+ 4.5	-	0.6	- 0.6
IIIs	118.3	5.6	+112.7	1.1	9.1	- 8.0
IIIw	74.2	0.1	+ 74.1	7.1	0.1	+ 7.0
IVe	-	0.1	- 0.1	-	-	-
IVs	6.9	2.7	+ 4.2	0.3	1.1	- 0.8
IVw	170.3	0.8	+169.5	13.0	5.6	+ 7.4
V	-	5.8	- 5.8	1.0	1.6	- 0.6
VI	-	1.8	- 1.8	-	-	-
VII	-	1.7	- 1.7	-	0.3	- 0.3
VIII	-	0.9	- 0.9	-	0.2	- 0.2
TOTAL	408.5	21.8	+386.7	32.9	19.4	+13.5

TABLE 2.8 (cont'd)
(1,000 Acres)

Capability Classes	OTHER CROPS To be Established	OTHER CROPS Loss	OTHER CROPS Net Change	IMPROVED PASTURE To be Established	IMPROVED PASTURE Loss	IMPROVED PASTURE Net Change
I	0.1	0.2	- 0.1	-	0.2	- 0.2
IIe	3.9	0.1	+ 3.8	1.3	-	+ 1.3
IIs	6.2	0.3	+ 5.9	1.7	4.8	- 3.1
IIw	13.6	0.9	+12.7	12.8	9.3	+ 3.5
IIIe	-	3.3	- 3.3	10.8	-	+ 10.8
IIIs	11.8	13.1	- 1.3	218.3	36.4	+181.9
IIIw	13.0	0.6	+12.4	102.4	0.5	+101.9
IVe	-	0.4	- 0.4	-	1.3	- 1.3
IVs	3.2	3.6	- 0.4	3.9	13.1	- 9.2
IVw	8.3	6.9	+ 1.4	440.9	1.9	+439.0
V	-	3.3	- 3.3	51.1	4.0	+ 47.1
VI	-	0.3	- 0.3	0.6	2.9	- 2.3
VII	-	0.1	- 0.1	-	1.6	- 1.6
VIII	-	0.9	- 0.9	-	1.9	- 1.9
TOTAL	60.1	34.0	+26.1	843.8	77.9	+765.9

TABLE 2.8 (cont'd)
(1,000 Acres)

Capability Classes	UNIMPROVED PASTURE Gain	Loss	Net Change	WOODLAND To be Established	Loss	Net Change
I	-	0.1	- 0.1	-	0.7	- 0.7
IIe	-	0.8	- 0.8	-	6.7	- 6.7
IIs	-	2.6	- 2.6	-	13.3	- 13.3
IIw	-	29.4	- 29.4	-	48.4	- 48.4
IIIe	-	0.8	- 0.8	0.1	14.0	- 13.9
IIIs	-	115.3	- 115.3	-	389.2	-389.2
IIIw	-	161.4	- 161.4	-	160.8	-160.8
IVe	-	0.3	- 0.3	1.2	0.1	+ 1.1
IVs	-	8.8	- 8.8	10.1	17.4	- 7.3
IVw	-	872.2	- 872.2	-	255.8	-255.8
V	3.3	90.4	- 87.1	-	92.2	- 92.2
VI	0.2	1.0	- 0.8	0.7	6.1	- 5.4
VII	0.3	5.6	- 5.3	-	15.1	- 15.1
VIII	0.6	9.4	- 8.8	21.5	6.1	+ 15.4
TOTAL	4.4	1,298.1	-1,293.7	33.6	1,025.9	-992.3

TABLE 2.8 (cont'd)
(1,000 Acres)

Capability Classes	MISCELLANEOUS Gain	Loss	Net Change	Total Agricultural Loss
I	-	-	-	0.1
IIe	-	1.2	- 1.2	1.4
IIs	0.3	0.1	+ 0.2	5.0
IIw	2.1	2.3	- 0.2	31.3
IIIe	0.3	-	+ 0.3	3.0
IIIs	6.9	7.4	- 0.5	219.7
IIIw	3.6	8.9	- 5.3	132.1
IVe	0.5	-	+ 0.5	0.5
IVs	4.0	1.4	+ 2.6	19.7
IVw	8.9	24.5	-15.6	526.3
V	0.5	35.8	-35.3	177.2
VI	4.2	0.2	+ 4.0	6.6
VII	9.6	0.1	+ 9.5	14.6
VIII	3.1	41.4	-38.3	35.6
TOTAL	44.0	123.3	-79.3	1,173.1

TABLE 2.9
AGRICULTURAL LAND USE, BY CAPABILITY CLASSES - 1963

Basin Total
(1,000 Acres)

Capability Classes	Citrus	Vegetables	Other Crops	Improved Pasture
I	-	-	0.2	0.2
IIe	1.2	0.4	2.8	8.7
IIs	1.7	0.5	3.8	8.4
IIw	17.2	3.4	3.2	31.7
IIIe	1.7	0.6	3.5	6.8
IIIs	171.5	16.8	65.3	248.1
IIIw	5.9	5.5	3.3	57.9
IVe	0.1	-	0.4	2.0
IVs	16.8	1.6	8.8	30.0
IVw	86.9	15.1	12.1	304.8
V	5.8	4.2	3.2	48.5
VI	1.8	-	0.3	3.3
VII	1.7	0.3	0.1	11.8
VIII	0.9	0.2	0.9	1.9
TOTAL	313.2	48.6	107.9	754.1

TABLE 2.9 (Cont'd)

Capability Classes	Unimproved Pasture	Woodland	Miscellaneous	Total
I	0.1	0.7	-	1.2
IIe	0.8	8.3	1.7	23.9
IIs	2.6	14.2	0.8	32.0
IIw	30.4	59.1	2.7	147.7
IIIe	1.1	27.5	0.8	42.0
IIIs	122.6	662.9	19.5	1,306.7
IIIw	165.3	223.0	14.4	475.3
IVe	0.3	3.4	0.1	6.3
IVs	11.3	85.8	2.6	156.9
IVw	935.0	586.1	36.0	1,976.0
V	207.1	620.8	72.7	962.3
VI	1.8	31.4	1.2	39.8
VII	9.8	26.4	1.2	41.3
VIII	27.5	32.6	98.0	162.0
TOTAL	1,515.7	2,382.2	251.7	5,373.4

TABLE 2.10
PROJECTED AGRICULTURAL LAND USE BY CAPABILITY CLASSES - 1980

Basin Total
(1,000 Acres)

Capability Classes	Citrus	Vegetables	Other Crops	Improved Pasture
I	0.2	0.2	0.3	-
IIe	1.1	0.1	3.1	9.4
IIs	5.3	1.1	6.5	10.4
IIw	25.8	4.1	4.5	44.7
IIIe	1.3	0.4	2.9	8.2
IIIs	195.7	13.4	61.2	247.8
IIIw	46.5	6.3	4.7	111.8
IVe	-	0.1	0.3	1.5
IVs	16.2	0.8	5.3	14.5
IVw	116.7	15.9	6.9	405.3
V	3.9	2.6	1.2	44.2
VI	0.8	-	-	0.7
VII	1.0	-	-	1.0
VIII	0.5	-	-	0.5
TOTAL	415.0	45.0	96.9	900.0

TABLE 2.10 (Cont'd)

(1,000 Acres)

Capability Classes	Unimproved Pasture	Woodland	Miscellaneous	Total
I	-	0.5	-	1.2
IIe	0.6	7.0	1.6	22.9
IIs	0.1	5.3	1.2	29.9
IIw	11.9	34.0	6.3	131.3
IIIe	0.8	25.7	0.8	40.1
IIIs	55.5	571.0	39.4	1,184.0
IIIw	65.7	155.2	18.6	408.8
IVe	0.3	3.7	0.1	6.0
IVs	5.8	91.4	8.6	142.6
IVw	649.9	484.9	41.7	1,721.3
V	185.9	566.7	54.9	859.4
VI	1.4	26.7	5.5	35.1
VII	3.7	15.7	13.4	34.8
VIII	19.5	48.3	71.4	140.2
TOTAL	1,001.1	2,036.1	263.5	4,757.6

TABLE 2.11
PROJECTED AGRICULTURAL LAND USE BY CAPABILITY CLASSES - 2015

Basin Total
(1,000 Acres)

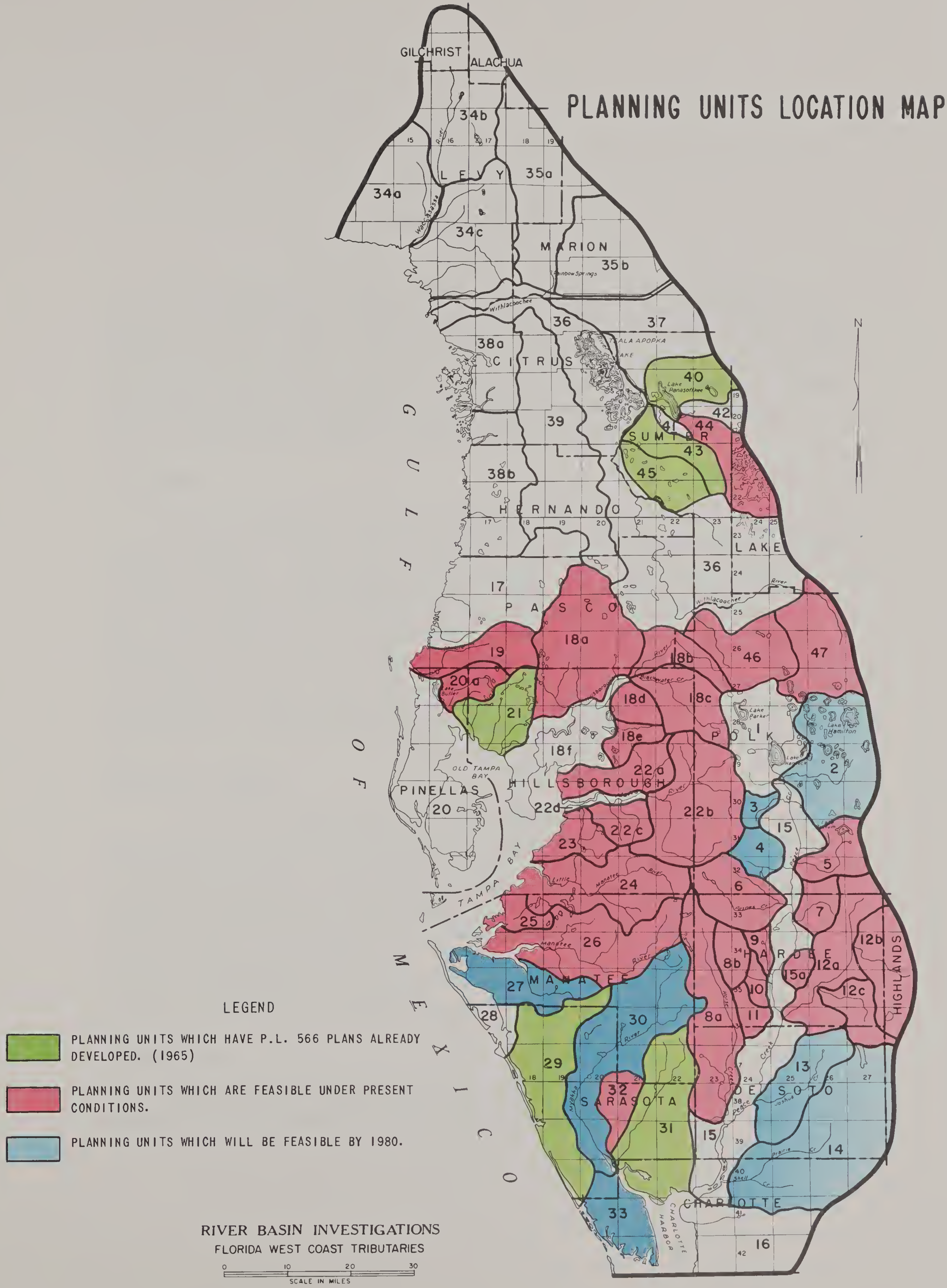
Capability Classes	Citrus	Vegetables	Other Crops	Improved Pasture
I	-	1.0	0.1	-
IIe	3.8	-	6.5	10.0
IIs	8.2	1.6	9.1	6.3
IIw	42.7	10.8	16.8	33.8
IIIe	5.3	0.2	0.2	18.5
IIIs	283.4	9.0	64.5	431.1
IIIw	80.0	12.3	15.6	158.3
IVe	-	-	-	0.6
IVs	21.0	1.0	8.3	20.8
IVw	255.6	22.1	12.9	743.4
V	-	4.0	-	96.1
VI	-	-	-	0.9
VII	-	-	-	0.2
VIII	-	-	-	-
TOTAL	700.0	62.0	134.0	1,520.0

TABLE 2.11 (cont'd)
(1,000 Acres)

Capability Classes	Unimproved Pasture	Woodland	Miscellaneous	Total
I	-	-	-	1.1
IIe	-	1.6	0.6	22.5
IIs	-	1.0	0.8	27.0
IIw	0.8	8.9	2.6	116.4
IIIe	0.3	13.5	1.0	39.0
IIIs	7.4	273.5	18.1	1,087.0
IIIw	4.8	63.5	8.7	343.2
IVe	-	4.6	0.6	5.8
IVs	2.3	78.7	5.1	137.2
IVw	63.5	331.7	20.5	1,449.7
V	119.5	527.8	37.7	785.1
VI	1.1	26.0	5.2	33.2
VII	4.5	10.8	11.2	26.7
VIII	17.8	48.3	60.3	126.4
TOTAL	222.0	1,389.9	172.4	4,200.3

P A R T 3

PLANNING UNITS



USDA-SCS-SPARTANBURG, S. C. 1965

M R 65-88

PART 3

PLANNING UNITS

The entire Basin was subdivided into units (hydrologic areas) of 250,000 acres or less, except for the mainstem of the Withlacoochee, Peace, Hillsborough, and Alafia Rivers, the Cross Florida Barge Canal, and unit number 39, an area without a well defined pattern of natural surface outlets. Delineation of the planning units was made on topographic quandrangle sheets. Field checks were made of questionable areas.

Land Use

The boundaries of the planning units were transferred to county maps on which land resource areas (soil associations) had been outlined. Based on the land use pattern for each land resource area located partially or wholly within each of the planning units, the 1963 land use, by units, was determined. This determination included the allocation of area to non-agricultural use, as well as the separation of the agricultural areas into major uses. Land use within each planning unit, by capability classes and subclasses was arrived at through the use of data contained in the Conservation Needs Inventory.

Selected Samples

Fifteen planning units were selected as sample areas for evaluation as potential projects under P. L. 566 criteria. The principal problem in these units is inadequate outlets for the removal of excess water and lack of water management facilities needed to maintain a high level of agricultural production. In some areas, flooding of rural and/or urban residential developments is also experienced. Anticipated future agricultural and urban development will further aggrevate the problem and cause present waterways to become even more inadequate.

Selection

The soils in each planning unit in the Basin were grouped into capability classes and subclasses according to data obtained from the Conservation Needs Inventory and the soil association groupings for the portion of each county represented in the planning unit. The data for each of the capability classes in a unit were converted to percent of the total agricultural land area for that unit.

The major agricultural uses of the units were determined from data obtained from land use estimates for the counties. These uses had not been determined for the units according to the capability groupings at this stage of study. The data for each use in a unit were converted to percent of the total agricultural land area for that unit.

The percentage determination for both the capability groupings and the agricultural uses for a unit were plotted on graph paper. Planning units were selected for additional studies where the plotted percentage data indicated 50 percent or more of the soils was in capability subclasses IIw through IVw, and at least 50 percent of the total agricultural land was used for citrus, vegetables, other cropland, improved pasture and range.

Channel Design

Proposed channels were located so that all areas with excess water problems would be within one mile of a major outlet. Channel systems were designed for those areas where flooding, or lack of drainage was considered to be a major problem. The location and need for these channels were determined by field reconnaissance, study of topographic and soils maps, and in consideration of land use patterns. Data from a limited number of stream cross sections at strategic stations was used in the design procedures.

The channel size was based on a removal rate determined by the formula $Q = 25M^{5/6}$ in which "M" is the drainage area in square miles and "Q" is the discharge in cubic feet per second. This will remove approximately one inch in 24 hours from one square mile of drainage area and a decreasing amount from larger areas.

Designed hydraulic gradients average one foot below natural ground elevations except at the grade stabilization structures, where hydraulic gradients were designed at ground level.

In general, the channel slope used was the steepest that could be installed without exceeding a velocity of two feet per second. This velocity is considered to be the maximum allowable for most of the soils in the Basin. Side slopes were computed at 1:1 (one foot horizontal to one foot vertical). A co-efficient of friction ("N") of 0.035 and a minimum bottom width of four feet was used for channel design.

Grade stabilization structures were included in channels where the natural slope of the land indicated that velocities in the channels would exceed two feet per second. These grade stabilization structures were planned so that a standard head loss of five feet between the upstream and downstream water surface would be incorporated into each structure. In order to standardize procedures, all of these grade stabilization structures were planned as Type "C" concrete structures (From SCS National Engineering Handbook No. 11, entitled "Drop Spillways"). In actual construction, many of the smaller structures might be built as pipe drops or other types of structures.

An average width of 125 feet was used in computing easements and rights-of-way. The spoil is to be continuous on both sides of the channels, and laterals are to be admitted through controlled inlets. An average of two pipe drop inlet structures per mile of channel was used for cost estimates.

Charts were prepared from which excavation yardage per linear foot could be read directly by knowing the discharge and land slope. In computing yardages, it was assumed that no channels exist where improvements are proposed, unless existing (excavated) channels have capacities comparable to those which are proposed for the area.

Costs

Costs were calculated for each of the 15 sample planning units. A composite cost per square mile of drainage area was developed, using an average of the sample unit costs, and the costs contained in approved P. L. 566 work plans or preliminary investigations for units within the Basin. This cost per square mile was then used for all planning units in the Basin, including the 15 sample units.

Annual installation costs for the 15 sample units were determined by amortizing total installation costs at 3.125 percent interest over a 50 year period. Replacement costs for all portions of the structural measures with less than a 50 year expected life, were amortized and included as annual cost items along with annual operation and maintenance costs.

Associated costs for such items as on-farm drainage and irrigation facilities were based on estimates obtained from SCS technicians, Experiment Station bulletins, and from calculations of actual quantities.

The following 1963 unit costs were used in developing structural costs for reservoirs and for channel improvement:

(1) Channel excavation - 35¢ per cubic yard, including contingencies, and engineering and other services.

(2) Land clearing - $300 per acre of woodland.

(3) Land, easements, and rights-of-way - $100 per acre.

(4) Pipe drop structures (to allow entry of water from laterals along the sides of the main channels) - $500 each.

(5) Concrete, in place, including steel - $150 per cubic yard.

(6) Compact earth fill - 50¢ per cubic yard.

(7) Road and bridge relocation:

4 lane primary highway - $100,000 per mile.
2 lane primary highway - $40,000 per mile.
2 lane secondary highway - $15,000 - $25,000 per mile.
Graded dirt road - $8,000 per mile.
Primary road bridge (2 lane) $325 per linear foot.
Secondary road bridge (2 lane) $220 per linear foot.
Small county road bridge $9 per square foot.
Box culvert, installed and reinforced $100 per cubic yard.
Railroad bridge, single track, ballast deck - $225 per linear foot.
Railroad bridge, single track, open deck - $175 per linear foot.

Benefits

Cost-return estimates were developed for the following crops, as representative of the Basin; oranges, grapefruit, grass-clover pasture, improved grass pasture, tomatoes, watermelons, and cucumbers, with cucumbers representing all vegetables other than watermelons and tomatoes. Separate cost-return estimates were made for wet-land sites and well drained sites, for those crops which are commonly grown under both soil conditions. The cost-return estimates were the basis for benefits used in the evaluation of structural measures for water and land resource projects.

Average yield estimates were based on a composite opinion of SCS Work Unit Technical Guides, Agricultural Experiment Station summary reports, and consultation of River Basin Staff members with Experiment Station personnel. Production costs and inputs were also based on information obtained through discussions with Experiment Station personnel and from published and unpublished material.

Production increases resulting from irrigation of citrus, were based on percentage yield increases obtained from studies made by the Lake Alfred Citrus Experiment Station, and these percentages were applied to average yields mentioned above. Irrigated yields for other crops and pasture are based on field interview information obtained from P. L. 566 surveys, and judgment estimates.

Prices received and paid, as used in the cost-return estimates, are long-term prices, developed by the Agricultural Research Service and the Agricultural Marketing Service in 1957, for use in connection with evaluations of water resources projects.

Agricultural benefits are based on 1963 and projected 1980 acreages of citrus, vegetables, improved pasture, and woodland, on which flood prevention and water management measures are, or will be needed. These needs were estimated on the basis of soils having excess water problems.

Since the channels were designed for a pasture removal rate, potential benefits to vegetables and citrus were substantially reduced in evaluations. If future detailed planning reveals the need for a higher degree of protection, the resulting increase in costs for works of improvement will be accompanied by a corresponding increase in benefits.

TABLE 3.1
LAND AND WATER AREA BY PLANNING UNITS - 1963
(1,000 Acres)

Planning Unit No.	WATER Fresh	WATER Salt	LAND Non-Agri-cultural	LAND Agri-cultural	Total
1	13.1	-	39.1	61.5	113.7
2	20.5	-	13.8	88.9	123.2
3	-	-	8.2	8.6	16.8
4	-	-	18.8	21.6	40.4
5	1.6	-	7.2	31.3	40.1
6	0.1	-	21.1	61.7	82.9
7	0.1	-	5.4	29.1	34.6
8a	0.4	-	2.6	127.5	130.5
8b	-	-	0.6	28.7	29.3
9	-	-	0.3	13.2	13.5
10	-	-	0.2	12.8	13.0
11	-	-	0.6	20.8	21.4
12a	0.1	-	1.2	97.7	99.0
12b	0.1	-	3.1	64.5	67.7
12c	0.1	-	0.5	41.4	42.0
13	0.1	-	1.7	87.4	89.2
14	0.4	27.1	3.1	214.2	244.8
15	2.9	5.8	35.8	206.6	251.1
15a	-	-	0.4	16.8	17.2

TABLE 3.1 (Cont'd)
(1,000 Acres)

Planning Unit No.	WATER Fresh	Salt	LAND Non-agricultural	Agricultural	Total
16	0.3	25.1	4.1	85.5	115.0
17	2.4	1.0	11.5	162.7	177.6
18a	5.0	-	4.6	160.0	169.6
18b	0.5	-	2.4	44.0	46.9
18c	0.9	-	5.7	48.5	55.1
18d	0.9	-	0.2	18.5	19.6
18e	1.0	-	3.0	19.0	23.0
18f	7.6	-	61.1	62.9	131.6
19	0.5	2.6	6.7	66.2	76.0
20	7.0	20.4	86.6	65.3	179.3
20a	2.9	-	0.3	23.4	26.6
21	5.9	-	6.1	57.4	69.4
22a	2.5	-	12.5	56.2	71.2
22b	2.6	-	74.7	111.7	189.0
22c	1.3	-	2.4	36.7	40.4
22d	0.3	0.5	0.7	5.9	7.4
23	0.9	0.5	7.5	48.7	57.6
24	4.3	1.2	13.8	137.0	156.3
25	0.5	3.5	4.2	16.7	24.9
26	4.2	31.0	10.5	122.8	168.5

TABLE 3.1 (Cont'd)
(1,000 Acres)

Planning Unit No.	WATER Fresh	Salt	LAND Non-Agricultural	Agricultural	Total
27	2.0	19.3	28.1	70.1	119.5
28	-	4.0	1.3	7.7	13.0
29	0.1	11.7	23.0	132.1	166.9
30	6.5	3.7	10.0	171.4	191.6
31	0.7	10.1	16.4	143.3	170.5
32	0.2	-	5.5	32.3	38.0
33	0.1	13.2	9.2	61.2	83.7
34a	-	4.6	0.5	124.1	129.2
34b	4.9	-	2.9	220.0	227.8
34c	0.3	6.8	1.2	162.0	170.3
35a	2.6	-	3.8	162.2	168.6
35b	0.3	-	3.3	135.2	138.8
36	46.9	0.5	12.4	387.0	446.8
37	0.7	-	2.0	98.5	101.2
38a	2.7	34.0	4.2	107.1	148.0
38b	2.8	16.7	1.6	134.5	155.6
39	5.4	-	15.6	250.6	271.6
40	3.0	-	2.8	66.2	72.0
41	1.8	-	0.3	7.8	9.9
42	0.3	-	0.5	7.5	8.3
43	2.2	-	2.3	48.5	53.0
44	5.1	--	3.9	58.5	67.5

TABLE 3.1 (Cont'd)
(1,000 Acres)

Planning Unit No.	WATER Fresh	Salt	LAND Non-Agricultural	Agricultural	Total
45	1.0	-	3.2	50.5	54.7
46	1.1	-	4.1	74.5	79.7
47	5.1	-	3.0	77.2	85.3

TABLE 3.2
LAND AND WATER AREA BY PLANNING UNITS - 1980

(1,000 Acres)

Planning Unit No.	WATER Fresh	Salt	LAND Non-Agricultural	Agricultural	Total
1	13.1	-	37.4	63.2	113.7
2	20.5	-	11.2	91.5	123.2
3	-	-	7.9	8.9	16.8
4	-	-	17.0	23.4	40.4
5	1.6	-	5.5	33.0	40.1
6	0.1	-	20.5	62.3	82.9
7	0.1	-	5.8	28.7	34.6
8a	0.8	-	6.7	123.0	130.5
8b	0.1	-	1.5	27.7	29.3
9	-	-	0.8	12.7	13.5
10	-	-	0.6	12.4	13.0
11	-	-	1.2	20.2	21.4
12a	0.2	-	4.2	94.6	99.0
12b	0.2	-	7.7	59.8	67.7
12c	0.1	-	1.8	40.1	42.0
13	0.2	-	3.0	86.0	89.2
14	1.0	27.1	26.5	190.2	244.8
15	3.4	5.8	44.2	197.7	251.1
15a	-	-	1.0	16.2	17.2
16	0.3	25.1	25.3	64.3	115.0
17	4.4	1.0	21.5	150.7	177.6

TABLE 3.2 (Cont'd)
(1,000 Acres)

Planning Unit No.	WATER Fresh	Salt	LAND Non-agricultural	Agricultural	Total
18a	22.1	-	6.5	141.0	169.6
18b	7.3	-	1.4	38.2	46.9
18c	9.9	-	4.3	40.9	55.1
18d	0.9	-	5.2	13.5	19.6
18e	1.0	-	7.9	14.1	23.0
18f	16.6	-	68.8	46.2	131.6
19	0.5	2.6	11.3	61.6	76.0
20	7.0	20.4	123.0	28.9	179.3
20a	2.9	-	9.6	14.1	26.6
21	5.9	-	21.7	41.8	69.4
22a	2.5	-	16.9	51.8	71.2
22b	2.6	-	75.2	111.2	189.0
22c	1.3	-	4.7	34.4	40.4
22d	0.3	0.5	2.3	4.3	7.4
23	0.9	0.5	18.3	37.9	57.6
24	4.3	1.2	45.6	105.2	156.3
25	0.5	3.5	6.4	14.5	24.9
26	7.6	31.0	23.9	106.0	168.5
27	2.0	19.3	38.3	59.9	119.5
28	-	4.0	3.4	5.6	13.0
29	0.1	11.7	57.9	97.2	166.9
30	6.5	3.7	42.2	139.2	191.6

TABLE 3.2 (Cont'd)
(1,000 Acres)

Planning Unit No.	WATER Fresh	WATER Salt	LAND Non-Agricultural	LAND Agricultural	Total
31	0.7	10.1	49.4	110.3	170.5
32	0.2	-	13.5	24.3	38.0
33	0.1	13.2	24.7	45.7	83.7
34a	-	4.6	1.2	123.4	129.2
34b	4.9	-	4.8	218.1	227.8
34c	0.3	6.8	2.8	160.4	170.3
35a	2.6	-	7.5	158.5	168.6
35b	0.3	-	4.1	134.4	138.8
36	135.5	0.5	12.7	298.1	446.8
37	0.7	-	4.8	95.7	101.2
38a	2.7	34.0	16.3	95.0	148.0
38b	2.8	16.7	9.5	126.6	155.6
39	5.4	-	35.7	230.5	271.6
40	3.0	-	11.2	57.8	72.0
41	2.5	-	1.5	5.9	9.9
42	0.3	-	2.2	5.8	8.3
43	23.0	-	2.3	27.7	53.0
44	5.1	-	4.6	57.8	67.5
45	6.1	-	3.0	45.6	54.7
46	9.0	-	8.0	62.7	79.7
47	5.1	-	21.0	59.2	85.3

TABLE 3.3
LAND AND WATER AREA BY PLANNING UNITS - 2015

(1,000 Acres)

	WATER		LAND		
Planning Unit No.	Fresh	Salt	Non-Agricultural	Agricultural	Total
1	13.1	-	47.5	53.1	113.7
2	20.5	-	25.1	77.6	123.2
3	-	-	9.2	7.6	16.8
4	-	-	20.2	20.2	40.4
5	4.4	-	7.2	28.5	40.1
6	1.4	-	24.7	56.8	82.9
7	0.5	-	7.3	26.8	34.6
8a	4.8	-	10.5	115.2	130.5
8b	0.2	-	2.8	26.3	29.3
9	-	-	1.5	12.0	13.5
10	-	-	1.1	11.9	13.0
11	-	-	2.0	19.4	21.4
12a	5.0	-	5.0	89.0	99.0
12b	0.2	-	9.5	58.0	67.7
12c	1.3	-	2.4	38.3	42.0
13	0.7	-	5.4	83.1	89.2
14	1.0	27.1	38.7	178.0	244.8
15	3.4	5.8	58.1	183.8	251.1
15a	-	-	1.8	15.4	17.2
16	0.3	25.1	33.4	56.2	115.0
17	4.4	1.0	27.0	145.2	177.6

TABLE 3.3 (Cont'd)
(1,000 Acres)

Planning Unit No.	WATER Fresh	Salt	LAND Non-Agricultural	Agricultural	Total
18a	22.1	-	19.3	128.2	169.6
18b	7.3	-	5.0	34.6	46.9
18c	9.9	-	13.0	32.2	55.1
18d	0.9	-	10.4	8.3	19.6
18e	1.0	-	13.4	8.6	23.0
18f	16.6	-	87.0	28.0	131.6
19	0.5	2.6	17.1	55.8	76.0
20	7.0	20.4	151.9	-	179.3
20a	2.9	-	17.5	6.2	26.6
21	5.9	-	38.2	25.3	69.4
22a	2.5	-	43.6	25.1	71.2
22b	7.6	-	102.2	79.2	189.0
22c	1.9	-	22.1	16.4	40.4
22d	0.3	0.5	3.9	2.7	7.4
23	1.1	0.5	33.6	22.4	57.6
24	7.3	1.2	81.6	66.2	156.3
25	0.5	3.5	11.5	9.4	24.9
26	9.0	31.0	60.4	68.1	168.5
27	2.0	19.3	58.8	39.4	119.5
28	-	4.0	4.3	4.7	13.0
29	0.1	11.7	74.3	80.8	166.9
30	6.8	3.7	80.7	100.4	191.6
31	0.7	10.1	70.1	89.6	170.5

TABLE 3.3 (Cont'd)
(1,000 Acres)

Planning Unit No.	WATER Fresh	Salt	LAND Non-Agricultural	Agricultural	Total
32	0.2	-	17.9	19.9	38.0
33	0.1	13.2	30.7	39.7	83.7
34a	-	4.6	1.9	122.7	129.2
34b	4.9	-	6.2	216.7	227.8
34c	0.3	6.8	4.1	159.1	170.3
35a	2.6	-	9.0	157.0	168.6
35b	0.3	-	6.4	132.1	138.8
36	135.5	0.5	19.9	290.9	446.8
37	0.7	-	8.0	92.5	101.2
38a	2.7	34.0	19.6	91.7	148.0
38b	2.8	16.7	14.0	122.1	155.6
39	5.4	-	43.5	222.7	271.6
40	3.0	-	11.9	57.1	72.0
41	2.5	-	1.7	5.7	9.9
42	0.3	-	2.4	5.6	8.3
43	23.0	-	2.3	27.7	53.0
44	5.1	-	8.5	53.9	67.5
45	6.1	-	5.8	42.8	54.7
46	9.0	-	17.5	53.2	79.7
47	5.1	-	27.0	53.2	85.3

PEACE CREEK
(Planning Unit Number 2)

LOCATION AND DESCRIPTION

This watershed includes approximately 123,200 acres or 192.5 square miles. It is located in central Polk County. Included within the watershed are the cities of Winter Haven and Lake Alfred, and portions of Haines City, Dundee, Lake Wales, and Auburndale. Numerous natural lakes are located throughout the area. The watershed is well served by highways and railroads. The major agricultural crops are citrus, improved pasture, vegetables, and timber. Much of the woodland is sparsely stocked and utilized for grazing as well as for timber production.

Soils which comprise this watershed are grouped in the following capability classes and sub-classes:

33% in IIs - IVs

40% in IIw - IVw

27% in V - VIII

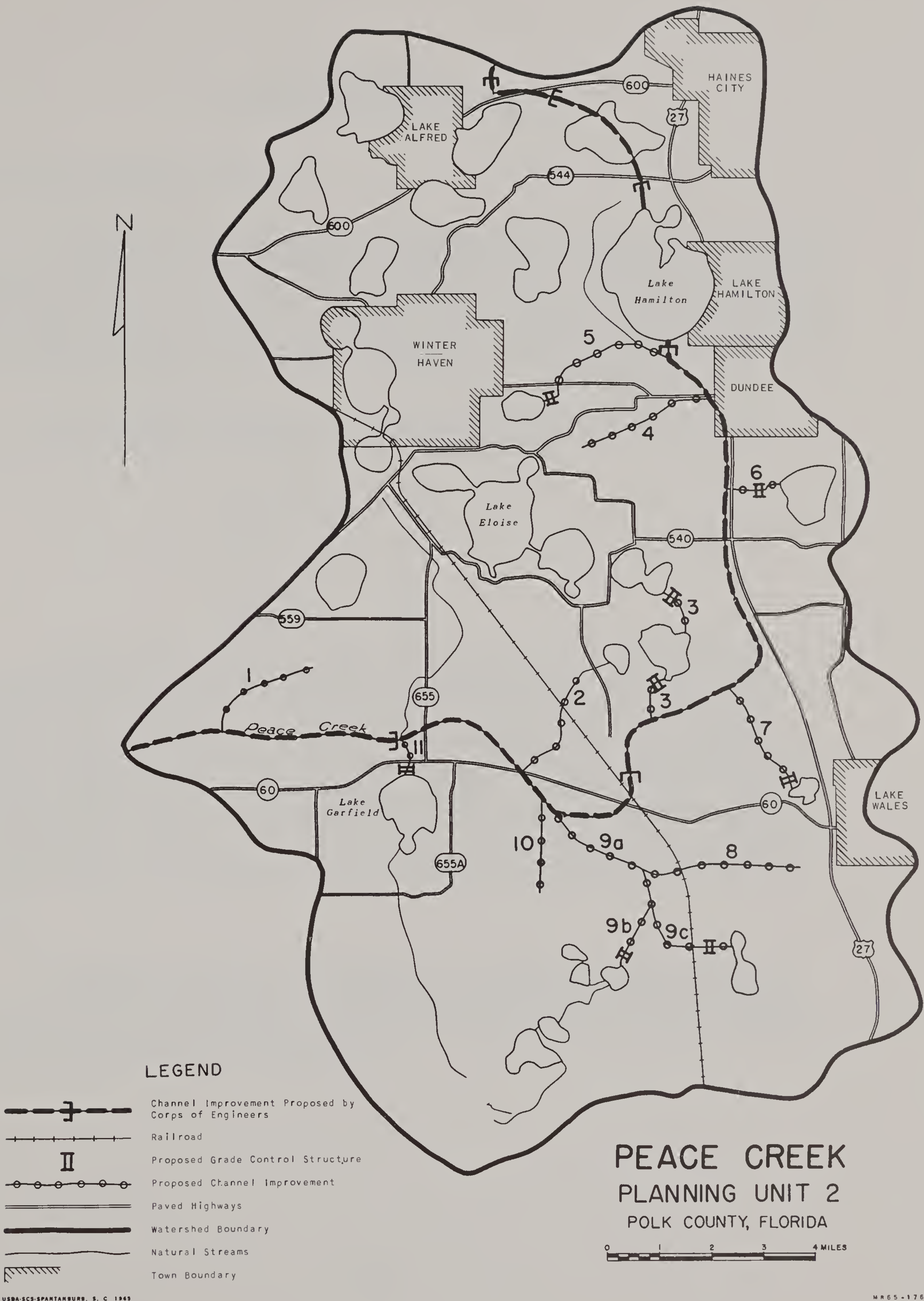
There are presently 2,000 acres of citrus, 300 acres of vegetables, 300 acres of other crops, and 6,300 acres of improved pasture on soils with an excess water hazard. In addition, 47,900 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 5,600 acres of citrus, 400 acres of vegetables, 400 acres of other crops, and 8,200 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 25.5 miles of channel improvement with 51 pipe drop structures at entries of existing or needed waterways into the main channels, and nine grade stabilization structures.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	5.48	12,300	100	25,830
2	5.16	12,000	97	25,200
3	5.40	8,800	100	39,585
4	3.04	10,900	62	32,700
5	5.40	12,500	100	47,875
6	3.92	5,600	110	27,384
7	8.72	12,900	150	108,747
8	9.20	16,000	158	130,560
9a	45.08	10,800	600	140,400
9b	17.88	5,600	275	49,280
9c	33.16	14,700	460	177,280
10	3.76	9,000	74	42,210
11	15.12	3,500	240	27,930



HAINES CITY
LAKE ALFRED
600
27
544
Lake Hamilton
LAKE HAMILTON
WINTER HAVEN
DUNDEE
Lake Eloise
540
559
655
Peace Creek
60
Lake Garfield
655A
LAKE WALES
1
2
3
4
5
6
7
8
9a
9b
9c
10
11
N
LEGEND
Channel Improvement Proposed by Corps of Engineers
Railroad
Proposed Grade Control Structure
Proposed Channel Improvement
Paved Highways
Watershed Boundary
Natural Streams
Town Boundary
PEACE CREEK
PLANNING UNIT 2
POLK COUNTY, FLORIDA
0 1 2 3 4 MILES
USDA-SCS-SPARTANBURG, S. C. 1965
MR65-176

BOWLEGS CREEK
(Planning Unit Number 5)

LOCATION AND DESCRIPTION

This watershed includes approximately 40,100 acres, or 62.7 square miles. It is located in south central Polk County between the cities of Frostproof and Fort Meade. U.S. Highway 98 and one railroad serve the area. The major agricultural crops are citrus, improved pasture, timber and vegetables. Much of the woodland is utilized for grazing as well as for timber production.

Soils which comprise the watershed are grouped in the following capability classes and subclasses:

18% in IIs - IVs

56% in IIw - IVw

26% in V - VIII

There are presently 1,200 acres of citrus, 100 acres of vegetables, and 3,300 acres of improved pasture on soils with an excess water hazard. In addition, 20,200 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 2,400 acres of citrus, 100 acres of vegetables, 100 acres of other crops, and 3,100 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 10.9 miles of channel improvement with 22 pipe drop structures at entries of existing or needed waterways into the main channels, and one lake control structure.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
2	32.7	3,000	480	15,000
3	12.8	8,200	225	68,400
4	4.4	16,400	130	33,000
5	14.2	19,100	250	64,000
6	2.3	10,900	54	18,600

LEGEND

Potential Reservoir

Proposed Lake Control Structure

Proposed Channel Improvement

Watershed Boundary

Paved Highways

Natural Streams

Town Boundary

BOWLEGS CREEK
PLANNING UNIT 5
POLK COUNTY, FLORIDA

0 1 2 3 4 MILES

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-175

PAYNE CREEK
(Planning Unit Number 6)

LOCATION AND DESCRIPTION

This watershed includes approximately 82,900 acres, or 129.5 square miles. It is located in southwest Polk County and northwest Hardee County, its area being about evenly divided between the two counties. Included within the watershed are the community of Fort Green Springs, and a portion of the city of Bowling Green. The area is served by several state and federal highways and two railroads. The major agricultural crops are citrus, improved pasture, timber, and vegetables. Much of the woodland is utilized for grazing as well as for timber production.

Soils which comprise the watershed are grouped in the following capability classes and subclasses:

16% in IIs - IVs

64% in IIw - IVw

20% in V - VIII

There are presently 2,900 acres of citrus, 300 acres of vegetables, 200 acres of other crops, and 8,700 acres of improved pasture on soils with an excess water hazard. In addition, 39,700 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished.

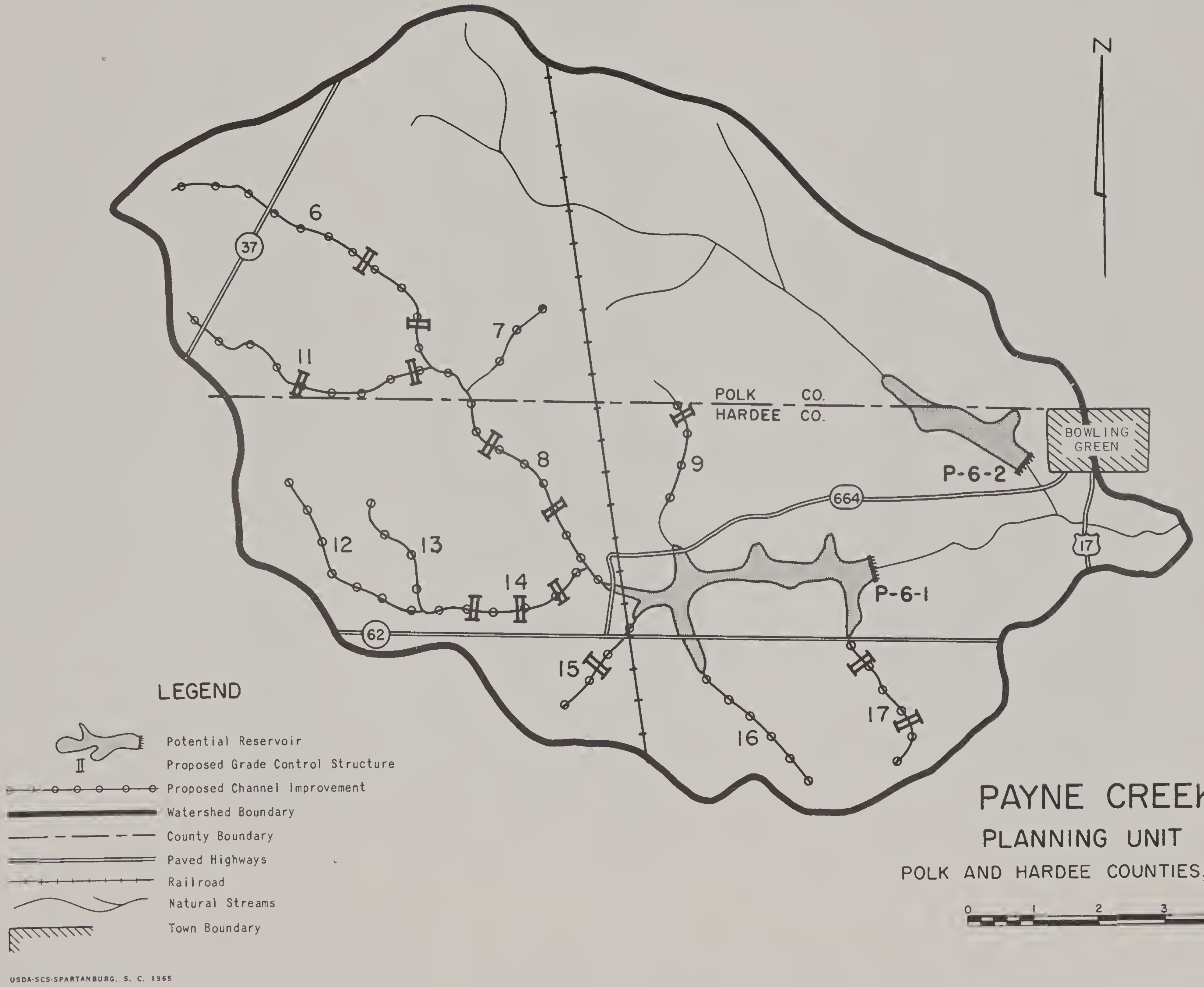
It is anticipated that, by 1980, 4,900 acres of citrus, 300 acres of vegetables, 100 acres of other crops, and 12,500 acres of improved pasture will be located on soils having an excess water problem.

PLAN

Proposed works of improvement include the installation of 31.6 miles of channel improvement with 63 pipe drop structures at entries of existing or needed waterways into the main channels, and 13 grade stabilization structures.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin.ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
6	12.24	28,200	200	110,920
7	2.76	6,800	58	11,560
8	41.68	23,900	570	281,860
9	4.96	7,600	95	24,320
11	6.56	21,800	120	62,400
12	5.48	18,400	104	51,520
13	2.68	10,800	56	18,360
14	11.64	14,600	195	82,740
15	3.64	10,600	73	28,070
16	5.44	12,000	103	21,600
17	3.88	12,200	77	37,200



PAYNE CREEK
PLANNING UNIT 6
POLK AND HARDEE COUNTIES, FLORIDA

LITTLE CHARLIE CREEK
(Planning Unit Number 7)

LOCATION AND DESCRIPTION

This watershed includes approximately 34,600 acres, or 54.1 square miles. It is located about two miles east of Bowling Green, in the northeast portion of Hardee County, with 11,000 acres extending into Polk County. The area is served by several state highways and county roads. The major agricultural crops are citrus, improved pasture, and timber. Much of the woodland is utilized for grazing as well as for timber production.

Soils which comprise the watershed are grouped in the following capability classes and subclasses:

9% in IIs - IVs

73% in IIw - IVw

18% in V - VIII

There are presently 1,700 acres of citrus, 100 acres of vegetables, 100 acres of other crops, and 4,500 acres of improved pasture on soils with an excess water hazard. In addition, 11,500 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 2,200 acres of citrus, 100 acres of vegetables, and 7,600 acres of improved pasture will be located on soils having an excess water problem.

PLAN

Proposed works of improvement include the installation of 13.9 miles of channel improvement with 28 pipe drop structures at entries of existing or needed waterways into the main channels, and 4 grade stabilization structures.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
3	12.8	8,000	210	37,600
4	5.6	11,400	105	25,100
5	2.5	11,600	55	19,700
6	4.1	13,000	82	25,500
7	1.3	7,400	90	12,600
8	1.6	5,000	37	17,300
9	7.2	9,600	130	39,400
10	1.7	7,200	40	23,500

LITTLE CHARLIE CREEK

PLANNING UNIT 7

POLK AND HARDEE COUNTIES, FLORIDA

0 1 2 3 4 MILES

LEGEND

- Potential Reservoir
- Proposed Grade Control Structure
- Proposed Channel Improvement
- Watershed Boundary
- County Boundary
- Paved Highways
- Natural Streams

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-171

BRUSHY CREEK
(Planning Unit Number 8b)

LOCATION AND DESCRIPTION

This watershed includes approximately 29,300 acres, or 45.8 square miles. It is located in the western half of Hardee County, about six miles west of Wauchula. The community of Ona is located on the east boundary of the watershed. One railroad and several state highways and county roads serve the area. The major agricultural crops are citrus and improved pasture. The soils which comprise the watershed are grouped in the following capability classes and subclasses:

80% in IIw - IVw

20% in V - VIII

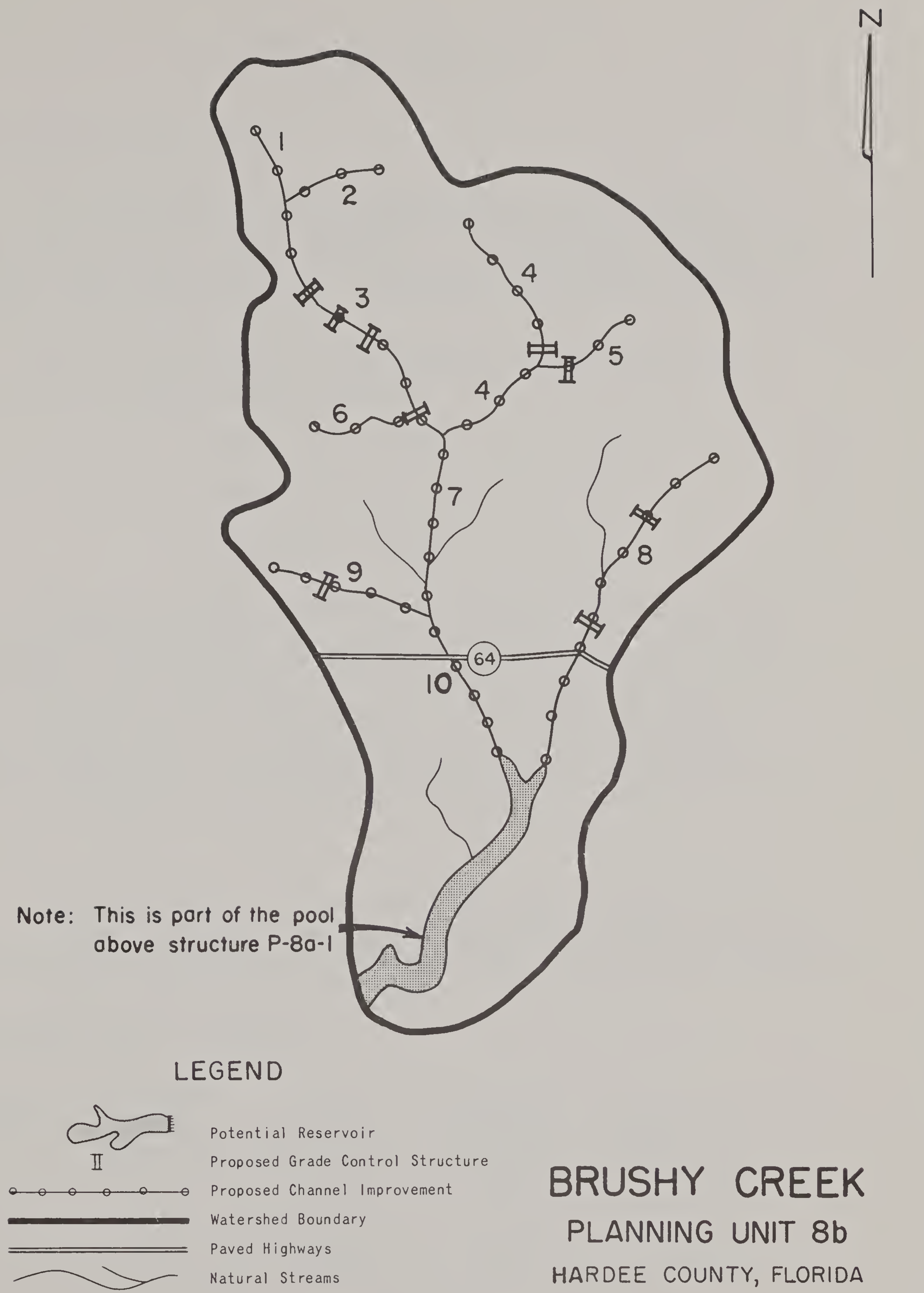
There are presently 1,500 acres of citrus, 100 acres of vegetables, and 5,000 acres of improved pasture on soils with an excess water hazard. In addition, 22,000 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 2,700 acres of citrus, 100 acres of vegetables, and 9,000 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 24.8 miles of channel improvement with 50 pipe drop structures at entries of existing or needed waterways into the main channels, and 9 grade stabilization structures.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	2.1	7,200	46	21,600
2	2.1	6,600	46	19,800
3	8.9	21,200	195	111,200
4	5.7	20,400	148	68,300
5	2.9	7,800	60	23,400
6	2.8	8,400	58	25,200
7	25.8	12,000	380	150,600
8	8.5	25,900	148	103,200
9	3.1	11,800	62	35,400
10	32.7	9,900	450	124,200



BRUSHY CREEK
PLANNING UNIT 8b
HARDEE COUNTY, FLORIDA

USDA-SCS-SPARTANBURG, S. C. 1965

TROUBLESOME CREEK
(Planning Unit Number 9)

LOCATION AND DESCRIPTION

This watershed includes approximately 13,500 acres or 21.1 square miles. It is located in west central Hardee County, about three miles west of Wauchula. Several state highways and county roads serve the area. The major agricultural crops are citrus and improved pasture.

Soils which comprise the watershed are grouped in the following classes and subclasses:

21% in IIs - IVs

66% in IIw - IVw

13% in V - VIII

There are presently 600 acres of citrus and 2,100 acres of improved pasture on soils with an excess water hazard. In addition, 7,700 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 1,000 acres of citrus and 3,300 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 5.7 miles of channel improvement with 12 pipe drop structures at entries of existing or needed waterways into the main channels, and 1 grade stabilization structure.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	9.0	17,500	140	45,800
2	4.2	12,800	82	42,200

TROUBLESOME CREEK

PLANNING UNIT 9

HARDEE COUNTY, FLORIDA

0 1 2 3 4 MILES

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-169

OAK AND HICKORY CREEKS
(Planning Unit Number 10)

LOCATION AND DESCRIPTION

This watershed includes approximately 13,000 acres, or 20.3 square miles. It is located in west central Hardee County, approximately six miles southwest of Wauchula. The community of Ona is located on the northwest boundary of the watershed. One railroad, three state highways, and several county roads serve the area. The major agricultural crops are citrus and improved pasture.

Soils which comprise the watershed are grouped in the following classes and subclasses:

7% in IIs - IVs

73% in IIw - IVw

20% in V - VIII

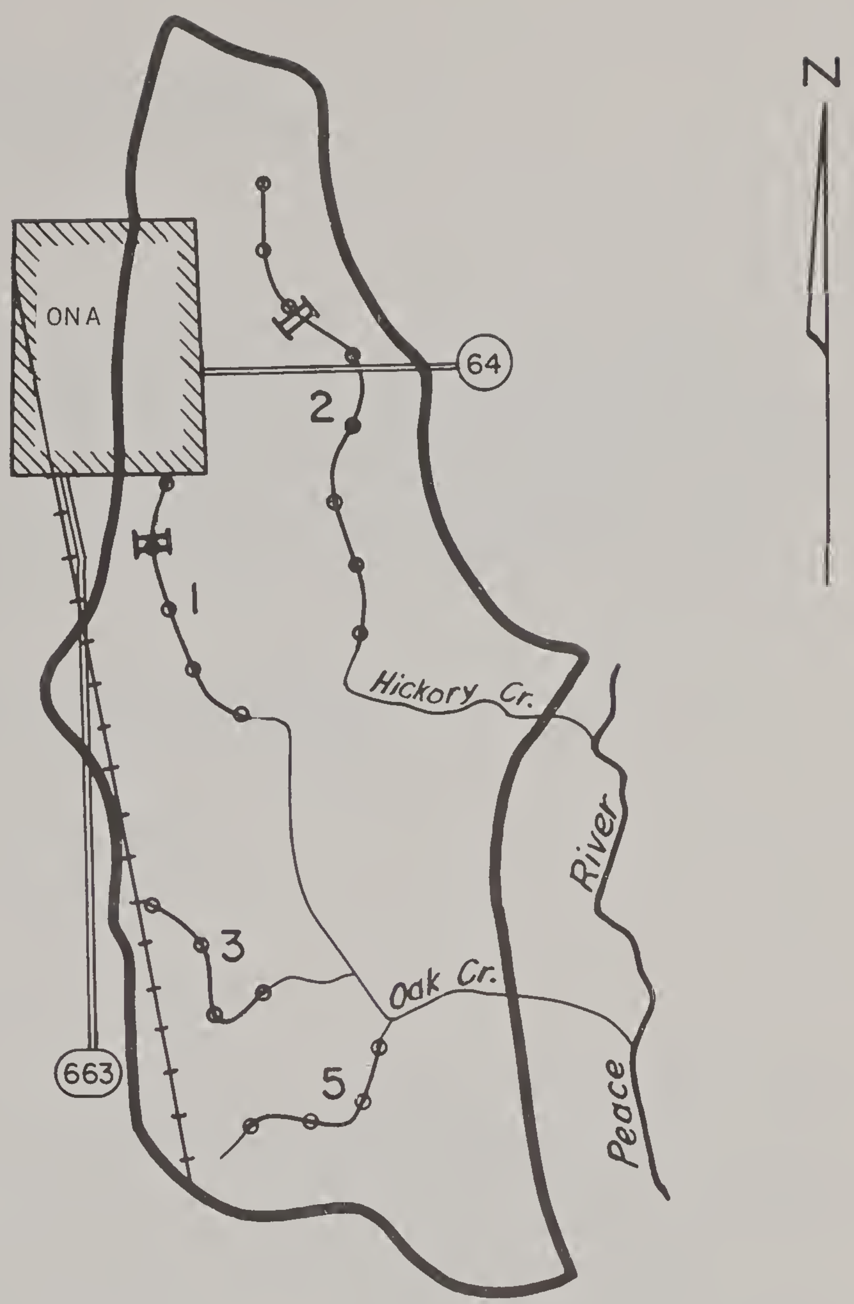
There are presently 600 acres of citrus, and 2,500 acres of improved pasture on soils with an excess water hazard. In addition, 7,900 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 800 acres of citrus and 3,800 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 8.4 miles of channel improvement, 17 pipe drop structures at entries of existing or needed waterways into the main channels, and 2 grade stabilization structures.

STRUCTURAL DATA - Channels

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	5.0	13,300	75	41,100
2	5.3	20,000	80	53,500
3	1.4	6,500	35	20,200
5	1.5	4,500	35	14,400



LEGEND

II	Proposed Grade Control Structure
	Proposed Channel Improvement
	Watershed Boundary
	Paved Highways
	Natural Streams
	Railroad
	Town Boundary

OAK AND HICKORY CREEKS

PLANNING UNIT 10

HARDEE COUNTY, FLORIDA

0 1 2 3 4 MILES

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-166

LIMESTONE CREEK
(Planning Unit Number 11)

LOCATION AND DESCRIPTION

This watershed includes approximately 21,400 acres or 33.4 square miles. It is located in the southwest quadrant of Hardee County, with 4,700 acres extending southward into DeSoto County. The community of Limestone is located in the center of the watershed. One railroad and several state highways and county roads serve the area. The major agricultural crops are citrus and improved pasture.

Soils which comprise the watershed are grouped in the following capability classes and subclasses:

5% in IIs - IVs

80% in IIw - IVw

15% in V - VIII

There are presently 1,100 acres of citrus and 3,600 acres of improved pasture on soils with an excess water hazard. In addition, 14,900 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 1,700 acres of citrus and 7,200 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 16.7 miles of channel improvement with 32 pipe drop structures at entries of existing or needed waterways into the main channels, and 3 grade stabilization structures.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	11.3	26,000	185	65,400
2	4.8	18,200	92	51,300
3	7.5	20,800	135	80,200
4	33.4	20,000	400	193,400

LIMESTONE CREEK

PLANNING UNIT II

HARDEE AND DE SOTO COUNTIES, FLORIDA

0 1 2 3 4 MILES

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-173

CHARLIE CREEK
(Planning Unit Number 12a)

LOCATION AND DESCRIPTION

This watershed includes approximately 99,000 acres, or 154.7 square miles. It is made up from portions of four counties, as follows: 4,800 acres in the northern portion of DeSoto; 86,500 acres in the eastern half of Hardee; 1,100 acres in northwestern Highlands; 6,600 acres in south central Polk. U. S. Highway 17, one railroad, and many state highways and county roads serve the area. The major agricultural crops are citrus, improved pasture, vegetables, and timber. Most of the commercial pine timber is located in the northern end of the watershed, and the majority of the woodland is utilized for grazing, as well as for timber production.

Soils which comprise the watershed are grouped in the following capability classes and subclasses:

10% in IIs - IVs

70% in IIw - IVw

20% in V - VIII

There are presently 4,700 acres of citrus, 500 acres of vegetables and 15,700 acres of improved pasture on soils with an excess water hazard. In addition, 66,300 acres of unimproved pasture, woodland, and miscellaneous uses are on soils with excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 6,400 acres of citrus, 300 acres of vegetables, and 25,100 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 32.7 miles of channel improvement, 66 pipe drop structures at entries of existing or needed waterways into the main channels, and 7 grade stabilization structures.

STRUCTURAL DATA - Channels

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	3.0	7,000	62	18,100
2	6.2	18,500	115	64,400
3	10.0	21,400	170	78,900
4	2.8	12,400	59	38,400
5	2.5	13,800	54	23,500
6	14.1	19,000	225	87,500
7	5.5	15,000	103	41,700
8	44.4	43,400	585	324,700
9	5.3	12,700	100	21,600
10	3.0	9,200	62	16,900


N
POLK CO.
HARDEE CO.
HIGHLANDS CO.
HARDEE CO.
8
9
10
64
64A
64
6
7
Note: Part of pool from structure P-12a-1 extends into area 12 b
636
5
66
P-12a-1
634
17
Peace R.
4
3
HARDEE CO.
DE SOTO CO.
1
2
Potential Reservoir
Proposed Grade Control Structure
Proposed Channel Improvement
Watershed Boundary
County Boundary
Paved Highways
Natural Streams
CHARLIE CREEK
PLANNING UNIT 12a
HARDEE, POLK, DE SOTO, HIGHLANDS
COUNTIES, FLORIDA
0 1 2 3 4 MILES
USDA SCS SPARTANBURG S C 1965

LITTLE CHARLIE BOWLEGS
(Planning Unit Number 12b)

LOCATION AND DESCRIPTION

This watershed includes approximately 67,700 acres, or 105.8 square miles. About 30,100 acres is in eastern Hardee County, and 37,600 acres is in western Highlands County. The Highlands Hammock State Park, covering some 3,800 acres is located near the eastern boundary of the watershed. Several state highways serve the area. The major agricultural crops are citrus, improved pasture, and timber. Much of the privately owned woodland is utilized for grazing as well as for timber production.

Soils which comprise the watershed are grouped in the following classes and subclasses:

5% IIs - IVs

70% IIw - IVw

25% V - VIII

There are presently 1,500 acres of citrus, 100 acres of vegetables, and 9,300 acres of improved pasture on soils with an excess water hazard. In addition, 42,400 acres (excluding the area in the state park) of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished.

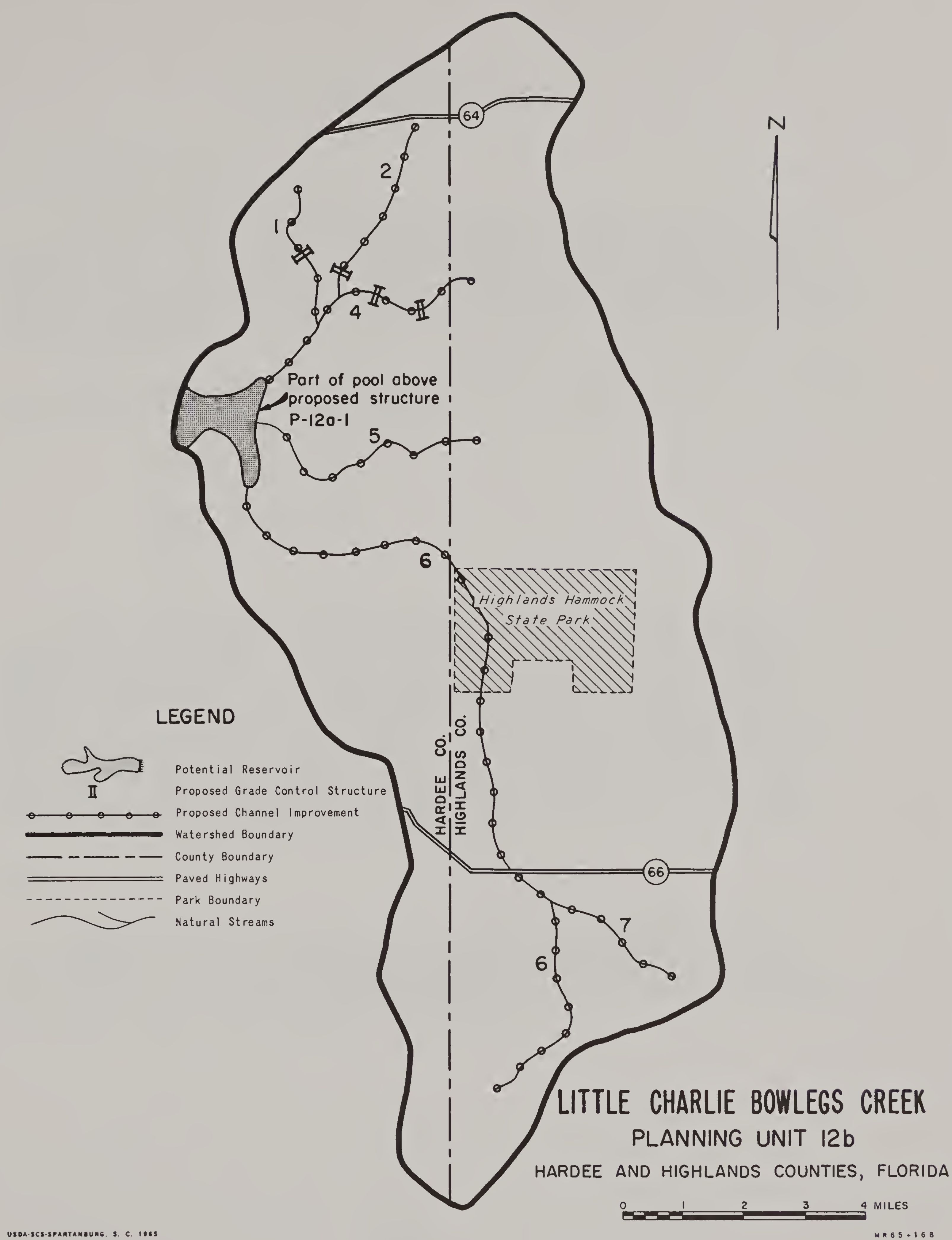
It is anticipated that, by 1980, 3,300 acres of citrus, 400 acres of vegetables, and 17,200 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 30.1 miles of channel improvement with 60 pipe drop structures at entries of existing or needed waterways into the main channels, and 4 grade stabilization structures.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	3.9	16,600	78	43,800
2	8.8	14,400	152	48,200
4	16.6	25,300	410	208,100
5	7.8	21,000	110	45,700
6	58.9	65,600	600	482,200
7	6.4	15,800	117	37,100



64
N
2
1
4
Part of pool above proposed structure P-12a-1
5
6
Highlands Hammock State Park
LEGEND
Potential Reservoir
Proposed Grade Control Structure
Proposed Channel Improvement
Watershed Boundary
County Boundary
Paved Highways
Park Boundary
Natural Streams
HARDEE CO.
HIGHLANDS CO.
66
7
6
LITTLE CHARLIE BOWLEGS CREEK
PLANNING UNIT 12b
HARDEE AND HIGHLANDS COUNTIES, FLORIDA
0 1 2 3 4 MILES
USDA-SCS-SPARTANBURG, S. C. 1965
MR65-168

OAK CREEK
(Planning Unit Number 12c)

LOCATION AND DESCRIPTION

This watershed includes approximately 42,000 acres, or 65.6 square miles. It is located in southeast Hardee County, with 13,000 acres extending into DeSoto County. Several state and county roads serve the area. The major agricultural crops are citrus and improved pasture.

Soils which comprise the watershed are grouped in the following capability classes and subclasses:

5% in IIs - IVs

76% in IIw - IVw

19% in V - VIII

There are presently 1,800 acres of citrus, 100 acres of vegetables, and 6,700 acres of improved pasture on soils with an excess water hazard. In addition, 30,800 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is ancitipated that, by 1980, 2,700 acres of citrus, 100 acres of vegetables and 10,400 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 29.7 miles of channel improvement with 60 pipe drop structures at entries of existing or needed waterways into the main channels, and eight grade stabilization structures.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	67.4	26,400	360	197,900
2	5.8	19,400	110	76,500
3	5.2	5,800	100	10,900
4	3.6	10,500	72	28,700
5	2.7	12,000	58	26,000
6	5.3	14,800	100	24,000
7	2.8	3,700	54	6,200
8	10.9	17,800	190	66,500
9	4.6	18,000	90	39,600
10	5.2	13,600	100	37,400
11	6.0	14,400	110	57,400

LEGEND

- Potential Reservoir
- Proposed Grade Control Structure
- Proposed Channel Improvement
- Watershed Boundary
- County Boundary
- Paved Highways
- Natural Streams

OAK CREEK

PLANNING UNIT 12c

HARDEE AND DE SOTO COUNTIES, FLORIDA

0 1 2 3 4

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-172

JOSHUA CREEK
(Planning Unit Number 13)

LOCATION AND DESCRIPTION

This watershed includes approximately 89,200 acres, or 139.4 square miles. It is located near the center of DeSoto County and extends almost the entire north-south distance of the county. The city of Arcadia is located on the west boundary of the watershed, most of the city being outside of the area. The town of Nocatee is situated in the southwest portion of the watershed. U. S. Highway 17 and several state highways and county roads serve the area. The major agricultural crops are citrus, improved pasture, and vegetables.

Soils which comprise this watershed are grouped in the following capability classes and subclasses:

3% in IIs - IVs

11% in IIw - IVw

86% in V - VIII

There are presently 2,000 acres of citrus, 600 acres of vegetables and other crops, and 11,500 acres of improved pasture on soils with an excess water hazard. In addition, 70,600 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 4,700 acres of citrus, 600 acres of vegetables and other crops, and 15,900 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 56.9 miles of channel improvement with 114 pipe drop structures at entries of existing or needed waterways into the main channels, and 10 grade stabilization structures.

STRUCTURAL DATA - Channels

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
3	8.5	28,500	125	91,000
5	11.4	25,200	160	73,100
6	12.2	26,000	110	59,800
7	9.6	38,500	172	136,700
8	5.5	19,300	104	55,000
9	2.4	11,000	51	18,400
10	3.0	11,900	100	32,800
11	9.3	6,400	190	27,100
12	15.6	7,500	322	53,900
13	26.0	9,900	345	84,800
15	4.6	17,300	86	55,300
16	14.0	37,200	225	175,100
17	9.4	31,000	165	137,800
18	12.8	14,400	210	110,100
19	24.6	7,400	360	50,400
20	42,0	9,100	560	168,300

N
ARCADIA
Peace River
Joshua Cr
P-13-1
70
31
760
760A
17
3
5
6
7
8
9
10
11
12
13
15
16
17
18
19
20
LEGEND
Potential Reservoir
Proposed Grade Control Structure
Proposed Channel Improvement
Watershed Boundary
Paved Highways
Natural Streams
Town Boundary
JOSHUA CREEK
PLANNING UNIT 13
DE SOTO COUNTY, FLORIDA
0 1 2 3 4 MILES
USDA-SCS SPARTANBURG S. C. 1965
MR65-164

ALLIGATOR AND HICKORY BRANCHES
(Planning Unit Number 15a)

LOCATION AND DESCRIPTION

This watershed includes approximately 17,200 acres, or 26.9 square miles. It is located in central Hardee County and includes most of the town of Zolfo Springs. U. S. Highway 17 and several state and county roads serve the area. The major agricultural crops are citrus and improved pasture.

Soils which comprise the watershed are grouped in the following capability classes and subclasses:

13% in IIs - IVs

70% in IIw - IVw

17% in V - VIII

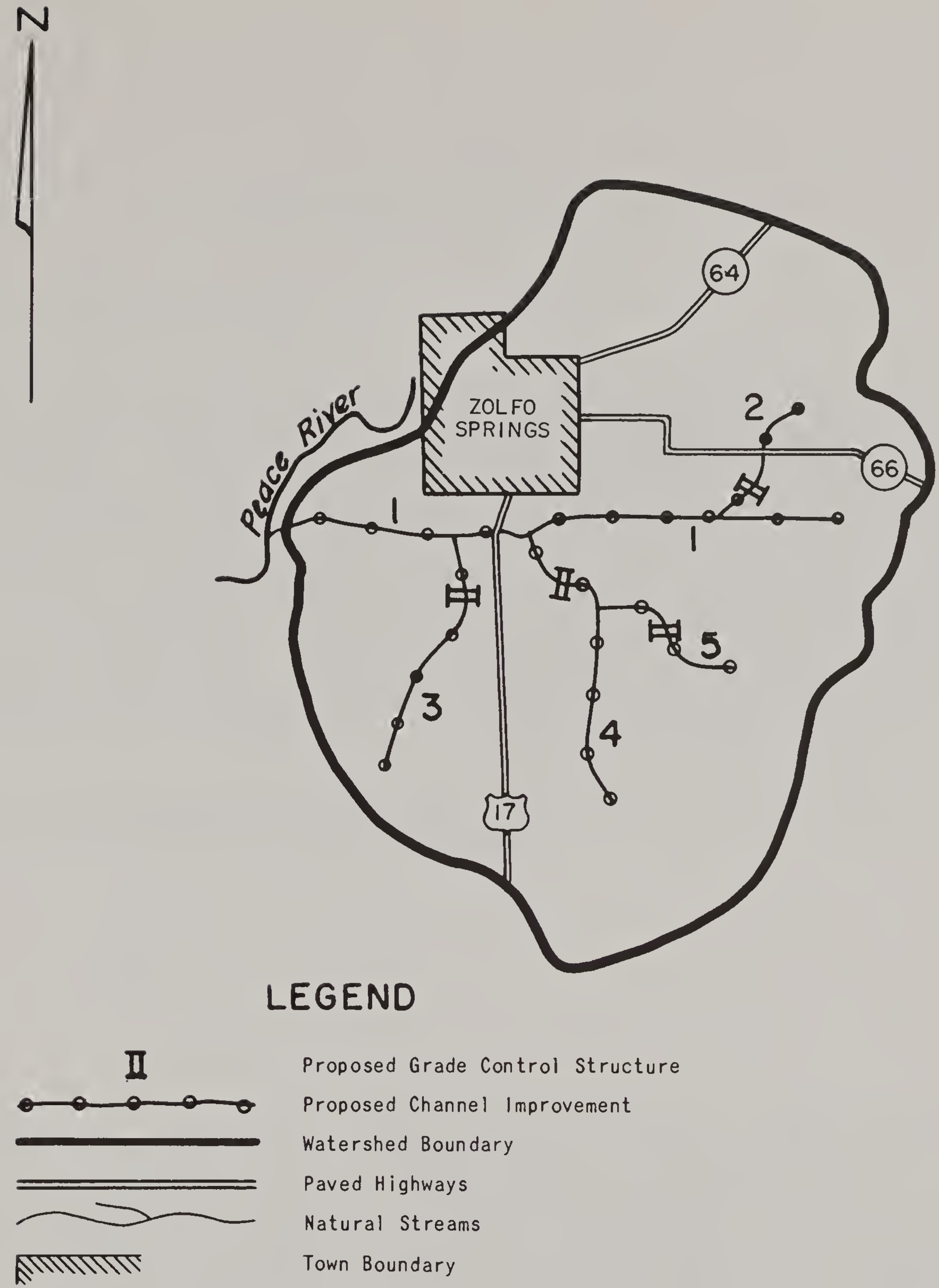
There are presently 800 acres of citrus, 100 acres of vegetables, and 3,000 acres of improved pasture on soils with an excess water hazard. In addition, 10,800 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 1,100 acres of citrus and 4,800 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 12.0 miles of channel improvement, with 24 pipe drop structures at entries of existing or needed waterways into the main channels, and four grade stabilization structures.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	7.3	17,000	325	137,600
2	2.2	7,800	48	24,200
3	3.6	13,400	72	47,300
4	6.6	16,600	120	53,900
5	2.7	8,500	56	20,900



ALLIGATOR AND HICKORY BRANCHES

PLANNING UNIT 15a

HARDEE COUNTY, FLORIDA

0 1 2 3 4 MILES

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-165

MYAKKA RIVER
(Planning Unit Number 30)

LOCATION AND DESCRIPTION

This watershed includes approximately 191,600 acres or 298.4 square miles. About 3,100 acres is in western Hardee County, with 105,000 acres in southeastern Manatee County, and 83,500 acres in eastern Sarasota County. A portion of North Port Charlotte is located at the downstream end of the watershed. The majority of the Myakka River State Park is also in the watershed. U. S. Highway 41 and several state highways and county roads serve the area. The major agricultural crops are citrus, vegetables, improved pasture, and timber. Much of the woodland is utilized for grazing as well as for timber production.

Soils which comprise the watershed are grouped in the following capability classes and subclasses:

2% in IIs - IVs

81% in IIw - IVw

17% in V - VIII

There are presently 4,100 acres of citrus, 1,800 acres of vegetables, 1,600 acres of other crops, and 21,800 acres of improved pasture on soils with an excess water hazard. In addition, 133,500 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 7,300 acres of citrus, 1,700 acres of vegetables, 1,600 acres of other crops, and 36,200 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 24.1 miles of channel improvement with 48 pipe drop structures at entries of existing or needed waterways into the main channels, and 2 grade stabilization structures.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	13.6	21,400	200	112,000
2	5.9	16,400	110	65,600
3	5.6	11,500	95	38,000
4	7.1	19,700	110	58,000
6	7.0	13,800	125	34,500
7	6.3	8,600	90	32,700
8	4.6	8,600	60	14,600
9	12.8	27,500	210	127,000

MYAKKA RIVER
PLANNING UNIT 30
MANATEE AND SARASOTA COUNTIES, FLORIDA

0 1 2 3 4 MILES

USDA-SCS-SPARTANBURG, S. C. 1965

MR65-178

NORTH POLK
(Planning Unit Number 46)

LOCATION AND DESCRIPTION

This watershed includes approximately 79,700 acres, or 124.5 square miles. It is located in northwestern Polk County. The town of Polk City is situated in the southeast corner of the watershed. Interstate Highway 4 forms part of the southern boundary of the area, with U. S. Highway 98 and State Highway 33 near the west and east boundaries, respectively. The major agricultural crops are citrus, vegetables, improved pasture, and timber. Much of the woodland is utilized for grazing, as well as for timber production.

Soils which comprise the watershed are grouped in the following capability classes and subclasses:

10% in IIs - IVs

66% in IIw - IVw

24% in V - VIII

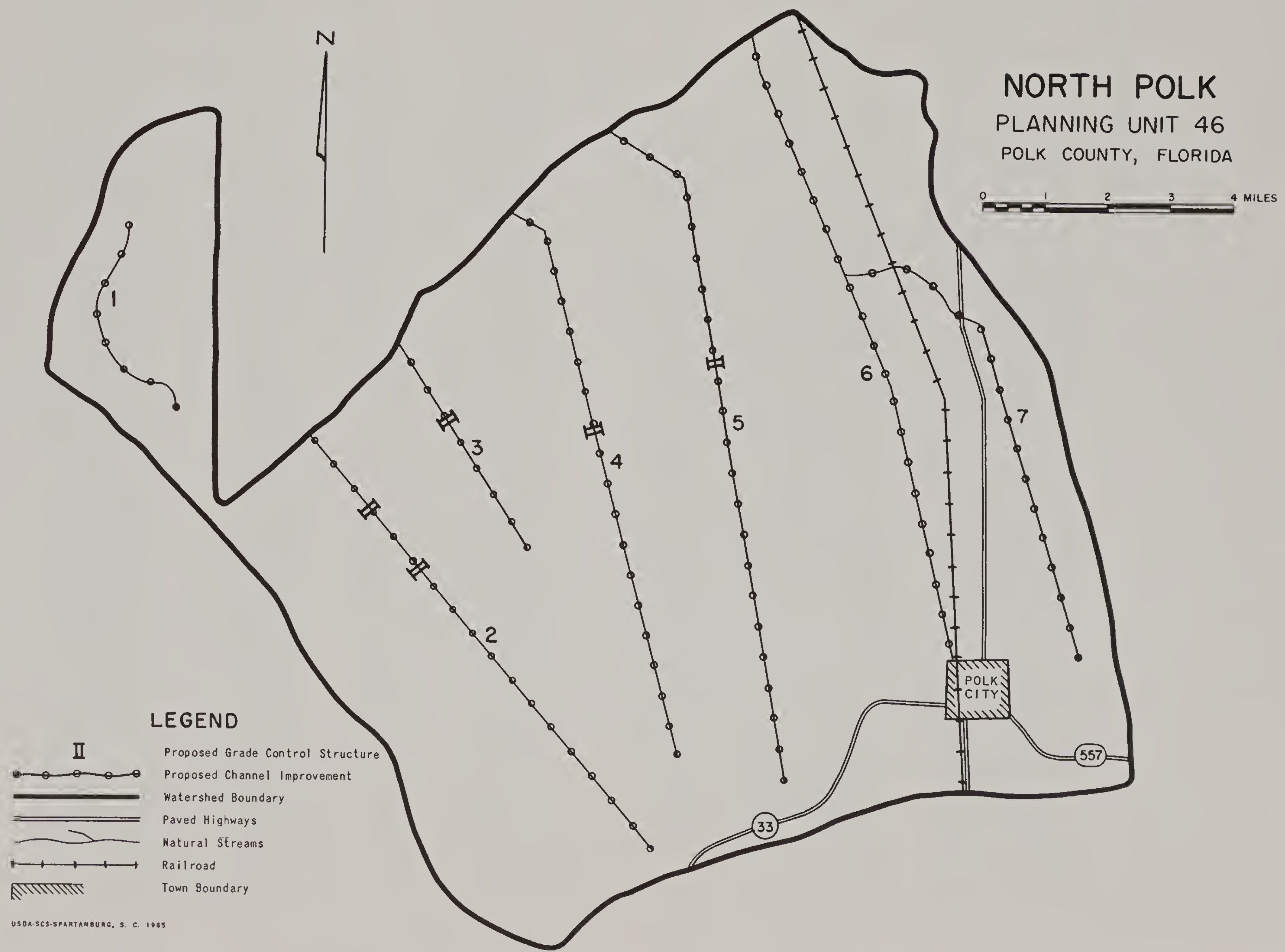
There are presently 3,500 acres of citrus, 500 acres of vegetables, 600 acres of other crops, and 8,800 acres of improved pasture on soils with an excess water hazard. In addition, 53,200 acres of unimproved pasture, woodland, and miscellaneous uses are on soils having excess water problems which must be considered if development of these areas to higher agricultural uses is accomplished. It is anticipated that, by 1980, 6,400 acres of citrus, 700 acres of vegetables, 500 acres of other crops, and 8,400 acres of improved pasture will be located on soils having an excess water hazard.

PLAN

Proposed works of improvement include the installation of 52.7 miles of channel improvement with 106 pipe drop structures at entries of existing or needed waterways into the main channels, and 5 grade stabilization structures.

STRUCTURAL DATA - Channels.

Channel Number	Drainage Area (sq. mi.)	Length (lin. ft.)	Capacity (c.f.s.)	Excavation (cu. yds.)
1	5.8	33,400	110	72,200
2	25.2	49,600	365	317,400
3	6.9	22,600	125	59,100
4	18.8	26,300	290	240,900
5	21.6	60,200	320	301,700
6	41.1	54,600	550	358,800
7	13.0	31,600	210	101,200



NORTH POLK
PLANNING UNIT 46
POLK COUNTY, FLORIDA
0 1 2 3 4 MILES
N
1
2
3
4
5
6
7
POLK CITY
557
33
LEGEND
Proposed Grade Control Structure
Proposed Channel Improvement
Watershed Boundary
Paved Highways
Natural Streams
Railroad
Town Boundary
USDA-SCS-SPARTANBURG, S. C. 1965

PART 4

FORESTRY

Basic Assumptions

The demand for wood products will increase in the Basin during the two time periods covered by this report in accordance with the national trends, provided the trend in price of timber products is relative to the trend in prices of competing non-timber products. Per capita consumption of wood products will decrease but population increases will result in an increased total consumption.

The total national consumption of wood products will increase from 11.8 billion cubic feet in 1963 to 13.4 billion cubic feet by 1980 and 21.1 billion cubic feet by 2015. Per capita consumption of wood products will decrease from 62.7 cubic feet in 1963 to 52.7 cubic feet and 45.5 cubic feet by 1980 and 2015 respectively.

The total consumption of wood products in the Basin will increase from 84.6 million cubic feet in 1963 to 134.4 million cubic feet by 1980, and 307.1 million cubic feet by 2015.

Procedures

County information furnished by the USDA Forest Service, Southeastern Forest Experiment Station was adapted to the Basin to determine type, degree of stocking, site quality, stand size classes, and ownership of commercial forest land.

The net volume of sawtimber and growing stock for the Basin was taken from tables 37a, 37c, 37d, 38a, 38c, and 38d in Forest Survey Release No. 57.

The net annual growth of growing stock was determined from Table 5, "Estimated timber growth, cut and mortality of growing stock by county, Florida, 1958," supplied by the Southeastern Forest Experiment Station.

The volume and growth for counties partially within the Basin were calculated as having the same relationship to total county volume and growth as county land area in the Basin has to total county land area. Timber harvested in the Basin by products and species groups was taken from the 1961 Commodity Drain information by counties for all wood products except pulpwood. In partial counties, the total drain was listed by individual operators and reduced as advised by the Farm Foresters to include amounts cut in the Basin. The amount of pulpwood cut by counties was taken from Southern Pulpwood Production, 1962, USDA Forest Service and Southern Pulpwood Conservation Association. Amounts for partial counties were adjusted as indicated above for other wood products.

The annual cut, net annual growth, and total volume for the Basin were projected to 1963, 1980, and 2015 by applying factors from data expressing timber trends in the United States developed by the U. S. Forest Service, June 1, 1964.

The growing stock-sawtimber relationship was calculated at the ratio shown in Timber Trends in the United States, Forest Resource Report No. 17, Tables 9 and 10 on pages 152 and 154 for inventory, and Tables 25 and 28 on pages 172 and 175 for cut and growth.

The converting factors used in making cut, growth and volume calculations taken from Timber Resources for America's Future are shown below:

Pulpwood

Cubic feet of wood per average cord

	All Species	Softwood	Hardwood
Growth & Volume	71	74	69
Cut	73	72	79

Sawtimber

Board feet per cubic foot

	All Species	Softwood	Hardwood
Growth & Volume	4.878	5.1282	4.6296
Cut	6.1349	5.988	6.4935

County information supplied by the Southeastern Forest Experiment Station showing stand treatment needed for full productivity of commercial forest land in 1959 was used as a basis for estimating needed amounts of planting, timber stand improvement and stand reinforcement by under-planting during the report periods.

<u>Sources of Information</u>

1. Florida's Timber by Larson & Goforth. Forest Survey Release No. 57.

2. Southern Pulpwood Production, 1962. USDA Forest Service and Southern Pulpwood Conservation Association.

3. Timber Trends in the United States - USDA Forest Service.

4. The Demand and Price Situation for Forest Products, 1963. USDA Forest Service Miscellaneous Publication No. 953.

5. The Economic Importance of Timber in the United States. Miscellaneous Publication No. 941. USDA Forest Service.

6. Timber Resources for America's Future. USDA Forest Service. Forest Resource Report No. 14.

7. A Place to Live, USDA 1963.

8. Soil Survey Interpretations for Woodland Conservation, Georgia, 1961. USDA Soil Conservation Service.

9. Forest Drainage Research in the Coastal Plain. By Ralph A. Klawitter and Cortland E. Young, Jr.

Definition of Terms[1/]

<u>Forest Types</u>

Forest type is based on the crown density of live, free growing trees and the free-growing seedlings.

Pine types: Stands of longleaf, slash, loblolly, spruce, pond, sand or shortleaf pine and red cedar making up 50 percent or more of the crown density.

Oak-pine type: Stands with yellow pines or red cedar making up at least 25 percent but less than 50 percent of the crown density. The remaining cover is usually hardwoods, but may include cypress, other softwoods or cabbage palmetto.

Hardwood types: Stands with yellow pines or red cedar making up less than 25 percent of the crown density.

Stocking

Stocking is a measure of the degree to which growing space is effectively utilized by trees.

Well stocked: areas 70 percent or better stocked with growing stock.

Medium stocked: areas 40 to 50 percent stocked with growing stock.

Poorly stocked: areas less than 40 percent stocked with growing stock.

Site Quality Classes

Site quality classes for pine and oak-pine types are determined from an index based on the height of the dominant and codominant trees at 50 years.

Poor site: Site index of 60 or less for loblolly pine type and site index of 50 or less for all other pine types and all oak-pine types.

Fair site: Site index of 70 for loblolly pine type and site index of 60 for all other pine types and all oak-pine types.

Good sites: Site index of 80 or greater for loblolly pine type and site index of 70 or greater for all other pine types and all oak-pine types.

Site quality classes for hardwood types are based on the average length of the saw-log portion at maturity.

Poor site: Evidenced by stands of poor growth and scrubby form, producing short-boled timber with an average length of one 16-foot log or less, usually found on dry sites or poorly drained flats with underlying hardpan.

Fair site: Evidenced by stands of average height and form where the trees may be expected to produce an average merchantable length of two 16-foot logs.

Good site: Evidenced by hardwood stands of the best form and species and capable of producing trees with a merchantable length of three 16-foot logs or more. Such sites are usually found in bottoms of deep, well drained soils, although cypress and tupelo may be found growing on good sites in swampy, wet areas.

Stand Size

Heavy sawtimber stands: Stands containing a net volume of 5,000 board feet or more (Int. $\frac{1}{4}$ inch rule) per acre.

Light sawtimber stands: Stands containing a net volume of 1,500 but less than 5,000 board feet per acre.

Poletimber stands: Stands failing to qualify as sawtimber but at least 10 percent stocked with poletimber and sawtimber and with at least 5 percent of the stocking in poletimber.

Seedlings and sapling stands: Stands not qualifying as sawtimber or poletimber but having at least 10 percent stocking of growing stock, and with at least 5 percent of the stocking in seedlings and saplings.

Nonstocked and other areas: Commercial forest areas not qualifying as sawtimber, poletimber, or seedling and sapling stands. Includes denuded areas and areas stocked with culls.

Area Condition Classes

Class 1: Areas 70 percent or more stocked with desireable trees.

Class 2: Areas 40 to 70 percent stocked with desireable trees and with less than 20 percent of the area controlled by inhibiting vegetation or surface conditions that will prevent occupancy by desireable trees.

Class 3: Areas 40 to 70 percent stocked with desireable trees but with 20 percent or more of the area controlled by less desireable cover such as poor growing stock, limited use, rough and rotten trees or shrubs. Also includes all other areas 40 percent or more stocked with growing stock.

Class 4: Areas less than 40 percent stocked with growing stock and with adequate seed source and seedbed favorable to natural restocking. Includes upland and flatwood areas with at least 5 pine seed trees per acre and less than 20 percent of the area controlled by inhibiting vegetation.

Class 5: Areas less than 40 percent stocked with growing stock and with inadequate seed source and/or seedbed unfavorable to natural regeneration. Includes upland areas with less than 5 pine seed trees per acre and 20 percent or more of the area controlled by inhibiting vegetation, and all lowlands less than 40 percent stocked with growing stock.

1/ All from Forest Survey Release No. 57 for convenience in using this report.

TABLE 4.1
COMMERCIAL FOREST LAND BY MAJOR FOREST TYPE AND STOCKING
1963
(1,000 Acres)

	Total	Sub - Basins 1	2	3
Pine type:				
Well stocked	225.6	24.3	47.8	153.5
Medium stocked	189.8	27.9	55.7	106.2
Poorly stocked	635.6	155.6	277.3	202.7
TOTAL	1,051.0	207.8	380.8	462.4
Oak-Pine type:				
Well stocked	26.5	-	0.2	26.3
Medium stocked	32.9	1.9	13.6	17.4
Poorly stocked	24.3	2.0	5.8	16.5
TOTAL	83.7	3.9	19.6	60.2
Hardwood type:				
Well stocked	308.9	50.1	79.5	179.3
Medium stocked	257.8	23.3	52.2	182.3
Poorly stocked	638.1	50.1	162.4	425.6
TOTAL	1,204.8	123.5	294.1	787.2
All types:				
Well stocked	561.0	74.4	127.5	359.1
Medium stocked	480.5	53.1	121.5	305.9
Poorly stocked	1,298.0	207.7	445.5	644.8
TOTAL	2,339.5	335.2	694.5	1,309.8

TABLE 4.2
COMMERCIAL FOREST LAND BY MAJOR FOREST TYPE AND SITE QUALITY - 1963
(1,000 Acres)

Type and Site Quality:	Total	Sub - Basins 1	2	3
Pine type:				
Poor site	225.6	143.4	45.7	36.5
Fair site	504.7	45.3	300.5	158.9
Good site	320.7	19.1	34.6	267.0
Total	1,051.0	207.8	380.8	462.4
Oak-Pine type:				
Poor site	10.8	1.1	-	9.7
Fair site	18.1	1.7	9.6	6.8
Good site	54.8	1.1	10.0	43.7
TOTAL	83.7	3.9	19.6	60.2
Hardwood type:				
Poor site	288.8	30.3	103.4	155.1
Fair site	653.6	80.9	134.7	438.0
Good site	262.4	12.3	56.0	194.1
TOTAL	1,204.8	123.5	294.1	787.2
All types:				
Poor site	525.2	174.8	149.1	201.3
Fair site	1,176.4	127.9	444.8	603.7
Good site	637.9	32.5	100.6	504.8
TOTAL	2,339.5	335.2	694.6	1,309.8

TABLE 4.3
COMMERCIAL FOREST LAND BY STOCKING CLASSES AND
FOREST TYPE, BASIN TOTAL, 1963
(1,000 Acres)

Forest Type	Total	Well Stocked 70% +	Medium Stocked 40 - 70%	Poorly Stocked Less than 40%
Softwood types:				
Longleaf pine	643.2	138.1	116.1	389.0
Slash pine	317.9	68.2	57.4	192.3
Loblolly pine	24.2	5.2	4.4	14.6
Shortleaf pine	7.3	1.6	1.3	4.4
Pond pine	8.1	1.7	1.5	4.9
Sand pine	50.3	10.8	9.1	30.4
TOTAL	1,051.0	225.6	189.8	635.6
Oak-Pine Type:	83.7	26.5	32.9	24.3
Hardwood Types:				
Upland hardwood	109.2	28.1	23.3	57.8
Scrub oak	408.9	104.8	87.5	216.6
Bench hardwood	9.2	2.4	2.0	4.8
Water oak-gum	478.7	122.8	102.4	253.5
Gum-Cypress	186.8	47.8	40.0	99.0
Palm	12.0	3.0	2.6	6.4
TOTAL	1,204.8	308.9	257.8	638.1
Total All Types:				
Softwood	1,051.0	225.6	189.8	635.6
Oak-Pine	83.7	26.5	32.9	24.3
Hardwood	1,204.8	308.9	257.8	638.1
TOTAL	2,339.5	561.0	480.5	1,298.0

TABLE 4.4
COMMERCIAL FOREST LAND BY STOCKING CLASSES AND FOREST TYPE, SUB-BASIN - 1, 1963
(1,000 Acres)

Forest Type	Total	Well Stocked 70% +	Medium Stocked 40 - 70%	Poorly Stocked less than 40%
Softwood types:				
Longleaf pine	128.8	15.1	17.3	96.4
Slash pine	76.8	9.0	10.3	57.5
Loblolly pine	-	-	-	-
Shortleaf pine	-	-	-	-
Pond pine	-	-	-	-
Sand pine	2.2	0.2	0.3	1.7
TOTAL	207.8	24.3	27.9	155.6
Oak-Pine Type:	3.9	-	1.9	2.0
Hardwood types:				
Upland hardwood	5.3	2.2	1.0	2.1
Scrub oak	19.6	7.9	3.7	8.0
Bench hardwood	-	-	-	-
Water oak-gum	67.6	27.5	12.7	27.4
Gum-Cypress	26.3	10.6	5.0	10.7
Palm	4.7	1.9	0.9	1.9
TOTAL	123.5	50.1	23.3	50.1
Total All Types:				
Softwood	207.8	24.3	27.9	155.6
Oak-Pine	3.9	-	1.9	2.0
Hardwood	123.5	50.1	23.3	50.1
TOTAL	335.2	74.4	53.1	207.7

TABLE 4.5
COMMERCIAL FOREST LAND BY STOCKING CLASSES AND
FOREST TYPE, SUB-BASIN - 2, 1963
(1,000 Acres)

Forest Type	Total	Well Stocked 70% +	Medium Stocked 40 - 70%	Poorly Stocked Less than 40%
Softwood types:				
Longleaf pine	267.1	33.6	39.1	194.4
Slash pine	104.7	13.1	15.3	76.3
Loblolly pine	2.1	0.3	0.3	1.5
Shortleaf pine	-	-	-	-
Pond pine	0.2	-	-	0.2
Sand pine	6.7	0.8	1.0	4.9
TOTAL	380.8	47.8	55.7	277.3
Oak-Pine Type:	19.6	0.2	13.6	5.8
Hardwood Types:				
Upland hardwood	27.0	7.3	4.8	14.9
Scrub oak	79.8	21.6	14.2	44.0
Bench hardwood	2.8	0.7	0.5	1.6
Water oak-gum	120.6	32.6	21.4	66.6
Gum-Cypress	57.6	15.6	10.2	31.8
Palm	6.3	1.7	1.1	3.5
TOTAL	294.1	79.5	52.2	162.4
Total All Types:				
Softwood	380.8	47.8	55.7	277.3
Oak-Pine	19.6	0.2	13.6	5.8
Hardwood	294.1	79.5	52.2	162.4
TOTAL	694.5	127.5	121.5	445.5

TABLE 4.6
COMMERCIAL FOREST LAND BY STOCKING CLASSES AND
FOREST TYPE, SUB-BASIN - 3, 1963
(1,000 Acres)

Forest Type	Total	Well Stocked 70% +	Medium Stocked 40 - 70%	Poorly Stocked less than 40%
Softwood types:				
Longleaf pine	247.3	82.1	56.8	108.4
Slash pine	136.4	45.3	31.3	59.8
Loblolly pine	22.1	7.3	5.1	9.7
Shortleaf pine	7.3	2.4	1.7	3.2
Pond pine	7.9	2.6	1.8	3.5
Sand pine	41.4	13.8	9.5	18.1
TOTAL	462.4	153.5	106.2	202.7
Oak-Pine Type:	60.2	26.3	17.4	16.5
Hardwood types:				
Upland hardwood	76.9	17.5	17.8	41.6
Scrub oak	309.5	70.4	71.7	167.4
Bench hardwood	6.4	1.5	1.5	3.4
Water oak-gum	290.5	66.2	67.3	157.0
Gum-Cypress	102.9	23.5	23.8	55.6
Palm	1.0	0.2	0.2	0.6
TOTAL	787.2	179.3	182.3	425.6
Total All Types:				
Softwood	462.4	153.5	106.2	202.7
Oak-Pine	60.2	26.3	17.4	16.5
Hardwood	787.2	179.3	182.3	425.6
TOTAL	1,309.8	359.1	305.9	644.8

TABLE 4.7
COMMERCIAL FOREST LAND BY FOREST TYPE AND STAND SIZE CLASSES, BASIN TOTALS, 1963
(1,000 Acres)

Forest Type	All Stand Sizes	Large Saw-timber	Small Saw-timber
Softwood types:			
Longleaf pine	643.2	35.7	121.8
Slash pine	317.9	17.7	60.1
Loblolly pine	24.2	1.3	4.6
Shortleaf pine	7.3	0.4	1.4
Pond pine	8.1	0.5	1.5
Sand pine	50.3	2.8	9.5
TOTAL	1,051.0	58.4	198.9
Oak-Pine type:	83.7	4.7	15.8
Hardwood types:			
Upland hardwood	109.2	6.1	20.7
Scrub oak	408.9	22.7	77.4
Bench hardwood	9.2	0.5	1.8
Water oak-gum	478.7	26.6	90.4
Gum-Cypress	186.8	10.4	35.3
Palm	12.0	0.7	2.3
TOTAL	1,204.8	67.0	227.9
All types:			
Softwood	1,051.0	58.4	198.9
Oak-Pine	83.7	4.7	15.8
Hardwood	1,204.8	67.0	227.9
TOTAL	2,339.5	130.1	442.6

TABLE 4.7 (cont'd)

(1,000 Acres)

Forest Type	Pole Timber	Seedlings and Saplings	Non-stocked and Other Areas
Softwood types:			
Longleaf pine	177.1	135.3	173.3
Slash pine	87.6	66.8	85.7
Loblolly pine	6.7	5.1	6.5
Shortleaf pine	2.0	1.5	2.0
Pond pine	2.2	1.7	2.2
Sand pine	13.8	10.6	13.6
TOTAL	289.4	221.0	283.3
Oak-Pine type:	23.0	17.6	22.6
Hardwood types:			
Upland hardwood	30.1	22.9	29.4
Scrub oak	112.6	86.0	110.2
Bench hardwood	2.5	1.9	2.5
Water oak-gum	131.9	100.7	129.1
Gum-Cypress	51.4	39.3	50.4
Palm	3.3	2.5	3.2
TOTAL	331.8	253.3	324.8
All types:			
Softwood	289.4	221.0	283.3
Oak-Pine	23.0	17.6	22.6
Hardwood	331.8	253.3	324.8
TOTAL	644.2	491.9	630.7

TABLE 4.8
COMMERCIAL FOREST LAND BY FOREST TYPE AND STAND SIZE CLASSES, SUB - BASIN - 1,1963
(1,000 Acres)

Forest type	All Stand Sizes	Large Saw-timber	Small Saw-timber
Softwood types:			
Longleaf pine	128.8	3.7	19.6
Slash pine	76.8	2.2	11.7
Loblolly pine	-	-	-
Shortleaf pine	-	-	-
Pond pine	-	-	-
Sand pine	2.2	0.1	0.3
TOTAL	207.8	6.0	31.6
Oak-Pine type:	3.9	0.1	0.6
Hardwood types:			
Upland hardwood	5.3	0.2	0.8
Scrub oak	19.6	0.6	3.0
Bench hardwood	-	-	-
Water oak-gum	67.6	1.9	10.3
Gum-Cypress	26.3	0.7	4.1
Palm	4.7	0.1	0.7
TOTAL	123.5	3.5	18.9
All types:			
Softwood	207.8	6.0	31.6
Oak-Pine	3.9	0.1	0.6
Hardwood	123.5	3.5	18.9
TOTALS	335.2	9.6	51.1

TABLE 4.8 (cont'd)
(1,000 Acres)

Forest Type	Pole Timber	Seedlings and Saplings	Non-stocked and Other Areas
Softwood types:			
Longleaf pine	42.2	35.3	28.0
Slash pine	25.2	21.0	16.7
Loblolly pine	-	-	-
Shortleaf pine	-	-	-
Pond pine	-	-	-
Sand pine	0.7	0.6	0.5
TOTAL	68.1	56.9	45.2
Oak-Pine type:	1.3	1.1	0.8
Hardwood types:			
Upland hardwood	1.7	1.4	1.2
Scrub oak	6.4	5.4	4.2
Bench hardwood	-	-	-
Water oak-gum	22.2	18.5	14.7
Gum-Cypress	8.6	7.2	5.7
Palm	1.6	1.3	1.0
TOTAL	40.5	33.8	26.8
All types:			
Softwood	68.1	56.9	45.2
Oak-Pine	1.3	1.1	0.8
Hardwood	40.5	33.8	26.8
TOTAL	109.9	91.8	72.8

TABLE 4.9
COMMERCIAL FOREST LAND BY FOREST TYPE AND
STAND SIZE CLASSES, SUB - BASIN - 2, 1963
(1,000 Acres)

Forest Type	All Stand Sizes	Large Saw-timber	Small Saw-timber
Softwood types:			
Longleaf pine	267.1	10.7	41.6
Slash pine	104.7	4.2	16.3
Loblolly pine	2.1	0.1	0.3
Shortleaf pine	-	-	-
Pond pine	0.2	-	-
Sand pine	6.7	0.3	1.1
TOTAL	380.8	15.3	59.3
Oak-Pine types:	19.6	0.8	3.0
Hardwood types:			
Upland hardwood	27.0	1.1	4.2
Scrub Oak	79.8	3.2	12.4
Bench hardwood	2.8	0.1	0.4
Water oak-gum	120.6	4.8	18.8
Gum-Cypress	57.6	2.3	9.0
Palm	6.3	0.3	1.0
TOTAL	294.1	11.8	45.8
All types:			
Softwood	380.8	15.3	59.3
Oak-Pine	19.6	0.8	3.0
Hardwood	294.1	11.8	45.8
TOTAL	694.5	27.9	108.1

TABLE 4.9 (cont'd)
(1,000 Acres)

Forest Type	Pole Timber	Seedlings and Saplings	Non-stocked and Other Areas
Softwood types:			
Longleaf pine	61.0	57.5	96.3
Slash pine	23.9	22.5	37.8
Loblolly pine	0.5	0.5	0.7
Shortleaf pine	-	-	-
Pond pine	0.1	-	0.1
Sand pine	1.4	1.5	2.4
TOTAL	86.9	82.0	137.3
Oak-Pine type:	4.5	4.2	7.1
Hardwood types:			
Upland hardwood	6.2	5.8	9.7
Scrub oak	18.2	17.2	28.8
Bench hardwood	0.6	0.6	1.1
Water oak-gum	27.5	26.0	43.5
Gum-Cypress	13.2	12.4	20.7
Palm	1.4	1.4	2.2
TOTAL	67.1	63.4	106.0
All types:			
Softwood	86.9	82.0	137.3
Oak-Pine	4.5	4.2	7.1
Hardwood	67.1	63.4	106.0
TOTALS	158.5	149.6	250.4

TABLE 4.10
COMMERCIAL FOREST LAND BY FOREST TYPE AND
STAND SIZE CLASSES, SUB-BASIN - 3, 1963
(1,000 Acres)

Forest Type:	All Stand Sizes	Large Saw-timber	Small Saw-timber
Softwood types:			
Longleaf pine	247.3	17.5	53.5
Slash pine	136.4	9.7	29.5
Loblolly pine	22.1	1.6	4.8
Shortleaf pine	7.3	0.5	1.6
Pond pine	7.9	0.5	1.7
Sand pine	41.4	2.9	9.0
TOTAL	462.4	32.7	100.1
Oak-Pine type:	60.2	4.3	13.0
Hardwood types:			
Upland hardwood	76.9	5.4	16.6
Scrub oak	309.5	21.9	67.0
Bench hardwood	6.4	0.4	1.4
Water-oak gum	290.5	20.5	62.8
Gum-Cypress	102.9	7.3	22.3
Palm	1.0	0.1	0.2
TOTAL	787.2	55.6	170.3
All types:			
Softwood	462.4	32.7	100.1
Oak-Pine	60.2	4.3	13.0
Hardwood	787.2	55.6	170.3
TOTALS	1,309.8	92.6	283.4

TABLE 4.10 (cont'd)
(1,000 Acres)

Forest type:	Pole Timber	Seedlings and Saplings	Non-stocked and Other Areas
Softwood types:			
Longleaf pine	71.0	47.3	58.0
Slash pine	39.1	26.1	32.0
Loblolly pine	6.3	4.2	5.2
Shortleaf pine	2.1	1.4	1.7
Pond pine	2.3	1.5	1.9
Sand pine	11.9	7.9	9.7
TOTAL	132.7	88.4	108.5
Oak-Pine type:	17.3	11.5	14.1
Hardwood types:			
Upland hardwood	22.1	14.7	18.1
Scrub oak	88.8	59.2	72.6
Bench hardwood	1.8	1.2	1.6
Water-oak-gum	83.3	55.6	68.3
Gum-Cypress	29.5	19.7	24.1
Palm	0.3	0.2	0.2
TOTAL	225.8	150.6	184.9
All types:			
Softwood	132.7	88.4	108.5
Oak-Pine	17.3	11.5	14.1
Hardwood	225.8	150.6	184.9
TOTALS	375.8	250.5	307.5

TABLE 4.11
TIMBER HARVESTED - 1963

BASIN TOTALS

36,953.9	M. Bd. ft. softwood sawtimber
4,505.7	M. Bd. ft. hardwood sawtimber
4,550.0	M. Bd. ft. poles and piling
1,484.8	M. Bd. ft. softwood veneer logs
7,367.4	M. Bd. ft. hardwood veneer logs
40.1	M. Bd. ft. softwood ties
51.7	M. Bd. ft. hardwood ties
54,953.6	M. Bd. ft. TOTAL

10,828.7	cords miscellaneous softwood
21,668.0	cords miscellaneous hardwood
839.5	cords fence posts
16,294.8	cords softwood fuelwood
7,558.6	cords hardwood fuelwood
154,313.0	cords pine pulpwood
1,942.0	cords hardwood pulpwood
213,444.6	TOTAL CORDS

193,603 Tons stumpwood

TABLE 4.12
TIMBER HARVESTED - 1963
Sub - Basin 1

1,960.2	M. Bd. ft. softwood sawtimber
118.3	M. Bd. ft. poles and piling
2,078.5	M. Bd. ft. TOTAL

625.3	Cords miscellaneous softwood
16.6	Cords fence posts
488.9	Cords softwood fuelwood
32,509.0	Cords pine pulpwood
33,639.8	TOTAL CORDS

88,855 Tons stumpwood

TABLE 4.13
TIMBER HARVESTED - 1963
Sub - Basin 2

13,822.4	M. Bd. ft. softwood sawtimber
1,640.6	M. Bd. ft. hardwood sawtimber
680.6	M. Bd. ft. poles and piling
16,143.6	M. Bd. ft. TOTAL
2,297.6	Cords miscellaneous softwood
159.6	Cords fence posts
3,421.9	Cords softwood fuelwood
1,587.4	Cords hardwood fuelwood
35,132.0	Cords pine pulpwood
42,598.5	TOTAL CORDS
80,448	Tons stumpwood

TABLE 4.14
TIMBER HARVESTED - 1963
Sub - Basin 3

21,171.3	M. Bd. ft. softwood sawtimber
2,865.1	M. Bd. ft. hardwood sawtimber
3,751.1	M. Bd. ft. poles and piling
1,484.8	M. Bd. ft. softwood veneer
7,367.4	M. Bd. ft. hardwood veneer
40.1	M. Bd. ft. softwood ties
51.7	M. Bd. ft. hardwood ties
36,731.5	M. Bd. ft. TOTAL

7,905.8	Cords miscellaneous softwood
21,668.0	Cords miscellaneous hardwood
663.3	Cords fence posts
12,384.0	Cords softwood fuelwood
5,971.2	Cords hardwood fuelwood
86,672.0	Cords pine pulpwood
1,942.0	Cords hardwood pulpwood
137,206.3	TOTAL CORDS

24,300 Tons stumpwood

TABLE 4.15
NET ANNUAL GROWTH AND DRAIN - 1963
BASIN TOTALS

	Growing Stock Million Cubic Feet			Sawtimber Million Board Feet		
	Softwood	Hardwood	Total	Softwood	Hardwood	Total
Net Annual Growth	28.1	8.9	37.0	96.8	22.3	119.1
Drain	19.0	2.5	21.5	54.8	15.4	70.2

	Growing Stock - cubic feet		
	Softwood	Hardwood	Total
Net annual growth per acre	12.0	3.8	15.8

The figures under growing stock in the above table indicate the growth of all trees of commercial species 5.0 inches d.b.h. and larger. The figures for sawtimber indicate the change in volume during the year of softwood trees 9.0 inches d.b.h. and larger, and hardwood trees 11.0 inches d.b.h. and larger. This rate of annual growth is a reasonable amount to expect from commercial forest land largely in farm and other private ownership. Growth figures for 1958 for Florida indicate that the average annual growth per acre for farm woodlands is 13 cubic feet and 14 cubic feet for lands in other private ownership. Eighty-five percent of the commercial forest land in the Basin is in the above ownerships.

TABLE 4.16
TIMBER CUT, NET GROWTH, AND INVENTORY OF GROWING STOCK AND SAWTIMBER IN FWCT BASIN, BY TIME PERIODS

		Growing stock - thousand cubic feet			
			Projections		
		Base[1/]	1963	1980	2015
[2/]Cut:	Softwood	19,238	18,946	22,196	39,396
	Hardwood	2,503	2,517	3,148	4,899
	TOTAL	21,741	21,463	25,344	44,295
Net growth:					
	Softwood	25,442	28,060	30,933	17,707
	Hardwood	8,760	8,901	7,869	8,088
	TOTAL	34,202	36,961	38,802	25,795
Inventory:					
	Softwood	574,731	651,056	914,495	595,110
	Hardwood	336,557	355,067	392,522	235,179
	TOTAL	911,288	1,006,123	1,307,017	830,289
		Sawtimber - thousand board feet			
Cut:	Softwood	54,977	54,796	75,052	132,352
	Hardwood	15,628	15,429	14,579	18,006
	TOTAL	70,605	70,225	89,631	150,358
Net growth:					
	Softwood	88,276	96,777	107,596	54,170
	Hardwood	22,754	22,328	21,688	19,184
	TOTAL	111,030	119,105	129,284	73,354
Inventory:					
	Softwood	2,193,164	2,479,153	3,375,555	2,086,688
	Hardwood	873,312	890,254	863,409	833,154
	TOTALS	3,066,476	3,369,407	4,238,964	2,919,842

1/ Cut from 1961 commodity drain report, Growth and Inventory from Forest Survey Release No. 57.

2/ Only 90.69 percent from growing stock.

TABLE 4.17
TIMBER CUT, NET GROWTH, AND INVENTORY OF GROWING STOCK AND SAWTIMBER PER ACRE IN FWCT BASIN, BY TIME PERIODS

Growing stock - cubic feet

		Base[1]	Projections 1963	1980	2015
[2] Cut:	Softwood	8.2	8.1	10.9	28.4
	Hardwood	1.1	1.1	1.5	3.5
	TOTAL	9.3	9.2	12.4	31.9
Net Growth:					
	Softwood	10.9	12.0	15.2	12.8
	Hardwood	3.7	3.8	3.9	5.8
	TOTAL	14.6	15.8	19.1	18.6
Inventory:					
	Softwood	245.7	278.2	449.1	428.2
	Hardwood	143.8	151.8	192.8	169.2
	TOTAL	389.5	430.0	641.9	597.4
		Sawtimber - Board feet			
Cut:	Softwood	23.5	23.4	36.9	95.2
	Hardwood	6.7	6.6	7.1	13.0
	TOTAL	30.2	30.0	44.0	108.2
Net Growth:					
	Softwood	37.7	41.4	52.8	39.0
	Hardwood	9.7	9.5	10.7	13.8
	TOTAL	47.4	50.9	63.5	52.8
Inventory:					
	Softwood	937.4	1,059.7	1,657.9	1,501.3
	Hardwood	373.3	380.5	424.0	599.5
	TOTAL	1,310.7	1,440.2	2,081.9	2,100.8

[1] Cut, from 1961 Commodity Drain Report; Growth and Inventory, from Forest Survey Release No. 57.

[2] Only 90.69 percent from growing stock.

TABLE 4.18
COMMERCIAL FOREST LAND OWNERSHIP
BASIN TOTALS - 1963

Ownership	Thousand Acres	Percent
Bureau of Land Management	0.3	
Other Federal	5.5	
TOTAL FEDERAL	5.8	*
Other Public		
State	124.2	
County and Municipal	5.3	
TOTAL	129.5	6
Forest Industry		
Pulpwood	52.0	
Other industry	157.4	
TOTAL	209.4	9
Farm	828.4	35
Miscellaneous Private	1,166.4	50
GRAND TOTAL	2,339.5	100

*Less than 0.5 percent.

COMMERCIAL FOREST LAND OWNERSHIP

FLORIDA WEST COAST TRIBUTARY BASINS

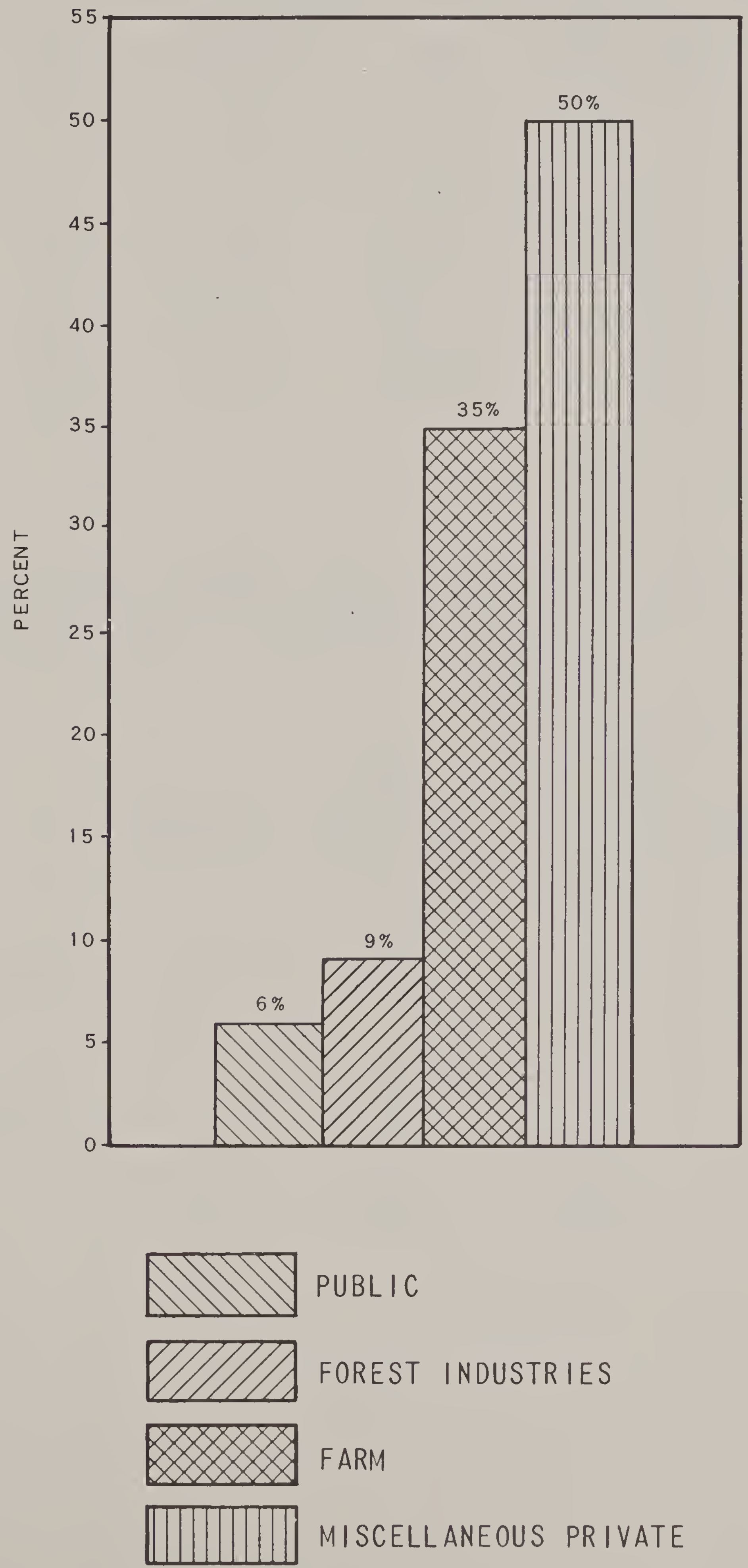


Figure 4.1

USDA-SCS-SPARTANBURG, S. C. 1965

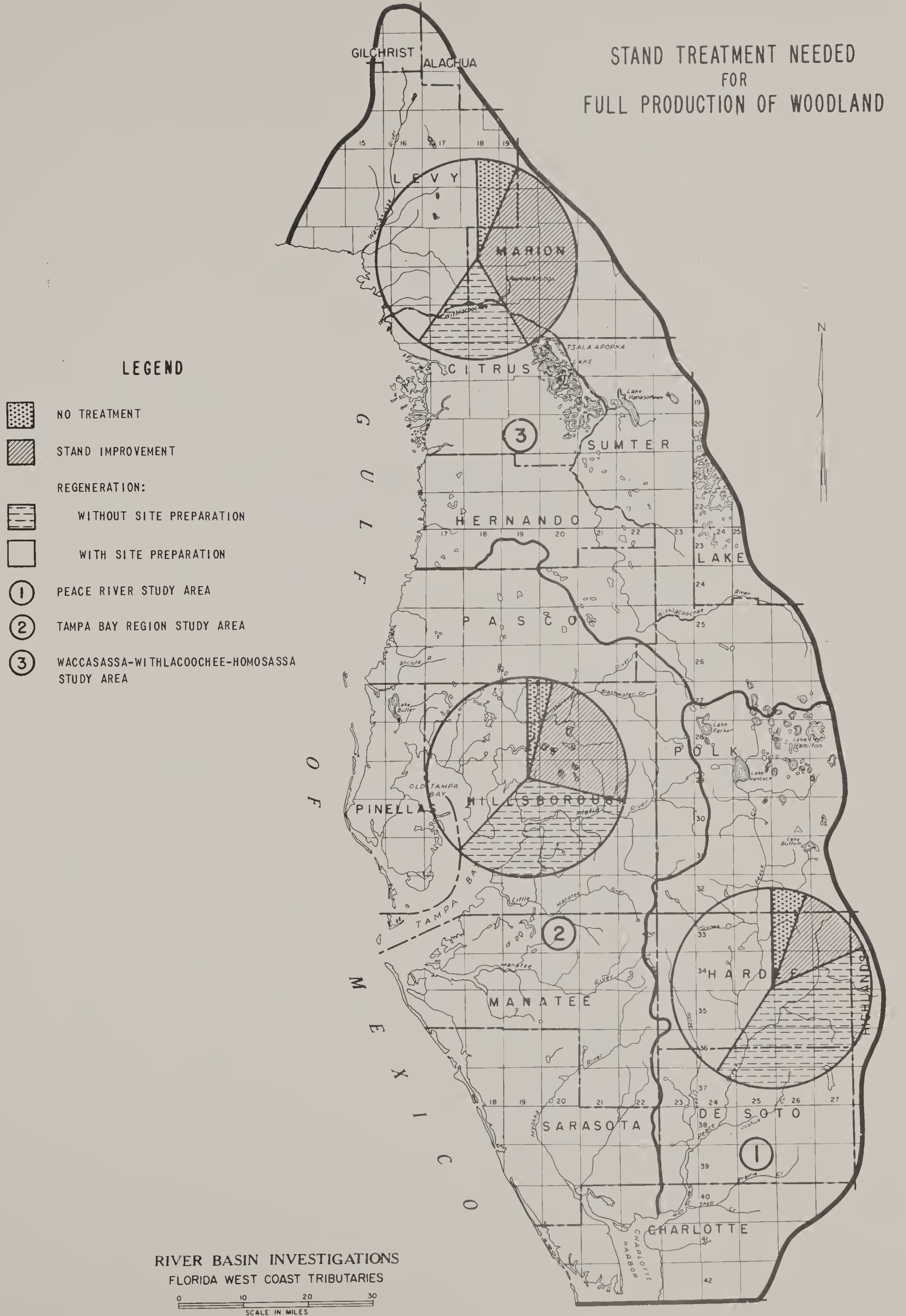
MR65-80

TABLE 4.19
COMMERCIAL FOREST LAND BY AREA CONDITION CLASSES, BY OWNERSHIP, BASIN TOTALS, 1963

Area Condition Class	Ownership - Thousand Acres				
	Public	Forest Industry	Farm	Miscellaneous Private	Total
1	5.2	8.0	31.7	44.6	89.5
2	3.0	4.6	18.0	25.3	50.9
3	38.9	60.3	238.5	335.8	673.5
5	88.2	136.5	540.2	760.7	1,525.6
TOTAL	135.3	209.4	828.4	1,166.4	2,339.5

TABLE 4.20
STAND TREATMENT NEEDED FOR FULL PRODUCTIVITY OF COMMERCIAL FOREST LAND, BY OWNERSHIP, BASIN TOTALS, 1963

Ownership	No Treatment Needed	Timber Stand Improvement	Regeneration Without Site Preparation	Regeneration With Site Preparation	Total
Public	8.2	38.9	35.0	53.2	135.3
Forest Industry	12.6	60.3	54.2	82.3	209.4
Farm	49.7	238.5	214.6	325.6	828.4
Miscellaneous Private	69.9	335.8	302.1	458.6	1,166.4
TOTAL	140.4	673.5	605.9	919.7	2,339.5



USDA-SCS-SPARTANSBURG, S. C. 1965

M R 65-87

Figure 4.2

P A R T 5

WATER STORAGE RESERVOIRS

RIVER BASIN INVESTIGATIONS
FLORIDA WEST COAST TRIBUTARIES

0 10 20 30
SCALE IN MILES

USDA-SCS-SPARTANBURG, S. C. 1969

MR65-84

P A R T 5

WATER STORAGE RESERVOIRS

The topographic features of the Basin were studied on topographic quadrangle sheets for possible site locations for fresh water impoundments. Twenty-two sites were selected for further study to determine feasibility of storing water for purposes of irrigation, recreation, fish and wildlife, or other beneficial uses. Tentative pool elevations were set, taking into account damageable values below the permanent pool elevations (roads, bridges, agricultural land, homes, etc.)

Design Criteria

The established policies as set forth in the National Engineering Handbooks, Memoranda, and Technical Releases, of the Soil Conservation Service were used in the design of potential reservoirs. All sites that appeared physically feasible for water storage were located on topographic maps, county maps, aerial mosaics and other available maps. Field reconnaissance surveys were made to check features that would affect the feasibility of the developments. A survey was made along the center line of the proposed structures up to the height of the dam or higher.

A combined principal and emergency spillway was planned for each of the 22 sites because of the limited amount of floodwater storage available and the degree of control desired in height of pool level. This spillway would be a fixed crest concrete weir overfall structure with a stilling basin located downstream of the weir to dissipate the energy of the falling water. This type spillway was chosen because of the low operation and maintenance cost involved. The spillway was designed to pass the routed emergency spillway hydrograph for a Class "a" structure unless other factors such as fixed improvements downstream, or dams in series, indicated the need for a higher safety factor. The emergency spillway hydrograph for a Class "a" structure is based on the largest storm expected to occur once in a hundred years.

The crest elevation of the dam was determined by routing the runoff from a storm approximately 150 percent of the size of the hundred year frequency storm. This is the freeboard hydrograph for Class "a" structures. For Class "b" structures, a higher safety factor is necessary and a storm of approximately 220 percent of the hundred year frequency storm was used to compute the settled height of the dam. A minimum of two feet was added to the height of the dam computed by routing the freeboard hydrograph through the structure. This additional height was added for wave action due to the relatively high incidence of tropical storms and the associated high winds.

The times of concentration at the various structures were determined by plotting actual rainfall and runoff data for those streams having runoff records. Where the stream gages did not correspond to the reservoir sites, the times of concentration were plotted versus drainage area on logarithmic paper for all available stream gage locations and the times of concentration for ungaged drainage areas were determined from this plot.

Design rainfall amounts, as read from ES-1020, were derived from U. S. Weather Bureau Technical Paper No. 40. The duration of the design storm was chosen so that the time of excess rainfall was equal to or greater than 0.7 of the time of concentration.

The dam was designed with a top width of 15 feet, an 8 foot berm at the elevation of the permanent pool, and 3 (horizontal) to 1 (vertical) side slopes. The spillway was proportioned by criteria developed by model studies at the St. Anthony Falls Hydraulic Laboratory and presented in the SCS National Engineering Handbook, Section 11, entitled "Drop Spillways."

Land for each reservoir would be acquired up to the spillway design elevation. Land for recreational facilities is in addition to that for the reservoir. The pool area would be cleared of all trees and brush so that stumps will not exceed one foot in height.

Storage Capacity

The storage capacity of each reservoir was determined by use of available topographic maps of the area. The very limited storage of flood water will be incidential to other purposes. For purposes of irrigation and recreation use, it will be desirable to maintain water in the pools near their capacities, thereby minimizing flood storage capacities. Floodplains downstream from the proposed structures are relatively undeveloped, and offer few possibilities for obtaining benefits for justification of floodwater retarding structures.

Although the proposed structures are not designed for floodwater retardation, they will reduce peak flows downstream by 10 to 50 percent due to the temporary storage available above the crest of the emergency spillway. Due to the limited flood water storage, peak flows for the major storms will not be reduced appreciably, whereas the smaller annual peak flows will be reduced substantially. This will tend to stabilize streamflow. The structures are designed for a minimum release rate, determined by the Division of Water Resources and Conservation, Florida State Board of Conservation, and in each case, the minimum stream flow will be considerably greater than it is under present conditions. The improved stream flow characteristics will be beneficial for fish and wildlife, low flow augmentation, and for irrigation purposes.

Irrigation

It was assumed that irrigation water could be economically pumped for distances up to one mile from its source. With this assumption in mind, the agricultural land use within one mile of the proposed pool areas was delineated, making use of photographs and land use data on topographic sheets. Each of the reservoir sites was studied in the field, and recent land use changes, topographic conditions, and other factors affecting feasibility were noted. Between now and 2015, it is anticipated that land use shifts will occur which will place sufficient acreages of the more intensive agricultural uses within feasible irrigating distances to utilize all water available for irrigation. Even under present land use conditions several of the reservoirs are surrounded by ample acreages of citrus, vegetables, and grass-clover pasture to make use of all available irrigation water planned for these reservoirs.

Allocation of storage capacity by purposes was made on a general rule of the top two feet, (vertical distance) of storage being for irrigation with the remainder being for recreation, fish and wildlife, and low flow augmentation. Data concerning each potential water storage development are given in individual presentations.

Recreation

Costs and volume of use of recreation facilities (including fishing, swimming, camping, picnicking, and hiking) were developed for an area of 50 acres to serve as a unit of measure to which development costs may be applied. Installation costs include such items as land purchase and clearing, buildings, parking lots, boat ramps, playfields, docks, paths and walkways, landscaping, signs,utilities, and incinerators. These costs were reduced to an annual equivalent cost per acre of land for recreation facilities, using an interest rate of 3.125 percent for 50 years. Replacement costs for items not expected to last 50 years were amortized and added to the annual operation and maintenance costs, which also include costs for labor, material, and tools needed in adequately maintaining the facilities.

The annual cost per acre for facilities was applied to the estimated land area required around each impoundment site to determine the total annual cost of facilities for the site.

Costs for installation and maintenance of access roads were developed on an annual cost per mile basis, and this value was applied to the estimated number of miles needed around each impoundment site.

The maximum daily volume of use for a typical recreation site was estimated, considering the facilities provided. The average annual volume of use was determined through consideration of the following assumptions: (1) Ten of the twelve summer weekends will have maximum use. (2) Of the remaining 42 weekends, 37 will have suitable weather and will have 50 percent of maximum use. (3) Of 261 week days, 200 will have suitable weather, and will have 10 percent of maximum use. The average annual use was reduced to a per acre value and applied to the estimated number of land acres needed for facilities around each impoundment.

Costs, spacing, and types of recreation facilities were developed in consultation with available U.S.D.A. and other publications, and in cooperation with SCS recreation specialists.

BOWLEGS CREEK
(Dam and Reservoir)
Structure #P-5-1

LOCATION

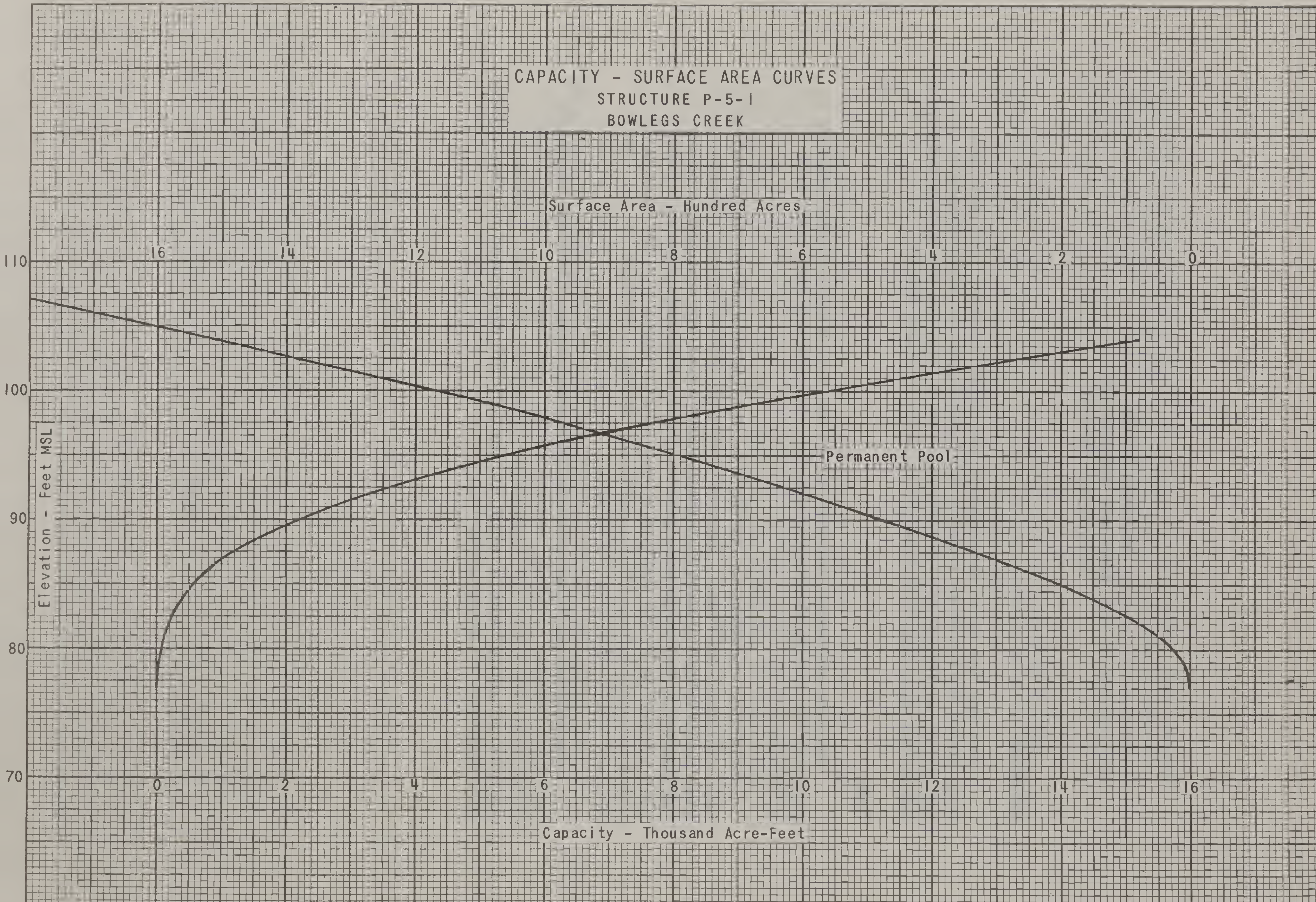
The dam for this development would be located just upstream from where Keller Road crosses Bowlegs Creek, or approximately two miles southeast of Fort Meade. This location is approximately two miles upstream from the junction with Peace River.

PLAN

This development consists of a dam and reservoir designed to provide for irrigation water supply, recreation, and fish and wildlife.

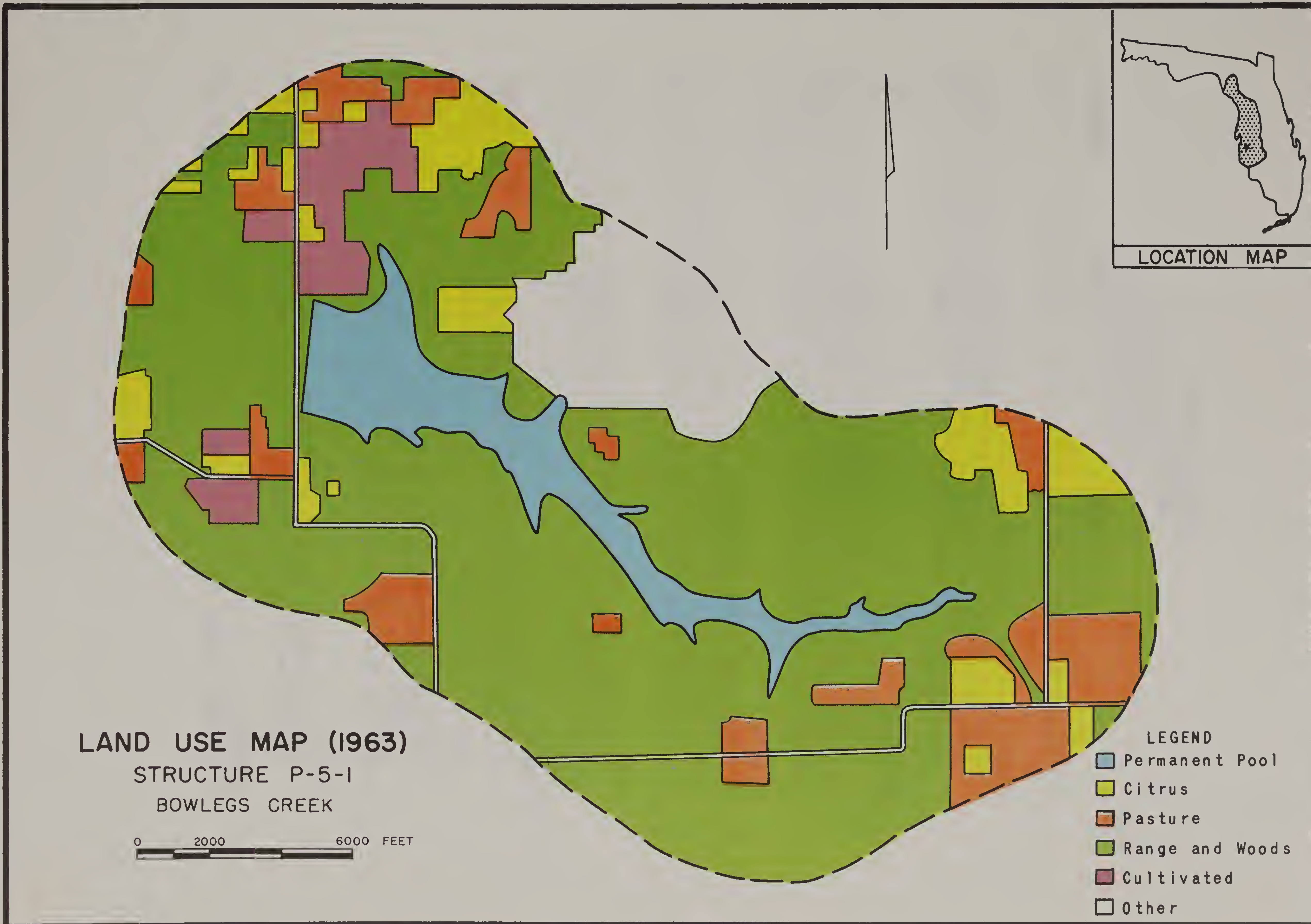
The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered. The reservoir area would be cleared to normal full pool elevation of 95 feet mean sea level. Land for the reservoir would be acquired up to the spillway design elevation of 100 feet MSL and would total 1,170 acres.

Facilities will be provided for picnicking, fishing, swimming, parking, boating, hiking, nature study, and camping, requiring an additional 250 acres of land above elevation 100 feet. These facilities would have a capacity for 184,700 user-days of recreation and reservoir fishing annually.



USDA-SCS SPARTANBURG S. C. 1964

MR64-316



USDA-SCS SPARTANBURG, S.C. 1964

MR64-295

Bowlegs Creek
#P-5-1

DATA

Item	Unit	Amount
Drainage area -------------------------	square mile	60
Dam		
Length ----------------------------	foot	3,840
Maximum height --------------------	foot	26
Crest elevation, mean sea level ----	foot	106
Spillway		
Crest elevation, mean sea level ----	foot	95
Length ----------------------------	foot	170
Routed design discharge ------------	cfs	6,000
Capacity to top of dam -------------	cfs	19,200
Reservoir		
Normal full pool elevation		
Mean sea level -------------------	foot	95
Minimum design pool elevation		
Mean sea level -------------------	foot	93
Area		
Normal full pool ------------------	acre	790
Minimum design pool ----------------	acre	660
Capacity		
Normal full pool ------------------	acre-foot	5,400
Minimum design pool ----------------	acre-foot	3,900
Runoff, normal full pool -----------	inch	1.34
Storage irrigation -----------------	acre-foot	1,500
Storage, recreation, and fish and wildlife -------------------------	acre-foot	3,900
Minimum flow required below dam ----	cfs	0.19
Costs		
Total installation -----------------	dollar	1,195,000
Average annual --------------------	dollar	93,000
Benefits		
Average annual --------------------	dollar	311,100

BOWLEGS CREEK
(Dam and Reservoir)
Structure #P-5-2

LOCATION

The dam for this development would be located approximately 1½ miles downstream from where U. S. Highway 98 crosses Bowlegs Creek, or approximately six miles southeast of Fort Meade.

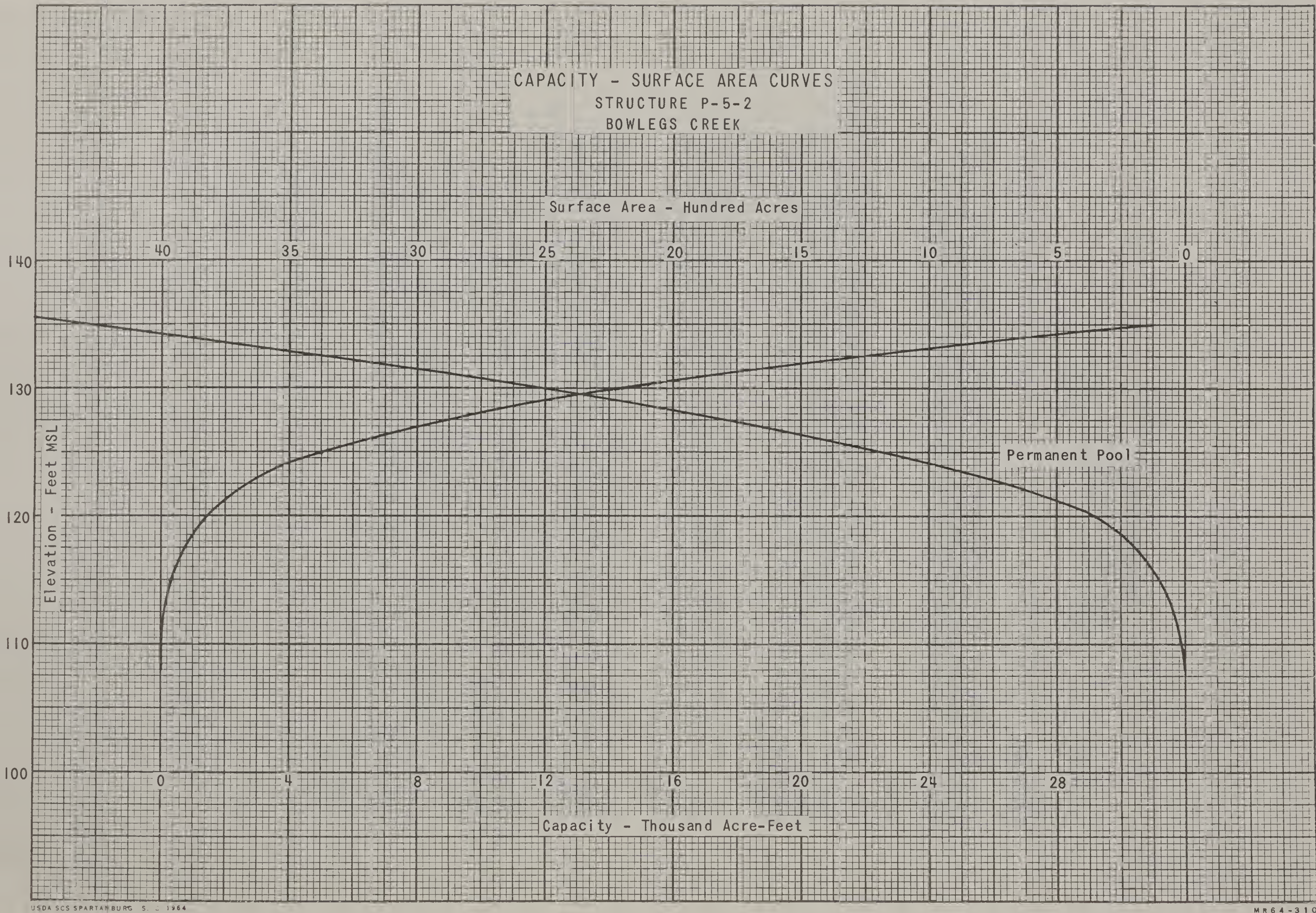
PLAN

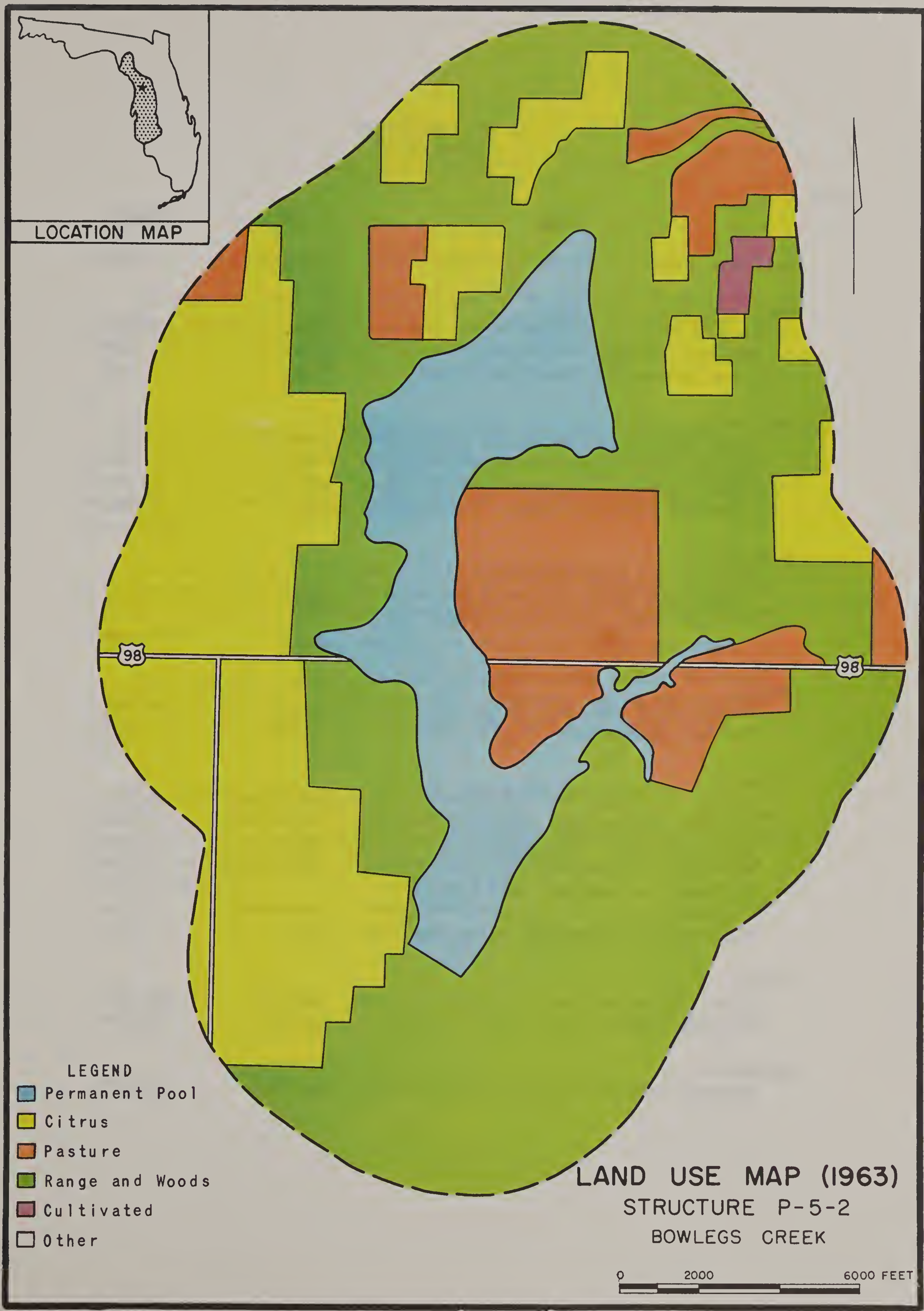
This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife. There is a large acreage of citrus within a short distance of the permanent pool which could utilize the irrigation water from the impoundment.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The permanent pool would be over four miles in length and would average one-fourth mile wide. The reservoir area would be cleared to the normal full pool elevation of 125 feet. Land for the reservoir would be acquired up to the spillway design elevation of 130 feet. The two bridges on U. S. Highway 98 would have to be raised along with two miles of adjoining roadway which would be a major expense.

Facilities would be provided for boating, fishing, parking, camping, hiking, nature study, and picnicking, requiring an additional 100 acres of land above elevation 130 feet. These facilities would have a capacity for 73,900 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE P-5-2
BOWLEGS CREEK
Surface Area - Hundred Acres
40
35
30
25
20
15
10
5
0
140
130
120
110
100
Elevation - Feet MSL
Permanent Pool
0
4
8
12
16
20
24
28
Capacity - Thousand Acre-Feet
USDA SCS SPARTANBURG S. C. 1964
MR64-310



USDA-SCS SPARTANBURG, S. C. 1964

MR64-306

Bowlegs Creek
#P-5-2

DATA

Item	Unit	Amount
Drainage area -------------------------	square mile	45
Dam		
Length ----------------------------	foot	2,750
Maximum height --------------------	foot	28
Crest elevation, mean sea level ----	foot	135
Spillway		
Crest elevation, mean sea level ----	foot	125
Length ----------------------------	foot	64
Routed design discharge ------------	cfs	2,200
Capacity to top of dam ------------	cfs	6,300
Reservoir		
Normal full pool elevation		
Mean sea level -------------------	foot	125
Minimum design pool elevation		
Mean sea level -------------------	foot	123
Area		
Normal full pool ------------------	acre	1,155
Minimum design pool ----------------	acre	755
Capacity		
Normal full pool ------------------	acre-foot	5,190
Minimum design pool ----------------	acre-foot	3,100
Runoff, normal full pool -----------	inch	2.16
Storage, irrigation ----------------	acre-foot	2,090
Storage, recreation, and fish and wildlife ------------------------	acre-foot	3,100
Minimum flow required below dam ----	cfs	0.13
Costs		
Total installation -----------------	dollar	955,000
Average annual ---------------------	dollar	58,600
Benefits		
Average annual ---------------------	dollar	169,300

PAYNE Creek
(Dam and Reservoir)
Structure #P-6-1

LOCATION

The dam for this development would be located three miles southwest of Bowling Green. This is just downstream from where Plunder Branch joins Payne Creek.

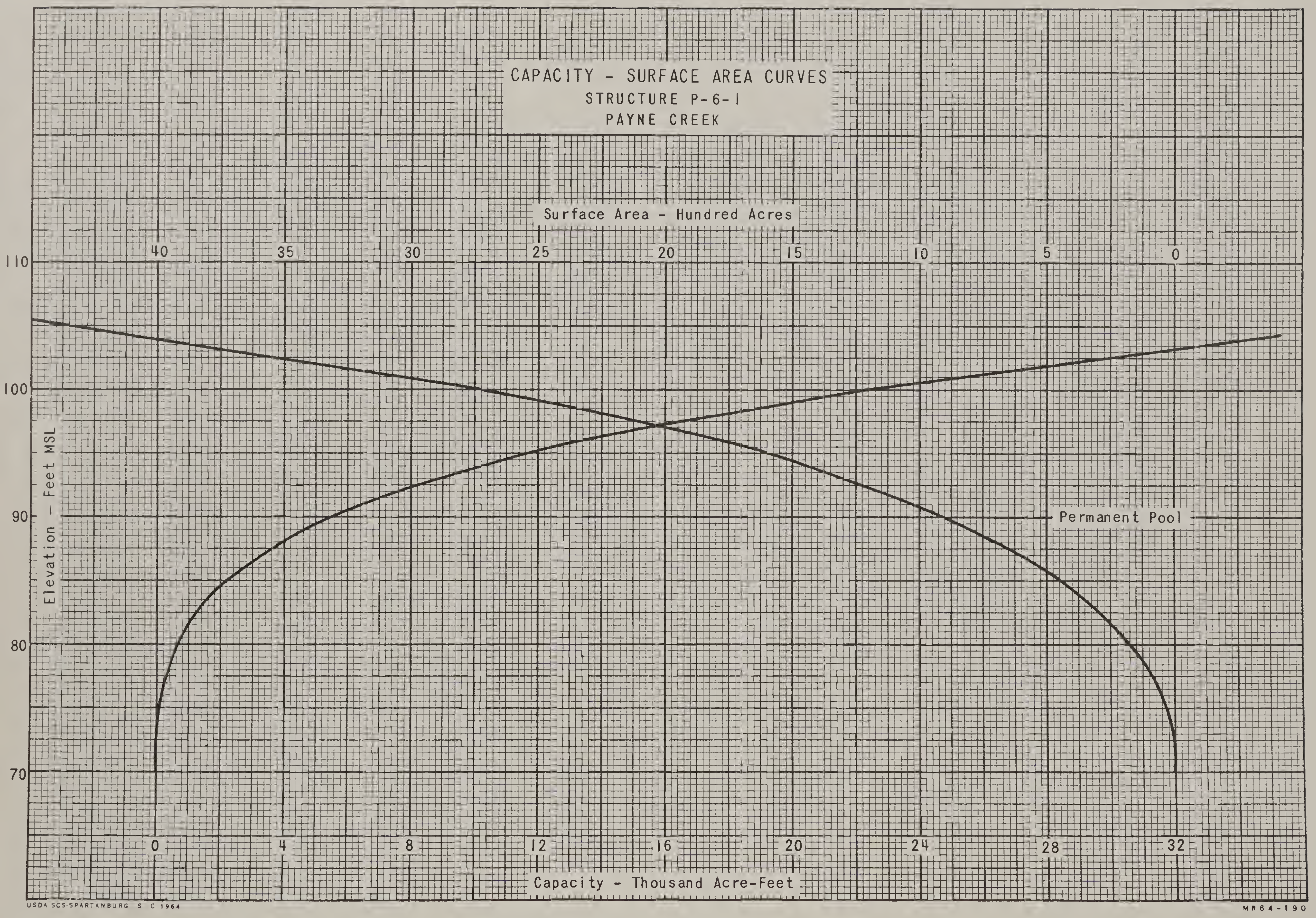
PLAN

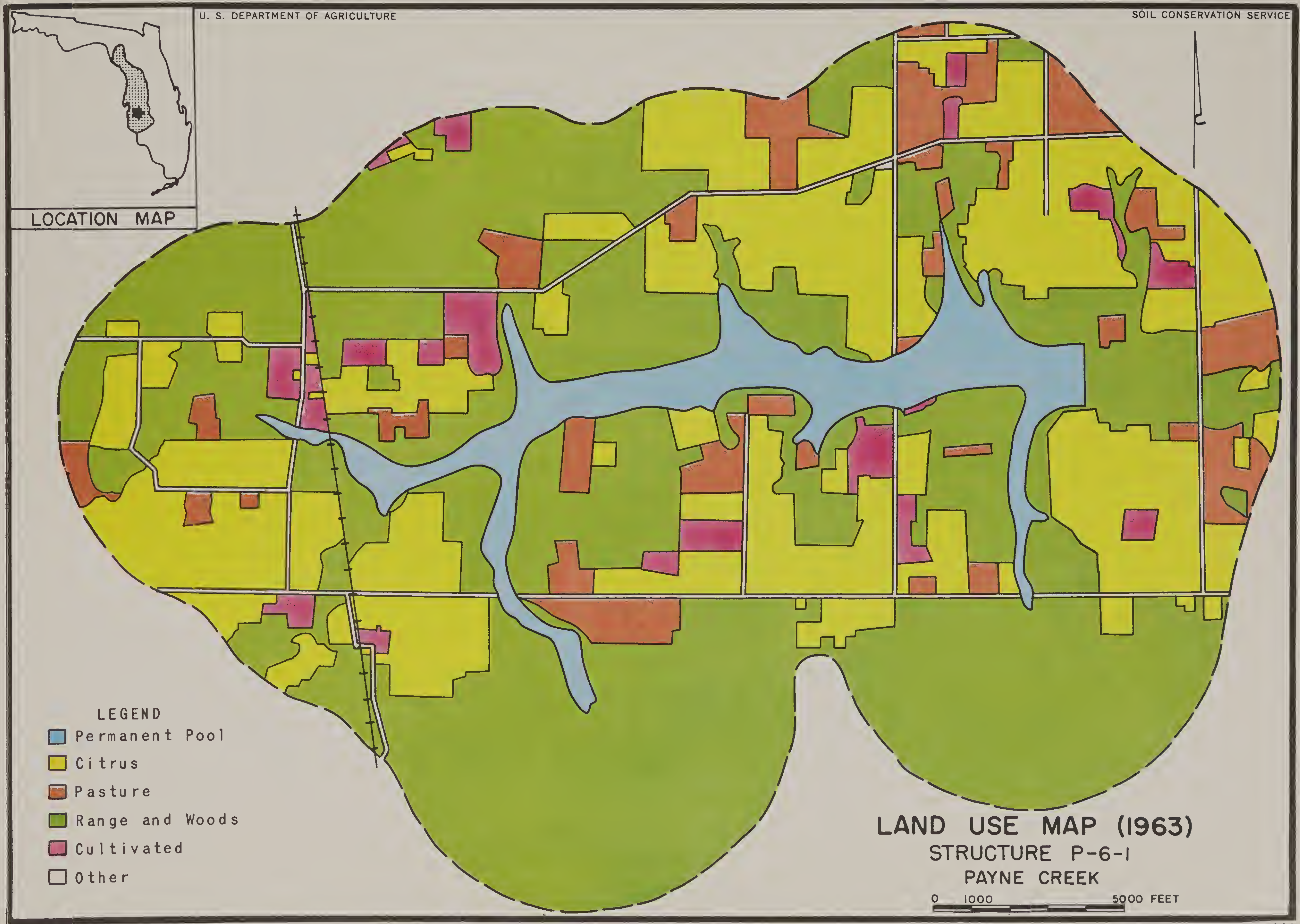
This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife. There is a large acreage of citrus within a short distance of the permanent pool which could utilize the irrigation water from the impoundment.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 90 feet. Land for the reservoir would be acquired up to the spillway design elevation of 95 feet and would total 1,600 acres.

Facilities would be provided for boating, fishing, parking, picnicking, camping, and paths and walks, requiring an additional 250 acres of land above elevation 95 feet. These facilities would have a capacity for 184,700 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE P-6-1
PAYNE CREEK
Surface Area - Hundred Acres
40
35
30
25
20
15
10
5
0
Elevation - Feet MSL
110
100
90
80
70
Permanent Pool
0
4
8
12
16
20
24
28
32
Capacity - Thousand Acre-Feet
USDA SCS SPARTANBURG S C 1964
MR64-190


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LOCATION MAP
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Cultivated
Other
LAND USE MAP (1963)
STRUCTURE P-6-1
PAYNE CREEK
0 1000 5000 FEET
USDA-SCS-SPARTANBURG S C 1964
MR64-180

Payne Creek
#P-6-1

DATA

Item	Unit	Amount
Drainage area	square mile	67
Dam		
Length	foot	2,230
Maximum height	foot	100
Spillway		
Crest elevation, mean sea level	foot	90
Length	foot	180
Routed design discharge	cfs	6,200
Capacity to top of dam	cfs	17,700
Reservoir		
Normal full pool elevation Mean sea level	foot	90
Minimum design pool elevation Mean sea level	foot	88
Area		
Normal full pool	acre	900
Minimum design pool	acre	700
Capacity		
Normal full pool	acre-foot	5,530
Minimum design pool	acre-foot	4,000
Runoff, normal full pool	inch	1.54
Storage, irrigation	acre-foot	1,530
Storage, recreation, fish and wildlife	acre-foot	4,000
Minimum flow required below dam	cfs	0.69
Costs		
Total installation	dollar	1,428,000
Average annual	dollar	105,400
Benefits		
Average annual	dollar	314,500

LITTLE PAYNE CREEK
(Dam and Reservoir)
Structure #P-6-2

LOCATION

The Little Payne Creek dam site is about one mile west of Bowling Green, Florida, and approximately one-half mile downstream from the bridge across Little Payne Creek on State Highway 664.

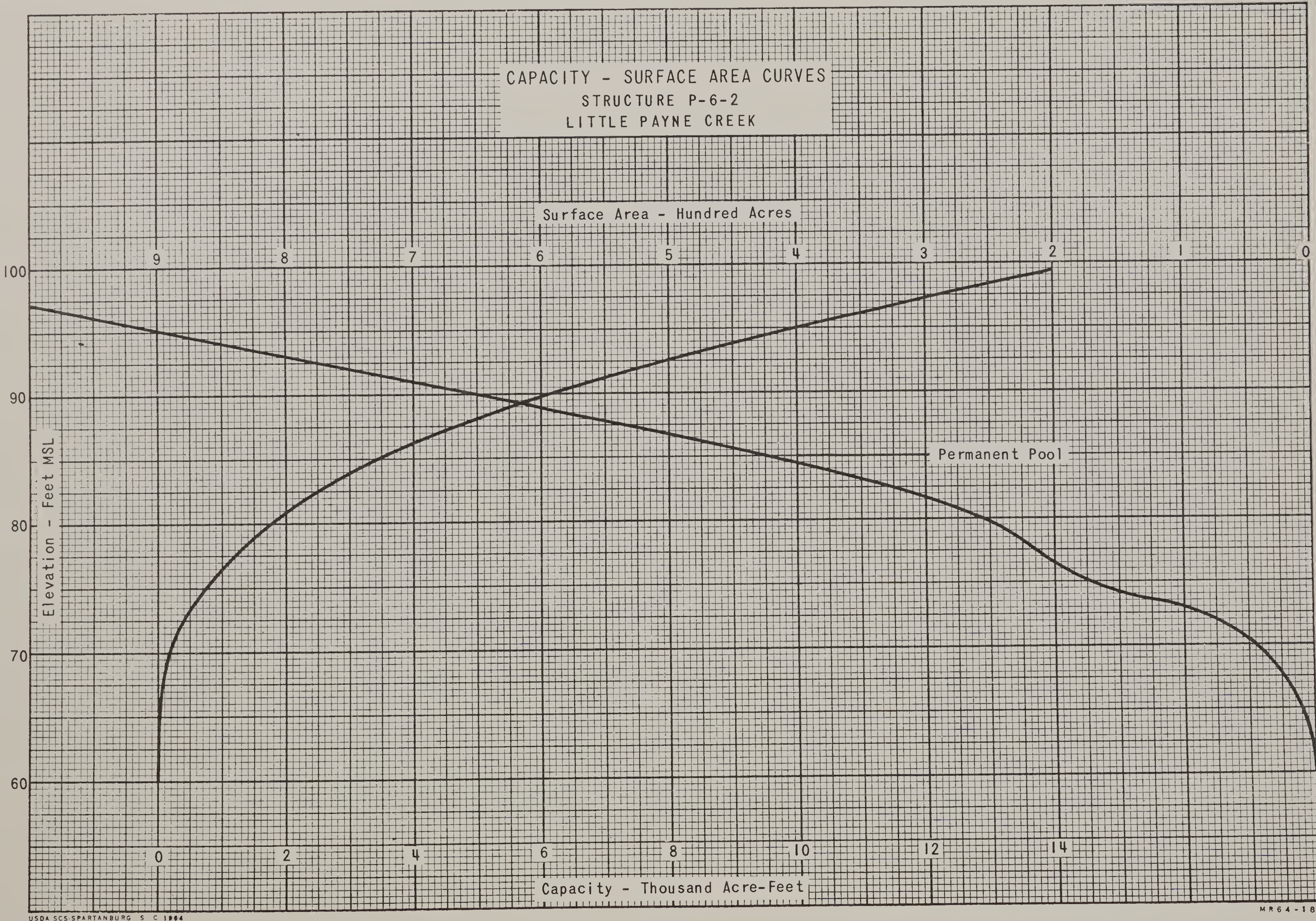
PLAN

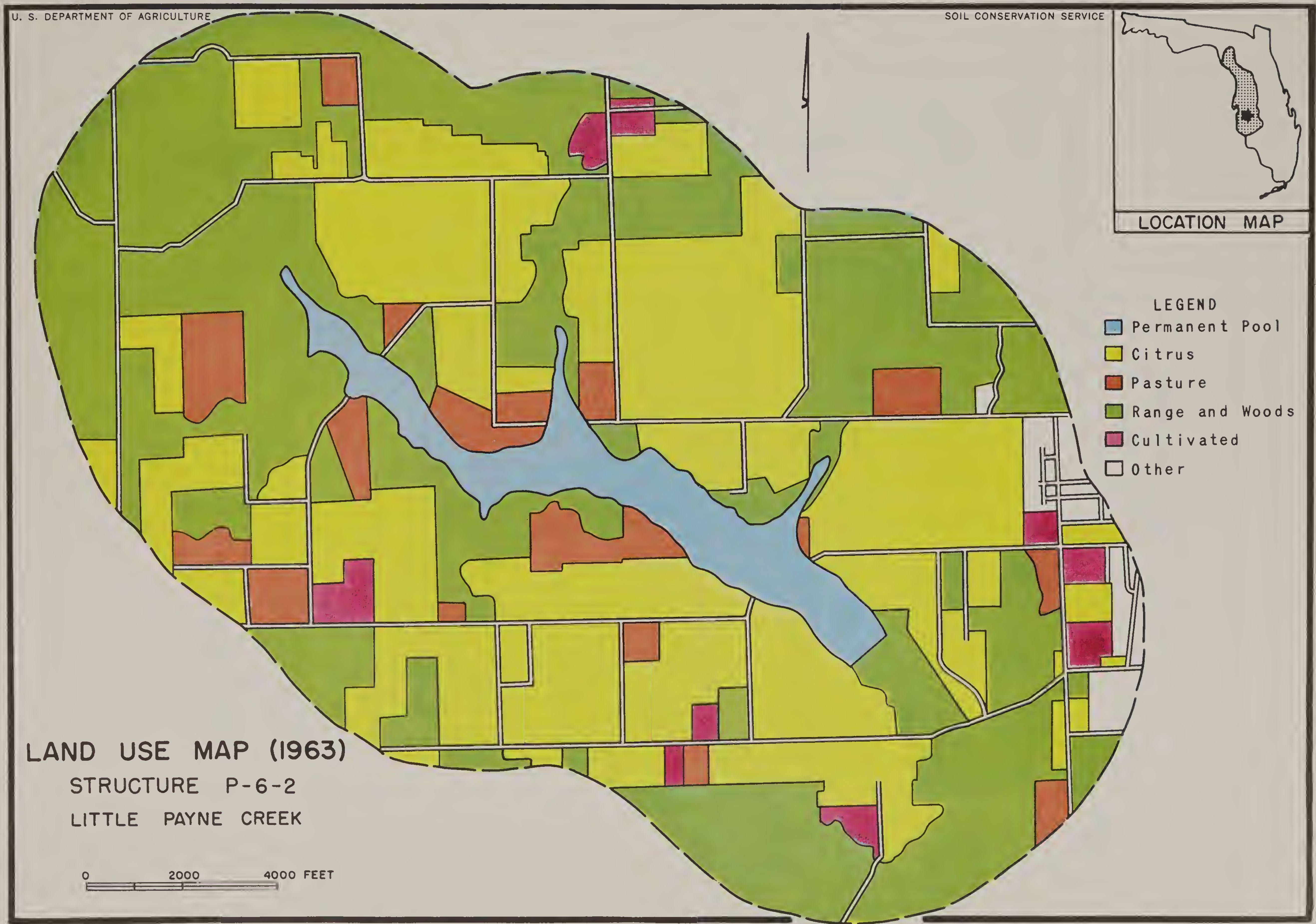
This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife. Part of the area around the reservoir is in citrus groves and is well situated for utilization of irrigation water from the impoundment.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to normal full pool elevation of 85 feet. Land for the reservoir would be acquired up to the spillway design elevation of 90 feet and would total 650 acres. Relocation of fixed improvements in the reservoir area would include 0.50 mile of graded road, 0.25 mile of secondary paved road, one secondary state road bridge and two county road bridges.

Facilities would be provided for boating, fishing, parking, and picnicking, requiring an additional 150 acres of land above elevation 90 feet. These facilities would have a capacity for 110,800 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE P-6-2
LITTLE PAYNE CREEK
Surface Area - Hundred Acres
9
8
7
6
5
4
3
2
1
0
100
90
80
70
60
Elevation - Feet MSL
Permanent Pool
0
2
4
6
8
10
12
14
Capacity - Thousand Acre-Feet
USDA SCS-SPARTANBURG S C 1964
MR64-18


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LOCATION MAP
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Cultivated
Other
LAND USE MAP (1963)
STRUCTURE P-6-2
LITTLE PAYNE CREEK
0
2000
4000 FEET
USDA SCS SPARTANBURG S C 1964
MR64-178

Little Payne Creek
#P-6-2

DATA

Item	Unit	Amount
Drainage area ------------------------	square mile	35
Dam		
Length ------------------------------	foot	1,480
Maximum height ---------------------	foot	29
Crest elevation, mean sea level ----	foot	95
Spillway		
Crest elevation, mean sea level ----	foot	85
Length ------------------------------	foot	115
Routed design discharge ------------	cfs	4,000
Capacity to top of dam -------------	cfs	11,300
Reservoir		
Normal full pool elevation		
Mean sea level -------------------	foot	85
Minimun design pool elevation		
Mean sea level -------------------	foot	83
Area		
Normal full pool -------------------	acre	420
Minimum design pool ----------------	acre	345
Capacity		
Normal full pool -------------------	acre-foot	3,450
Minimum design pool ----------------	acre-foot	2,650
Runoff, normal full pool -----------	inch	1.87
Storage, irrigation ----------------	acre-foot	800
Storage, recreation, fish and		
wildlife -------------------------	acre-foot	2,650
Minimum flow required below dam ----	cfs	0.35
Costs		
Total installation -----------------	dollar	868,000
Average annual ---------------------	dollar	62,600
Benefits		
Average annual ---------------------	dollar	187,000

LITTLE CHARLIE CREEK
(Dam and Reservoir)
Structure #P-7-1

LOCATION

The Little Charlie Creek dam site is located approximately three miles upstream from the confluence of Charlie Creek and Peace River or approximately four miles northeast of the town of Wauchula.

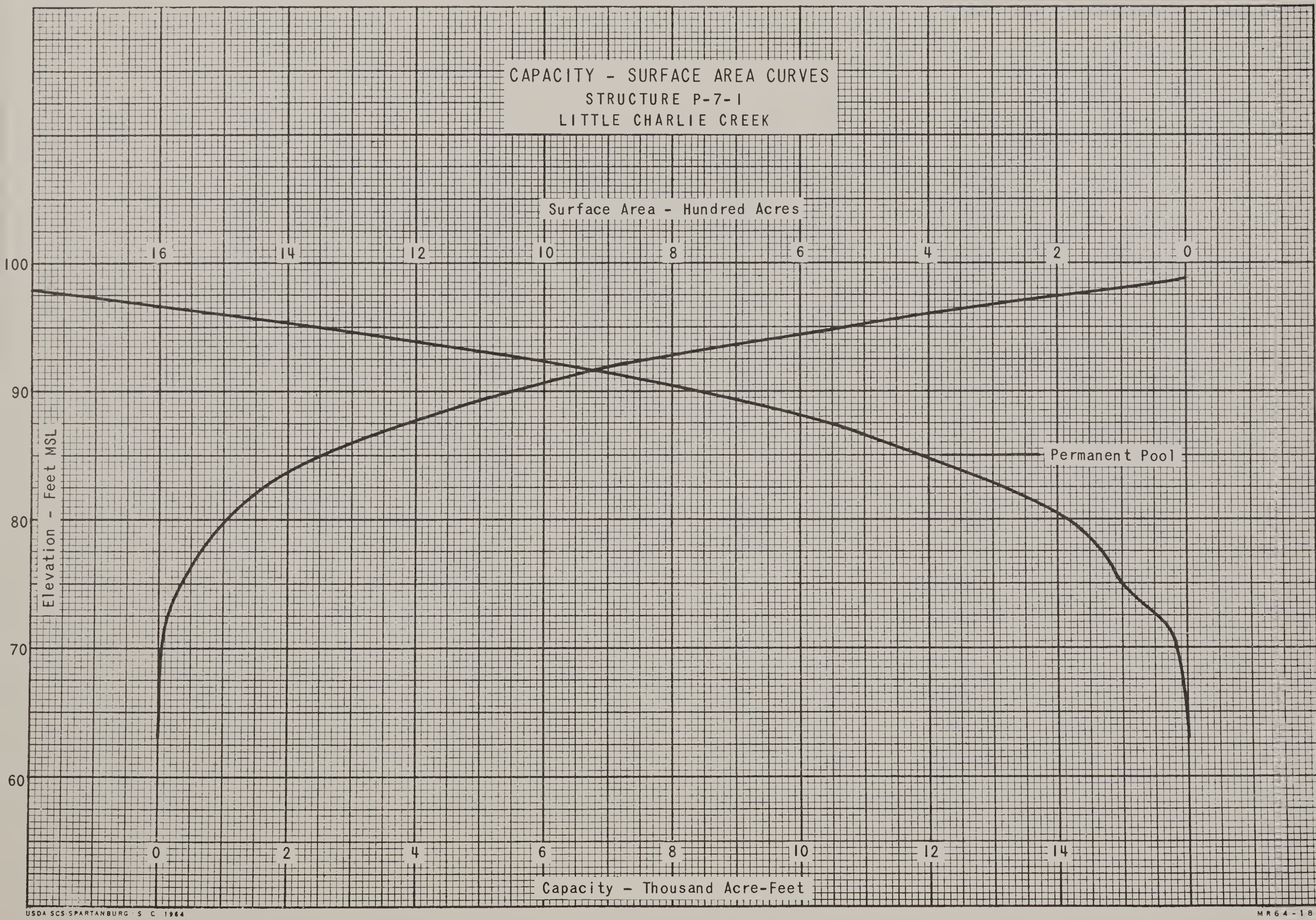
PLAN

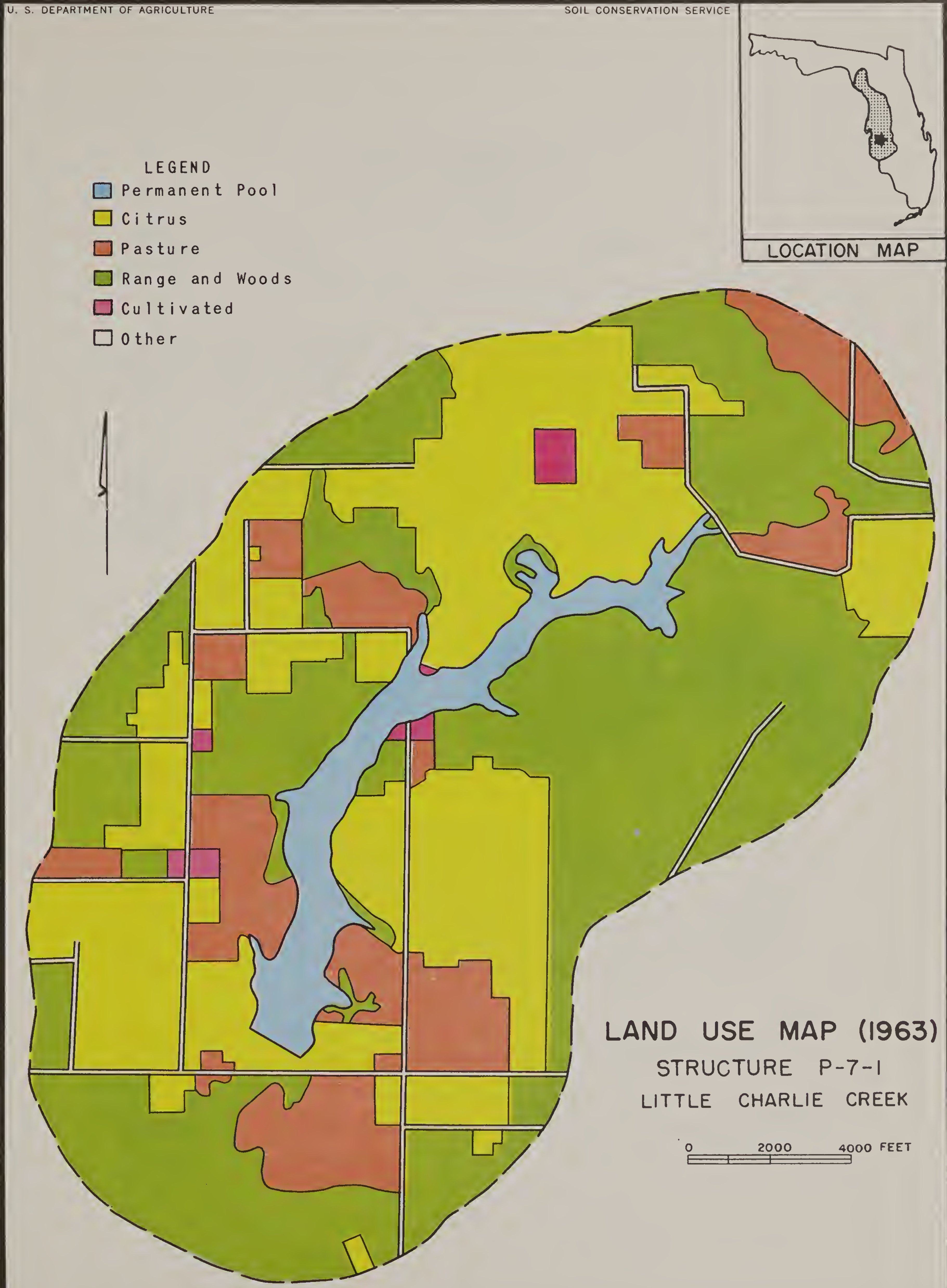
This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to normal full pool elevation of 85 feet. Land for the reservoir would be acquired up to the spillway design elevation of 90 feet and would total 740 acres. Relocation of fixed improvements in the reservoir area would include 0.50 mile of graded road, one wooden bridge, and one house.

Facilities would be provided for boating, fishing, parking, and picnicking, requiring an additional 100 acres of land above elevation 90 feet. These facilities would have a capacity for 73,900 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE P-7-1
LITTLE CHARLIE CREEK
Surface Area - Hundred Acres
16
14
12
10
8
6
4
2
0
100
90
80
70
60
Elevation - Feet MSL
Permanent Pool
0
2
4
6
8
10
12
14
Capacity - Thousand Acre-Feet
USDA SCS-SPARTANBURG S C 1964
MR64-185



LAND USE MAP (1963)

STRUCTURE P-7-1

LITTLE CHARLIE CREEK

Little Charlie Creek
#P-7-1

DATA

Item	Unit	Amount
Drainage Area	square mile	38
Dam		
Length	foot	2,140
Maximum height	foot	25
Crest elevation, mean sea level	foot	95
Spillway		
Crest elevation, mean sea level	foot	85
Length	foot	100
Routed design discharge	cfs	3,400
Capacity to top of dam	cfs	9,800
Reservoir		
Normal full pool elevation Mean sea level	foot	85
Minimum design pool elevation Mean sea level	foot	83
Area		
Normal full pool	acre	420
Minimum design pool	acre	310
Capacity		
Normal full pool	acre-foot	2,580
Minimum design pool	acre-foot	1,750
Runoff, normal full pool	inch	1.26
Storage, irrigation	acre-foot	830
Storage, recreation, fish and wildlife	acre-foot	1,750
Minimum flow required below dam	cfs	0.56
Costs		
Total installation	dollar	646,000
Average annual	dollar	45,100
Benefits		
Average annual	dollar	122,400

HORSE CREEK
(Dam and Reservoir)
Structure #P-8a-1

LOCATION

The dam for this development would be located one mile upstream from where State Highway 661 crosses Horse Creek or approximately 2.5 miles downstream from the confluence of Brushy Creek and Horse Creek.

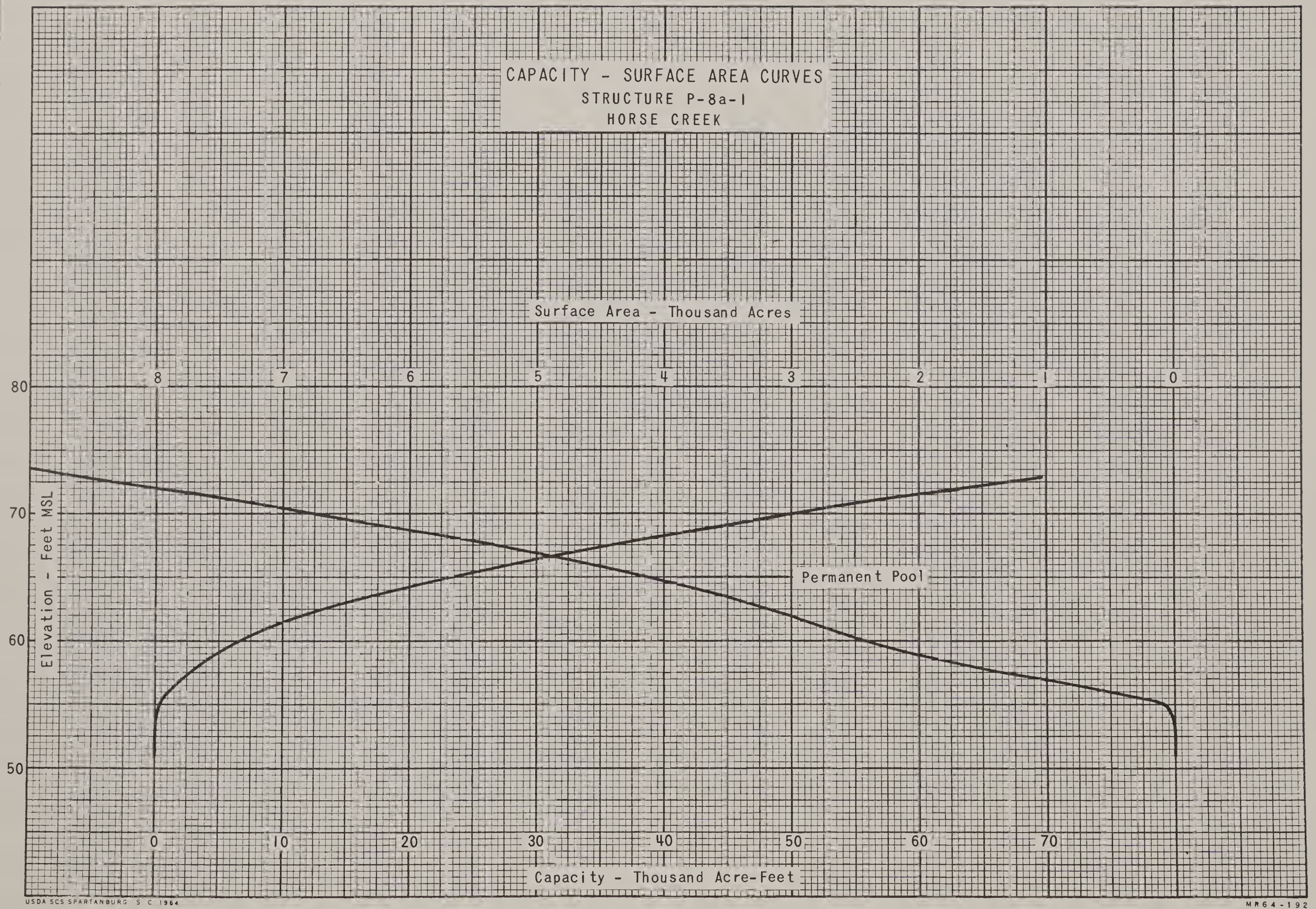
PLAN

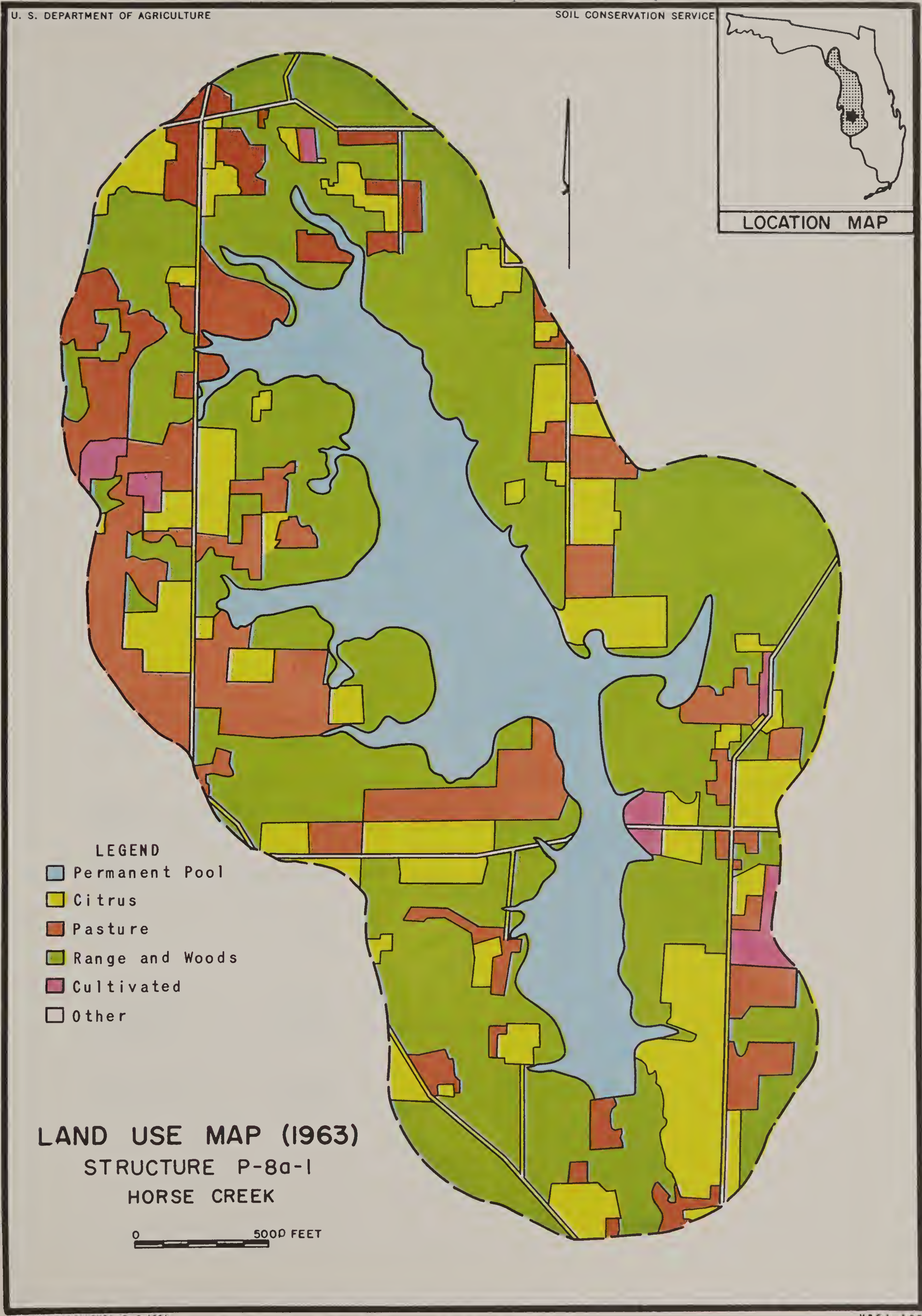
The Horse Creek development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information for the area indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to normal full pool elevation of 65 feet. Land for the reservoir would be acquired up to the spillway design elevation of 70 feet and would total 6,770 acres. Relocation of fixed improvements in the reservoir area would include two miles of paved secondary road and two secondary road bridges.

Facilities would be provided for boating, fishing, picnicking, parking, hiking, nature study, and camping, requiring an additional 1,100 acres of land above elevation 70 feet. A small marina could be provided for the sale, rental, and storage of boats and motors. These facilities would have a capacity for 812,900 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE P-8a-1
HORSE CREEK
Surface Area - Thousand Acres
8
7
6
5
4
3
2
1
0
80
70
60
50
Elevation - Feet MSL
Permanent Pool
0
10
20
30
40
50
60
70
Capacity - Thousand Acre-Feet
USDA SCS SPARTANBURG S C 1964
MR64-192


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LOCATION MAP
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Cultivated
Other
LAND USE MAP (1963)
STRUCTURE P-8a-1
HORSE CREEK
0
5000 FEET

Horse Creek
#P-8a-1

DATA

Item	Unit	Amount
Drainage area	square mile	136
Dam		
Length	foot	3,000
Maximum height	foot	21
Crest elevation, mean sea level	foot	75
Spillway		
Crest elevation, mean sea level	foot	65
Length	foot	105
Routed design discharge	cfs	3,550
Capacity to top of dam	cfs	10,300
Reservoir		
Normal full pool elevation Mean sea level	foot	65
Minimum design pool elevation Mean sea level	foot	63
Area		
Normal full pool	acre	4,120
Minimum design pool	acre	3,350
Capacity		
Normal full pool	acre-foot	22,850
Minimum design pool	acre-foot	15,050
Runoff, normal full pool	inch	3.14
Storage, irrigation	acre-foot	7,800
Storage, recreation, fish and wildlife	acre-foot	15,050
Minimum flow required below dam	cfs	1.22
Costs		
Total installation	dollar	4,623,000
Average annual	dollar	369,900
Benefits		
Average annual	dollar	1,375,200

CHARLIE CREEK
(Dam and Reservoir)
Structure #P-12a-1

LOCATION

The Charlie Creek dam site is located approximately two miles upstream from where State Highway 634 crosses Charlie Creek, or just upstream from the junction of Oak Creek. This location is five miles southeast of Zolfo Springs.

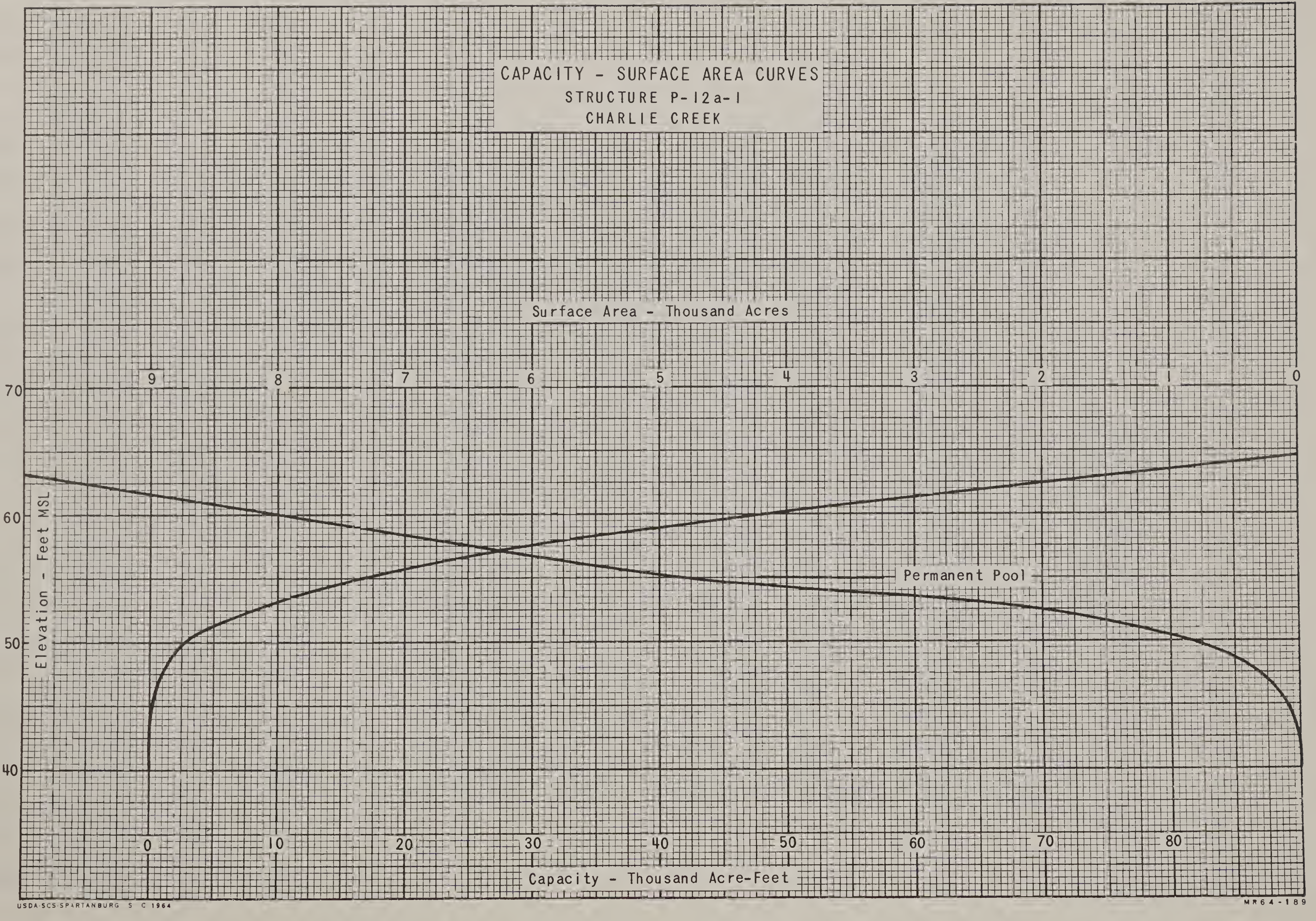
PLAN

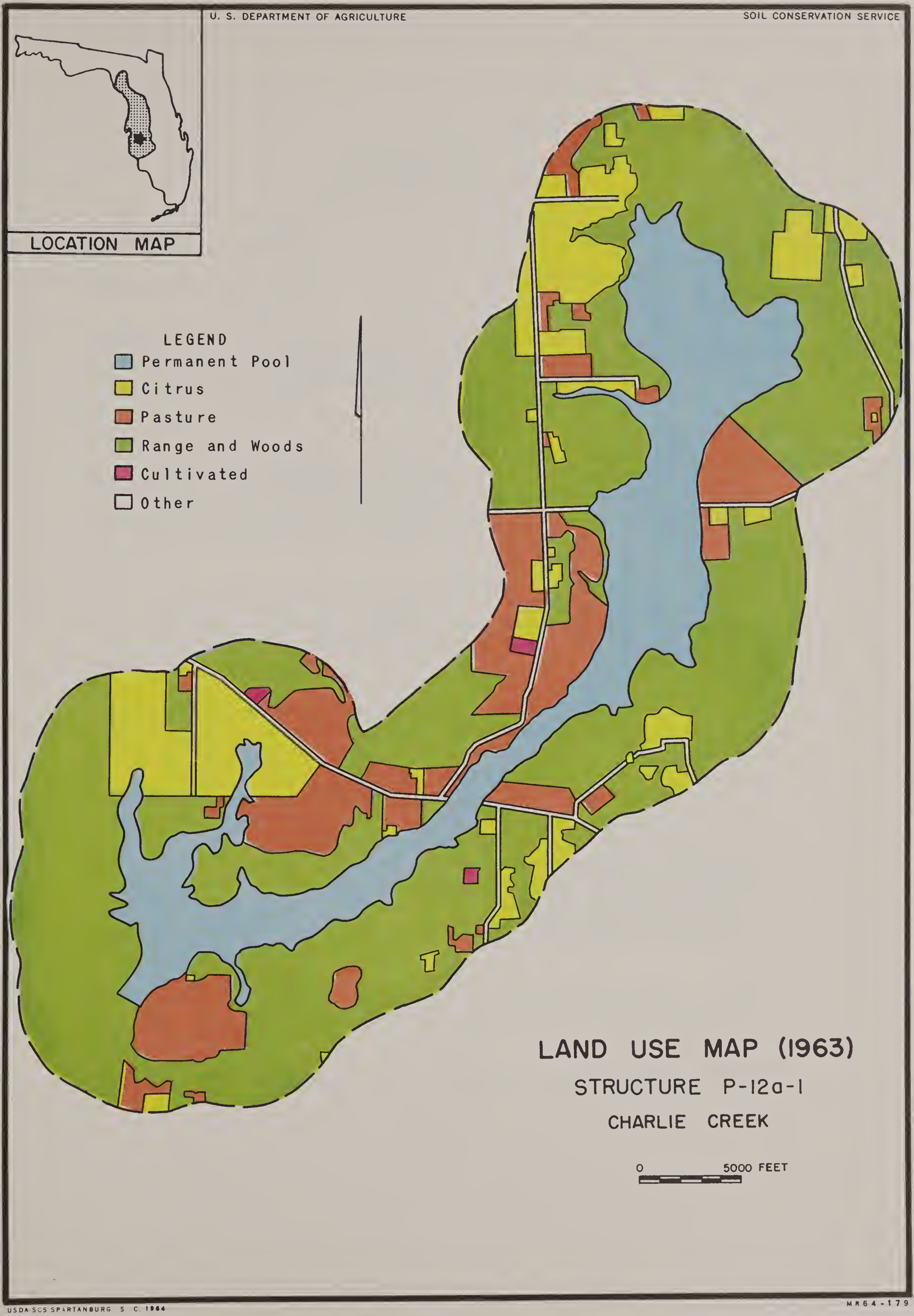
This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to normal full pool elevation of 55 feet. Land for the reservoir would be acquired up to the spillway design elevation of 60 feet and would total 7,965 acres.

Facilities would be provided for boating, fishing, parking, hiking, nature study, picnicking, and camping, requiring an additional 800 acres of land above elevation 60 feet. There could also be a small marina for storage, sales, and rental of boats and motors. These facilities would have a capacity of 591,200 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE P-12a-1
CHARLIE CREEK
Surface Area - Thousand Acres
9
8
7
6
5
4
3
2
1
0
70
60
50
40
Elevation - Feet MSL
Permanent Pool
0
10
20
30
40
50
60
70
80
Capacity - Thousand Acre-Feet
USDA-SCS-SPARTANBURG S C 1964
MR64-189


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LOCATION MAP
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Cultivated
Other
LAND USE MAP (1963)
STRUCTURE P-12a-1
CHARLIE CREEK
0
5000 FEET
USDA-SCS SPARTANBURG S. C. 1964
MR64-179

Charlie Creek
#P-12a-1

DATA

Item	Unit	Amount
Drainage area	square mile	216
Dam		
Length	foot	3,080
Maximum height	foot	22
Crest elevation, mean sea level	foot	65
Spillway		
Crest elevation, mean sea level	foot	55
Length	foot	170
Routed design discharge	cfs	5,900
Capacity to top of dam	cfs	16,700
Reservoir		
Normal full pool elevation Mean sea level	foot	55
Minimum design pool elevation Mean sea level	foot	53
Area		
Normal full pool	acre	4,800
Minimum design pool	acre	2,500
Capacity		
Normal full pool	acre-foot	16,675
Minimum design pool	acre-foot	9,675
Runoff, normal full pool	inch	1.45
Storage, irrigation	acre-foot	7,000
Storage, recreation, fish and wildlife	acre-foot	9,675
Minimum flow required below dam	cfs	3.02
Costs		
Total installation	dollar	3,972,000
Average annual	dollar	295,900
Benefits		
Average annual	dollar	984,300

OAK CREEK
(Dam and Reservoir)
Structure #P-12c-1

LOCATION

The Oak Creek dam site is about 3½ miles upstream from where Oak Creek joins Charlie Creek. This location is approximately eight miles southeast of Zolfo Springs in Hardee County.

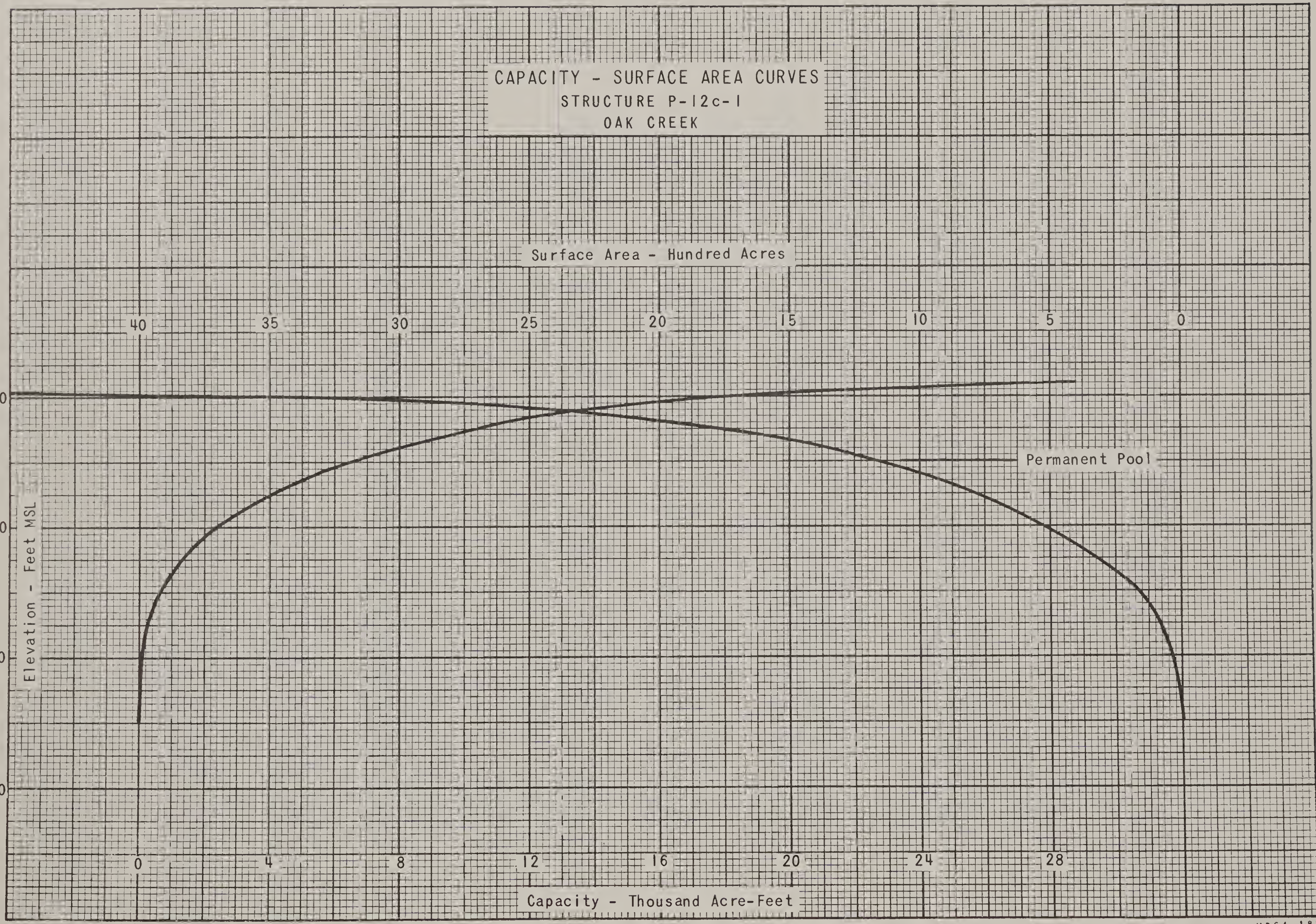
PLAN

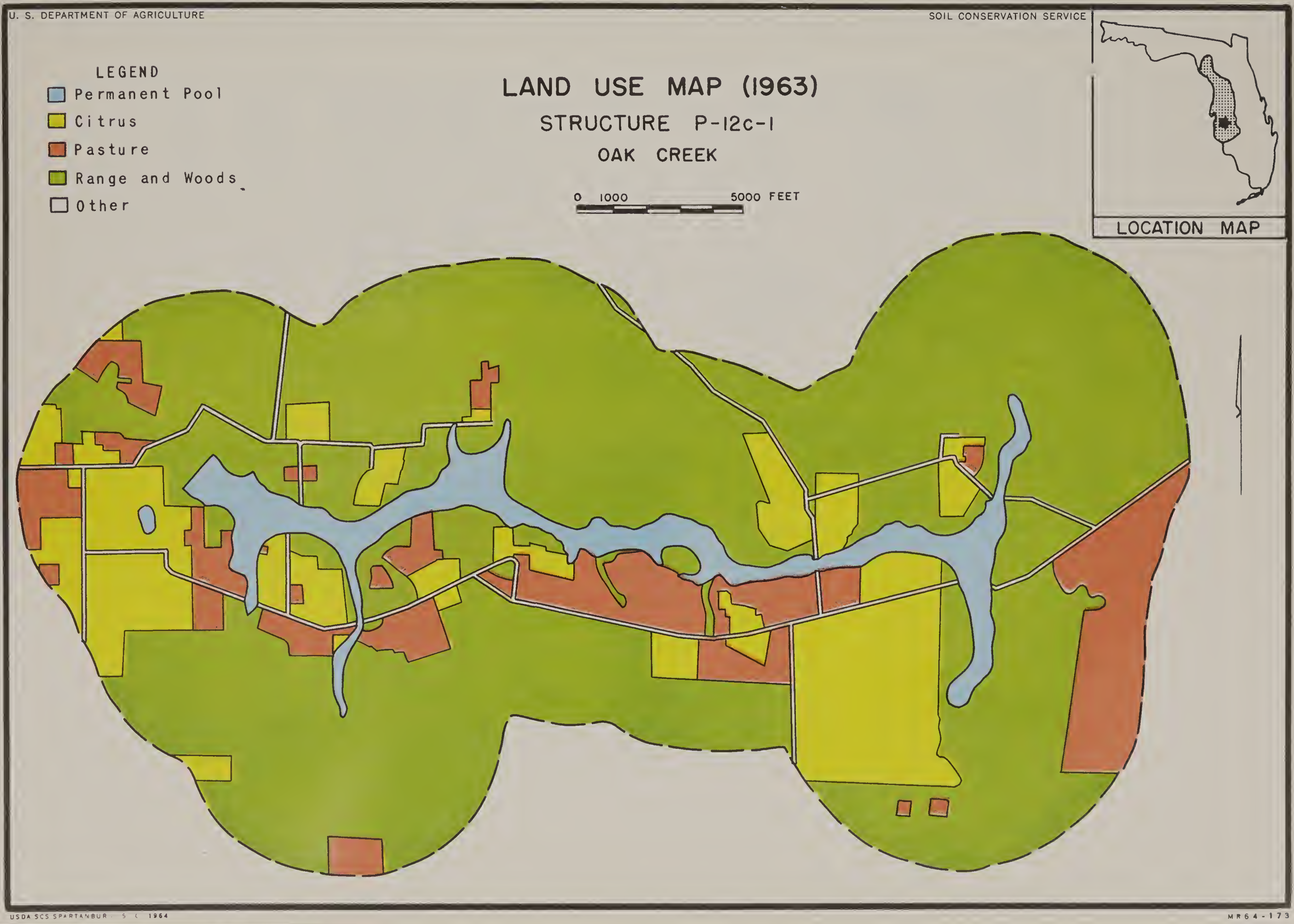
This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife. There is a large area of citrus nearby on the south side of the permanent pool that could utilize irrigation water from the impoundment.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 75 feet. Land for the reservoir would be acquired up to the spillway design elevation of 80 feet and would total 3,500 acres. Relocation of fixed improvements in the reservoir area would include five county road bridges and two miles of graded road.

Facilities would be provided for boating, fishing, picnicking, parking, camping, hiking, nature study, and swimming, requiring an additional 300 acres above elevation 80 feet. These facilities would have a capacity of 221,700 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE P-12c-1
OAK CREEK
Surface Area - Hundred Acres
40
35
30
25
20
15
10
5
0
Permanent Pool
80
70
60
50
Elevation - Feet MSL
0
4
8
12
16
20
24
28
Capacity - Thousand Acre-Feet
USDA SCS-SPARTANBURG S C 1964
MR64-183


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LAND USE MAP (1963)
STRUCTURE P-12c-1
OAK CREEK
0 1000 5000 FEET
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Other
LOCATION MAP
USDA SCS SPARTANBURG S C 1964
MR64-173

Oak Creek
#P-12c-1

DATA

Item	Unit	Amount
Drainage area	square mile	63
Dam		
Length	foot	2,120
Maximum height	foot	26
Crest elevation, mean sea level	foot	86
Spillway		
Crest elevation, mean sea level	foot	75
Length	foot	125
Routed design discharge	cfs	4,280
Capacity to top of dam	cfs	14,150
Reservoir		
Normal full pool elevation		
Mean sea level	foot	75
Minimum design pool elevation		
Mean sea level	foot	73
Area		
Normal full pool	acre	1,160
Minimum design pool	acre	850
Capacity		
Normal full pool	acre-foot	6,550
Minimum design pool	acre-foot	4,450
Runoff, normal full pool	inch	3.45
Storage, irrigation	acre-foot	2,100
Storage, recreation, fish and wildlife	acre-foot	4,450
Minimum flow required below dam	cfs	0.88
Costs		
Total installation	dollar	1,648,000
Average annual	dollar	119,800
Benefits		
Average annual	dollar	375,500

JOSHUA CREEK
(Dam and Reservoir)
Structure #P-13-1

LOCATION

The dam for the Joshua Creek development would be located in DeSoto County just upstream from where State Road 31 crosses Joshua Creek. This location is three miles southeast of the town of Arcadia and approximately four miles upstream from where Joshua Creek joins Peace River.

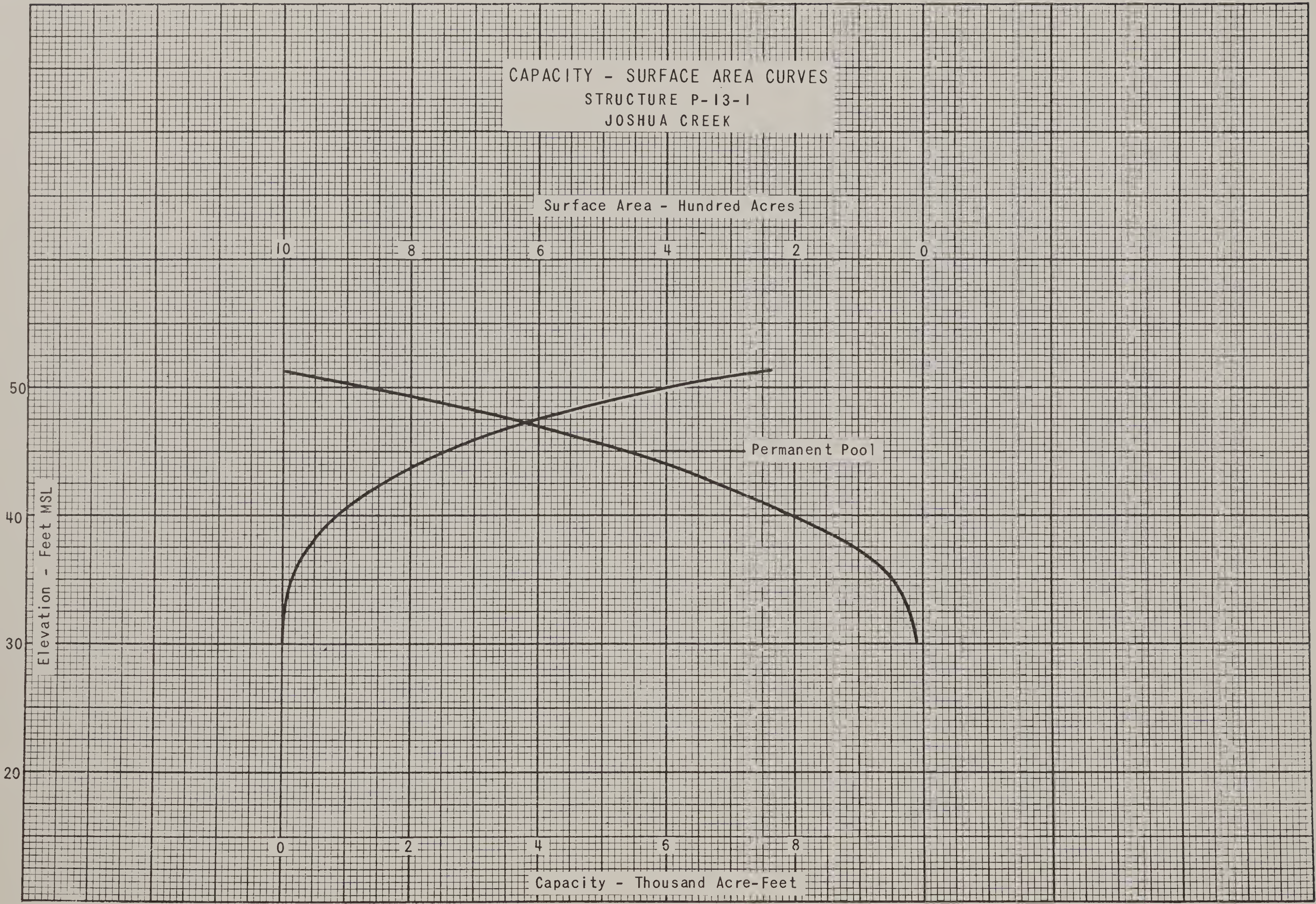
PLAN

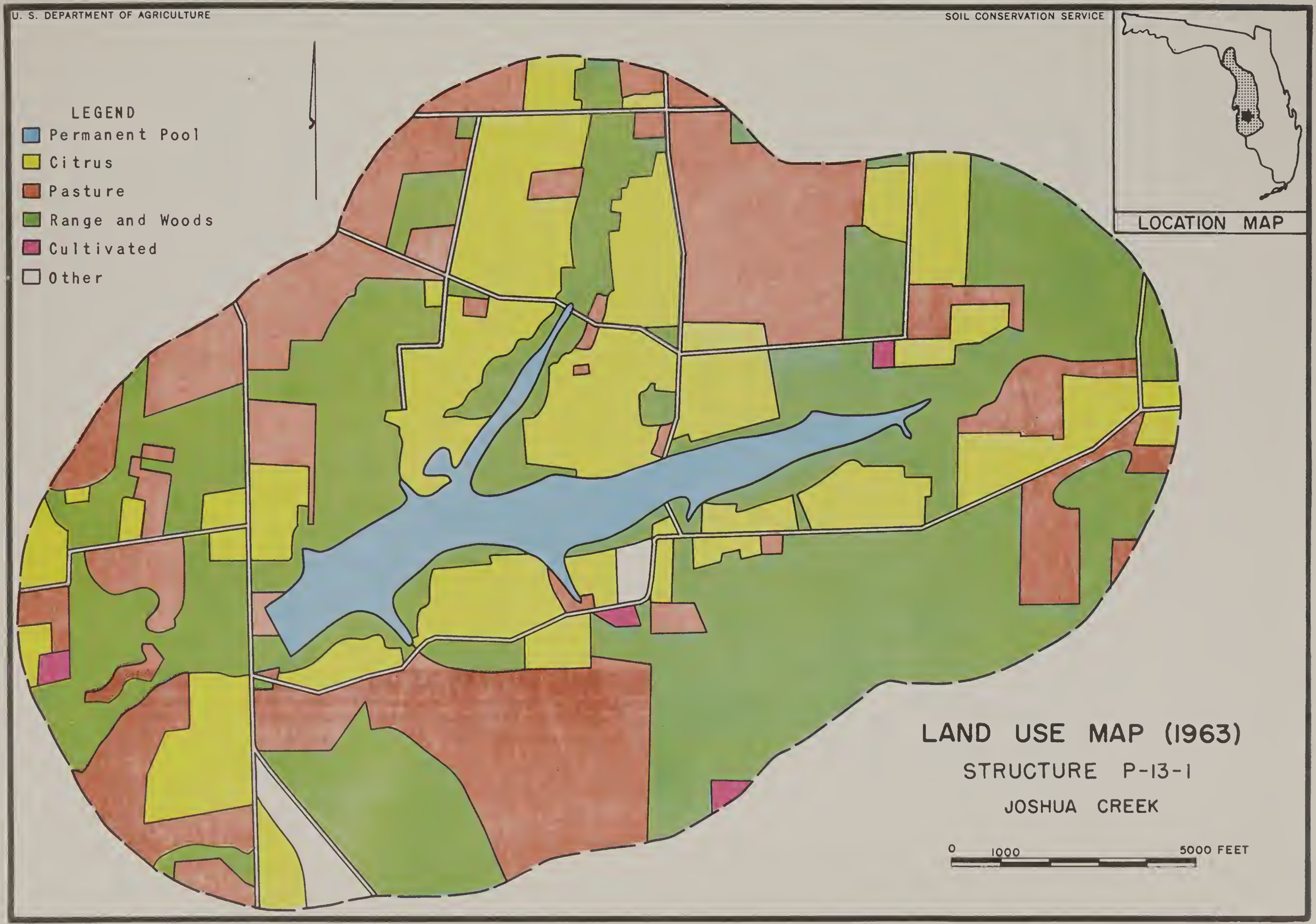
This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife. There is a large acreage of citrus within a short distance of the permanent pool which could utilize irrigation water from the impoundment.

The dam would be an earthfill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 45 feet. Land for the reservoir would be acquired up to the spillway design elevation of 50 feet. One small wooden bridge located 1.5 miles upstream from the dam would have to be replaced as well as approximately 1,500 feet of roadway.

Facilities would be provided for picnicking, boating, parking, camping, and fishing, requiring an additional 150 acres of land above elevation 50 feet. These facilities would have a capacity for 110,800 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE P-13-1
JOSHUA CREEK
Surface Area - Hundred Acres
10
8
6
4
2
0
Permanent Pool
Elevation - Feet MSL
50
40
30
20
0
2
4
6
8
Capacity - Thousand Acre-Feet



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Cultivated
Other
LOCATION MAP
LAND USE MAP (1963)
STRUCTURE P-13-1
JOSHUA CREEK
0
1000
5000 FEET
USDA SCS SPARTANBURG S. C. 1964
MR64-181

Joshua Creek
#P-13-1

DATA

Item	Unit	Amount
Drainage area -------------------------	square mile	86
Dam		
Length -----------------------------	foot	1,960
Maximum height ---------------------	foot	24
Crest elevation, mean sea level ----	foot	54
Spillway		
Crest elevation, mean sea level ----	foot	45
Length -----------------------------	foot	230
Routed design discharge ------------	cfs	8,050
Capacity to top of dam -------------	cfs	19,250
Reservoir		
Normal full pool elevation		
Mean sea level -------------------	foot	45
Minimum design pool elevation		
Mean sea level -------------------	foot	43
Area		
Normal full pool -------------------	acre	470
Minimum design pool ----------------	acre	345
Capacity		
Normal full pool -------------------	acre-foot	2,530
Minimum design pool ----------------	acre-foot	1,730
Runoff, normal full pool -----------	inch	1.3
Storage, irrigation ----------------	acre-foot	800
Storage, recreation, and fish and wildlife -------------------------	acre-foot	1,730
Minimum flow required below dam ----	cfs	1.0
Costs		
Total installation -----------------	dollar	872,000
Average annual ---------------------	dollar	63,600
Benefits		
Average annual ---------------------	dollar	185,800

ALAFIA RIVER
(Dam and Reservoir)
Structure #T-22b-4

LOCATION

The Alafia River dam site #T-22b-4 is located a short distance upstream from where State Road 39 crosses the Alafia River, or just downstream from the junction of North Prong and South Prong.

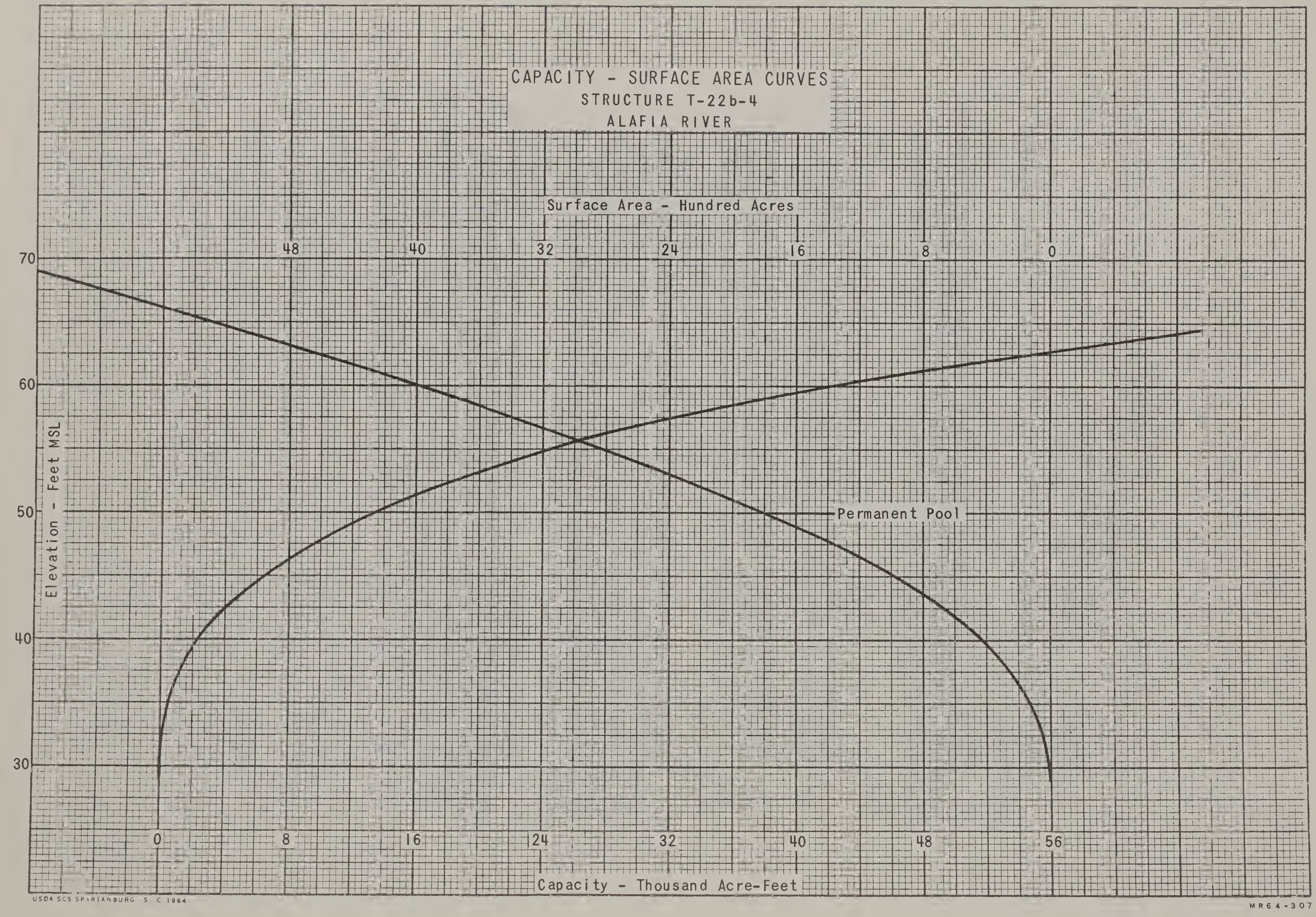
PLAN

This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

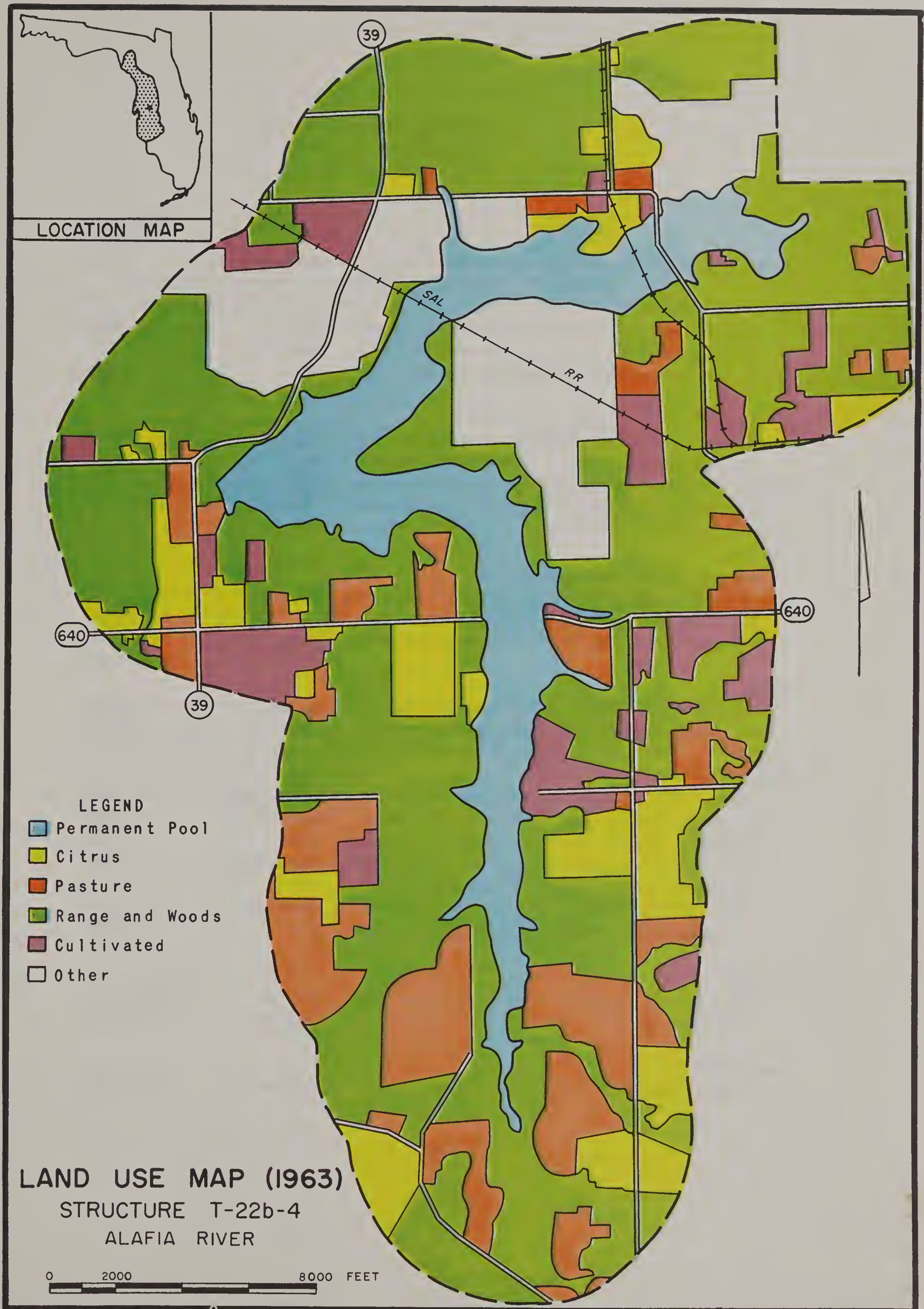
The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 50 feet. Land for the reservoir would be acquired up to the spillway design elevation of 55 feet and would total 2,860 acres. Relocation of fixed improvements in the reservoir area would include 1.3 miles of secondary paved road, three wooden bridges, and one concrete bridge.

Facilities would be provided for boating, fishing, picnicking, parking, camping, hiking, nature study, and swimming requiring an additional 500 acres of land above elevation 55 feet. These facilities would have a capacity for 369,500 user-days of recreation and reservoir fishing annually.



CAPACITY - SURFACE AREA CURVES
STRUCTURE T-22b-4
ALAFIA RIVER
Surface Area - Hundred Acres
48
40
32
24
16
8
0
70
60
50
40
30
Elevation - Feet MSL
Permanent Pool
0
8
16
24
32
40
48
56
Capacity - Thousand Acre-Feet
USDA SCS SPARTANBURG S C 1964
MR64-307



USDA SCS SPARTANBURG S C 1964

MR64-301

Alafia River
#T-22b-4

DATA

Item	Unit	Amount
Drainage area -------------------------	square mile	259
Dam		
Length ----------------------------	foot	3,190
Maximum height --------------------	foot	29
Crest elevation, mean sea level ----	foot	59
Spillway		
Crest elevation, mean sea level ----	foot	50
Length ----------------------------	foot	465
Routed design discharge ------------	cfs	16,100
Capacity to top of dam ------------	cfs	38,900
Reservoir		
Normal full pool elevation		
Mean sea level -------------------	foot	50
Minimum design pool elevation		
Mean sea level -------------------	foot	48
Area		
Normal full pool ------------------	acre	1,790
Minimum design pool ---------------	acre	1,440
Capacity		
Normal full pool ------------------	acre-foot	13,360
Minimum design pool ---------------	acre-foot	10,160
Runoff, normal full pool ----------	inch	0.96
Storage, irrigation ---------------	acre-foot	3,200
Storage, recreation, fish and wildlife ------------------------	acre-foot	10,160
Minimum flow required below dam ----	cfs	34.80
Costs		
Total installation ----------------	dollar	2,727,000
Average annual --------------------	dollar	199,500
Benefits		
Average annual --------------------	dollar	608,900

SOUTH PRONG ALAFIA RIVER
(Dam and Reservoir)
Structure #T-22b-5

LOCATION

The location for structure #T-22b-5 is approximately one-half mile southeast of the community of Picnic on the South Prong of the Alafia River.

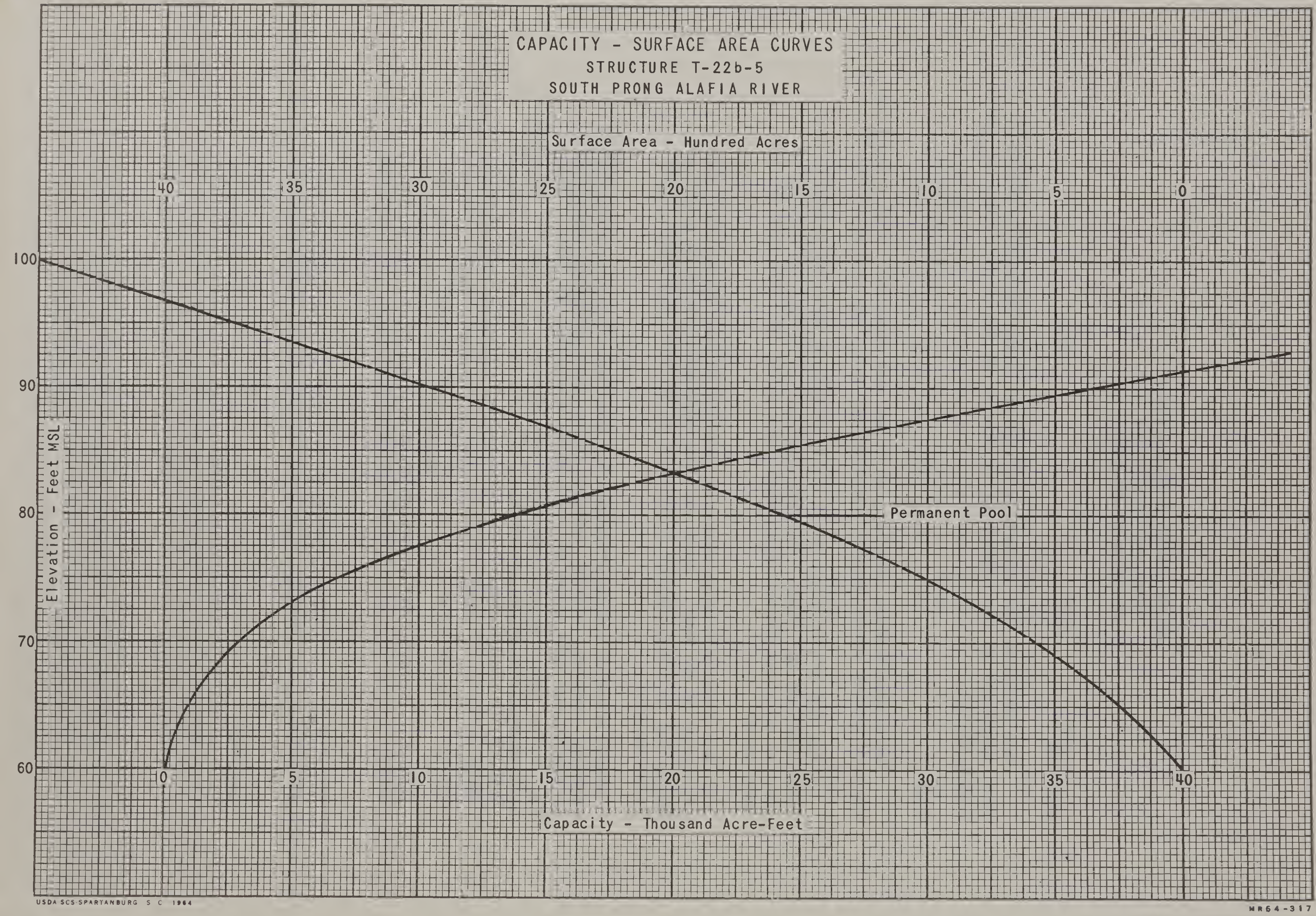
PLAN

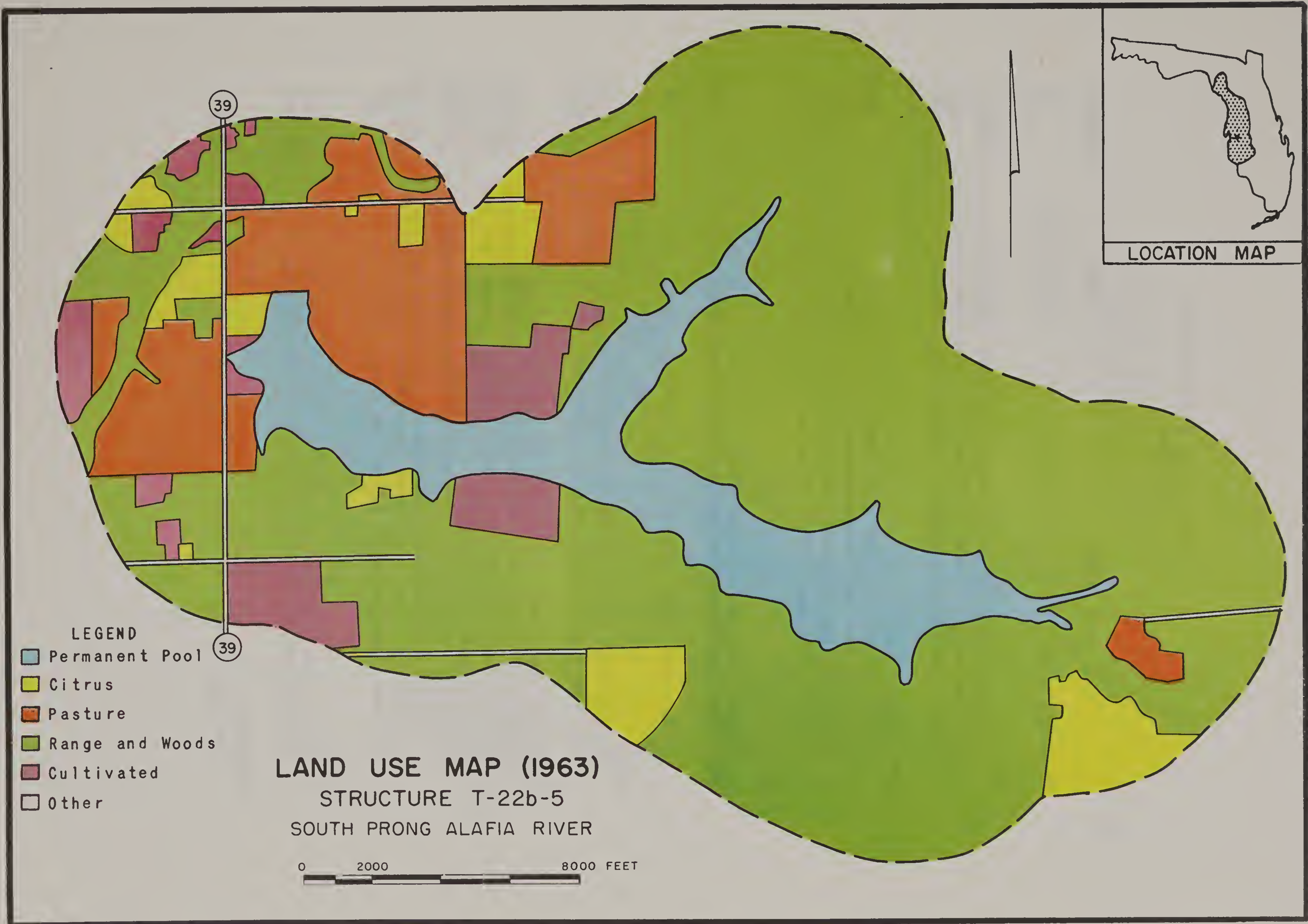
This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 80 feet. Land for the reservoir would be acquired up to the spillway design elevation of 85 feet and would total 2,250 acres.

Facilities would be provided for boating, fishing, picnicking, parking, camping, hiking, nature study, and swimming, requiring an additional 400 acres of land above elevation 85 feet. These facilities would have a capacity for 295,600 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE T-22b-5
SOUTH PRONG ALAFIA RIVER
Surface Area - Hundred Acres
40
35
30
25
20
15
10
5
0
100
90
80
70
60
Elevation - Feet MSL
Permanent Pool
0
5
10
15
20
25
30
35
40
Capacity - Thousand Acre-Feet
USDA SCS SPARTANBURG S C 1964
MR64-317



LAND USE MAP (1963)
STRUCTURE T-22b-5
SOUTH PRONG ALAFIA RIVER

MR64-296

South Prong Alafia River
#T-22b-5

DATA

Item	Unit	Amount
Drainage area	square mile	76
Dam		
Length	foot	2,010
Maximum height	foot	27
Crest elevation, mean sea level	foot	90
Spillway		
Crest elevation, mean sea level	foot	80
Length	foot	160
Routed design discharge	cfs	5,430
Capacity to top of dam	cfs	15,700
Reservoir		
Normal full pool elevation		
Mean sea level	foot	80
Minimum design pool elevation		
Mean sea level	foot	78
Area		
Normal full pool	acre	1,570
Minimum design pool	acre	1,300
Capacity		
Normal full pool	acre-foot	13,715
Minimum design pool	acre-foot	10,615
Runoff, normal full pool	inch	3.4
Storage, irrigation	acre-foot	3,100
Storage, recreation, fish and wildlife	acre-foot	10,615
Minimum flow required below dam	cfs	11.28
Costs		
Total installation	dollar	1,909,000
Average annual	dollar	148,600
Benefits		
Average annual	dollar	506,800

NORTH PRONG ALAFIA RIVER
(Dam and Reservoir)
Structure #T-22b-6

LOCATION

The dam for the North Prong of the Alafia River is located two miles northeast of Keysville, or approximately three miles downstream from where State Highway 60 crosses the North Prong of the Alafia River.

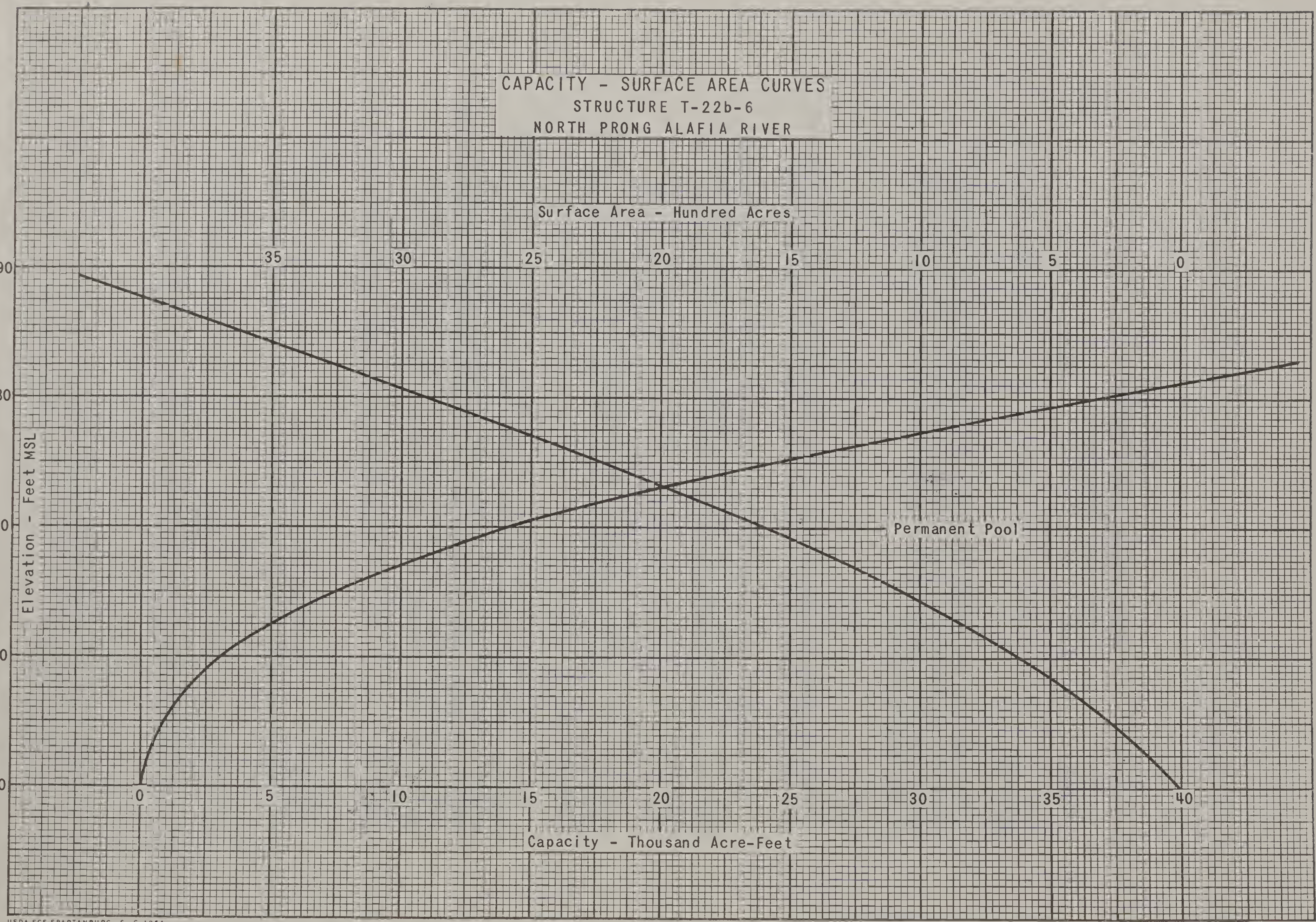
PLAN

This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

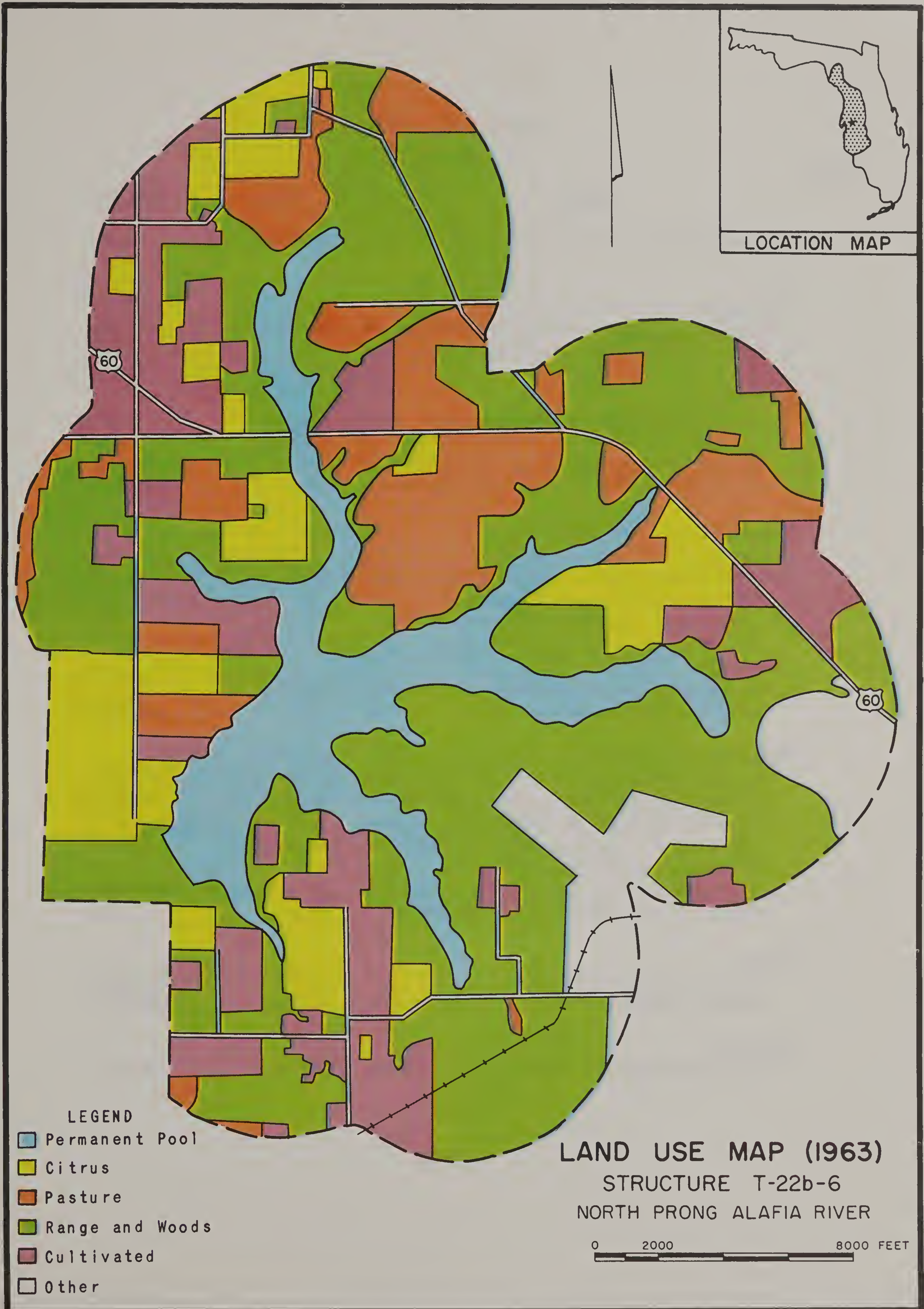
The reservoir area would be cleared to the normal full pool elevation of 70 feet. Land for the reservoir would be acquired up to the spillway design elevation of 75 feet and would total 2,240 acres.

Facilities would be provided for boating, fishing, picnicking, parking, camping, hiking, nature study, and swimming, requiring an additional 400 acres of land above elevation 75 feet. These facilities would have a capacity for 295,600 user-days of recreation and reservoir fishing annually. There could also be a small marina for the storage, sale and rental of boats and motors.



USDA-SCS-SPARTANBURG S. C 1964

MR64-311



USDA SCS SPARTANBURG S C 1964

MR64-305

North Prong Alafia River
#T-22b-6

DATA

Item	Unit	Amount
Drainage area	square mile	127
Dam		
Length	foot	2,000
Maximum height	foot	30
Crest elevation, mean sea level	foot	80
Spillway		
Crest elevation, mean sea level	foot	70
Length	foot	300
Routed design discharge	cfs	10,500
Capacity to top of dam	cfs	29,300
Reservoir		
Normal full pool elevation Mean sea level	foot	70
Minimum design pool elevation Mean sea level	foot	68
Area		
Normal full pool	acre	1,600
Minimum design pool	acre	1,350
Capacity		
Normal full pool	acre-foot	14,200
Minimum design pool	acre-foot	11,000
Runoff, normal full pool	inch	2.1
Storage, irrigation	acre-foot	3,200
Storage, recreation, fish and wildlife	acre-foot	11,000
Minimum flow required below dam	cfs	26
Costs		
Total installation	dollar	2,143,000
Average annual	dollar	158,900
Benefits		
Average annual	dollar	504,400

FISHHAWK CREEK
(Dam and Reservoir)
Structure #T-22c-3

LOCATION

The Fishhawk Creek dam site is located approximately five miles east of Riverview. This location is one mile upstream from where Fishhawk Creek joins the Alafia River.

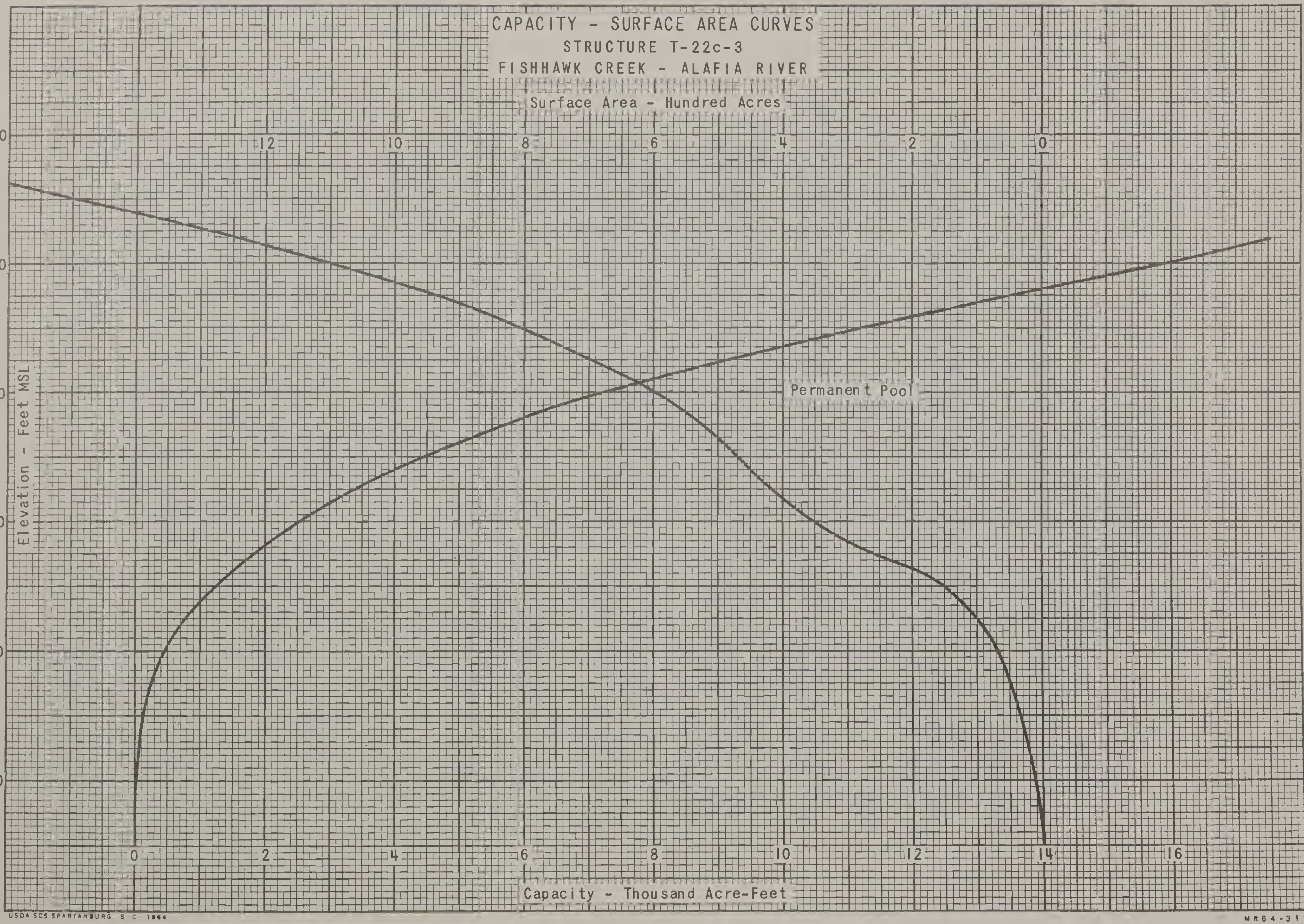
PLAN

This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

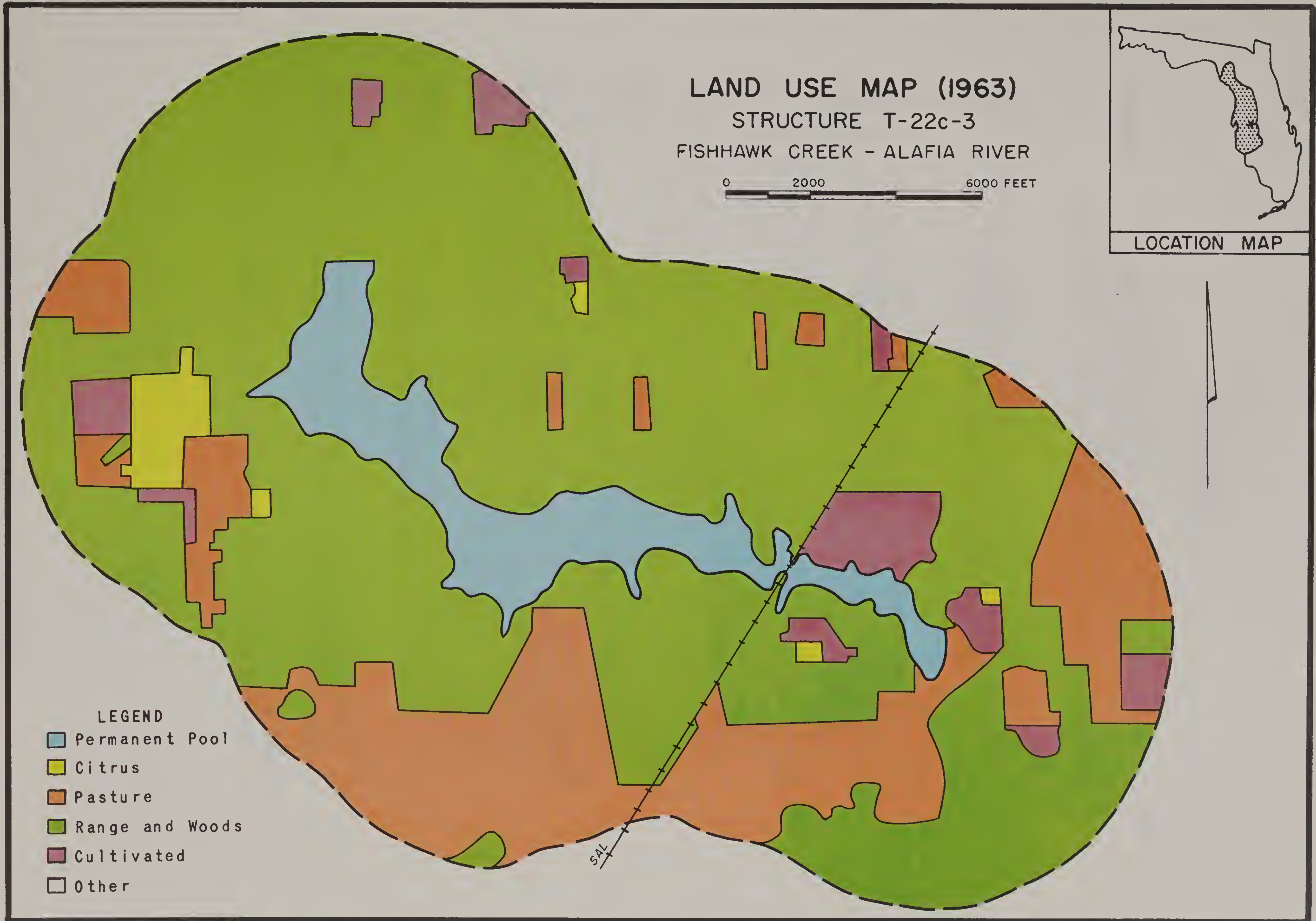
The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 45 feet. Land for the reservoir would be acquired up to the spillway design elevation of 50 feet and would total 675 acres.

Facilities would be provided for boating, fishing, picnicking, parking, and camping, requiring an additional 200 acres of land above elevation 55 feet. These facilities would have a capacity for 147,800 user-days of recreation and reservoir fishing annually.



CAPACITY - SURFACE AREA CURVES
STRUCTURE T-22c-3
FISHHAWK CREEK - ALAFIA RIVER
Surface Area - Hundred Acres
12
10
8
6
4
2
0
70
60
50
40
30
20
Elevation - Feet MSL
Permanent Pool
0
2
4
6
8
10
12
14
16
Capacity - Thousand Acre-Feet
USDA SCS SPARTANBURG, S. C. 1964
MR64-315



USDA SCS SPARTANBURG S. C. 1964 MR64-300

Fishhawk Creek
#T-22c-3

DATA

Item	Unit	Amount
Drainage area	square mile	27
Dam		
Length	foot	1,290
Maximum height	foot	34
Crest elevation, mean sea level	foot	54
Spillway		
Crest elevation, mean sea level	foot	45
Length	foot	120
Routed design discharge	cfs	4,200
Capacity to top of dam	cfs	10,000
Reservoir		
Normal full pool elevation Mean sea level	foot	45
Minimum design pool elevation Mean sea level	foot	43
Area		
Normal full pool	acre	470
Minimum design pool	acre	430
Capacity		
Normal full pool	acre-foot	4,500
Minimum design pool	acre-foot	3,600
Runoff, normal full pool	inch	3.1
Storage, irrigation	acre-foot	900
Storage, recreation, fish and wildlife	acre-foot	3,600
Minimum flow required below dam	cfs	1.74
Costs		
Total installation	dollar	1,030,000
Average annual	dollar	78,200
Benefits		
Average annual	dollar	255,000

BULLFROG CREEK
(Dam and Reservoir)
Structure #T-23-1

LOCATION

The Bullfrog Creek dam site is located three miles southeast of Gibsonton, Hillsborough County.

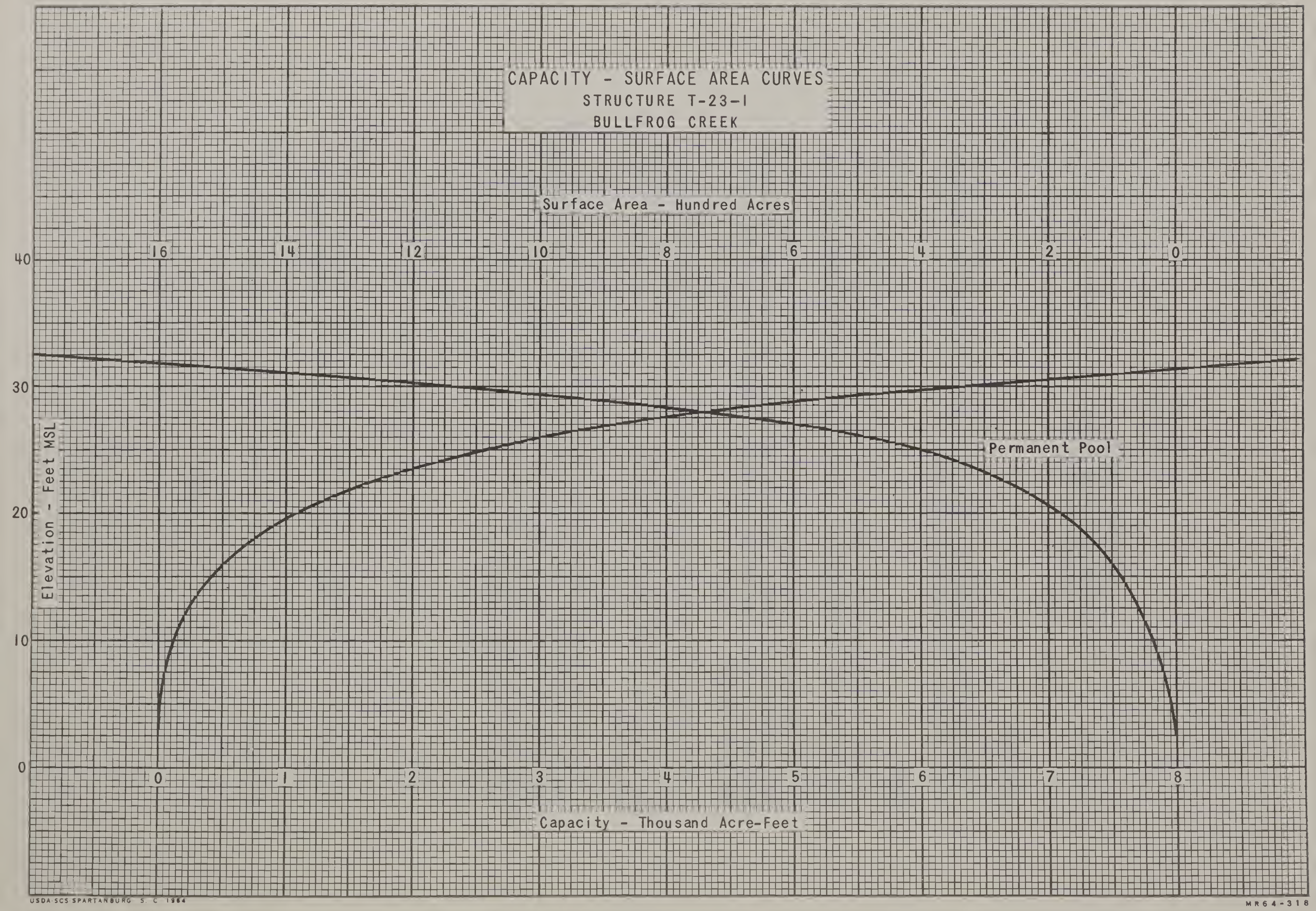
PLAN

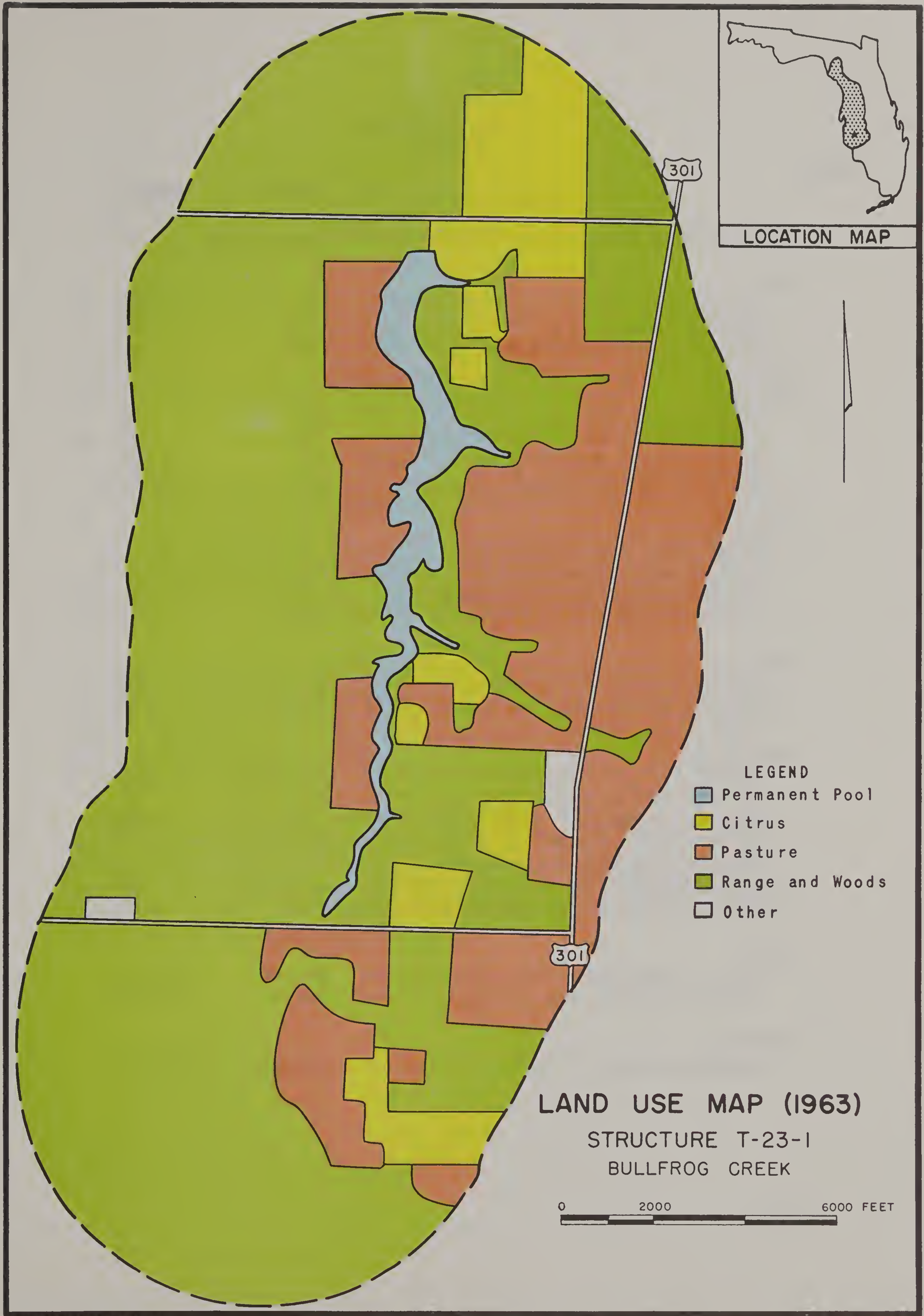
This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 20 feet. Land for the reservoir would be acquired up to the spillway design elevation of 25 feet and would total 400 acres.

Facilities would be provided for boating, fishing, picnicking, parking, playfields, and walks and paths, requiring an additional 130 acres of land above elevation 25 feet. These facilities would have a capacity for 96,100 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE T-23-1
BULLFROG CREEK
Surface Area - Hundred Acres
16
14
12
10
8
6
4
2
0
40
30
20
10
0
Elevation - Feet MSL
Permanent Pool
0
1
2
3
4
5
6
7
8
Capacity - Thousand Acre-Feet
USDA-SCS-SPARTANBURG S. C. 1964
MR64-318



301
LOCATION MAP
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Other
301
LAND USE MAP (1963)
STRUCTURE T-23-1
BULLFROG CREEK
0
2000
6000 FEET

Bullfrog Creek
#T-23-1

DATA

Item	Unit	Amount
Drainage area ------------------------	square mile	37
Dam		
Length ----------------------------	foot	1,250
Maximum height --------------------	foot	27
Crest elevation, mean sea level ----	foot	30
Spillway		
Crest elevation, mean sea level ----	foot	20
Length ----------------------------	foot	300
Routed design discharge ------------	cfs	10,600
Capacity to top of dam ------------	cfs	29,500
Reservoir		
Normal full pool elevation		
Mean sea level ------------------	foot	20
Minimum design pool elevation		
Mean sea level ------------------	foot	18
Area		
Normal full pool ------------------	acre	180
Minimum design pool ---------------	acre	130
Capacity		
Normal full pool ------------------	acre-foot	1,070
Minimum design pool ---------------	acre-foot	750
Runoff, normal full pool ----------	inch	0.55
Storage, irrigation ---------------	acre-foot	320
Storage, recreation, fish and wildlife ------------------------	acre-foot	750
Minimum flow required below dam ----	cfs	2.84
Costs		
Total installation ----------------	dollar	673,000
Average annual --------------------	dollar	53,200
Benefits		
Average annual --------------------	dollar	151,300

LITTLE MANATEE RIVER
(Dam and Reservoir)
Structure #T-24-1

LOCATION

The Little Manatee River dam site is located 2½ miles upstream from where U. S. Highway 301 crosses the Little Manatee River, and is five miles south-southwest of the town of Wimauma.

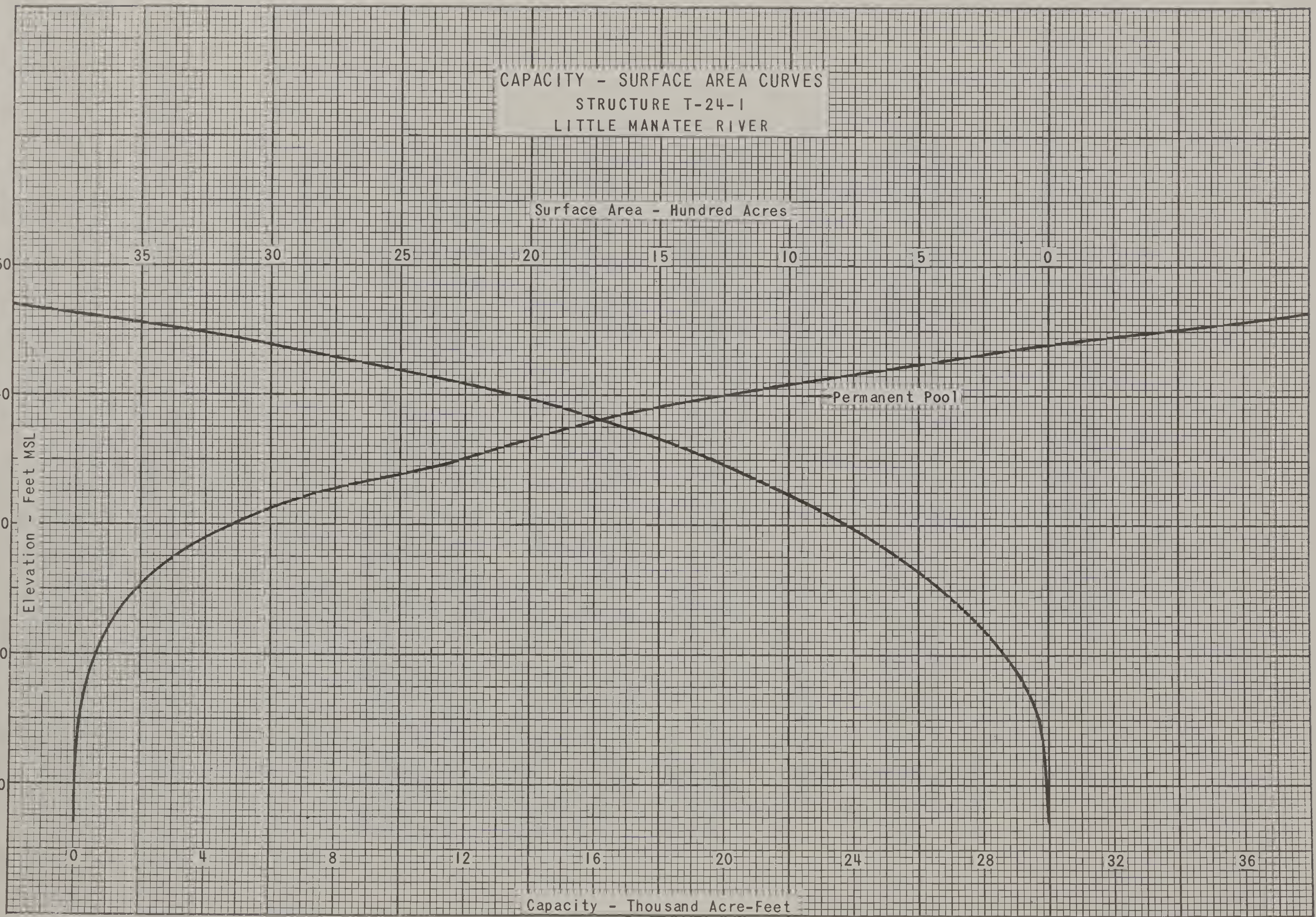
PLAN

This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

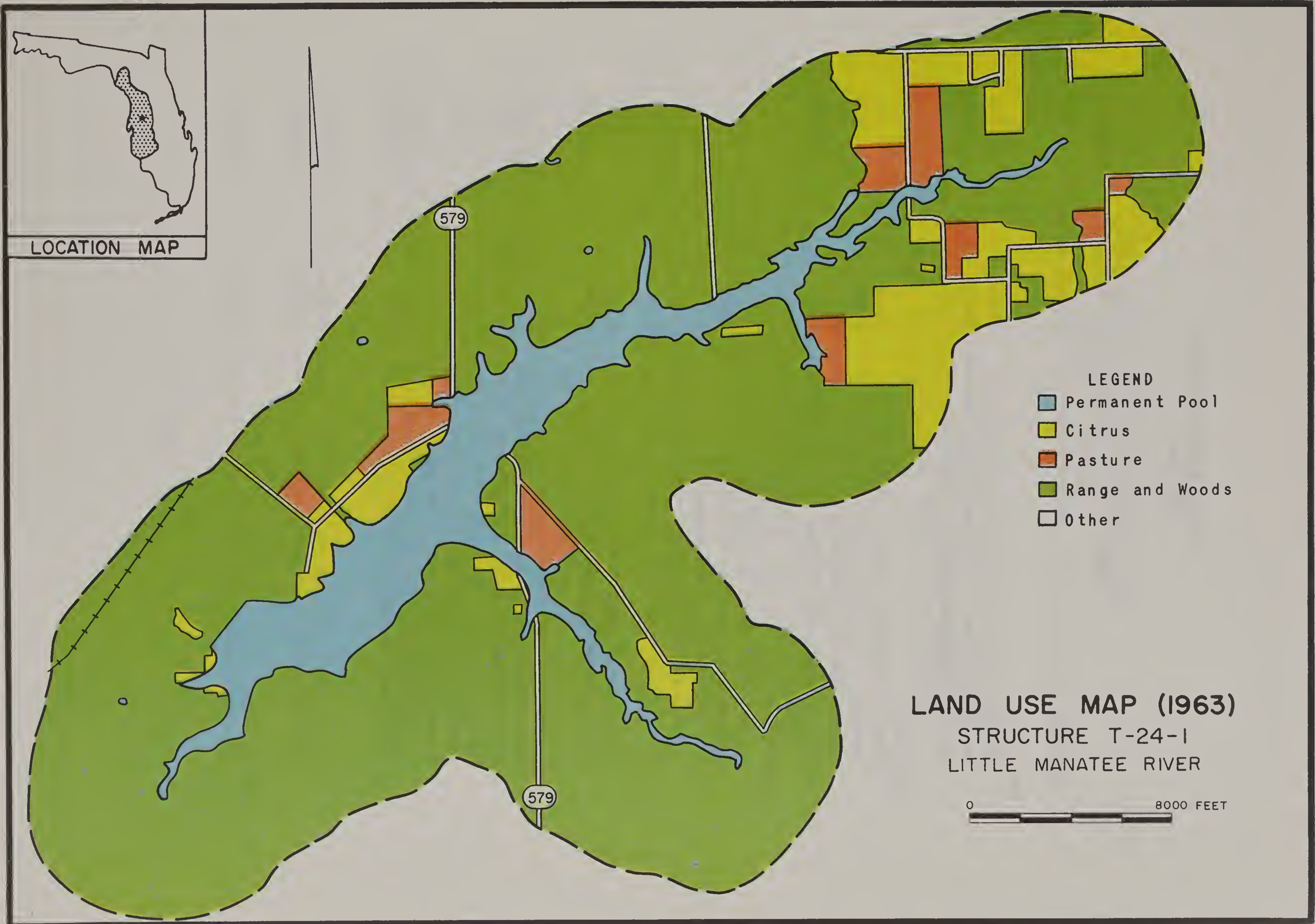
The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 40 feet. Land for the reservoir would be acquired up to the spillway design elevation of 45 feet and would total 3,320 acres. Relocation of fixed improvements in the reservoir area would consist of three bridges, 0.3 miles of graded road, and 1.4 miles of paved road.

Facilities would be provided for boating, fishing, picnicking, parking, camping, and swimming, requiring an additional 750 acres of land above elevation 45 feet. These facilities would have a capacity for 554,200 user-days of recreation and reservoir fishing annually. There could also be a small marina for storage, sale, and rental of boats and motors.



CAPACITY - SURFACE AREA CURVES
STRUCTURE T-24-1
LITTLE MANATEE RIVER
Surface Area - Hundred Acres
35
30
25
20
15
10
5
0
50
40
30
20
10
Elevation - Feet MSL
Permanent Pool
0
4
8
12
16
20
24
28
32
36
Capacity - Thousand Acre-Feet


LOCATION MAP
579
579
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Other
LAND USE MAP (1963)
STRUCTURE T-24-1
LITTLE MANATEE RIVER
0
8000 FEET

Little Manatee River
#T-24-1

DATA

Item	Unit	Amount
Drainage area	square mile	139
Dam		
Length	foot	2,600
Maximum height	foot	34
Crest elevation mean sea level	foot	49
Spillway		
Crest elevation, mean sea level	foot	40
Length	foot	350
Routed design discharge	cfs	12,200
Capacity to top of dam	cfs	29,300
Reservoir		
Normal full pool elevation Mean sea level	foot	40
Minimum design pool elevation Mean sea level	foot	38
Area		
Normal full pool	acre	2,030
Minimum design pool	acre	1,700
Capacity		
Normal full pool	acre-foot	20,200
Minimum design pool	acre-foot	16,100
Runoff, normal full pool	inch	2.74
Storage, irrigation	acre-foot	4,100
Storage, recreation, fish and wildlife	acre-foot	16,100
Minimum flow required below dam	cfs	10.67
Costs		
Total installation	dollar	3,158,000
Average annual	dollar	257,600
Benefits		
Average annual	dollar	959,200

SOUTH FORK OF LITTLE MANATEE RIVER
(Dam and Reservoir)
Structure #T-24-2

LOCATION

The site for Structure #T-24-2 is on the South Fork of the Little Manatee River and is located seven miles southeast of Wimauma. This site is between sections 7 and 18 of Township 33S, Range 21E.

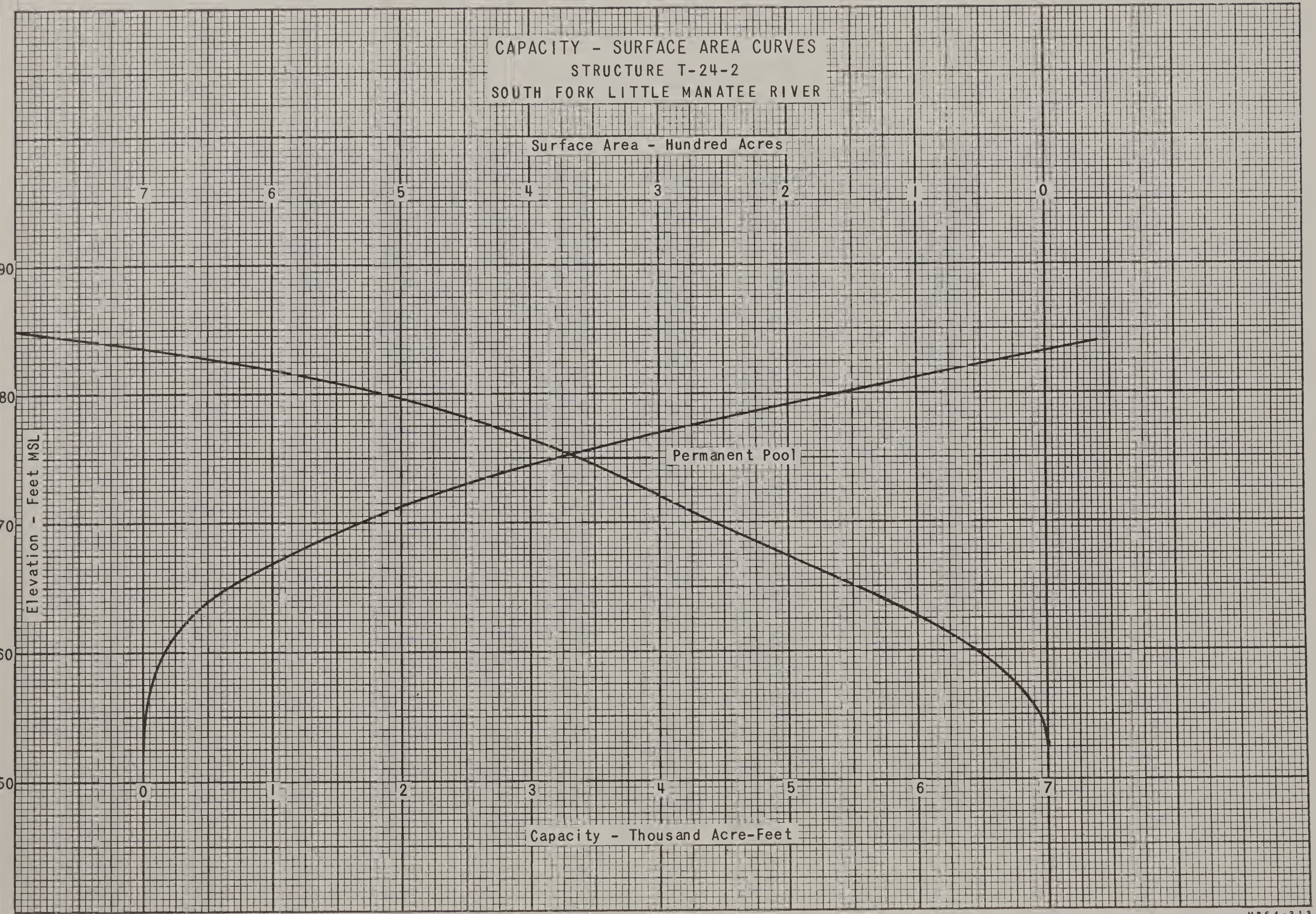
PLAN

This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife. There is considerable citrus acreage adjacent to the permanent pool that could utilize water for irrigation.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 75 feet. Land for the reservoir would be acquired up to the spillway design elevation of 80 feet and would total 510 acres. Relocation of fixed improvements in the reservoir area would include one wooden bridge and 0.1 mile of graded road.

Facilities would be provided for boating, fishing, parking, and picnicking, requiring an additional 100 acres of land above elevation 80 feet. These facilities would have a capacity for 73,900 user-days of recreation and reservoir fishing annually.



USDA-SCS-SPARTANBURG S C 1964 MR64-313

USDA-SCS-SPARTANBURG, S. C. 1964

M R 6 4 - 2 9 7

South Fork of Little Manatee River
#T-24-2

DATA

Item	Unit	Amount
Drainage area	square mile	28
Dam		
Length	foot	1,100
Maximum height	foot	26
Crest elevation, mean sea level	foot	84
Spillway		
Crest elevation, mean sea level	foot	75
Length	foot	150
Routed design discharge	cfs	5,200
Capacity to top of dam	cfs	12,550
Reservoir		
Normal full pool elevation Mean sea level	foot	75
Minimum design pool elevation Mean sea level	foot	73
Area		
Normal full pool	acre	360
Minimum design pool	acre	315
Capacity		
Normal full pool	acre-foot	3,220
Minimum design pool	acre-foot	2,500
Runoff, normal full pool	inch	2.16
Storage, irrigation	acre-foot	720
Storage, recreation, fish and wildlife	acre-foot	2,500
Minimum flow required below dam	cfs	2.15
Costs		
Total installation	dollar	584,000
Average annual	dollar	42,600
Benefits		
Average annual	dollar	128,400

SOUTH FORK LITTLE MANATEE RIVER
(Dam and Reservoir)
Structure #T-24-3

LOCATION

The site for Structure #T-24-3 is located approximately one-half mile north of Bunker Hill Church, or seven miles west-northwest of Duette. This is in the southwest corner of section 15 in Township 33S, Range 21E.

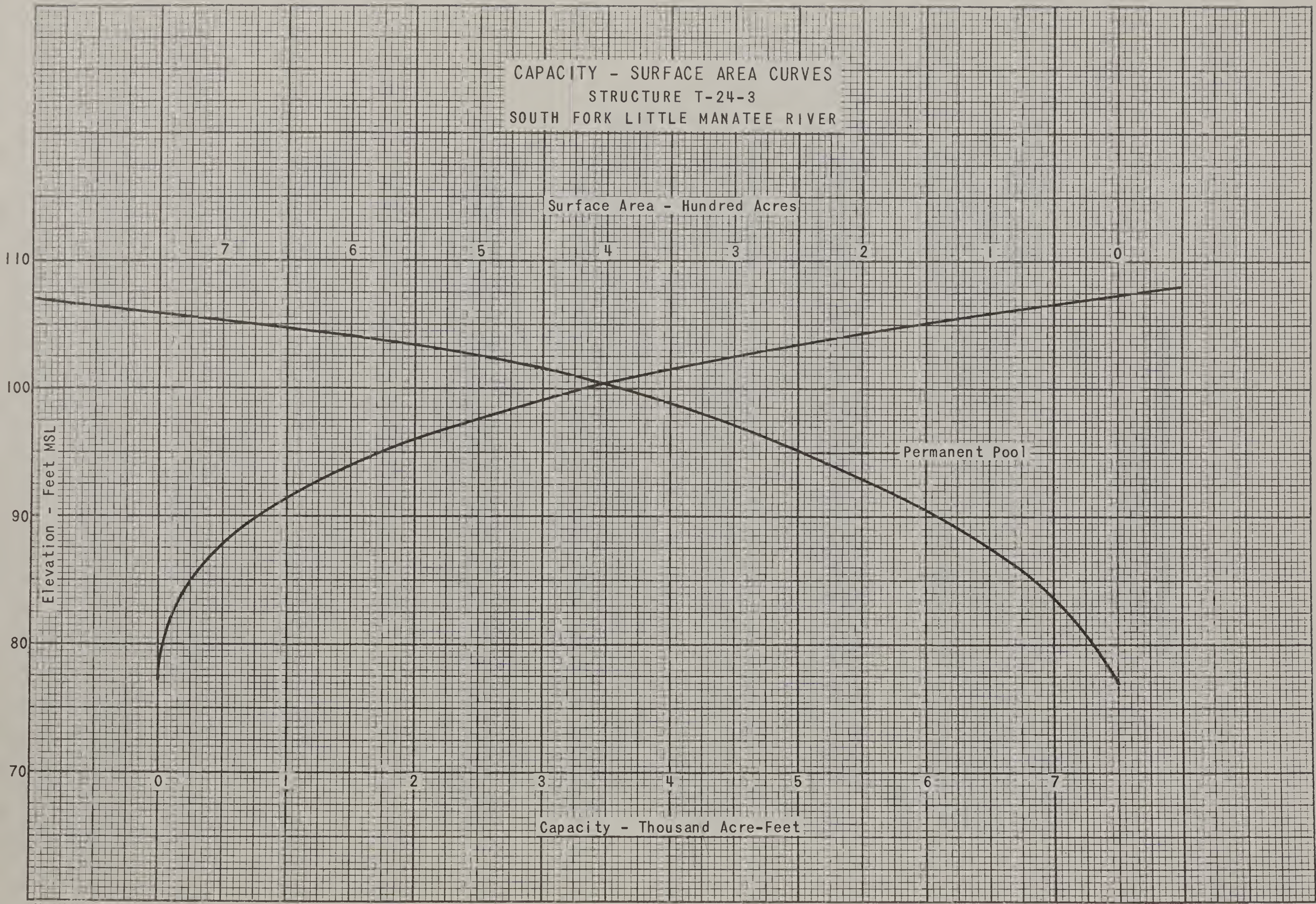
PLAN

This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife. There is considerable acreage of citrus near to the permanent pool that could utilize the irrigation water in the reservoir.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir would be cleared to the normal full pool elevation of 95 feet. Land for the reservoir would be acquired up to the spillway design elevation of 100 feet and would total 385 acres. Relocation of fixed improvements in the reservoir area would include two bridges and one-half mile of graded road.

Facilities would be provided for boating, fishing, parking, and picnicking, requiring an additional 75 acres of land above elevation 100 feet. These facilities would have a capacity for 55,400 user-days of recreation and reservoir fishing annually.



USDA-SCS-SPARTANBURG S. C. 1964

MR64-309

USDA SCS SPARTANBURG S. C. 1964

MR64-302

South Fork of Little Manatee River
#T-24-3

DATA

Item	Unit	Amount
Drainage area	square mile	16
Dam		
Length	foot	1,210
Maximum height	foot	29
Crest elevation, mean sea level	foot	104
Spillway		
Crest elevation, mean sea level	foot	95
Length	foot	110
Routed design discharge	cfs	3,700
Capacity to top of dam	cfs	9,200
Reservoir		
Normal full pool elevation		
Mean sea level	foot	95
Minimum design pool elevation		
Mean sea level	foot	93
Area		
Normal full pool	acre	250
Minimum design pool	acre	200
Capacity		
Normal full pool	acre-foot	1,740
Minimum design pool	acre-foot	1,270
Runoff, normal full pool	inch	2.1
Storage, irrigation	acre-foot	470
Storage, recreation, fish and wildlife	acre-foot	1,270
Minimum flow required below dam	cfs	1.23
Costs		
Total installation	dollar	462,000
Average annual	dollar	33,300
Benefits		
Average annual	dollar	94,600

LITTLE MANATEE RIVER
(Dam and Reservoir)
Structure #T-24-4

LOCATION

The Little Manatee River Structure site #T-24-4 is located two miles west-southwest of Fort Lonesome. This is approximately 3/4 mile upstream from where State Highway 674 crosses Little Manatee River.

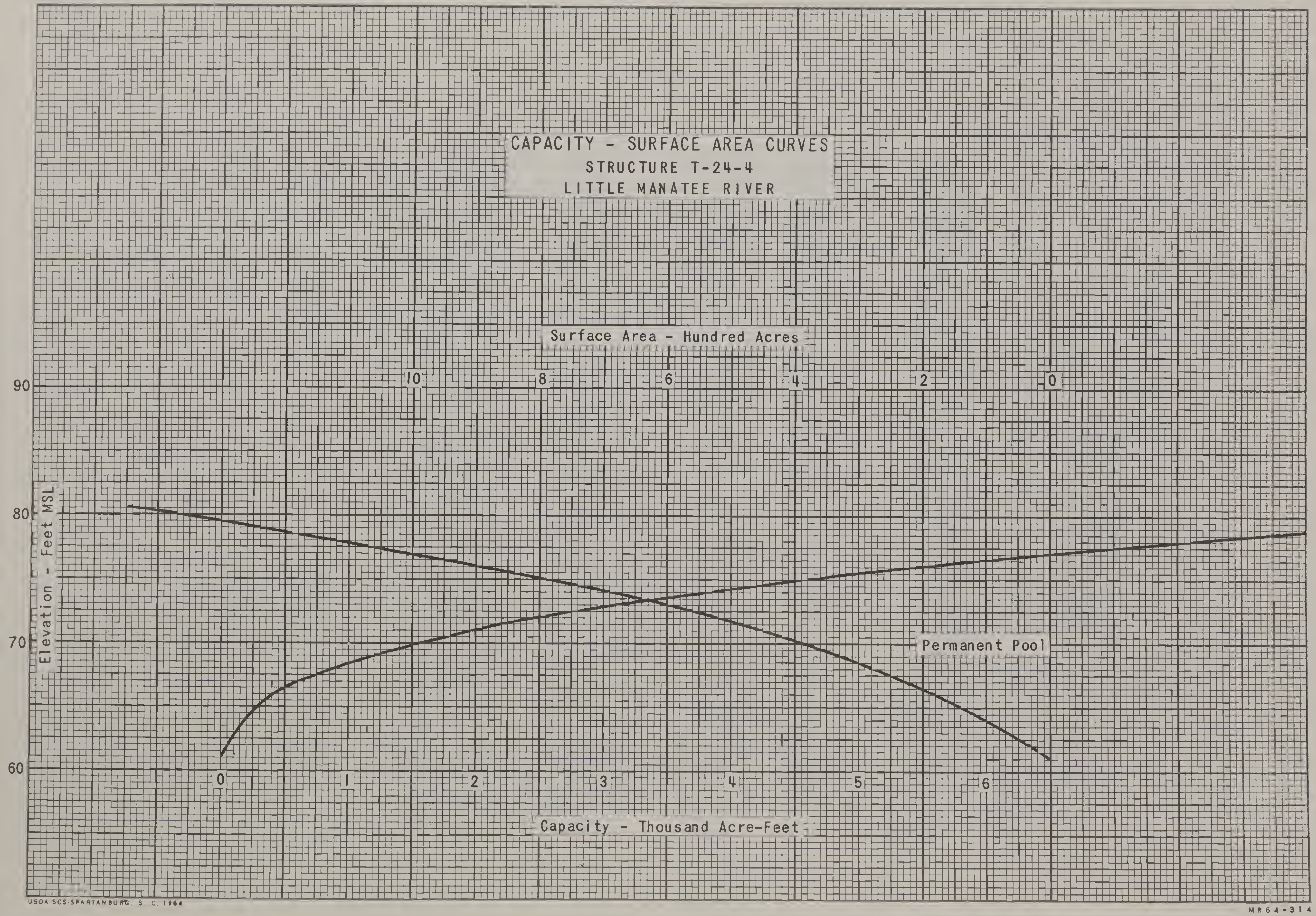
PLAN

This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 70 feet. Land for the reservoir would be acquired up to the spillway design elevation of 75 feet and would total 790 acres. Relocation of fixed improvements in the reservoir area would include 3/4 mile of paved secondary road and one concrete bridge.

Facilities would be provided for boating, fishing, parking, and picnicking, requiring an additional 150 acres of land above elevation 75 feet. These facilities would have a capacity for 110,800 user-days of recreation and reservoir fishing annually.



CAPACITY - SURFACE AREA CURVES
STRUCTURE T-24-4
LITTLE MANATEE RIVER
Surface Area - Hundred Acres
10
8
6
4
2
0
90
80
70
60
Elevation - Feet MSL
Permanent Pool
0
1
2
3
4
5
6
Capacity - Thousand Acre-Feet
USDA-SCS-SPARTANBURG, S. C. 1964
MR64-314

LAND USE MAP (1963)
STRUCTURE T-24-4
LITTLE MANATEE RIVER
LOCATION MAP
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Cultivated
Other
674
39
0
2000
6000 FEET
MR64-299

Little Manatee River
#T-24-4

DATA

Item	Unit	Amount
Drainage area	square mile	30
Dam		
Length	foot	2,270
Maximum height	foot	17
Crest elevation, mean sea level	foot	79
Spillway		
Crest elevation, mean sea level	foot	70
Length	foot	150
Routed design discharge	cfs	5,050
Capacity to top of dam	cfs	12,550
Reservoir		
Normal full pool elevation Mean sea level	foot	70
Minimum design pool elevation Mean sea level	foot	68
Area		
Normal full pool	acre	390
Minimum design pool	acre	275
Capacity		
Normal full pool	acre-foot	1,610
Minimum design pool	acre-foot	910
Runoff, normal full pool	inch	1.0
Storage, irrigation	acre-foot	700
Storage, recreation, fish and wildlife	acre-foot	910
Minimum flow required below dam	cfs	2.00
Costs		
Total installation	dollar	726,000
Average annual	dollar	55,900
Benefits		
Average annual	dollar	178,800

MANATEE RIVER
(Dam and Reservoir)
Structure #T-26-2

LOCATION

The Manatee River Structure site #T-26-2 is located approximately four miles east of the community of Bethany, or approximately 3/4 mile upstream from State Road 64.

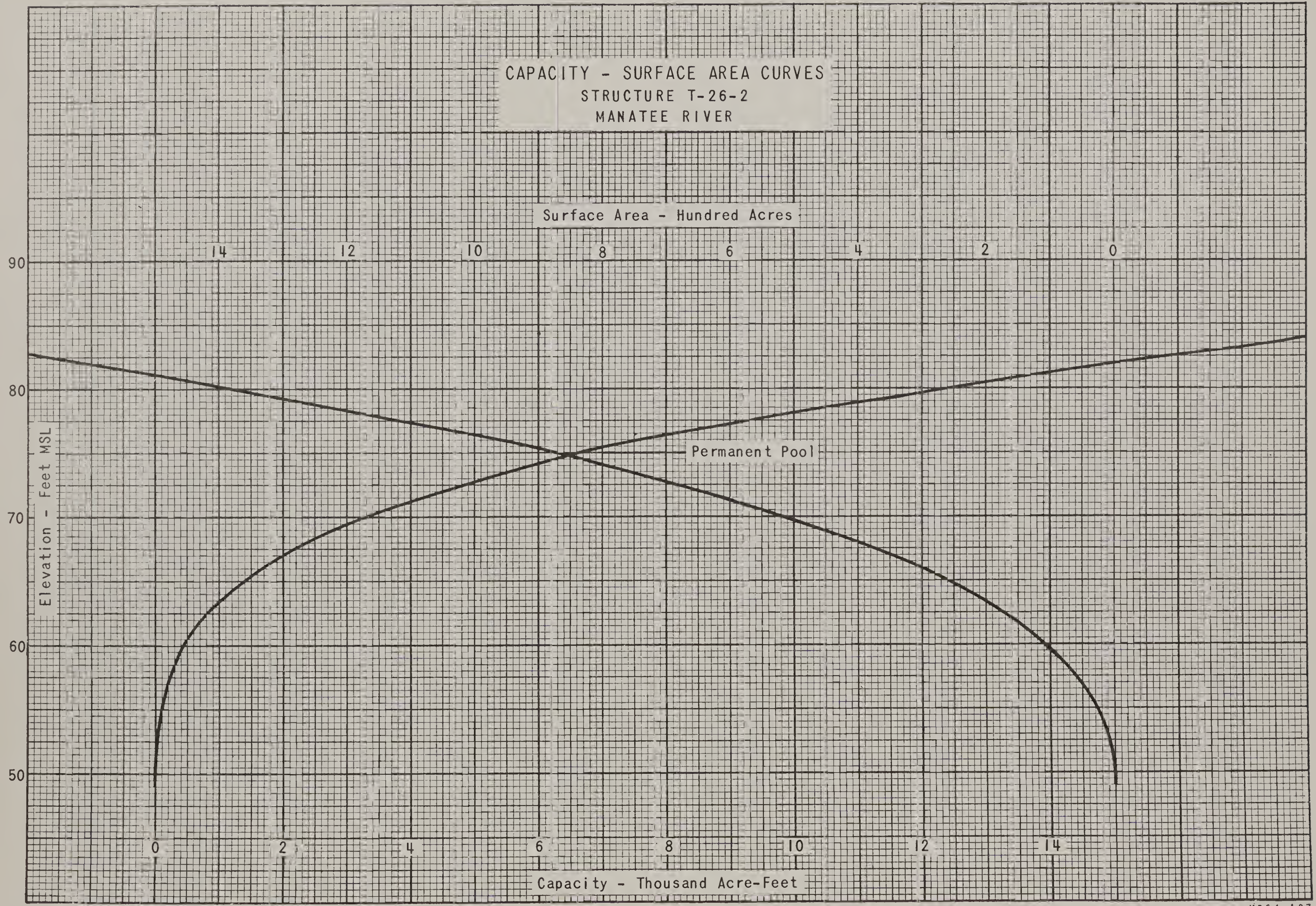
PLAN

This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam consdered.

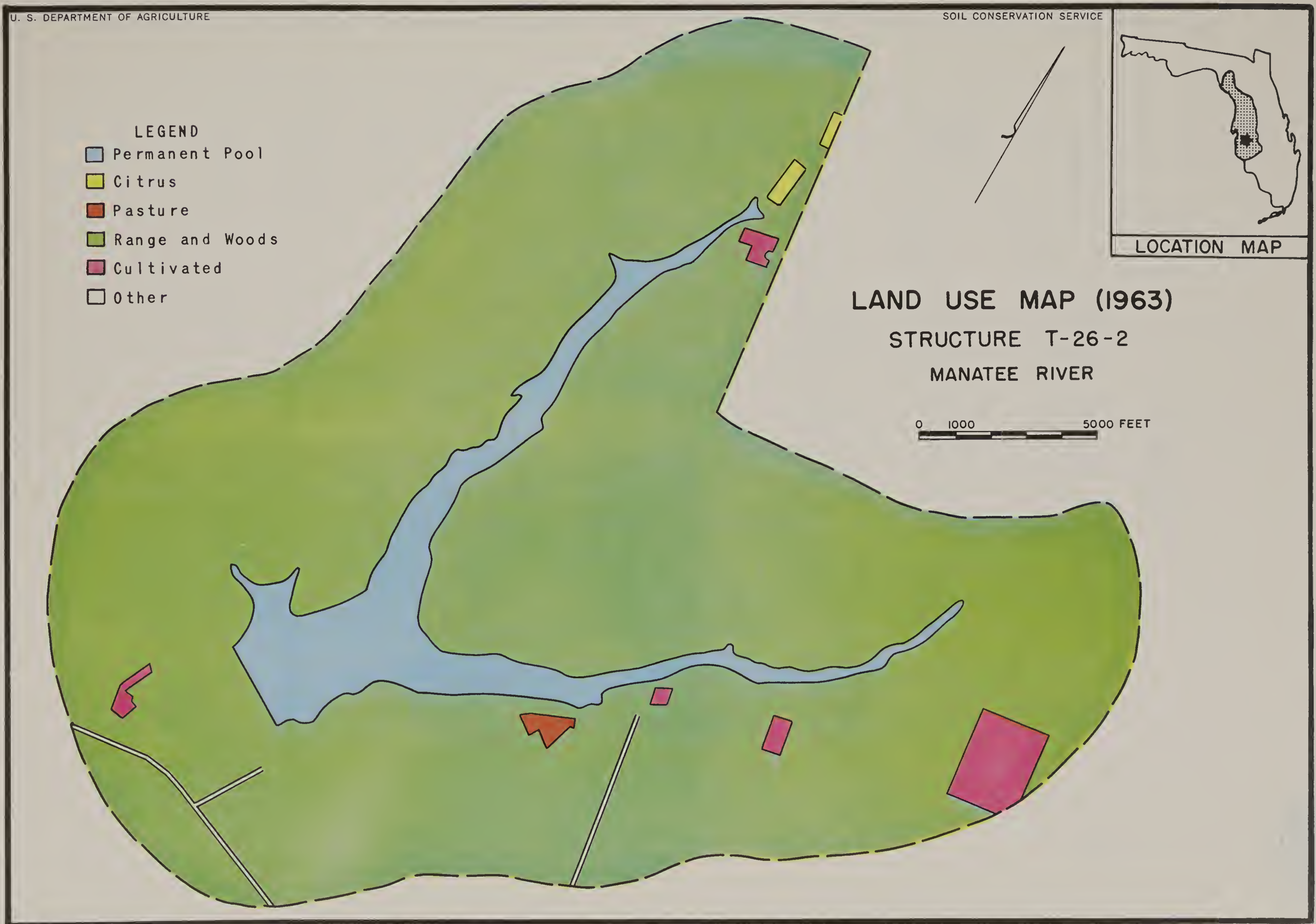
The reservoir area would be cleared to the normal full pool elevation of 75 feet. Land for the reservoir would be acquired up to the spillway design elevation of 82.6 feet and would total 1,670 acres.

Facilities would be provided for boating, fishing, picnicking, parking, hiking, nature study, and camping, requiring an additional 300 acres of land above elevation 82.6 feet. These facilities would have a capacity for 221,700 user-days of recreation and reservoir fishing annually.



USDA-SCS-SPARTANBURG S. C. 1964

MR64-187


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Cultivated
Other
LOCATION MAP
LAND USE MAP (1963)
STRUCTURE T-26-2
MANATEE RIVER
0 1000 5000 FEET
USDA SCS SPARTANBURG S. C. 1964
MR64-177

Manatee River
#T-26-2

DATA

Item	Unit	Amount
Drainage area	square mile	62
Dam		
Length	foot	4,020
Maximum height	foot	32
Crest elevation, mean sea level	foot	87
Spillway		
Crest elevation, mean sea level	foot	75
Length	foot	75
Routed design discharge	cfs	4,860
Capacity to top of dam	cfs	9,650
Reservoir		
Normal full pool elevation		
Mean sea level	foot	75
Minimum design pool elevation		
Mean sea level	foot	73
Area		
Normal full pool	acre	875
Minimum design pool	acre	720
Capacity		
Normal full pool	acre-foot	6,770
Minimum design pool	acre-foot	5,070
Runoff, normal full pool	inch	2.07
Storage, irrigation	acre-foot	1,700
Storage, recreation, fish and wildlife	acre-foot	5,070
Minimum flow required below dam	cfs	4.25
Costs		
Total installation	dollar	1,293,000
Average annual	dollar	104,700
Benefits		
Average annual	dollar	372,300

NORTH FORK MANATEE RIVER
(Dam and Reservoir)
Structure #T-26-3

LOCATION

The North Fork Manatee River Structure #T-26-3 is located five miles southwest of Duette.

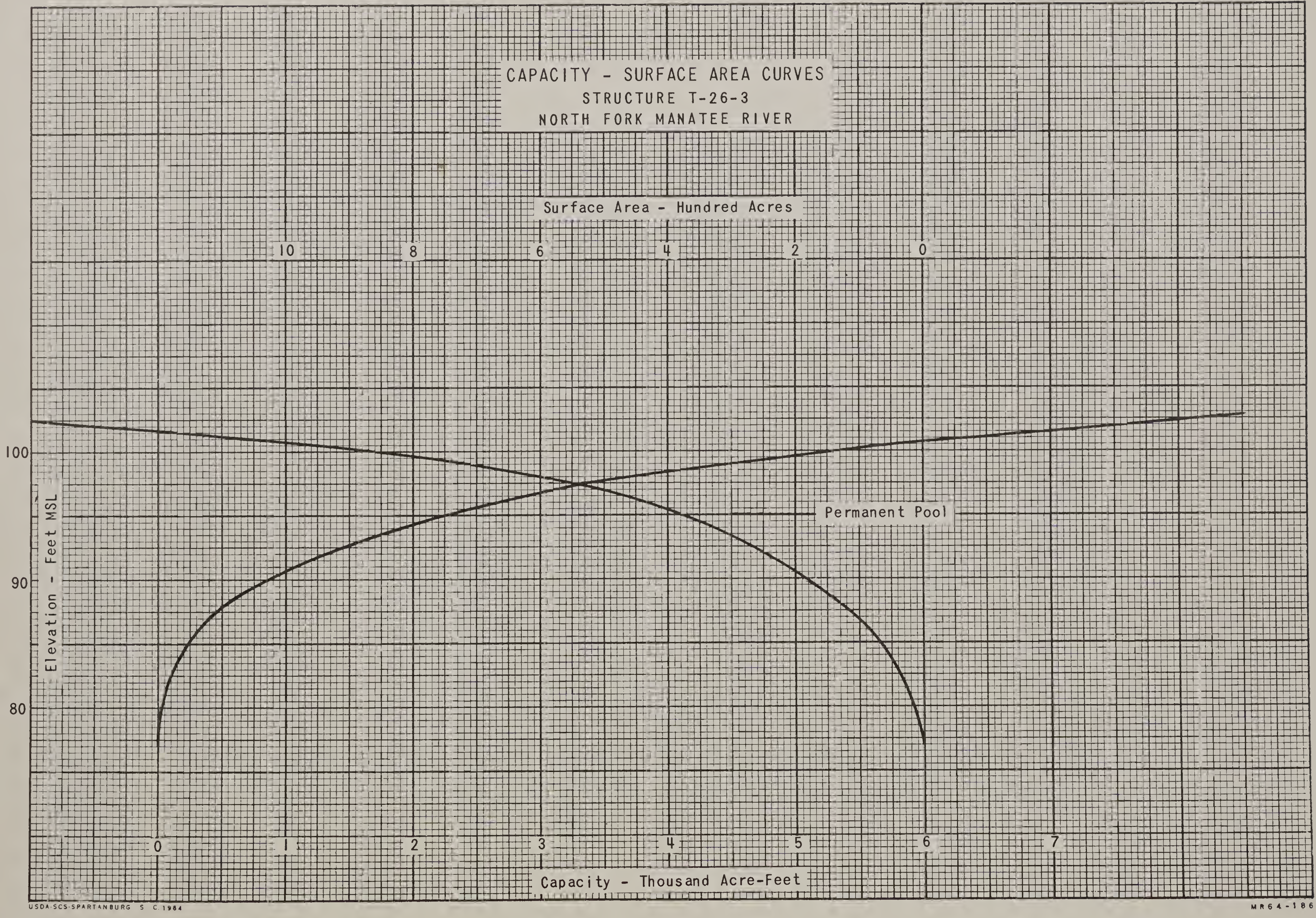
PLAN

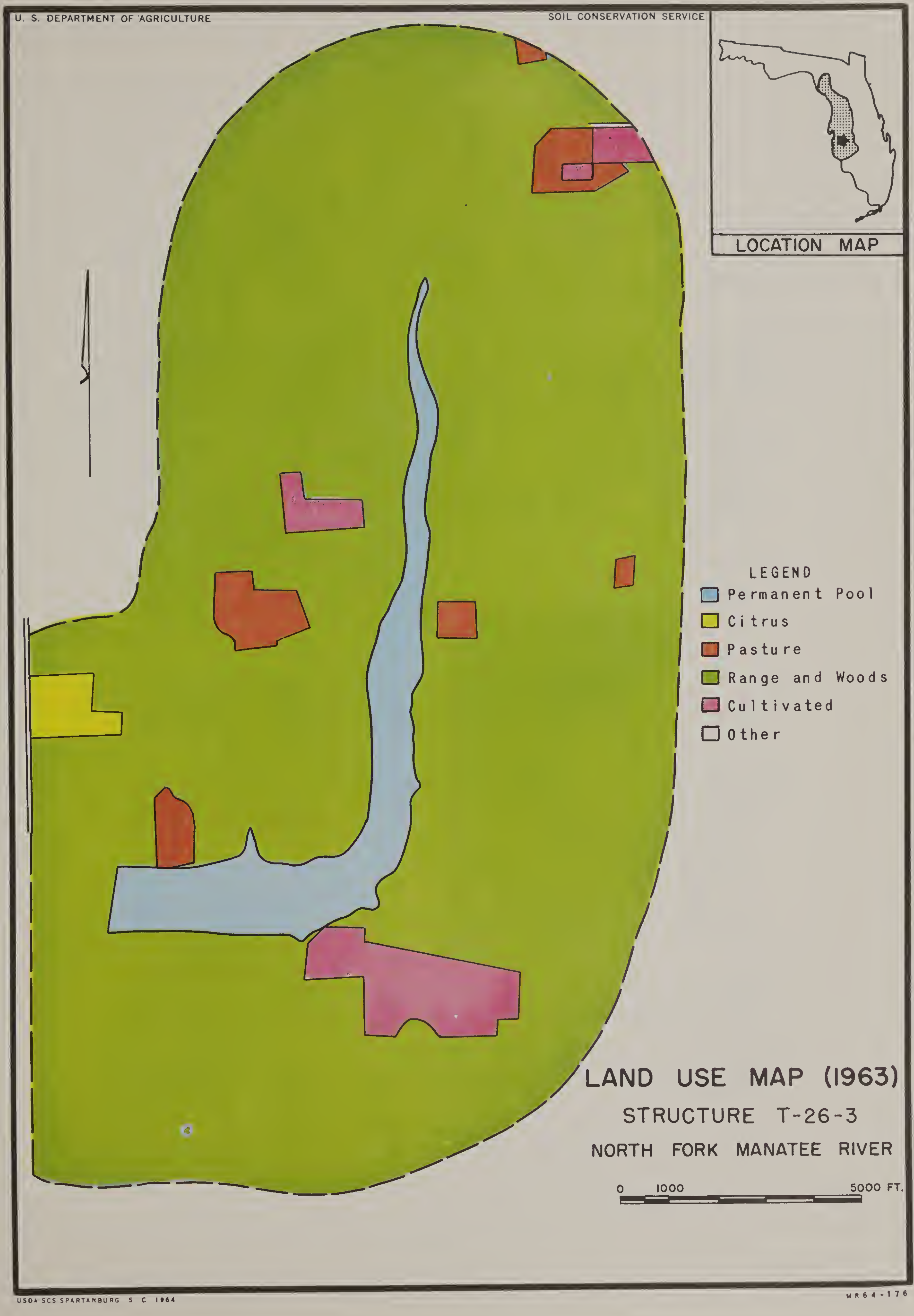
This development would consist of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 95 feet. Land for the reservoir would be acquired up to the spillway design elevation of 100 feet and would total 870 acres.

Facilities would be provided for boating, fishing, parking, and picnicking, requiring an additional 100 acres of land above elevation 100 feet. These facilities would have a capacity for 73,900 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE T-26-3
NORTH FORK MANATEE RIVER
Surface Area - Hundred Acres
10
8
6
4
2
0
Permanent Pool
100
90
80
Elevation - Feet MSL
0
1
2
3
4
5
6
7
Capacity - Thousand Acre-Feet
USDA-SCS-SPARTANBURG S C 1964
MR64-186


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LOCATION MAP
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Cultivated
Other
LAND USE MAP (1963)
STRUCTURE T-26-3
NORTH FORK MANATEE RIVER
0 1000 5000 FT.
USDA SCS SPARTANBURG S C 1964
MR64-176

North Fork Manatee River
#T-26-3

DATA

Item	Unit	Amount
Drainage area	square mile	17
Dam		
Length	foot	2,660
Maximum height	foot	26
Crest elevation, mean sea level	foot	105
Spillway		
Crest elevation, mean sea level	foot	95
Length	foot	52
Routed design discharge	cfs	1,800
Capacity to top of dam	cfs	5,100
Reservoir		
Normal full pool elevation		
Mean sea level	foot	95
Minimum design pool elevation		
Mean sea level	foot	93
Area		
Normal full pool	acre	380
Minimum design pool	acre	285
Capacity		
Normal full pool	acre-foot	2,270
Minimum design pool	acre-foot	1,590
Runoff, normal full pool	inch	2.5
Storage, irrigation	acre-foot	680
Storage, recreation, fish and wildlife	acre-foot	1,590
Minimum flow required below dam	cfs	1.06
Costs		
Total installation	dollar	520,000
Average annual	dollar	39,600
Benefits		
Average annual	dollar	122,400

EAST FORK MANATEE RIVER
(Dam and Reservoir)
Structure #T-26-4

LOCATION

The East Fork Manatee River structure site is located five miles south of Duette, or approximately two miles downstream from where State Highway 39 crosses the East Fork of the Manatee River.

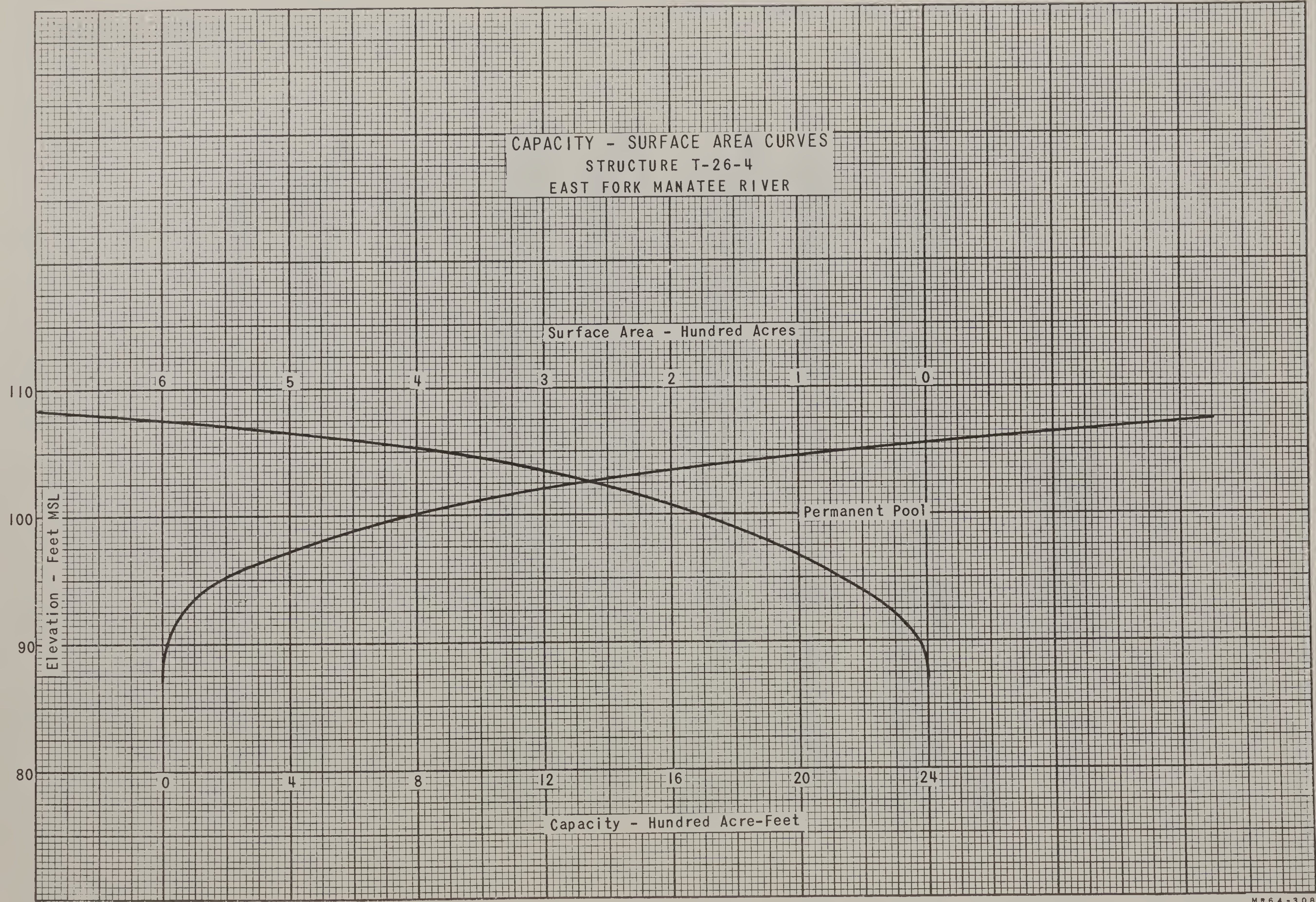
PLAN

This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, and fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

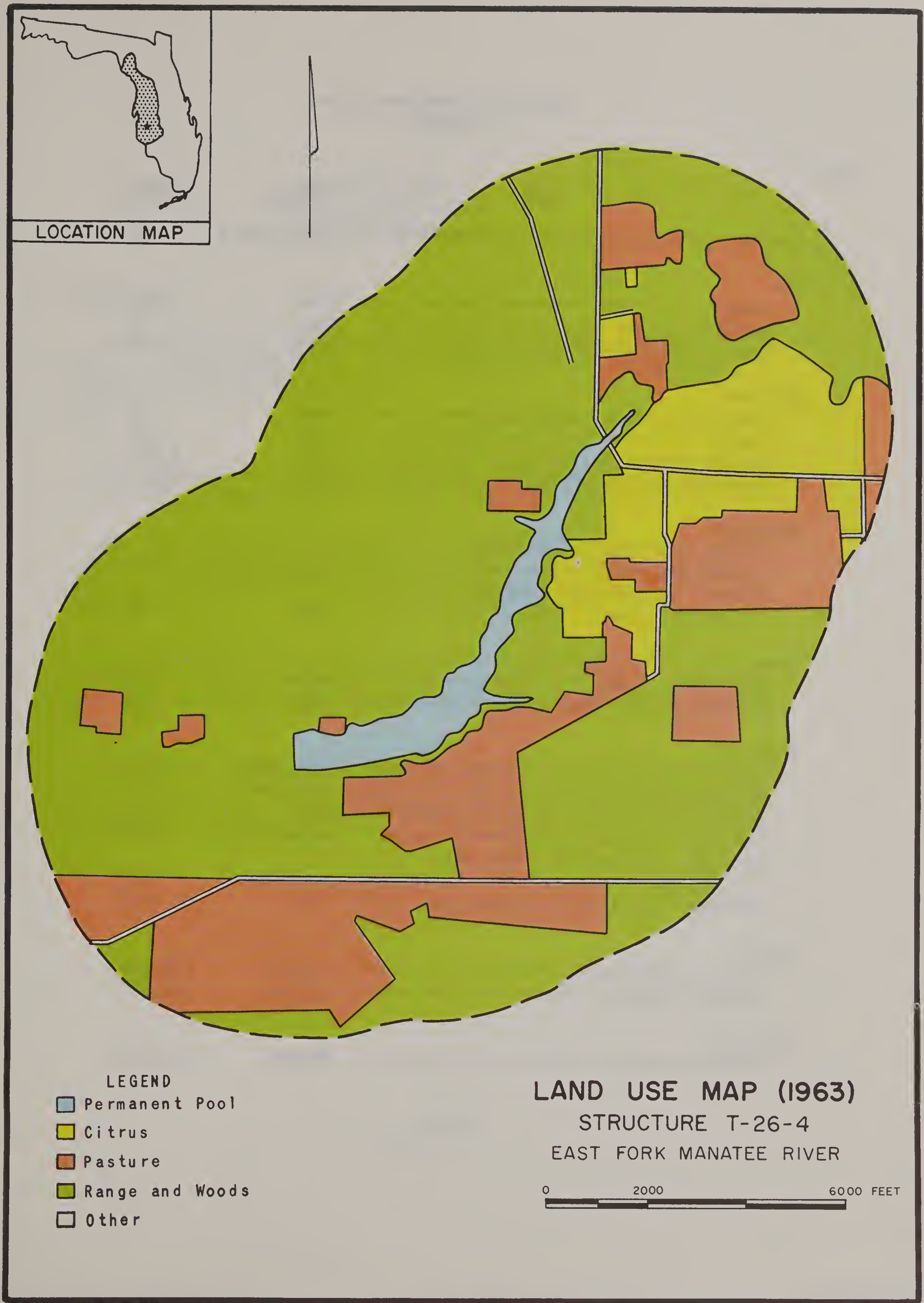
The reservoir would be cleared to the normal full pool elevation of 100 feet. Land for the reservoir would be acquired up to the spillway design elevation of 105 feet and would total 380 acres.

Facilities would be provided for boating, fishing, parking, and picnicking, requiring an additional 50 acres of land above elevation 105 feet. These facilities would have a capacity for 36,900 user-days of recreation and reservoir fishing annually.



USDA-SCS-SPARTANBURG S C. 1964

MR64-308



SUA CS SPARTANBURG S C 1964

MR64-303

East Fork Manatee River
#T-26-4

DATA

Item	Unit	Amount
Drainage area	square mile	15
Dam		
Length	foot	1,960
Maximum height	foot	20
Crest elevation, mean sea level	foot	110
Spillway		
Crest elevation, mean sea level	foot	100
Length	foot	85
Routed design discharge	cfs	2,900
Capacity to top of dam	cfs	8,350
Reservoir		
Normal full pool elevation Mean sea level	foot	100
Minimum design pool elevation Mean sea level	foot	98
Area		
Normal full pool	acre	180
Minimum design pool	acre	130
Capacity		
Normal full pool	acre-foot	800
Minimum design pool	acre-foot	500
Runoff, normal full pool	inch	1.0
Storage, irrigation	acre-foot	300
Storage, recreation, fish and wildlife	acre-foot	500
Minimum flow required below dam	cfs	1.12
Costs		
Total installation	dollar	319,000
Average annual	dollar	23,300
Benefits		
Average annual	dollar	63,700

MYAKKA RIVER
(Dam and Reservoir)
Structure #T-30-1

LOCATION

The Myakka River dam site is located 5.5 miles north of Myakka City, or approximately two miles downstream from where State Highway 64 crosses Myakka River.

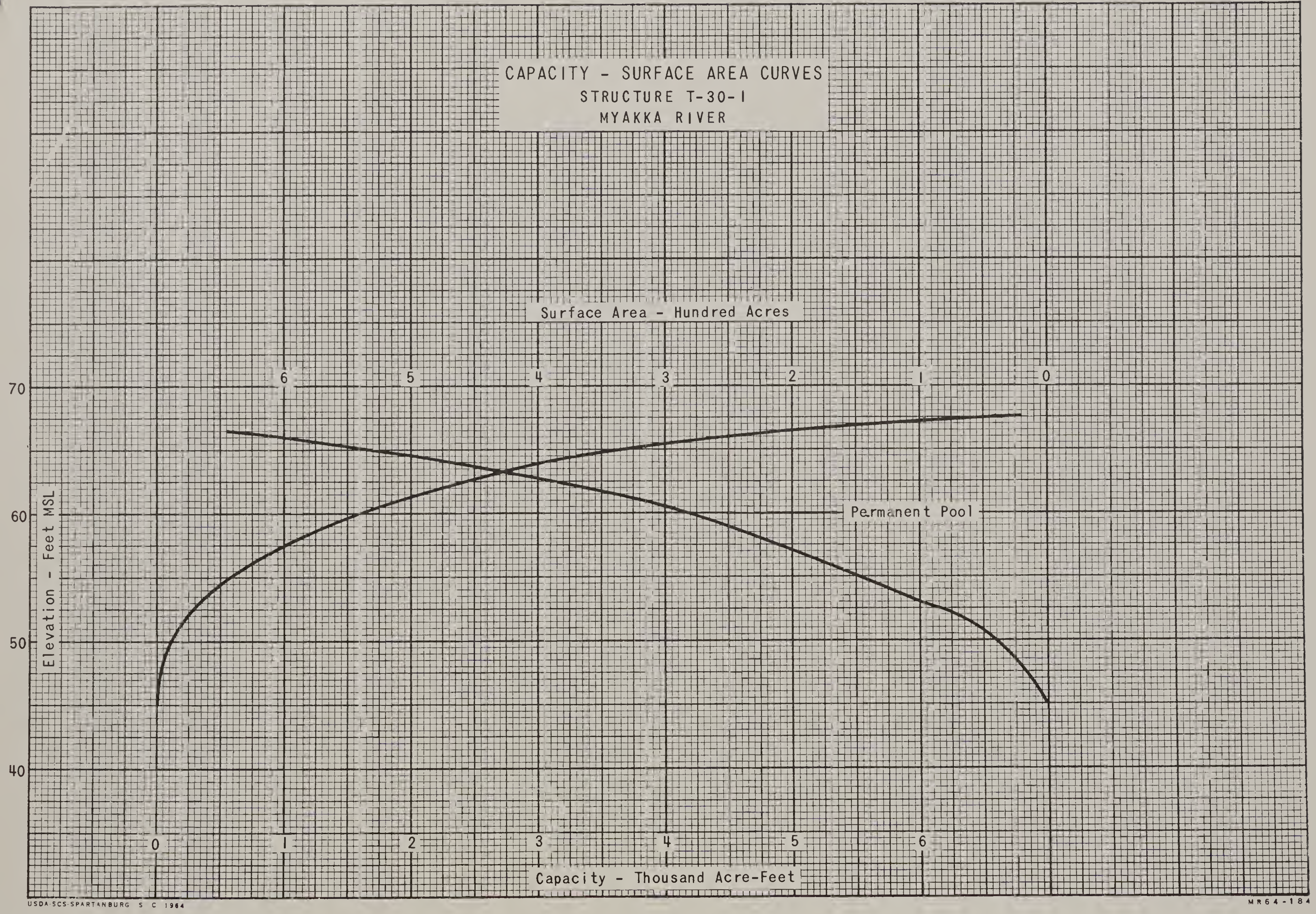
PLAN

This development consists of a dam and reservoir with facilities for irrigation water supply, recreation, fish and wildlife.

The dam would be an earth fill structure with an uncontrolled weir concrete spillway. General geologic information indicates that no critical foundation conditions exist for the type of dam considered.

The reservoir area would be cleared to the normal full pool elevation of 60 feet. Land for the reservoir would be acquired up to the spillway design elevation of 65 feet and would total 530 acres.

Facilities would be provided for boating, fishing, parking, and picnicking, requiring an additional 100 acres of land above elevation 65 feet. These facilities would have a capacity for 73,900 user-days of recreation and reservoir fishing annually.


CAPACITY - SURFACE AREA CURVES
STRUCTURE T-30-1
MYAKKA RIVER
Surface Area - Hundred Acres
6
5
4
3
2
1
0
70
60
50
40
Elevation - Feet MSL
Permanent Pool
0
1
2
3
4
5
6
Capacity - Thousand Acre-Feet
USDA SCS-SPARTANBURG S C 1964
MR64-184


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LOCATION MAP
LAND USE MAP (1963)
STRUCTURE T-30-1
MYAKKA RIVER
0
1000
5000 FEET
LEGEND
Permanent Pool
Citrus
Pasture
Range and Woods
Other
MR64-174

Myakka River
#T-30-1

DATA

Item	Unit	Amount
Drainage area	square mile	26
Dam		
Length	foot	3,140
Maximum height	foot	22
Crest elevation, mean sea level	foot	69
Spillway		
Crest elevation, mean sea level	foot	60
Length	foot	105
Routed design discharge	cfs	3,700
Capacity to top of dam	cfs	8,800
Reservoir		
Normal full pool elevation Mean sea level	foot	60
Minimum design pool elevation Mean sea level	foot	58
Area		
Normal full pool	acre	280
Minimum design pool	acre	220
Capacity		
Normal full pool	acre-foot	1,620
Minimum design pool	acre-foot	1,120
Runoff, normal full pool	inch	1.15
Storage, irrigation	acre-foot	500
Storage, recreation, fish and wildlife	acre-foot	1,120
Minimum flow required below dam	cfs	-
Costs		
Total installation	dollar	513,000
Average annual	dollar	39,500
Benefits		
Average annual	dollar	122,000

PART 6

AGRICULTURAL WATER

Irrigation

To obtain optimum plant growth, for a season or year with average weather conditions, irrigation water is a requirement. Many factors enter into the quantitative determination of the total acre feet or inches of water for a given plant under a given set of conditions or assumptions.

The modified Blaney-Criddle method was used to determine irrigation requirements for the various crops grown in the Basin. This procedure takes into account average temperature, percent of daylight hours, consumptive use, stage of growth, effective rainfall, and other factors.

Crops considered for the Florida West Coast Tributaries along with their respective growing seasons are as follows:

Crop	Season
Citrus	12 months
Grasses & clovers	12 months
Cabbage & carrots	Oct. 1 - Dec. 20
Cabbage & carrots	Jan 15 - April 5
Beans, bush, snap	April 1 - May 31
Beans, bush, snap	Oct. 1 - Nov. 30
Watermelons	Feb. 15 - May 12
Cucumbers	Feb. 15 - April 16
Onions	Sept. 1 - Nov. 7
Onions	Mar. 15 - May 24
Sweet corn	Feb. 1 - April 22
Tomatoes	Feb. 1 - April 22
Tomatoes	Sept. 1 - Nov. 20
Strawberries	Oct. 15 - Jan. 23
Celery	Nov. 15 - Mar. 15
Pepper	Feb. 10 - May 1
Squash	Feb. 1 - May 12

Climatic conditions for the period 1931-1960 were taken as norms at the following stations: Gainesville, Brooksville, Tampa, Bradenton, Punta Gorda, Tarpon Springs, Lakeland, Inverness, Arcadia, and Avon Park.

Monthly temperature, rainfall and daylight hours selected:

Month	Temperature (Degrees F.)	Rainfall (Inches)	Daylight Hours (Monthly Percent of Total Annual)
January	61.5	2.05	7.42
February	63.0	2.53	7.08
March	66.3	3.46	8.39
April	71.3	3.45	8.67
May	76.6	3.73	9.44
June	80.4	8.07	9.35
July	81.4	8.57	9.56
August	81.7	7.20	9.14
September	80.2	7.61	8.32
October	74.4	3.61	8.03
November	70.1	1.59	7.28
December	62.3	1.66	7.30

If the total rainfall were evenly distributed throughout the growing season of the various plants, irrigation would not be needed. However, since this is not the case, it is necessary to determine which part of the total monthly rainfall is effective for plant use. This varies with the stage of growth of the plants; type of plant; season of year grown; available water holding capacity, infiltration and percolation rate of the soil; the antecedent moisture condition; and possibly other related factors. Using one and one-half inches of water to be replaced in the soil profile at each irrigation cycle, the effective rainfall could be expected to range from a low of 0.51 inches in January to a high of 5.25 inches in July.

The total amount of water applied for any irrigation cycle depends on the amount to be replaced within the root zone of the plant irrigated and the efficiency of the method of irrigation. The efficiency factors used were 65 percent for sprinklers and 75 percent for surface and subsurface methods.

The gross annual irrigation water requirements for selected plants in the Basin, which is generally located between latitudes 27° and 29° 30'' North and longitudes 81° 30'' and 82° 45'' west, are shown in the following table.

Crop	Average Conditions (Acre Feet)	20 Percent Chance (Acre Feet)
Grass & clover pasture	2.88	3.69
Citrus	1.95	2.66
Cabbage (fall)	0.72	0.94
(spring)	0.56	0.75
Carrots (fall)	0.72	0.94
(spring)	0.56	0.75
Beans, bush (fall)	0.55	0.70
(spring)	0.66	0.81
Cucumbers	0.38	0.62
Onions (fall)	0.51	0.67
(spring)	0.55	0.82
Celery	0.84	1.13
Pepper	0.66	0.84
Squash (winter)	0.84	1.05
Sweet corn	0.61	0.71
Tomatoes (Fall)	0.50	0.66
(spring)	0.61	0.71
Strawberries	0.85	1.12
Watermelons	0.71	1.03

Irrigation Surveys

A survey was made of each county in the Basin with the assistance of Soil Conservation Service personnel to determine the types of systems (sprinkler, surface or subsurface) and extent of irrigation practiced in 1963. The data collected included location, (Township, Range and Section) crops and acres irrigated, types of systems, and the sources of water supply.

A further check was made with county agricultural leaders to obtain their estimates of the extent of irrigation for the two target dates of 1980 and 2015. This data along with the data for 1963 was used in formulating projected irrigation water requirements.

Other agricultural water uses and projected requirements were obtained through cooperative efforts of the Florida Extension Service and from population projections furnished by the Division of Water Resources and Conservation, Florida State Board of Conservation.

Agricultural Water Use

The water use evaluations were made as they apply to uses for agricultural purposes. (Table 6.1) Some of these uses are consumptive and others return the water to either the surface or ground water supplies.

The agricultural water use for the base period, 1963, amounted to 526,000 acre feet. Of this amount, 333,700 acre feet was used for irrigation. The greater portion, 293,000 acre feet, was obtained from underground supplies with the remainder, 40,700 acre feet coming from surface supplies. The daily water requirements for rural household use, livestock, and rural home lawns and gardens amounted to 171,680,000 gallons or about 192,300 acre feet per year.

TABLE 6.1
AGRICULTURAL WATER USE BY SUB-BASINS - 1963

Sub-Basin	Rural Household (Million Gallons Per Day)	Domestic Lawns/Gardens (Million Gallons Per Day)	Livestock (Million Gallons Per Day)	Irrigation (1,000 Ac. Ft. Per Year)
1	5.00	17.03	1.71	135.5
2	35.68	82.89	4.34	164.9
3	9.56	13.70	1.77	33.3
TOTAL	50.24	113.62	7.82	333.7

TABLE 6.2
AGRICULTURAL WATER USE - 1963

County	Household	Livestock	Lawns, Gardens, etc.	Irrigation
	(Million Gallons Per Day)			(1,000 Ac. Ft. Per Year)
Alachua	0.52	0.08	0.44	0.10
Charlotte	0.90	0.33	0.50	19.50
Citrus	1.35	0.16	2.50	1.50
DeSoto	0.98	0.48	1.25	29.00
Gilchrist	0.06	0.03	0.09	---
Hardee	1.35	0.35	3.75	46.90
Hernando	1.20	0.25	0.94	1.90
Highlands	0.05	0.05	0.08	0.20
Hillsborough	15.00	1.47	30.46	77.40
Lake	0.08	0.02	0.02	2.90
Levy	1.12	0.36	1.00	---
Manatee	6.15	1.29	16.88	53.00
Marion	1.84	0.22	0.66	0.50
Pasco	3.84	0.81	3.75	9.10
Pinellas	5.00	0.24	21.30	7.10
Polk	4.50	0.98	22.50	67.90
Sarasota	4.80	0.34	6.25	14.90
Sumter	1.50	0.36	1.25	1.80
TOTAL	50.24	7.82	113.62	333.70

TABLE 6.3
DISTRIBUTION OF IRRIGATION BY CROPS - 1963
(1,000 Acres)

Crops	Sub - Basin 1	2	3	Total
Total Citrus	114.6	134.2	64.4	313.2
Citrus Irrigated	54.4	48.4	14.3	117.1
Percent Irrigated	47	36	22	37
Total Improved Pasture	171.6	232.3	350.2	754.1
Improved Pasture Irrigated	15.1	22.3	1.6	39.0
Percent Irrigated	9	10	-	5
Total Vegetables	7.2	22.6	18.8	48.6
Vegetables Irrigated	3.3	22.6	3.2	29.1
Percent Irrigated	46	100	17	60
Total Field Crops	3.2	13.3	91.4	107.9
Field Crops Irrigated	-	-	-	-
Percent Irrigated	-	-	-	-
Total Crops	296.6	402.4	524.8	1,223.8
Total Irrigated	72.8	93.3	19.1	185.2
Percent Irrigated	25	23	4	15

TABLE 6.4
METHOD OF IRRIGATION - 1963
(Percent)

	Sub-Basin 1	Sub-Basin 2	Sub-Basin 3	Total
Sprinkler	71	52	90	63
Seepage and/or Surface	29	48	10	37
TOTAL	100	100	100	100

TABLE 6.5
METHOD OF IRRIGATION BY CROPS - 1963
(Percent)

	Citrus		Improved Pasture		Vegetables	
Sub-Basin	Sprinkler	Seepage and/or Surface	Sprinkler	Seepage and/or Surface	Sprinkler	Seepage and/or Surface
1	93	7	2	98	31	69
2	93	7	-	100	18	82
3	100	-	6	94	86	14
TOTAL	94	6	1	99	26	74

TABLE 6.6
SOURCES OF IRRIGATION WATER SUPPLY

SURFACE SUPPLY 1963
(1,000 Acre Feet)

Crops	Sub-Basins 1	2	3	Total
Citrus	10.7	19.8	8.9	39.4
Improved Pasture	0.1	0.6	0.3	1.0
Vegetables	-	-	0.3	0.3
Field Crops	-	-	-	-
TOTAL	10.8	20.4	9.5	40.7

SUBSURFACE SUPPLY 1963
(1,000 Acre Feet)

Crops	Sub-Basins 1	2	3	Total
Citrus	87.8	76.6	17.6	182.0
Improved Pasture	35.1	50.7	4.5	90.3
Vegetables	1.8	15.8	1.6	19.2
Field Crops	-	1.4	0.1	1.5
TOTAL	124.7	144.5	23.8	293.0
GRAND TOTAL	135.5	164.9	33.3	333.7

TABLE 6.7
PROJECTED AGRICULTURAL WATER USE - 1980

County	Household	Livestock	Lawns, Gardens, etc.	Irrigation
	(Million Gallons Per Day)			(1,000 Ac. Ft. Per Year)
Alachua	0.12	0.08	0.12	1.1
Charlotte	3.75	0.37	11.50	39.2
Citrus	1.65	0.19	9.38	21.5
DeSoto	1.50	0.54	3.50	97.2
Gilchrist	0.12	0.27	0.12	4.8
Hardee	1.50	0.44	4.75	135.3
Hernando	2.10	0.23	5.88	12.8
Highlands	0.15	0.10	0.20	15.0
Hillsborough	30.00	1.52	38.37	127.8
Lake	0.12	0.02	0.50	18.9
Levy	0.82	0.35	1.75	8.3
Manatee	11.25	1.90	17.25	136.6
Marion	0.90	0.19	0.25	10.5
Pasco	7.50	1.07	14.25	114.3
Pinellas	3.00	0.11	2.25	10.7
Polk	16.50	0.99	15.75	186.3
Sarasota	11.25	0.49	10.00	66.8
Sumter	2.40	0.34	8.88	38.5
TOTAL	93.82	9.20	144.70	1,045.6

TABLE 6.8
PROJECTED AGRICULTURAL WATER USE - 1980

Sub-Basin	Rural Domestic Household	Rural Domestic Lawns/Gardens	Livestock	Irrigation
	(Million Gallons Per Day)			(1,000 ac. ft. per yr.)
1	13.50	26.25	1.85	405.1
2	65.97	84.96	5.27	459.4
3	14.35	33.49	2.08	181.1
TOTAL	93.82	144.70	9.20	1,045.6

TABLE 6.9
DISTRIBUTION OF IRRIGATION BY CROPS - 1980
(1,000 Acres)

Crops	Sub - Basins 1	2	3	Basin Total
Total Citrus	167.2	174.1	73.7	415.0
Citrus Irrigated	136.9	117.1	42.1	296.1
Percent Irrigated	82	67	57	71
Total Improved Pasture	246.5	290.1	363.4	900.0
Improved Pasture Irrigated	46.5	72.2	25.1	143.8
Percent Irrigated	19	25	7	16
Total Vegetables	6.9	20.9	17.2	45.0
Vegetables Irrigated	6.9	19.5	9.8	36.2
Percent Irrigated	100	93	57	80
Total Other Crops	2.3	14.9	79.7	96.9
Other Crops Irrigated	1.2	12.2	22.8	36.2
Percent Irrigated	52	82	29	37
Total Crops	422.9	500.0	534.0	1,456.9
Total Crops Irrigated	191.5	221.0	99.8	512.3
Percent Irrigated	45	44	19	35

TABLE 6.10
SOURCE OF IRRIGATION WATER SUPPLY - 1980

Surface Supply
(1,000 Acre Feet)

Crops	Sub - Basins 1	2	3	Basin Total
Citrus	20.4	30.8	19.1	70.3
Improved Pasture	3.4	10.3	11.0	24.7
Vegetables	0.2	1.6	1.4	3.2
Other Crops	0.1	0.4	3.1	3.6
TOTAL	24.1	43.1	34.6	101.8

Subsurface Supply
(1,000 Acre Feet)

Crops	Sub - Basins 1	2	3	Basin Total
Citrus	246.6	197.6	63.0	507.2
Improved Pasture	128.7	196.3	58.8	383.8
Vegetables	4.6	10.6	5.3	20.5
Other Crops	1.1	11.8	19.4	32.3
TOTAL	381.0	416.3	146.5	943.8
GRAND TOTAL	405.1	459.4	181.1	1,045.6

TABLE 6.11
PROJECTED AGRICULTURAL WATER USE - 2015

County	Household	Livestock	Lawns, Gardens, etc.	Irrigation
	(Million Gallons Per Day)			(1,000 Ac. Ft. per yr.)
Alachua	0.15	0.10	0.50	3.2
Charlotte	11.25	1.69	16.25	188.3
Citrus	2.25	0.39	6.25	34.5
DeSoto	3.00	1.12	9.12	300.4
Gilchrist	0.15	0.06	0.50	7.5
Hardee	2.25	0.73	4.50	278.3
Hernando	3.00	0.63	9.13	59.2
Highlands	0.22	0.12	0.32	27.0
Hillsborough	75.00	2.23	20.00	317.3
Lake	0.20	0.04	0.62	50.4
Levy	0.90	0.51	1.88	42.2
Manatee	37.50	3.46	9.38	336.0
Marion	0.15	0.48	0.50	58.5
Pasco	12.00	2.05	21.20	259.5
Pinellas	-	-	-	-
Polk	33.75	1.96	9.12	335.4
Sarasota	26.25	0.90	9.13	192.8
Sumter	3.75	0.49	6.88	88.8
TOTAL	211.77	16.96	125.28	2,579.3

TABLE 6.12
PROJECTED AGRICULTURAL WATER USE - 2015

Sub-Basin	Rural Domestic Household (Million Gallons Per Day)	Rural Domestic Lawns/Gardens (Million Gallons Per Day)	Livestock (Million Gallons Per Day)	Irrigation (1,000 Ac. Ft. per year)
1	31.96	39.95	4.80	993.8
2	165.16	63.60	9.48	1,100.0
3	14.65	21.73	2.68	485.5
TOTAL	211.77	125.28	16.96	2,579.3

TABLE 6.13
DISTRIBUTION OF IRRIGATION BY CROPS - 2015
(1,000 Acres)

Crops	Sub - Basins 1	2	3	Basin Total
Total Citrus	287.3	274.5	138.2	700.0
Citrus Irrigated	267.9	231.6	115.8	615.3
Percent Irrigated	93	84	84	88
Total Improved Pasture	437.9	425.3	656.8	1,520.0
Improved Pasture Irrigated	156.1	214.2	71.2	441.5
Percent Irrigated	36	50	11	29
Total Vegetables	18.1	24.7	19.2	62.0
Vegetables Irrigated	18.1	22.5	17.8	58.4
Percent Irrigated	100	91	93	94
Total Other Crops	16.7	23.5	93.8	134.0
Other Crops Irrigated	13.2	20.3	48.8	82.3
Percent Irrigated	79	86	52	61
Total Crops	760.0	748.0	908.0	2,416.0
Total Crops Irrigated	455.3	488.6	253.6	1,197.5
Percent Irrigated	60	65	28	50

TABLE 6.14
SOURCE OF IRRIGATION WATER SUPPLY - 2015

Surface Supply
(1,000 Acre Feet)

Crops	Sub - Basins 1	2	3	Basin Total
Citrus	55.5	66.0	33.6	155.1
Improved Pasture	9.0	21.4	12.9	43.3
Vegetables	0.2	2.8	1.8	4.8
Other Crops	0.1	0.6	5.2	5.9
TOTAL	64.8	90.8	53.5	209.1

Subsurface Supply
(1,000 Acre Feet)

Crops	Sub - Basins 1	2	3	Basin Total
Citrus	467.0	385.4	192.4	1,044.8
Improved Pasture	437.0	592.6	186.5	1,216.1
Vegetables	11.9	11.4	9.5	32.8
Other Crops	13.1	19.8	43.6	76.5
TOTAL	929.0	1,009.2	432.0	2,370.2
GRAND TOTAL	993.8	1,100.0	485.5	2,579.3