Project 2.1
CZ 115
CM-207
FINAL

DEVELOPMENT OF A BASIN MANAGEMENT PROGRAM FOR THE LOWER MATANZAS RIVER - MOULTRIE CREEK AND MOSES CREEK WATERSHEDS PHASE I

DER CONTRACT NO. CM-207

DRAFT REPORT - MARCH 1989

FUNDS FOR THIS PROJECT WERE PROVIDED BY THE DEPARTMENT OF ENVIRONMENTAL REGULATION, OFFICE OF COASTAL MANAGEMENT USING FUNDS MADE AVAILABLE THROUGH THE NATIONAL OCEANIC AND ATMOSPHERE ADMINISTRATION UNDER THE COASTAL ZONE MANAGEMENT ACT OF 1972, AS AMENDED.

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ABSTRACT

EXECUTIVE SUMMARY FOR PHASE 1

The value of the established goals and objectives of the development of a basin management program for the lower Matanzas River - Moultrie Creek and Moses Creek Watersheds, Phases 1 and 2, is enhanced by St. Johns County's ability to apply them directly to daily county operations. The data gathered during Phase 1 of the basin management program will be used as a basis for processing residential and commercial building permits. The basin management program will also serve as a tool to be used by the county in evaluating applications for rezonings, Final Development Plans, Subdivision Plats and Developments of Regional Impact, thereby enforcing the Basin Management Program objectives.

Phase 1 of the Basin Management Program has been primarily a data collection and presentation effort. Data related to hydrology, topography, drainage systems, soil types, natural resource areas, and pollution sources has been collected from a large volume of references. Most of the collected information has been graphically presented in a series of maps of uniform scale.

Presentation of data has been a strong concern during Phase 1. St. Johns County has taken full advantage of the opportunity presented by the CM 207 grant to begin to build a computerized geographic information system (GIS) data base for the study area. During the design of the data base

itself, the county held several meetings with potential users of the information compiled for the study area. These resulting discussions helped to identified several county wide needs to be addressed by the data presentation systems including:

manipulation for a variety of uses.

consistency with other state and federal agencies with respect to format, scale and presentation.

logical data base construction within the GIS to ensure the long term value of the information package to the user.

complete data collection to meet the needs of all county departments to be involved in the basin management program.

consistency of information with the Comprehensive Plan findings, goals and presentation.

practical daily application of the data base for use in clearance sheets preparation, building permit issuance, preliminary wetlands identification (utilizing soil types, topography, aerial photography and hydrologic information), St. Johns County Health Department site analysis for the permitting of wastewater treatment facilities, St. Johns County Planning and Zoning Department use in monitoring land use, changes in density and open space requirements, and St. John's County Engineering Department use in determining right of way requirements for roads, drainage, regional stormwater treatment facilities and ordinance modifications.

Each of the different types of data has been input as a separate map "layer" into the ARC/INFO system. The county is able to manipulate the "layers" as necessary to relate a variety of graphical information either separately or in combination. The county has selected the property

appraiser's map as the base map for the GIS for a number of reasons.

The County operates primarily on a property ownership parcel basis. When a plat is recorded, the plat map is sent directly to the St. Johns County Property Appraiser's office, and the official county Property Appraiser's map is modified to reflect the subdivision of land. By the same token, when a building permit is issued, the permit is issued according to property ownership and permit information is forwarded back to the St. Johns County Property Appraiser's office to assist him in the upgraded assessment for that particular parcel. Tax collection in turn is based upon property ownership and appraised value. The St. Johns County Emergency 911 address system is also based upon the Property Appraiser's map and ownership records. All of these factors in combination make the selection of the Property Appraiser's map as the base map straight forward.

The computerized GIS, as developed, is able to relate site characteristics to the location of an individual parcel. This site specific information will prove invaluable in sound basin management and daily county operations. The value of GIS manipulation of the data base at a particular parcel location can be observed manually by overlaying mylar prints of the separate map information "layers" at a uniform scale. The manual placement of map "layers" over the Property Appraiser's (scale 1" = 200'), enables the observer to mimic

the computerized data base process.

Phase 1 has been primarily a data collection and presentation effort. During Phase 2, this information will serve as the basis for modifications to Paving and Drainage Ordinance No. 86-4 and other county programs.

INTRODUCTION

BACKGROUND

The Florida Coastal Management Program has previously supported (1979) investigations of shellfish growing areas in the Matanzas River, toward the overall goal of protecting these resources from the effects of anticipated population growth. These investigations identified septic tanks and non-point source pollution (i.e. stormwater drainage) as the major threats to the future health of the area's estuarine waters. Subsequently, the St. Johns County Commission adopted a county wide drainage ordinance and strengthened regulation of septic tanks. Additionally, the state adopted more stringent water quality standards for much of the area.

In spite of these regulatory actions, most of the shellfish growing areas in St. Johns County recently have been closed to harvesting and the remaining "conditionally approved" areas are threatened. It is now generally recognized that maintenance of the overall health of estuarine resources in the area will require more comprehensive, basin-wide management approaches as well as refinement of existing project-by-project regulatory actions administered by St. Johns County, Department of Environmental Regulation (DER) and the St. Johns River Water Management District (SJRWMD), including special area management.

Major obstacles confronting basin-wide management in the area include the size and complexity of drainage areas involved, a severe lack of detailed information upon which to develop needed plans and

ordinances, as well as rapid population growth in critical watershed areas.

PROJECT OBJECTIVES

This work is Phase 1 of a two to three year project which will provide the basis for county wide improvements in stormwater management, flood protection and protection of natural resources. Phase 1 work will emphasize developing a sound data base on characteristics/conditions of the study area. Information developed will be in sufficient detail and in a form usable for day-to-day regulatory and engineering work by the St. Johns County Engineer's Office, as well as for developing comprehensive basin management strategies in Phase 2 of the project.

Specific Phase 1 work objectives are as follows:

1. Develop a comprehensive inventory of areas within the watersheds that deserve special management consideration. This inventory will be used as a basis for the following:

   a. Improving coordination and regulation consistency between St. Johns County, the SJRWMD; the U.S. Army Corps of Engineers, (COE) and DER:

   b. Revising the County's comprehensive plan; and

   c. Future resource investigations by state and local agencies.

2. Develop detailed information on topography, soils, flood prone areas, land use and other conditions pertinent to achieving stormwater management, flood prevention, and resource protection objectives for the study area.

3. Develop refinements for special area protection under County Ordinance 86-4 and apply these refinements within the study area. This will include specific recommended actions such as stormwater master plans, improved performance standards for new development, provision of infrastructure to reduce environmental impacts, and improved coordination between state, regional, and local efforts to control non-point pollution.

4. Use products developed for special area management in the project area as a prototype for improving flood protection and stormwater controls in critical resource areas throughout the county.

PROJECT TASKS

Five major tasks were developed to achieve the project objectives of Phase 1:

Task 1: Project refinement.

Task 2: Assess opportunities for refining existing plans, regulations and management tools.

Task 3: Establish an understanding of the hydrology of the Moultrie Creek and Moses Creek Watersheds.

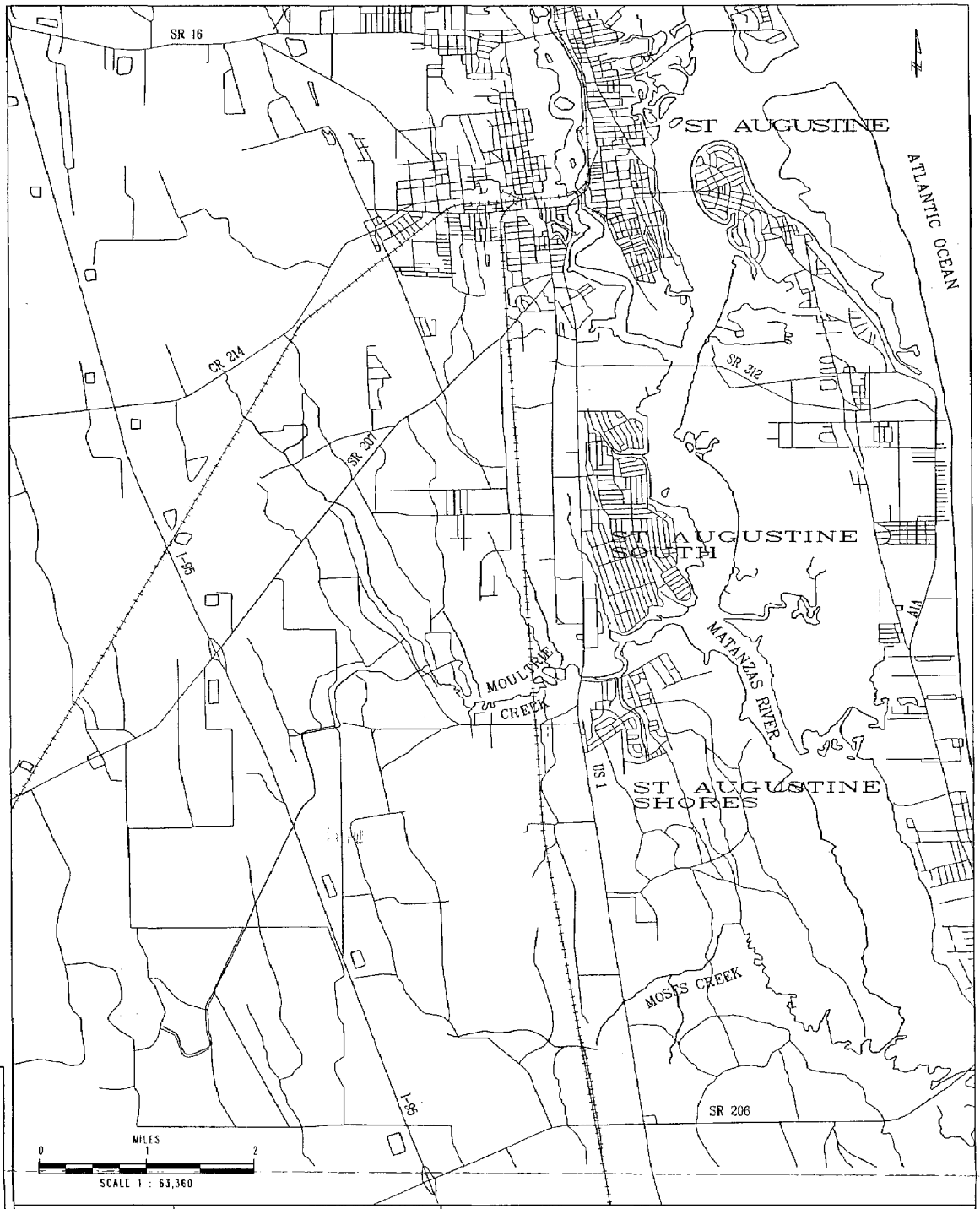
Task 4: Inventory and assess land characteristics and land use with in the watersheds.

Task 5: Analysis of information developed in Tasks 1 through 4.

PROJECT AREA

The priority area selected for this project is experiencing increasing development pressures and poses critical flood prevention and stormwater management problems as growth occurs. Relative to other parts of the county, significant natural resources in the area remain undisturbed.

Work during 1988 focused on the Moultrie Creek and Moses Creek Watersheds. In general, this includes the area east of the Interstate 95 bounded on the north by State Road 312 and on the south by State Road 206. State Road 207 forms the northwest boundary (see FIGURE 1). Adjacent waters of the Matanzas River are also included.



ST JOHNS COUNTY

PROJECT AREA

Produced by the St Johns County Geographic Information System Using PRIME ARC/INFO.

FUNDS FOR THIS PROJECT WERE PROVIDED BY THE DEPARTMENT OF ENVIRONMENTAL REGULATION, OFFICE OF COASTAL MANAGEMENT USING FUNDS MADE AVAILABLE THROUGH THE NATIONAL OCEANIC AND ATMOSPHERE ADMINISTRATION UNDER THE COASTAL ZONE MANAGEMENT ACT OF 1972, AS AMENDED.

CM207>COMPS9X15>FIG1.PLT
MAP
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MOULTRIE CREEK AND MOSES CREEK
WATERSHED MANAGEMENT PROJECT

BASEMAP LINE KEY
- PRIMARY/SECONDARY HIGHWAYS
- IMPROVED/UNIMPROVED ROADS
- WATER BOUNDARIES
- RAILROADS

FIGURE 1. PROJECT AREA

CHAPTER ONE

SCOPE OF SERVICES

TASK 1: PROJECT REFINEMENT

This task finalizes the plan of work and contract scope of services required to achieve project objectives. The Master Work Plan is listed in Appendix A.

CHAPTER TWO

EVALUATION OF COUNTY PLANS

TASK 2: ASSESS OPPORTUNITIES FOR REFINING EXISTING PLANS, REGULATIONS, AND MANAGEMENT TOOLS

This evaluation will be ongoing throughout the life of this project and will focus on achieving specific, practical improvements. Initially, emphasis will be placed on assessing the current St. Johns County Paving and Drainage Ordinance and identifying needed improvements. The guidlines and objectives of this study will be incorporated into other county plans and programs in Phase 2 and beyond.

SUBTASK 2A: REFINEMENT OF THE EXISITING ST. JOHNS COUNTY DRAINAGE ORDINANCE No. 86-4 TO PROVIDE CONSIDERATION OF SPECIAL MANAGEMENT AREA AND WATER QUALITY PROTECTION NEEDS INCLUDING:

1. **ONSITE TREATMENT CRITERIA FOR STORMWATER.**

2. **IMPROVED DESIGN CRITERIA AND METHODOLOGIES GOVERNING BOTH THE QUALITY AND QUANTITY OF STORMWATER DISCHARGE.**

The St. Johns County Paving and Drainage Ordinance specifies minimum design and construction standards for public and private roadways, and drainage facilities for single family, multifamily, commerical, institutional and industrial construction projects within the unincorporated areas of St. Johns County.

Under the current ordinance, all subdivisions, multifamily, commerical, industrial and institutional projects must provide for retention of stormwater within the boundaries of the project. For projects within areas designated for "Zero Discharge", storage shall accomodate a 100 year, 24 hour storm event. For all other areas, retention must accomodate the greater of (A) the first one half inch of stormwater within the boundaries of the project area, or (B) the first one inch of stormwater from all roofs, sidewalks, paved surfaces and parking areas (at 100% run-off), whether paved or not. The project must also provide detention for all stormwater flows.

Paving and Drainage Ordinance No. 86-4, adopted by the St. Johns County Board of Commissioners on January 14, 1986, requires surface retention and detention of stormwater run-off. However, provisions for alternative means of water quality treatment and disposal have not been allowed. Refinements to the Paving and Drainage Ordinance are being considered in conjunction with Task 2, during Phase 2 of this study. Potential refinements to the Paving and Drainage Ordinance

No. 86-4 include, but are not limited to the following:

Regional treatment facilities.

Alternative pavement methods, including turf block and porous concrete, which may reduce direct offsite discharge, and encourage onsite percolation.

Provisions for alternative stormwater treatment devices including underdrains, exfiltration and other mechanisms.

Incentives to reduce pavement surfaces and promote innovative site design.

Requirements for maintenance plans and routine maintenance schedules prior to project construction authorization.

Monitoring for compliance with permits and maintenance schedules after completion of construction.

There are four specific areas of concern that will be addressed in Phase 2 of this project. They are:

1. Control of Pollutants
2. Stormwater Treatment Methods.
3. Stormwater Treatment Methods.
4. Water Quality Policies.

1. Control of Pollutants. Various pollutants are introducted into stormwater as a result of the "first flush" of rainfall. This equates to the first one inch of run-off which is responsbile for 90% of the pollution load from a storm event.

These pollutants include various lawn and crop chemicals (insecticides, herbicides, pesticides, fertilizers, etc.) that are swept along with soil sediment and animal wastes. Also, oil, grease, and litter are washed off pavements into the stormwater system.

Presently, the control of pollutants is accomplished by the treatment of the first one inch of run-off. This helps to minimize the impact of pollutants on the quality of water.

2. Stormwater Treatment Facilities. Onsite, development, and

stormwater treatment facilities need to be considered.

Onsite treatment systems provide detention and/or retention storage to control water quanity and water quality. The storage of this stormwater provides limited water quality treatment depending on storage duration, waterflow, and filtratin materials.

A development treatment facility is designed to accomodate the increased stormwater demands produced by a change in land use. This type of facility provides a series of onsite storage basins that control the flow of the stormwater through a cascading stage of basins and reduce the resultant impact on water quality.

A regional treatment facility serves a larger area and may include many dvelopments and communities. This type of system is costly in terms of set up costs and overall maintenance. However, it may prove to be economical in the long run if planned and designed effectively and efficiently.

3. Treatment Methods. There are many methods available that can be considered for the treatment of stormwater. These include swales, retention ponds, dry/wet detention ponds, natural lakes, natural filtration, underground exfiltration systems, vegetation, forestation, and the use of semi-pervious pavement materials.

4. Water Quality Policies. At the present time, there are few policies regarding stormwater quality. Stormwater by its very nature is expected to be polluted. However, water discharged from the stormwater system is carefully regulated.

SUBTASK 2B: IDENTIFYING MECHANISMS WHEREBY STORMWATER MANAGEMENT CAN BE INCORPORATED IN OTHER COUNTY PLANS AND PROGRAMS, INCLUDING:

1. **ROAD CONSTRUCTION DENSITY AND ZONING CONTROLS, LOCAL GOVERNMENT COMPREHENSIVE PLAN, ETC.**

2. **IDENTIFICATION OF STORMWATER-RELATED INFRASTRUCTURE NEEDS, INCLUDING LAND ACQUISITION, FLOW EASEMENTS, ENGINEERING DESIGN, ETC. AS WELL AS FUNDING MECHANISMS FOR MEETING THESE NEEDS.**

The guidelines and objectives of the Basin Management Program will be incorporated within other county plans and programs at every opportunity. The basis for coordination county wide will be provided by the data base created within the county's GIS as a part of Phase 1. The graphic presentation of site characteristics and limitations, as well as future and proposed land use is the first step toward logical and consistent growth management county wide. The specific, practical methods to utilize this information will be further identified and developed during Phase 2.

SUBTASK 2C: INCREASING MUTUAL SUPPORT BETWEEN COUNTY, WATER MANAGEMENT DISTRICT, AND STATE PROGRAMS REGARDING CONTROL OF POLLUTION INPUTS TO ESTUARINE WATERS.

The mutual cooperation between the county, water management district, and state and federal programs has already begun. The data collection process necessary during Phase 1 has helped formulate many professional relationships between agencies. This joint cooperation is expected to continue through Phase 2 and beyond.

CHAPTER THREE

WATERSHED HYDROLOGY

TASK 3: ESTABLISH AN UNDERSTANDING OF THE HYDROLOGY OF THE MOULTRIE CREEK AND MOSES CREEK WATERSHEDS

Preliminary hydrologic information has been gathered for the Moses Creek and Moultrie Creek Watershed areas. This information includes streamflow and rainfall data, aerial photography and United States Geological Survey (USGS) Quadrangle maps. From aerial photography and USGS Quadrangle maps, the drainage basins have been delineated. Capability for producing extensive mapping is available within the GIS for such characteristics as drainage basin and soil group delineations, streamflow and rainfall data, and 1985 Federal Emergency Management Agency (FEMA) Floodway maps.

SUBTASK 3A: REVIEW AND ASSESS EXISTING UNITED STATES GEOLOGICAL SURVEY (USGS), FEMA AND SJRWMD STREAMFLOW INFORMATION ON THE MOULTRIE CREEK AND MOSES CREEK DRAINAGE SYSTEMS, INCLUDING RAINFALL AND OTHER PERTINENT INFORMATION

Streamflow information for the Moultrie Creek Watershed has been obtained from USGS Stream Gauge No. 02246900. This gauge is located at the intersection of Moultrie Creek and State Road 207. Rating curves have been generated from a plot of gauge height versus discharge utilizing data from this stream gauge. Stream gauge data is not available for the Moses Creek Watershed.

Various publications have been reviewed to obtain general hydrologic information for both watersheds. Two USGS publications, "Low-Flow Frequency Data for Selected Stream-Gauging Stations in Florida" (USGS,1985) and the "Technique for Estimating Magnitude and Frequency of Floods on Natural-Flow Streams in Florida" (USGS,1982) contained data for the Moultrie Creek Watershed. Information was not available in these publications for the Moses Creek Watershed.

In addition to the USGS publications discussed above, the 1985 FEMA Flood Insurance Study for St. Johns County, Florida was reviewed with respect to hydrologic and hydraulic analyses, peak discharge rates, and flood profiles for the Moses Creek and Moultrie Creek Watersed areas.

Finally, historical rainfall data for St. Johns County was obtained from the SJRWMD's publication, "Rainfall Analysis For Northeast Florida-Part I & II" and rainfall quantities were obtained from the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) publication, "Rainfall Frequency Atlas of Alabama, Florida, Georgia, and South Carolina for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years".

Historical monthly rainfall data for St. Johns County during the period 1957 to 1984 is available in TABLE 7. The maximum yearly rainfall data for St. Johns County for various duration storms during the period 1960 to 1983 is reported in TABLE 8.

SUBTASK 3B: IDENTIFY NEEDS FOR ADDITIONAL STREAM GAUGES AND INSTALL AS NEEDED

To provide additional background information for the Moultrie Creek Watershed, a stream gauge was installed in June, 1988, by the USGS Jacksonville Office, at the intersection of Moultrie Creek Tributary No. 4 and State Road 207. The USGS will be responsible for data collection and maintenance of the stream gauge. However, reliable information is not expected until Fall 1989 or after. The Moses Creek Watershed lacks streamflow data and could benefit from the installation of a stream gauge. However, due to its tidally influenced nature, the installation of a stream gauge is not possible.

SUBTASK 3C: DOCUMENT EXISTING STREAMFLOW DATA IN TERMS OF:

1. **TOTAL AVERAGE FLOWS.**
2. **SEASONAL AND LONG-TERM EXTREMES.**
3. **MAJOR AND MINOR TRIBUTARIES.**
4. **CONTRIBUTING WATERSHED ACREAGES.**
5. **DISCHARGE VS. FREQUENCY RELATIONSHIPS.**
6. **STAGE VS. FREQUENCY RELATIONSHIPS.**

1. TOTAL AVERAGE FLOWS.

TABLE 1 demonstrates total average flow or discharge rate, (in cubic feet per second) for USGS Stream Gauge No. 02246900. The mean, maximum, minimum, and equivalent flows are also provided. TABLE 2 indicates the 10 year, 50 year, 100 year, and 500 year peak discharges for Moultrie Creek, Moses Creek and their tributaries.

2. SEASONAL AND LONG-TERM EXTREMES.

Monthly streamflow discharges at USGS Stream Gauge No.02246900 are listed in TABLE 3. Seasonal data is not available for Moultrie Creek or its tributaries or Moses Creek.

Long-term extreme streamflow for Moultrie Creek, as measured at State Road 207, can be found in TABLE 1. The maximum total discharge for the period occurred in 1972 and the minimum total discharge was in 1981. Historical streamflow data is not available for Moses Creek or other tributaries of Moultrie Creek.

3. MAJOR AND MINOR TRIBUTARIES.

Streamflow data is available at the stream gauge location only and is provided in TABLES 1 and 3. Floodway data for the major and minor tributaries of Moses Creek and Moultrie Creek is available in TABLE 4. This table provides general cross sectional and mean velocity information for each cross section.

4. CONTRIBUTING WATERSHED ACREAGES.

The drainage basin acreages for Moses Creek, Moultrie Creek and their associated tributaries as calculated from the USGS Quadrangle maps and aerial photographs of the study area, are listed in TABLE 5. These acreages have also been calculated by FEMA and are included in TABLE 6. The FEMA study does not include all of the drainage basins defined in this document; however, the areas common to both studies are found to be similar.

5. DISCHARGE VS. FREQUENCY.

Discharge vs frequency information was obtained from the 1985 FEMA Flood Insurance Study for the 10 year, 50 year, 100 year, 500 year storm events for Moultrie Creek, Moses Creek, and their tributaries.

6. STAGE VS FREQUENCY RELATIONSHIPS.

The flood profiles from the 1985 FEMA Flood Insurance Study were utilized. The stages corresponding to the 10 year, 50 year, 100 year, and 500 year storm events for Moultrie Creek, Moses Creek, and their tributaries were obtained.

CHAPTER FOUR

LAND CHARACTERISTICS

Land characteristics have been identified using aerial photographs with topography. These aerial photographs facilitate the location and identification of natural and manmade water conveyance and storage systems, as well as areas of point and non-point pollution sources. Drainage patterns, soil locations and limitations, and natural resource areas within the study area are available in the county GIS. From the GIS data, severe soil limitatins can been seen to exist in the Moultrie Creek and Moses Creek Watersheds. These limitations will require substantial efforts in the design and planning of the development of this area. Existing land use information is presently available in the county's GIS and is being updated via a complementary planning and zoning department Comprehensive Plan project.

SUBTASK 4A: DELINEATE/MAP TOPOGRAPHY OF THE STUDY AREA

The study area is bounded on the north by State Road 16, the east by the Matanzas River, the south by State Road 206, and the west by Interstate 95 (I-95) comprising approximately 54 square miles. Rectified aerial photographic maps have been prepared under contract for the study area by St. Johns County at a scale of one inch equals 200 feet with an elevation contour interval of one foot. Sixty-six aerial photographs with topography were flown in January 1987 for the project area north of Moultrie Creek (Contract 87-17) and in January 1988 for the southern project area (Contract 88-14). Refer to FIGURE 2 for an index of the aerial photographs by location.

SUBTASK 4B: INVENTORY/MAP NATURAL WATER CONVEYANCE/STORAGE SYSTEM.

In combination, Moultrie Creek and Moses Creek have a drainage area of approximately 64 square miles in St. Johns County. For the purpose of drainage basin delineation, approximately 40 square miles of this area have been considered in detail. These 40 square miles are bounded, in general, by State Road 16 on the north, I-95 on the west, State Road 206 on the south, and the Matanzas and San Sebastian Rivers on the east. The watersheds are significantly affected by approximately 20 square miles of offsite contributing areas. These offsite areas extend from State Road 207 north to State Road 16. They were investigated for two reasons: 1) a significant portion of the Moultrie Creek drainage system lies north of State Road 207, and 2) the topographic aerial survey for the area north of State Road 207 had already been completed. Refer to FIGURE 2.

The northern portion of the Moultrie Creek drainage basin contains a total of 45.0 square miles which has 18.2 square miles of an offsite drainage area. The remaining 26.8 square miles onsite have been delineated in detail in FIGURE 3. The southern portion of the Moses Creek drainage basin contains a total of 19.3 square miles with 6.1 square miles of an offsite drainage area. The remaining 13.2 square miles onsite have been delineated in detail in FIGURE 3.

Drainage basins have been delineated on the basis of topographic data provided by the aerial surveys of the study area. The initial basin areas were delineated on a set of blue line copies of the aerial photographs at a scale of one inch equals 200 feet. The basin outlines have been transferred by means of State Plane Feet coordinates to USGS Quadrangle maps at a scale of one inch equals 2,000 feet. This information was in turn entered into the St. Johns County GIS as the

BASINS coverage layer. The area of each basin is shown on TABLE 9.

The contributions of offsite drainage areas (i.e. west of I-95 and south of State Road 206) were estimated on the basis of existing information provided by the USGS and Florida Department of Transportation (FDOT). The USGS provided a drainage map for the northwest portion of Moultrie Creek and FDOT provided drainage maps for the Moses Creek area and the southern portion of Moultrie Creek.

Tributary designations in this study follow the precedent of the 1985 FEMA Flood Insurance Study for St. Johns County with the exception of three additional tributaries. These tributaries have been defined and designated as: Moultrie Creek Tributary A, Moultrie Creek Tributary B, and Moses Creek Tributary A.

Current study findings were compared with existing information for the Moultrie Creek basin area west (upstream) of U.S. Highway No. 1. The FEMA study indicates a total basin area of 41.7 square miles while the present study indicates a total basin area of 42.1 square miles. This is a difference of 1.0%. A similar comparison for Moses Creek results in a difference of about 14% for the portion of the Moses Creek Watershed above the confluence of Tributary 1 with the main branch. The FEMA study indicates a total basin area for this portion of Moses Creek of 15.8 square miles, while the results of this study have been estimated as 18.0 square miles. The estimation was necessary due to the non-specific description of the Moses Creek basin in the FEMA report, and the lack of a topographic map with drainage basins (not available from FEMA or their sub-contractors).

Details regarding flood plains and flood prone areas within the main tributary flow channels are provided by the FEMA Floodway maps

(and FEMA Flood Insurance Rate Maps where Floodway maps are not available).

The FEMA maps have been digitized and are now available in the GIS as the FLOODWAYS coverage layer. FIGURE 4 delineates the floodways and flood plains within the project area at a scale of one inch equals one mile. The county GIS can plot this information at any scale necessary.

The natural drainage system or basins outlined in FIGURE 3, showing the routing of water through the study area, will form the framework to support the results of this study.

SUBTASK 4C: INVENTORY/MAP MANMADE WATER CONVEYANCE/STORAGE SYSTEM

The manmade drainage system map depicts the locations of the major drainage structures within the study area and is shown in FIGURE 5. The structures shown fall into three catagories: bridges, culverts, and fords. At this time, these items are categorized as culverts because they share similar discharge characteristics. Further definition can be provided in the future, if necessary. Each item has been inventoried according to details such as the type of structure and its location, size or diameter, length, and invert elevation as shown in TABLE 11. These details were obtained from field measurements and other sources such as FEMA, the FDOT, the Florida East Coast Railroad, and various subdivision drainage maps. Field measurements were not taken for elevation verification; all elevation figures shown were obtained from outside sources.

Three major ditches or ditch systems have been identified in the study area: 1) a drainage ditch beginning approximately two miles west of I-95 and continuing in a northeasterly direction into Moultrie Creek with a total length of approximately four miles; 2) a ditch adjacent to and west of U.S. Highway No. 1 continuing in a southerly direction from Corpus Christi Church parking lot (at Datil Pepper Road and U.S. Highway No. 1) to the main branch of Moses Creek, with a total length of approximately 1400 feet; and 3) a system of ditches in and around the St. Augustine Shores subdivision.

The St. Augustine Shores subdivision contains the only significant water storage system in the study area. The system consists of a series of interconnected lakes and ponds.

SUBTASK 4D: DETAILED SOILS SURVEY

USING THE MOST RECENT, DETAILED SOILS INFORMATION, DETERMINE AND MAP (SCALE: 1" = 200')

1. AREAS WHERE SOILS MAY BE LIMITED FOR SEPTIC TANKS, DETENTION/ RETENTION PONDS, INFRASTRUCTURE, ETC.

2. AREAS WHERE SOILS ARE EASILY ERODIBLE AND EROSION CONTROL MEASURES ARE ESPECIALLY NEEDED TO PREVENT SEDIMENT TRANSPORT OFFSITE

In October 1983, the SCS published a detailed soil survey for St. Johns County, Florida. The soil survey identifies a total of 60 soil types in the project area. These can be found on TABLE 12. Based on the soil survey, soil boundaries were digitized and input into the county GIS. These boundaries are shown on FIGURE 6 according to soil type. Note that due to scale limitations, individual soil numbers (corresponding to soil name) cannot be shown.

Information pertaining to limitations, related to soil suitability for use in septic tank, detention/retention pond, and infrastructure areas was obtained from Tables 3, 10, 11, 13, and 16 of the soil survey. In general, severe limitations are present in a majority of soil types for all of the above land use applications. Specifically, moderate to severe limitations are present in 53 of the 60 soil types for use in septic tank areas. Refer to FIGURE 7 for an overall location of soil limitations. Soil limitations due to ponding effects from a seasonal high water table are present in 12% of the soils. Soil types exhibiting ponding effects can be found on FIGURE 8. Due to the severe limitations present, special planning and design would be required to overcome the soil deficiencies.

Erosion is the removal of rock or soil by such transporting agents as wind and water. Nonvegetated areas are especially susceptible to erosion and will require control measures. Implementing control measures will

be further investigated in Phase 2. As a result of Phase 2, Ordinance 86-4 will be modified to incorporate study findings.

Based on correspondence with staff of the SCS, a total of 4 soil types are areas of concern for erosion. Two soil types (Fripp, of the Fripp-Satellite Complex, #31 and Pits, #38) are classified as potentially highly erodible and are found within the project area. The remaining two soil types (Floridana, #62 and Placid, #63) are classified as hydric soils and are not found within the project area, but are areas of concern. The potentially highly erodible soils are delineated on FIGURE 9.

Further soils information, compiled from the SCS Soil Survey, is available in Appendix B.

SUBTASK 4E: IDENTIFY AND MAP IMPORTANT NATURAL RESOURCE AREA OF THE TWO WATERSHEDS

There are two areas of concern when identifying locations important as natural resource areas: 1) threatened and endangered species habitat areas, and 2) wetland areas.

The "Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida" was obtained to determine habitat areas. This publication contains the animal and plants on the federal list by the United States Department of Interior Fish and Wildlife Service (USFWS). It also identifies animals on a state list by the Florida Game and Freshwater Fish Commission (FGFWFC), and plants on a state list by the Florida Department of Agriculture and Consumer Services (FDACS).

There are some differences between the federal and state lists. Some animals and plants may be endangered or threatened based on their occurrence on a national level, while in the State of Florida these animals and plants occur in such large numbers that they are not considered by the state agencies as endangered or threatened. Conversely, some animals and plants, while occurring in large numbers nationwide, may be declining in their habitats in Florida. As a state agency, the county should consider the state lists of animals and plants, while not totally discounting the federal lists. Those animals which may be found in St. Johns County who appear on these lists are given in TABLE 34.

The term "endangered" is defined as an animal or plant whose number has declined to a level citing this species as headed for extinction unless special efforts are made to protect these species in order to increase their numbers. The term "threatened" is defined

as a species numbers declining at such a rate that it will become endangered unless protective efforts are made.

Some species have been labeled, "Threatened Due to Similarity of Appearance", or T(S/A) by the USFWS. These species are not threatened by becoming endangered except that outside forces, usually man, are threatening a similar species and may threaten this species also. An example of this is the American alligator (Alligator mississippiensis) which is listed as T(S/A) because the American crocodile (Crocodylus acutus) is listed as endangered. The state list uses the term "species of special concern" (SSC) as an alternative to the T(S/A) classification. These species are being reviewed by state agencies as to their declining numbers.

Each species has a characteristic habitat in which they occur. The Soil Conservation Society of America (SCSA) has issued a publication which describes the characteristics of the habitats in Florida in terms of soils, vegetation, animals, land use, and endangered and threatened plants and animals. The "26 Ecological Communities of Florida" (SCSA, 1987) includes a detailed description of each community. TABLE 35 gives the ecological communities by number and name and notes those communities which occur in St. Johns County as determined by the Florida SCS. The concept of ecological communities is based on the awareness that a soil type commonly supports a specific vegetative community, which in turn provides the habitat needed by specific wildlife species. Ecological community occurrence is dependent on several environmental factors. Within a specific area, however, the type of soil is the most influential factor. Appendix A of the above publication contains a listing of the soil series in Florida and those ecological communities that these soils can support. Some soil series are found with only one

community type, while others may support several communities. However, where more than one community has been found, the change can usually be attributed to plant successional stages or regional location differences within the state.

TABLE 36 contains the ecological communities found in St. Johns County and those soils which may support them. A soil may support various communities depending on depth to water, flooding frequency, and plant successional stages. TABLE 37 makes this apparent by listing the ecological communities that "may" be found in each soil type. TABLE 36 and TABLE 37 contain complementary information which may make the relationship between soil types and ecological communities more apparent. The association of an ecological community with a soil type does not absolutely mean that where that soil occurs this community will be found. At this time site inspection is still necessary for verification. This is especially true because the ecological community which occurs on a site may be altered in times of drought or by clearing the area by man or by fire. Because clearing an area may destroy an area of a critical habitat, serious consequences can occur to wildlife.

Appendix B of the "26 Ecological Communities of Florida" contains a listing of plants by ecological community occurence. This information is intended only as a guide and does not claim to contain all plants occurring in Florida. By drawing from plant range and site description in a number of botanical references and from field knowledge, Florida SCS plant scientists were able to prepare this data.

Similar information for animals is given in Appendix C of the same source. TABLE 38 contains the animals from this Appendix that occur in the "central" climatic zone, where St. Johns County is located, and those animals that occur in the ecological communities of St. Johns

County. TABLE 38 can be used to show in which ecological community an animal may be found. The term "characterizing" is described as an animal that is one of the characteristic animals of this ecological community. The ecological community could then be tied to soils for possible location although site inspection would still be necessary.

Wetland areas are the other important natural resource areas. Wetlands, as defined by the SJRWMD, are hydrological sensitive areas which are identified by being inundated or saturated by surface or groundwater with a frequency and duration sufficient to support, and under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Hydrologically sensitive areas, including wetlands, are areas whose hydrology and hydraulics, are valuable because of their importance to fish and wildlife and their capacity to maintain water quality, recharge groundwater, and store flood waters.

In Florida, there are four levels of regulatory control for projects located in wetlands: federal - COE, state - DER, regional - water management districts and regional planning councils, and local - county governments. For St. Johns County the regional governmental bodies are the SJRWMD and the Northeast Florida Regional Planning Council (NEFRPC).

These regulatory agencies try to avoid impacts to wetlands through development, minimize unavoidable impacts, and restore the function of equivalent wetlands. Major impacts to wetlands from development results from the following activities: clearing, filling, and grading of wetlands; ditching and draining of wetlands and water bodies; pollution from stormwater run off and other discharges; and flooding

due to diversion of flow and loss of storage capacity in thewatershed. Development due to continued growth in Florida will continue to impact Florida's wetlands, while regulatory agencies continue to protect them. Each regulatory agency has its own definition and permitting policies for wetlands.

The SJRWMD defines wetlands using the vegetative index, which is based on the percentage of the areal extent of the submerged and transitional species, and/or the soils index. Hydric soils have the characteristic of being inundated or saturated on an average of 30 consecutive days per year. St. Johns County has a SCS Soil Survey and the SJRWMD has published a soils index for the hydric soils. The hydric soils contained in St. Johns County include:

Bakersville muck, #69

Beaches, #28Bluff sandy clay loam, frequently flooded, #42

Durbin Muck, frequently flooded, #52

Floridana fine sand, frequently flooded, #18

Holopaw fine sand, frequently flooded, #47

Hontoon Muck # 35

Manatee fine sandy loam, frequently flooded, #22

Moultrie fine sand, frequently flooded, #49

Myakka fine sand, depressional, #4

Parkwood fine sandy loam, frequently flooded, #25

Pellicer silty clay loam, frequently flooded, #24

Riviera fine sand, depressional, #61

Riviera fine sand, frequently flooded, #36

Samsula muck, #26

St. Johns fine sand, depressional, #5

Terra Ceia Muck, frequently flooded, #66

Tisonia mucky peat, frequently flooded, #67

Tomoka muck, #41

Westconnett fine sand, frequently flooded, #30

Winder fine sand, frequently flooded, #48

FIGURE 10 shows the hydric soils found in the project area and is a preliminary wetlands map based upon the hydrologically sensitive soils index defined by the SJRWMD.

The "Classification of Wetlands and Deepwater Habitats of the United States" (USFWS, 1979) defines wetlands as lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate, or underlying layer, is predominantly an undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year. Hydrophytes are those plants which grow in water on a substrate that is a least periodically deficient in oxygen as a result of excessive water content. Supplementary to this publication are the USGS Quadrangle size maps at a scale of one inch equals 2,000 feet which show very specific wetland and deepwater habitats.

The USFWS definition depends on a list of hydrophytes, or wetland plants, and a list of hydric soils. The USFWS publication, "Wetland Plants of the State of Florida 1986" the USDA SCS publication, "Hydric Soils of the State of Florida 1985" and as the paper quadrangle maps of the wetlands habitat have been obtained. These habitat maps have

not been entered into the GIS at the time of this report.

NOTE: The SJRWMD is in the process of producing a wetlands map for the project area which is scheduled for completion in late 1989. This map will contain information based on aerial photographic interpretation and ground truthing of vegetation. The information will be at a scale of one inch equals 2,000 feet (Quadrangle scale) and ready to be entered into the county GIS.

Additionally, Landmark Technologies, Inc. of Jacksonville, Florida has prepared a county map using SPOT satellite imagery with a spatial resolution (pixel size) of 20 meters by 20 meters, or about one tenth of an acre. Wetland categories were defined by both vegetation and environmental characteristics. This SPOT classification data should be available for the county GIS by the middle of 1989.

These maps from SJRWMD and Landmark Technologies will supplement previous maps of wetlands that have been compiled.

SUBTASK 4F: MAP AND ASSESS EXISTING LAND USES AND AREA WHERE FLOODING PROBLEMS EXIST

USING THE MOST RECENT LAND USE INFORMATION, SUPPLEMENTED BY AERIAL PHOTOGRAPHY AND HYDROLOGIC INFORMATION

1. MAP LAND USES IN SUFFICIENT DETAIL TO ESTIMATE STORMWATER RUN-OFF TO ADJACENT WATER BODIES

2. IDENTIFY RESIDENTAL FLOODING PROBLEMS, SEPTIC TANKS IN FLOOD PRONE AREAS, EROSION INTO WATER COURSES, AND OTHER FLOOD PROBLEMS OF POTENTIAL CONCERN

Existing land use data has been entered into the county GIS system within a file known as the LANDUSE coverage. This data was acquired through an information sharing system with the St. Johns County Planning and Zoning Department via existing county land use generated using SPOT satellite imagery. Contract No. 87-095.01 provides the GIS LANDUSE coverage including ground cover as seen by the SPOT satellite. Since the contract is not completed at this time, Landmark Technologies Inc., Jacksonville, Florida has furnished a map at 1:24,000 scale (one inch equals 2,000 feet). This information has been digitized and coded into the GIS as a temporary LANDUSE coverage until the contract for SPOT data is completed.

The LANDUSE coverage, FIGURE 11, contains existing land use for the project area for the following classifications:

1. Residential

    a. Low Density, 110
    b. Medium Density, 120
    c. High Density, 130
    d. Mobile Home Parks, 102

2. Commercial, 140

3. Industrial, 150

4. Institutional, 170

These classifications follow those established in the "Florida Land Use, Cover and Forms Classification System" (FDOT, 1985). These

classifications were designed by FDOT to provide a consistent means of classifying land use throughout Florida. Level I land use data is very general in nature. "Urban and Built-up" is the Level I classification for land that consists of areas of intensive use with much of the land occupied by manmade structures. Level II land use data is more specific and may be obtained from high altitude imagery and falls under the Level I classification "Urban and Built-up".

Residential land uses range from high-density urban housing developments to low-density rural areas characterized by a relatively small number of homes per acre. The subclasses of residential land use are based on the number of dwelling units per acre. The residential subclasses are defined as follows:

1. Low Density Residential : Less than two dwelling units per acre.
2. Medium Density Residential : Greater than or equal to two but less than or equal to five dwelling units per acre.
3. High Density Residential : Greater than five dwelling units per acre.

The classification "Mobile Home Park" has been reserved for mobile home parks or subdivisions with more than five units per acre. In the case of one or only a few mobile homes within one of the other residential classifications, the Mobile Home classification has not been delineated. Because the Mobile Home Parks have not been classified at Level III or 132, the 102 classification was derived for this study.

Commercial areas are predominantly associated with the distribution of products and services. This includes shopping centers and commercial strip developments, resorts, retail, wholesale, professional services, cultural, entertainment, tourist services, oil and gas storage, and cemeteries.

The Industrial classification is comprised of those land uses where manufacturing, assembly or processing of materials and products are accomplished. This includes food processing, timber processing, mineral processing, oil and gas processing, other light industry, and other heavy industry. Light industry includes steel fabrication, small boat manufacturing, electronic manufacturing, and assembly plants. Heavy industry includes major ship repair, ship building, and large lumber mills.

The Institutional classification includes land use associated with educational, religious, health, military, governmental, and correctional facilities.

The ground cover information provided by the SPOT satellite will introduce further classifications, some of which will include agricultural, various forest cover, and wetlands.

Stormwater generated from urban land uses is significant because it can carry pollution from these urban areas into adjacent water bodies. FIGURE 12 shows the existing land uses and the watersheds for the project area.

The topography of the basin determines the path that the stormwater run off will follow. The drainage basins delineated in FIGURE 12 have been plotted to a scale equal to the topographic aerial photographs (one inch equals 200 feet). The topographic aerial photographs have then been overlaid by the basin map to determine the course of the stormwater run off. This was performed by the St. Johns County Engineering Department using the GIS.

Pollutants, such as litter, pesticides, oil, gas, etc. from urban and agricultural land uses that discharge into water bodies can cause serious environmental consequences. The existence of pollution sources within flood prone areas will facilitate the spread of pollutants by

flood waters from these sources. This is especially important regarding non point pollution sources.

RESIDENTIAL FLOODING PROBLEMS

Residential flooding problems are identified by observing areas of residential land use and flood prone areas. Flood prone areas have been identified on the basis of soils which are prone to flooding as well as by areas which lie within the flood plains of Moses and Moultrie Creeks and their tributaries.

FIGURE 13 outlines areas of residential land use and areas that lie within the flood plains. Other urban flooding problems may be seen in FIGURE 14 which shows areas of urban land use and areas within the flood plain boundaries.

TABLES 24 to 29 contain information on flood prone areas based on soil characteristics[11] and are located in Appendix B. TABLE 39 gives information on the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. None is defined as flooding that is not probable, rare that it is unlikely but possible under unusual weather conditions, common that it is likely under normal conditions, occasional that it occurs, on the average, no more than once in two years, and frequent that it occurs on the average more than once in two years. Duration is expressed as very brief if less than two days, brief if two to seven days, and long if more than seven days. Probable dates are expressed in months. For example, November - May indicates that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater, an irregular decrease in organic matter content with increasing depth, and the absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood prone areas at specific flood frequency levels.

FIGURE 15 shows areas of residential land use and areas that have soils with flooding characteristics. Other related urban flooding problems may be seen in FIGURE 16.

TABLE 40 also contains information on flood prone areas based on soil characteristics. From this table, information about soil limitations for dwelling units with and without basements refers to residential areas. Those soils with limitations due to flooding, as well as residential areas of land use, are shown in FIGURE 17. These soils in addition to those soils limited for small commercial sites (see TABLE 41) are shown with other urban areas in FIGURE 18.

By observing which residential areas are prone to flooding, areas in which further investigation should be considered are located. The exact location of a flooding problem will be dictated by topography and available drainage facilities. These can be observed on the topographic aerial photographs. The information in these figures has been plotted at a scale of one inch equals 200 feet with the county GIS and then overlaid on the topographic aerial photographs.

SEPTIC TANKS IN FLOOD PRONE AREAS

Areas that have septic tanks in high densities and areas that are prone to flooding by being within the flood plain are shown in FIGURE 19. Sewage treatment plants (STP) and areas with sewer service are also included.

Areas that have soils with flooding characteristics (see TABLE 39) and areas with high density septic tanks, sewage treatment plants and areas of sewer service are shown in FIGURE 20. Also, flood prone areas based on soil limitations for dwelling units are shown in FIGURE 21.

Erosion into water courses may occur on any vegetated site. The amount of sediment carried away from a site depends on the cohesiveness of the soil, the size of the grains, the energy and velocity of the water, the shape of the channel, and the vegetation holding the soil. Only the potentially highly erodible soils are of concern in this area. These soils are Fripp-Satellite complex, #31 and Pits, #38, and of moderate concern are Floridana fine sand, #62 and Placid fine sand, #63. These soils as well as the water courses and their basins are shown in FIGURE 22. From this figure, the water courses that might be affected by these soils can be seen. Erosion is normally linked to vegetation, or lack of it, which will be easily seen from the SPOT satellite imagery.

SUBTASK 4G: IDENTIFY POINT AND NON-POINT POLLUTION SOURCES

The drainage basins for Moultrie Creek and Moses Creek lie to the south and west of the city of St. Augustine. This area includes a wide variety of land uses ranging from forest and timber land to residential and commercial development. As a result there is a wide variety of potential pollution inputs to the Moultrie Creek and Moses Creek Watersheds. Point and Non-point Pollution Source map FIGURE 23.

The term "point source" refers to a source of pollution which enters the drainage system at a particular location, i.e., the outfall of a sewage treatment plant. "Non-point" sources are those sources associated with storm water run-off from a particular area of land rather than a specific point such as a high density residential area with septic tanks.

Note that although the features shown on the Point and Non-point ap are referred to as "pollution sources", they may or may not be active sources; it is more correct to consider them to be potential pollution sources.

Twenty point sources have been identified by this study and they fall into three catagories; 1) large STP (STP with a capacity of 500,000 GPD or greater), 2) package plant (a small STP serving apartment complexes, small subdivisions, or small commercial sites), and 3) industrial wastewater treatment plants. TABLE 42 identifies the properties of the sewage treatment plants as they are numbered in FIGURE 23. All point sources shown on the map have been located by property boundaries. No attempt has been made to find exact locations within property boundaries.

The twelve identified non-point sources fall into either of two categories: 1) high density septic areas, and 2) septic tank sludge disposal areas.

The aerial photographs (scale 1"=200') were used to locate the high density septic tank areas. The areas outlined depict residential areas with densities of 0.3 units per acre or greater where no municipal or commercial sewer service is available. TABLE 43 lists the names of these areas as they are numbered in FIGURE 23. The names of the areas with commercial sewer service appear in TABLE 44.

Three septic tank sludge disposal areas are shown. These are areas where sludge has been or is currently being spread.

Stormwater run-off from densely developed commercial or urban areas is an important non-point source that is not shown on the point and non-point pollution source map, but still should be considered. This type of pollution is associated with the clearing of the ground that occurs during a rain storm. Obviously, the material that is washed from the ground goes somewhere; usually it goes to the nearest creek or water course. This is a problem when pollutants, such as litter, motor oils, gasoline, fertilizers, pesticides, etc., have been left on the ground where there is significant development. In the study area, commercial development is most prevalent along U.S. Highway No. 1, north of Moultrie Creek, while urban development is most prevalent in the St. Augustine South and St. Augustine Shores (the "Shores") area, see FIGURE 11. The "Shores", being a newer subdivision, was (and is being) designed and built with some of the current concepts of storm water management in mind.

Excavation sites are considered to be potential point sources as loose soil can easily be tranported offsite causing sedimentation

and/or turbidity problems. There are several active excavation sites in or near the study area, particularly north of State Road 207 along Holmes Boulevard.

There are no landfills in the study area, although the St. Johns County landfill on Tillman Ridge Road, is just west of and adjacent to the Moultrie Creek drainage basin. This area is drained by McCullough Creek into the St. Johns River. The landfill should have no effect on the study area.

Two solid waste transfer stations, although not in the study area or the Moultrie and Moses Creek drainage basin, have a potential pollution impact on the Matanzas River. One, located on the west end of 16th Street in St. Augustine Beach, drains directly into the Matanzas River. The other, located on Pacific Boulevard, drains into the Matanzas River via San Sebastian Creek and Red House Branch.

CHAPTER FIVE

PRELIMINARY ANALYSIS

TASK 5: ANALYSIS OF INFORMATION DEVELOPED IN TASKS 1 THROUGH 4.

This task involves the compilation and interpretation of all pertinent information generated within the previous four tasks for use as the basis of a basin management plan. This plan will be formulated during Phase 2 of DER Contract No. CM 217.

SUBTASK 5A: ASSESSMENT OF POTENTIAL EROSION AND SEDIMENTATION PROBLEMS OF EXISTING LAND USES.

Potential erosion problems occur in areas that include potentially erodible soils, cultivated soils, or soils stripped of vegetation. The location of the highly erodible soils within the project area were previously described in Subtask 4D and shown in FIGURE 9.

A concern not specifically shown in FIGURE 9, is the areas of soils that are stripped of vegetation while construction projects are in progress. It is during this period that soil erosion resulting from stormwater run-off occurs on the bare soils and soil embankments. This can result in turbidity of streams if not controlled and monitored during construction.

The upgrading of compliance inspections during the construction phase of projects can help alleviate the erosion and turbidity problems caused by the stormwater run-off.

Some of the drainage improvement methods that will be investigated in Phase 2 of this project include culvert types, detention/retention pond vegetation, alternative pavement materials such as semi-pervious paving blocks, as well as incentives for erosion and turbidity protection.

SUBTASK 5B: ESTIMATES OF THE ABILITY OF THE DRAINAGE SYSTEMS TO ACCOMODATE EXISTING RUN-OFF VOLUMES AND EVALUATION OF CURRENT LOCAL AND STATE REGULATIONS TO MANAGE THESE SYSTEMS IN A WAY THAT WILL ENSURE FUTURE CAPACITY AND PROTECT WATER QUALITY.

The project area contains two significant housing developments that impact the handling of stormwater run-off. These areas are St. Augustine Shores and St. Augustine South.

The St. Augustine Shores Subdivision is located south of Moultrie Creek and north of Moses Creek. This subdivision utilizes an engineering water storage system consisting of a series of interconnected lakes and ponds for stormwater management. Subsequently, minimal flooding problems occur in this area.

The St. Augustine South Subdivision, located north of Moultrie Creek, was constructed when development plans did not specifically address stormwater management. There are numerous areas within this subdivision that experience frequent flooding problems. Using the topographic aerial photographs, many of the flooding areas are readily identified.

Additionally, information is being collected from the St. Johns County Road and Bridge Department concerning specific residential flooding problems. A record-keeping procedure is being explored whereby the county will be able to maintain records of specific flooding complaints, locations, actions taken, priorities, costs, etc.

St. Johns County Ordinance 86-4 addresses the retention of stormwater within project boundaries of all subdivisions, multifamily, commercial, industrial, and institutional projects as previously described in Task 2.

SUBTASK 5C: GENERAL ASSESSMENT OF POTENTIAL IMPACTS OF DEVELOPMENT AND FLOOD CONTROL FACILITIES ON IMPORTANT HABITAT AND OTHER AREAS IDENTIFIED IN TASK 4 AS NEEDING SPECIAL PROTECTION.

Wetland areas, as important natural resource areas, were previously described in Subtask 4E and shown in FIGURE 10.

There are four levels of regulatory control for the protection of Florida's wetlands. These include the COE at the federal level, the DER at the state level, the SJRWMD and the NEFRPC at the regional level, and the St. Johns County government at the local level. The impact of project development on wetlands is closely monitored on an individual project basis in each step of the permitting process.

The production of wetlands maps based on soils by the SCS, on vegetation by the SJRWMD, and on satellite imagery by LANDMARK TECHNOLOGIES, INC. will greatly enhance the county's ability to identify and monitor the association of land use and wetland areas.

The need to compile maps and information of large natural resource areas increases the necessity for utilizing the county GIS as an efficient tool for the effective management of these areas.

SUBTASK 5D: PROPOSED STRAGEGY FOR INCORPORATING THESE FINDINGS WITHIN THE LOCAL GOVERNMENT'S MULT-DEPARTMENT DEVELOPMENT REVIEW PROCESS TO PROVIDE DIRECT PRACTICAL APPLICATION OF PROJECT FINDINGS AND RECOMMENDATIONS.

The information collected in Phase 1 of this project is to be utilized in the development of a comprehensive stormwater management program as defined in Phase 2.

These findings are to be used to refine the St. Johns County Ordinance 86-4. They will also be used to refine St. Johns County's Comprehensive Plan to address the sanitary sewer, solid waste, drainage, potable water, and natural aquifer recharge elements.

Additionally, pertinent sections of Chapter 40C-4 of the Florida Administrative Code relating to the management and storage of surface waters, as well as Chapter 40C-42 relating to stormwater discharge, are to be incorporated into Ordinance 86-4.

TABLES

The following tables have been produced from data which is in the county GIS.

TABLE 1: TOTAL AVERAGE YEARLY STREAMFLOWS IN CUBIC FEET PER SECOND

YEAR	TOTAL FLOW (cfs)	MEAN FLOW (cfs)	MAXIMUM FLOW (cfs)	MINIMUM FLOW (cfs)	EQUIVALENT FLOW (cfs/sq mile)
1969	12113.15	33.20	679.00	0.09	1.68
1970	8142.29	22.30	512.00	0.02	1.13
1971	1805.58	4.95	91.00	0.01	0.25
1972	13456.14	36.80	479.00	0.36	1.86
1973	9008.96	24.70	219.00	0.03	1.25
1974	5180.36	14.20	465.00	0.13	0.72
1975	3909.46	10.70	505.00	0.03	0.54
1976	2447.33	6.69	97.00	0.10	0.34
1977	2490.90	6.82	119.00	0.02	0.34
1978	3057.45	8.38	192.00	0.02	0.42
1979	11671.14	32.00	653.00	0.09	1.61
1980	3816.71	10.40	269.00	0.04	0.53
1981	804.33	2.20	42.00	0.00	0.11
1982	10869.84	29.80	455.00	0.42	1.50
1983	11884.10	32.60	265.00	0.31	1.64
1984	7503.04	20.50	286.00	0.11	1.04
1985	8067.10	22.10	327.00	0.02	1.12
1986	2351.44	6.44	81.00	0.03	0.33

TABLE 2: PEAK DISCHARGES FOR MOULTRIE AND MOSES CREEKS

FLOOD SOURCE	TRIB NO.	COMMENTS ABOUT LOCATION OF CROSS-SECTION	PEAK DISCHARGES (cfs) 10YR	50YR	100YR	500YR
MOSES	0	AT CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 1	987	1744	2,120	3,163
		AT CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 2	918	1626	1,978	2,955
		AT CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 5	810	1436	1,748	2,622
		AT SR 206	210	390	483	779
		DOWNSTREAM OF CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 6	642	1145	1,394	2,105
		UPSTREAM OF CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 5	727	1292	1,573	2,367
		UPSTREAM OF CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 6	395	714	873	1,338
	1	AT MOUTH	135	248	304	466
	2	AT MOUTH	60	115	143	223
	3	AT MOUTH	78	148	182	278
	4	ABOUT 3500 FT UPSTREAM FROM MOUTH	151	281	349	568
		AT MOUTH	239	436	535	830
	5	ABOUT 4000 FT UPSTREAM OF MOUTH	71	134	168	278
		AT MOUTH	173	318	390	601
	6	AT MOUTH	377	682	834	1,276
MOULTRIE	0	AT CONFLUENCE OF MOUTRIE CREEK TRIBUTARY NO. 3	1980	3480	4,215	6,190
		AT FLORIDA EAST COAST RAILWAY	960	1850	2,300	3,640
		AT STATE ROAD 207	1130	2200	2,750	4,340
		AT U.S. ROUTE 1	2089	3619	4,375	6,419
	1	AT MOUTH	236	430	526	799
		AT U.S. ROUTE 1	165	303	372	570
	3	AT MOUTH	195	355	435	650
	4	AT MOUTH	384	694	848	1,280
		AT STATE ROAD 207	153	289	359	581
		UPSTREAM OF KINGS ESTATES ROAD	208	387	480	772

TABLE 3: MONTHLY STREAMFLOW DISCHARGE IN CUBIC FEET PER SECOND

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1969	115.10	297.00	1082.30	181.55	114.57	15.81	8.21	108.63	3278.10	4369.00	1494.00	1048.90
1970	2358.00	2542.00	1024.50	1278.30	17.77	41.51	225.10	397.26	226.80	12.56	6.98	11.60
1971	18.96	125.56	156.55	256.46	19.73	1.58	30.47	20.92	11.18	184.05	77.24	902.90
1972	691.70	1398.00	309.90	600.30	991.00	1170.13	698.40	1137.15	2319.60	1080.60	1554.40	1505.00
1973	963.00	1427.00	597.00	1455.60	187.04	679.70	361.50	1386.40	589.00	932.60	182.50	247.70
1974	156.90	109.30	96.22	32.88	91.73	1863.52	1075.30	1175.00	550.90	13.39	5.16	10.12
1975	48.42	243.89	60.88	10.91	2.17	21.08	156.46	93.30	293.51	2662.40	261.90	54.56
1976	133.70	65.67	33.33	49.94	243.30	612.90	316.49	11.72	36.52	5.86	9.14	928.78
1977	1199.00	411.00	69.24	13.40	6.17	8.97	1.90	3.20	15.66	4.33	80.86	677.20
1978	565.80	928.90	1365.70	65.84	36.39	7.25	7.81	52.21	6.14	4.94	3.60	12.94
1979	438.87	450.70	475.40	55.01	632.96	10.49	88.84	116.50	5304.91	2281.00	417.20	1399.30
1980	1134.30	572.30	1398.40	560.80	100.39	8.69	8.18	3.77	2.96	3.06	8.14	15.49
1981	6.24	18.51	44.92	22.71	0.41	0.41	0.79	203.87	140.59	19.08	276.20	70.60
1982	478.50	144.00	337.80	1379.00	132.78	2861.00	917.60	1616.00	652.40	1799.00	396.80	155.00
1983	449.60	1822.00	2464.00	1654.00	351.80	336.70	272.67	346.08	335.60	1759.50	704.90	1387.30
1984	1163.00	1130.30	879.50	778.40	36.10	115.03	430.90	50.77	1665.61	860.80	281.00	111.70
1985	39.90	70.53	119.36	35.69	2.62	1.68	17.55	501.69	4119.00	1757.00	1295.00	107.10
1986	604.60	836.60	636.40	65.02	8.35	11.22	7.82	10.46	16.93	28.80	47.00	78.30
1987	140.50	2243.50	1973.00	809.70	9.14	2.28	1.15	0.33	0.72	2.87	9999.99	9999.99

TABLE 4: MOULTRIE AND MOSES CREEKS FLOODWAY DATA

CREEK/TRIBUTARY	CROSS SECTION	DISTANCE (ft)	WIDTH (ft)	AREA (sq ft)	VELOCITY (fps)
MOSES CREEK	A	7,000	616	3,171	0.7
	B	12,700	446	2,967	0.7
	C	16,450	468	3,814	0.6
	D	24,690	226	1,928	1.0
	E	26,090	294	1,833	1.1
	F	27,890	461	2,762	0.7
	G	32,690	302	1,296	1.2
	H	32,980	73	486	3.2
	I	34,800	374	2,054	0.8
	J	36,750	64	344	4.6
	K	38,209	313	1,713	0.5
	L	42,149	483	1,460	0.6
	M	42,431	72	430	2.0
MOSES CREEK NO 1	A	700	55	163	1.9
	B	1,230	22	93	3.3
	C	5,230	53	134	2.3
	D	5,640	17	85	3.6
MOSES CREEK NO 2	A	320	20	60	2.4
	B	1,998	148	931	0.2
	C	3,698	127	561	0.2
	D	6,148	140	232	0.4
MOSES CREEK NO 3	A	600	39	82	2.2
	B	2,110	6	31	5.8
MOSES CREEK NO 4	A	330	64	421	1.3
	B	930	49	233	2.3
	C	3,500	67	268	1.3

TABLE 4: MOULTRIE AND MOSES CREEKS FLOODWAY DATA

CREEK/TRIBUTARY	CROSS SECTION	DISTANCE (ft)	WIDTH (ft)	AREA (sq ft)	VELOCITY (fps)
MOSES CREEK NO 5	A	600	52	250	1.6
	B	4,040	200	197	0.9
MOSES CREEK NO 6	A	500	104	337	2.5
	B	800	23	179	4.7
	C	3,663	167	484	1.7
MOULTRIE CREEK	A	4,800	171	1,360	3.2
	B	7,900	399	2,353	1.9
	C	8,380	148	1,107	4.0
	D	14,617	172	1,398	3.1
	E	15,990	1,066	8,038	0.5
	F	20,760	457	3,087	1.4
	G	24,960	411	3,610	1.1
	H	30,150	359	2,193	1.4
	I	35,550	241	1,700	1.6
	J	35,805	365	2,242	1.2
	K	39,105	262	1,503	1.8
	L	42,615	240	1,693	1.4
	M	45,433	1,131	4,774	0.5
MOULTRIE CREEK NO 1	A	1,050	23	142	3.7
	B	4,750	99	387	1.0
	C	5,710	134	392	0.9
	D	6,757	48	163	2.3
	E	7,129	59	189	2.0
	F	9,129	41	126	3.0
	G	10,129	6	35	4.9
MOULTRIE CREEK NO 3	A	1,800	74	268	1.6

TABLE 4: MOULTRIE AND MOSES CREEKS FLOODWAY DATA

CREEK/TRIBUTARY	CROSS SECTION	DISTANCE (ft)	WIDTH (ft)	AREA (sq ft)	VELOCITY (fps)
MOULTRIE CREEK NO 3	B	5,800	90	313	1.4
MOULTRIE CREEK NO 4	A	1,000	86	265	2.5
	B	2,400	114	449	1.5
	C	2,870	26	137	4.9
	D	6,005	96	447	1.5
	E	7,195	87	453	1.5
	F	9,305	112	409	1.2
	G	11,245	111	486	1.0
	H	14,295	226	672	0.7
	I	16,023	17	119	3.0

TABLE 5: DRAINAGE BASIN ACREAGES

NAME OF	BASIN	AREA (sq ft)	ACRES	sq miles
		-1E+09	0.000	0.000
MOSES CREEK	TRIBUTARY 6	1.2E+08	2,733.252	4.270
MOULTRIE CREEK	TRIBUTARY 4	1.0E+08	2,313.874	3.615
MOULTRIE CREEK	TRIBUTARY 3	3.0E+07	688.284	1.075
MOULTRIE CREEK	TRIBUTARY 5	2.6E+07	598.468	0.935
MOSES CREEK	MAIN BRANCH E	1.8E+07	406.393	0.635
MOULTRIE CREEK	TRIBUTARY 1	5.0E+07	1,151.030	1.798
MOULTRIE CREEK	TRIBUTARY A	2.1E+07	488.522	0.763
MOULTRIE CREEK	MAIN BRANCH E	8.6E+06	196.702	0.307
MOSES CREEK	TRIBUTARY A	1.5E+07	340.619	0.532
MOSES CREEK	TRIBUTARY 4	1.3E+07	298.127	0.466
MOSES CREEK	MAIN BRANCH S	1.2E+07	272.557	0.426
MOSES CREEK	TRIBUTARY 1	1.4E+07	314.830	0.492
MOULTRIE CREEK	MAIN BRANCH N	2.8E+08	6,427.000	10.041
MOULTRIE CREEK	TRIBUTARY B	6.7E+07	1,542.421	2.410
MOULTRIE CREEK	MAIN BRANCH S	1.4E+08	3,232.765	5.051
MOSES CREEK	MAIN BRANCH W	1.0E+08	2,353.023	3.676
MOSES CREEK	TRIBUTARY 5	4.0E+07	911.759	1.425
MOULTRIE CREEK	TRIBUTARY 2	2.4E+07	546.190	0.853
MOSES CREEK		1.5E+07	355.463	0.555
MOSES CREEK	TRIBUTARY 3	1.9E+07	443.415	0.693

TABLE 6: DRAINAGE BASIN ACREAGES AS FOUND BY FEMA

FLOOD SOURCE	TRIB NO.	COMMENTS ON LOCATION OFCROSS-SECTION	DRAINAGE AREA (sq miles)
MOSES	0	AT CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 1	15.8
		AT CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 2	14.6
		AT CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 5	10.6
		AT SR 206	2.7
		DOWNSTREAM OF CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 6	7.1
		UPSTREAM OF CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 5	8.6
		UPSTREAM OF CONFLUENCE OF MOSES CREEK TRIBUTARY NO. 6	3.8
	1	AT MOUTH	0.5
	2	AT MOUTH	0.8
	3	AT MOUTH	0.6
	4	ABOUT 3500 FT UPSTREAM FROM MOUTH	1.4
		AT MOUTH	1.6
	5	ABOUT 4000 FT UPSTREAM OF MOUTH	0.5
		AT MOUTH	0.9
	6	AT MOUTH	3.3
MOULTRIE	0	AT CONFLUENCE OF MOUTRIE CREEK TRIBUTARY NO. 3	35.7
		AT FLORIDA EAST COAST RAILWAY	17.5
		AT STATE ROAD 207	19.8
		AT U.S. ROUTE 1	41.7
	1	AT MOUTH	1.5
		AT U.S. ROUTE 1	1.0
	3	AT MOUTH	0.7
	4	AT MOUTH	4.1
		AT STATE ROAD 207	2.6
		UPSTREAM OF KINGS ESTATES ROAD	3.5

TABLE 7: MONTHLY AND ANNUAL RAINFALL IN INCHES FOR ST JOHNS COUNTY NEAR ST AUGUSTINE

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL YEARLY RAINFALL
1957	0.58	3.44	4.91	1.42	8.09	8.20	10.40	11.30	6.24	5.07	1.51	1.50	62.66
1958	4.69	3.17	6.65	4.31	2.88	3.54	3.74	2.84	4.65	11.74	3.01	4.22	55.44
1959	4.70	2.85	9.72	5.21	2.58	6.38	2.51	6.61	6.25	5.46	6.20	1.58	60.05
1960	1.85	3.64	11.02	0.62	1.99	5.33	8.42	4.05	11.42	8.05	0.65	1.04	58.08
1961	4.11	9.20	1.42	4.00	2.89	5.19	10.56	5.42	3.48	5.57	4.79	0.67	57.30
1962	2.46	0.74	3.18	1.61	1.81	5.57	10.11	7.75	12.00	1.35	1.92	2.17	50.67
1963	2.33	5.84	1.32	0.98	3.79	9.10	4.67	4.73	21.80	2.41	2.91	3.43	63.31
1964	8.56	5.80	2.84	5.14	7.60	4.95	6.06	8.51	13.53	3.10	9.51	3.90	79.50
1965	0.82	6.51	3.17	1.72	1.19	8.45	6.96	3.86	4.23	2.79	1.35	2.99	44.04
1966	4.28	10.67	0.85	1.22	9.16	7.61	8.57	4.27	4.87	1.22	0.62	1.18	54.52
1967	3.18	6.37	0.41	0.06	1.59	4.42	6.74	4.10	8.48	3.99	0.03	4.91	44.28
1968	0.16	1.66	1.96	0.31	4.45	7.96	3.86	10.93	1.99	7.56	1.98	1.39	44.21
1969	1.82	3.68	6.40	0.36	4.22	3.15	2.85	8.05	15.97	8.85	3.33	3.80	62.48
1970	6.38	8.38	7.19	2.24	2.38	5.09	5.98	7.38	4.30	3.55	0.16	2.07	55.10
1971	1.80	4.37	5.18	2.69	1.86	8.47	5.93	4.85	4.26	6.72	3.14	5.81	55.08
1972	3.68	5.88	3.59	5.27	6.54	8.58	6.87	10.33	5.43	2.20	10.44	4.80	73.61
1973	4.17	4.21	4.77	2.67	6.64	3.88	5.35	8.88	5.31	0.59	0.56	4.21	51.24
1974	0.73	2.02	2.47	1.21	2.01	13.52	5.58	6.82	3.91	1.24	0.51	1.63	41.65
1975	2.23	4.36	2.54	1.67	2.55	8.60	4.57	5.49	6.50	6.61	1.30	2.15	48.57
1976	1.24	1.00	1.61	2.44	7.80	4.36	2.02	9.59	2.93	1.17	2.68	7.70	44.54
1977	3.06	2.67	0.76	1.97	3.06	1.83	4.20	4.27	4.51	0.54	3.68	7.50	38.05
1978	3.22	4.22	3.38	2.58	2.56	3.03	8.10	3.55	6.81	3.07	0.32	5.06	45.90
1979	8.80	3.47	2.77	3.42	8.35	3.98	5.31	1.10	16.33	3.80	2.02	7.28	66.63
1980	5.29	1.27	5.91	3.39	2.87	3.23	3.43	1.24	1.81	3.13	2.77	0.63	34.97
1981	0.71	5.60	3.71	0.60	0.97	2.29	4.21	10.36	4.80	2.92	4.78	2.57	43.52
1982	3.61	1.66	5.02	6.63	3.20	12.63	5.46	6.04	6.20	6.61	1.73	0.98	59.77

TABLE 7: MONTHLY AND ANNUAL RAINFALL IN INCHES FOR ST JOHNS COUNTY NEAR ST AUGUSTINE

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL YEARLY RAINFALL
1983	3.82	4.83	8.12	6.14	1.97	4.93	3.25	4.95	7.16	6.68	3.51	6.22	61.58
1984	2.29	5.41	4.14	2.87	1.30	4.30	4.69	2.51	11.17	2.58	1.72	0.74	43.72

TABLE 8: BASIN ACREAGES

BASIN NAME	AREA	ACRES	sq mile
MOL MAIN E	8568320.000	196.702	0.307
MOL MAIN N	2.799413E+08	6,427.000	10.041
MOL MAIN S	1.408192E+08	3,232.765	5.051
MOL TRIB 1	50138880.000	1,151.030	1.798
MOL TRIB 2	23792028.000	546.190	0.853
MOL TRIB 3	29981644.000	688.284	1.075
MOL TRIB 4	1.007924E+08	2,313.874	3.615
MOL TRIB 5	26069252.000	598.468	0.935
MOL TRIB A	21280036.000	488.522	0.763
MOL TRIB B	67187872.000	1,542.421	2.410
MOS MAIN E	17702460.000	406.393	0.635
MOS MAIN S	11872592.000	272.557	0.426
MOS MAIN W	1.024977E+08	2,353.023	3.676
MOS TRIB 1	13713980.000	314.830	0.492
MOS TRIB 2	15483954.000	355.463	0.555
MOS TRIB 3	19315144.000	443.415	0.693
MOS TRIB 4	12986412.000	298.127	0.466
MOS TRIB 5	39716232.000	911.759	1.425
MOS TRIB 6	1.190605E+08	2,733.252	4.270
MOS TRIB A	14837344.000	340.619	0.532

TABLE 9: ACREAGE OF DRAINAGE BASINS

BASIN NUMBE	NAME OF BASIN	ACREAGE OF BASIN	SQUARE MILES OF BASIN
2	MOL TRIB 5	598.468	0.935
3	MOL MAIN E	196.702	0.307
4	MOL TRIB 2	546.190	0.853
5	MOL MAIN S	3,232.765	5.051
6	MOS TRIB 2	355.463	0.555
7	MOS TRIB 3	443.415	0.693
8	MOS TRIB 6	2,733.252	4.270
9	MOS MAIN W	2,353.023	3.676
10	MOS TRIB A	340.619	0.532
11	MOS TRIB 4	298.127	0.466
12	MOS MAIN E	406.393	0.635
13	MOS TRIB 5	911.759	1.425
14	MOS MAIN S	272.557	0.426
15	MOS TRIB 1	314.830	0.492
19	MOL TRIB 4	2,313.874	3.615
20	MOL TRIB 1	1,151.030	1.798
21	MOL TRIB 3	688.284	1.075
22	MOL TRIB A	488.522	0.763
23	MOL MAIN N	6,427.000	10.041
24	MOL TRIB B	1,542.421	2.410

TABLE 10: MOULTRIE CREEK AND MOSES CREEK FLOODWAY DATA

CREEK & TRIBUTARY #	CROSS-SECTION	DISTANCE UPSTREAM (ft)	WIDTH AT CROSS-SECTION (ft)	CROSS-SECTIONAL AREA (sq ft)	MEAN VELOCITY (fps)
MOSES CREEK	A	7,000	616	3,171	0.7
	B	12,700	446	2,967	0.7
	C	16,450	468	3,814	0.6
	D	24,690	226	1,928	1.0
	E	26,090	294	1,833	1.1
	F	27,830	461	2,762	0.7
	G	32,690	302	1,296	1.2
	H	32,980	73	486	3.2
	I	34,800	374	2,054	0.8
	J	36,750	64	344	4.6
	K	38,209	313	1,713	0.5
	L	42,149	483	1,460	0.6
	M	42,431	72	430	2.0
MOSES CREEK NO 1	A	700	55	163	1.9
	B	1,230	22	93	3.3
	C	5,230	53	134	2.3
	D	5,640	17	85	3.6
MOSES CREEK NO 2	A	320	20	60	2.4
	B	1,998	148	931	0.2
	C	3,698	127	561	0.2
	D	6,148	140	232	0.4
MOSES CREEK NO 3	A	600	39	82	2.2
	B	2,110	6	31	5.8
MOSES CREEK NO 4	A	330	64	421	1.3
	B	930	49	233	2.3
	C	3,500	67	268	1.3
MOSES CREEK NO 5	A	600	52	250	1.6
	B	4,040	200	197	0.9
MOSES CREEK NO 6	A	500	104	337	2.5
	B	800	23	179	4.7
	C	3,663	167	484	1.7
MOULTRIE CREEK	A	4,800	171	1,360	3.2
	B	7,900	399	2,353	1.9
	C	8,380	148	1,107	4.0
	D	14,617	172	1,398	3.1
	E	15,990	1,066	8,038	0.5
	F	20,760	457	3,087	1.4
	G	24,960	411	3,610	1.1
	H	30,150	359	2,193	1.4
	I	35,550	241	1,700	1.6
	J	35,805	365	2,242	1.2
	K	39,105	262	1,503	1.8
	L	42,615	240	1,693	1.4
	M	45,433	1,131	4,774	0.5

TABLE 10: MOULTRIE CREEK AND MOSES CREEK FLOODWAY DATA

CREEK & TRIBUTARY #	CROSS-SECTION	DISTANCE UPSTREAM (ft)	WIDTH AT CROSS-SECTION (ft)	CROSS-SECTIONAL AREA (sq ft)	MEAN VELOCITY (fps)
MOULTRIE CREEK NO 1	A	1,050	23	142	3.7
	B	4,750	99	387	1.0
	C	5,710	134	392	0.9
	D	6,757	48	163	2.3
	E	7,129	59	189	2.0
	F	9,129	41	126	3.0
	G	10,129	6	35	4.9
MOULTRIE CREEK NO 3	A	1,800	74	268	1.6
	B	5,800	90	313	1.4
MOULTRIE CREEK NO 4	A	1,000	86	265	2.5
	B	2,400	114	449	1.5
	C	2,870	26	137	4.9
	D	6,005	96	447	1.5
	E	7,195	87	453	1.5
	F	9,305	112	409	1.2
	G	11,245	111	486	1.0
	H	14,295	226	672	0.7
	I	16,023	17	119	3.0

TABLE 11: RIGHT OF WAY CROSS CULVERTS

CULVERT NUMBER	ROAD	DISTANCE (FEET)	LOCATION	QUANTITY	DIAMETER (INCHES)	TYPE	LENGTH (FEET)	INVERT ELEV. (ft)	COMMENTS
1	SR 214	1,470	W OF HOLMES	1	24	CMP	0	0.0	PLUGGED
2		564	W OF HOLMES	2	24	CMP	420	0.0	50% OPEN
3		2,400	E OF DEERWOOD	3	**	CBC	390	24.8	OPEN ** 4'x8'
4		1,000	E OF I-95	3	36	CP	380	0.0	OPEN
5	CHERRY TREE RD	2,395	W OF KINGS RD	1	15	CMP	0	0.0	
6		2,570	W OF KINGS RD	2	18	CMP	0	0.0	
7		4,420	W OF KINGS RD	1	15	CMP	0	0.0	
8	OAK RIDGE RD	1,550	W OF KINGS RD	1	18	CMP	0	0.0	
9	FRANCES RD	620	E OF MAC RD	1	60	CMP	600	12.9	OPEN
10	KINGS RD	650	W OF J(CORNER)	1	60	CMP	400	15.2	OPEN
11	KINGS ESTATE RD	500	E OF GORDA BELLA	1	60	CMP	400	20.6	OPEN
12		760	W OF OLD MOULTRIE RD	1	18	CMP	0	0.0	OPEN
13		0	W EDGE OF DOBBS RD	1	18	CMP	0	0.0	OPEN
14		0	SW EDGE OF KINGS RD	2	18	CMP	0	0.0	OPEN
15	FEC RR	6,072	S OF KINGS ESTATE RD	3	72	CMP	840	6.0	OPEN
16		2,375	S OF KINGS ESTATE RD	2	30	CMP	570	0.0	10% OPEN
17		1,800	W OF HOLMES	3	24	CMP	400	0.0	OPEN
18		450	E OF DEERWOOD ACRES	1	**	CBC	400	24.0	** 4'x4.5'
19		975	W OF HOLMES	2	42	CMP	400	0.0	
20	OLD MOULTRIE RD	0	CALLE DE LEON	1	24	CP	0	0.0	50% OPEN
21		0	LEWIS PT RD	1	30	CP	0	0.0	OPEN
22		1,250	N OF LEWIS PT RD	1	30	CP	0	0.0	OPEN
23		2,100	N OF LEWIS PT RD	2	30	CP	0	0.0	OPEN
24		7,300	N OF LEWIS PT RD	1	30	CP	0	0.0	OPEN
25		8,400	N OF LEWIS PT RD	1	36	CP	0	0.0	OPEN
26	CYPRESS RD	600	W OF DOBBS RD	1	15	CMP	0	0.0	OPEN
27		0	ST AUGUSTINE BLVD	1	24	CMP	0	0.0	OPEN
28		0	ST AUGUSTINE BLVD	1	30	CMP	0	0.0	OPEN
29	LEWIS PT RD	875	W OF US 1	1	72	CMP	330	19.0	OPEN
30	FP & L	430	W OF DOBBS RD	1	18	CMP	0	0.0	OPEN
31		1,550	W OF DOBBS RD	1	18	CMP	0	0.0	50% OPEN
32		520	W OF IND. PARK RD	1	24	CMP	0	0.0	50% OPEN
33		750	W OF IND. PARK RD	3	50	CMP	320	27.9	50% OPEN
34	DOBBS RD	500	N OF KINGS ESTATE	1	15	CMP	0	0.0	BLOCKED
35	SR 207	1,800	E OF LIGHTSEY RD	2	**	CBC	460	29.2	OPEN ** 4'x8'
36		300	E OF HILLTOP RD	1	36	CP	680	0.0	OPEN
37		1,500	W OF HILLTOP RD	4	**	CBC	400	14.0	OPEN ** 8'x10'
38		2,500	E OF I 95	2	18	CP	480	0.0	OPEN; FLOWING N
39	US 1	3,700	S OF LEWIS PT RD	1	**	CBC	125	6.6	OPEN ** 5'x10'

TABLE 11: RIGHT OF WAY CROSS CULVERTS

CULVERT NUMBER	ROAD	DISTANCE (FEET)	LOCATION	QUANTITY	DIAMETER (INCHES)	TYPE	LENGTH (FEET)	INVERT ELEV. (ft)	COMMENTS
40	HILLTOP RD	650	S OF SR 207	1	55	CMP	40	0.0	OPEN
41	TROY MARA KENNELS RD	300	W OF US 1	1	60	CMP	0	9.0	OPEN
42	DEER RUN RD	350	W OF HOLMES EXT	1	18	CMP	0	0.0	BLOCKED
43	HOLMES BLVD	500	N OF SCHOOL	1	30	CMP	0	0.0	75% OPEN
44	NORTHWOOD RD	1,300	W OF HOLMES	3	24	CMP	0	0.0	OPEN
45	LIGHTSEY RD	5,550	W OF SR 207	2	60		16	20.2	OPEN
46	WILDWOOD RD	300	N OF CHEYENNE	2	55	CP	62	0.0	OPEN
47	OSCEOLA TRAIL	250	E OF WILDWOOD	5	72	CMP	40	-1.5	OPEN -2.5(S
48		0		0			0	0.0	
49	WINTERHAWK	200	E OF ARROWHEAD	1	36	CMP	0	0.0	50% OPEN
50	SOUTH WINTERHAWK	300	E OF ARROWHEAD	2	24	CMP	0	0.0	50% OPEN
51		200	W OF OSPREY CIRCLE	2	24	CMP	0	0.0	OPEN
52	WINTERHAWK	200	E OF ARROWHEAD	1	18	CMP	0	0.0	OPEN
53	DEERWOOD ACRES RD	2,400	S OF SR 214	1	36	CMP	0	0.0	OPEN
54	UNNAMED RD	200	W OF DEERWOOD	1	30	CMP	0	0.0	BLOCKED
55	WILDWOOD RD	1,600	W OF FEC RR	1	60	CMP	63	0.0	OPEN
56		3,190	W OF FEC RR	1	**	CP	45	0.0	OPEN ** 62"x108"
57		370	S OF PRAIRIE CREEK	1	55	CP	70	0.0	OPEN
58		1,210	E OF FEC RR	1	48	CMP	62	0.0	75% OPEN
59	VAILL POINT RD	1,980	E OF US 1	2	**	CMP	61	0.0	OPEN ** 66"x46"
60	SHORES BLVD	2,980	E OF US 1	1	48	CMP	100	0.0	OPEN
61	SHORES BLVD N	1,135	E OF SEVILLA	1	42	CMP	86	0.0	OPEN
62		100	W OF SEVILLA	1	72	CMP	191	14.2	OPEN
63	US 1	5,700	S OF SHORES BLVD S	0		BRG	0	12.8	OPEN / BRIDGE
64		2,300	S OF SHORES BLVD N	1	**	CBC	0	0.0	OPEN ** 4'x4'
65		900	S OF SHORES BLVD S	1	**	CBC	0	0.0	OPEN ** 4'x20'
66	SR 206	3,820	W OF US 1	2	**	CBC	75	18.5	OPEN ** 4'x20'
67		0	E OF FEC RR	1	30	CP	60	0.0	OPEN
68		650	E OF FEC RR	2	24	CP	80	0.0	OPEN
69	FEC RR	4,350	N OF SR 206	0		BRG	0	17.2	OPEN / BRIDGE
70	CROOKED TREE TRAIL	870	W OF US 1	2	48	CP	81	0.0	OPEN

TABLE 11: RIGHT OF WAY CROSS CULVERTS

CULVERT NUMBER	ROAD	DISTANCE (FEET)	LOCATION	QUANTITY	DIAMETER (INCHES)	TYPE	LENGTH (FEET)	INVERT ELEV. (ft)	COMMENTS
71	CROOKED TREE TRAIL	870	W OF US 1	1	36	CP	81	0.0	OPEN
72	ROEHERS RD	500	E OF US 1	2	**	CMP	45	0.0	OPEN ** 72"x42"
73	DATIL PEPPER RD	275	W OF US 1	1	36	CMP	33	0.0	OPEN
74	CORPUS CHRISTI CHURCH	275	W OF US 1	1	36	CMP	64	0.0	OPEN
75	SR 206	8,190	E OF US 1	2	**	CBC	70	16.0	OPEN ** 4'x8'
76	SEVILLA	662	W OF SARTO CT	1	**	CMP	189	0.0	OPEN ** 57"x38"
77	GOLF COURSE	0	S OF SEVILLA	1	60	CMP	200	0.0	OPEN
78	DATIL PEPPER RD	1,207	N OF L	1	36	CMP	25	0.0	25% OPEN
79	COLONIAL DR	745	E OF CYPRESS PT RD	1	24	CP	44	0.0	OPEN
80		270	E OF CYPRESS LANE	3	**	CMP	64	0.0	OPEN ** 25"x40"
81	AUX POWER LINE RD	452	W OF MAIN POWER LINE	1	36	CMP	18	0.0	50% OPEN
82		452	W OF MAIN POWER LINE	1	30	CMP	18	0.0	50% OPEN
83		995	E OF MAIN POWER LINE	2	24	CMP	31	0.0	75% OPEN
84	FEC RR	1,122	N OF WATSON RD	2	36	CMP	45	0.0	
85		2,970	S OF WATSON RD	2	30	CMP	42	0.0	
86		594	S OF WATSON RD	2	30	CMP	39	0.0	
87		6,930	S OF WATSON RD	2	30	CMP	51	0.0	
88		132	N OF SR 206	2	30	CMP	54	0.0	
89	DELTONA BLVD	205	E OF LILY	1	48		100	0.0	SUBMERGED
90		286	W OF RITA CIR W	1	**		90	0.0	OPEN ** 33"x24"
91		216	E OF RITA CIR E	1	**		90	0.0	OPEN ** 33"x24"
92	WATSON RD	0	DATIL PEPPER RD	1	24		40	0.0	OPEN
93	DATIL PEPPER RD	0	WATSON RD	1	18		30	0.0	OPEN
94	LOGGIN RD #23	0	MOSES BRANCH 6	0		BRG	22	0.0	3'x13' BRIDGE
95	LOGGIN RD #27	0	MOSES BRANCH 6	0		BRG	25	0.0	6.5'x20.5' BRIDGE
96	TRAIL	0	MOSES BRANCH 5	1	24		0	0.0	
97		0	MOSES MAIN BRANCH	0			0	0.0	FORD
98		0	MOSES BRANCH 4	0			0	0.0	FORD
99		0	MOSES BRANCH 1	0			0	0.0	FORD
100	DRIVEWAY	0	W OF US 1 N OF MOSES	1	**	CMP	41	0.0	OPEN ** 60"x32"
101	RIVIERA BLVD	0	N OF ROEHRS	1	32	CMP	41	0.0	OPEN
102	SHORES BLVD	0	S OF BIANCA	1	18	CMP	0	0.0	OPEN

TABLE 11: RIGHT OF WAY CROSS CULVERTS

CULVERT NUMBER	ROAD	DISTANCE (FEET)	LOCATION	QUANTITY	DIAMETER (INCHES)	TYPE	LENGTH (FEET)	INVERT ELEV. (ft)	COMMENTS
103	CHRISTINA	0	SW END OF STREET	1	18	CMP	0	0.0	OPEN
104	OLD LOGGING RD	0	W OF WILDWOOD PINES	1	36	CMP	40	0.0	OPEN
105	I 95	26,850	N OF SR 206	1	30	CMP	166	36.5	36.3(E)
106		25,620	N OF SR 206	2	30	CMP	168	36.5	36.3(E)
107		21,620	N OF SR 206	2	42	CMP	168	34.3	34.1(E)
108		19,920	N OF SR 206	2	**	CBC	234	29.9	12'X8'
109		18,620	N OF SR 206	2	**	CBC	162	34.0	8'X3'
110		14,370	N OF SR 206	2	24	CMP	180	36.1	35.7(E)
111		12,820	N OF SR 206	2	30	CMP	168	36.5	36.3(E)
112		7,520	N OF SR 206	1	24	CMP	166	37.0	36.8(E)
113		6,370	N OF SR 206	2	24	CMP	168	37.0	36.8(E)
114		4,720	N OF SR 206	2	24	CMP	168	37.0	36.8(E)
115		3,145	N OF SR 206	2	30	CMP	178	36.5	36.3(E)
116		3,100	N OF SR 214	3	**	CBC	0	0.0	12'X4'
117	US 1	462	N OF WILDWOOD	1	**	CBC	47	0.0	2'X2'
118		2,376	N OF WATSON RD	1	**	CBC	102	0.0	4'X8'
119	SR 206	160	E OF US 1	1	18	CP	70	0.0	
120		975	E OF US 1	1	24	CP	74	0.0	
121		1,470	E OF I 95	1	18	CP	64	0.0	
122		3,800	E OF 95	1	18	CP	63	0.0	
123		5,580	E OF I 95	1	18	CP	64	0.0	
124	CORPUS CHRISTI CHURCH	300	S OF DATIL PEPPER RD	1	36	CMP	36	0.0	OPEN
125	US 1	0	MOULTRIE CREEK	1		BRG	0	-2.2	BRIDGE
126	FEC RR	0	MOULTRIE CREEK	1		BRG	0	-6.0	BRIDGE
127		7,900	NE OF I 95	1		BRG	0	24.0	BRIDGE

TABLE 12: DETAILED SOIL MAP UNITS

SOIL NUMBER	SOIL NAME
1	ADAMSVILLE FINE SAND
2	ASTATULA FINE SAND 0-8% SLOPE
3	MYAKKA FINE SAND
4	MYAKKA FINE SAND DEPRESSIONAL
5	ST JOHNS FINE SAND DEPRESSIONAL
6	TAVARES FINE SAND 0-5% SLOPE
7	IMMOKALEE FINE SAND
8	ZOLFO FINE SAND
9	POMONA FINE SAND
11	SMYRNA FINE SAND
12	ONA FINE SAND
13	ST JOHNS FINE SAND
14	CASSIA FINE SAND
15	POMELLO FINE SAND 0-5% SLOPE
16	ORSINO FINE SAND 0-5% SLOPE
18	FLORIDANA FINE SAND FREQUENTLY FLOODED
19	POMPANO FINE SAND
21	WABASSO FINE SAND
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED
23	PAOLA FINE SAND 0-8% SLOPE
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED
26	SAMSULA MUCK
27	ST AUGUSTINE FINE SAND
28	BEACHES
29	SATELLITE FINE SAND

TABLE 12: DETAILED SOIL MAP UNITS

SOIL NUMBER	SOIL NAME
30	WESCONNETT FINE SAND FREQUENTLY FLOODED
31	FRIP-SATELLITE COMPLEX
32	PALM BEACH SAND 0-5% SLOPE
33	JONATHAN FINE SAND
34	TOCOI FINE SAND
35	HONTOON MUCK
36	RIVIERA FINE SAND FREQUENTLY FLOODED
38	PITS
40	POTTSBURG FINE SAND
41	TOMOKA MUCK
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED
44	SPARR FINE SAND 0-5% SLOPE
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM
46	HOLOPAW FINE SAND
47	HOLOPAW FINE SAND FREQUENTLY FLOODED
48	WINDER FINE SAND FREQUENTLY FLOODED
49	MOULTRIE FINE SAND FREQUENTLY FLOODED
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM
51	ST AUGUSTINE-URBAN LAND COMPLEX
52	DURBIN MUCK FREQUENTLY FLOODED
53	IMMOKALEE-URBAN LAND COMPLEX
54	ASTATULA-URBAN LAND COMPLEX
55	ARENTS 0-2% SLOPE
57	ADAMSVILLE VARIANT FINE SAND
58	EAUGALLIE FINE SAND
61	RIVIERA FINE SAND DEPRESSIONAL

TABLE 12: DETAILED SOIL MAP UNITS

SOIL NUMBER	SOIL NAME
62	FLORIDANA FINE SAND
63	PLACID FINE SAND
64	ELLZEY FINE SAND
65	RIVIERA FINE SAND
66	TERRA CEIA MUCK FREQUENTLY FLOODED
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED
68	WINDER FINE SAND
69	BAKERSVILLE MUCK

TABLE 13: SOIL SERIES AND RELATED SOIL UNITS

SOIL SERIES	SOIL NO.	SOIL NAME
- - -	38	PITS
	55	ARENTS
ADAMSVILLE	1	ADAMSVILLE FINE SAND
	57	ADAMSVILLE VARIANT FINE SAND
ASTATULA	2	ASTATULA FINE SAND 0-8% SLOPE
	54	ASTATULA-URBAN LAND COMPLEX
BAKERSVILLE	69	BAKERSVILLE MUCK
BEACHES	28	BEACHES
BLUFF	42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED
CASSIA	14	CASSIA FINE SAND
DURBIN	52	DURBIN MUCK FREQUENTLY FLOODED
EAUGALLIE	58	EAUGALLIE FINE SAND
ELLZEY	64	ELLZEY FINE SAND
FLORIDANA	18	FLORIDANA FINE SAND FREQUENTLY FLOODED
	62	FLORIDANA FINE SAND
FRIPP	31	FRIP-SATELLITE COMPLEX
HOLOPAW	46	HOLOPAW FINE SAND
	47	HOLOPAW FINE SAND FREQUENTLY FLOODED
HONTOON	35	HONTOON MUCK
IMMOKALEE	7	IMMOKALEE FINE SAND
	53	IMMOKALEE-URBAN LAND COMPLEX
JONATHAN	33	JONATHAN FINE SAND
MANATEE	22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED
MOULTRIE	49	MOULTRIE FINE SAND FREQUENTLY FLOODED
MYAKKA	3	MYAKKA FINE SAND
MYAKKA DEPRESS	4	MYAKKA FINE SAND DEPRESSIONAL
NARCOOSSEE	50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM
ONA	12	ONA FINE SAND
ORSINO	16	ORSINO FINE SAND 0-5% SLOPE

TABLE 13: SOIL SERIES AND RELATED SOIL UNITS

SOIL SERIES	SOIL NO.	SOIL NAME
PALM BEACH	32	PALM BEACH SAND 0-5% SLOPE
PAOLA	23	PAOLA FINE SAND 0-8% SLOPE
PARKWOOD	25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED
PELLICER	24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED
PLACID	63	PLACID FINE SAND
POMELLO	15	POMELLO FINE SAND 0-5% SLOPE
POMONA	9	POMONA FINE SAND
POMPANO	19	POMPANO FINE SAND
POTTSBURG	40	POTTSBURG FINE SAND
RIVIERA	36	RIVIERA FINE SAND FREQUENTLY FLOODED
	65	RIVIERA FINE SAND
RIVIERA DEPRESS	61	RIVIERA FINE SAND DEPRESSIONAL
SAMSULA	26	SAMSULA MUCK
SATELLITE	29	SATELLITE FINE SAND
	31	FRIP-SATELLITE COMPLEX
SMYRNA	11	SMYRNA FINE SAND
SPARR	44	SPARR FINE SAND 0-5% SLOPE
ST AUGUSTINE	27	ST AUGUSTINE FINE SAND
	45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM
	51	ST AUGUSTINE-URBAN LAND COMPLEX
ST JOHNS	13	ST JOHNS FINE SAND
ST JOHNS DEPRESS	5	ST JOHNS FINE SAND DEPRESSIONAL
TAVARES	6	TAVARES FINE SAND 0-5% SLOPE
TERRA CEIA	66	TERRA CEIA MUCK FREQUENTLY FLOODED
TISONIA	67	TISONIA MUCKY PEAT FREQUENTLY FLOODED
TOCOI	34	TOCOI FINE SAND
TOMOKA	41	TOMOKA MUCK
WABASSO	21	WABASSO FINE SAND

TABLE 13: SOIL SERIES AND RELATED SOIL UNITS

SOIL SERIES	SOIL NO.	SOIL NAME
WESCONNETT	30	WESCONNETT FINE SAND FREQUENTLY FLOODED
WINDER	48	WINDER FINE SAND FREQUENTLY FLOODED
	68	WINDER FINE SAND
ZOLFO	8	ZOLFO FINE SAND

TABLE 14: SOIL LIMITATIONS FOR SEPTIC TANKS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS		
1	ADAMSVILLE FINE SAND	SEVERE	WETNESS		POOR FILTER
2	ASTATULA FINE SAND 0-8% SLOPE	SLIGHT		*	
3	MYAKKA FINE SAND	SEVERE	WETNESS		
4	MYAKKA FINE SAND DEPRESSIONAL	SEVERE		PONDING	
5	ST JOHNS FINE SAND DEPRESSIONAL	SEVERE		PONDING	
6	TAVARES FINE SAND 0-5% SLOPE	MODERATE	WETNESS	*	
7	IMMOKALEE FINE SAND	SEVERE	WETNESS		
8	ZOLFO FINE SAND	SEVERE	WETNESS		POOR FILTER
9	POMONA FINE SAND	SEVERE	WETNESS		PERCS SLOWLY
11	SMYRNA FINE SAND	SEVERE	WETNESS		POOR FILTER
12	ONA FINE SAND	SEVERE	WETNESS		POOR FILTER
13	ST JOHNS FINE SAND	SEVERE	WETNESS		
14	CASSIA FINE SAND	SEVERE	WETNESS		
15	POMELLO FINE SAND 0-5% SLOPE	SEVERE	WETNESS		POOR FILTER
16	ORSINO FINE SAND 0-5% SLOPE	MODERATE	WETNESS		
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	PERCS SLOWLY
19	POMPANO FINE SAND	SEVERE	WETNESS		POOR FILTER
21	WABASSO FINE SAND	SEVERE	WETNESS		PERCS SLOWLY
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
23	PAOLA FINE SAND 0-8% SLOPE	SLIGHT		*	
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	PERCS SLOWLY
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	PERCS SLOWLY
26	SAMSULA MUCK	SEVERE		PONDING	POOR FILTER
27	ST AUGUSTINE FINE SAND	SEVERE	WETNESS		POOR FILTER
28	BEACHES			*	
29	SATELLITE FINE SAND	SEVERE	WETNESS		POOR FILTER

TABLE 14: SOIL LIMITATIONS FOR SEPTIC TANKS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF	LIMITATIONS
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS, FLOODING	POOR FILTER
31	FRIP-SATELLITE COMPLEX	SLIGHT	*	
		SEVERE	WETNESS	POOR FILTER
32	PALM BEACH SAND 0-5% SLOPE	SLIGHT	*	
33	JONATHAN FINE SAND	SEVERE	WETNESS	POOR FILTER, PERCS SLOWLY
34	TOCOI FINE SAND	SEVERE	WETNESS	
35	HONTOON MUCK	SEVERE	PONDING	POOR FILTER
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS, FLOODING	PERCS SLOWLY
38	PITS			
40	POTTSBURG FINE SAND	SEVERE	WETNESS	
41	TOMOKA MUCK	SEVERE	PONDING	POOR FILTER
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS, FLOODING	PERCS SLOWLY
44	SPARR FINE SAND 0-5% SLOPE	SEVERE	WETNESS	
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	SEVERE	WETNESS	
46	HOLOPAW FINE SAND	SEVERE	WETNESS	POOR FILTER
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS, FLOODING	
48	WINDER FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS, FLOODING	PERCS SLOWLY
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS, FLOODING	POOR FILTER
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	SEVERE	WETNESS	POOR FILTER
51	ST AUGUSTINE-URBAN LAND COMPLEX	SEVERE	WETNESS	POOR FILTER
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE	WETNESS, FLOODING	POOR FILTER
53	IMMOKALEE-URBAN LAND COMPLEX	SEVERE	WETNESS	
54	ASTATULA-URBAN LAND COMPLEX	SLIGHT	*	
55	ARENTS 0-2% SLOPE			
57	ADAMSVILLE VARIANT FINE SAND	SEVERE	WETNESS	POOR FILTER
58	EAUGALLIE FINE SAND	SEVERE	WETNESS	

TABLE 14: SOIL LIMITATIONS FOR SEPTIC TANKS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS		
61	RIVIERA FINE SAND DEPRESSIONAL	SEVERE		PONDING	PERCS SLOWLY
62	FLORIDANA FINE SAND	SEVERE	WETNESS		PERCS SLOWLY
63	PLACID FINE SAND	SEVERE	WETNESS		POOR FILTER
64	ELLZEY FINE SAND	SEVERE	WETNESS		
65	RIVIERA FINE SAND	SEVERE	WETNESS		PERCS SLOWLY
66	TERRA CEIA MUCK FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	POOR FILTER
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	PERCS SLOWLY
68	WINDER FINE SAND	SEVERE	WETNESS		PERCS SLOWLY
69	BAKERSVILLE MUCK	SEVERE		PONDING	

TABLE 15: SEASONAL HIGH WATER TABLE

SOIL NO.	SOIL NAME	DEPTH TO WATER (FT)		KIND OF WATER TABLE	MONTHS WATER TABLE	WATER IS HIGH
1	ADAMSVILLE FINE SAND	2.0	3.5	APPARENT	JUN	NOV
2	ASTATULA FINE SAND 0-8% SLOPE	6.0	%			
3	MYAKKA FINE SAND	0.0	1.0	APPARENT	JUN	NOV
4	MYAKKA FINE SAND DEPRESSIONAL	+2.0	1.0	APPARENT	JUN	FEB
5	ST JOHNS FINE SAND DEPRESSIONAL	+2.0	1.0	APPARENT	JUN	APR
6	TAVARES FINE SAND 0-5% SLOPE	3.5	6.0	APPARENT	JUN	DEC
7	IMMOKALEE FINE SAND	0.0	1.0	APPARENT	JUN	NOV
8	ZOLFO FINE SAND	2.0	3.5	APPARENT	JUN	NOV
9	POMONA FINE SAND	0.0	1.0	APPARENT	JUL	SEP
11	SMYRNA FINE SAND	0.0	1.0	APPARENT	JUL	OCT
12	ONA FINE SAND	0.0	1.0	APPARENT	JUN	NOV
13	ST JOHNS FINE SAND	0.0	1.0	APPARENT	JUN	APR
14	CASSIA FINE SAND	1.5	3.5	APPARENT	JUL	JAN
15	POMELLO FINE SAND 0-5% SLOPE	2.0	3.5	APPARENT	JUL	NOV
16	ORSINO FINE SAND 0-5% SLOPE	3.5	5.0	APPARENT	JUN	DEC
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	0.0	1.0	APPARENT	JUN	FEB
19	POMPANO FINE SAND	0.0	1.0	APPARENT	JUN	NOV
21	WABASSO FINE SAND	0.0	1.0	APPARENT	JUN	OCT
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	0.0	1.0	APPARENT	JUN	FEB
23	PAOLA FINE SAND 0-8% SLOPE	6.0	%			
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	0.0	0.5	APPARENT	JAN	DEC
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	0.0	1.0	APPARENT	JUN	OCT
26	SAMSULA MUCK	+2.0	1.0	APPARENT	JAN	DEC
27	ST AUGUSTINE FINE SAND	1.5	3.0	APPARENT	JUL	OCT
28	BEACHES					
29	SATELLITE FINE SAND	1.0	3.5	APPARENT	JUN	NOV

TABLE 15: SEASONAL HIGH WATER TABLE

SOIL NO.	SOIL NAME	DEPTH TO WATER	(FT)	KIND OF WATER TABLE	MONTHS TABLE	WATER IS HIGH
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	0.0	1.0	APPARENT	JUN	FEB
31	FRIP-SATELLITE COMPLEX	6.0 1.0	% 3.5	APPARENT	JUN	NOV
32	PALM BEACH SAND 0-5% SLOPE	6.0	%			
33	JONATHAN FINE SAND	3.0	5.0	APPARENT	JUN	OCT
34	TOCOI FINE SAND	0.0	1.0	APPARENT	AUG	FEB
35	HONTOON MUCK	+2.0	1.0	APPARENT	JAN	DEC
36	RIVIERA FINE SAND FREQUENTLY FLOODED	0.0	1.0	APPARENT	JUN	DEC
38	PITS					
40	POTTSBURG FINE SAND	0.0	1.0	APPARENT	JUL	MAR
41	TOMOKA MUCK	+1.0	0.0	APPARENT	JUN	APR
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	0.0	1.0	APPARENT	JUL	DEC
44	SPARR FINE SAND 0-5% SLOPE	1.5	3.5	APPARENT	JUL	OCT
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	1.5	3.0	APPARENT	JUL	OCT
46	HOLOPAW FINE SAND	0.0	1.0	APPARENT	JUN	NOV
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	0.0	1.0	APPARENT	JUN	FEB
48	WINDER FINE SAND FREQUENTLY FLOODED	0.0	1.0	APPARENT	JUN	DEC
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	0.0	1.0	APPARENT	JAN	DEC
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	2.0	3.5	APPARENT	JUN	NOV
51	ST AUGUSTINE-URBAN LAND COMPLEX	1.5	3.0	APPARENT	JUL	OCT
52	DURBIN MUCK FREQUENTLY FLOODED	0.0	0.5	APPARENT	JAN	DEC
53	IMMOKALEE-URBAN LAND COMPLEX	0.0	1.0	APPARENT	JUN	NOV
54	ASTATULA-URBAN LAND COMPLEX	6.0	%			
55	ARENTS 0-2% SLOPE					
57	ADAMSVILLE VARIANT FINE SAND	2.0	3.5	APPARENT	JUN	NOV
58	EAUGALLIE FINE SAND	0.0	1.0	APPARENT	JUN	OCT
61	RIVIERA FINE SAND DEPRESSIONAL	+2.0	1.0	APPARENT	JUN	DEC

TABLE 15: SEASONAL HIGH WATER TABLE

SOIL NO.	SOIL NAME	DEPTH TO WATER	(FT)	KIND OF WATER TABLE	MONTHS WATER TABLE	IS HIGH
62	FLORIDANA FINE SAND	0.0	1.0	APPARENT	JUN	FEB
63	PLACID FINE SAND	0.0	1.0	APPARENT	JUN	MAR
64	ELLZEY FINE SAND	0.0	1.0	APPARENT	JUN	OCT
65	RIVIERA FINE SAND	0.0	1.0	APPARENT	JUN	DEC
66	TERRA CEIA MUCK FREQUENTLY FLOODED	0.0	1.0	APPARENT	JAN	DEC
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	0.0	0.5	APPARENT	JAN	DEC
68	WINDER FINE SAND	0.0	1.0	APPARENT	JUN	DEC
69	BAKERSVILLE MUCK	+2.0	1.0	APPARENT	JUL	MAR

TABLE 15: SOIL LIMITATIONS FOR EMBANKMENTS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND	OF	LIMITATIONS	
1	ADAMSVILLE FINE SAND	SEVERE	SEEPAGE	PIPING		
2	ASTATULA FINE SAND 0-8% SLOPE	SEVERE	SEEPAGE	PIPING		
3	MYAKKA FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
4	MYAKKA FINE SAND DEPRESSIONAL	SEVERE	SEEPAGE	PIPING		PONDING
5	ST JOHNS FINE SAND DEPRESSIONAL	SEVERE	SEEPAGE	PIPING		PONDING
6	TAVARES FINE SAND 0-5% SLOPE	SEVERE	SEEPAGE	PIPING		
7	IMMOKALEE FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
8	ZOLFO FINE SAND	SEVERE	SEEPAGE			
9	POMONA FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
11	SMYRNA FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
12	ONA FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
13	ST JOHNS FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
14	CASSIA FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
15	POMELLO FINE SAND 0-5% SLOPE	SEVERE	SEEPAGE	PIPING		
16	ORSINO FINE SAND 0-5% SLOPE	SEVERE	SEEPAGE	PIPING		
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE				WETNESS
19	POMPANO FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
21	WABASSO FINE SAND	SEVERE	SEEPAGE			WETNESS
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE				WETNESS
23	PAOLA FINE SAND 0-8% SLOPE	SEVERE	SEEPAGE	PIPING		
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE	HARD TO PACK		EXCESS SALT	WETNESS
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	SEEPAGE	PIPING		WETNESS
26	SAMSULA MUCK	SEVERE	EXCESS HUMUS			PONDING
27	ST AUGUSTINE FINE SAND	SEVERE	SEEPAGE	PIPING	EXCESS SALT	
28	BEACHES	*				
29	SATELLITE FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS

TABLE 16: SOIL LIMITATIONS FOR EMBANKMENTS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS			
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	SEEPAGE	PIPING		WETNESS
31	FRIP-SATELLITE COMPLEX	SEVERE SEVERE	SEEPAGE SEEPAGE	PIPING PIPING	* FRIPP * SATELLITE	WETNESS
32	PALM BEACH SAND 0-5% SLOPE	SEVERE	SEEPAGE	PIPING		
33	JONATHAN FINE SAND	SEVERE	SEEPAGE	PIPING		
34	TOCOI FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
35	HONTOON MUCK	SEVERE	EXCESS HUMUS			PONDING
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	SEEPAGE	PIPING		WETNESS
38	PITS	*				
40	POTTSBURG FINE SAND	SEVERE	SEEPAGE			WETNESS
41	TOMOKA MUCK	SEVERE		PIPING		PONDING
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE				WETNESS
44	SPARR FINE SAND 0-5% SLOPE	SEVERE	SEEPAGE			
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	SEVERE	SEEPAGE	PIPING		
46	HOLOPAW FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	SEEPAGE	PIPING		WETNESS
48	WINDER FINE SAND FREQUENTLY FLOODED	SEVERE	SEEPAGE			WETNESS
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	SEEPAGE	PIPING		WETNESS
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	SEVERE	SEEPAGE			
51	ST AUGUSTINE-URBAN LAND COMPLEX	SEVERE	SEEPAGE	PIPING		
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE	EXCESS HUMUS		EXCESS SALT	WETNESS
53	IMMOKALEE-URBAN LAND COMPLEX	SEVERE	SEEPAGE	PIPING		WETNESS
54	ASTATULA-URBAN LAND COMPLEX	SEVERE	SEEPAGE	PIPING		
55	ARENTS 0-2% SLOPE	*				
57	ADAMSVILLE VARIANT FINE SAND	SEVERE	SEEPAGE	PIPING		
58	EAUGALLIE FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
61	RIVIERA FINE SAND DEPRESSIONAL	SEVERE	SEEPAGE	PIPING		PONDING

TABLE 16: SOIL LIMITATIONS FOR EMBANKMENTS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS			
62	FLORIDANA FINE SAND	SEVERE				WETNESS
63	PLACID FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
64	ELLZEY FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
65	RIVIERA FINE SAND	SEVERE	SEEPAGE	PIPING		WETNESS
66	TERRA CEIA MUCK FREQUENTLY FLOODED	SEVERE	EXCESS HUMUS			WETNESS
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	HARD TO PACK		EXCESS SALT	WETNESS
68	WINDER FINE SAND	SEVERE				WETNESS
69	BAKERSVILLE MUCK	SEVERE	SEEPAGE	PIPING		PONDING

TABLE 17: SOIL LIMITATIONS FOR AQUIFER-FED EXCAVATED PONDS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS		
1	ADAMSVILLE FINE SAND	SEVERE	CUTBANKS CAVE		
2	ASTATULA FINE SAND 0-8% SLOPE	SEVERE		NO WATER	
3	MYAKKA FINE SAND	SEVERE	CUTBANKS CAVE		
4	MYAKKA FINE SAND DEPRESSIONAL	SEVERE	CUTBANKS CAVE		
5	ST JOHNS FINE SAND DEPRESSIONAL	SEVERE	CUTBANKS CAVE		
6	TAVARES FINE SAND 0-5% SLOPE	SEVERE	CUTBANKS CAVE		
7	IMMOKALEE FINE SAND	SEVERE	CUTBANKS CAVE		
8	ZOLFO FINE SAND	SEVERE	CUTBANKS CAVE		
9	POMONA FINE SAND	SEVERE	CUTBANKS CAVE	SLOW REFILL	
11	SMYRNA FINE SAND	SEVERE	CUTBANKS CAVE		
12	ONA FINE SAND	SEVERE	CUTBANKS CAVE		
13	ST JOHNS FINE SAND	SEVERE	CUTBANKS CAVE		
14	CASSIA FINE SAND	SEVERE	CUTBANKS CAVE		
15	POMELLO FINE SAND 0-5% SLOPE	SEVERE	CUTBANKS CAVE		
16	ORSINO FINE SAND 0-5% SLOPE	SEVERE	CUTBANKS CAVE		
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE	SLOW REFILL	
19	POMPANO FINE SAND	SEVERE	CUTBANKS CAVE		
21	WABASSO FINE SAND	SEVERE		SLOW REFILL	
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE		
23	PAOLA FINE SAND 0-8% SLOPE	SEVERE		NO WATER	
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE		SLOW REFILL	SALTY WATER
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE		
26	SAMSULA MUCK	SEVERE	CUTBANKS CAVE		
27	ST AUGUSTINE FINE SAND	SEVERE	CUTBANKS CAVE		SALTY WATER
28	BEACHES	*			
29	SATELLITE FINE SAND	SEVERE	CUTBANKS CAVE		

TABLE 17: SOIL LIMITATIONS FOR AQUIFER-FED EXCAVATED PONDS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND	OF	LIMITATIONS
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE		
31	FRIP-SATELLITE COMPLEX	SEVERE		NO WATER	* FRIPP
		SEVERE	CUTBANKS CAVE		* SATELLITE
32	PALM BEACH SAND 0-5% SLOPE	SEVERE		NO WATER	
33	JONATHAN FINE SAND	SEVERE	CUTBANKS CAVE	SLOW REFILL	
34	TOCOI FINE SAND	SEVERE	CUTBANKS CAVE		
35	HONTOON MUCK	SLIGHT	FAVORABLE		
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE		
38	PITS	*			
40	POTTSBURG FINE SAND	SEVERE	CUTBANKS CAVE		
41	TOMOKA MUCK	SEVERE	CUTBANKS CAVE		
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE		SLOW REFILL	
44	SPARR FINE SAND 0-5% SLOPE	SEVERE	CUTBANKS CAVE		
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	SEVERE	CUTBANKS CAVE		SALTY WATER
46	HOLOPAW FINE SAND	SEVERE	CUTBANKS CAVE		
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE		
48	WINDER FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE	SLOW REFILL	
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE		SALTY WATER
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	SEVERE	CUTBANKS CAVE		
51	ST AUGUSTINE-URBAN LAND COMPLEX	SEVERE	CUTBANKS CAVE		SALTY WATER
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE		SALTY WATER
53	IMMOKALEE-URBAN LAND COMPLEX	SEVERE	CUTBANKS CAVE		
54	ASTATULA-URBAN LAND COMPLEX	SEVERE		NO WATER	
55	ARENTS 0-2% SLOPE	*			
57	ADAMSVILLE VARIANT FINE SAND	SEVERE	CUTBANKS CAVE		
58	EAUGALLIE FINE SAND	SEVERE	CUTBANKS CAVE		
61	RIVIERA FINE SAND DEPRESSIONAL	SEVERE	CUTBANKS CAVE		

TABLE 17: SOIL LIMITATIONS FOR AQUIFER-FED EXCAVATED PONDS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS
62	FLORIDANA FINE SAND	SEVERE	CUTBANKS CAVE SLOW REFILL
63	PLACID FINE SAND	SEVERE	CUTBANKS CAVE
64	ELLZEY FINE SAND	SEVERE	CUTBANKS CAVE
65	RIVIERA FINE SAND	SEVERE	CUTBANKS CAVE
66	TERRA CEIA MUCK FREQUENTLY FLOODED	SLIGHT	
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	SLOW REFILL SALTY WATER
68	WINDER FINE SAND	SEVERE	CUTBANKS CAVE SLOW REFILL
69	BAKERSVILLE MUCK	SEVERE	CUTBANKS CAVE

TABLE 18: FEATURES AFFECTING SOILS USE FOR DRAINAGE

SOIL NO.	SOIL NAME					
1	ADAMSVILLE FINE SAND		CUTBANKS CAVE			
2	ASTATULA FINE SAND 0-8% SLOPE		DEEP TO WATER			
3	MYAKKA FINE SAND		CUTBANKS CAVE			
4	MYAKKA FINE SAND DEPRESSIONAL	PONDING	CUTBANKS CAVE			
5	ST JOHNS FINE SAND DEPRESSIONAL	PONDING	CUTBANKS CAVE			
6	TAVARES FINE SAND 0-5% SLOPE		DEEP TO WATER			
7	IMMOKALEE FINE SAND		CUTBANKS CAVE			
8	ZOLFO FINE SAND		CUTBANKS CAVE			
9	POMONA FINE SAND		CUTBANKS CAVE			
11	SMYRNA FINE SAND		CUTBANKS CAVE			
12	ONA FINE SAND		CUTBANKS CAVE			
13	ST JOHNS FINE SAND	WETNESS	CUTBANKS CAVE			
14	CASSIA FINE SAND		CUTBANKS CAVE			
15	POMELLO FINE SAND 0-5% SLOPE		CUTBANKS CAVE			
16	ORSINO FINE SAND 0-5% SLOPE		DEEP TO WATER			
18	FLORIDANA FINE SAND FREQUENTLY FLOODED			FLOODING	PERC SLOW	
19	POMPANO FINE SAND		CUTBANKS CAVE			
21	WABASSO FINE SAND		CUTBANKS CAVE		PERC SLOW	
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED			FLOODING		
23	PAOLA FINE SAND 0-8% SLOPE		DEEP TO WATER			
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED			FLOODING	PERC SLOW	EXCESS SALT
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED		CUTBANKS CAVE	FLOODING		
26	SAMSULA MUCK	PONDING			SUBSIDES	
27	ST AUGUSTINE FINE SAND		CUTBANKS CAVE			EXCESS SALT
28	BEACHES	*				
29	SATELLITE FINE SAND		CUTBANKS CAVE			

TABLE 18: FEATURES AFFECTING SOILS USE FOR DRAINAGE

SOIL NO.	SOIL NAME					
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	WETNESS	CUTBANKS CAVE	FLOODING		
31	FRIP-SATELLITE COMPLEX	* FRIPP * SATEL	DEEP TO WATER CUTBANKS CAVE			
32	PALM BEACH SAND 0-5% SLOPE		DEEP TO WATER			
33	JONATHAN FINE SAND		DEEP TO WATER			
34	TOCOI FINE SAND		CUTBANKS CAVE			
35	HONTOON MUCK	PONDING			SUBSIDES	
36	RIVIERA FINE SAND FREQUENTLY FLOODED	WETNESS		FLOODING	PERC SLOW	
38	PITS	*				
40	POTTSBURG FINE SAND		CUTBANKS CAVE			
41	TOMOKA MUCK	PONDING			SUBSIDES	
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED			FLOODING	PERC SLOW	
44	SPARR FINE SAND 0-5% SLOPE		CUTBANKS CAVE			
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM		CUTBANKS CAVE			
46	HOLOPAW FINE SAND		CUTBANKS CAVE			
47	HOLOPAW FINE SAND FREQUENTLY FLOODED		CUTBANKS CAVE	FLOODING		
48	WINDER FINE SAND FREQUENTLY FLOODED			FLOODING	PERC SLOW	
49	MOULTRIE FINE SAND FREQUENTLY FLOODED		CUTBANKS CAVE	FLOODING		EXCESS SALT
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM		CUTBANKS CAVE			
51	ST AUGUSTINE-URBAN LAND COMPLEX		CUTBANKS CAVE			
52	DURBIN MUCK FREQUENTLY FLOODED			FLOODING	SUBSIDES	EXCESS SALT
53	IMMOKALEE-URBAN LAND COMPLEX		CUTBANKS CAVE			
54	ASTATULA-URBAN LAND COMPLEX		DEEP TO WATER			
55	ARENTS 0-2% SLOPE	*				
57	ADAMSVILLE VARIANT FINE SAND		CUTBANKS CAVE			
58	EAUGALLIE FINE SAND		CUTBANKS CAVE			
61	RIVIERA FINE SAND DEPRESSIONAL	PONDING			PERC SLOW	

TABLE 18: FEATURES AFFECTING SOILS USE FOR DRAINAGE

SOIL NO.	SOIL NAME				
62	FLORIDANA FINE SAND				PERC SLOW
63	PLACID FINE SAND		CUTBANKS CAVE		
64	ELLZEY FINE SAND		CUTBANKS CAVE		
65	RIVIERA FINE SAND				PERC SLOW
66	TERRA CEIA MUCK FREQUENTLY FLOODED			FLOODING	SUBSIDES
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	WETNESS		FLOODING	PERC SLOW
68	WINDER FINE SAND				PERC SLOW
69	BAKERSVILLE MUCK	PONDING	CUTBANKS CAVE		SUBSIDES

TABLE 19: FEATURES AFFECTING SOILS USE FOR IRRIGATION

SOIL NO.	SOIL NAME					
1	ADAMSVILLE FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
2	ASTATULA FINE SAND 0-8% SLOPE		DROUGHTY	FAST INTAKE	SOIL BLOWING	
3	MYAKKA FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
4	MYAKKA FINE SAND DEPRESSIONAL	PONDING	DROUGHTY	FAST INTAKE		
5	ST JOHNS FINE SAND DEPRESSIONAL	PONDING	DROUGHTY	FAST INTAKE		
6	TAVARES FINE SAND 0-5% SLOPE		DROUGHTY	FAST INTAKE	SOIL BLOWING	
7	IMMOKALEE FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
8	ZOLFO FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
9	POMONA FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
11	SMYRNA FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
12	ONA FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
13	ST JOHNS FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
14	CASSIA FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
15	POMELLO FINE SAND 0-5% SLOPE	WETNESS	DROUGHTY	FAST INTAKE		
16	ORSINO FINE SAND 0-5% SLOPE		DROUGHTY	FAST INTAKE	SOIL BLOWING	
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	WETNESS		FAST INTAKE	SOIL BLOWING	
19	POMPANO FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
21	WABASSO FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	WETNESS			SOIL BLOWING	
23	PAOLA FINE SAND 0-8% SLOPE		DROUGHTY	FAST INTAKE	SOIL BLOWING	
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	WETNESS	FLOODING	EXCESS SALT		
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	WETNESS	FLOODING		SOIL BLOWING	
26	SAMSULA MUCK	PONDING			SOIL BLOWING	
27	ST AUGUSTINE FINE SAND	WETNESS	DROUGHTY	EXCESS SALT		
28	BEACHES					
29	SATELLITE FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		

TABLE 19: FEATURES AFFECTING SOILS USE FOR IRRIGATION

SOIL NO.	SOIL NAME					
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	WETNESS		FAST INTAKE	SOIL BLOWING	
31	FRIP-SATELLITE COMPLEX	SLOPE WETNESS	DROUGHTY DROUGHTY	FAST INTAKE FAST INTAKE	*FRIPP *SATEL	
32	PALM BEACH SAND 0-5% SLOPE		DROUGHTY	FAST INTAKE	SOIL BLOWING	
33	JONATHAN FINE SAND		DROUGHTY	FAST INTAKE	SOIL BLOWING	
34	TOCOI FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
35	HONTOON MUCK	PONDING			SOIL BLOWING	
36	RIVIERA FINE SAND FREQUENTLY FLOODED	WETNESS	DROUGHTY	FAST INTAKE		
38	PITS					
40	POTTSBURG FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
41	TOMOKA MUCK	PONDING				
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	WETNESS		PERC SLOW		
44	SPARR FINE SAND 0-5% SLOPE	WETNESS	DROUGHTY	FAST INTAKE		
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	WETNESS	DROUGHTY			
46	HOLOPAW FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	WETNESS	DROUGHTY	FAST INTAKE		
48	WINDER FINE SAND FREQUENTLY FLOODED	WETNESS	DROUGHTY	FAST INTAKE		
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	WETNESS	FLOODING	EXCESS SALT		
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	WETNESS	DROUGHTY	FAST INTAKE		
51	ST AUGUSTINE-URBAN LAND COMPLEX	WETNESS	DROUGHTY			
52	DURBIN MUCK FREQUENTLY FLOODED	WETNESS	FLOODING	EXCESS SALT		
53	IMMOKALEE-URBAN LAND COMPLEX	WETNESS	DROUGHTY	FAST INTAKE		
54	ASTATULA-URBAN LAND COMPLEX		DROUGHTY	FAST INTAKE	SOIL BLOWING	
55	ARENTS 0-2% SLOPE					
57	ADAMSVILLE VARIANT FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
58	EAUGALLIE FINE SAND	WETNESS	DROUGHTY	FAST INTAKE		
61	RIVIERA FINE SAND DEPRESSIONAL	PONDING	DROUGHTY	FAST INTAKE		

TABLE 19: FEATURES AFFECTING SOILS USE FOR IRRIGATION

SOIL NO.	SOIL NAME				
62	FLORIDANA FINE SAND	WETNESS		FAST INTAKE	SOIL BLOWING
63	PLACID FINE SAND	WETNESS		FAST INTAKE	SOIL BLOWING
64	ELLZEY FINE SAND	WETNESS		FAST INTAKE	
65	RIVIERA FINE SAND	WETNESS	DROUGHTY	FAST INTAKE	
66	TERRA CEIA MUCK FREQUENTLY FLOODED	WETNESS	FLOODING		SOIL BLOWING
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	WETNESS	FLOODING	PERC SLOW	
68	WINDER FINE SAND	WETNESS	DROUGHTY	FAST INTAKE	
69	BAKERSVILLE MUCK	PONDING		FAST INTAKE	

TABLE 20: FEATURES AFFECTING SOILS USE FOR TERRACES AND DIVERSIONS

SOIL NO.	SOIL NAME			
1	ADAMSVILLE FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING
2	ASTATULA FINE SAND 0-8% SLOPE		TOO SANDY	SOIL BLOWING
3	MYAKKA FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING
4	MYAKKA FINE SAND DEPRESSIONAL	PONDING	TOO SANDY	SOIL BLOWING
5	ST JOHNS FINE SAND DEPRESSIONAL	PONDING	TOO SANDY	
6	TAVARES FINE SAND 0-5% SLOPE		TOO SANDY	SOIL BLOWING
7	IMMOKALEE FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING
8	ZOLFO FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING
9	POMONA FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING
11	SMYRNA FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING
12	ONA FINE SAND	WETNESS	TOO SANDY	
13	ST JOHNS FINE SAND	WETNESS	TOO SANDY	
14	CASSIA FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING
15	POMELLO FINE SAND 0-5% SLOPE	WETNESS	TOO SANDY	SOIL BLOWING
16	ORSINO FINE SAND 0-5% SLOPE		TOO SANDY	SOIL BLOWING
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	WETNESS	PERC SLOW	SOIL BLOWING
19	POMPANO FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING
21	WABASSO FINE SAND	WETNESS	TOO SANDY	
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	WETNESS		SOIL BLOWING
23	PAOLA FINE SAND 0-8% SLOPE		TOO SANDY	SOIL BLOWING
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	WETNESS	PERC SLOW	
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	WETNESS		SOIL BLOWING
26	SAMSULA MUCK	PONDING		SOIL BLOWING
27	ST AUGUSTINE FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING
28	BEACHES			
29	SATELLITE FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING

TABLE 20: FEATURES AFFECTING SOILS USE FOR TERRACES AND DIVERSIONS

SOIL NO.	SOIL NAME				
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	WETNESS	TOO SANDY		
31	FRIP-SATELLITE COMPLEX	SLOPE WETNESS	TOO SANDY TOO SANDY	SOIL BLOWING SOIL BLOWING	
32	PALM BEACH SAND 0-5% SLOPE		TOO SANDY	SOIL BLOWING	
33	JONATHAN FINE SAND		TOO SANDY	SOIL BLOWING	
34	TOCOI FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING	
35	HONTOON MUCK	PONDING		SOIL BLOWING	
36	RIVIERA FINE SAND FREQUENTLY FLOODED	WETNESS	TOO SANDY	SOIL BLOWING	
38	PITS				
40	POTTSBURG FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING	
41	TOMOKA MUCK	PONDING			
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	WETNESS	PERC SLOW		
44	SPARR FINE SAND 0-5% SLOPE	WETNESS	TOO SANDY	SOIL BLOWING	
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	WETNESS	TOO SANDY	SOIL BLOWING	
46	HOLOPAW FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING	
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	WETNESS	TOO SANDY	SOIL BLOWING	
48	WINDER FINE SAND FREQUENTLY FLOODED	WETNESS	PERC SLOW	SOIL BLOWING	
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	WETNESS	TOO SANDY		
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	WETNESS	TOO SANDY	SOIL BLOWING	
51	ST AUGUSTINE-URBAN LAND COMPLEX	WETNESS	TOO SANDY	SOIL BLOWING	
52	DURBIN MUCK FREQUENTLY FLOODED	WETNESS			
53	IMMOKALEE-URBAN LAND COMPLEX	WETNESS	TOO SANDY	SOIL BLOWING	
54	ASTATULA-URBAN LAND COMPLEX		TOO SANDY	SOIL BLOWING	
55	ARENTS 0-2% SLOPE				
57	ADAMSVILLE VARIANT FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING	
58	EAUGALLIE FINE SAND	WETNESS	TOO SANDY	SOIL BLOWING	
61	RIVIERA FINE SAND DEPRESSIONAL	PONDING	TOO SANDY	SOIL BLOWING	

TABLE 20: FEATURES AFFECTING SOILS USE FOR TERRACES AND DIVERSIONS

SOIL NO.	SOIL NAME	
62	FLORIDANA FINE SAND	WETNESS PERC SLOW SOIL BLOWING
63	PLACID FINE SAND	WETNESS TOO SANDY SOIL BLOWING
64	ELLZEY FINE SAND	WETNESS TOO SANDY SOIL BLOWING
65	RIVIERA FINE SAND	WETNESS TOO SANDY SOIL BLOWING
66	TERRA CEIA MUCK FREQUENTLY FLOODED	WETNESS SOIL BLOWING
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	WETNESS PERC SLOW
68	WINDER FINE SAND	WETNESS PERC SLOW SOIL BLOWING
69	BAKERSVILLE MUCK	PONDING TOO SANDY

TABLE 21: FEATURES AFFECTING SOILS USE FOR GRASSED WATERWAYS

SOIL NO.	SOIL NAME				
1	ADAMSVILLE FINE SAND		DROUGHTY		
2	ASTATULA FINE SAND 0-8% SLOPE		DROUGHTY		
3	MYAKKA FINE SAND	WETNESS	DROUGHTY		
4	MYAKKA FINE SAND DEPRESSIONAL	WETNESS	DROUGHTY		
5	ST JOHNS FINE SAND DEPRESSIONAL	WETNESS	DROUGHTY		
6	TAVARES FINE SAND 0-5% SLOPE		DROUGHTY		
7	IMMOKALEE FINE SAND	WETNESS	DROUGHTY		
8	ZOLFO FINE SAND		DROUGHTY		
9	POMONA FINE SAND	WETNESS	DROUGHTY		
11	SMYRNA FINE SAND	WETNESS	DROUGHTY		
12	ONA FINE SAND	WETNESS	DROUGHTY		
13	ST JOHNS FINE SAND	WETNESS			
14	CASSIA FINE SAND		DROUGHTY		
15	POMELLO FINE SAND 0-5% SLOPE		DROUGHTY		
16	ORSINO FINE SAND 0-5% SLOPE		DROUGHTY		
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	WETNESS		PERC SLOW	
19	POMPANO FINE SAND	WETNESS	DROUGHTY		
21	WABASSO FINE SAND	WETNESS	DROUGHTY		
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	WETNESS			
23	PAOLA FINE SAND 0-8% SLOPE		DROUGHTY		
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	WETNESS		PERC SLOW	EXCESS SALT
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	WETNESS			
26	SAMSULA MUCK	WETNESS			
27	ST AUGUSTINE FINE SAND		DROUGHTY		
28	BEACHES	*			
29	SATELLITE FINE SAND	WETNESS	DROUGHTY		

TABLE 21: FEATURES AFFECTING SOILS USE FOR GRASSED WATERWAYS

SOIL NO.	SOIL NAME				
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	WETNESS			
31	FRIP-SATELLITE COMPLEX	WETNESS	DROUGHTY DROUGHTY		SLOPE
32	PALM BEACH SAND 0-5% SLOPE		DROUGHTY		
33	JONATHAN FINE SAND		DROUGHTY		
34	TOCOI FINE SAND	WETNESS	DROUGHTY		
35	HONTOON MUCK	WETNESS			
36	RIVIERA FINE SAND FREQUENTLY FLOODED	WETNESS	DROUGHTY	PERC SLOW	
38	PITS	*			
40	POTTSBURG FINE SAND	WETNESS	DROUGHTY		
41	TOMOKA MUCK	WETNESS			
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	WETNESS		PERC SLOW	
44	SPARR FINE SAND 0-5% SLOPE		DROUGHTY		
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM		DROUGHTY		
46	HOLOPAW FINE SAND	WETNESS	DROUGHTY		
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	WETNESS	DROUGHTY		
48	WINDER FINE SAND FREQUENTLY FLOODED	WETNESS	DROUGHTY	PERC SLOW	
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	WETNESS			EXCESS SALT
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM		DROUGHTY		
51	ST AUGUSTINE-URBAN LAND COMPLEX		DROUGHTY		
52	DURBIN MUCK FREQUENTLY FLOODED	WETNESS			EXCESS SALT
53	IMMOKALEE-URBAN LAND COMPLEX	WETNESS	DROUGHTY		
54	ASTATULA-URBAN LAND COMPLEX		DROUGHTY		
55	ARENTS 0-2% SLOPE	*			
57	ADAMSVILLE VARIANT FINE SAND		DROUGHTY		
58	EAUGALLIE FINE SAND	WETNESS	DROUGHTY		
61	RIVIERA FINE SAND DEPRESSIONAL	WETNESS	DROUGHTY	PERC SLOW	

TABLE 21: FEATURES AFFECTING SOILS USE FOR GRASSED WATERWAYS

SOIL NO.	SOIL NAME				
62	FLORIDANA FINE SAND	WETNESS		PERC SLOW	
63	PLACID FINE SAND	WETNESS			
64	ELLZEY FINE SAND	WETNESS			
65	RIVIERA FINE SAND	WETNESS	DROUGHTY	PERC SLOW	
66	TERRA CEIA MUCK FREQUENTLY FLOODED	WETNESS			
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	WETNESS		PERC SLOW	EXCESS SALT
68	WINDER FINE SAND	WETNESS	DROUGHTY	PERC SLOW	
69	BAKERSVILLE MUCK	WETNESS			

TABLE 22: SOME PHYSICAL PROPERTIES OF SOILS

SOIL NO.	SOIL NAME	SOIL DEPTH	LAYERS (in.)	RANGE OF PERMEABILITY (in./hr)		PERCENT OF PARTICLES		MOIST DENSITY	BULK (g/cubic cm)
1	ADAMSVILLE FINE SAND	0	8	6.00	20.00	2.0	8.0	1.37	1.44
		8	80	6.00	20.00	1.0	7.0	1.49	1.58
2	ASTATULA FINE SAND 0-8% SLOPE	0	80	20.00	0.00	1.0	3.0	1.45	1.60
3	MYAKKA FINE SAND	0	23	6.00	20.00	0.0	2.0	1.36	1.44
		23	53	0.60	6.00	2.0	8.0	1.47	1.59
		53	80	6.00	20.00	0.0	2.0	1.48	1.61
4	MYAKKA FINE SAND DEPRESSIONAL	0	17	6.00	20.00	0.0	2.0	1.36	1.44
		17	[illegible]	[illegible]	6.00	2.0	8.0	1.47	1.59
		31	80	6.00	20.00	0.0	2.0	1.48	1.51
5	ST JOHNS FINE SAND DEPRESSIONAL	0	13	6.00	20.00	1.0	4.0	1.30	1.50
		13	25	6.00	20.00	1.0	3.0	1.50	1.70
		25	50	0.20	2.00	2.0	6.0	1.50	1.58
		50	80	6.00	20.00	1.0	4.0	1.50	1.65
6	TAVARES FINE SAND 0-5% SLOPE	0	7	6.00	20.00	0.5	4.0	1.25	1.45
		7	80	6.00	20.00	0.5	4.0	1.40	1.65
7	IMMOKALEE FINE SAND	0	8	6.00	20.00	1.0	5.0	1.20	1.50
		8	40	6.00	20.00	1.0	5.0	1.45	1.70
		40	64	0.60	2.00	2.0	7.0	1.30	1.60
		64	80	6.00	20.00	1.0	5.0	1.40	1.60
8	ZOLFO FINE SAND	0	5	6.00	20.00	1.0	5.0	1.40	1.55
		5	66	6.00	20.00	1.0	5.0	1.50	1.60
		66	80	0.60	2.00	1.0	5.0	1.50	1.70
9	POMONA FINE SAND	0	6	6.00	20.00	1.0	6.0	1.20	1.50
		6	21	6.00	20.00	1.0	6.0	1.45	1.70
		21	31	0.60	2.00	2.0	7.0	1.30	1.60
		31	47	6.00	20.00	1.0	6.0	1.40	1.60
		47	63	0.20	0.60	16.0	36.0	1.50	1.70
		63	80	6.00	20.00	1.0	6.0	1.45	1.70
11	SMYRNA FINE SAND	0	14	6.00	20.00	1.0	6.0	1.35	1.45
		14	21	0.60	6.00	3.0	8.0	1.35	1.45
		21	32	6.00	20.00	1.0	6.0	1.50	1.65
		32	45	0.60	6.00	3.0	8.0	1.35	1.45
		45	80	6.00	20.00	1.0	6.0	1.35	1.45
12	ONA FINE SAND	0	8	6.00	20.00	1.0	7.0	1.40	1.55
		8	25	0.60	2.00	3.0	8.0	1.50	1.65
		25	80	6.00	20.00	1.0	4.0	1.50	1.65
13	ST JOHNS FINE SAND	0	10	6.00	20.00	1.0	4.0	1.30	1.50
		10	15	6.00	20.00	1.0	3.0	1.50	1.70
		15	28	0.20	2.00	2.0	6.0	1.50	1.58
		28	42	6.00	20.00	1.0	4.0	1.50	1.65
		42	66	0.20	2.00	2.0	6.0	1.50	1.58

TABLE 22: SOME PHYSICAL PROPERTIES OF SOILS

SOIL NO.	SOIL NAME	SOIL DEPTH	LAYERS (in.)	RANGE OF PERMEABILITY (in./hr)		PERCENT OF PARTICLES		MOIST DENSITY	BULK (g/cubic cm)
13	ST JOHNS FINE SAND	66	80	6.00	20.00	1.0	4.0	1.50	1.65
14	CASSIA FINE SAND	0	18	6.00	20.00	1.0	4.0	1.30	1.55
		18	32	0.60	6.00	2.0	10.0	1.30	1.55
		32	75	6.00	20.00	1.0	5.0	1.40	1.60
		75	80	0.60	6.00	2.0	10.0	1.30	1.55
15	POMELLO FINE SAND 0-5% SLOPE	0	45	20.00	0.00	0.0	2.0	1.35	1.65
		45	57	2.00	6.00	0.0	2.0	1.45	1.60
		57	80	6.00	20.00	0.0	2.0	1.35	1.65
16	ORSINO FINE SAND 0-5% SLOPE	0	18	20.00	0.00	0.0	1.0	1.35	1.55
		18	80	20.00	0.00	0.0	2.0	1.35	1.55
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	0	18	6.00	20.00	3.0	10.0	1.40	1.49
		18	28	6.00	20.00	1.0	7.0	1.52	1.58
		28	80	0.00	0.20	15.0	30.0	1.60	1.69
19	POMPANO FINE SAND	0	80	20.00	0.00	0.0	5.0	1.30	1.65
21	WABASSO FINE SAND	0	25	6.00	20.00	0.0	5.0	1.25	1.55
		25	32	0.60	2.00	1.0	12.0	1.50	1.75
		32	45	0.00	0.20	12.0	30.0	1.60	1.80
		45	80	6.00	20.00	2.0	12.0	1.40	1.70
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	0	13	0.60	2.00	10.0	20.0	1.25	1.45
		13	34	0.60	2.00	10.0	20.0	1.50	1.65
		34	52	0.60	2.00	6.0	20.0	1.55	1.70
		52	80	0.60	2.00	6.0	20.0	1.55	1.70
23	PAOLA FINE SAND 0-8% SLOPE	0	17	20.00	0.00	0.0	2.0	1.45	1.60
		17	80	20.00	0.00	0.0	3.0	1.45	1.60
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	0	10	0.06	0.20	30.0	40.0	0.60	1.00
		10	70	0.00	0.06	35.0	60.0	0.50	1.00
		70	80	6.00	20.00	5.0	20.0	1.30	1.50
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	0	10	6.00	20.00	10.0	18.0	1.00	1.40
		10	55	0.06	0.60	15.0	22.0	1.30	1.55
		55	80	6.00	20.00	3.0	13.0	1.45	1.60
26	SAMSULA MUCK	0	31	6.00	20.00	0.0	0.0	0.25	0.50
		31	80	6.00	20.00	1.0	14.0	1.35	1.55
27	ST AUGUSTINE FINE SAND	0	10	6.00	20.00	0.0	2.0	1.30	1.40
		10	80	2.00	20.00	4.0	12.0	1.40	1.55
28	BEACHES	99	99	99.99	99.99	99.9	99.9	9.99	9.99
29	SATELLITE FINE SAND	0	6	20.00	0.00	1.0	3.0	1.10	1.45
		6	80	20.00	0.00	0.5	2.0	1.35	1.55

TABLE 22: SOME PHYSICAL PROPERTIES OF SOILS

SOIL NO.	SOIL NAME	SOIL DEPTH	LAYERS (in.)	RANGE OF PERMEABILITY (in./hr)		PERCENT PARTICLES	OF C	MOIST DENSITY	BULK (g/cubic cm)
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	0	8	6.00	20.00	1.0	7.0	1.10	1.40
		8	34	0.60	6.00	3.0	8.0	1.30	1.55
		34	45	6.00	20.00	2.0	7.0	1.35	1.50
		45	80	0.60	6.00	2.0	8.0	1.40	1.65
31	FRIP-SATELLITE COMPLEX	0	5	6.00	20.00	0.0	5.0	1.30	1.70
		5	80	6.00	20.00	0.0	5.0	1.30	1.70
		0	6	20.00	0.00	1.0	3.0	1.10	1.45
		6	80	20.00	0.00	0.5	2.0	1.35	1.55
32	PALM BEACH SAND 0-5% SLOPE	0	80	20.00	0.00	2.0	0.0	1.25	1.50
33	JONATHAN FINE SAND	0	4	6.00	20.00	0.0	3.0	1.30	1.55
		4	71	6.00	20.00	0.0	3.0	1.40	1.70
		71	80	0.00	0.20	1.0	8.0	1.55	1.75
34	TOCOI FINE SAND	0	13	6.00	20.00	0.0	5.0	1.35	1.45
		13	23	2.00	20.00	2.0	13.0	1.45	1.60
		23	45	6.00	20.00	0.0	5.0	1.35	1.50
		45	76	2.00	6.00	8.0	13.0	1.50	1.60
		76	80	0.60	20.00	2.0	13.0	1.40	1.60
35	HONTOON MUCK	0	55	6.00	20.00	0.0	0.0	0.22	0.38
		55	80	6.00	20.00	1.0	5.0	1.30	1.55
36	RIVIERA FINE SAND FREQUENTLY FLOODED	0	23	6.00	20.00	1.0	6.0	1.40	1.65
		23	28	0.00	0.20	12.0	25.0	1.50	1.70
		28	71	0.00	0.20	15.0	25.0	1.50	1.70
		71	80	0.60	6.00	1.0	8.0	1.40	1.65
38	PITS	0	0	0.00	0.00	0.0	0.0	0.00	0.00
40	POTTSBURG FINE SAND	0	60	6.00	20.00	0.0	5.0	1.20	1.45
		60	80	0.60	2.00	2.0	6.0	1.30	1.50
41	TOMOKA MUCK	0	21	6.00	20.00	5.0	0.0	0.25	0.30
		21	80	0.60	6.00	15.0	30.0	1.60	1.70
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	0	3	6.00	20.00	0.0	0.0	0.25	0.50
		3	9	0.20	0.60	20.0	40.0	0.65	1.25
		9	25	0.06	0.20	20.0	40.0	1.30	1.50
		25	53	0.06	0.20	20.0	40.0	1.30	1.50
		53	80	0.06	0.20	20.0	40.0	1.30	1.50
44	SPARR FINE SAND 0-5% SLOPE	0	3	6.00	20.00	1.0	5.0	1.20	1.50
		3	68	6.00	20.00	1.0	5.0	1.55	1.70
		68	80	0.60	2.00	15.0	32.0	1.55	1.70
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	0	21	6.00	20.00	1.0	6.0	1.30	1.40
		21	48	2.00	20.00	4.0	12.0	1.40	1.55
		48	53	0.20	0.60	15.0	20.0	1.40	1.60
		53	80	0.00	0.06	60.0	85.0	1.60	1.70

TABLE 22: SOME PHYSICAL PROPERTIES OF SOILS

SOIL NO.	SOIL NAME	SOIL DEPTH	LAYERS (in.)	RANGE OF PERMEABILITY (in./hr)		PERCENT OF PARTICLES	C	MOIST DENSITY	BULK (g/cubic cm)
46	HOLOPAW FINE SAND	0	53	6.00	20.00	1.0	7.0	1.35	1.60
		53	72	0.20	2.00	13.0	28.0	1.60	1.70
		72	80	6.00	20.00	7.0	13.0	1.50	1.60
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	0	50	6.00	20.00	2.0	5.0	1.20	1.60
		50	68	0.60	2.00	16.0	24.0	1.50	1.70
		68	80	6.00	20.00	6.0	12.0	1.20	1.60
48	WINDER FINE SAND FREQUENTLY FLOODED	0	11	6.00	20.00	1.0	6.0	1.40	1.65
		11	16	0.20	0.60	10.0	18.0	1.45	1.65
		16	42	0.00	0.20	20.0	30.0	1.60	1.70
		42	80	0.00	0.20	15.0	30.0	1.50	1.70
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	0	22	20.00	0.00	0.0	2.0	1.40	1.55
		22	29	2.00	20.00	2.0	8.0	1.45	1.60
		29	80	20.00	0.00	0.0	2.0	1.45	1.55
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	0	3	20.00	0.00	1.0	5.0	1.40	1.50
		3	11	20.00	0.00	1.0	5.0	1.40	1.60
		11	14	20.00	0.00	2.0	6.0	1.45	1.60
		14	80	6.00	20.00	1.0	5.0	1.40	1.50
51	ST AUGUSTINE-URBAN LAND COMPLEX	0	10	6.00	20.00	0.0	2.0	1.30	1.40
		10	80	2.00	20.00	4.0	12.0	1.40	1.55
52	DURBIN MUCK FREQUENTLY FLOODED	0	59	6.00	20.00	0.0	0.0	0.20	0.50
		59	80	6.00	20.00	2.0	5.0	1.30	1.45
53	IMMOKALEE-URBAN LAND COMPLEX	0	6	6.00	20.00	1.0	5.0	1.20	1.50
		6	42	6.00	20.00	1.0	5.0	1.45	1.70
		42	66	0.60	2.00	2.0	7.0	1.30	1.60
		66	80	6.00	20.00	1.0	5.0	1.40	1.60
54	ASTATULA-URBAN LAND COMPLEX	0	80	20.00	0.00	1.0	3.0	1.45	1.60
55	ARENTS 0-2% SLOPE	0	0	0.00	0.00	0.0	0.0	0.00	0.00
57	ADAMSVILLE VARIANT FINE SAND	0	10	20.00	0.00	2.0	8.0	1.05	1.44
		10	80	6.00	20.00	1.0	5.0	1.30	1.58
58	EAUGALLIE FINE SAND	0	17	6.00	20.00	0.0	5.0	1.25	1.50
		17	23	0.60	6.00	1.0	8.0	1.45	1.60
		23	53	6.00	20.00	1.0	5.0	1.45	1.65
		53	58	0.06	2.00	13.0	31.0	1.55	1.70
		58	80	0.60	6.00	1.0	13.0	1.45	1.55
61	RIVIERA FINE SAND DEPRESSIONAL	0	25	6.00	20.00	1.0	6.0	1.40	1.65
		25	35	0.00	0.20	12.0	25.0	1.50	1.70
		35	55	0.00	0.20	15.0	25.0	1.50	1.70
		55	80	0.60	6.00	1.0	8.0	1.40	1.65

TABLE 22: SOME PHYSICAL PROPERTIES OF SOILS

SOIL NO.	SOIL NAME	SOIL DEPTH	LAYERS (in.)	RANGE OF PERMEABILITY (in./hr)		PERCENT OF C PARTICLES		MOIST DENSITY	BULK (g/cubic cm)
62	FLORIDANA FINE SAND	0	11	6.00	20.00	3.0	10.0	1.40	1.49
		11	30	6.00	20.00	1.0	7.0	1.52	1.58
		30	80	0.00	0.20	15.0	30.0	1.60	1.69
63	PLACID FINE SAND	0	12	6.00	20.00	0.0	10.0	1.20	1.40
		12	80	6.00	20.00	0.0	10.0	1.30	1.60
64	ELLZEY FINE SAND	0	12	2.00	6.00	1.0	5.0	1.35	1.45
		12	37	2.00	6.00	2.0	6.0	1.35	1.50
		37	58	0.60	2.00	8.0	14.0	1.50	1.60
		58	80	2.00	6.00	2.0	7.0	1.40	1.60
65	RIVIERA FINE SAND	0	28	6.00	20.00	1.0	6.0	1.40	1.65
		28	40	0.00	0.20	12.0	25.0	1.50	1.70
		40	65	0.00	0.20	15.0	25.0	1.50	1.70
		65	80	0.60	6.00	1.0	8.0	1.40	1.65
66	TERRA CEIA MUCK FREQUENTLY FLOODED	0	80	6.00	20.00	0.0	0.0	0.15	0.35
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	0	18	6.00	20.00	0.0	0.0	0.20	0.50
		18	65	0.00	0.06	60.0	85.0	1.25	1.55
68	WINDER FINE SAND	0	10	6.00	20.00	1.0	6.0	1.40	1.65
		10	14	0.20	0.60	10.0	18.0	1.45	1.65
		14	56	0.00	0.20	20.0	30.0	1.60	1.70
		56	80	0.00	0.20	15.0	30.0	1.50	1.70
69	BAKERSVILLE MUCK	0	5	6.00	20.00	0.0	8.0	0.20	0.55
		5	41	2.00	6.00	1.0	10.0	1.40	1.65
		41	59	0.60	2.00	10.0	18.0	1.60	1.70
		59	86	2.00	6.00	1.0	10.0	1.40	1.65

TABLE 23: SOME PHYSICAL AND CHEMICAL SOIL PROPERTIES

SOIL NO.	SOIL NAME	SOIL LAYERS DEPTH	(in.)	AVAILABLE CAPACITY	WATER (in./in.)	SOIL	pH
1	ADAMSVILLE FINE SAND	0	8	0.05	0.10	4.5	7.8
		8	80	0.03	0.08	4.5	7.8
2	ASTATULA FINE SAND 0-8% SLOPE	0	80	0.02	0.05	4.5	6.5
3	MYAKKA FINE SAND	0	23	0.02	0.05	3.6	6.5
		23	53	0.10	0.15	3.6	6.5
		53	80	0.02	0.05	3.6	6.5
4	MYAKKA FINE SAND DEPRESSIONAL	0	17	0.02	0.05	3.6	6.5
		17	31	0.10	0.15	3.6	6.5
		31	80	0.02	0.05	3.6	6.5
5	ST JOHNS FINE SAND DEPRESSIONAL	0	13	0.10	0.15	3.6	5.5
		13	25	0.03	0.08	3.6	5.5
		25	50	0.10	0.30	3.6	5.5
		50	80	0.03	0.08	3.6	5.5
6	TAVARES FINE SAND 0-5% SLOPE	0	7	0.05	0.10	3.6	6.0
		7	80	0.02	0.05	4.5	6.0
7	IMMOKALEE FINE SAND	0	8	0.05	0.10	3.6	6.0
		8	40	0.02	0.05	3.6	6.0
		40	64	0.10	0.25	3.6	6.0
		64	80	0.02	0.05	3.6	6.0
8	ZOLFO FINE SAND	0	5	0.10	0.15	4.5	7.3
		5	66	0.03	0.10	4.5	7.3
		66	80	0.10	0.25	3.6	6.5
9	POMONA FINE SAND	0	6	0.05	0.10	3.6	5.5
		6	21	0.03	0.08	3.6	5.5
		21	31	0.10	0.15	3.6	5.5
		31	47	0.03	0.08	3.6	5.5
		47	63	0.13	0.17	3.6	5.5
		63	80	0.03	0.08	3.6	5.5
11	SMYRNA FINE SAND	0	14	0.03	0.07	3.6	7.3
		14	21	0.10	0.15	3.6	7.3
		21	32	0.03	0.07	4.5	5.5
		32	45	0.10	0.15	3.6	7.3
		45	80	0.13	0.07	3.6	7.3
12	ONA FINE SAND	0	8	0.10	0.15	3.6	6.0
		8	25	0.10	0.15	3.6	6.0
		25	80	0.03	0.08	3.6	6.0
13	ST JOHNS FINE SAND	0	10	0.10	0.15	3.6	5.5
		10	15	0.03	0.08	3.6	5.5
		15	28	0.10	0.30	3.6	5.5
		28	42	0.03	0.08	3.6	5.5
		42	66	0.10	0.30	3.6	5.5

TABLE 23: SOME PHYSICAL AND CHEMICAL SOIL PROPERTIES

SOIL NO.	SOIL NAME	SOIL DEPTH	LAYERS (in.)	AVAILABLE WATER CAPACITY (in./in.)	SOIL	pH
13	ST JOHNS FINE SAND	66	80	0.03	0.08	3.6 5.5
14	CASSIA FINE SAND	0	18	0.03	0.07	4.5 6.0
		18	32	0.10	0.15	4.5 6.0
		32	75	0.03	0.07	4.5 6.0
		75	80	0.10	0.15	4.5 6.0
15	POMELLO FINE SAND 0-5% SLOPE	0	45	0.02	0.05	4.5 6.0
		45	57	0.10	0.30	4.5 6.0
		57	80	0.02	0.05	4.5 6.0
16	ORSINO FINE SAND 0-5% SLOPE	0	18	0.02	0.08	3.6 6.0
		18	80	0.02	0.08	3.6 6.0
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	0	18	0.10	0.20	4.5 8.4
		18	28	0.05	0.10	4.5 8.4
		28	80	0.10	0.20	4.5 8.4
19	POMPANO FINE SAND	0	80	0.02	0.05	4.5 7.8
21	WABASSO FINE SAND	0	25	0.02	0.05	4.5 6.5
		25	32	0.10	0.15	4.5 7.3
		32	45	0.10	0.15	5.1 8.4
		45	80	0.05	0.10	7.4 8.4
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	0	13	0.15	0.25	5.6 8.4
		13	34	0.10	0.15	6.6 7.8
		34	52	0.08	0.15	7.4 8.4
		52	80	0.08	0.15	7.4 8.4
23	PAOLA FINE SAND 0-8% SLOPE	0	17	0.02	0.05	3.6 7.3
		17	80	0.02	0.05	3.6 7.3
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	0	10	0.20	0.30	6.1 8.4
		10	70	0.15	0.20	6.1 8.4
		70	80	0.05	0.10	6.1 8.4
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	0	10	0.15	0.26	6.6 8.4
		10	55	0.10	0.20	7.4 8.4
		55	80	0.05	0.22	7.4 8.4
26	SAMSULA MUCK	0	31	0.20	0.25	4.5 5.5
		31	80	0.02	0.05	3.6 5.5
27	ST AUGUSTINE FINE SAND	0	10	0.02	0.05	6.1 8.4
		10	80	0.05	0.10	6.1 8.4
28	BEACHES	99	99	9.99	9.99	9.9 9.9
29	SATELLITE FINE SAND	0	6	0.02	0.10	4.5 7.8
		6	80	0.02	0.05	4.5 7.8

TABLE 23: SOME PHYSICAL AND CHEMICAL SOIL PROPERTIES

SOIL NO.	SOIL NAME	SOIL DEPTH	LAYERS (in.)	AVAILABLE CAPACITY	WATER (in./in.)	SOIL	pH
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	0	8	0.10	0.15	3.6	6.5
		8	34	0.10	0.15	3.6	6.5
		34	45	0.05	0.08	3.6	6.5
		45	80	0.10	0.15	3.6	6.5
31	FRIP-SATELLITE COMPLEX	0	5	0.02	0.08	5.1	7.8
		5	80	0.01	0.03	5.6	7.8
		0	6	0.02	0.10	4.5	7.8
		6	80	0.02	0.05	4.5	7.8
32	PALM BEACH SAND 0-5% SLOPE	0	80	0.02	0.05	7.4	8.4
33	JONATHAN FINE SAND	0	4	0.05	0.08	4.5	5.5
		4	71	0.01	0.05	5.1	6.0
		71	80	0.10	0.15	3.6	5.0
34	TOCOI FINE SAND	0	13	0.02	0.10	3.6	7.3
		13	23	0.05	0.15	3.6	5.5
		23	45	0.02	0.10	3.6	5.5
		45	76	0.10	0.20	3.6	5.5
		76	80	0.05	0.15	3.6	5.5
35	HONTOON MUCK	0	55	0.20	0.25	4.5	5.5
		55	80	0.15	0.20	4.5	5.5
36	RIVIERA FINE SAND FREQUENTLY FLOODED	0	23	0.05	0.08	4.5	7.3
		23	28	0.10	0.14	6.1	8.4
		28	71	0.12	0.15	6.1	8.4
		71	80	0.05	0.08	7.9	8.4
38	PITS	0	0	0.00	0.00	0.0	0.0
40	POTTSBURG FINE SAND	0	60	0.03	0.07	4.5	6.5
		60	80	0.07	0.10	4.5	6.0
41	TOMOKA MUCK	0	21	0.30	0.50	3.6	4.4
		21	80	0.10	0.15	3.6	4.4
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	0	3	0.20	0.25	3.6	6.0
		3	9	0.18	0.20	5.6	7.3
		9	25	0.12	0.17	6.1	8.4
		25	53	0.12	0.17	6.1	8.4
		53	80	0.12	0.17	7.4	8.4
44	SPARR FINE SAND 0-5% SLOPE	0	3	0.08	0.12	4.5	6.5
		3	68	0.05	0.08	4.5	6.5
		68	80	0.11	0.15	4.5	6.5
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	0	21	0.02	0.05	6.1	8.4
		21	48	0.05	0.10	6.1	8.4
		48	53	0.10	0.20	6.1	8.4
		53	80	0.15	0.20	6.1	8.4

TABLE 23: SOME PHYSICAL AND CHEMICAL SOIL PROPERTIES

SOIL NO.	SOIL NAME	SOIL DEPTH	LAYERS (in.)	AVAILABLE CAPACITY	WATER (in./in.)	SOIL	pH
46	HOLOPAW FINE SAND	0	53	0.07	0.10	5.1	7.3
		53	72	0.15	0.20	5.1	8.4
		72	80	0.05	0.10	5.1	8.4
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	0	50	0.03	0.07	5.1	7.3
		50	68	0.10	0.15	5.1	8.4
		68	80	0.05	0.10	4.5	8.4
48	WINDER FINE SAND FREQUENTLY FLOODED	0	11	0.03	0.08	5.6	7.8
		11	16	0.06	0.10	6.1	7.8
		16	42	0.10	0.15	6.6	8.4
		42	80	0.06	0.12	7.4	8.4
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	0	22	0.02	0.05	6.1	8.4
		22	29	0.10	0.15	4.5	6.5
		29	80	0.02	0.05	4.5	6.5
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	0	3	0.03	0.10	3.6	6.0
		3	11	0.02	0.05	3.6	6.0
		11	14	0.05	0.10	5.1	6.5
		14	80	0.05	0.10	6.6	8.4
51	ST AUGUSTINE-URBAN LAND COMPLEX	0	10	0.02	0.05	6.1	8.4
		10	80	0.05	0.10	6.1	8.4
52	DURBIN MUCK FREQUENTLY FLOODED	0	59	0.20	0.25	3.6	7.3
		59	80	0.10	0.15	3.6	8.4
53	IMMOKALEE-URBAN LAND COMPLEX	0	6	0.05	0.10	3.6	6.0
		6	42	0.02	0.05	3.6	6.0
		42	66	0.10	0.25	3.6	6.0
		66	80	0.02	0.05	3.6	6.0
54	ASTATULA-URBAN LAND COMPLEX	0	80	0.02	0.05	4.5	6.5
55	ARENTS 0-2% SLOPE	0	0	0.00	0.00	0.0	0.0
57	ADAMSVILLE VARIANT FINE SAND	0	10	0.10	0.15	6.1	8.4
		10	80	0.05	0.10	6.6	8.4
58	EAUGALLIE FINE SAND	0	17	0.02	0.07	4.5	6.0
		17	23	0.15	0.25	4.5	6.5
		23	53	0.02	0.05	5.1	7.8
		53	58	0.10	0.20	5.1	7.8
		58	80	0.05	0.15	5.1	7.8
61	RIVIERA FINE SAND DEPRESSIONAL	0	25	0.05	0.08	4.5	7.3
		25	35	0.10	0.14	6.1	8.4
		35	55	0.12	0.15	6.1	8.4
		55	80	0.05	0.08	7.9	8.4

TABLE 23: SOME PHYSICAL AND CHEMICAL SOIL PROPERTIES

SOIL NO.	SOIL NAME	SOIL DEPTH	LAYERS (in.)	AVAILABLE CAPACITY	WATER (in./in.)	SOIL	pH
62	FLORIDANA FINE SAND	0	11	0.10	0.20	4.5	8.4
		11	30	0.05	0.10	4.5	8.4
		30	80	0.10	0.20	4.5	8.4
63	PLACID FINE SAND	0	12	0.15	0.20	3.6	5.5
		12	80	0.05	0.08	3.6	6.5
64	ELLZEY FINE SAND	0	12	0.10	0.20	5.6	7.3
		12	37	0.10	0.15	5.6	7.3
		37	58	0.15	0.20	4.5	7.3
		58	80	0.10	0.15	4.5	7.3
65	RIVIERA FINE SAND	0	28	0.05	0.08	4.5	7.3
		28	40	0.10	0.14	6.1	8.4
		40	65	0.12	0.15	6.1	8.4
		65	80	0.05	0.08	7.9	8.4
66	TERRA CEIA MUCK FREQUENTLY FLOODED	0	80	0.30	0.50	5.6	8.4
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	0	18	0.25	0.35	6.1	7.8
		18	65	0.15	0.20	6.1	7.8
68	WINDER FINE SAND	0	10	0.03	0.08	5.6	7.8
		10	14	0.06	0.10	6.1	7.8
		14	56	0.10	0.15	6.6	8.4
		56	80	0.06	0.12	7.4	8.4
69	BAKERSVILLE MUCK	0	5	0.20	0.25	4.5	5.5
		5	41	0.10	0.20	4.5	5.5
		41	59	0.10	0.20	4.5	5.5
		59	86	0.05	0.15	4.5	5.5

TABLE 24: SOIL LIMITATIONS FOR SHALLOW EXCAVATIONS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS
1	ADAMSVILLE FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
2	ASTATULA FINE SAND 0-8% SLOPE	SEVERE	CUTBANKS CAVE
3	MYAKKA FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
4	MYAKKA FINE SAND DEPRESSIONAL	SEVERE	CUTBANKS CAVE PONDING
5	ST JOHNS FINE SAND DEPRESSIONAL	SEVERE	CUTBANKS CAVE PONDING
6	TAVARES FINE SAND 0-5% SLOPE	SEVERE	CUTBANKS CAVE
7	IMMOKALEE FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
8	ZOLFO FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
9	POMONA FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
11	SMYRNA FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
12	ONA FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
13	ST JOHNS FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
14	CASSIA FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
15	POMELLO FINE SAND 0-5% SLOPE	SEVERE	CUTBANKS CAVE WETNESS
16	ORSINO FINE SAND 0-5% SLOPE	SEVERE	CUTBANKS CAVE
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE WETNESS
19	POMPANO FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
21	WABASSO FINE SAND	SEVERE	WETNESS
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS
23	PAOLA FINE SAND 0-8% SLOPE	SEVERE	CUTBANKS CAVE
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE WETNESS
26	SAMSULA MUCK	SEVERE	CUTBANKS CAVE PONDING EXCESS HUMUS
27	ST AUGUSTINE FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
28	BEACHES		
29	SATELLITE FINE SAND	SEVERE	CUTBANKS CAVE WETNESS

TABLE 24: SOIL LIMITATIONS FOR SHALLOW EXCAVATIONS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND	OF	LIMITATIONS
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE	WETNESS	
31	FRIP-SATELLITE COMPLEX	SEVERE	CUTBANKS CAVE		*FRIPP
		SEVERE	CUTBANKS CAVE	WETNESS	*SATEL
32	PALM BEACH SAND 0-5% SLOPE	SEVERE	CUTBANKS CAVE		
33	JONATHAN FINE SAND	SEVERE	CUTBANKS CAVE		
34	TOCOI FINE SAND	SEVERE	CUTBANKS CAVE	WETNESS	
35	HONTOON MUCK	SEVERE		PONDING	EXCESS HUMUS
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE	WETNESS	
38	PITS				
40	POTTSBURG FINE SAND	SEVERE	CUTBANKS CAVE	WETNESS	
41	TOMOKA MUCK	SEVERE	CUTBANKS CAVE	PONDING	EXCESS HUMUS
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE		WETNESS	
44	SPARR FINE SAND 0-5% SLOPE	SEVERE	CUTBANKS CAVE		
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	SEVERE	CUTBANKS CAVE	WETNESS	
46	HOLOPAW FINE SAND	SEVERE	CUTBANKS CAVE	WETNESS	
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE	WETNESS	
48	WINDER FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE	WETNESS	
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	CUTBANKS CAVE	WETNESS	FLOODING
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	SEVERE	CUTBANKS CAVE	WETNESS	
51	ST AUGUSTINE-URBAN LAND COMPLEX	SEVERE	CUTBANKS CAVE	WETNESS	
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE		WETNESS	EXCESS HUMUS
53	IMMOKALEE-URBAN LAND COMPLEX	SEVERE	CUTBANKS CAVE	WETNESS	
54	ASTATULA-URBAN LAND COMPLEX	SEVERE	CUTBANKS CAVE		
55	ARENTS 0-2% SLOPE				
57	ADAMSVILLE VARIANT FINE SAND	SEVERE	CUTBANKS CAVE	WETNESS	
58	EAUGALLIE FINE SAND	SEVERE	CUTBANKS CAVE	WETNESS	
61	RIVIERA FINE SAND DEPRESSIONAL	SEVERE	CUTBANKS CAVE	PONDING	

TABLE 24: SOIL LIMITATIONS FOR SHALLOW EXCAVATIONS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS
62	FLORIDANA FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
63	PLACID FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
64	ELLZEY FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
65	RIVIERA FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
66	TERRA CEIA MUCK FREQUENTLY FLOODED	SEVERE	WETNESS EXCESS HUMUS
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	WETNESS
68	WINDER FINE SAND	SEVERE	CUTBANKS CAVE WETNESS
69	BAKERSVILLE MUCK	SEVERE	CUTBANKS CAVE PONDING

TABLE 25: SOIL LIMITATIONS FOR DWELLING UNITS WITHOUT BASEMENTS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS		
1	ADAMSVILLE FINE SAND	MODERATE	WETNESS		
2	ASTATULA FINE SAND 0-8% SLOPE	SLIGHT			
3	MYAKKA FINE SAND	SEVERE	WETNESS		
4	MYAKKA FINE SAND DEPRESSIONAL	SEVERE	PONDING		
5	ST JOHNS FINE SAND DEPRESSIONAL	SEVERE	PONDING		
6	TAVARES FINE SAND 0-5% SLOPE	SLIGHT			
7	IMMOKALEE FINE SAND	SEVERE	WETNESS		
8	ZOLFO FINE SAND	MODERATE	WETNESS		
9	POMONA FINE SAND	SEVERE	WETNESS		
11	SMYRNA FINE SAND	SEVERE	WETNESS		
12	ONA FINE SAND	SEVERE	WETNESS		
13	ST JOHNS FINE SAND	SEVERE	WETNESS		
14	CASSIA FINE SAND	MODERATE	WETNESS		
15	POMELLO FINE SAND 0-5% SLOPE	MODERATE	WETNESS		
16	ORSINO FINE SAND 0-5% SLOPE	SLIGHT			
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
19	POMPANO FINE SAND	SEVERE	WETNESS		
21	WABASSO FINE SAND	SEVERE	WETNESS		
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
23	PAOLA FINE SAND 0-8% SLOPE	SLIGHT			
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	SHRINK-SWELL
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
26	SAMSULA MUCK	SEVERE	PONDING		LOW STRENGTH
27	ST AUGUSTINE FINE SAND	SEVERE		FLOODING	
28	BEACHES				
29	SATELLITE FINE SAND	SEVERE	WETNESS		

TABLE 25: SOIL LIMITATIONS FOR DWELLING UNITS WITHOUT BASEMENTS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF	LIMITATIONS
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
31	FRIP-SATELLITE COMPLEX	MODERATE SEVERE	SLOPE WETNESS	*FRIPP *SATEL
32	PALM BEACH SAND 0-5% SLOPE	SLIGHT		
33	JONATHAN FINE SAND	SLIGHT		
34	TOCOI FINE SAND	SEVERE	WETNESS	
35	HONTOON MUCK	SEVERE	PONDING	LOW STRENGTH
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
38	PITS			
40	POTTSBURG FINE SAND	SEVERE	WETNESS	
41	TOMOKA MUCK	SEVERE	PONDING	LOW STRENGTH
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	SHRINK-SWELL
44	SPARR FINE SAND 0-5% SLOPE	MODERATE	WETNESS	
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	SEVERE	FLOODING	
46	HOLOPAW FINE SAND	SEVERE	WETNESS	
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
48	WINDER FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	MODERATE	WETNESS	
51	ST AUGUSTINE-URBAN LAND COMPLEX	SEVERE	FLOODING	
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	LOW STRENGTH
53	IMMOKALEE-URBAN LAND COMPLEX	SEVERE	WETNESS	
54	ASTATULA-URBAN LAND COMPLEX	SLIGHT		
55	ARENTS 0-2% SLOPE			
57	ADAMSVILLE VARIANT FINE SAND	MODERATE	WETNESS	
58	EAUGALLIE FINE SAND	SEVERE	WETNESS	
61	RIVIERA FINE SAND DEPRESSIONAL	SEVERE	PONDING	

TABLE 25: SOIL LIMITATIONS FOR DWELLING UNITS WITHOUT BASEMENTS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS		
62	FLORIDANA FINE SAND	SEVERE	WETNESS		
63	PLACID FINE SAND	SEVERE	WETNESS		
64	ELLZEY FINE SAND	SEVERE	WETNESS		
65	RIVIERA FINE SAND	SEVERE	WETNESS		
66	TERRA CEIA MUCK FREQUENTLY FLOODED	SEVERE	WETNESS		LOW STRENGTH
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	SHRINK-SWELL
68	WINDER FINE SAND	SEVERE	WETNESS		
69	BAKERSVILLE MUCK	SEVERE	PONDING		

TABLE 26: SOIL LIMITATIONS FOR DWELLING UNITS WITH BASEMENTS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS
1	ADAMSVILLE FINE SAND	SEVERE	WETNESS
2	ASTATULA FINE SAND 0-8% SLOPE	SLIGHT	
3	MYAKKA FINE SAND	SEVERE	WETNESS
4	MYAKKA FINE SAND DEPRESSIONAL	SEVERE	PONDING
5	ST JOHNS FINE SAND DEPRESSIONAL	SEVERE	PONDING
6	TAVARES FINE SAND 0-5% SLOPE	MODERATE	WETNESS
7	IMMOKALEE FINE SAND	SEVERE	WETNESS
8	ZOLFO FINE SAND	SEVERE	WETNESS
9	POMONA FINE SAND	SEVERE	WETNESS
11	SMYRNA FINE SAND	SEVERE	WETNESS
12	ONA FINE SAND	SEVERE	WETNESS
13	ST JOHNS FINE SAND	SEVERE	WETNESS
14	CASSIA FINE SAND	SEVERE	WETNESS
15	POMELLO FINE SAND 0-5% SLOPE	SEVERE	WETNESS
16	ORSINO FINE SAND 0-5% SLOPE	MODERATE	WETNESS
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING
19	POMPANO FINE SAND	SEVERE	WETNESS
21	WABASSO FINE SAND	SEVERE	WETNESS
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING
23	PAOLA FINE SAND 0-8% SLOPE	SLIGHT	
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING SHRINK-SWELL
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING
26	SAMSULA MUCK	SEVERE	PONDING
27	ST AUGUSTINE FINE SAND	SEVERE	WETNESS FLOODING
28	BEACHES		
29	SATELLITE FINE SAND	SEVERE	WETNESS

TABLE 26: SOIL LIMITATIONS FOR DWELLING UNITS WITH BASEMENTS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS		
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
31	FRIP-SATELLITE COMPLEX	MODERATE		SLOPE	*FRIPP
		SEVERE	WETNESS		*SATEL
32	PALM BEACH SAND 0-5% SLOPE	SLIGHT			
33	JONATHAN FINE SAND	MODERATE	WETNESS		
34	TOCOI FINE SAND	SEVERE	WETNESS		
35	HONTOON MUCK	SEVERE	PONDING		
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
38	PITS				
40	POTTSBURG FINE SAND	SEVERE	WETNESS		
41	TOMOKA MUCK	SEVERE	PONDING		
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	SHRINK-SWELL
44	SPARR FINE SAND 0-5% SLOPE	SEVERE	WETNESS		
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	SEVERE	WETNESS	FLOODING	
46	HOLOPAW FINE SAND	SEVERE	WETNESS		
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
48	WINDER FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	SEVERE	WETNESS		
51	ST AUGUSTINE-URBAN LAND COMPLEX	SEVERE	WETNESS	FLOODING	
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
53	IMMOKALEE-URBAN LAND COMPLEX	SEVERE	WETNESS		
54	ASTATULA-URBAN LAND COMPLEX	SLIGHT			
55	ARENTS 0-2% SLOPE				
57	ADAMSVILLE VARIANT FINE SAND	SEVERE	WETNESS		
58	EAUGALLIE FINE SAND	SEVERE	WETNESS		
61	RIVIERA FINE SAND DEPRESSIONAL	SEVERE	PONDING		

TABLE 26: SOIL LIMITATIONS FOR DWELLING UNITS WITH BASEMENTS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS
62	FLORIDANA FINE SAND	SEVERE	WETNESS
63	PLACID FINE SAND	SEVERE	WETNESS
64	ELLZEY FINE SAND	SEVERE	WETNESS
65	RIVIERA FINE SAND	SEVERE	WETNESS
66	TERRA CEIA MUCK FREQUENTLY FLOODED	SEVERE	WETNESS
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING SHRINK-SWELL
68	WINDER FINE SAND	SEVERE	WETNESS
69	BAKERSVILLE MUCK	SEVERE	PONDING

TABLE 27: SOIL LIMITATIONS FOR SMALL COMMERCIAL BUILDINGS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS		
1	ADAMSVILLE FINE SAND	MODERATE	WETNESS		
2	ASTATULA FINE SAND 0-8% SLOPE	MODERATE		SLOPE	
3	MYAKKA FINE SAND	SEVERE	WETNESS		
4	MYAKKA FINE SAND DEPRESSIONAL	SEVERE	PONDING		
5	ST JOHNS FINE SAND DEPRESSIONAL	SEVERE	PONDING		
6	TAVARES FINE SAND 0-5% SLOPE	SLIGHT			
7	IMMOKALEE FINE SAND	SEVERE	WETNESS		
8	ZOLFO FINE SAND	MODERATE	WETNESS		
9	POMONA FINE SAND	SEVERE	WETNESS		
11	SMYRNA FINE SAND	SEVERE	WETNESS		
12	ONA FINE SAND	SEVERE	WETNESS		
13	ST JOHNS FINE SAND	SEVERE	WETNESS		
14	CASSIA FINE SAND	MODERATE	WETNESS		
15	POMELLO FINE SAND 0-5% SLOPE	MODERATE	WETNESS		
16	ORSINO FINE SAND 0-5% SLOPE	SLIGHT			
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
19	POMPANO FINE SAND	SEVERE	WETNESS		
21	WABASSO FINE SAND	SEVERE	WETNESS		
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
23	PAOLA FINE SAND 0-8% SLOPE	MODERATE		SLOPE	
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	SHRINK-SWELL
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
26	SAMSULA MUCK	SEVERE	PONDING		LOW STRENGTH
27	ST AUGUSTINE FINE SAND	SEVERE		FLOODING	
28	BEACHES				
29	SATELLITE FINE SAND	SEVERE	WETNESS		

TABLE 27: SOIL LIMITATIONS FOR SMALL COMMERCIAL BUILDINGS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF	LIMITATIONS
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
31	FRIP-SATELLITE COMPLEX	MODERATE	SLOPE	*FRIPP
		SEVERE	WETNESS	*SATEL
32	PALM BEACH SAND 0-5% SLOPE	SLIGHT		
33	JONATHAN FINE SAND	SLIGHT		
34	TOCOI FINE SAND	SEVERE	WETNESS	
35	HONTOON MUCK	SEVERE	PONDING	LOW STRENGTH
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
38	PITS			
40	POTTSBURG FINE SAND	SEVERE	WETNESS	
41	TOMOKA MUCK	SEVERE	PONDING	LOW STRENGTH
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	SHRINK-SWELL
44	SPARR FINE SAND 0-5% SLOPE	MODERATE	WETNESS	
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	SEVERE	FLOODING	
46	HOLOPAW FINE SAND	SEVERE	WETNESS	
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
48	WINDER FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	MODERATE	WETNESS	
51	ST AUGUSTINE-URBAN LAND COMPLEX	SEVERE	FLOODING	
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	LOW STRENGTH
53	IMMOKALEE-URBAN LAND COMPLEX	SEVERE	WETNESS	
54	ASTATULA-URBAN LAND COMPLEX	SLIGHT		
55	ARENTS 0-2% SLOPE			
57	ADAMSVILLE VARIANT FINE SAND	MODERATE	WETNESS	
58	EAUGALLIE FINE SAND	SEVERE	WETNESS	
61	RIVIERA FINE SAND DEPRESSIONAL	SEVERE	PONDING	

TABLE 27: SOIL LIMITATIONS FOR SMALL COMMERCIAL BUILDINGS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS		
62	FLORIDANA FINE SAND	SEVERE	WETNESS		
63	PLACID FINE SAND	SEVERE	WETNESS		
64	ELLZEY FINE SAND	SEVERE	WETNESS		
65	RIVIERA FINE SAND	SEVERE	WETNESS		
66	TERRA CEIA MUCK FREQUENTLY FLOODED	SEVERE	WETNESS		LOW STRENGTH
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	SHRINK-SWELL
68	WINDER FINE SAND	SEVERE	WETNESS		
69	BAKERSVILLE MUCK	SEVERE	PONDING		

TABLE 28: SOIL LIMITATIONS FOR LOCAL ROADS AND STREETS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATONS
1	ADAMSVILLE FINE SAND	MODERATE	WETNESS
2	ASTATULA FINE SAND 0-8% SLOPE	SLIGHT	
3	MYAKKA FINE SAND	SEVERE	WETNESS
4	MYAKKA FINE SAND DEPRESSIONAL	SEVERE	PONDING
5	ST JOHNS FINE SAND DEPRESSIONAL	SEVERE	PONDING
6	TAVARES FINE SAND 0-5% SLOPE	SLIGHT	
7	IMMOKALEE FINE SAND	SEVERE	WETNESS
8	ZOLFO FINE SAND	MODERATE	WETNESS
9	POMONA FINE SAND	SEVERE	WETNESS
11	SMYRNA FINE SAND	SEVERE	WETNESS
12	ONA FINE SAND	SEVERE	WETNESS
13	ST JOHNS FINE SAND	SEVERE	WETNESS
14	CASSIA FINE SAND	MODERATE	WETNESS
15	POMELLO FINE SAND 0-5% SLOPE	MODERATE	WETNESS
16	ORSINO FINE SAND 0-5% SLOPE	SLIGHT	
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING
19	POMPANO FINE SAND	SEVERE	WETNESS
21	WABASSO FINE SAND	SEVERE	WETNESS
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING
23	PAOLA FINE SAND 0-8% SLOPE	SLIGHT	
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING LOW STRENGTH
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING
26	SAMSULA MUCK	SEVERE	PONDING
27	ST AUGUSTINE FINE SAND	MODERATE	WETNESS FLOODING
28	BEACHES		
29	SATELLITE FINE SAND	MODERATE	WETNESS

TABLE 28: SOIL LIMITATIONS FOR LOCAL ROADS AND STREETS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATONS		
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS		*PONDING
31	FRIP-SATELLITE COMPLEX	MODERATE		SLOPE	*FRIPP
		MODERATE	WETNESS		*SATEL
32	PALM BEACH SAND 0-5% SLOPE	SLIGHT			
33	JONATHAN FINE SAND	SLIGHT			
34	TOCOI FINE SAND	SEVERE	WETNESS		
35	HONTOON MUCK	SEVERE	PONDING		LOW STRENGTH
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
38	PITS				
40	POTTSBURG FINE SAND	SEVERE	WETNESS		
41	TOMOKA MUCK	SEVERE	PONDING		
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	LOW STRENGTH
44	SPARR FINE SAND 0-5% SLOPE	MODERATE	WETNESS		
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	MODERATE	WETNESS	FLOODING	
46	HOLOPAW FINE SAND	SEVERE	WETNESS		
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
48	WINDER FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	MODERATE	WETNESS		
51	ST AUGUSTINE-URBAN LAND COMPLEX	MODERATE	WETNESS	FLOODING	
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
53	IMMOKALEE-URBAN LAND COMPLEX	SEVERE	WETNESS		
54	ASTATULA-URBAN LAND COMPLEX	SLIGHT			
55	ARENTS 0-2% SLOPE				
57	ADAMSVILLE VARIANT FINE SAND	MODERATE	WETNESS		
58	EAUGALLIE FINE SAND	SEVERE	WETNESS		
61	RIVIERA FINE SAND DEPRESSIONAL	SEVERE	PONDING		

TABLE 28: SOIL LIMITATIONS FOR LOCAL ROADS AND STREETS

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATONS	
62	FLORIDANA FINE SAND	SEVERE	WETNESS	
63	PLACID FINE SAND	SEVERE	WETNESS	
64	ELLZEY FINE SAND	SEVERE	WETNESS	
65	RIVIERA FINE SAND	SEVERE	WETNESS	
66	TERRA CEIA MUCK FREQUENTLY FLOODED	SEVERE	WETNESS	LOW STRENGTH
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	LOW STRENGTH
68	WINDER FINE SAND	SEVERE	WETNESS	
69	BAKERSVILLE MUCK	SEVERE	PONDING	

TABLE 29: SOIL LIMITATIONS FOR LAWNS AND LANDSCAPING

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS		
1	ADAMSVILLE FINE SAND	MODERATE		DROUGHTY	TOO SANDY
2	ASTATULA FINE SAND 0-8% SLOPE	SEVERE		DROUGHTY	
3	MYAKKA FINE SAND	SEVERE	WETNESS		
4	MYAKKA FINE SAND DEPRESSIONAL	SEVERE	PONDING		
5	ST JOHNS FINE SAND DEPRESSIONAL	SEVERE	PONDING		
6	TAVARES FINE SAND 0-5% SLOPE	SEVERE		DROUGHTY	
7	IMMOKALEE FINE SAND	SEVERE	WETNESS	DROUGHTY	
8	ZOLFO FINE SAND	MODERATE		DROUGHTY	TOO SANDY
9	POMONA FINE SAND	SEVERE	WETNESS		
11	SMYRNA FINE SAND	SEVERE	WETNESS		
12	ONA FINE SAND	SEVERE	WETNESS		
13	ST JOHNS FINE SAND	SEVERE	WETNESS		
14	CASSIA FINE SAND	MODERATE	WETNESS	DROUGHTY	
15	POMELLO FINE SAND 0-5% SLOPE	SEVERE		DROUGHTY	
16	ORSINO FINE SAND 0-5% SLOPE	SEVERE		DROUGHTY	
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
19	POMPANO FINE SAND	SEVERE	WETNESS	DROUGHTY	
21	WABASSO FINE SAND	SEVERE	WETNESS		
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
23	PAOLA FINE SAND 0-8% SLOPE	SEVERE		DROUGHTY	
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	EXCESS SULFUR	EXCESS SALT
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS	FLOODING	
26	SAMSULA MUCK	SEVERE	PONDING		EXCESS HUMUS
27	ST AUGUSTINE FINE SAND	MODERATE		DROUGHTY	
28	BEACHES				
29	SATELLITE FINE SAND	SEVERE		DROUGHTY	

TABLE 29: SOIL LIMITATIONS FOR LAWNS AND LANDSCAPING

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF	LIMITATIONS
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
31	FRIP-SATELLITE COMPLEX	SEVERE SEVERE	DROUGHTY DROUGHTY	*FRIPP *SATEL
32	PALM BEACH SAND 0-5% SLOPE	SEVERE	DROUGHTY	
33	JONATHAN FINE SAND	SEVERE	DROUGHTY	
34	TOCOI FINE SAND	SEVERE	WETNESS	
35	HONTOON MUCK	SEVERE	PONDING	EXCESS HUMUS
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
38	PITS			
40	POTTSBURG FINE SAND	SEVERE	WETNESS DROUGHTY	
41	TOMOKA MUCK	SEVERE	PONDING	EXCESS HUMUS
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
44	SPARR FINE SAND 0-5% SLOPE	MODERATE	WETNESS DROUGHTY	
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	MODERATE	DROUGHTY	
46	HOLOPAW FINE SAND	SEVERE	WETNESS DROUGHTY	
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	
48	WINDER FINE SAND FREQUENTLY FLOODED			
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	EXCESS SALT
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	MODERATE	DROUGHTY	
51	ST AUGUSTINE-URBAN LAND COMPLEX	MODERATE	DROUGHTY	
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE	WETNESS FLOODING	EXCESS SALT
53	IMMOKALEE-URBAN LAND COMPLEX	SEVERE	WETNESS DROUGHTY	
54	ASTATULA-URBAN LAND COMPLEX	SEVERE	DROUGHTY	
55	ARENTS 0-2% SLOPE			
57	ADAMSVILLE VARIANT FINE SAND	MODERATE	DROUGHTY	SMALL STONES
58	EAUGALLIE FINE SAND	SEVERE	WETNESS DROUGHTY	
61	RIVIERA FINE SAND DEPRESSIONAL	SEVERE	PONDING	

TABLE 29: SOIL LIMITATIONS FOR LAWNS AND LANDSCAPING

SOIL NO.	SOIL NAME	DEGREE OF LIMITATION	KIND OF LIMITATIONS		
62	FLORIDANA FINE SAND	SEVERE	WETNESS		
63	PLACID FINE SAND	SEVERE	WETNESS		
64	ELLZEY FINE SAND	SEVERE	WETNESS		
65	RIVIERA FINE SAND	SEVERE	WETNESS		
66	TERRA CEIA MUCK FREQUENTLY FLOODED	SEVERE	WETNESS		EXCESS HUMUS
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	WETNESS	EXCESS SULFUR	EXCESS SALT
68	WINDER FINE SAND	SEVERE	WETNESS		
69	BAKERSVILLE MUCK	SEVERE	PONDING		EXCESS HUMUS

TABLE 30: RESTRICTIVE SOIL FEATURES FOR SOILS AS A SOURCE OF ROADFILL

SOIL NO.	SOIL NAME	SOIL RATING	RESTRICTIVE SOIL FEATURES	
1	ADAMSVILLE FINE SAND	FAIR		WETNESS
2	ASTATULA FINE SAND 0-8% SLOPE	GOOD		
3	MYAKKA FINE SAND	POOR		WETNESS
4	MYAKKA FINE SAND DEPRESSIONAL	POOR		WETNESS
5	ST JOHNS FINE SAND DEPRESSIONAL	POOR		WETNESS
6	TAVARES FINE SAND 0-5% SLOPE	GOOD		
7	IMMOKALEE FINE SAND	POOR		WETNESS
8	ZOLFO FINE SAND	FAIR		WETNESS
9	POMONA FINE SAND	POOR		WETNESS
11	SMYRNA FINE SAND	POOR		WETNESS
12	ONA FINE SAND	POOR		WETNESS
13	ST JOHNS FINE SAND	POOR		WETNESS
14	CASSIA FINE SAND	FAIR		WETNESS
15	POMELLO FINE SAND 0-5% SLOPE	FAIR		WETNESS
16	ORSINO FINE SAND 0-5% SLOPE	GOOD		
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	POOR		WETNESS
19	POMPANO FINE SAND	POOR		WETNESS
21	WABASSO FINE SAND	POOR		WETNESS
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	POOR		WETNESS
23	PAOLA FINE SAND 0-8% SLOPE	GOOD		
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	POOR	LOW STRENGTH	WETNESS
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	POOR		WETNESS
26	SAMSULA MUCK	POOR		WETNESS
27	ST AUGUSTINE FINE SAND	FAIR		WETNESS
28	BEACHES	*		
29	SATELLITE FINE SAND	FAIR		WETNESS

TABLE 30: RESTRICTIVE SOIL FEATURES FOR SOILS AS A SOURCE OF ROADFILL

SOIL NO.	SOIL NAME	SOIL RATING	RESTRICTIVE SOIL FEATURES	
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	POOR		WETNESS
31	FRIP-SATELLITE COMPLEX	*		
32	PALM BEACH SAND 0-5% SLOPE	GOOD		
33	JONATHAN FINE SAND	GOOD		
34	TOCOI FINE SAND	POOR		WETNESS
35	HONTOON MUCK	POOR	LOW STRENGTH	WETNESS
36	RIVIERA FINE SAND FREQUENTLY FLOODED	POOR		WETNESS
38	PITS	*		
40	POTTSBURG FINE SAND	POOR		WETNESS
41	TOMOKA MUCK	POOR		WETNESS
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	POOR		WETNESS SHRINK-SWELL
44	SPARR FINE SAND 0-5% SLOPE	FAIR		WETNESS
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	FAIR		WETNESS
46	HOLOPAW FINE SAND	POOR		WETNESS
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	POOR		WETNESS
48	WINDER FINE SAND FREQUENTLY FLOODED	POOR		WETNESS
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	POOR		WETNESS
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	FAIR		WETNESS
51	ST AUGUSTINE-URBAN LAND COMPLEX	FAIR		WETNESS
52	DURBIN MUCK FREQUENTLY FLOODED	POOR		WETNESS
53	IMMOKALEE-URBAN LAND COMPLEX	POOR		WETNESS
54	ASTATULA-URBAN LAND COMPLEX	GOOD		
55	ARENTS 0-2% SLOPE	*		
57	ADAMSVILLE VARIANT FINE SAND	FAIR		WETNESS
58	EAUGALLIE FINE SAND	POOR		WETNESS
61	RIVIERA FINE SAND DEPRESSIONAL	POOR		WETNESS

TABLE 30: RESTRICTIVE SOIL FEATURES FOR SOILS AS A SOURCE OF ROADFILL

SOIL NO.	SOIL NAME	SOIL RATING	RESTRICTIVE SOIL FEATURES
62	FLORIDANA FINE SAND	POOR	WETNESS
63	PLACID FINE SAND	POOR	WETNESS
64	ELLZEY FINE SAND	POOR	WETNESS
65	RIVIERA FINE SAND	POOR	WETNESS
66	TERRA CEIA MUCK FREQUENTLY FLOODED	POOR	LOW STRENGTH WETNESS
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	POOR	LOW STRENGTH WETNESS SHRINK-SWELL
68	WINDER FINE SAND	POOR	WETNESS
69	BAKERSVILLE MUCK	POOR	WETNESS

TABLE 31: PROBABILITY OF FINDING AGGREGATES SUITABLE FOR USE

SOIL NO.	SOIL NAME	PROBABILITY FOR SAND	REASON FOR IMPROBABILITY	PROBABILITY FOR GRAVEL	REASON FOR IMPROBABILITY
1	ADAMSVILLE FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
2	ASTATULA FINE SAND 0-8% SLOPE	PROBABLE		IMPROBABLE	TOO SANDY
3	MYAKKA FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
4	MYAKKA FINE SAND DEPRESSIONAL	PROBABLE		IMPROBABLE	TOO SANDY
5	ST JOHNS FINE SAND DEPRESSIONAL	PROBABLE		IMPROBABLE	TOO SANDY
6	TAVARES FINE SAND 0-5% SLOPE	PROBABLE		IMPROBABLE	TOO SANDY
7	IMMOKALEE FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
8	ZOLFO FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
9	POMONA FINE SAND	IMPROBABLE	THIN LAYER	IMPROBABLE	TOO SANDY
11	SMYRNA FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
12	ONA FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
13	ST JOHNS FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
14	CASSIA FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
15	POMELLO FINE SAND 0-5% SLOPE	PROBABLE		IMPROBABLE	TOO SANDY
16	ORSINO FINE SAND 0-5% SLOPE	PROBABLE		IMPROBABLE	TOO SANDY
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	IMPROBABLE	EXCESS FINES	IMPROBABLE	EXCESS FINES
19	POMPANO FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
21	WABASSO FINE SAND	IMPROBABLE	THIN LAYER	IMPROBABLE	TOO SANDY
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	IMPROBABLE	EXCESS FINES	IMPROBABLE	EXCESS FINES
23	PAOLA FINE SAND 0-8% SLOPE	PROBABLE		IMPROBABLE	TOO SANDY
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	IMPROBABLE	EXCESS FINES	IMPROBABLE	EXCESS FINES
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	IMPROBABLE	EXCESS FINES	IMPROBABLE	EXCESS FINES
26	SAMSULA MUCK	PROBABLE		IMPROBABLE	TOO SANDY
27	ST AUGUSTINE FINE SAND	PROBABLE		IMPROBABLE	EXCESS FINES
28	BEACHES	*		*	
29	SATELLITE FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY

TABLE 31: PROBABILITY OF FINDING AGGREGATES SUITABLE FOR USE

SOIL NO.	SOIL NAME	PROBABILITY FOR SAND	REASON FOR IMPROBABILITY	PROBABILITY FOR GRAVEL	REASON FOR IMPROBABILITY
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	PROBABLE		IMPROBABLE	TOO SANDY
31	FRIP-SATELLITE COMPLEX	PROBABLE		IMPROBABLE	TOO SANDY
32	PALM BEACH SAND 0-5% SLOPE	PROBABLE		IMPROBABLE	TOO SANDY
33	JONATHAN FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
34	TOCOI FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
35	HONTOON MUCK	IMPROBABLE		IMPROBABLE	
36	RIVIERA FINE SAND FREQUENTLY FLOODED	PROBABLE		IMPROBABLE	EXCESS FINES
38	PITS	*		*	
40	POTTSBURG FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
41	TOMOKA MUCK	IMPROBABLE	EXCESS FINES	IMPROBABLE	EXCESS FINES
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	IMPROBABLE	EXCESS FINES	IMPROBABLE	EXCESS FINES
44	SPARR FINE SAND 0-5% SLOPE	IMPROBABLE	THIN LAYER	IMPROBABLE	TOO SANDY
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	PROBABLE		IMPROBABLE	EXCESS FINES
46	HOLOPAW FINE SAND	IMPROBABLE	THIN LAYER	IMPROBABLE	TOO SANDY
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	PROBABLE		IMPROBABLE	TOO SANDY
48	WINDER FINE SAND FREQUENTLY FLOODED	PROBABLE		IMPROBABLE	EXCESS FINES
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	PROBABLE		IMPROBABLE	TOO SANDY
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	PROBABLE		IMPROBABLE	TOO SANDY
51	ST AUGUSTINE-URBAN LAND COMPLEX	PROBABLE		IMPROBABLE	EXCESS FINES
52	DURBIN MUCK FREQUENTLY FLOODED	PROBABLE		IMPROBABLE	TOO SANDY
53	IMMOKALEE-URBAN LAND COMPLEX	PROBABLE		IMPROBABLE	TOO SANDY
54	ASTATULA-URBAN LAND COMPLEX	PROBABLE		IMPROBABLE	TOO SANDY
55	ARENTS 0-2% SLOPE	*		*	
57	ADAMSVILLE VARIANT FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
58	EAUGALLIE FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
61	RIVIERA FINE SAND DEPRESSIONAL	PROBABLE		IMPROBABLE	EXCESS FINES

TABLE 31: PROBABILITY OF FINDING AGGREGATES SUITABLE FOR USE

SOIL NO.	SOIL NAME	PROBABILITY FOR SAND	REASON FOR IMPROBABILITY	PROBABILITY FOR GRAVEL	REASON FOR IMPROBABILITY
62	FLORIDANA FINE SAND	IMPROBABLE	EXCESS FINES	IMPROBABLE	EXCESS FINES
63	PLACID FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
64	ELLZEY FINE SAND	PROBABLE		IMPROBABLE	TOO SANDY
65	RIVIERA FINE SAND	PROBABLE		IMPROBABLE	EXCESS FINES
66	TERRA CEIA MUCK FREQUENTLY FLOODED	IMPROBABLE	EXCESS FINES	IMPROBABLE	EXCESS FINES
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	IMPROBABLE	EXCESS FINES	IMPROBABLE	EXCESS FINES
68	WINDER FINE SAND	PROBABLE		PROBABLE	
69	BAKERSVILLE MUCK	PROBABLE		IMPROBABLE	TOO SANDY

TABLE 32: RESTRICTIVE SOIL FEATURES FOR SOILS AS A SOURCE OF TOPSOIL

SOIL NO.	SOIL NAME	SOIL RATING	RESTRICTIVE SOIL FEATURES	
1	ADAMSVILLE FINE SAND	POOR	TOO SANDY	
2	ASTATULA FINE SAND 0-8% SLOPE	POOR	TOO SANDY	
3	MYAKKA FINE SAND	POOR	TOO SANDY	WETNESS
4	MYAKKA FINE SAND DEPRESSIONAL	POOR	TOO SANDY	WETNESS
5	ST JOHNS FINE SAND DEPRESSIONAL	POOR	TOO SANDY	WETNESS
6	TAVARES FINE SAND 0-5% SLOPE	POOR	TOO SANDY	
7	IMMOKALEE FINE SAND	POOR	TOO SANDY	WETNESS
8	ZOLFO FINE SAND	POOR	TOO SANDY	
9	POMONA FINE SAND	POOR	TOO SANDY	WETNESS
11	SMYRNA FINE SAND	POOR	TOO SANDY	WETNESS
12	ONA FINE SAND	POOR	TOO SANDY	WETNESS
13	ST JOHNS FINE SAND	POOR	TOO SANDY	WETNESS
14	CASSIA FINE SAND	POOR	TOO SANDY	
15	POMELLO FINE SAND 0-5% SLOPE	POOR	TOO SANDY	
16	ORSINO FINE SAND 0-5% SLOPE	POOR	TOO SANDY	
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	POOR	TOO SANDY	WETNESS
19	POMPANO FINE SAND	POOR	TOO SANDY	WETNESS
21	WABASSO FINE SAND	POOR	TOO SANDY	WETNESS
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	POOR		WETNESS
23	PAOLA FINE SAND 0-8% SLOPE	POOR	TOO SANDY	
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	POOR		WETNESS EXCESS SALT
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	POOR		WETNESS
26	SAMSULA MUCK	POOR	EXCESS HUMUS	WETNESS
27	ST AUGUSTINE FINE SAND	POOR	TOO SANDY	
28	BEACHES	*		
29	SATELLITE FINE SAND	POOR	TOO SANDY	

TABLE 32: RESTRICTIVE SOIL FEATURES FOR SOILS AS A SOURCE OF TOPSOIL

SOIL NO.	SOIL NAME	SOIL RATING	RESTRICTIVE SOIL FEATURES
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	POOR	TOO SANDY WETNESS
31	FRIP-SATELLITE COMPLEX	POOR	TOO SANDY
32	PALM BEACH SAND 0-5% SLOPE	POOR	TOO SANDY
33	JONATHAN FINE SAND	POOR	TOO SANDY
34	TOCOI FINE SAND	POOR	TOO SANDY WETNESS
35	HONTOON MUCK	POOR	EXCESS HUMUS WETNESS
36	RIVIERA FINE SAND FREQUENTLY FLOODED	POOR	TOO SANDY WETNESS
38	PITS	*	
40	POTTSBURG FINE SAND	POOR	TOO SANDY WETNESS
41	TOMOKA MUCK	POOR	EXCESS HUMUS WETNESS
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	POOR	THIN LAYER WETNESS
44	SPARR FINE SAND 0-5% SLOPE	POOR	TOO SANDY
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	POOR	TOO SANDY
46	HOLOPAW FINE SAND	POOR	TOO SANDY WETNESS
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	POOR	TOO SANDY WETNESS
48	WINDER FINE SAND FREQUENTLY FLOODED	POOR	TOO SANDY WETNESS
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	POOR	TOO SANDY WETNESS EXCESS SALT
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	POOR	TOO SANDY
51	ST AUGUSTINE-URBAN LAND COMPLEX	POOR	TOO SANDY
52	DURBIN MUCK FREQUENTLY FLOODED	POOR	EXCESS HUMUS WETNESS EXCESS SALT
53	IMMOKALEE-URBAN LAND COMPLEX	POOR	TOO SANDY WETNESS
54	ASTATULA-URBAN LAND COMPLEX	POOR	TOO SANDY
55	ARENTS 0-2% SLOPE	*	
57	ADAMSVILLE VARIANT FINE SAND	POOR	TOO SANDY
58	EAUGALLIE FINE SAND	POOR	TOO SANDY WETNESS
61	RIVIERA FINE SAND DEPRESSIONAL	POOR	TOO SANDY WETNESS

TABLE 32: RESTRICTIVE SOIL FEATURES FOR SOILS AS A SOURCE OF TOPSOIL

SOIL NO.	SOIL NAME	SOIL RATING	RESTRICTIVE SOIL FEATURES		
62	FLORIDANA FINE SAND	POOR	TOO SANDY	WETNESS	
63	PLACID FINE SAND	POOR	TOO SANDY	WETNESS	
64	ELLZEY FINE SAND	POOR	TOO SANDY	WETNESS	
65	RIVIERA FINE SAND	POOR	TOO SANDY	WETNESS	
66	TERRA CEIA MUCK FREQUENTLY FLOODED	POOR	EXCESS HUMUS	WETNESS	
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	POOR	EXCESS HUMUS	WETNESS	EXCESS SALT
68	WINDER FINE SAND	POOR	TOO SANDY	WETNESS	
69	BAKERSVILLE MUCK	POOR	EXCESS HUMUS	WETNESS	

TABLE 33: EROSION CHARACTERISTICS OF SOILS

SOIL NO.	SOIL NAME	RANGE OF SOIL	SLOPE	WIND ERODI- BILITY GROUP	K FACTOR (TONS/ACRE/YR)	T FACTOR (TONS/ACRE/YR)
1	ADAMSVILLE FINE SAND	0	2	2	0.10	5
2	ASTATULA FINE SAND 0-8% SLOPE	0	8	2	0.10	5
3	MYAKKA FINE SAND	0	2	2	0.10	5
4	MYAKKA FINE SAND DEPRESSIONAL	0	2	2	0.10	5
5	ST JOHNS FINE SAND DEPRESSIONAL	0	2	2	0.10	5
6	TAVARES FINE SAND 0-5% SLOPE	0	5	2	0.10	5
7	IMMOKALEE FINE SAND	0	2	2	0.10	5
8	ZOLFO FINE SAND	0	2	2	0.10	5
9	POMONA FINE SAND	0	2	2	0.10	5
11	SMYRNA FINE SAND	0	2	2	0.10	5
12	ONA FINE SAND	0	2	2	0.10	5
13	ST JOHNS FINE SAND	0	2	2	0.10	5
14	CASSIA FINE SAND	0	2	2	0.10	5
15	POMELLO FINE SAND 0-5% SLOPE	0	2	2	0.10	5
16	ORSINO FINE SAND 0-5% SLOPE	0	5	2	0.10	5
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	0	2	2	0.10	5
19	POMPANO FINE SAND	0	2	2	0.10	5
21	WABASSO FINE SAND	0	2	2	0.10	5
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	0	2	3	0.10	5
23	PAOLA FINE SAND 0-8% SLOPE	0	8	1	0.10	5
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	0	1	4	0.32	5
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	0	2	3	0.10	5
26	SAMSULA MUCK	0	1	2	9999	99
27	ST AUGUSTINE FINE SAND	0	2	2	0.10	5
28	BEACHES	0	99	99	9999	99
29	SATELLITE FINE SAND	0	2	2	0.10	5

TABLE 33: EROSION CHARACTERISTICS OF SOILS

SOIL NO.	SOIL NAME	RANGE OF SOIL SLOPE		WIND ERODIBILITY GROUP	K FACTOR (TONS/ACRE/YR)	T FACTOR (TONS/ACRE/YR)
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	0	2	2	0.10	5
31	FRIP-SATELLITE COMPLEX	8	15	1	0.10	5
		0	2	2	0.10	5
32	PALM BEACH SAND 0-5% SLOPE	0	5	1	0.10	5
33	JONATHAN FINE SAND	0	2	2	0.10	5
34	TOCOI FINE SAND	0	2	2	0.10	5
35	HONTOON MUCK	0	1	2	9999	99
36	RIVIERA FINE SAND FREQUENTLY FLOODED	0	1	2	0.10	4
38	PITS	1	8	99	9999	99
40	POTTSBURG FINE SAND	0	2	2	0.10	5
41	TOMOKA MUCK	1	2	2	9999	99
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	0	2	2	9999	99
44	SPARR FINE SAND 0-5% SLOPE	0	5	2	0.10	5
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	0	2	2	0.10	5
46	HOLOPAW FINE SAND	0	2	2	0.10	5
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	0	2	2	0.10	5
48	WINDER FINE SAND FREQUENTLY FLOODED	0	2	2	0.10	5
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	0	1	99	0.10	5
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	0	2	2	0.10	5
51	ST AUGUSTINE-URBAN LAND COMPLEX	0	2	2	0.10	5
52	DURBIN MUCK FREQUENTLY FLOODED	0	1	99	9999	99
53	IMMOKALEE-URBAN LAND COMPLEX	0	2	2	0.10	5
54	ASTATULA-URBAN LAND COMPLEX	0	8	2	0.10	5
55	ARENTS 0-2% SLOPE	0	2	99	9999	99
57	ADAMSVILLE VARIANT FINE SAND	0	2	2	0.10	5
58	EAUGALLIE FINE SAND	0	2	2	0.10	5
61	RIVIERA FINE SAND DEPRESSIONAL	0	2	2	0.10	4

TABLE 33: EROSION CHARACTERISTICS OF SOILS

SOIL NO.	SOIL NAME	RANGE OF SOIL SLOPE		WIND ERODIBILITY GROUP	K FACTOR (TONS/ACRE/YR)	T FACTOR (TONS/ACRE/YR)
62	FLORIDANA FINE SAND	0	2	2	0.10	5
63	PLACID FINE SAND	0	2	2	0.10	5
64	ELLZEY FINE SAND	0	2	2	0.10	5
65	RIVIERA FINE SAND	0	2	2	0.10	4
66	TERRA CEIA MUCK FREQUENTLY FLOODED	0	1	2	9999	99
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	0	1	2	9999	5
68	WINDER FINE SAND	0	2	2	0.10	5
69	BAKERSVILLE MUCK	0	2	99	9999	99

TABLE 34: ANIMALS THAT MAY OCCUR IN ST JOHNS COUNTY WHO ARE LISTED BY THE USFWS OR FGFWFC

COMMON NAME OF ANIMAL	SCIENTIFIC NAME OF ANIMAL	FGFWFC STATUS	USFWS STATUS	OCCURS IN SJC
ALLIGATOR SNAPPING TURTLE	MACROCLEMYS TEMMINCKI	SSC	UR	
AMERICAN ALLIGATOR	ALLIGATOR MISSISSIPPIENSIS	SSC	T(S/A)	SJC
AMERICAN CROCODILE	CROCODYLUS ACUTUS	E	E	
AMERICAN OYSTERCATCHER	HAEMATOPUS PALLIATUS	SSC		SJC
ANASTASIA BEACH MOUSE	PEROMYSCUS POLIONOTUS PHASMA		UR	SJC
ANASTASIA ISLAND COTTON MOUSE	PEROMYSCUS GOSSYPINUS ANASTASAE		UR	SJC
ANASTASIA ISLAND MOLE	SCALOPUS AQUATICUS ANASTASAE		UR	SJC
ARCTIC PEREGRINE FALCON	FALCO PEREGRINUS TUNDRIUS	E	T	MIGRATES THRU
ATLANTIC GREEN TURTLE	CHELONIA MYDAS MYDAS	E	E	SJC
ATLANTIC HAWKSBILL TURTLE	ERETMOCHELYS IMBRICATA IMBRICATA	E	E	
ATLANTIC LEATHERBACK TURTLE	DERMOCHELYS CORIACEA	E	E	OCCASSIONALLY
ATLANTIC LOGGERHEAD TURTLE	CARETTA CARETTA CARETTA	T	T	SJC
ATLANTIC RIDLEY TURTLE	LEPIDOCHELYS KEMPI	E	E	
ATLANTIC SALT MARSH WATER SNAKE	NERODIA FASCIATA TAENIATA	T	T	
ATLANTIC STURGEON	ACIPENSER OXYRHYNCHUS	SSC	UR	
BACHMAN'S SPARROW	AIMOPHILA AESTIVALIS		UR	
BACHMAN'S WARBLER	VERMIVORA BACHMANII	E	E	
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	T	E	SJC
BARBOUR'S MAP TURTLE	GRAPTEMYS BARBOURI	SSC	UR	
BEACH MOUSE	PEROMYSCUS POLIONOTUS ALLOPHRYS	E	E	
	PEROMYSCUS POLIONOTUS DECOLORATUS	E	UR	
	PEROMYSCUS POLIONOTUS LEUCOCEPHALUS		UR	
	PEROMYSCUS POLIONOTUS NIVEIVENTRIS		UR	
	PEROMYSCUS POLIONOTUS PENINSULARIS		UR	
	PEROMYSCUS POLIONOTUS PHASMA		UR	SJC
	PEROMYSCUS POLIONOTUS TRISSYLLEPSIS	E	E	

TABLE 34: ANIMALS THAT MAY OCCUR IN ST JOHNS COUNTY WHO ARE LISTED BY THE USFWS OR FGFWFC

COMMON NAME OF ANIMAL	SCIENTIFIC NAME OF ANIMAL	FGFWFC STATUS	USFWS STATUS	OCCURS IN SJC
BIG CYPRESS FOX SQUIRREL	SCIURUS NIGER AVICENNIA	T	UR	
BIG PINE KEY RINGNECK SNAKE	DIADOPHIS PUNCTATUS ACRICUS	T	UR	
BLACK BEAR	URSUS AMERICANUS FLORIDANUS	T	UR	SJC
BLACKMOUTH SHINER	NOTROPIS sp. (UNDESCRIBED)	E	UR	
BLUE-TAILED MOLE SKINK	EUMECES EGREGIUS LIVIDUS	T	T	
BLUESTRIPE SHINER	NOTROPIS CALLITAENIA	SSC	UR	
BOG FROG	RANA OKALOOSAE	SSC		
BROWN PELICAN	PELECANUS OCCIDENTALIS	SSC		SJC
BURROWING OWL	ATHENE CUNICULARIA	SSC		
CAPE SABLE SEASIDE SPARROW	AMMODRAMUS MARITIMUS MIRABILIS	E	E	
CHADWICK BEACH COTTON MOUSE	PEROMYSCUS GOSSYPINUS RESTRICTUS	E	UR	
CHOCTAWHATCHEE BEACH MOUSE	PEROMYSCUS POLIONOTUS ALLOPHRYS	E	E	
CLAPPER RAIL	RALLUS LONGIROSTRIS INSULARUM		UR	
COMMON SNOOK	CENTROPOMUS UNDECIMALIS	SSC		
CORN SNAKE	ELAPHE GUTTATA GUTTATA	SSC		
COTTON MOUSE	PEROMYSCUS GOSSYPINUS ALLAPATICOLA	E	E	
	PEROMYSCUS GOSSYPINUS ANASTASAE		UR	SJC
	PEROMYSCUS GOSSYPINUS RESTRICTUS	E	UR	
COTTON RAT	SIGMODON HISPIDUS EXSPUTUS		UR	
	SIGMODON HISPIDUS INSULICOLA		UR	
	SIGMODON HISPIDUS LITTORALIS		UR	
CRESTED CARACARA	POLYBORUS PLANCUS	T	T	
CRYSTAL DARTER	AMMOCRYPTA ASPRELLA	T	UR	
DUKE'S SALTMARSH VOLE	MICROTUS PENNSYLVANICUS DUKECAMPBELLI	SSC	UR	
DUSKY SEASIDE SPARROW	AMMODRAMUS MARITIMUS NIGRISCENS	E	E	
DWARF SIREN	PSEUDOBRANCHUS STRIATUS LUSTRICOLUS		UR	

TABLE 34: ANIMALS THAT MAY OCCUR IN ST JOHNS COUNTY WHO ARE LISTED BY THE USFWS OR FGFWFC

COMMON NAME OF ANIMAL	SCIENTIFIC NAME OF ANIMAL	FGFWFC STATUS	USFWS STATUS	OCCURS IN SJC
EASTERN CHIPMUNK	TAMIAS STRIATUS	SSC		
EASTERN COTTONTAIL RABBIT	SYLVILAGUS FLORIDANUS AMMOPHILUS		UR	
EASTERN INDIGO SNAKE	DRYMARCHON CORAIS COUPERI	T	T	SJC
EASTERN WOOD RAT	NEOTOMA FLORIDANA SMALLI	E	E	
ENGLEWOOD MOLE	SCALOPUS AQUATICUS BASSI		UR	
EVERGLADES MINK	MUSTELA VISON EVERGLADENSIS	T	UR	
FINBACK WHALE	BALAENOPTERA PHYSALUS	E	E	
FLATWOODS SALAMANDER	AMBYSTOMA CINGULATUM		UR	
FLORIDA BLACK BEAR	URSUS AMERICANUS FLORIDANUS	T	UR	SJC
FLORIDA BROWN SNAKE	STORERIA DEKAYI VICTA	T		
FLORIDA GOPHER FROG	RANA AREOLATA AESOPUS	SSC	UR	SJC
FLORIDA GRASSHOPPER SPARROW	AMMODRAMUS SAVANNARUM FLORIDANUS	E	E	
FLORIDA KEYS MOLE SKINK	EUMECES EGREGIUS EGREGIUS	SSC	UR	
FLORIDA LONG-TAILED WEASEL	MUSTELA FRENATA PENINSULAE		UR	
FLORIDA MASTIFF BAT	EUMOPS GLAUCINUS FLORIDANUS		UR	
FLORIDA MINK	MUSTALA VISON LUTENSIS		UR	
FLORIDA MOUSE	PEROMYSCUS FLORIDANUS	SSC	UR	
FLORIDA PANTHER	FELIS CONCOLOR CORYI	E	E	SJC
FLORIDA PINE SNAKE	PITUOPHIS MELANOLEUCUS MUGITUS	SSC	UR	SJC
FLORIDA RIBBON SNAKE	THAMNOPHIS SAURITUS SACKENI	T		
FLORIDA SANDHILL CRANE	GRUS CANADENSIS PRATENSIS	T		SJC
FLORIDA SCRUB JAY	APHELOCOMA COERULESCENS COERULESCENS	T	T	SJC
FLORIDA SCRUB LIZARD	SCELOPORUS WOODI		UR	
FLORIDA WATER RAT	NEOFIBER ALLENI		UR	
FOX SQUIRREL	SCIURUS NIGER AVICENNIA	T	UR	
	SCIURUS NIGER SHERMANI	SSC	UR	SJC

TABLE 34: ANIMALS THAT MAY OCCUR IN ST JOHNS COUNTY WHO ARE LISTED BY THE USFWS OR FGFWFC

COMMON NAME OF ANIMAL	SCIENTIFIC NAME OF ANIMAL	FGFWFC STATUS	USFWS STATUS	OCCURS IN SJC
GEORGIA BLIND SALAMANDER	HAIDEOTRITON WALLACEI	SSC	UR	
GOFF'S POCKET GOPHER	GEOMYS PINETIS GOFFI	E	UR	
GOPHER FROG	RANA AREOLATA AESOPUS	SSC	UR	SJC
GOPHER TORTOISE	GOPHERUS POLYPHEMUS	SSC	UR	SJC
GRAY BAT	MYOTIS GRISESCENS	E	E	
GULF HAMMOCK DWARF SIREN	PSEUDOBRANCHUS STRIATUS LUSTRICOLUS		UR	
HARLEQUIN DARTER	ETHEOSTOMA HISTRIO	SSC		
HOMOSASSA SHREW	SOREX LONGIROSTRIS EIONIS	SSC	UR	
HUMPBACK WHALE	MEGAPTERA NOVAEANGLIAE	E	E	
INDIANA BAT	MYOTIS SODALIS	E	E	
INSULAR COTTON RAT	SIGMODON HISPIDUS INSULICOLA		UR	
IVORY-BILLED WOODPECKER	CAMPEPHILUS PRINCIPALIS	E	E	
KEY BLENNY	STARKSIA STARCKI	SSC		
KEY DEER	ODOCOILEUS VIRGINIANUS CLAVIUM	E	E	
KEY LARGO COTTON MOUSE	PEROMYSCUS GOSSYPINUS ALLAPATICOLA	E	E	
KEY LARGO WOODRAT	NEOTOMA FLORIDANA SMALLI	E	E	
KEY SILVERSIDE	MENIDIA CONCHORUM	T		
KEY VACA RACCOON	PROCYON LOTOR AUSPICATUS		UR	
KEY WEST RACCOON	PROCYON LOTOR INCANTUS		UR	
KIRTLAND'S WARBLER	DENDROICA KIRTLANDII	E	E	MIGRATES THRU
LAKE EUSTIS PUPFISH	CYPRINODON VARIEGATUS HUBBSI	SSC		
LEAST TERN	STERNA ANTILLARUM	T		SJC
LIMPKIN	ARAMUS GUARAUNA	SSC		SJC
LITTLE BLUE HERON	EGRETTA CAERULEA	SSC		SJC
LITTLE KESTREL	FALCO SPARVERIUS PAULUS	T	UR	
LOGGERHEAD SHRIKE	LANIUS LUDOVICIANUS MIGRANS		UR	

TABLE 34: ANIMALS THAT MAY OCCUR IN ST JOHNS COUNTY WHO ARE LISTED BY THE USFWS OR FGFWFC

COMMON NAME OF ANIMAL	SCIENTIFIC NAME OF ANIMAL	FGFWFC STATUS	USFWS STATUS	OCCURS IN SJC
LOUISANA HERON	EGRETTA TRICOLOR	SSC		SJC
LOWER KEYS COTTON RAT	SIGMODON HISPIDUS EXSPUTUS		UR	
LOWER KEYS RABBIT	SYLVILAGUS PALUSTRIS HEFNERI		UR	
MANGROVE CLAPPER RAIL	RALLUS LONGIROSTRIS INSULARUM		UR	
MARIAN'S MARSH WREN	CISTOTHORUS PALUSTRIS MARIANAE	SSC		
MARSH RABBIT	SYLVILAGUS PALUSTRIS HEFNERI		UR	
MIAMI BLACK-HEADED SNAKE	TANTILLA OOLITICA	T	UR	
MICCO COTTON RAT	SIGMODON HISPIDUS LITTORALIS		UR	
MICCO COTTONTAIL RABBIT	SYLVILAGUS FLORIDANUS AMMOPHILUS		UR	
MIGRANT LOGGERHEAD SHRIKE	LANIUS LUDOVICIANUS MIGRANS		UR	
MINK	MUSTELA VISON EVERGLADENSIS	T	UR	
OKALOOSA DARTER	ETHEOSTOMA OKALOOSAE	E	E	
PALLID BEACH MOUSE	PEROMYSCUS POLIONOTUS DECOLORATUS	E	UR	
PERDIDO KEY BEACH MOUSE	PEROMYSCUS POLIONOTUS TRISSYLLEPSIS	E	E	
PEREGRINE FALCON	FALCO PEREGRINUS TUNDRIUS	E	T	MIGRATES THRU
PINE BARRENS TREEFROG	HYLA ANDERSONII	SSC		
PINE ISLAND RICE RAT	ORYZOMYS PALUSTRIS PLANIROSTRIS		UR	
PIPING PLOVER	CHARADRIUS MELODUS	T	T	WINTERTIME
RACCOON	PROCYON LOTOR AUSPICATUS		UR	
	PROCYON LOTOR INCANTUS		UR	
RED RAT SNAKE	ELAPHE GUTTATA GUTTATA	SSC		
RED-COCKADED WOODPECKER	PICOIDES BOREALIS	T	E	SJC
REDDISH EGRET	EGRETTA RUFESCENS	SSC	UR	
RIGHT WHALE	BALAENA GLACIALIS	E	E	
RIMROCK CROWNED SNAKE	TANTILLA OOLITICA	T	UR	
RIVULUS	RIVULUS MARMORATUS	SSC		

TABLE 34: ANIMALS THAT MAY OCCUR IN ST JOHNS COUNTY WHO ARE LISTED BY THE USFWS OR FGFWFC

COMMON NAME OF ANIMAL	SCIENTIFIC NAME OF ANIMAL	FGFWFC STATUS	USFWS STATUS	OCCURS IN SJC
ROSEATE SPOONBILL	AJAIA AJAJA	SSC		
ROSEATE TERN	STERNA DOUGALLII	T	T	
ROUND-TAILED MUSKRAT	NEOFIBER ALLENI		UR	
SALTMARSH TOPMINNOW	FUNDULUS JENKINSI	SSC		
SAND SKINK	NEOSEPS REYNOLDSI	T	T	
SANDHILL CRANE	GRUS CANADENSIS PRATENSIS	T		SJC
SANIBEL ISLAND RICE RAT	ORYZOMYS PALUSTRIS SANIBELI	SSC	UR	
SANTA ROSA BEACH MOUSE	PEROMYSCUS POLIONOTUS LEUCOCEPHALUS		UR	
SCOTT'S SEASIDE SPARROW	AMMODRAMUS MARITIMUS PENINSULAE	SSC		
SCRUB JAY	APHELOCOMA COERULESCENS COERULESCENS	T	T	SJC
SEI WHALE	BALAENOPTERA BOREALIS	E	E	
SHERMAN'S FOX SQUIRREL	SCIURUS NIGER SHERMANI	SSC	UR	SJC
SHERMAN'S SHORT-TAILED SHREW	BLARINA CAROLINENSIS SHERMANI	SSC	UR	
SHOAL BASS	MICROPTEROUS sp. (UNDESCRIBED)	SSC		
SHORT-TAILED SNAKE	STILOSOMA EXTENUATUM	T	UR	
SHORTNOSE STURGEON	ACIPENSER BREVIROSTRUM	E	E	SJC
SILVER RICE RAT	ORYZOMYS ARGENTATUS	E	UR	
SMYRNA SEASIDE SPARROW	AMMODRAMUS MARITIMUS PELONOTUS		UR	
SNAIL KITE	ROSTRHAMUS SOCIABILIS	E	E	
SNOWY EGRET	EGRETTA THULA	SSC		SJC
SOUTHEAST BEACH MOUSE	PEROMYSCUS POLIONOTUS NIVEIVENTRIS		UR	
SOUTHEASTERN BAT	MYOTIS AUSTRORIPARIUS		UR	
SOUTHEASTERN BIG-EARED BAT	PLECOTUS RAFINESQUII		UR	
SOUTHEASTERN KESTREL	FALCO SPARVERIUS PAULUS	T	UR	
SOUTHEASTERN POCKET GOPHER	GEOMYS PINETIS GOFFI	E	UR	
SOUTHEASTERN SHREW	SOREX LONGIROSTRIS EIONIS	SSC	UR	

TABLE 34: ANIMALS THAT MAY OCCUR IN ST JOHNS COUNTY WHO ARE LISTED BY THE USFWS OR FGFWFC

COMMON NAME OF ANIMAL	SCIENTIFIC NAME OF ANIMAL	FGFWFC STATUS	USFWS STATUS	OCCURS IN SJC
SOUTHEASTERN SNOWY PLOVER	CHARADRIUS ALEXANDRINUS TENUIROSTRIS	T	UR	
SOUTHERN BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	T	E	SJC
SOUTHERN RING-NECKED SNAKE	DIADOPHIS PUNCTATUS ACRICUS	T	UR	
SOUTHERN TESSELLATED DARTER	ETHEOSTOMA OLMSTEDI MACULATICEPS	SSC		
SPERM WHALE	PHYSTER CATODON	E	E	
ST. ANDREWS BEACH MOUSE	PEROMYSCUS POLIONOTUS PENINSULARIS		UR	
STODDARD'S YELLOW-THROATED WARBLER	DENDROICA DOMINICA STODDARDI		UR	
STRIPED MUD TURTLE	KINOSTERNON BAURI	E	UR	
SUWANNEE BASS	MICROPTERUS NOTIUS	SSC		
SUWANNEE COOTER	CHRYSEMYS CONCINNA SUWANNIESIS	SSC	UR	
SWAINSON'S HAWK	BUTEO SWAINSONI		UR	
SWALLOW-TAILED KITE	ELANOIDES FORFICATUS		UR	
TRICOLORED HERON	EGRETTA TRICOLOR	SSC		SJC
WAKULLA SEASIDE SPARROW	AMMODRAMUS MARITIMUS JUNCICOLUS	SSC	UR	
WEST INDIAN MANATEE	TRICHECHUS MANATUS LATIROSTRIS	E	E	SJC
WHITE TAIL DEER	ODOCOILEUS VIRGINIANUS CLAVIUM	E	E	
WHITE-CROWNED PIGEON	COLUMBA LEUCOCEPHALA	T	UR	
WOOD STORK	MYCTERIA AMERICANA	E	E	SJC
WORTHINGTON'S MARSH WREN	CISTOTHORUS PALUSTRIS GRISEUS	SSC		SJC
YELLOW-THROATED WARBLER	DENDROICA DOMINICA STODDARDI		UR	

TABLE 35: ECOLOGICAL COMMUNITIES IN ST JOHNS COUNTY

NUMBER	NAME
1	NORTH FLA COASTAL STRAND
3	SAND PINE SCRUB
4	LONGLEAF PINE-TURKEY OAK HILLS
6	SOUTH FLA FLATWOODS
7	NORTH FLA FLATWOODS
8	CABBAGE PALM FLATWOODS
11	UPLAND HARDWOOD HAMMOCKS
12	WETLAND HARDWOOD HAMMOCKS
13	CABBAGE PALM HAMMOCKS
15	OAK HAMMOCKS
17	CYPRESS SWAMP
18	SALT MARSH
21	SWAMP HARDWOODS
22	SHRUB BOG
25	FRESHWATER MARSH AND PONDS
26	SLOUGH

TABLE 36: THOSE SOILS WHICH MAY SUPPORT THE ECOLOGICAL COMMUNITIES IN ST JOHNS COUNTY

EC NO.	ECOLOGICAL COMMUNITY NAME	SOIL NO.	SOIL NAME
1	NORTH FLA COASTAL STRAND	28	BEACHES
		31	FRIP-SATELLITE COMPLEX
		32	PALM BEACH SAND 0-5% SLOPE
3	SAND PINE SCRUB	2	ASTATULA FINE SAND 0-8% SLOPE
		14	CASSIA FINE SAND
		15	POMELLO FINE SAND 0-5% SLOPE
		16	ORSINO FINE SAND 0-5% SLOPE
		23	PAOLA FINE SAND 0-8% SLOPE
		29	SATELLITE FINE SAND
		31	FRIP-SATELLITE COMPLEX
		33	JONATHAN FINE SAND
		54	ASTATULA-URBAN LAND COMPLEX
4	LONGLEAF PINE-TURKEY OAK HILLS	2	ASTATULA FINE SAND 0-8% SLOPE
		6	TAVARES FINE SAND 0-5% SLOPE
		54	ASTATULA-URBAN LAND COMPLEX
6	SOUTH FLA FLATWOODS	1	ADAMSVILLE FINE SAND
		3	MYAKKA FINE SAND
		4	MYAKKA FINE SAND DEPRESSIONAL
		7	IMMOKALEE FINE SAND
		9	POMONA FINE SAND
		11	SMYRNA FINE SAND
		12	ONA FINE SAND
		13	ST JOHNS FINE SAND
		14	CASSIA FINE SAND
		19	POMPANO FINE SAND
		21	WABASSO FINE SAND
		34	TOCOI FINE SAND
		50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM
		53	IMMOKALEE-URBAN LAND COMPLEX
		57	ADAMSVILLE VARIANT FINE SAND
		58	EAUGALLIE FINE SAND
		64	ELLZEY FINE SAND
7	NORTH FLA FLATWOODS	40	POTTSBURG FINE SAND
8	CABBAGE PALM FLATWOODS	36	RIVIERA FINE SAND FREQUENTLY FLOODED
		65	RIVIERA FINE SAND
11	UPLAND HARDWOOD HAMMOCKS	1	ADAMSVILLE FINE SAND
		8	ZOLFO FINE SAND
		44	SPARR FINE SAND 0-5% SLOPE
		57	ADAMSVILLE VARIANT FINE SAND
12	WETLAND HARDWOOD HAMMOCKS	19	POMPANO FINE SAND
		21	WABASSO FINE SAND
		25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED
		36	RIVIERA FINE SAND FREQUENTLY FLOODED
		46	HOLOPAW FINE SAND
		47	HOLOPAW FINE SAND FREQUENTLY FLOODED

TABLE 36: THOSE SOILS WHICH MAY SUPPORT THE ECOLOGICAL COMMUNITIES IN ST JOHNS COUNTY

EC NO.	ECOLOGICAL COMMUNITY NAME	SOIL NO.	SOIL NAME
12	WETLAND HARDWOOD HAMMOCKS	48	WINDER FINE SAND FREQUENTLY FLOODED
		65	RIVIERA FINE SAND
		68	WINDER FINE SAND
13	CABBAGE PALM HAMMOCKS	25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED
		48	WINDER FINE SAND FREQUENTLY FLOODED
		68	WINDER FINE SAND
15	OAK HAMMOCKS	1	ADAMSVILLE FINE SAND
		6	TAVARES FINE SAND 0-5% SLOPE
		8	ZOLFO FINE SAND
		25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED
		50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM
		57	ADAMSVILLE VARIANT FINE SAND
17	CYPRESS SWAMP	18	FLORIDANA FINE SAND FREQUENTLY FLOODED
		26	SAMSULA MUCK
		61	RIVIERA FINE SAND DEPRESSIONAL
		62	FLORIDANA FINE SAND
		63	PLACID FINE SAND
18	SALT MARSH	24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED
		49	MOULTRIE FINE SAND FREQUENTLY FLOODED
		52	DURBIN MUCK FREQUENTLY FLOODED
		67	TISONIA MUCKY PEAT FREQUENTLY FLOODED
21	SWAMP HARDWOODS	18	FLORIDANA FINE SAND FREQUENTLY FLOODED
		22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED
		26	SAMSULA MUCK
		30	WESCONNETT FINE SAND FREQUENTLY FLOODED
		35	HONTOON MUCK
		41	TOMOKA MUCK
		42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED
		61	RIVIERA FINE SAND DEPRESSIONAL
		62	FLORIDANA FINE SAND
		63	PLACID FINE SAND
		66	TERRA CEIA MUCK FREQUENTLY FLOODED
		69	BAKERSVILLE MUCK
22	SHRUB BOG	26	SAMSULA MUCK
		35	HONTOON MUCK
25	FRESHWATER MARSH AND PONDS	4	MYAKKA FINE SAND DEPRESSIONAL
		5	ST JOHNS FINE SAND DEPRESSIONAL
		18	FLORIDANA FINE SAND FREQUENTLY FLOODED
		22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED
		26	SAMSULA MUCK
		35	HONTOON MUCK
		41	TOMOKA MUCK
		42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED
		61	RIVIERA FINE SAND DEPRESSIONAL
		62	FLORIDANA FINE SAND

TABLE 36: THOSE SOILS WHICH MAY SUPPORT THE ECOLOGICAL COMMUNITIES IN ST JOHNS COUNTY

EC NO.	ECOLOGICAL COMMUNITY NAME	SOIL NO.	SOIL NAME
25	FRESHWATER MARSH AND PONDS	63	PLACID FINE SAND
		66	TERRA CEIA MUCK FREQUENTLY FLOODED
26	SLOUGH	19	POMPANO FINE SAND
		21	WABASSO FINE SAND
		36	RIVIERA FINE SAND FREQUENTLY FLOODED
		46	HOLOPAW FINE SAND
		47	HOLOPAW FINE SAND FREQUENTLY FLOODED
		48	WINDER FINE SAND FREQUENTLY FLOODED
		63	PLACID FINE SAND
		65	RIVIERA FINE SAND
		68	WINDER FINE SAND
99	MAN MADE	27	ST AUGUSTINE FINE SAND
		38	PITS
		45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM
		51	ST AUGUSTINE-URBAN LAND COMPLEX
		55	ARENTS

TABLE 37: THOSE ECOLOGICAL COMMUNITIES WHICH MAY BE FOUND IN THE SOIL UNITS OF ST JOHNS COUNTY

SOIL NO.	SOIL NAME	EC NO.	ECOLOGICAL COMMUNITY NAME
1	ADAMSVILLE FINE SAND	6	SOUTH FLA FLATWOODS
		11	UPLAND HARDWOOD HAMMOCKS
		15	OAK HAMMOCKS
2	ASTATULA FINE SAND 0-8% SLOPE	3	SAND PINE SCRUB
		4	LONGLEAF PINE-TURKEY OAK HILLS
3	MYAKKA FINE SAND	6	SOUTH FLA FLATWOODS
4	MYAKKA FINE SAND DEPRESSIONAL	6	SOUTH FLA FLATWOODS
		25	FRESHWATER MARSH AND PONDS
5	ST JOHNS FINE SAND DEPRESSIONAL	25	FRESHWATER MARSH AND PONDS
6	TAVARES FINE SAND 0-5% SLOPE	4	LONGLEAF PINE-TURKEY OAK HILLS
		15	OAK HAMMOCKS
7	IMMOKALEE FINE SAND	6	SOUTH FLA FLATWOODS
8	ZOLFO FINE SAND	11	UPLAND HARDWOOD HAMMOCKS
		15	OAK HAMMOCKS
9	POMONA FINE SAND	6	SOUTH FLA FLATWOODS
11	SMYRNA FINE SAND	6	SOUTH FLA FLATWOODS
12	ONA FINE SAND	6	SOUTH FLA FLATWOODS
13	ST JOHNS FINE SAND	6	SOUTH FLA FLATWOODS
14	CASSIA FINE SAND	3	SAND PINE SCRUB
		6	SOUTH FLA FLATWOODS
15	POMELLO FINE SAND 0-5% SLOPE	3	SAND PINE SCRUB
16	ORSINO FINE SAND 0-5% SLOPE	3	SAND PINE SCRUB
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	17	CYPRESS SWAMP
		21	SWAMP HARDWOODS
		25	FRESHWATER MARSH AND PONDS
19	POMPANO FINE SAND	6	SOUTH FLA FLATWOODS
		12	WETLAND HARDWOOD HAMMOCKS
		26	SLOUGH
21	WABASSO FINE SAND	6	SOUTH FLA FLATWOODS
		12	WETLAND HARDWOOD HAMMOCKS
		26	SLOUGH
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	21	SWAMP HARDWOODS
		25	FRESHWATER MARSH AND PONDS

TABLE 37: THOSE ECOLOGICAL COMMUNITIES WHICH MAY BE FOUND IN THE SOIL UNITS OF ST JOHNS COUNTY

SOIL NO.	SOIL NAME	EC NO.	ECOLOGICAL COMMUNITY NAME
23	PAOLA FINE SAND 0-8% SLOPE	3	SAND PINE SCRUB
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	18	SALT MARSH
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	12	WETLAND HARDWOOD HAMMOCKS
		13	CABBAGE PALM HAMMOCKS
		15	OAK HAMMOCKS
26	SAMSULA MUCK	17	CYPRESS SWAMP
		21	SWAMP HARDWOODS
		22	SHRUB BOG
		25	FRESHWATER MARSH AND PONDS
27	ST AUGUSTINE FINE SAND	99	MAN MADE
28	BEACHES	1	NORTH FLA COASTAL STRAND
29	SATELLITE FINE SAND	3	SAND PINE SCRUB
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	21	SWAMP HARDWOODS
31	FRIP-SATELLITE COMPLEX	1	NORTH FLA COASTAL STRAND
		3	SAND PINE SCRUB
32	PALM BEACH SAND 0-5% SLOPE	1	NORTH FLA COASTAL STRAND
33	JONATHAN FINE SAND	3	SAND PINE SCRUB
34	TOCOI FINE SAND	6	SOUTH FLA FLATWOODS
35	HONTOON MUCK	21	SWAMP HARDWOODS
		22	SHRUB BOG
		25	FRESHWATER MARSH AND PONDS
36	RIVIERA FINE SAND FREQUENTLY FLOODED	8	CABBAGE PALM FLATWOODS
		12	WETLAND HARDWOOD HAMMOCKS
		26	SLOUGH
38	PITS	99	EXCAVATIONS
40	POTTSBURG FINE SAND	7	NORTH FLA FLATWOODS
41	TOMOKA MUCK	21	SWAMP HARDWOODS
		25	FRESHWATER MARSH AND PONDS
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	21	SWAMP HARDWOODS
		25	FRESHWATER MARSH AND PONDS
44	SPARR FINE SAND 0-5% SLOPE	11	UPLAND HARDWOOD HAMMOCKS
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	99	MAN MADE

TABLE 37: THOSE ECOLOGICAL COMMUNITIES WHICH MAY BE FOUND IN THE SOIL UNITS OF ST JOHNS COUNTY

SOIL NO.	SOIL NAME	EC NO.	ECOLOGICAL COMMUNITY NAME
46	HOLOPAW FINE SAND	12	WETLAND HARDWOOD HAMMOCKS
		26	SLOUGH
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	12	WETLAND HARDWOOD HAMMOCKS
		26	SLOUGH
48	WINDER FINE SAND FREQUENTLY FLOODED	12	WETLAND HARDWOOD HAMMOCKS
		13	CABBAGE PALM HAMMOCKS
		26	SLOUGH
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	18	SALT MARSH
50	NARCOOSSEE FINE SAND SHELLY SUBSTRATUM	6	SOUTH FLA FLATWOODS
		15	OAK HAMMOCKS
51	ST AUGUSTINE-URBAN LAND COMPLEX	99	MAN MADE
52	DURBIN MUCK FREQUENTLY FLOODED	18	SALT MARSH
53	IMMOKALEE-URBAN LAND COMPLEX	6	SOUTH FLA FLATWOODS
54	ASTATULA-URBAN LAND COMPLEX	3	SAND PINE SCRUB
		4	LONGLEAF PINE-TURKEY OAK HILLS
55	ARENTS	99	HETEROGENEOUS FILL MATERIAL
57	ADAMSVILLE VARIANT FINE SAND	6	SOUTH FLA FLATWOODS
		11	UPLAND HARDWOOD HAMMOCKS
		15	OAK HAMMOCKS
58	EAUGALLIE FINE SAND	6	SOUTH FLA FLATWOODS
61	RIVIERA FINE SAND DEPRESSIONAL	17	CYPRESS SWAMP
		21	SWAMP HARDWOODS
		25	FRESHWATER MARSH AND PONDS
62	FLORIDANA FINE SAND	17	CYPRESS SWAMP
		21	SWAMP HARDWOODS
		25	FRESHWATER MARSH AND PONDS
63	PLACID FINE SAND	17	CYPRESS SWAMP
		21	SWAMP HARDWOODS
		25	FRESHWATER MARSH AND PONDS
		26	SLOUGH
64	ELLZEY FINE SAND	6	SOUTH FLA FLATWOODS
65	RIVIERA FINE SAND	8	CABBAGE PALM FLATWOODS
		12	WETLAND HARDWOOD HAMMOCKS
		26	SLOUGH
66	TERRA CEIA MUCK FREQUENTLY FLOODED	21	SWAMP HARDWOODS

TABLE 37: THOSE ECOLOGICAL COMMUNITIES WHICH MAY BE FOUND IN THE SOIL UNITS OF ST JOHNS COUNTY

SOIL NO.	SOIL NAME	EC NO.	ECOLOGICAL COMMUNITY NAME
66	TERRA CEIA MUCK FREQUENTLY FLOODED	25	FRESHWATER MARSH AND PONDS
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	18	SALT MARSH
68	WINDER FINE SAND	12	WETLAND HARDWOOD HAMMOCKS
		13	CABBAGE PALM HAMMOCKS
		26	SLOUGH
69	BAKERSVILLE MUCK	21	SWAMP HARDWOODS

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
ALLIGATOR SNAPPING TURTLE	UR	SSC			
AMERICAN CROCODILE	E	E			
ARCTIC PEREGRINE FALCON	T	E	1	NORTH FLA COASTAL STRAND	
			6	SOUTH FLA FLATWOODS	
			18	SALT MARSH	
			25	FRESHWATER MARSH AND PONDS	
ATLANTIC HAWKSBILL TURTLE	E	E			
ATLANTIC LEATHERBACK TURTLE	E	E	1	NORTH FLA COASTAL STRAND	
ATLANTIC RIDLEY TURTLE	E	E	1	NORTH FLA COASTAL STRAND	
ATLANTIC SALT MARSH WATER SNAKE	T	T			
ATLANTIC STURGEON	UR	SSC			
BACHMAN'S SPARROW	UR		1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	YES
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	YES
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
BACHMAN'S WARBLER	E	E			
BARBOUR'S MAP TURTLE	UR	SSC			
BEACH MOUSE	E	E			
			1	NORTH FLA COASTAL STRAND	
			1	NORTH FLA COASTAL STRAND	
			1	NORTH FLA COASTAL STRAND	
			1	NORTH FLA COASTAL STRAND	
			1	NORTH FLA COASTAL STRAND	
BIG CYPRESS FOX SQUIRREL	UR	T	4	LONGLEAF PINE-TURKEY OAK HILLS	YES
			6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
BIG PINE KEY RINGNECK SNAKE	UR	T	6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
			8	CABBAGE PALM FLATWOODS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
			22	SHRUB BOG	

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
BLACKMOUTH SHINER	UR	E			
BLUE-TAILED MOLE SKINK	T	T			
BLUESTRIPE SHINER	UR	SSC			
BOG FROG		SSC			
BURROWING OWL		SSC			
CAPE SABLE SEASIDE SPARROW	E	E			
CHADWICK BEACH COTTON MOUSE	UR	E	4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
CHOCTAWHATCHEE BEACH MOUSE	E	E			
CLAPPER RAIL	UR		18	SALT MARSH	YES
COMMON SNOOK		SSC			
CORN SNAKE		SSC	3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	YES
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
COTTON MOUSE	E	E	4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
COTTON MOUSE	UR	E	21	SWAMP HARDWOODS	
COTTON RAT	UR		4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
			26	SLOUGH	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
			26	SLOUGH	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
			26	SLOUGH	
CRESTED CARACARA	T	T			
CRYSTAL DARTER	UR	T			
DUKE'S SALTMARSH VOLE	UR	SSC			
DUSKY SEASIDE SPARROW	E	E			
DWARF SIREN	UR		17	CYPRESS SWAMP	
			21	SWAMP HARDWOODS	
			25	FRESHWATER MARSH AND PONDS	
EASTERN CHIPMUNK		SSC			
EASTERN COTTONTAIL RABBIT	UR		1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
EASTERN COTTONTAIL RABBIT	UR		13	CABBASE PALM HAMMOCKS	
			18	SALT MARSH	
EASTERN WOOD RAT	E	E	11	UPLAND HARDWOOD HAMMOCKS	YES
			12	WETLAND HARDWOOD HAMMOCKS	
ENGLEWOOD MOLE	UR				
EVERGLADES MINK	UR	T	6	SOUTH FLA FLATWOODS	
			12	WETLAND HARDWOOD HAMMOCKS	
			17	CYPRESS SWAMP	YES
			18	SALT MARSH	
			21	SWAMP HARDWOODS	YES
			22	SHRUB BOG	
			25	FRESHWATER MARSH AND PONDS	YES
			26	SLOUGH	YES
FINBACK WHALE	E	E			
FLATWOODS SALAMANDER	UR				
FLORIDA BROWN SNAKE		T	6	SOUTH FLA FLATWOODS	
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			17	CYPRESS SWAMP	
			21	SWAMP HARDWOODS	
			22	SHRUB BOG	
			25	FRESHWATER MARSH AND PONDS	
			26	SLOUGH	
FLORIDA GRASSHOPPER SPARROW	E	E			
FLORIDA KEYS MOLE SKINK	UR	SSC			
FLORIDA LONG-TAILED WEASEL	UR				
FLORIDA MASTIFF BAT	UR				
FLORIDA MINK	UR				
FLORIDA MOUSE	UR	SSC	1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	YES
FLORIDA RIBBON SNAKE		T	4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
FLORIDA RIBBON SNAKE		T	13	CABBAGE PALM HAMMOCKS	
			17	CYPRESS SWAMP	
			18	SALT MARSH	
			21	SWAMP HARDWOODS	
			25	FRESHWATER MARSH AND PONDS	
			26	SLOUGH	
FLORIDA SCRUB LIZARD	UR				
FLORIDA WATER RAT	UR		25	FRESHWATER MARSH AND PONDS	YES
FOX SQUIRREL	UR	T	4	LONGLEAF PINE-TURKEY OAK HILLS	YES
			6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
GEORGIA BLIND SALAMANDER	UR	SSC			
GOFF'S POCKET GOPHER	UR	E			
GRAY BAT	E	E			
GULF HAMMOCK DWARF SIREN	UR		17	CYPRESS SWAMP	
			21	SWAMP HARDWOODS	
			25	FRESHWATER MARSH AND PONDS	
HARLEQUIN DARTER		SSC			
HOMOSASSA SHREW	UR	SSC	12	WETLAND HARDWOOD HAMMOCKS	
			17	CYPRESS SWAMP	
			21	SWAMP HARDWOODS	
HUMPBACK WHALE	E	E			
INDIANA BAT	E	E			
INSULAR COTTON RAT	UR		4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
			26	SLOUGH	
IVORY-BILLED WOODPECKER	E	E	12	WETLAND HARDWOOD HAMMOCKS	
			17	CYPRESS SWAMP	
			21	SWAMP HARDWOODS	
KEY BLENNY		SSC			
KEY DEER	E	E	1	NORTH FLA COASTAL STRAND	

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
KEY DEER	E	E	3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
			17	CYPRESS SWAMP	
			18	SALT MARSH	
			21	SWAMP HARDWOODS	
			22	SHRUB BOG	
			25	FRESHWATER MARSH AND PONDS	
			26	SLOUGH	
KEY LARGO COTTON MOUSE	E	E	4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
KEY LARGO WOODRAT	E	E	11	UPLAND HARDWOOD HAMMOCKS	YES
			12	WETLAND HARDWOOD HAMMOCKS	
KEY SILVERSIDE		T			
KEY VACA RACCOON	UR		1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	YES
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
			17	CYPRESS SWAMP	YES
			18	SALT MARSH	
			21	SWAMP HARDWOODS	YES
			22	SHRUB BOG	
			25	FRESHWATER MARSH AND PONDS	
			26	SLOUGH	
KEY WEST RACCOON	UR		1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
KEY WEST RACCOON	UR		8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	YES
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
			17	CYPRESS SWAMP	YES
			18	SALT MARSH	
			21	SWAMP HARDWOODS	YES
			22	SHRUB BOG	
			25	FRESHWATER MARSH AND PONDS	
			26	SLOUGH	
KIRTLAND'S WARBLER	E	E			
LAKE EUSTIS PUPFISH		SSC			
LITTLE KESTREL	UR	T	1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
			17	CYPRESS SWAMP	
			18	SALT MARSH	
			21	SWAMP HARDWOODS	
			22	SHRUB BOG	
			26	SLOUGH	YES
LOGGERHEAD SHRIKE	UR		1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	YES
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	YES
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
LOWER KEYS COTTON RAT	UR		4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
			26	SLOUGH	

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
LOWER KEYS RABBIT	UR		12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			18	SALT MARSH	
			25	FRESHWATER MARSH AND PONDS	YES
			26	SLOUGH	YES
MANGROVE CLAPPER RAIL	UR		18	SALT MARSH	YES
MARIAN'S MARSH WREN		SSC			
MARSH RABBIT	UR		12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			18	SALT MARSH	
			25	FRESHWATER MARSH AND PONDS	YES
			26	SLOUGH	YES
MIAMI BLACK-HEADED SNAKE	UR	T			
MICCO COTTON RAT	UR		4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
			26	SLOUGH	
MICCO COTTONTAIL RABBIT	UR		1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			18	SALT MARSH	
MIGRANT LOGGERHEAD SHRIKE	UR		1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	YES
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	YES
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
MINK	UR	T	6	SOUTH FLA FLATWOODS	
			12	WETLAND HARDWOOD HAMMOCKS	
			17	CYPRESS SWAMP	YES

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
MINK	UR	T	18	SALT MARSH	
			21	SWAMP HARDWOODS	YES
			22	SHRUB BOG	
			25	FRESHWATER MARSH AND PONDS	YES
			26	SLOUGH	YES
OKALOOSA DARTER	E	E			
PALLID BEACH MOUSE	UR	E	1	NORTH FLA COASTAL STRAND	
PERDIDO KEY BEACH MOUSE	E	E	1	NORTH FLA COASTAL STRAND	
PEREGRINE FALCON	T	E	1	NORTH FLA COASTAL STRAND	
			6	SOUTH FLA FLATWOODS	
			18	SALT MARSH	
			25	FRESHWATER MARSH AND PONDS	
PINE BARRENS TREEFROG		SSC			
PINE ISLAND RICE RAT	UR				
PIPING PLOVER	T	T			
RACCOON	UR		1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	YES
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
			17	CYPRESS SWAMP	YES
			18	SALT MARSH	
			21	SWAMP HARDWOODS	YES
			22	SHRUB BOG	
			25	FRESHWATER MARSH AND PONDS	
			26	SLOUGH	
			1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	YES
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
			17	CYPRESS SWAMP	YES
			18	SALT MARSH	
			21	SWAMP HARDWOODS	YES

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
RACCOON	UR		22	SHRUB BOG	
			25	FRESHWATER MARSH AND PONDS	
			26	SLOUGH	
RED RAT SNAKE		SSC	3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	YES
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
REDDISH EGRET	UR	SSC			
RIGHT WHALE	E	E			
RIMROCK CROWNED SNAKE	UR	T			
RIVULUS		SSC			
ROSEATE SPOONBILL		SSC			
ROSEATE TERN	T	T			
ROUND-TAILED MUSKRAT	UR		25	FRESHWATER MARSH AND PONDS	YES
SALTMARSH TOPMINNOW		SSC			
SAND SKINK	T	T	3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
SANIBEL ISLAND RICE RAT	UR	SSC			
SANTA ROSA BEACH MOUSE	UR		1	NORTH FLA COASTAL STRAND	
SCOTT'S SEASIDE SPARROW		SSC			
SEI WHALE	E	E			
SHERMAN'S SHORT-TAILED SHREW	UR	SSC			
SHOAL BASS		SSC			
SHORT-TAILED SNAKE	UR	T	3	SAND PINE SCRUB	YES
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			15	OAK HAMMOCKS	
SILVER RICE RAT	UR	E			
SMYRNA SEASIDE SPARROW	UR				

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
SNAIL KITE	E	E			
SOUTHEAST BEACH MOUSE	UR		1	NORTH FLA COASTAL STRAND	
SOUTHEASTERN BAT	UR				
SOUTHEASTERN BIG-EARED BAT	UR				
SOUTHEASTERN KESTREL	UR	T	1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	YES
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
			17	CYPRESS SWAMP	
			18	SALT MARSH	
			21	SWAMP HARDWOODS	
			22	SHRUB BOG	
			26	SLOUGH	YES
SOUTHEASTERN POCKET GOPHER	UR	E			
SOUTHEASTERN SHREW	UR	SSC	12	WETLAND HARDWOOD HAMMOCKS	
			17	CYPRESS SWAMP	
			21	SWAMP HARDWOODS	
SOUTHEASTERN SNOWY PLOVER	UR	T			
SOUTHERN RING-NECKED SNAKE	UR	T	6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
			8	CABBAGE PALM FLATWOODS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			21	SWAMP HARDWOODS	
			22	SHRUB BOG	
SOUTHERN TESSELLATED DARTER		SSC			
SPERM WHALE	E	E			
ST. ANDREWS BEACH MOUSE	UR		1	NORTH FLA COASTAL STRAND	
STODDARD'S YELLOW-THROATED WARBLER	UR		4	LONGLEAF PINE-TURKEY OAK HILLS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			15	OAK HAMMOCKS	
			17	CYPRESS SWAMP	
			21	SWAMP HARDWOODS	

TABLE 38: ECOLOGICAL COMMUNITY OF ANIMALS LISTED BY USFWS OR FGFWFC AND OCCURRING IN ST JOHNS COUNTY

COMMON NAME OF ANIMAL	USFWS STATUS	FGFWFC STATUS	EC NO.	ECOLOGICAL COMMUNITY NAME	CHARACTERISTIC OF COMMUNITY
STRIPED MUD TURTLE	UR	E	17	CYPRESS SWAMP	
			25	FRESHWATER MARSH AND PONDS	
SUWANNEE BASS		SSC			
SUWANNEE COOTER	UR	SSC			
SWAINSON'S HAWK	UR				
SWALLOW-TAILED KITE	UR		6	SOUTH FLA FLATWOODS	YES
			7	NORTH FLA FLATWOODS	YES
			8	CABBAGE PALM FLATWOODS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			17	CYPRESS SWAMP	
			25	FRESHWATER MARSH AND PONDS	
			26	SLOUGH	
WAKULLA SEASIDE SPARROW	UR	SSC			
WHITE TAIL DEER	E	E	1	NORTH FLA COASTAL STRAND	
			3	SAND PINE SCRUB	
			4	LONGLEAF PINE-TURKEY OAK HILLS	
			6	SOUTH FLA FLATWOODS	
			7	NORTH FLA FLATWOODS	
			8	CABBAGE PALM FLATWOODS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			13	CABBAGE PALM HAMMOCKS	
			15	OAK HAMMOCKS	
			17	CYPRESS SWAMP	
			18	SALT MARSH	
			21	SWAMP HARDWOODS	
			22	SHRUB BOG	
			25	FRESHWATER MARSH AND PONDS	
			26	SLOUGH	
WHITE-CROWNED PIGEON	UR	T			
YELLOW-THROATED WARBLER	UR		4	LONGLEAF PINE-TURKEY OAK HILLS	
			11	UPLAND HARDWOOD HAMMOCKS	
			12	WETLAND HARDWOOD HAMMOCKS	
			15	OAK HAMMOCKS	
			17	CYPRESS SWAMP	
			21	SWAMP HARDWOODS	

TABLE 39: SOILS CHARACTERISTIC OF FLOODING

SOIL NUMBER	SOIL NAME	FLOODING FREQUENCY	FLOODING DURATION	PROBABLE MONTHS
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	FREQUENT	VERY LONG	JUL - SEP
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	FREQUENT	VERY LONG	JUN - FEB
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	FREQUENT	VERY LONG	JAN - DEC
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	FREQUENT	BRIEF	JUL - NOV
		FREQUENT	LONG	JUL - NOV
		FREQUENT	VERY LONG	JUL - NOV
		FREQUENT	BRIEF	JUL - NOV
		FREQUENT	LONG	JUL - NOV
		FREQUENT	VERY LONG	JUL - NOV
27	ST AUGUSTINE FINE SAND	RARE	- - -	- - -
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	FREQUENT	VERY LONG	JUN - FEB
36	RIVIERA FINE SAND FREQUENTLY FLOODED	FREQUENT	BRIEF	JUL - OCT
		FREQUENT	BRIEF	JUL - OCT
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	FREQUENT	LONG	JUN - NOV
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	RARE	- - -	- - -
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	FREQUENT	VERY LONG	JUN - FEB
48	WINDER FINE SAND FREQUENTLY FLOODED	FREQUENT	LONG	JUL - OCT
		FREQUENT	LONG	JUL - OCT
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	FREQUENT	VERY LONG	JAN - DEC
51	ST AUGUSTINE-URBAN LAND COMPLEX	RARE	- - -	- - -
52	DURBIN MUCK FREQUENTLY FLOODED	FREQUENT	VERY LONG	JAN - DEC
66	TERRA CEIA MUCK FREQUENTLY FLOODED	FREQUENT	LONG	JUN - NOV
		FREQUENT	LONG	JUN - NOV
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	FREQUENT	VERY LONG	JAN - DEC

TABLE 40: SOILS WITH FLOODING LIMITATIONS FOR DWELLING UNITS WITH AND WITHOUT BASEMENTS

SOIL NUMBER	SOIL NAME	WITHOUT BASEMENT LIMITATION IS	DUE TO	WITH BASEMENT LIMITATION IS	DUE TO
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
27	ST AUGUSTINE FINE SAND	SEVERE	FLOODING	SEVERE	FLOODING
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	SEVERE	FLOODING	SEVERE	FLOODING
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
48	WINDER FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
51	ST AUGUSTINE-URBAN LAND COMPLEX	SEVERE	FLOODING	SEVERE	FLOODING
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	FLOODING	SEVERE	FLOODING

TABLE 41: SOILS WITH FLOODING LIMITATIONS FOR SMALL COMMERCIAL CITES

SOIL NUMBER	SOIL NAME	LIMITATION IS	DUE TO
18	FLORIDANA FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING
22	MANATEE FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	FLOODING
24	PELLICER SILTY CLAY LOAM FREQUENTLY FLOODED	SEVERE	FLOODING
25	PARKWOOD FINE SANDY LOAM FREQUENTLY FLOODED	SEVERE	FLOODING
27	ST AUGUSTINE FINE SAND	SEVERE	FLOODING
30	WESCONNETT FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING
36	RIVIERA FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING
42	BLUFF SANDY CLAY LOAM FREQUENTLY FLOODED	SEVERE	FLOODING
45	ST AUGUSTINE FINE SAND CLAYEY SUBSTRATUM	SEVERE	FLOODING
47	HOLOPAW FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING
48	WINDER FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING
49	MOULTRIE FINE SAND FREQUENTLY FLOODED	SEVERE	FLOODING
51	ST AUGUSTINE-URBAN LAND COMPLEX	SEVERE	FLOODING
52	DURBIN MUCK FREQUENTLY FLOODED	SEVERE	FLOODING
67	TISONIA MUCKY PEAT FREQUENTLY FLOODED	SEVERE	FLOODING

TABLE 42: DESCRIPTION OF SEWAGE TREATMENT PLANTS (STP)

STP NUMBER	STP NAME	CATEGORY	POPULATION	CAPACITY (gpd)
1	MCDANIELS SLUDGE DISPOSAL AREA	SEPTIC TANK	0	0
2	SPANISH TRAIL MOBILE HOME PARK	PACKAGE STP	75	13,000
3	LUI-M CORPORATION	PACKAGE STP	175	2,500
4	MOULTRIE LAKES APARTMENTS	PACKAGE STP	250	30,000
5	SALT & SAND CAR WASH	PACKAGE STP	0	400
6	PONCE DELEON CARE CENTER	PACKAGE STP	120	12,000
7	MOULTRIE APARTMENTS	PACKAGE STP	120	12,000
8	JACK WILSON CAR WASH	PACKAGE STP	0	1,500
9	SOUTHGATE MOBILE HOME PARK	PACKAGE STP	30	4,000
10	WAGON WHEEL MOBILE HOME PARK	PACKAGE STP	0	4,200
11	BURNEY'S SLUDGE DISPOSAL AREA	SEPTIC TANK	0	0
12	CITY OF ST AUGUSTINE SLUDGE DISPOSAL AREA	SEPTIC TANK	0	0
13	MOULTRIE WOODS	PACKAGE STP	0	24,000
14	WILDWOOD APARTMENTS	PACKAGE STP	180	20,000
15	MOULTRIE OAKS PARK	PACKAGE STP	93	42,500
16	MERIDIAN NURSING HOME	PACKAGE STP	0	15,000
17	ST AUGUSTINE SHORES	STP	6,000	500,000
18	ST AUGUSTINE CENTER FOR LIVING	PACKAGE STP	75	7,500
19	VAW	STP	0	105,000
20	CITY OF ST AUGUSTINE #1	STP	15,700	5000000
21	CITY OF ST AUGUSTINE #2	STP	15,000	1500000
22	ANASTASIA SANITARY DISTRICT	STP	11,100	2000000
23	VAW	PACKAGE STP	55	6,000

TABLE 43: AREAS WITH HIGH DENSITY SEPTIC TANKS

MAP NUMBER	NAME OF AREA
1	GREEN ACRES
2	DEER RUN ROAD
3	GLIMPSE OF GLORY
4	POWELL ROAD
5	CENTURY HILLS
6	ST AUGUSTINE SOUTH
7	ST AUGUSTINE HEIGHTS
8	PRAIRIE CREEK
9	WILDWOOD CREEK

TABLE 44: AREAS WITH SEWER SERVICE

MAP NUMBER	NAME OF AREA
1	CITY OF ST AUGUSTINE
2	ST AUGUSTINE SHORES

GLOSSARY

AGGREGATE, SOIL: Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms are called peds.

AQUIFER: A body of saturated rock or sediment through which water can move readily.

AQUIFER RECHARGE: The process of returning surface water or rainfall to the groundwater system. The addition of new water to an aquifer or to the zone of saturation.

ARTIFICIAL RECHARGE: Groundwater recharge increased by engineering techniques.

C HORIZON: A soil layer composed of incompletely weathered parent material.

CLAY: Sediment composed of particles with diameter less than 1/256 mm.

COMPLEX, SOIL: A map unit of two or more kinds of soil in such an intricate pattern or so small an area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

CONFINING LAYERS: Layers of rock or sediment which reduce the amount of water recharge to the Floridan Aquifer, also called confining units or aquacludes.

CRITICAL HABITATS: Habitats for endangered and threatened species. These areas should be evaluated prior to development to identify land uses which could adversely impact endangered or threatened species.

CUTBANKS CAVE: (in tables) The walls of excavations tend to cave in or slough.

DETENTION: The collection and temporary storage of stormwater in such a manner as to provide for treatment through physical, chemical, or biological processes with subsequent gradual release of the stormwater. Facilities are typically within the line of flow of the drainage system. Stormwater from a site passes through the detention facility and is filtered prior to discharge to remove pollutants.

DRAINAGE BASIN: Consists of a surface stream, its tributaries, and the surrounding land that these streams drain.

DRAINAGE DIVIDE: Either natural ridges or cultural features such as roads railroads, or levees, that separate adjacent drainage basins. Also called basin boundary or watershed.

EFFLUENT: That which flows out of a septic system.

EROSION: The physical removal of rock or soil by an agent such as running water, glacial ice, or wind.

EXCESS FINES: (in tables) Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

EXCESS SALTS: (in tables) Excess water-soluble salts in the soils that restrict the growth of most plants.

FAST INTAKE: (in tables) The rapid movement of water into the soil.

FLOOD BOUNDARY: The 100 year or 500 year flood boundary is the outer edge of the flood plain. It is used to delineate which properties are within the flood plain for regulatory and flood insurance purposes. The flood boundary usually follows a natural contour line. The area within a flood boundary which includes the floodway and floodway fringe.

FLOOD PLAIN: A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially. A broad strip of land built up by sedimentation of either side of a stream channel.

FLOOD PRONE AREAS: Areas where flooding is either common (likely under normal conditions) or frequent (occurs, on the average, more than once in two years). Areas of low elevation to which drainage is directed.

FLOODING: The temporary inundation of an area, caused by an overflowing streams by runoff from adjacent slopes, or by tides. Water standing for a short period after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

FLOODWAY: The permanent channel of a stream of other watercourse, plus any adjacent flood plain areas that must be kept free of any encroachment in order to discharge the 100 year flood without substantial increases in flood height.

FRIABLE: Easily crumbled or pulverized.

GRASSED WATERWAY: (in tables) A natural or reconstructed waterway,typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

GRAVEL: Rounded or angular fragments of rock up to 3 inches (2 mm to 7.5 cm) in diameter. An individual piece is a pebble.

GROUND WATER: The water that lies beneath the ground surface, filling the cracks, crevices, and pore space of rocks.

HORIZON, SOIL: Any of the layers of soil that are distinguishable by characteristic pyhsical or chemical properties. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes.

HUMUS: (in tables) The well decomposed, more or less stable part of the organic matter in mineral soils.

HYDRIC SOILS: Soils that are sufficiently wet under undrained conditions to support the growth and regeneration of hydrophytic vegetation. The list of these soils includes hydric soils that are either drained or undrained; therefore, not all areas of hydric soils support predominantly hydrophytic vegetation and thus are not wetlands.

HYDROLOGIC CYCLE: The movement of water and water vapor from the sea to the atmosphere, to the land, and back to the sea and atmosphere again.

HYDROLOGIC SOIL GROUPS: Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups (see subtask 4D).

HYDROPHYTE: A perennial vascular aquatic plant having its overwintering buds under water. A plant growing in water or in soil too waterlogged for most plants to survive.

INFRASTRUCTURE: The underlying foundation or basic framework of a system.

IRRIGATION: Application of water to soils to assist in production of crops.

LEACHING: The removal of soluble material from soil or other material by percolating water.

LIQUID LIMIT: The moisture content at which the soil passes from a plastic to liquid state.

LOAM: Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

LOW STRENGTH: (in tables) The soil is not strong enough to support loads.

MAP UNITS, SOIL: Divide the landscape into areas which consist of one or more soils for which the unit is named. These soils have similar characteristics such as depth of each layer, color, texture, permeability, etc., have been named and numbered.

NON-POINT SOURCE POLLUTION: Pollution associated with land use activities which do not have a well-defined point of discharge. Nonpoint contaminants are carried to water bodies by direct runoff or even by percolation through the soil to groundwater. While the exact source of nonpoint pollution often is not easily identified, some potential sources include: 1) Construction site runoff, 2) Urban stormwater, 3) Leachates from septic tanks and landfills, and 4) Agricultural runoff.

ORGANIC MATTER: Plant and animal residue in the soil in various stages of decomposition.

PERCHED WATER TABLE: A water table separated from the main water table beneath it by a zone that is not saturated.

PERCOLATION: The downward movement of water through the soil.

PERMEABILITY: The capacity to transmit a fluid. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil.

PERCS SLOWLY: (in tables) The slow movement of water through the soil adversely affecting the specified use.

pH VALUE: A numerical designation of acidity and alkalinity in soil.

PHASE, SOIL: A subdivision of a soil series based on features that its use and management. For example, slope, stoniness, and thickness.

PIPING: (in tables) Formation of subsurface tunnels or pipeline by water moving through the soil.

PLASTIC LIMIT: The moisture content at which a soil changes from to plastic.

PLASTICITY INDEX: The numerical difference between the liquid limit the plastic limit; the range of moisture content within which the soil remains plastic.

POINT SOURCE POLLUTION: Pollution associated with land use activities which have a well-defined point of discharge, such as a pipe or a smoke stack. Easier to identify than nonpoint sources. They include, wastewater treatment plants, industrial facilities, construction activities, accidental spills, illegal discharges and others.

PONDING: Standing water on soils in closed depressions. Unless the soils are artifically drained, the water can be removed only by percolation or evapotranspiration.

PORE SPACE: The total amount of space taken up by openings between sediment grains.

POROSITY: The percentage of a rock's volume that is taken up by openings.

POTENTIOMETRIC SURFACE: The level to which water rises without pumping in a tightly cased well.

PROFILE, SOIL: A vertical section of the soil extending through all its horizons and into the parent material.

REACTION, SOIL: A measure of acidity or alkalinity of a soil, expressed in ph values. A soil that tests to ph 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline.

RESIDUAL SOIL: Soil that develops directly from weathering of the rock below.

RETENTION: Requires the diversion of the required volume of run-off to an impoundment area with no subsequent direct discharge to surface waters. The prevention of discharge of a given volume of stormwater runoff by complete onsite storage.

RUNOFF: The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

SALINITY: Percent of a composition which is saline or salt.

SALTWATER INTRUSION: Process where saltwater replaces surface and groundwater which were formerly fresh. May be brought on by reductions of streamflow and channelization, over pumpage of ground water, rainfall deficits, changes in recharge, construction of saltwater canals, dredging and other activities.

SAND: As a soil separate, individual or rock mineral fragments from 0.05 mm to 2.0 mm in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

SATURATED ZONE: A subsurface zone in which all rock openings are filled with water.

SEDIMENT: Loose, solid particles that can originate by 1) weathering and erosion of preexisting rocks, 2) chemical precipitation from solution, usually in water, and 3) secretion by organisms.

SEDIMENTATION: A natural process which brings nutrients and other organic and inorganic materials from upland areas to lowland areas.

SEEPAGE: (in tables) The movement of water through the soil. Seepage adversely affects the specified use.

SERIES, SOIL: Made up of soils with similar profiles or horizons which are similar in composition, thickness, and arrangement.

SEPARATE, SOIL: Mineral particles less than two milimeters in equivalent diameter and ranging between specified size limits.

SHEET EROSION: The removal of a thin layer of surface material, usually topsoil, by a flowing sheet of water.

SHRINK-SWELL: The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

SILT: As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 mm) to the lower limit of very fine-sand (0.05 mm). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

SOIL: A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earth parent material, as conditioned by relief over periods of time. The layer of weathered, unconsolidated material on top of bed rock often also being capable of supporting plant growth.

SLOPE: The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

SOLUM: The upper part of a soil profile, above the C horizon in which the processes of soil formation are active. The living roots and plant and animal activities are largely confined to the solum.

STORMWATER: The flow of water which results from, and which occurs immediately following, a rainfall event.

STREAM: A moving body of water, confined in a channel and running downhill under the influence of gravity.

SUBSTRATUM: The part of the soil below the solum.

TEXTURE, SOIL: The relative proportions of sand, silt, and clay particles in a mass of soil.

THIN LAYER: (in tables) Otherwise suitable soil material too thin for the specified use.

TOPOGRAPHY: Graphic delineation of natural and man-made features of a region in a way to show their relative positions and elevations.

TOPSOIL: The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

TRIBUTARY: Small stream flowing into a large stream, adding water to the large stream.

TURBIDITY: Streamflow that is thick or opaque with sediment.

TURBIDITY CURRENT: A flowing mass of sediment-laden water that is heavier than clear water and therefore flows downslope along the bottom of the sea or a lake.

UNCONSOLIDATED: In referring to sediment grains, loose, separate, unattached to one another.

UNSATURATED ZONE: A subsurface zone in which rock openings are filled partly with air and partly with water; above the saturated zone.

VARIANT, SOIL: A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

WATER TABLE: Depth to water, below this the soil is saturated. The upper surface of the zone of saturation. The upper limit of the soil or underlying rock material that is wholly saturated with water.

WEATHERING: The group of processes that change rock at or near the earth's surface. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

WETLANDS: Hydrologically sensitive areas which are identified by being inundated or saturated by surface or ground water with a frequency and duration sufficient to support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. Also identified by hydric soils.

APPENDIX A

CONTRACT NO. CM-207

Appendix A contains a copy of the contract between DER and the St. Johns County Engineering Department to perform this study. It also contains the Master Work Plan as addressed in TASK 1.

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DER Contract No. CM - 207
DEPARTMENT OF ENVIRONMENTAL REGULATION

AGREEMENT FOR DEVELOPMENT OF A BASIN MANAGEMENT PROGRAM FOR THE MOULTRIE CREEK AND MOSES CREEK WATERSHEDS

This agreement is made and entered into between the State of Florida Department of Environmental Regulation and the St. Johns County Board of County Commissioners, (hereinafter called DER and CONTRACTOR respectively).

WITNESSETH:

WHEREAS, the DER has responsibility for disbursement of federal funds appropriated under the Coastal Zone Management Act of 1972, as amended; and,

WHEREAS, the Coastal Zone Management Improvement Act of 1980 requires state coastal management efforts to provide for the management of coastal resources;

NOW, THEREFORE, in consideration of the mutual covenants, promises and representations herein, the CONTRACTOR and DER hereby agree as follows:

SECTION 1. Scope of Services.

The CONTRACTOR shall perform the services and specific responsibilities as set forth in Attachment A, attached hereto and made a part hereof.

SECTION 2. Compensation.

For satisfactory performance, the DER agrees to compensate the CONTRACTOR on a fixed price basis in the amount of $125,000.00 for Phase I work.

The State of Florida's performance and obligation to pay under this contract is contingent upon an annual appropriation by the Legislature or continuation of other funding presently anticipated, without liability for anticipated profits for unfinished work.

SECTION 3. Payments.

The CONTRACTOR shall submit invoices in two copies, on a convenient basis, but not more frequently than monthly, based on a percentage of completion. The invoices shall be submitted in conjunction with the progress reports required hereunder or with supplemental progress reports meeting the contract requirements if payment is desired more frequently than quarterly; additional reimbursement for travel expenses is not authorized under this agreement. Invoices shall be in sufficient detail for a preaudit and postaudit thereof. The DER reserves the right to withhold payment of up to 10% of the total project budget pending receipt and acceptance of the final report.

SECTION 4. Time of Performance.

This agreement shall cover the period from the date of execution through September 30, 1989 subject to the approval of Attachment A and the availability of funds after September 29, 1988 by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration (hereinafter called OCRM/NOAA).

SECTION 5. Approvals and Notices.

A. The CONTRACTOR's project manager is Charles C. Space, P.E., County Engineer, telephone 904/824-8131. The DER project manager is James W. Stoutamire, Office of Coastal Management, telephone 904/488-4805 or (Suncom) 278-4805. DER reserves the right to approve changes in project managers upon receipt of a written request; however, this approval will not require a contract amendment. All matters shall be coordinated with or directed to the project managers for proper disposition.

B. Any notice or other written communications between the CONTRACTOR and the DER shall be considered delivered when posted by certified mail or delivered in person to the respective project manager.

C. Either party may request changes in the scope of the services to be performed hereunder. Those changes which are mutually agreed upon shall be made by a written order designated to be a change order. Any change order which causes a change in the cost or time of performance shall be incorporated in written amendments to the agreement.

D. This agreement may be extended or renewed should additional funds and/or time become available to continue the project. Any extension or renewal will be contingent on approval of an extension or renewal of the availability of these funds by the OCRM/NOAA.

SECTION 6. Work/Reports Required.

A. Project Initiation Report

This report shall be submitted within two weeks of the contract beginning date and shall include, for approval by DER: names and brief credentials of staff persons assigned to the project.

B. Progress Reports

Progress reports shall be submitted every three months beginning January 1, 1988. These reports shall consist of a summary of the work completed on the project to date and shall be based on project tasks listed in Attachment A. Progress reports shall also include any press clippings or press notices related to this project.

C. Interim and Final Reports

In accordance with Attachment A, draft interim reports will be submitted at the completion of Tasks 2, 3, and 4. The final report in eight copies shall be submitted upon completion of tasks in accordance with the requirements of Attachment A, shall include a separate executive summary document briefly outlining the work conducted and its results, and shall be submitted no later than the completion date of the contract.

D. Ownership of Documents

All reports produced and other data gathered by the CONTRACTOR for the purpose of this contract shall become the mutual property of the OCRM/NOAA, the DER, and the CONTRACTOR without restriction or limitation upon their use and shall be made available by the CONTRACTOR at any time upon request of the DER.

E. Copyrights

Books, publications, or other copyrightable materials developed under this agreement may be copyrighted provided that the DER and the OCRM/NOAA reserve a royalty-free nonexclusive and irrevocable right to reproduce, publish, or otherwise use, and to authorize others to use, the materials for government purposes.

F. Documentation

The cover or title page of all reports, studies, maps or other documents resulting from contracts supported in whole or in part by this grant shall contain the following statement: Funds for this project were provided by the Department of Environmental Regulation, Office of Coastal Management using funds made available through the National Oceanic and Atmospheric Administration under the Coastal Zone Management Act of 1972, as amended.

SECTION 7. United States Government Involvement.

A. This agreement is funded in part by a grant from the OCRM/NOAA. In exchange for Coastal Zone Management funding, the CONTRACTOR agrees to abide by and comply with OMB Circular A-102 and A-87.

B. The CONTRACTOR agrees that the DER, the Comptroller General of the United States or any of his duly authorized representatives and the United States Secretary of Commerce or any of his duly authorized representatives shall, until the expiration of three years after expenditure of funds under this agreement, have access to and the right to examine any directly pertinent books, documents, papers, and records of the CONTRACTOR involving transactions related to this agreement. The CONTRACTOR agrees that payment(s) made under this agreement shall be subject to reduction for amounts charged thereto which are found on the basis of

audit examination not to constitute allowable costs under this agreement. The CONTRACTOR shall refund by check payable to the DER the amount of such reduction of payments. All required records shall be maintained until an audit is completed and all questions arising therefrom are resolved, or three years after completion of the project and submission of a final invoice, whichever is sooner.

SECTION 8. Non-Supplanting.

Federal funds made available for state or local projects under the Coastal Zone Management Act of 1972, as amended, may not be so used as to supplant state or other funds that would be available in the absence of such federal funds for coastal zone management program activities, but rather will be so used as to increase such state or other funds available for coastal zone management.

SECTION 9. Responsibilities of DER.

The DER shall:

A. Provide guidance, assistance and coordination to the extent necessary and feasible;

B. Provide reference documents as required;

C. Provide for timely review of drafts and interim reports, and furnish comments, suggestions or approvals as appropriate;

D. Provide for review of the final report draft and furnish comments within twenty working days.

SECTION 10. Decisions by the DER.

All services shall be performed by the CONTRACTOR to the satisfaction of the Secretary of DER or his designated representative, who shall decide all questions, difficulties, and disputes of whatever nature which may arise under or by reason of the agreement, the prosecution and fulfillment of the services hereunder and the character, quality, amount and value thereof. The Secretary's decision upon all claims, questions and disputes shall be final, conclusive and binding upon the parties hereto. This section shall not preclude any party from seeking relief by filing a petition for an administrative hearing pursuant to Chapter 120, F.S.

SECTION 11. Termination of Agreement.

A. Termination for Convenience

This contract may be terminated by either party at any time prior to fulfillment following thirty calendar days written notice, delivered by certified mail return receipt

requested, to the other party. The CONTRACTOR shall be paid for services performed and/or costs incurred based on an estimate of that portion of the work that has been completed, as determined by the DER.

B. Termination for Cause

If the CONTRACTOR shall fail to fulfill in a timely and proper manner its obligations under this contract, or if the CONTRACTOR shall violate any of the covenants, agreements, or stipulations of this contract, the DER shall thereupon have the right to terminate this contract by giving written notice to the CONTRACTOR of such termination and specifying the effective time/date thereof. In that event, all items or materials furnished by the DER and any finished or unfinished reports, notes, or field data prepared by the CONTRACTOR shall immediately be delivered to a place designated by DER, and the CONTRACTOR shall be entitled to receive just and equitable compensation for any satisfactory work or services completed.

Notwithstanding the above, the CONTRACTOR shall not be relieved of liability to the DER for damages sustained by the DER by virtue of any breach of the contract by the CONTRACTOR, and the DER may withhold any payments to the CONTRACTOR for the purpose of setoff until such time as the exact amount of damage due the DER is determined.

C. Termination Based Upon Withdrawal of Federal Funds

This contract is subject to the availability and continuation of federal funding anticipated at the time of execution. Should funding be discontinued or reduced, the contract will be terminated or amended, as appropriate, and the CONTRACTOR shall be compensated for work or services completed.

D. Termination for Refusal to Allow Public Access to Records

The DER reserves the right to unilaterally cancel this agreement for refusal by the CONTRACTOR to allow public access to all documents, papers, letters, or other material subject to the provisions of Chapter 119, Florida Statutes and made or received by the CONTRACTOR in conjunction with the contract.

SECTION 12. Disclaimer of Liability.

The CONTRACTOR hereby agrees to indemnify, defend, save and hold harmless the DER from all claims, demands, liabilities, and suits of any nature whatsoever arising out of, because of, or due to any negligent act or occurrence of omission or commission of the CONTRACTOR, its agents, or employees to the extent permitted by Florida law.

SECTION 13. Interest of the CONTRACTOR.

The CONTRACTOR covenants that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of services required to be performed under this contract. The CONTRACTOR further covenants that in the performance of this contract no person having any such interest shall be employed.

SECTION 14. Personnel.

A. To the extent required by law, the CONTRACTOR will secure and maintain such insurance as will protect it from claims by employees under the Workers' Compensation Act and from claims by employees for bodily injury or death which may arise from the performance of its services under this contract.

B. The CONTRACTOR assures that the program supported by the grant will be conducted in compliance with Title VI of the Civil Rights Act of 1964 (P.L.88-352) as amended, (42USC2000d) and the requirements imposed by the regulations of the Department of Commerce (15CFRPart8) issued pursuant to that Title. In accordance therewith no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the CONTRACTOR receives federal financial assistance and the CONTRACTOR will immediately take any measures necessary to effectuate this agreement.

SECTION 15. Officials not to Benefit.

No member of or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this contract or to any benefit that may arise therefrom.

SECTION 16. Covenant Against Contingent Fees.

The CONTRACTOR warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for the CONTRACTOR, to solicit or secure this agreement, and that it has not paid or agreed to pay any person, company, corporation, individual, or firm, other than a bona fide employee working solely for the CONTRACTOR, any fee, commission, percentage, gift or other consideration contingent upon or resulting from the award or making of this contract. For breach or violation of this provision, the DER shall have the right to terminate the agreement without liability and, at its discretion, to deduct from the contract price, or otherwise recover, the full amount of such fee, commission, percentage, gift, or consideration. The DER shall further be responsible for

reporting the details of such breach or violation to the proper legal authorities, when and where appropriate.

SECTION 17. Agreement as Including Entire Agreement.

This instrument embodies the entire agreement of the parties. There are no provisions, terms, conditions or obligations other than those contained herein; and this agreement shall supersede all previous communication, representation or agreements, either verbal or written between the parties hereto.

ST. JOHNS COUNTY BOARD OF COUNTY COMMISSIONERS

Lawrence O. Hartley

Date: 12-10-87

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL REGULATION

for Secretary

Date: 11/23/87

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Attachment A
MASTER WORK PLAN

Project Title

Development of a Basin Management Program for the Lower Matanzas River - Moultrie Creek and Moses Creek Watersheds (Reference NOAA Task 2.1).

Background And Statement Of The Problem

The Florida Coastal Management Program has previously supported (1979) investigations of shellfish growing areas in the Matanzas River, toward the overall goal of protecting these resources from the effects of anticipated population growth. These investigations identified septic tanks and non-point source pollution (i.e. stormwater drainage) as the major threats to the future health of the area's estuarine waters. Subsequently, the St. Johns County Commission adopted a county-wide drainage ordinance and strengthened regulation of septic tanks. Additionally, the state adopted more stringent water quality standards for much of the area.

In spite of these regulatory actions, most of the shellfish growing areas in St. Johns County recently have been closed to harvesting and the remaining "conditionally approved" areas are threatened. It is now generally recognized that maintenance of the overall health of estuarine resources in the area will require more comprehensive, basin-wide management approaches as well as refinement of existing project-by-project regulatory actions administered by St. Johns County, DER and the St. Johns River Water Management District (SJRWMD), including special area management.

Major obstacles confronting basin-wide management in the area include the size and complexity of drainage areas involved, a severe lack of detailed information upon which to develop needed plans and ordinances, as well as rapid population growth in critical watershed areas. For maximum efficiency in using available funds and expertise, efforts toward addressing these problems must be directed at priority geographic areas and regulatory improvement needs.

Project Area

The priority area selected for this project is experiencing increasing development pressures and poses critical flood prevention and stormwater management problems as growth occurs. Relative to other parts of the County, significant natural resources in the area remain undisturbed.

Work during 1987-88 will focus on the Moultrie Creek and Moses Creek watersheds. In general, this includes the area east of the Interstate 95 highway, bounded on the north by State road 312 and on the south by State Road 206. State road 207 forms the northwest boundary (see figure 1). Adjacent waters of the Matanzas River are also included.

Project Objectives

This work is Phase 1 of a 2-3 year project which will provide the basis for county-wide improvements in stormwater management, flood protection and protection of natural resources. Phase 1 work will emphasize developing a sound data base on characteristics/conditions of the study area. Information developed will be in sufficient detail and in a form usable for day-to-day regulatory and engineering work by the County Engineer's Office, as well as for developing comprehensive basin management strategies in Phase 2 of the project.

Specific phase 1 work objectives are as follows:

1. Develop a comprehensive inventory of areas within the watersheds that deserve special management consideration. This inventory will be used as a basis for the following:
   a. Improving coordination and regulation consistency between St. Johns County, the St. Johns River Water Management District, the U.S. Army Corps of Engineers, and DER;
   b. Revising the County's comprehensive plan; and
   c. Future resource investigations by state and local agencies.

2. Develop detailed information on topography, soils, flood prone areas, land use and other conditions pertinent to achieving stormwater management, flood prevention, and resource protection objectives for the study area.

3. Develop refinements for special area protection under County Ordinance 86-4 and apply these refinements within the study area. This will include specific recommended actions such as stormwater master plans, improved performance standards for new development, provision of infrastructure to reduce environmental impacts, and improved coordination between state, regional, and local efforts to control non-point pollution.

4. Use products developed for special area management in the project area as a prototype for improving flood protection and stormwater controls in critical resource areas throughout the County.

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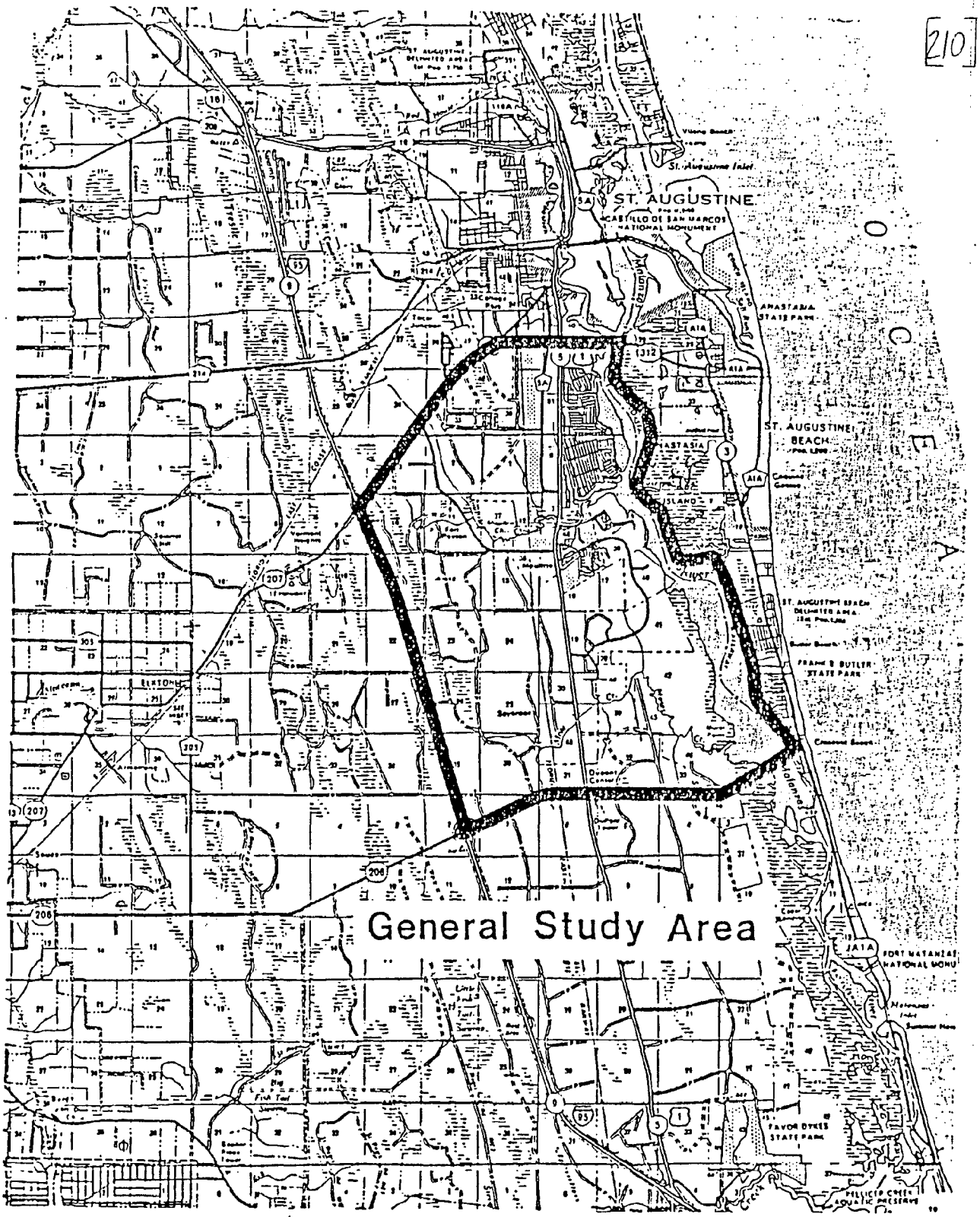
ST. AUGUSTINE
ST. AUGUSTINE BEACH
ANASTASIA STATE PARK
FRANK B BUTLER STATE PARK
FAVOR DYKES STATE PARK
FORT MATANZAS NATIONAL MONU
General Study Area

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Master Work Plan

Five major tasks have been developed to achieve project objectives in Phase 1.

Task 1: Project refinement.
Task 2: Assess opportunities for refining existing plans, regulations, and management tools.

Task 3: Establish an understanding of the hydrology of the Moultrie Creek and Moses Creek watersheds.

Task 4: Inventory and assess land characteristics/land use within the watersheds.

Task 5: Analysis of information developed in Tasks 1 through 4.

Results of these tasks will provide the basis for setting resource management goals/objectives and developing a watershed management plan during FY 1988.

TASK SUMMARIES

Task : 1Project refinement

This task will finalize the plan of work and contract scope of services required to achieve project objectives.

Work Products:

1. Final plan of work.

Responsibilities:

DER/OCM: Participate in developing plan of work.

St. Johns County: Finalize plan of work.

SJRWMD: Provide advice and technical information as appropriate.

Task 2: Assess Opportunities for Refining Existing Plans, Regulations, and Management Tools

This evaluation will be ongoing throughout the life of the project and will focus on achieving specific, practical improvements. Initially, emphasis will be on:

Subtask A. Refinement of the existing St. Johns County drainage ordinance (No. 86-4) to provide consideration of special management area and water quality protection needs including:

1. On site treatment criteria for stormwater.
2. Improved design criteria and methodologies governing both the quality and quantity of stormwater discharge.

Subtask B. Identifying mechanisms whereby stormwater management can be incorporated in other County plans and programs, including:

1. Road construction, density and zoning controls, local government comprehensive plan, etc.

2. Identification of stormwater-related infrastructure needs, including land acquisition, flow easements, engineering design, etc. as well as funding mechanisms for meeting these needs.

Subtask C. Increasing mutual support between County, Water Management District, and State programs regarding control of pollution inputs to estuarine waters.

Work Products: Preliminary and final draft reports on Subtasks A, B, and C.

Responsibilities:

St. Johns County: Conduct assessment and produce report(s); provide drafts to DER and SJRWMD for review and comment.

DER/OCM: Review and comment.

SJRWMD: Review and comment.

Task 3: Establish An Understanding of The Hydrology of The Moultrie Creek And Moses Creek Watersheds.

This task is intended to provide information on stream flow characteristics as a basis for managing loadings of future land uses within the study area. Work will involve:

Subtask A. Review and assess existing USGS, FEMA, and SJRWMD streamflow information on the Moultrie Creek and Moses Creek drainage systems, including rainfall and other pertinent information.

Subtask B. Identify needs for additional stream gauges and install as needed.

Subtask C. Document existing streamflow data in terms of:

1. Total average flows;
2. Seasonal and long-term extremes;
3. Major and minor tributaries;
4. Contributing watershed averages;
5. Discharge vs. frequency relationships;
6. Storage vs. frequency relationships.

Work Products:

1. Collection and assessment of existing streamflow information on the Moultrie Creek and Moses Creek systems. Information will be taken from USGS, SJRWMD, COE, DOT, FEMA, and other sources as available to determine stage-discharge-frequency relationships and basin acreages for both the main watercourses and their tributaries.
2. Identification of the need for and installation of additional stream gauges as necessary.

Responsibilities:

DER/OCM: Coordination and technical assistance as appropriate.

St. Johns County: Provide assessment/interim report based on existing information.

SJRWMD: Help provide existing information, coordinate with U.S.G.S., assist in location/installation of stream gauges, and assist in interpretation of data.

Task 4: Inventory and Assess Land Characteristics/Land Use Within the Moultrie Creek and Moses Creek Watersheds.

Work under this task will provide information on the physical characteristics, drainage patterns, and potential sources of pollution. This task will provide the basis for understanding the hydrologic limitations of the area for urban development as well as developing strategies for flood protection/prevention, infrastructure needs, wetland protection, etc.

Subtask A: Delineate/Map Topography of the Study Area.

1. Obtain low-level aerial photography (scale 1"=200') for the study area.
2. Construct topographic maps of the study area (maximum of 2' interval).

Subtask B: Inventory/Map Natural Water Conveyance/Storage System.

This subtask includes floodplains, flood prone areas, etc. described in sufficient detail to identify areas critical for maintaining natural hydroperiods, regional flood control and flood protection of individual facilities.

Subtask C: Inventory/Map Man-made Water Conveyance/ Storage System

Work will include inventory of all major ditches, swales, storm sewers, detention ponds, retention ponds, etc., with detailed information as available, including size, invert elevations, storage capacity, etc.

Subtask D: Detailed Soils Survey.

Using the most recent, detailed soils information determine and map (scale: 1"=200'):

1. Areas where soils may be limited for septic tanks, detention/retention ponds, infrastructure, etc. (Using Table 3, SCS Survey).
2. Areas where soils are easily erodible and erosion control measures are especially needed to prevent sediment transport off-site.

Subtask E: Identify and Map Important Natural Resource Areas of the Two Watersheds.

Use existing information from sources such as the U.S. Fish and Wildlife Service, Florida Department of Natural Resources and others, to identify areas within the watersheds that have important values as habitat or which should otherwise be protected as part of stormwater management efforts. This will include preparation of a preliminary wetlands map (scale 1"=200') based on the U.S. Fish and Wildlife Service Wetlands Inventory and on the hydrologically sensitive soils index contained within the SJRWMD Applicant's Handbook.

Subtask F: Map and Assess Existing Land Uses and Areas Where Flooding Problems Exist.

Using the most recent land use information, supplemented by aerial photography and hydrologic information,

1. Map land uses in sufficient detail to estimate stormwater runoff to adjacent water bodies.
2. Identify residential flooding problems, septic tanks in flood prone areas, erosion into water courses and other flood problems of potential concern.

Subtask G: Identify Point and Non-Point Pollution Sources.

Using existing information from DER, DNR, St. Johns County Health Dept., etc., identify solid waste sites, high density residential areas with septic tank systems, storm sewer outfalls, package sewage treatment plants, sludge disposal areas, etc. which may be potential pollutant inputs to the watersheds. This information will be used to define priority corrective actions in Phase 2 of the project.

Work Products:

Subtask A: Aerial photographs with topography (1"=200', maximum of 2' contour interval).

Subtask B: Map Overlays (1"=200') and descriptive text delineating the drainage/storage systems.

Subtask C: Map Overlays (1"=200') and text delineating and describing the man-made water conveyance system.

Subtask D: Map Overlays (1"=200') with soils limitations and text explaining limitations.

Subtask E: Map Overlay (1"=200') and text describing important natural resource areas.

Subtask F: Existing land use map (1"=200') and descriptive text.

Subtask G: Draft inventory on point and non-point pollution sources, with maps and text as appropriate.

Responsibilities:

St. Johns County: Provide all information gathering, interpretation, map construction and interpretive text.

DER/OCM: Overall project coordination, review and comment on work products.
SJRWMD: Review and comment on work products, provide information and technical assistance as appropriate.

Task 5: Analysis of Information Developed in Tasks 1 through 4.

This task involves the compilation and interpretation of all pertinent information generated within the previous four tasks for use as the basis for formulating a comprehensive basin management plan, including:

Subtask A. Assessment of potential erosion and sedimentation problems of existing land uses.

Subtask B. Estimates of the ability of the drainage systems to accommodate existing runoff volumes and evaluation of current local and state regulations to manage these systems in a way that will ensure future capacity and protect water quality.

Subtask C. General assessment of potential impacts of development and flood control facilities on important habitat and other areas identified in Task 4 as needing special protection.

Subtask D. Proposed strategy for incorporating these findings within the local government's multi-department development review process to provide direct practical application of project findings and recommendations.

Work Products:

Draft and Final Reports covering Subtasks A, B, C and D for use in Phase 2 of the project.

Responsibilities:

St. Johns County: Provide preliminary and final draft Phase 1 reports.

SJRWMD: Review and comment on reports.

DER/OCM: Project management, review and comment on reports.

Phase 2 Tentative Work Plan

Specific work to be accomplished during year two of the project will be determined at the conclusion of Phase 1. Based upon previous work products, Phase 2 will develop conclusions, specific recommendations for improving existing ordinances, management capabilities, etc., as well as recommended basin wide strategies for stormwater management flood protection and protection of natural resources.

Task 1: Update Published Streamflow Information to accurately Reflect Present Watershed Conditions, and Provide Analysis of Hydrologic Characteristics of the Moultrie Creek and Moses Creek Systems.

Task 2: Construct A Future Land use Map of the Study Area, including Planned Infrastructure (Scale of 1" = 200').

Task 3: Assessment of Potential Stormwater Management, Flood Protection, and Natural Resource Protection Problems From Projected Land Use In the Study Area.

Task 4: Develop Recommended Basin-Wide Strategies For Stormwater Management, Flood Protection And Natural Resource Protection.

Recommendations will include at least the following considerations:

Subtask A: Identification of priority corrective actions regarding existing problems (i.e., point and non-point pollution sources, erosion/sedimentation, flooding, capital improvements, etc.).

Subtask B: Cost-effective measures for addressing existing flooding and stormwater problems.

Subtask C: Water quality protection through:

1. On-site stormwater treatment.
2. Basin-wide treatment facilities (e.g. retention/ detention facilities).
3. Septic tank and sewage treatment controls.

Subtask D: Natural resource protection through better stormwater regulation, flood protection, and wetlands management.

Subtask E: Requirements for meeting infrastructure needs, such as water management structures, sewage treatment, road construction, etc.

Subtask F: Requirements for local, state or water management district funding.

Subtask G: Incorporation of recommendations into County land use plans, zoning, building codes, capital improvement budgets, etc.

Subtask H: Increasing mutual support between County, Water Management District and State programs to coordinate growth management efforts in regulating both surface and subsurface discharge of potential contaminants to estuarine waters.

APPENDIX B

DETAILED SOIL INFORMATION

The USDA SCS performed a detailed soil survey of St. Johns County, Florida. A report of their findings was issued in October, 1983. In producing this soil survey, aerial photographs were taken at a scale of 1:20,000. Using these photographs and ground inspection, experienced soil scientists delineated the soils into detailed map units. TABLE 12 lists these soils map units and FIGURE 6 shows the boundaries of these map units, but due to the scale limitation the individual soil numbers are not shown.

Each map unit represents an area consisting of one or more soils for which the unit is named. Soils with similar characteristics, such as depth of each layer, color, texture, permeability, etc., have been established, named and numbered. Soils with similar profiles are combined to form a "soil series". TABLE 13 lists the soil units and the respective series. With the exception of differences in surface layer or underlying material texture, each of the soils within a particular series consist of major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture within the surface layer or the underlying material. They can also differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into "soil phases". Most of the areas shown on the detailed soil maps are phases of soils series. The name of a soil phase commonly

indicates a feature that affects its use or management. For example, "Riviera fine sand, frequently flooded", is one of several phases in the Riviera series.

Some map units are made up of two or more soils. These map units are called "soil complexes". A soil complex consists of two or more soils which exist in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of these soils are somewhat similar in all areas. Fripp-Satellite Complex, identified as soil number 31, is an example of a soil complex which can be found withiin the study area.

When interpreting the soil survey maps it is important to keep in mind the scale (1:20,000) of the aerial photographs used in preparing the soil survey. Considerable time and effort has been expended by many soil scientists using topographic maps, photographic interpretation, and ground truthings to classify the soils. Because the actual boundaries between the soil types are approximate and not absolute, field verification is recommended when relating this information to a particular location. The SCS Soil Survey contains a detailed soil description for each soil map unit, as well as many tables describing different properties of each of the soils found within St. Johns County.

MISCELLANEOUS SOILS

Because many of the soil tables refer to the soil description rather than give the soil's properties in the table, a few unique soils with special properties are worth mentioning more specifically. (This is done by an * in the Soil Survey, and by 99.99 in the tables here.) These unique soils are: Beaches (#28), Pits (#38), and Arents (#55), as well as St. Augustine (#57), Immokalee (#53), Astatula (#54) -Urban land

complex, and Fripp-Satellite complex (#31).

Beaches (#28) are nearly level strips of sand along the coast of the Atlantic Ocean. These strips are at least partially covered by seawater during tides, and are therefore subject to movement by tides and high winds often found at the beaches. This soil is a mixture of light gray to white quartz sand, few to many brown and black sand-size grains of heavy minerals, and sea shells and shell fragments.

Pits (#38) consists of excavations from which soil and geologic material have been removed, primarily for use in road construction, fill for low areas, and building foundations. Pits are locally called borrow pits and can be square or rectangular in shape. These areas have little or no value for growth of agricultural crops or pine trees, and are often filled with water due to the high water table in some areas.

Arents (#55) are nearly level soils made up of heterogeneous soil material that has been removed from other soils and used in land leveling as fill material, or as a final covering for sanitary landfill. This material is a mixture of fine sand or sand and fragments of sandy subsoil material that have dark organic accumulations. These areas can be square or rectangular in shape. Arents soils do not have an orderly sequence of soil layers and in some areas large cells of solid waste refuse can be found below a depth of two to four feet.

Urban land consists mainly of streets, sidewalks, parking lots, buildings, and other structures which obscure or alter the soils to such a degree that identification of the soil is not feasible. St. Augustine-Urban land complex (#51) consists of nearly level, somewhat poorly drained St. Augustine soils that have been used for urban development. Immokalee-Urban land complex (#53) consists of poorly drained, nearly

level Immokalee soils and urban land. Astatula-Urban land complex (#54) consists of nearly level to sloping, excessively drained Astatula soils on broad upland ridges and urban land.

Fripp-Satellite complex (#31) contains 1.) excessively drained, rolling or hilly Fripp soil on narrow relict (something left unchanged in the presence of change) beach dunes 2.) and somewhat poorly drained, nearly level Satellite soil in narrow swales between areas of the Fripp soil. These soils form in thick sandy deposits of marine origin mixed with small amounts of shell and shell fragments. Because of the fragile nature of the dunes, the slope is important in this soil complex. The slope of the Fripp soil ranges from eight to fifteen percent. Slopes are convex and short, with lengths generally ranging from 50 feet to 75 feet from crest to base. The slope of Satellite soil ranges from zero to two percent and is concave and narrow. Fripp fine sand usually constitutes 40 to 70 percent of this complex, while Satellite fine sand constitutes 20 to 35 percent of the complex.

USE OF SOIL INFORMATION

The "Use and Management of the Soils" section of the SCS Soil Survey contains soils information useful in engineering applications. Information in this section of the Soil Survey is intended for land use planning, evaluating land use alternatives, and planning site investigations prior to design and construction. However, the information has limitations. For example, estimates of soil characteristics and other data generally apply only to that part of the soil within a depth of five or six feet. In addition, small areas of different soils may be included within the mapped areas of a specific

soil, as a result of map scale.

It is important to recognize that this information is not highly site specific and can not substitute for onsite investigation and soils testing and analysis by personnel experienced in the design and construction of engineering works. The line delineating the soil boundaries may not be precise or may be questioned; therefore, a site inspection is still a necessity.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section of the SCS Soil Survey. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

This information can be used to:

1. Evaluate the potential of areas for residential, commercial, industrial and recreation uses.
2. Make preliminary estimates of construction conditions.
3. Evaluate alternative routes for roads, streets, highways, pipelines, and underground cables.
4. Evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons.
5. Plan detailed onsite investigations of soils and geology.
6. Locate potential sources of gravel, sand, earthfill, and topsoil.
7. Plan drainage systems, irrigation systems, ponds, and other structures for soil and water conservation.
8. Predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

USING THE MOST RECENT, DETAILED SOILS INFORMATION, DETERMINE AND MAP (SCALE: 1" = 200')

1. AREAS WHERE SOILS MAY BE LIMITED FOR SEPTIC TANKS, DETENTION/RETENTION PONDS, INFRASTRUCTURE, ETC.

SEPTIC TANKS

The effectiveness of septic tanks depends on the ability of absorption fields to filter effluent from the septic tank. This ability is based on limitations of soil properties and the depth to the water table. The SCS Soil Survey lists the degree and type of soil limitations that effect septic tank absorption fields. Reference Table 16 of the SCS Soil Survey for the various types, depths, and occurrences of seasonal high water tables.

Absorption Fields - Reformatted in TABLE 14 are the degree and the kind of soil limitations that affect septic tank absorption fields. Those soils with limitations for septic tanks are shown in FIGURE 7. Limitations considered are:

SLIGHT - Soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome.

MODERATE - Soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations.

SEVERE - Soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Additionally, a hazard of groundwater contamination may exist in areas having many septic tank absorption fields in the following soils:

Astatula (#2)	Beaches (#28)
Tavares (#6)	Fripp (#31)
Paola (#23)	Palm Beach (#32)

Septic tank absorption fields are areas in which effluent from a septic

tank is distributed into the soil through subsurface tiles or perforated pipe. In determining soil suitability for septic tank absorption fields, only that part of the soil between depths of 24 to 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to a confining layer, and flooding influence absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption and surfacing of effluent can affect public health. Groundwater can be polluted if highly permeable sand and gravel is less than four feet below the base of the absorption field, the slope is excessive, or the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. The St. Johns County Health Department will specify the thickness of the unsaturated soil layer based upon the results of an onsite percolation test.

Seasonal High Water Table - Septic tank absorption fields are affected by a high water table and by seasonal high water tables of the soils. TABLE 15, obtained from information Table 16 of the Soil Survey, gives the depth to the seasonal high water table, the kind of water table (Apparent, Artesian, or Perched), and the months during which it is commonly high. A seasonal high water table is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies only to undrained soils. A water table that is seasonally high for less than one month is not indicated in the table.

A plus sign preceding the range in depth indicates that the water table is above the surface of the soil (a condition of ponding). The

first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface. Those soils subject to ponding due to a seasonal high water table are shown on FIGURE 8.

Other depths shown in TABLE 15 without a plus sign preceding the range in depth indicate the depth to water table below the surface. A percent sign (%) for the maximum depth indicates that the water table was encountered at a greater depth than six feet. Only saturated zones within a depth of about six feet were investigated.

Only apparent water tables are found in St.Johns County. An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole, after adequate time is allowed for adjustment in the surrounding soil.

DETENTION/RETENTION PONDS

Site features relating to drainage, irrigation, embankments, and grassed water ways are considered to address the stormwater management issue of detention and retention pond design. The physical and chemical properties of the soils also affect the water management mechanisms. Table 13 of the Soil Survey gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for embankments and for aquifer-fed ponds.

Site Features - The limitations for water management devices considered are:

SLIGHT - Soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome.

MODERATE - Soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitation.

SEVERE - Soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

TABLE 16 contains the degree and kind of soil limitations for embankments. These are raised structures of soil material, generally less than twenty feet high, which are constructed to impound water or to protect land against flooding. The soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about five feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, extensive onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than five feet of suitable material and a high content of stones, organic matter, salts, or sodium. A high water table affects the amount of usable material.

TABLE 17 lists the degree and kind of soil limitations for aquifer-fed excavated ponds. These ponds are pits or dugouts that extend to a ground water aquifer. Excluded are ponds that are fed only by surface run-off and embankment ponds that impound water three feet or more above the original surface. Excavated ponds are affected by the depth to the fluctuating water table found in St. Johns County; the permeability of the aquifer; and the quality of the water as inferred

from the salinity of the soil. The depth to a hardpan layer and the content of large stones affect the ease of excavation.

Other water management mechanisms that may be important when reviewing soil potential for retention and detention ponds include drainage, irrigation, diversions, and grassed waterways. The features of the soil that affect these water management mechanisms are listed in TABLES 18 through 21.

TABLE 18 lists the features affecting each soil when used for drainage. Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to hardpan or other layers that affect the rate of water movement, permeability, depth to high water table or the depth of standing water (if the soil is subject to ponding), slope, susceptibility to flooding, and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected the by depth to hardpan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

TABLE 19 lists the features affecting each soil when used for irrigation. Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by the depth to high water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of an irrigation system is affected by large stones and the depth to a hardpan

layer. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

TABLE 20 lists the features affecting each soil when used for diversions. Diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to a hardpan layer affect the construction of diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

TABLE 21 lists the features affecting each soil when used for grassed waterways. Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surfacewater to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to a hardpan layer affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Physical and Chemical Properties of Soils - Another soil property that affects behavior of a soil for detention and retention ponds is permeability. TABLES 22 and 23 (from Table 15 of the Soil Survey) list estimates of some physical and chemical properties of soils, including permeability, percentage of clay particles, bulk density, available water capacity, and soil reaction or pH. These estimates are given for the major layers of each soil in the survey area. These estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or soil particle, consists of mineral soil particles that are less that 0.002 millimeter in diameter. In TABLE 22, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The percentage and characteristics of clay within a sample greatly affect the fertility and physical condition of the soil. This governs the ability of the soil to absorb cations and to retain moisture and influences shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and type of clay within a soil also affect tillage and earth-moving operations.

Also included in TABLE 22 is the moist bulk density or the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at one third bar moisture tension. Weight is determined after drying the soil at 105 degrees Celsius. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter (g/cm^3) of soil material that is less than two millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 g/cm^3 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability, a soil property that affects the behavior of a soil as a retention/detention pond function, refers to the ability of a soil to transmit water, air or other elements. The estimates of vertical

permeability included in TABLE 22 indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particular structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Another physical property of soil is its available water capacity. TABLE 23 refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water stor
age is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties affecting water capacity are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the selection of plants or crops to be grown, as well as in the design and managment of irrigation systems. Available water capacity is not an estimate of the quanity of water actually available to plants at any given time.

Soil reaction, a chemical property of the soil, is a measure of acidity or alkalinity and is expressed as a range in pH values. The pH for each soil layer is given in TABLE 23. The range in pH of each major horizon is based on the results of many field tests. For many soils, values have been verified by laboratory analysis. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

INFRASTRUCTURE

Soil properties create limitations on other soil applications such as their use as infrastructure both as a construction material and as a construction site.

Building Site Development - TABLES 24 through 29 (Table 10 of the Soil Survey) indicate the degree and type of soil limitations for use as a site for development for: shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations for application as a site for development considered are:

SLIGHT - Soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome.

MODERATE - Soil properties or site features are not favorable for the indicated use and special planning design, or maintenance is needed to overcome or minimize the limitations.

SEVERE - Soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Soil limitations for use in shallow excavations are shown in TABLE 24, and include trenches or holes dug to a maximum depth of five or six feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to a hardpan layer, stone content, soil texture, and slope. The time of year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit for small commercial buildings is the same as that for single family dwellings with basements, and for dwellings without basements. The ratings for dwellings without basements are shown in TABLE 25, for dwellings with basements in TABLE 26, and for small commercial buildings in TABLE 27. These ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to a hardpan layer, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cut and fill of more than five to six feet are not considered.

Soil limitations for local roads and streets are listed in TABLE 28. Local roads and streets have an all weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cut and fill work is generally limited to less than six feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to a hardpan layer, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil given in the SCS Soil Survey), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

Soil limitations for lawns and landscaping are given in TABLE 29. Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based

on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to a hardpan layer, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Construction Materials - Table 12 of the Soil Survey gives information about the usefulness of a soil as a source of construction material. This information is given in TABLES 30 through 32. The soils are rated good, fair, or poor as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal and use of the soil as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of five or six feet.

Roadfill is soil material that is excavated in one place and used for road embankments in another location. In TABLE 30, the soils are rated as a source of roadfill for low embankments, generally less than six feet high and less exacting in design than higher embankments. The ratings are for soil material below the surface layer to a depth of five or six feet. It is assumed that soil layers will be mixed during excavating and spreading. The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted

and drained is determined by its strength and shrink-swell potential.

Soils rated good contain significant amounts of sand or gravel or both. They have at least five feet of suitable material, low shrink-swell potential, none or few stones, slopes of fifteen percent or less and a depth to water table equal to or greater than three feet.

Soils rated fair are more than 35 percent silt and clay size particles and have a plasticity index of less than ten. They have moderate shrink-swell potential, slopes of 15 to 25 percent, many stones, and a depth to water table from one to three feet.

Soils rated poor have a plasticity index of more than ten, a high shrink-swell potential, many stones, spot slopes of more than 25 percent. They are wet and the depth to the water table is less than one foot. They may have layers of suitable material, but the material is less than three feet thick.

Sand and gravel are natural aggregates suitable for commercial use with minimum processing. Only the probability of finding material in suitable quantity is evaluated. These probabilities are listed in TABLE 31. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes, the thickness of suitable material, and the content of rock fragments.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to twelve percent silty fines. This material must be at least three feet thick and less than 50 percent by weight of large stones. All other soils are rated as an improbable source.

Topsoil is used to cover an area so that vegetation can be established

and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading conditions, and spreading is affected by rock fragments, slope, depth to water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to water table conditions, rock fragments, bedrock, and toxic material.

Soils rated good in TABLE 32 have brittle loamy material to a depth of at least 40 inches. They are free of stones, have little or no gravel, and have slopes of less than eight percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated fair are sandy soils, loamy soils with a relatively high content of clay, soils with only 20 to 40 inches of suitable material; or soils that have an appreciable amount of gravel, stones, or soluble salts; or soils that have slopes of eight to fifteen percent. The soils are not so wet that excavation is difficult.

Soils rated poor are very sandy or clayey, have less than twenty inches of suitable material, a large amount of gravel, stones, or soluble salts; have slopes of more than fifteen percent, or a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

2. AREAS WHERE SOILS ARE EASILY ERODIBLE AND EROSION CONTROL MEASURES ARE ESPECIALLY NEEDED TO PREVENT SEDIMENT TRANSPORT OFFSITE

Erosion is the removal of rock or soil by a transporting agent, such as wind or water. Types of erosion are sheet erosion, rill erosion, and wind erosion. Sheet erosion and rill erosion are uncommon in St. Johns County because of the sandy and level nature of most areas. Erosion from rapid run-off takes place only during heavy rains on bare soils that have short, steep slopes. During heavy rains, sheet and rill erosion originate when the force of raindrops striking and loosening the soil particles enables the soil to be transported downstream. Sheet erosion begins when run-off begins to carry particles that were detached by raindrops. Surface flow soon establishes paths. Some of these paths become small eroding channels or rills. Water flowing through rills readily detaches soil from the sides and bottoms of the flow path, resulting in rill erosion.

Wind erosion is a major hazard on the sandy and organic soils. Wind erosion becomes important in unprotected cropped areas when winds are strong and the soils are dry and bare of vegetation and surface mulch. Maintaining a plant or a surface mulch minimizes dust storms. Field windbreaks are effective in reducing wind erosion and crop damage when planted at right angles to the prevailing winds and at specific interval spacing. Table 15 of the Soil Survey shows wind erodibility groups that of soils with similar properties affecting their resistance to wind erosion in cultivated areas. These groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Sandy loams, coarse sandy loams, fine sandy loams and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 25 percent clay and more than five percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Loamy soils that are less than 18 percent clay and less than five percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than five percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Loamy soils that are 18 to 35 percent clay and less than five percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than five percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to wind erosion.

Areas that are easily erodible are of greatest concern in St. Johns County. Easily erodible areas include potentially highly erodible soils, cultivated soils, and soils stripped of vegetation.

Certain soils are classified as potentially highly erodible soils by the Soil Conservation Service due to characteristics of steep slope, particle size, compaction, permeability, and ground cover. The potentially highly erodible soils in St. Johns County are:

FRIPP - of the Fripp-Satellite Complex, #31.

PITS - #38.

Some special consideration also goes to these potentially moderately

erodible soils:

FLORIDANA - fine sand #62.

PLACID - fine sand #63.

This is due to the steep slope characteristic of these soils, and that their erodibility is increased when the soil is not vegetated. The location of these soils is shown in FIGURE 9. Although these Floridana and Placid soils do not occur in this project area they are of importance on a county wide basis. The characteristic slope for a Fripp soil is eight to fifteen percent and the characterisitic slope for a Pits soil is one to eight percent. The most effective method of controlling the erodibility of these soils is to keep them vegetated. Best management practices for Pits soils should include gentle slopes and vegetation. Dunes areas, where Fripp is found, should be vegetated and protected.

Erosion control factors for cultivated soils have been established by the Soil Survey. Erosion factors K and T are given for each soil in TABLE 33, from Table 15 of the Soil Survey.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is used to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on the percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T, or soil loss tolerance is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting the long-term productivity of soil and avoiding

such problems as severe rilling and nutrient losses. The T factor is derived from the rate at which topsoil forms. One inch of topsoil takes about 30 years to form from subsoil material. Subsoil forms from the parent material even more slowly. Since one inch of soil from one acre weighs about 150 tons, many conservationists believe that erosion should be held at or below five tons per acre per year on most deep soils. At this rate, it would take 33 years to loose one inch of soil; therefore, soil is being formed nearly as fast as it is lost. The T factor, however, does not consider other damage from erosion, such as water pollution from sediment and associated nutrients and pesticides.

Overall, erosion rates depend mainly on the characteristics of three interacting factors:

1. The erosive potential of rainstorms.
2. The protection provided by ground cover.
3. The resistance of the soil to erosion.

The forces and energy that cause erosion result from impacting waterdrops caused by rainfall and sprinkle irrigation, and run-off water from rainfall and irrigation. Plant canopy and ground cover reduce these forces and the erosivity of water. Soil properties determine the resistance of soil particles to the erosive energy that remains. The goals of erosion control practices is to reduce energy and/or increase the erosive resistance property of a soil. Therefore, if care is taken to provide proper erosion control and enforcement, the effects of erosion can be kept to a minimum.

APPENDIX C

DESCRIPTION OF GIS COVERAGES

AERIAL BOUNDARIES COVERAGE: The state plane feet coordinates of the aerial corners were obtained from the state plane feet grid on the mylar aerials and entered into the GIS system manually. These boundaries are available in CM207>AERIALS.

BASIN COVERAGE: The drainage basins were delineated on blue line copies of the topographic mylar aerials (one inch equal 200 feet) obtained from Continental Aerial Surveys, Inc. Alcoa, Tennessee. The state plane feet coordinates were then interpolated from the coordinate grids on the aerials. These coordinate points were then manually entered via keyboard into the GIS as the CM207>PROJCOV>BASINS coverage.

CULVERTS COVERAGE: The culverts were located using the aerial photographs (one inch equals 200 feet) of the project area and by using onsite investigations. The location of each culvert was determined by interpolating the state plane feet coordinates and entering them manually into the GIS system. The culverts and their characteristics are available in the CM207>PROJCOV>CULVERTS.

FLOODWAYS COVERAGE: Silverslick (similar to mylar) FEMA Floodway and Firm maps were obtained. The scale of these maps varies with the most prevalent scale being one inch equals 500 feet. Using road intersections as a reference to mark the state plane feet coordinates these maps were digitized, cleaned, and edgematched in as the CM207>PROJCOV>FLOODWAYS coverage.

LAND USE COVERAGE: SPOT satellite imagery was taken of the county, and is still being coded and ground truthed. In combination with the St. Johns County Planning and Zoning Department's work on the comprehensive plan with Prosser, Hallock & Kristoff, Inc. (PHK) of Jacksonville, Florida half sheets of zoning (scale: one inch equals 400 feet) and aerial photographs (scale: one inch equals 200 feet) were used to make a planimetric map (scale: 1:100,000). This plainimetric map was then digitized by Landmark Technologies, Inc., of Jacksonville, Florida and plotted on mylar at a scale of 1:24,000 (one inch equals 2,000 feet). This mylar land use map was then hand digitized into the county's GIS using quadrangle corners as reference marks. The cleaned and edited version of this map is the "temporary" CM207>PROJCOV>LANDUSE coverage. At the completion of Contract

No. 87-095.01 between the county's Planning and Zoning Department and PHK, the existing land use map will be read into the county's GIS.

ROADS, HYDROLOGY, RAILROAD, and STATE PLANE FEET COVERAGES: The 1:100,000 scale Digital Line Graph (DLG) data from the USGS Quadrangle sheets was read into the county's GIS via magnetic tape. This information is available in the MAP>SJQUADS directory.

SEPTIC, STP, and SEWER SERVICE AREAS COVERAGE: These areas were located using information from the St. Johns County Environmental Health Department, coordinated with aerial photographs (scale: one inch equals 200 feet) and site inspections. Locations were determined by interpolating x and y coordinates from the state plane coordinates on the mylar aerial photographs. These coordinates were then entered via the terminal into county's GIS. The areas of high density septic systems are available in the CM207>PROJCOV>SEPTIC coverage.

SOILS COVERAGE: The SCS furnished the original aerial photographs and original mylar soil maps (scale: 1:20,000) that were used to publish the "Soil Survey of St. Johns County, Florida" (SCS,1983). Photographic reduction (83.3333%) of these mylar soil maps using a computer assisted camera was done by Southside Blueprint Service, Inc., of Jacksonville, Florida. Mylar soil maps 8.5" X 12.5" were produced (scale: 1:24,000). Bob Baldwin (a soil scientist with the SCS who worked on the original soil survey for St. Johns County) hand transcribed the soil boundaries from these 8.5" X 12.5" sheets onto (scale: 1:24,000) quadrangle size mylar sheets. These sheets were based on the topography of the USGS mylar Quadrangle sheets. Mylar quadrangle size soil maps with soil boundaries only were scanned and digitized in AutoCad format onto floppy disk by Tampa Reprographics & Supply, of Tampa, Florida. AutoCad DWG (drawing) format data was translated into ARC/INFO format and read onto magnetic tape using translation software at the SJRWMD. This magnetic tape was then loaded into the GIS. Some cleaning and editing was done to the coverage, and the soil numbers were edited manually. The soil numbers relate to the INFO data base of data from the SCS Soil Survey. The soils are available in the CM207>SOILS coverage.

APPENDIX D

LIST OF CONTACTED AGENCIES

Alachua County Regional Information Center
GEOMAX Project - Stanley Latimer (904) 376-1232
- Beth Romano

Continental Aerial Surveys, Inc., Alcoa, Tennessee and Barton, Florida
Contract Manager - Dean Epling (800) 233-7138
Civil Engineer - Steven L. Howard, P.E.
AUTOCAD - Allen Henderson

Department of Environmental Regulation, Tallahasse, Florida
Office of Coastal Management - Lou Burney (904) 488-4805
- Fred Calder

Department of Environmental Regulation - Office of Coastal Management
Project Manager James W. Stoutamire (904) 488-4805

Department of Health and Rehabilitative Services
Division of Health, Mosquito Control
- Hampton Mickler (904) 471-3107
- Freddie Thomas

Department of Natural Resources - Bureau of Marine Research
- Ken Haddad (813) 896-8626
- Gail McGarry

Division of Plant Industries
- Dan Phelps (904) 372-3505

Federal Emergency Management Agency
National Office - Dan Colter (202) 646-2757
- Maynard Long
- James Walke

Regional Director - Mary Anne Lyle (404) 853-4432

Florida Department of Transportation
Bureau of Topographic Mapping - Donald Merkel (904) 488-2168
- Allen Shopmeyer

Division of Planning and Programs - Dave Lynch (904) 829-5697
- Hugh Smith

Florida Department of State
- Phyllis Desmore (904) 488-3684

Florida Game and Fresh Water Fish Commission
- Guana State Park Game Warden — Marc Epstein (904) 797-0216
- Division of Wildlife — Don Wood (904) 488-3831
- Office of Environmental Services — Randy S. Kautz (904) 488-6661

Florida Natural Areas Inventory
- Jim Muller (904) 224-8207
- Katy NeSmith

Geographic Information System
- Keith Houseman (713) 894-0702

Greenhorne & O'Mara, Inc.
- Richard Diaz, Jr., P.E. (813) 888-7465
- Nelson Allen (301) 345-7924
- Bea Chisholm
- Faith Diehl
- Albert Romano
- Rhonda Taylor

Jones Edmunds & Associates
- Dave Keough (904) 377-5821

Landmark Technologies, Inc.
- Bud Goodrick (904) 730-0321
- Bill Shelly, V.P.

Manatee County
- Dale Friedley (813) 748-8208

Mid Continent Mapping Center, USGS
(314) 341-0851

Prosser, Hallock & Kristoff, Inc.
- Michael G. Bell (904) 739-3655
- Harry Lerner

Soil Conservation Service
- Florida Cooperative Extension Service, St. Johns County
  - Jim Dilbeck (904) 824-8131
  - Wade Hurt (904) 377-1092
- Geographic Information Specialist Coordinator
  - William Puckett (904) 377-1092
- Soil Scientist
  - Lea Readle (904) 437-3151
  - Bob Baldwin
  - Gene Bertine (904) 692-1804
  - William Register
  - Winston Tooke (904) 328-6522

St. Johns County
- Department of Environmental Health
  - Phil Jordan (904) 824-4372
  - George Sigman
  - Cynthia Small

St. Johns County Engineering Department
DER Grant Project Manager - Sharon E. Holmes, P.E. (904) 824-8131
DER Grant Project Coordinator - Bob Riches
Co-op Engineering Student - John Bearce
- Jean Gamble
Office Specialist - Diane K. Boyce
- Claudia Pizzo

St. Johns County Planning & Zoning Department
- Don Bement (904) 824-8131
- Andy Campbell

St. Johns County Data Processing
Director of Data Processing - Ludy Beaver (904) 824-8131
Systems Analyst - Mark Dearing

St. Johns River Water Management District
Director of Water Resources - Barbara Vegara
Permits Department - Katie Purcel (904) 328-8321
Director of Records - Dannise Kemp
Quality Stations - John Hendrexson
Environmental Sciences Division - Palmer D. Kinser, Jr.
Geographic Information Specialist- Armando Calabello
- Bob Klein
Geographic Information Specialist- Marvin M. Williams
Stream Data Records - Charles Tai
Engineering - Armondo Calabello
Technical Services - Bill Osborn
- John Denton

Engineering Technician - Chuck Blum (904) 328-8321
Jacksonville Office - James Ray (904) 730-6270

State of Floirda Bureau of Land Management
Survey and Mapping - Ronnie Taylor (904) 488-2427

Tampa Reprographic & Supply
Laser Cad Division - Ford Bond (813) 873-1965
- Bob Prieto (813) 874-7711
- Dick Rice (813) 874-7711

U.S.Army Corps of Engineers
Jacksonville , Florida - James E. Boone, Jr. P.E. (904)791-1666
- Charles Vigh (904) 791-1666

U.S.Fish and Wildlife Service
Wetlands Inventory for St. Johns County
- Michael M. Bentizien, Ph.D (904) 791-2580
- Becky Stanely

U.S. Geological Survey
Jacksonville - John Coffin (904) 398-2121
- Eugene Hayes
- Mike Holmes
- Leel Knowles
- Rick Speckler
Stream Gage Information - Abe Jennette

University of Florida Department of Urban & Regional Planning
Automate Resource Mapping & analysis Systems Integration
- Dr. John F. Alexander (904) 393-0797
- James L. Hatchitt

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