STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Michael W. Sole, *Secretary*

FLORIDA GEOLOGICAL SURVEY
Walter Schmidt, *State Geologist and Director*

OPEN-FILE REPORT 91

TEXT TO ACCOMPANY GEOLOGIC MAP OF THE EASTERN PORTION OF THE U.S.G.S. PERRY 30 x 60 MINUTE QUADRANGLE, NORTHERN FLORIDA
(OPEN-FILE MAP SERIES 98)

By

Richard C. Green, P.G. #1776, David T. Paul,
and Thomas M. Scott, P.G.

2007
ISSN (1058-1391)

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program

Table of Contents

List of Figures

List of Tables

Abstract

The accompanying 1:100,000 scale geologic map (Open-File Map Series 98) shows the areal distribution of bedrock and surficial geologic units for the eastern half of the Perry, Florida 30 x 60 minute quadrangle. The map was constructed using a combination of field mapping at 1:24,000 scale, compilation of data from existing maps (various scales), core and cuttings analyses and descriptions, and analyses of various Geographic Information System (GIS) data sources. The resulting data was compiled in ESRI's ArcGIS ArcMap 9.1 for publication as part of the Florida Geological Survey Open-File Map Series (O.F.M.S.). Map units in the area range in age from the Eocene Ocala Limestone to undifferentiated Quaternary sediments. Important resources in the area include groundwater, springs, sand, limestone, and dolostone. Numerous springs, sinking streams (swallets), and other karst features are present in the study area. Understanding of geologic units, karst, springs and their interactions within the map area aids land planners, environmental professionals, and citizens in making land-use decisions such as designing new construction projects, siting new water supply wells, locating sources of mineable resources for aggregate supply, and protection of springs and water quality.

Keywords: Florida, geologic map, environmental geology, geomorphology, springs, swallets, Floridan aquifer system.

Introduction

This report is designed to accompany Open-File Map Series (O.F.M.S.) 98. O.F.M.S. 98-01 depicts the near-surface geology of the eastern half of the Perry 30 x 60 minute quadrangle. O.F.M.S. 98-02 depicts six geologic cross sections, as well as a correlative stratigraphic chart for the lithologic units for the study area. O.F.M.S. 98-03 shows a geomorphology map, a digital elevation model (DEM), locations of known springs, sinkholes and swallets, and photographs of selected outcrops within the study area.

The study area lies east of Perry and west of Live Oak, Florida and includes portions of Hamilton, Lafayette, Madison, Suwannee, and Taylor Counties (Figure 1). It lies west of the Lake City 30 x 60 minute quadrangle, part of which was mapped under a grant from the U.S.G.S. STATEMAP program (Green et al. 2006). A regionally important river, the Suwannee River, bisects the map area, and much of the area serves as recharge to the Floridan aquifer system, the primary source of drinking water in the region.

An objective for this report is to provide basic geologic information for the accompanying geologic map (O.F.M.S. 98-01), cross sections (O.F.M.S. 98-02) and geomorphology (O.F.M.S. 98-03). Information provided by this report and these maps is intended for a diverse audience comprising professionals in geology, hydrology, engineering, environmental and urban planning, and laypersons, all of whom have varying levels of geologic knowledge. The map can help users identify and interpret geologic features which impact activities related to groundwater quality and quantity, location of mineral resources, land-use planning, and designing construction projects. Applied uses of the map and data in this report include: 1) identifying potential new mineral resources, 2) characterizing aquifer recharge potential and confinement, 3) aiding in water-management decisions on groundwater flow and

usage, 4) providing information on aquifer vulnerability to potential pollution, 5) ecosystem, wetlands, and environmental characterization, and 6) recreational uses.

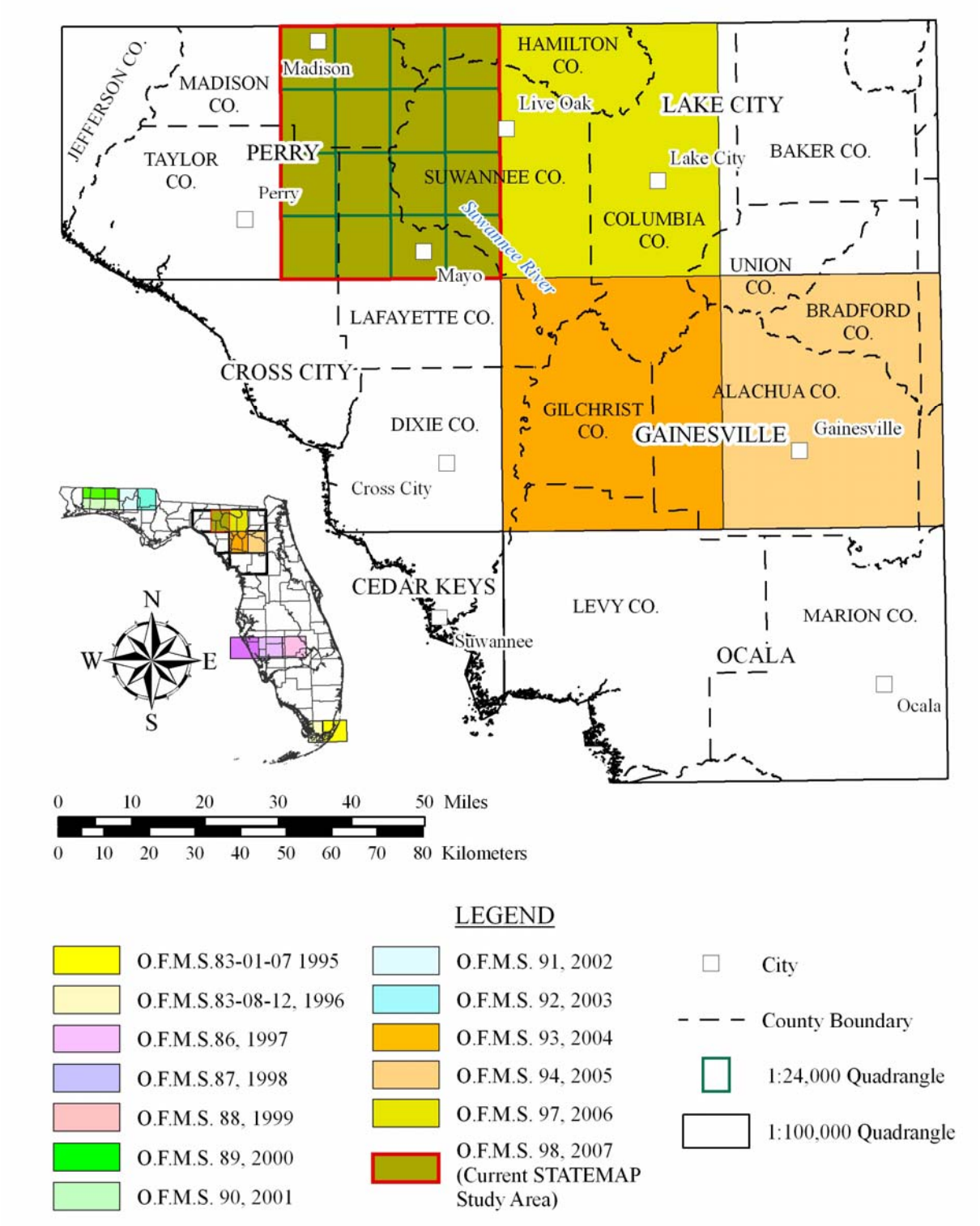

Figure 1: Areas mapped under FGS STATEMAP Program.

Methods

The study consisted of 1) reviewing and compiling existing geologic literature and data, 2) mapping geologic units in the field at 1:24,000 scale using standard techniques, 3) core and cuttings analyses of existing samples, 4) new core drilling, 5) collecting and describing of outcrop samples, and 6) preparing a geologic map, geological cross-sections, and geomorphic map of the area. Field work was performed during the spring and summer of 2007 and consisted of sampling and describing numerous outcrops, river and pit exposures. Seventy-eight new samples of geologic material were added to the FGS surface-sample archives (M-Series), four new cores were drilled, and numerous additional outcrops were examined during this project. All data, including data from over 400 wells, were compiled and analyzed by the authors and the map and accompanying plates were developed in ESRI's ArcGIS ArcMap 9.1 for publication as part of the Florida Geological Survey Open-File Map Series.

The study area is blanketed by a veneer of Quaternary sediments and soils. For this reason, and in keeping with geologic mapping practices developed by Scott et al. (2001), the authors have adopted the policy of mapping the first named geologic unit within 20 feet (6.1 meters) of the surface. If undifferentiated Quaternary (Qu) sediments attain a thickness greater than 20 feet (6.1 meters), then they appear as the mapped unit. If these undifferentiated sediments are less than 20 feet (6.1 meters) thick, then the underlying stratigraphic unit appears on the map.

The region is generally vegetated and public access is hindered by the presence of numerous farms and private land-owners. Fieldwork access was typically limited to public roads, State-owned lands, and Suwannee River Water Management District-owned lands.

Previous Work

The current study builds on many previous geologic investigations in and around the present map area. A statewide geologic map (Scott, et al., 2001) was published by the FGS in digital format and provided much of the base-map material. Preliminary county geologic maps have been published for Hamilton (Scott, 1993), Lafayette (Campbell, 1993c), Madison (Campbell, 1993a), Suwannee (Rupert et al. 1993), and Taylor (Campbell, 1993b) Counties at scales of 1:126,720. It is important to point out, however, that each of these Open-File Map Series geologic maps were constructed in an average time-frame of two weeks utilizing selected in-house geologic data with little to no extra field work. Although these maps provided an excellent starting point for the detailed geologic mapping undertaken for this project, significant refinement of the geologic maps was possible as a result of this project. This study also benefited from the work performed for geologic mapping in the western portion of the Lake City 30 x 60 minute quadrangle (Green et al. 2006). Many of the field relationships and stratigraphic problems were worked out during that project and data gathered during the project proved invaluable in the completion of this endeavor.

Geologic Summary

The near surface geology of the eastern portion of the U.S.G.S. 1:100,000 scale Perry quadrangle is composed of a complex mixture of Eocene to Holocene carbonate and siliciclastic sediments. A combination of factors, including fluvio-deltaic deposition, marine deposition, dissolution of underlying carbonates, erosion of sediments as a result of eustatic changes in sea level, and structural features, have influenced the geology of the study area.

Much of the eastern portion of the Perry quadrangle is located within the Suwannee, Alapaha, Withlacoochee, and Econfina River basins (Figure 2). In this area, the Suwannee River and its tributaries contain numerous documented springs, including six first magnitude springs and 53 lesser magnitude springs. A first magnitude spring is defined as having a minimum average flow of 100 cubic feet per second, or 64.6 million gallons per day. Many of these springs have evidenced significant increases in pollutants in the last few decades, particularly nitrate (Scott, et al. 2002). Detailed geologic mapping of lithostratigraphic units in this area provides critical data needed to help in future assessments of the vulnerability of the aquifer systems and these springs to contamination. The recharge areas for many of these springs are believed to be located in and around the current study area. Understanding the surficial geology of the map area is a key factor in developing management and protection plans, not only for the springs, but for the unconfined portions of the Floridan aquifer system (FAS).

Structure

Several structural variables have affected the geology of the region. The Peninsular Arch, (Figure 3) a structurally high area which affected deposition from the Cretaceous to the early Cenozoic, is the dominant subsurface feature in the Florida peninsula (Applin, 1951; Puri and Vernon, 1964; Williams et al. 1977; Schmidt, 1984; Miller, 1986; Scott, 1997).

The axis of the Peninsular Arch extends from southeastern Georgia to the vicinity of Lake Okeechobee in southern Florida in a general northwest to southeast trend. The crest of the arch passes beneath Alachua County south and east of the study area and is highest in Union and Baker Counties east of the study area. The arch was a topographic high during most of the Cretaceous Period and had Upper Cretaceous sediments deposited over it (Applin, 1951). It formed a relatively stable base for Eocene carbonate deposition except during times of periodic land emergence due to lowered sea levels (Williams et al. 1977). The arch did not affect Neogene to Holocene sediment deposition (Williams et al. 1977; Scott, 1997).

The Ocala Platform is the most prominent structure affecting the near surface depositional and post-depositional environments within the map area. Hopkins (1920) originally named this feature the Ocala Uplift. Vernon (1951) described the Ocala Uplift as a gentle flexure developed in Tertiary sediments with a northwest-southeast trending crest. Because there is continuing uncertainty about the origin of this feature, Scott (1988) used the term Ocala Platform, rather than Ocala Uplift or Ocala Arch, since it does not have a structural connotation. The Ocala Platform exerted its influence on Neogene sediment deposition, and Miocene sediments of the Hawthorn Group are thought to have been deposited across the platform (Scott, 1981a; Scott, 1988). Post-Miocene erosion, however, has removed sediments of the Hawthorn

Group from much of the crest of the Ocala Platform, exposing Eocene carbonates (Cooke, 1945; Espenshade and Spencer, 1963; Brooks, 1966; and Scott, 1981b).

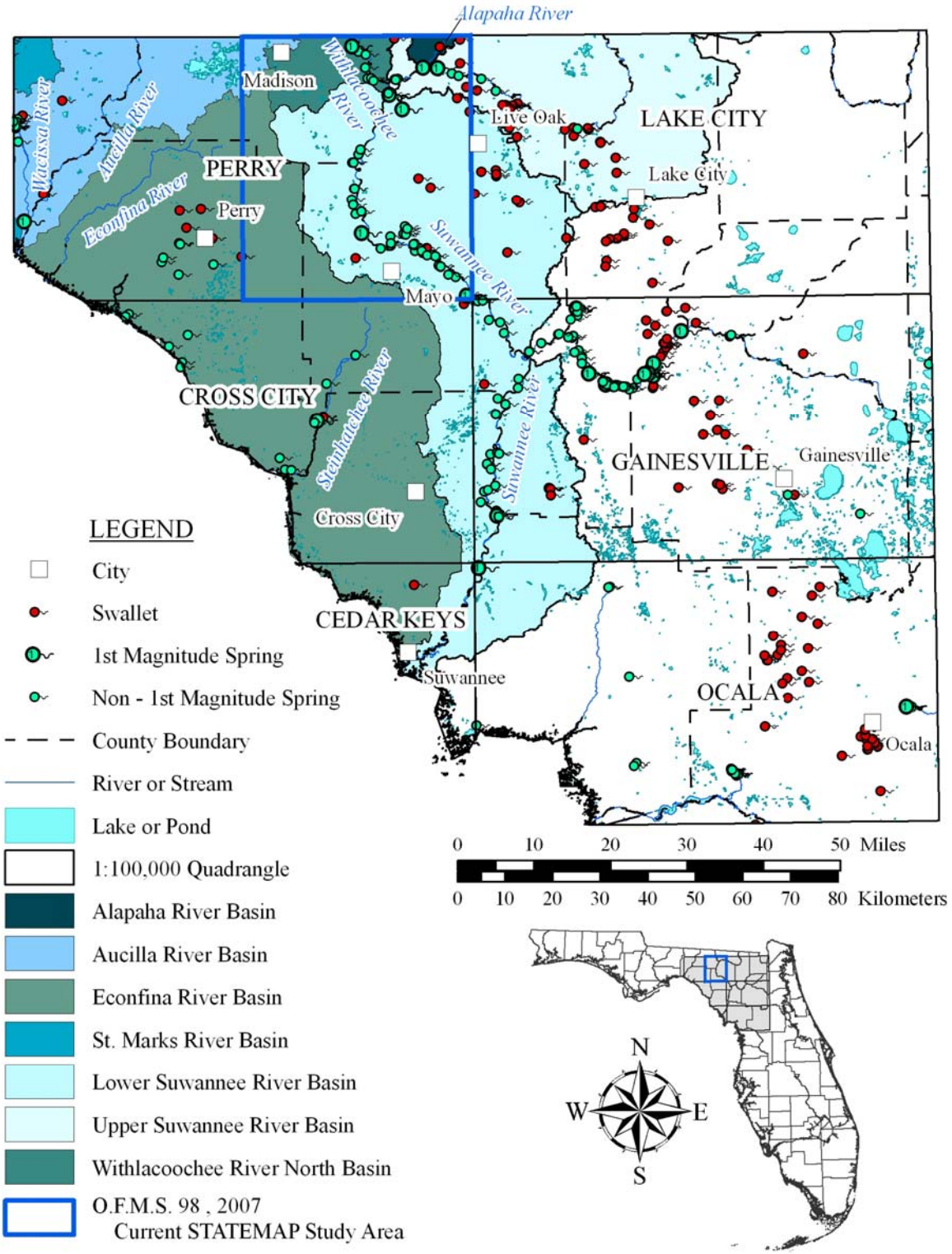

Figure 2: Location of selected river basins, springs, swallets, and other water bodies.

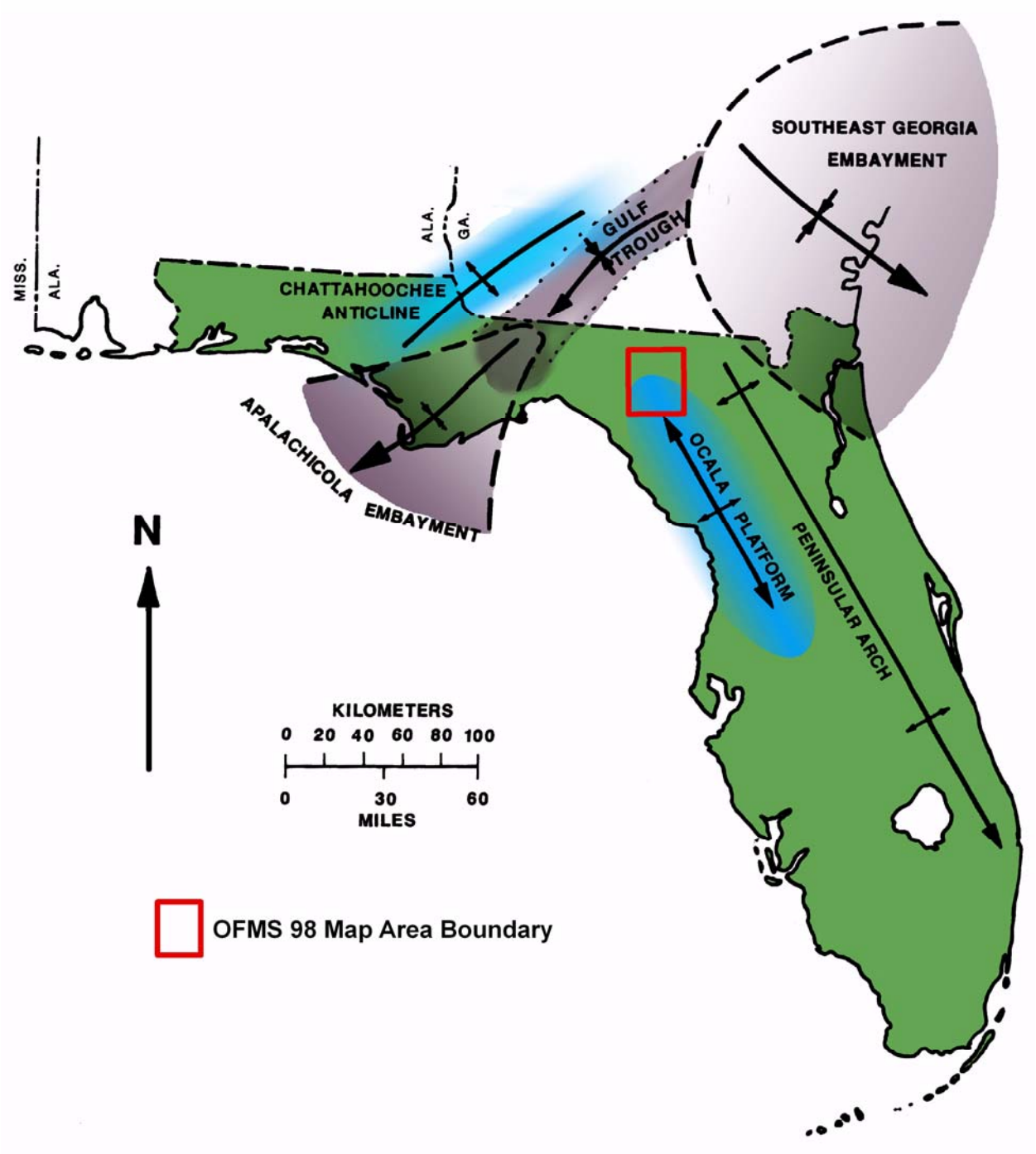

Figure 3: Principal subsurface structures of north Florida (modified from Puri and Vernon, 1964 and Schmidt, 1984).

This is evident in the southern portion of the map area. Undifferentiated sediments have subsequently been deposited on the exposed Oligocene and Eocene carbonates. These consist of residual clays, sands, and aeolian sands deposited during the Pliocene to Holocene (Scott, 1997).

Vernon (1951), utilizing aerial photographs, first mapped fracture patterns throughout northern peninsular Florida. Regionally, these fractures generally trend parallel to the axis of the Ocala Platform in a northwest-southeast orientation. A secondary system of fractures intersects these primary fractures at high angles in a northeast-southwest trend (Vernon, 1951). Orientation of stream meanders along the Suwannee River suggests that these fracture patterns may be a controlling factor in stream location (Colton, 1978).

Several relict Neogene coastal terraces, which developed as a result of fluctuating sea levels, have been documented in the study area. Healy (1975) recognized three marine terraces within the study area (Figure 4): the Wicomico terrace at elevations of 70 to 100 feet (21.3 to 30.5 meters) above mean sea level (MSL), the Sunderland/Okefenokee terrace at elevations between 100 and 170 feet (30.5 and 51.8 meters) above MSL, and the Coharie terrace at elevations between 170 and 215 feet (51.8 and 70.5 meters). The elevations between 150 and 170 feet (45.7 and 51.8 meters) above MSL were referred to as the Okefenokee Terrace by MacNeil (1950) and Alt and Brooks (1965). Detailed discussions and correlations of these marine terraces and relict shorelines have been attempted by many authors, including Matson and Sanford (1913), Cooke (1931, 1939), Flint (1940, 1971), MacNeil (1950), Alt and Brooks (1965), Pirkle et al. (1970), and Healy (1975).

Geomorphology

Geomorphic Districts

According to Scott (2005), the study area contains part of three geomorphic provinces – the Ocala Karst District, the Okefenokee Basin District, and the Tifton Upland District (see Figure 2, O.F.M.S. 98-03). Within the map area, these districts have been further subdivided topographically into five regional physiographic units: the Alachua Karst Hills, the Perry Karst/San Pedro Bay, and the Branford Karst Plain (Ocala Karst District), the Northern Okefenokee Basin (Okefenokee Basin District), and the Madison Hills (Tifton Upland District) (see Figure 3, O.F.M.S. 98-03).

Ocala Karst District

The majority of the current study area is located within White's (1970) Gulf Coastal Lowlands. Scott (2005) refers to this area as the Ocala Karst District. Within Florida, the Ocala Karst District encompasses a broad area from Wakulla County in the panhandle of Florida, south to Hillsborough and Pinellas Counties in the west-central peninsula and inland to nearly the center of the peninsula. Elevations within the district range from sea level along the coast to in excess of 300 feet (91.4 meters) above MSL on the Brooksville Ridge (O.F.M.S. 98-03, Figure 3). Within the study area, elevations range from 45 feet (13.7 meters) in the southwestern corner of the study area to 170 feet (56.0 meters) along the eastern edge of the map area (O.F.M.S. 98-03, Figure 1).

Carbonate sediments, ranging from the Middle Eocene Avon Park Formation to the Lower Oligocene Suwannee Limestone, lie at or near the land surface within this district. The Ocala Karst District is dominated by dissolution sinkholes and shallow bowl-shaped depressions, producing a rolling topography. Generally, a variably permeable siliciclastic cover allows downward percolating groundwater to slowly dissolve the underlying limestone, leading to cover-collapse sinkholes and cover-subsidence features. Cover-collapse sinkholes form rather

abruptly from the structural failure of an underlying cavern roof. An excellent example of this is Devil's Mill Hopper, located in Alachua County southeast of the present study area (Evans, et al. 2004).

Cover subsidence features generally occur in areas where overlying siliciclastics are thicker and sediments sag as carbonates dissolve underneath. Typically, areas such as these have only a few shallow sinks formed by the downward movement of the siliciclastic overburden filling voids created by slow dissolution of underlying carbonates. Springs, sinking and resurgent streams, and caverns commonly occur within the Ocala Karst District.

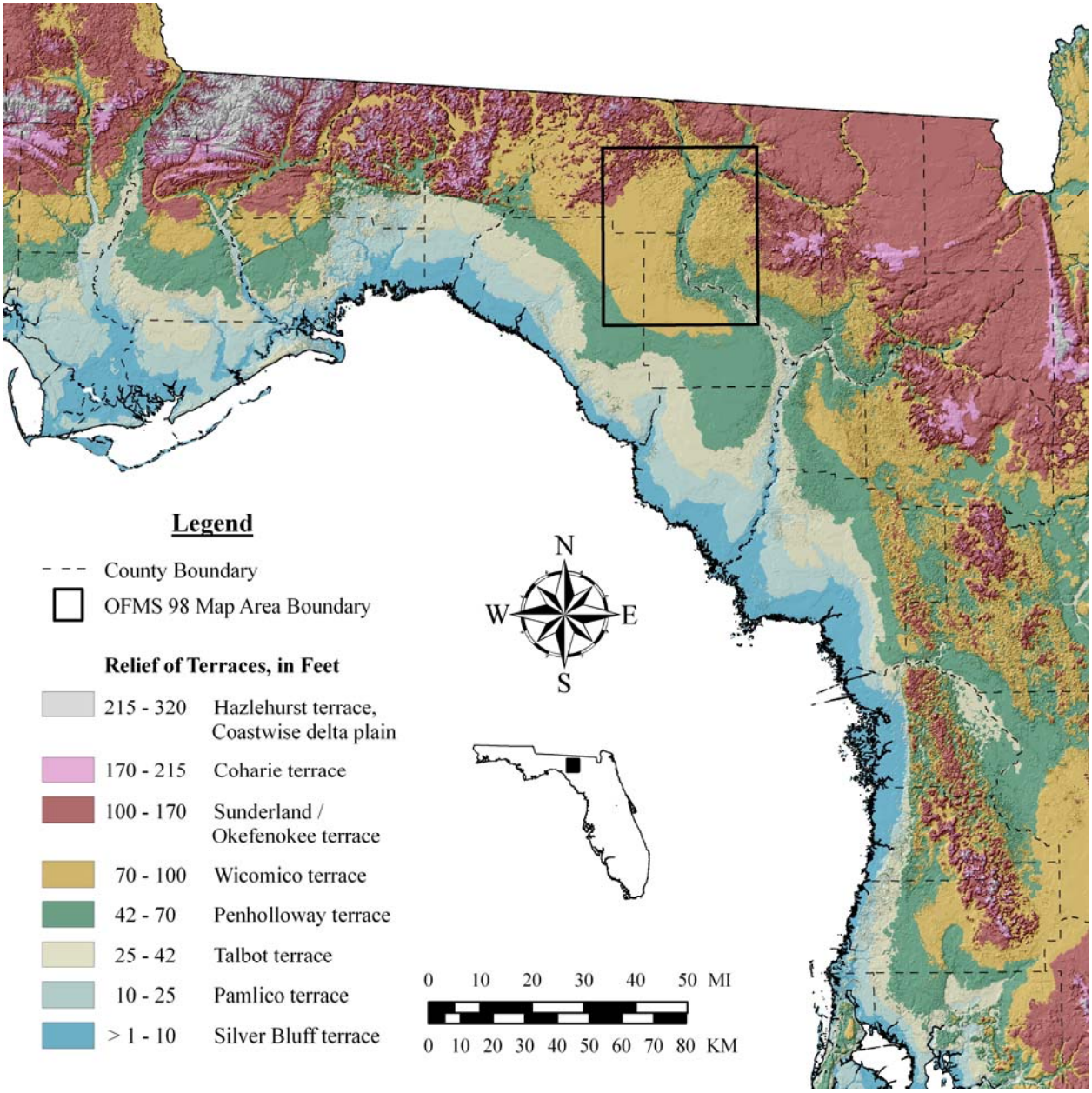

Figure 4: Terraces in Florida (after Healy, 1975).

Alachua Karst Hills

The Alachua Karst Hills, present along the eastern edge of the study area, are part of White's (1970) Northern Highlands. This physiographic unit is well drained and formed in response to karstification of uplands covered by Hawthorn Group and undifferentiated sediments. The karst hills are part of an erosional scarp retreat being formed as the Hawthorn Group and younger sediments are eroded and karstified. This scarp is part of the extensive Cody Scarp of Puri and Vernon (1964).

Regionally, the Alachua Karst Hills extend from northern Suwannee County to central Alachua County (O.F.M.S. 98-03, Figure 3). Elevations range from approximately 100 feet (30.5 meters) to in excess of 200 feet (61 meters) above MSL. In the study area, the Alachua Karst Hills are only present within central Suwannee County along the eastern boundary of the mapped area, where elevations range from approximately 70 feet (21.3 meters) to 170 feet (51.8 meters) above MSL (O.F.M.S. 98-03, Figure 3).

Branford Karst Plain

The Branford Karst Plain, which covers much of the eastern two-thirds of the map area, occupies the Suwannee River valley, the Alapaha River valley, and the Withlacoochee River valley (O.F.M.S. 98-03, Figure 3). Regionally, the plain extends south to the Santa Fe River on the Gilchrist County line (Scott, 2005). Elevations in the karst plain range from less than 15 feet (4.6 meters) above MSL along the Suwannee River to more than 140 feet (42.7 meters) above MSL. Within the study area, elevations of the Branford Karst Plain range from 20 feet (6.1 meters) along the Suwannee River valley in the southeastern corner of the map area to 140 feet (42.7 meters) above MSL in the northeastern portion of the map area (O.F.M.S. 98-03, Figure 1).

The Lower Oligocene Suwannee Limestone occurs in the northern half of the Branford Karst Plain and crops out within the Withlacoochee and Alapaha River valleys and the northern portion of the Suwannee River valley within the map area, while the Upper Eocene Ocala Limestone is near the surface in the southern part of the Branford Karst Plain. Silicified "float" boulders (remnants of the Lower Oligocene Suwannee Limestone and the Upper Eocene Ocala Limestone) are common in the southeastern quadrant of the map area.

Drainage within the Branford Karst Plain is primarily through karst features with relatively few surface streams. Closed topographic depressions (CTDs; Arthur et al. 2007) are numerous throughout the karst plain, particularly east of the Suwannee River (O.F.M.S. 98-03, Figure 1).

Perry Karst/San Pedro Bay

Regionally, the Perry Karst/San Pedro Bay complex extends from Madison County southward to the Gulf of Mexico in Dixie County (O.F.M.S. 98-03, Figure 3). The Perry Karst is the transition zone between the Woodville Karst Plain to the west and San Pedro Bay. Elevations within this area range from less than 5 feet (1.5 meters) to in excess of 100 feet (30.5 meters) above MSL. The elevations in San Pedro Bay are generally higher than in the Perry Karst area or the Branford Karst Plain. Elevations decline to the south toward the Gulf coast. The Perry Karst area is poorly to moderately drained while San Pedro Bay is extremely poorly drained. Copeland (2005) provides an excellent discussion of the San Pedro Bay, its origin and surrounding areas. The Perry

Karst/San Pedro Bay complex occupies much of the western and southwestern parts of the study area. Within the map area, elevations of the Perry Karst/San Pedro Bay range from 45 feet (13.7 meters) to over 100 feet (30.5 meters) above MSL (O.F.M.S. 98-03, Figure 1).

The Suwannee Limestone underlies much of the Perry Karst/San Pedro Bay, although it is absent under the central-southern and southeastern portions of the unit. In the San Pedro Bay, a clay layer up to five feet (1.5 meters) thick overlies the limestone, providing confinement to the FAS (Copeland, 1982). Plio-Pleistocene sediments cover the entire area, and the unit is poorly to very poorly drained. Recharge to the FAS is low to moderate, while recharge to the FAS may be moderate to high along the transition between the Perry Karst/San Pedro Bay and the Branford Karst Plain (Copeland, 2005).

Okefenokee Basin District

The Okefenokee Basin District is recognized based on topography, drainage characteristics and the general lack of karst features. East of the present study area, the Lake City Ridge subdivides the district into northern and southern basins (Scott, 2005). In the northern Okefenokee Basin, the hills are essentially absent and the entire area is poorly drained and flat. Hills are common and the area is better drained in the Southern Okefenokee Basin. The basin extends into Florida from Georgia and is recognized from Baker, Hamilton, and Columbia Counties on the north, southwards to northern Alachua County (O.F.M.S 98-03, Figure 3). Where the Okefenokee Basin District makes the transition to the Ocala Karst District, the land becomes well drained and has more relief.

Miocene Hawthorn Group (Th) sediments to Plio-Pleistocene siliciclastics underlie the district. The Statenville Formation of the Hawthorn Group (Ths) occurs at or near the surface in the western portion of the district, while Undifferentiated Plio-Pleistocene siliciclastics (TQu) underlie the eastern portion of the district.

Northern Okefenokee Basin

The Northern Okefenokee Basin lies to the north of the Lake City Ridge, the Alachua Karst Hills and the Branford Karst Plain and east of the Madison Hills (O.F.M.S. 98-03, Figure 3). Northeast of the study area, the Okefenokee Swamp occupies much of the northern portion of the Okefenokee Basin District from Georgia into Florida. The northern portion of the basin is very flat with few hills. Hills become more common towards the western and eastern boundaries of the area.

Plio-Pleistocene siliciclastics underlie much of the northern Okefenokee Basin but are poorly drained due to the near-surface presence of the Hawthorn Group clayey sediments and low relief. The Statenville Formation of the Hawthorn Group (Ths) is at or near the surface in the western part of the basin. Karst features, which are uncommon throughout most of the basin, occur primarily in the transition zone with the Ocala Karst District where the Hawthorn Group is thin and breached by sinkholes.

Elevations vary within the basin from approximately 100 feet (30.5 meters) to more than 190 feet (57.9 meters) above MSL (Scott, 2005). Where the Suwannee River occurs within the district east of the study area, elevations along the river may be less than 50 feet (15.2 meters). Within the map area, elevations range from 60 feet (18.3 meters) near the Suwannee River to 160 feet (48.8 meters) on some of the hilltops.

Tifton Upland District

In northern Florida, the Tifton Upland District (Scott, 2005) encompasses the area referred to as the Tallahassee Hills by White (1970). The uplands extend from the Apalachicola River eastward to central Hamilton County at the Alapaha River (O.F.M.S. 98-03, Figure 2). The Tifton Upland District's topography is characterized by broad, undulating hills with a well developed dendritic drainage pattern.

The Tifton Upland District is present in the northwestern and northern portion of the map area. Elevations in the district, which range from 35 feet (10.7 meters) above MSL in the major stream and river valleys and in the swamps of the eastern portion of the district up to 300 feet (91.4 meters) MSL on the hilltops, decrease toward the southern limit of the district.

Madison Hills

Within the study area, Scott (2005) delineated one physiographic unit within the Tifton Upland District: the Madison Hills. Regionally, the Madison Hills extend from the eastern end of the Tallahassee Hills in central Jefferson County, eastward to eastern Madison County on the west side of the Withlacoochee River (O.F.M.S. 98-03, Figure 3). The elevation of the Madison Hills ranges from 70 feet (21.3 meters) in the valleys between the Withlacoochee and Alapaha rivers to near 200 feet (61 meters) above MSL on some hill tops.

The Madison Hills are present in the northwestern portion of the map area, while a small area (separated from the main body of this zone by the Withlacoochee River Valley) is present in Hamilton County. Elevations within the map area for the Madison Hills range from 70 feet (21.3 meters) above MSL to 200 feet (61 meters) above MSL on some hilltops (O.F.M.S. 98-03, Figure 1).

The valleys within the Madison Hills are broad and poorly drained. The Miccosukee Formation (Tmc) forms the higher areas while the Hawthorn Group sediments underlie the lower portions of the landscape. Karst features occur in the eastern part of the district where the Suwannee Limestone lies near the land surface.

Lithostratigraphic Units

Tertiary System

Eocene Series
Middle Eocene

The Middle Eocene Avon Park Formation (Tap), first described by Applin and Applin (1944), is the oldest unit investigated in the present study area. The unit, which only occurs in the subsurface in the study area, consists of cream to light-brown to tan, poorly indurated to well-indurated, variably fossiliferous limestone (grainstone to wackestone, with rare mudstone). The limestones are interbedded with tan to brown, very poorly indurated to well indurated, very fine to medium crystalline, fossiliferous (molds and casts), vuggy dolostones. Fossils present in the unit include molluscs, foraminifera, echinoids, algae and carbonized plant remains.

The Avon Park Formation was only encountered in a few wells in the study area. The top of the Avon Park ranges from 307 feet (93.6 meters) below MSL in W-2548 to 164 feet (50 meters) below MSL in W-4497 (cross-section D-D'; OFMS 98-02). No wells utilized for cross-sections penetrated the entire section of the Avon Park Formation. The Avon Park Formation forms part of the FAS (Southeastern Geological Society, 1986).

Eocene Series

Upper Eocene

The Upper Eocene Ocala Limestone (To), first described by Dall and Harris (1892) is a biogenic marine limestone comprised largely of foraminifera, molluscs, echinoids and bryozoans. Based on lithologic differences it can be informally subdivided into an upper and lower unit (Scott, 1991a). This subdivision, while often apparent in cores and quarries, is difficult to ascertain in cuttings. As a consequence of this, the geologic cross sections do not break out the upper and lower Ocala Limestone.

The upper unit is typically a white to cream, fine- to coarse-grained, poorly- to well-indurated, poorly sorted, very fossiliferous limestone (wackestone, packstone, and grainstone). Fossils commonly include large foraminifers, bryozoans, mollusks, and a rich diversity of echinoids. The lower unit is typically a white to cream, fine- to medium-grained, poorly- to moderately- indurated limestone (grainstone to packstone). The unit may be partially dolomitized. Fossils include foraminifera (such as *Lepidocyclina* sp., *Heterostegina ocalana*, and miliolids), bryozoans, algae, mollusks, echinoids, and crabs.

Portions of the upper Ocala Limestone have been locally replaced by silica and upon erosion large boulders may remain as residual float. The most likely source of silica is from weathering of the Hawthorn Group sediments (Williams et al. 1977; Scott, 1988). There are several processes that have occurred, or are occurring, in the Hawthorn Group which release silica in solution and provide a source for silica in the replacement of carbonate rocks (Altshuler et al. 1963; Mitchell, 1965; and Assefa, 1969). The occurrence of this float throughout the southern portion of the study area is an indication that the Hawthorn Group once covered much more of the study area and has been subsequently removed by erosion and weathering (O.F.M.S. 98-01).

The top of the Ocala Limestone, which is often karstified, ranges from 60 feet (18.2 meters) above MSL in W-187 (cross sections B-B' and E-E'; OFMS 98-02) to 109 feet (33.2 meters) below MSL in W-2549 (cross sections A-A', D-D', and E-E'; OFMS 98-02). Only a few wells penetrated the entire thickness of the Ocala Limestone in the study area. In these wells, the thickness of the Ocala Limestone ranges from 177 feet (53.9 meters) in W-2549 (cross-sections A-A', D-D' and E-E'; OFMS 98-02) to 220 feet (67.1 meters) in W-2550 (cross section E-E'; OFMS 98-02). The Ocala Limestone is unconformably overlain by the Suwannee Limestone (Ts) throughout much of the study area and by undifferentiated Quaternary sediments (Qu) in the southern and southeastern portions of the study area. The Ocala Limestone forms part of the Floridan aquifer system (Southeastern Geological Society, 1986).

Oligocene Series

Lower Oligocene

The Lower Oligocene Suwannee Limestone (Ts), named by Cooke and Mansfield (1936) for exposures of limestone along the Suwannee River from White Springs to Ellaville, unconformably overlies the Ocala Limestone throughout most of the study area. The Suwannee Limestone is primarily a white to cream, poorly to well indurated packstone to grainstone comprised of miliolid tests, foraminifera, pelecypods, gastropods and echinoids. The echinoid *Rhyncholampas gouldii*, an index fossil for the Suwannee Limestone, is commonly seen in outcrops along the Suwannee River. The lithology is variably recrystallized and may range from poorly indurated, friable limestone to well indurated limestone cemented by calcite spar. Silicified residual boulders of the Suwannee Limestone ("float") are commonly found in the south-central to southeastern portion of the study area, indicating that it once covered much of the southern portion of the map area (O.F.M.S. 98-01).

The top of the Suwannee Limestone ranges from 5 feet (1.5 meters) above MSL in W-12516 (cross section A-A'; OFMS 98-02) to 112 feet (34.1 meters) above MSL in W-15888 (cross section D-D'; OFMS 98-02). The Suwannee Limestone ranges in thickness from approximately 5 feet (1.5 meters) in W-18768 (cross section B-B'; OFMS 98-02) to approximately 160 feet (48.8 meters) in W-18767 (cross section A-A'; OFMS 98-02).

The unit is unconformably overlain by sediments of the Miocene Statenville Formation (Ths; Hawthorn Group) in the northeastern portion of the map area, sediments of the Miocene Torreya Formation (Tht; Hawthorn Group) in the northwestern portion of the study area, and undifferentiated Quaternary sediments (Qu) throughout the remainder of the study area. Evidence from cuttings and field data indicates that isolated remnants of the Suwannee Limestone may occur throughout the southeastern portion of the map area (see W-358 and W-13471 on cross section E-E'; OFMS 98-02). The Suwannee Limestone forms part of the Floridan aquifer system (Southeastern Geological Society, 1986).

Miocene Series

Hawthorn Group (Th) sediments are encountered throughout much of the northern one-third of the study area, where they unconformably overlie the Suwannee Limestone (O.F.M.S. 98-01). Sediments of the Hawthorn Group are thought to have been deposited onto the platform throughout the area, but Post-Miocene erosion removed sediments from the crest of the Ocala Platform exposing the Eocene carbonates in the southern portion of the map area (Cooke, 1945; Espenshade and Spencer, 1963; Brooks, 1966; and Scott, 1981b). Fossils in the Hawthorn Group are sparse but may include vertebrate remains, corals, and mollusks. Williams et al. (1977) report that the most commonly found fossils are oysters and coral heads. Silicified coral heads were observed in the Suwannee, Withlacoochee, and Alapaha Rivers during field work. Within the map area, the Miocene Hawthorn Group (Th) is composed of the Lower Miocene Torreya Formation (Tht) and the Middle Miocene Statenville Formation (Ths). The Torreya Formation is present west of the Withlacoochee River, while the Statenville Formation (Ths) occurs east of the Withlacoochee River (O.F.M.S. 98-01).

Lower Miocene

The Lower Miocene Torreya Formation of the Hawthorn Group (Tht) is typically a siliciclastic unit with increasing amounts of carbonate in the lower portion of the unit. The majority of the outcrops of the Torreya Formation expose the siliciclastic part of the unit which varies from white to light olive gray unconsolidated to poorly indurated slightly clayey sands to light gray to bluish gray, poorly consolidated silty clay often containing a variable but minor component of carbonate (calcareous or dolomitic). Phosphate grains, while a common but minor lithologic component of the unit are often absent (Scott, 1988).

The carbonate sediments of the Torreya Formation are white to light olive gray, poorly indurated, variably sandy and clayey limestones. The limestone (mudstone and wackestone) often contains molds and casts of mollusks. The Torreya Formation overlies the Floridan aquifer system and forms part of the intermediate aquifer system/intermediate confining unit (IAS/ICU) (Southeastern Geological Society, 1986).

The top of the Torreya Formation ranges from 84 feet (25.6 meters) above MSL in W-2549 (cross sections A-A', D-D', and E-E'; OFMS 98-02) to 144 feet (43.9 meters) above MSL in W-15888 (cross section D-D'; OFMS 98-02). In wells utilized for cross sections, the unit ranges from 10 feet (3 meters) thick in W-704 (cross section E-E'; OFMS 98-02) to 80 feet (24.4 meters) thick in W-12516 (cross section A-A'; OFMS 98-02).

Middle Miocene

The Middle Miocene Statenville Formation of the Hawthorn Group (Ths) occurs within limited areas of the northeastern portion of the map area along the northeastern flank of the Ocala Platform (Scott, 2001b). The Statenville Formation consists of poorly to moderately indurated, interbedded quartz sands, clays and dolostones. Phosphate grains are common to abundant in the unit. The unit is lithologically variable and beds may pinch out and interfinger both laterally and vertically. Outcrops of the Statenville Formation in the study area are characteristically thin-bedded and often cross-bedded, generally consisting of thinly interbedded layers of dolostone and clay alternating with beds of sand. The Statenville Formation forms part of the IAS/ICU (Southeastern Geological Society, 1986).

The top of the Statenville Formation ranges from 60 feet (18.3 meters) above MSL along parts of the Suwannee River to 160 feet (48.8 meters) above MSL in hills north of Live Oak (cross section F-F'; OFMS 98-03). The Statenville Formation ranges up to 100 feet (30.5 meters) in thickness in the northeastern portion of the map area (cross section F-F'; OFMS 98-03).

Tertiary-Quaternary Systems

Pliocene Series

The Pliocene Miccosukee Formation (Tmc), named by Hendry and Yon (1967), is a prodeltaic siliciclastic unit composed of grayish-orange to grayish-red, mottled, poorly- to moderately indurated, interbedded clay, sand and gravel of variable coarseness and admixtures. The unit has limited distribution in the eastern panhandle of Florida and occurs from central Gadsden County (west of the study area) to eastern Madison County (Scott et al. 2001).

The top of the unit, present within a limited area in the northwestern corner of the map area, ranges from approximately 100 feet (30.5 meters) above MSL to approximately 200 feet (61 meters) above MSL (cross sections A-A', D-D' and E-E'; OFMS 98-02). The Miccosukee Formation ranges from a few feet to approximately 100 feet (30.5 meters) in thickness in this area. The unit is relatively impermeable due to its high clay content, but is considered to be part of the SAS (Southeastern Geological Society, 1986).

Pleistocene Series

Undifferentiated Quaternary sediments (Qu) lie unconformably on either the Eocene Ocala Limestone (To), the Oligocene Suwannee Limestone (Ts), the Miocene Torreya Formation (Tht), or the Miocene Statenville Formation (Ths) throughout much of the study area. These sediments, which generally consist of sandy clays and clayey sands, often include weathered and silicified boulders of the Ocala Limestone and Suwannee Limestone ("float"). The undifferentiated Quaternary sediments (Qu) are part of the surficial aquifer system (SAS; Southeastern Geological Society, 1986).

Sediments mapped as Quaternary Beach Ridges and Dunes (Qbd) exhibit discernable beach ridges and dune features. These sediments consist of unconsolidated light gray to tan fine to medium quartz sand with variable percentages of organic material. They are only present in a small area in the extreme southeastern portion of the map area. The Quaternary Beach Ridges and Dunes (Qbd) sediments are part of the SAS.

Hydrogeology

The hydrogeology of the map area consists of (in ascending order) the Floridan aquifer system (FAS), the intermediate aquifer system/intermediate confining unit (IAS/ICU), and the surficial aquifer system (SAS) (Southeastern Geological Society, 1986). The FAS, which is the primary source of drinking water in the region, is generally comprised of carbonate units of the Avon Park Formation, the Ocala Limestone, and the Suwannee Limestone. The sands, silts, and clays of the Hawthorn Group comprise the intermediate aquifer system/intermediate confining unit. The surficial aquifer system is comprised of the Miccosukee Formation and undifferentiated Quaternary sediments.

Where siliciclastic sediments of the Hawthorn Group and Miccosukee Formation are thick, they provide confinement for the Floridan aquifer system, but where the siliciclastic sediments of the Hawthorn Group and younger units are thin or missing, karst features often occur. "Swallets" (stream-to-sink features) are of particular concern to geoscientists and hydrogeologists in the area. Numerous swallets occur along the western edge of the Alachua Karst Hills and provide avenues for direct recharge to the FAS by surface water and runoff from agricultural and urban areas (O.F.M.S. 98-03, Figure 1).

Derivative Products

Several derivative products will come from this project. During the mapping project, data from several hundred wells (Table 1) were analyzed. Formation picks, made on all available wells, will allow for the creation of a structure contour map of the top of rock in the study area, along with an isopach map of overburden for the area. Several of the authors of this report are

working on an additional publication, which is beyond the scope of the original project, which will depict these maps. Additional derivative data that is anticipated to come from this mapping effort includes an aquifer vulnerability assessment map. Data derived from prior STATEMAP products has often been used to augment other FGS and FAVA projects in the state (Arthur et al. 2007; Baker et al. 2007).

Selected Bibliography

Allison, D., Groszos, M., and Rupert, F. R., 1995, Top of rock in the Floridan Aquifer System in the Suwannee River Water Management District: Florida Geological Survey Open File Map Series 84, scale 1:475,000.

Alt, D., and Brooks, H.K., 1965, Age of the Florida marine terraces: Journal of Geology, v. 73, no. 2, p. 406-411.

Altshuler, Z.S., Dwornik, E. J., and Kramer, H., 1963, Transformation of montmorillonite to kaolinite during weathering: Science, v. 141, no. 3576, p. 148-152.

Applin, P., 1951, Possible future petroleum provinces of North America - Florida: American Association of Petroleum Geologists Bulletin, v. 35, p. 405-407.

Applin, P.L., and Applin, E.R., 1944, Regional subsurface stratigraphy and structure of Florida and southern Georgia: American Association of Petroleum Geologists Bulletin, v. 28, p. 1673-1753.

Arthur, J.D., 1991, The geomorphology, geology and hydrogeology of Lafayette County, Florida: Florida Geological Survey Open File Report 45, 10 p.

Arthur, J.D., Baker, J., Cichon, J., Wood, A., and Rudin, A., 2007 (in review), Florida Aquifer Vulnerability Assessment (FAVA): Contamination potential of Florida's principal aquifer systems: Florida Geological Survey Bulletin 67.

Assefa, G., 1969, Mineralogy and petrology of selected rocks from the Hawthorn Formation, Marion and Alachua counties, Florida [Master's thesis]: Gainesville, University of Florida, 80 p.

Baker, A.E., Wood, H.A.R., and Cichon, J.R., 2007, The Marion County Aquifer Vulnerability Assessment; final report submitted to Marion County Board of County Commissioners in fulfillment of Marion County Project No. SS06-01, March 2007, 42 p. (unpublished).

Brooks, H.K., 1966, Geological history of the Suwannee River, *in* Southeastern Geological Society, 12th Annual Field Conference Guidebook, p. 37-45.

Campbell, K., 1993a, Geologic map of Madison County, Florida: Florida Geological Survey Open File Map Series 27, scale 1: 126,720.

Campbell, K., 1993b, Geologic map of Taylor County, Florida: Florida Geological Survey Open File Map Series 29, scale 1:126, 720.

Campbell, K., 1993c, Geologic map of Lafayette County, Florida: Florida Geological Survey, Open File Map Series 34, scale 1: 126,720.

Ceryak, R., Knapp, M.S., and Burnson, T., 1983, The Geology and Water Resources of the Upper Suwannee River Basin, Florida: Florida Geological Survey, Report of Investigation 87, 165 p.

Colquhoun, D.J., 1969, Coastal plain terraces in the Carolinas and Georgia, U.S.A.: Wright, H.E., Jr., editor, Quaternary Geology and Climate: Volume 16 of the Proceedings of the VII Congress of the International Association for Quaternary Research, v. 16, p. 150-162.

Colton, Richard C., 1978, The subsurface geology of Hamilton County Florida with emphasis on the Oligocene age Suwannee Limestone [Master's thesis]: Tallahassee, Florida State University, 185 p., 12 plates.

Cooke, C.W., 1916, The age of the Ocala Limestone: United States Geological Survey Professional Paper 95-I, p. 107-117.

Cooke, C.W., 1931, Seven coastal terraces in the southeastern United States: Washington Academy of Sciences Journal, v. 21, p. 503-513.

Cooke, C.W., 1939, Scenery of Florida interpreted by a geologist: Florida Geological Survey Bulletin 17, 120 p.

Cooke, C.W., 1945, Geology of Florida: Florida Geological Survey Bulletin 29, 342 p.

Cooke, C.W., and Mansfield, W.C., 1936, Suwannee Limestone of Florida [Abstract]: Geological Society of America Proceedings, 1935, p. 71-72.

Copeland, R.E., 1982, Identification of Groundwater Geochemical Patterns in the Western Portion of the Suwannee River Water Management District, *in* Beck, B., ed., Studies of the Hydrogeology of the Southeastern United States: 1981: Special Publication No. 1, Georgia Southwestern College, Americus, GA., p. 19-29.

Copeland, R., 2003, Florida spring classification system and spring glossary: Florida Geological Survey Special Publication 52, 17 p.

Copeland, R., 2005, Geomorphic influence of scarps in the Suwannee River Basin: Spring Field Trip, May 7, 2005, *in* Southeastern Geological Society Guidebook 44, 56p.

Dall, W.H., and Harris, G.D., 1892, Correlation papers, Neocene: United States Geological Survey Bulletin 84, 349 p.

Espenshade, G.H., and Spencer, C.W., 1963, Geologic features of phosphate deposits of northern peninsular Florida: United States Geological Survey Bulletin 1118, 115 p.

Evans, W.L., III, Green R.C., Bryan J.R., and Paul, D.T., 2004, Geologic map of the western portion of the U.S.G.S. 1:100,000 scale Gainesville Quadrangle, Northern Florida: Florida Geological Survey Open File Map Series No. 93, 2 plates, scale 1:100,000.

Flint, R.F., 1940, Pleistocene features of the Atlantic coastal plain: American Journal of Science, v., 238, p. 757-787.

Flint, R.F., 1971, Glacial and Quaternary Geology: New York, John Wiley and Sons, Inc., 892 p.

Green, R.C., Evans, W.L., III, Paul, D.T., and Scott, T.M., 2005, Geologic map of the eastern portion of the U.S.G.S. 1:100,000 scale Gainesville Quadrangle, Northern Florida: Florida Geological Survey Open-File Map Series No. 94, 2 plates, scale 1:100,000.

Green, R.C., Paul, D.T., Evans, W.L., Scott, T.M., and Petrushak, S.B., 2006, Geologic map of the western portion of the USGS 1:100,000 scale Lake City quadrangle, northern Florida: Florida Geological Survey Open File Map Series 97, 2 plates, scale 1:100,000.

Groszos, M., Ceryak, R., and Alison, D., 1992, Carbonate units of the intermediate aquifer system in the Suwannee River Water Management District: Florida Geological Survey Open File Report, 54, 22 p.

Groszos, M., and Rupert, F.R., 1992, An isopach map of the Hawthorn Group in the Suwannee River Water Management District: Florida Geological Survey Open File Map Series 2, scale 1:250, 000.

Healy, H.G., 1975, Terraces and shorelines of Florida: Florida Geological Survey Map Series No. 71, scale: 1:2,095,200.

Hendry, C.W., Jr., and Yon, J.W., Jr., 1967, Stratigraphy of Upper Miocene Miccosukee Formation, Jefferson and Leon Counties, Florida: American Association of Petroleum Geologists Bulletin, v. 51, p. 250-256.

Hoenstine, R.W., and Weissinger, S., 1982, A geologic guide to the Suwannee River, Ichetucknee Springs, O'leno and Manatee Springs State Parks: Florida Geological Survey Leaflet 12, 28 p.

Hoenstine, R.W., Spencer, S.M., and O'Carroll, T., 1990, Geology and ground-water resources of Madison County, Florida: Florida Geological Survey Bulletin 61, 93 p.

Hoenstine, R.W., Spencer, S.M., and Lane, E., 1993, Mineral resources of Suwannee County, Florida: Florida Geological Survey Map Series 137, scale 1:126,720.

Hopkins, O.B., 1920, Drilling for oil in Florida: United States Geological Survey Press Bulletin, April, 1920.

Hornsby, H.D., and Ceryak, R., 1998, Springs of the Suwannee River Basin in Florida: Live Oak, Suwannee River Water Management District, 178 p.

Houston, T.B., 1965, Soil survey, Suwannee County, Florida: U.S. Department of Agriculture, Soil Conservation Service, ser. 1961, no. 21, 101 p.

Howell, D.A., and Williams, C. A., 1990, Soil survey of Madison County, Florida: U.S. Department of Agriculture, Soil Conservation Service, 160 p.

Huddlestun, P.F., 1988, A revision of lithostratigraphic units of the Coastal Plain of Georgia - Miocene: Georgia Geological Survey Bulletin 104, 162 p.

Huddlestun, P.F., and Hunter, M.E., 1982, Stratigraphic revision of the Torreya Formation of Florida, *in* Scott, T.M., and Upchurch, S.B., (eds.) Miocene of the southeastern United States, Proceedings of the symposium: Florida Geological Survey Special Publication, 25, 210 p.

Hunter, M.E., and Huddlestun, P.F., 1982, The biostratigraphy of the Torreya Formation of Florida, *in* Scott, T.M., and Upchurch, S.B., (eds.) Miocene of the southeastern United States, Proceedings of the symposium: Florida Geological Survey Special Publication, 25, 210 p.

Knapp, M.S., 1978, Environmental geology series - Valdosta Sheet: Florida Geological Survey Map Series 88, scale 1:250,000.

Knapp, M.S., Copeland, R. E., Scott, T.M., Ceryak, R., Price, D., and Burnson, T., 1981, Karst hydrogeology and Miocene geology of the upper Suwannee River Basin, Hamilton County, Florida, October 23-24, 1981: Southeastern Geological Society Guidebook, 23, 36 p.

Lane, E., Hoenstine, RW., and Spencer, S.M., 1993, Mineral resources of Columbia County, Florida: Florida Geological Survey Map Series 136, scale 1:126,720.

Macesich, M., and Martinez, N., 1992, Mines and quarries greater than 10 acres in size in the Suwannee River Water Management District: Florida Geological Survey Open File Map Series 1, scale 1:250, 000.

MacNeil, F.S., 1950, Pleistocene shorelines in Florida and Georgia: United States Geological Survey Professional Paper 221-F, p. 95-107.

Matson, G.C., and Sanford, S., 1913, Geology and groundwater of Florida: United States Geological Survey Water Supply Paper 319, 445 p.

Miller, J.A., 1986, Hydrogeologic framework of the Florida aquifer system in Florida and in parts of Georgia, Alabama, and South Carolina: Regional Aquifer-System Analysis: united States Geological Survey Professional Paper 1403-B, Washington, 91p., 33 plates.

Mitchell, C.L., 1965, Petrology of selected carbonate rocks from the Hawthorn Formation, Devil's Mill Hopper, Alachua County, Florida [Master's thesis]: Gainesville, University of Florida, 51 p.

Pirkle, E.C., Jr., Yoho, W.H., and Hendry, C.W., Jr., 1970, Ancient sea level stands in Florida: Florida Geological Survey Bulletin 52, 61 p.

Price, D., 1981, Paleokarst features in Hamilton County, Florida, *in* Southeastern Geological Society, Field Conference Guidebook, vol. 23, p. 30-32.

Puri, H.S., 1957, Stratigraphy and zonation of the Ocala group: Florida Geological Survey Bulletin 38, 248 p.

Puri, H.S., and Vernon, R.O., 1964, Summary of the geology of Florida and a guidebook to the classic exposures: Florida Geological Survey Special Publication 5, revised, 312 p.

Randazzo, A.F., 1972, Petrography of the Suwannee Limestone; part II: Florida Geological Survey Bulletin, 54, 13 p.

Randazzo, A.F., and Jones, D.S., eds., 1997, The Geology of Florida: Gainesville, University Press of Florida, 327 p.

Rupert, F., 1989, The geology of Hamilton County, Florida: Florida Geological Survey Open File Report 27, 5 p.

Rupert, F.R., 1996, The geomorphology and geology of Taylor County, Florida: Florida Geological Survey Open File Report 70, 7 p.

Rupert, F., 2003, The geology of Suwannee County, Florida: Florida Geological Survey, Open File Report 86, 9 p.

Rupert, F., Lloyd J., and Campbell K., 1993, Geologic map of Suwannee County, Florida: Florida Geological Survey, Open File Map Series 33, scale: 1:126,720.

Schmidt, W., 1984, Neogene stratigraphy and geologic history of the Apalachicola Embayment, Florida: Florida Geological Survey Bulletin 58, 146p.

Scott, T.M., 1981a, The paleo-extent of the Miocene Hawthorn Formation in peninsular Florida [abs]: Florida Scientist, v. 44, Supplement 1, p.42.

Scott, T.M., 1981b, The Hawthorn Formation of North Florida: Southeastern Geological Society, Field Conference Guidebook, vol. 23, p. 15-23.

Scott, T.M., 1988, The lithostratigraphy of the Hawthorn Group (Miocene) of Florida: Florida Geological Survey Bulletin 59, 148 p.

Scott, T.M., 1989, The lithostratigraphy of the sediments exposed along the Suwannee River in the vicinity of White Springs, *in* Southeastern Geological Society, Field Conference Guidebook, v. 30, p. 6-13.

Scott, T.M., 1991a, Depositional patterns of the Hawthorn Group in Florida: Geological Society of America Abstracts with Programs - v. 23, p. 126.

Scott, T.M., 1991b, A geological Overview: *in* Scott, T.M., Lloyd, J.M., and Maddox, G.L., (*eds.)*, 1991, Florida's ground-water quality monitoring program, hydrogeologic framework: Florida Geological Survey Special Publication 32, 97 p.

Scott, T.M., 1992, A geological overview of Florida: Florida Geological Survey Open File Report 50, 78 p.

Scott, T.M., 1993, Geologic map of Hamilton County, Florida: Florida Geological Survey, Open File Map Series 32, scale: 1:126,720.

Scott, T.M., 1997, Miocene to Holocene history of Florida: *in* Randazzo, A.F., and Jones, D.S., eds., 1997, The Geology of Florida: Gainesville, University Press of Florida, 327 p.

Scott, T.M., 2001, Text to accompany the geologic map of Florida: Florida Geological Survey Open File Report 80, 29 p.

Scott, T.M., 2005, Revisions to the geomorphology of Florida focusing on the eastern panhandle and north-central Florida, *in* Southeastern Geological Society Field Trip Guidebook 44, pp. 18-36.

Scott, T.M., (in preparation) Geomorphic map of Florida: Florida Geological Survey, scale 1:750,000.

Scott, T.M., Campbell, K.M., Rupert, F.R., Arthur, J.A., Green, R.C., Means, G.H., Missimer, T.M., Lloyd, J.M., and Duncan, J.G., 2001, Geologic map of Florida: Florida Geological Survey Map Series 146, scale 1:750,000.

Scott, T.M., Means, G.H., Means, R.C., and Meegan R.P., 2002, First magnitude springs of Florida: Florida Geological Survey Open File Report 85, 138 p.

Scott, T.M., Means, G.H., Meegan, R.P., Means, R.C., Upchurch, S.B., Copeland, R.E., Jones, J., Roberts, T., and Willet, A., 2004, Springs of Florida: Florida Geological Survey Bulletin 66, 377 p.

Southeastern Geological Society (SEGS) Ad Hoc Committee on Florida Hydrostratigraphic Unit Definition, 1986, Hydrogeological units of Florida: Florida Geological Survey Special Publication 28, 8 p.

Spencer, S.M., Rupert, F., Hoenstine R.W., and Lane, E., 1993, Mineral resources of Hamilton County, Florida: Florida Geological Survey Map Series 135, scale 1:126,720.

Spencer, S.M., Yon, J.W., Hoenstine, R.W., and Lane, E., 1988, Mineral resources of Madison County, Florida: Florida Geologic Survey Map Series 121, scale 1: 126,720.

Stubbs, S.A., 1940, Solution a dominant factor in the geomorphology of peninsular Florida: Florida Academy of Sciences Proceedings, v. 5, p.148-157.

Upchurch, S.B., Champion, K.M., Schnieder, J.C., Hornsby, D., Ceryak, R., and Zwanka, W., and Suppl, 2004, Defining springshed boundaries and water-quality domains near first-magnitude springs in north Florida: Florida Scientist, v. 67, issue suppl. 1, 52 p.

U.S. Geological Survey, 1981, 1:100,000-scale metric topographic map of Lake City, Florida: Reston, U.S. Geological Survey.

Vernon, R.O., 1951, Geology of Citrus and Levy Counties, Florida: Florida Geological Survey Bulletin 33, 256 p.

Watts, F.C., Readle, E.L., Dearstyne, D.A., and Weatherspoon, R.L., 2000, Soil survey of Taylor County, Florida: U.S. Department of Agriculture, Natural Resources Conservation Service, 311 p.

Weatherspoon, R.L., Baldwin, R., Howell, D.A., 2004, Soil survey of Hamilton County, Florida: U.S. Department of Agriculture, Natural Resources Conservation Service, 189 p.

Weatherspoon, R.L., 2006, Soil Survey of Suwannee County, Florida: U.S. Department of Agriculture, Natural Resources Conservation Service, 449 p.

Weatherspoon, R.L., Anderson, K., Anzalone, W., Bednarek, R., Chibirka, J., Cummings, E., Dahl, R., French, C., Jakel, D., Johnson, W.R., Neilson, R.W., and Shurtliff, D., 1998, Soil survey of Lafayette County, Florida: U.S. Department of Agriculture, Soil Conservation Service, 201p.

White, W.A., 1970, The geomorphology of the Florida peninsula: Florida Geological Survey Bulletin 51, 164 p.

Williams, K.E., Nicol, D., and Randazzo, A.F., 1977, The geology of the western part of Alachua County, Florida: Florida Geological Survey Report of Investigation 85, 97 p.

Winkler, W., 1996, Surface water and groundwater interaction along the Cody Scarp transition region of the Suwannee River Basin near Live Oak, Florida, *in* Southeastern Geological Society, Guidebook 36, p. 1-15.

Acknowledgements

The authors would like to thank: Brian Kauffman, Gwen Lord, Bob Heeke, and Carlos Herd of the Suwannee River Water Management District (SRWMD) for access to district lands; Ron Ceryak for providing well information for the SRWMD; Steven Carpenter of the Division of Forestry for access to the Twin Rivers and Holton Creek Wildlife Management Areas. The late James H. Balsillie is thanked for his invaluable contributions in the field and in discussing this project with the authors. Ken Campbell, Bridget Coane, Adam Humphreys, Tom Greenhalgh, Nick John, Harley Means, Sarah Ramdeen, Guy Richardson, and David Wagner provided additional field support. David Anderson provided assistance with ArcMap and GIS analyses. Rick Copeland, Jackie Lloyd, Harley Means, Frank Rupert, and Walt Schmidt are thanked for their time in reviewing, discussing, and editing the product. This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program and in part by the FDEP/FGS.

Table 1: Wells utilized for study.

Map ID #	*Archived ID #	Data Source	Data Type	LATITUDE DD	MM	SS	LONGITUDE DD	MM	SS	1:24,000 Quadrangle	Elev. (Feet)	Total Depth (Feet)
1	W-187	FGS	CUTTINGS	30	17	21.70	83	18	45.21	Madison SE	90	129
2	W-358	FGS	CUTTINGS	30	10	57.25	83	10	55.00	Dowling Park	70	57
3	W-704	FGS	CUTTINGS	30	23	02.13	83	21	23.46	Lee	93	90
4	W-1066	FGS	CUTTINGS	30	14	29.30	83	15	01.67	Day	50	81
5	W-1451	FGS	CUTTINGS	30	18	26.55	83	00	25.72	Live Oak West	102	268
6	W-2000	FGS	CUTTINGS	30	00	37.02	83	16	46.04	Day SE	78	4560
7	W-2548	FGS	CUTTINGS	30	26	11.04	83	25	47.60	Madison	143	520
8	W-2549	FGS	CUTTINGS	30	28	19.73	83	25	44.60	Madison	99	515
9	W-2550	FGS	CUTTINGS	30	26	51.24	83	24	43.42	Madison	170	540
10	W-4497	FGS	CUTTINGS	30	04	05.09	83	30	0.99	Perry	61	460
11	W-8389	FGS	CUTTINGS	30	12	20.15	83	12	38.06	Dowling Park	80	330
12	W-8390	FGS	CUTTINGS	30	27	26.01	83	13	32.10	Ellaville	66	170
13	W-12247	FGS	CUTTINGS	30	14	49.00	83	01	53.00	Mayo NE	96	4510
14	W-12516	FGS	CUTTINGS	30	25	47.35	83	18	11.46	Lee	90	90
15	W-13122	FGS	CUTTINGS	30	01	45.08	83	29	50.00	Fenholloway	57	49
16	W-13218	FGS	CUTTINGS	30	30	04.46	83	04	23.56	Jennings	85	156
17	W-13471	FGS	CUTTINGS	30	09	10.00	83	10	15.00	Dowling Park	77	180
18	W-13479	FGS	CUTTINGS	30	25	34.06	83	23	12.00	Madison	105	100
19	W-13786	FGS	CUTTINGS	30	27	16.00	83	21	35.00	Lee	110	138
20	W-15854	FGS	CORE	29	59	57.23	83	03	27.15	Mallory Swamp NE	65	65
21	W-15867	FGS	CORE	30	03	52.07	83	11	51.14	Mayo	72	53
22	W-15888	FGS	CORE	30	23	06.10	83	26	37.89	Madison	160	89
23	W-15952	FGS	CORE	30	01	29.76	83	26	02.52	Fenholloway	73	36
24	W-15980	FGS	CORE	30	20	38.67	83	19	30.79	Madison SE	90	52
25	W-15983	FGS	CORE	30	16	29.10	83	24	37.01	Madison SW	99	62
26	W-16510	FGS	CUTTINGS	30	02	05.96	83	02	45.48	Mayo SE	42	17
27	W-16514	FGS	CUTTINGS	30	03	51.51	83	07	46.91	Mayo	59	45
28	W-17904	FGS	CORE	30	04	56.08	83	02	30.43	Mayo SE	46	48
29	W-18767	FGS	CORE	30	26	27.00	83	03	39.00	Fort Union	93	229
30	W-18768	FGS	CORE	30	17	57.10	83	14	26.90	Falmouth	62	69
31	W-18771	FGS	CORE	30	16	14.28	83	28	25.08	Madison SW	101	199
32	W-18770	FGS	CORE	30	08	47.31	83	27	15.57	Day NW	87	129
33	W-400	FGS	CUTTINGS	30	03	10.89	83	10	47.98	Mayo	78	200
34	W-1021	FGS	CUTTINGS	30	29	11.05	83	00	36.14	Fort Union	85	185
35	W-1061	FGS	CUTTINGS	30	17	07.37	83	19	20.38	Madison SE	92	27
36	W-1067	FGS	CUTTINGS	30	05	22.81	83	13	37.22	Mayo	65	28
37	W-1751	FGS	CUTTINGS	30	28	50.85	83	25	0.56	Madison	95	325
38	W-1827	FGS	CUTTINGS	30	12	03.21	83	07	44.10	Dowling Park	85	3819
39	W-1951	FGS	CUTTINGS	30	10	55.00	83	09	21.00	Dowling Park	80	160
40	W-2145	FGS	CUTTINGS	30	23	07.15	83	10	36.30	Ellaville	57	45
41	W-2155	FGS	CUTTINGS	30	27	45.51	83	24	00.27	Madison	181	154
42	W-2576	FGS	CUTTINGS	30	28	09.31	83	23	36.20	Madison	178	175
43	W-2987	FGS	CUTTINGS	30	27	06.72	83	24	40.63	Madison	129	185
44	W-3014	FGS	CUTTINGS	30	05	43.00	83	14	06.00	Mayo	67	80
45	W-4460	FGS	CUTTINGS	30	04	11.02	83	29	03.03	Fenholloway	63	360
46	W-4496	FGS	CUTTINGS	30	04	02.82	83	29	31.59	Fenholloway	62	411
47	W-4942	FGS	CUTTINGS	30	11	30.01	83	18	51.10	Day	86	175
48	W-5208	FGS	CUTTINGS	30	23	33.02	83	11	02.07	Ellaville	60	240

Map ID #	*Archived ID #	Data Source	Data Type	LATITUDE DD	MM	SS	LONGITUDE DD	MM	SS	1:24,000 Quadrangle	Elev. (Feet)	Total Depth (Feet)
49	W-6359	FGS	CUTTINGS	30	04	45.66	83	29	52.11	Fenholloway	62	65
50	W-6534	FGS	CUTTINGS	30	08	35.04	83	14	47.01	Dowling Park	68	100
51	W-6858	FGS	CUTTINGS	30	09	55.85	83	14	50.67	Dowling Park	58	62
52	W-7231	FGS	CUTTINGS	30	28	17.48	83	28	18.85	Madison	95	60
53	W-7232	FGS	CUTTINGS	30	28	05.00	83	26	15.00	Madison	110	56
54	W-7234	FGS	CUTTINGS	30	28	16.53	83	27	27.19	Madison	140	45
55	W-7641	FGS	CUTTINGS	30	27	51.47	83	12	41.09	Ellaville	85	110
56	W-7798	FGS	CUTTINGS	30	21	57.15	83	09	34.23	Falmouth	80	370
57	W-7800	FGS	CUTTINGS	30	22	07.05	83	09	36.07	Falmouth	70	220
58	W-8078	FGS	CUTTINGS	30	28	21.70	83	24	57.06	Madison	190	420
59	W-10300	FGS	CUTTINGS	30	28	10.00	83	11	44.00	Ellaville	90	80
60	W-10654	FGS	CORE	30	23	53.48	83	10	36.43	Ellaville	57	70
61	W-10655	FGS	CORE	30	24	06.01	83	11	52.34	Ellaville	60	42
62	W-10656	FGS	CORE	30	25	08.89	83	11	04.21	Ellaville	68	62
63	W-10657	FGS	CORE	30	23	01.00	83	10	20.00	Ellaville	65	72
64	W-11753	FGS	CUTTINGS	30	15	02.99	83	14	31.08	Falmouth	55	139
65	W-12608	FGS	CUTTINGS	30	24	24.00	83	13	52.00	Ellaville	84	120
66	W-12960	FGS	CUTTINGS	30	08	14.07	83	19	03.98	Day	86	120
67	W-13024	FGS	CUTTINGS	30	22	19.15	83	22	43.07	Madison SW	97	145
68	W-13029	FGS	CUTTINGS	30	16	41.04	83	03	04.04	Live Oak West	90	70
69	W-13200	FGS	CUTTINGS	30	16	58.40	83	13	23.79	Falmouth	55	24
70	W-13201	FGS	CUTTINGS	30	06	26.63	83	16	54.13	Day SE	82	30
71	W-13205	FGS	CUTTINGS	30	12	45.10	83	15	45.00	Day	66	27
72	W-13305	FGS	CUTTINGS	30	21	18.41	83	07	56.98	Falmouth	75	32
73	W-13366	FGS	CUTTINGS	30	22	08.00	83	16	30.00	Madison SE	84	165
74	W-13376	FGS	CUTTINGS	30	14	45.07	83	04	27.00	Mayo NE	88	100
75	W-13946	FGS	CUTTINGS	30	29	45.91	83	22	26.15	Lee	149	160
76	W-13998	FGS	CUTTINGS	30	20	30.00	83	18	34.00	Madison SE	88	35
77	W-14051	FGS	CUTTINGS	30	28	10.00	83	26	50.00	Madison	150	165
78	W-14856	FGS	CUTTINGS	30	22	12.00	83	28	35.00	Madison SW	110	90
79	W-14866	FGS	CUTTINGS	30	06	12.00	83	26	0.00	Fenholloway	80	34
80	W-15803	FGS	CORE	30	26	49.00	83	24	07.00	Madison	161	100
81	W-15853	FGS	CORE	30	06	20.22	83	26	50.82	Fenholloway	80	98
82	W-15936	FGS	CORE	30	28	48.99	83	14	44.36	Ellaville	60	75
83	W-15950	FGS	CORE	30	01	08.36	83	25	33.37	Fenholloway	73	28
84	W-15953	FGS	CORE	30	04	23.37	83	19	08.24	Day SE	87	42
85	W-15974	FGS	CORE	30	20	49.17	83	29	34.40	Madison SW	103	93
86	W-15981	FGS	CORE	30	22	18.23	83	13	58.95	Falmouth	71	62
87	W-15982	FGS	CORE	30	22	13.90	83	21	44.01	Madison SE	95	45
88	W-15984	FGS	CORE	30	24	49.41	83	17	51.41	Lee	80	57
89	W-16508	FGS	CUTTINGS	30	05	26.13	83	09	15.66	Mayo	53	25
90	W-16509	FGS	CUTTINGS	30	04	42.84	83	06	01.50	Mayo SE	49	15
91	W-16512	FGS	CUTTINGS	30	02	33.57	83	05	43.75	Mayo SE	63	25
92	W-16513	FGS	CUTTINGS	30	02	33.28	83	06	44.54	Mayo SE	72	98
93	W-16515	FGS	CUTTINGS	30	02	49.44	83	04	52.06	Mayo SE	51	20
94	W-16517	FGS	CUTTINGS	30	17	50.32	83	01	18.02	Live Oak West	103	18
95	W-16518	FGS	CUTTINGS	30	17	26.74	83	00	25.94	Live Oak West	93	75
96	W-16753	FGS	CORE	30	25	06.04	83	17	54.01	Lee	92	80
97	W-17902	FGS	CORE	30	04	46.53	83	02	45.81	Mayo SE	46	63
98	W-17905	FGS	CORE	30	05	11.38	83	02	44.36	Mayo SE	49	63

Map ID #	*Archived ID #	Data Source	Data Type	LATITUDE DD	MM	SS	LONGITUDE DD	MM	SS	1:24,000 Quadrangle	Elev. (Feet)	Total Depth (Feet)
99	W-18471	FGS	CORE	30	28	28.00	83	15	51.00	Lee	94	172
100	-031223002	SRWMD	Water Well	30	12	23.68	83	05	22.34	Mayo NE	90	245
101	-040931001	SRWMD	Water Well	30	05	39.99	83	28	09.99	Fenholloway	80	62
102	-050801001	SRWMD	Water Well	30	04	35.99	83	29	02.99	Fenholloway	68	393
103	-050801002	SRWMD	Water Well	30	04	16.99	83	28	36.99	Fenholloway	65	434
104	-041330007	SRWMD	Water Well	30	06	38.99	83	03	34.99	Mayo SE	60	57
105	-041331006	SRWMD	Water Well	30	05	49.49	83	03	31.59	Mayo SE	47	87
106	-041333002	SRWMD	Water Well	30	05	49.69	83	01	30.89	Mayo SE	71	225
107	-041333003	SRWMD	Water Well	30	05	49.49	83	01	00.19	Mayo SE	72	210
108	-041333004	SRWMD	Water Well	30	05	23.49	83	01	00.99	Mayo SE	68	240
109	-041329002	SRWMD	Water Well	30	06	19.39	83	02	02.39	Mayo SE	69	70
110	-041318010	SRWMD	Water Well	30	08	38.99	83	03	46.99	Mayo NE	65	90
111	-041319004	SRWMD	Water Well	30	07	44.99	83	03	41.99	Mayo NE	60	150
112	-051332004	SRWMD	Water Well	30	00	36.40	83	02	15.99	Mayo SE	45	49
113	-051329001	SRWMD	Water Well	30	01	10.38	83	02	39.83	Mayo SE	46	75
114	-051310001	SRWMD	Water Well	30	03	27.98	83	00	27.99	Mayo SE	42	115
115	-041305003	SRWMD	Water Well	30	09	57.99	83	02	37.99	Mayo NE	90	115
116	-041309001	SRWMD	Water Well	30	08	55.99	83	01	01.99	Mayo NE	92	85
117	-041231001	SRWMD	Water Well	30	05	29.99	83	09	41.99	Mayo	50	62
118	-051317001	SRWMD	Water Well	30	03	19.79	83	02	00.39	Mayo SE	42	69
119	-051306003	SRWMD	Water Well	30	04	59.49	83	03	28.49	Mayo SE	45	171
120	-051307003	SRWMD	Water Well	30	04	11.84	83	03	09.50	Mayo SE	43	49
121	-041222001	SRWMD	Water Well	30	07	28.99	83	06	35.99	Mayo SE	60	90
122	-041136002	SRWMD	Water Well	30	05	52.99	83	10	21.99	Mayo	50	55
123	-041202003	SRWMD	Water Well	30	09	52.99	83	05	06.99	Mayo NE	70	68
124	-041202004	SRWMD	Water Well	30	09	53.99	83	05	45.99	Mayo NE	80	138
125	-051224002	SRWMD	Water Well	30	02	12.99	83	04	42.99	Mayo SE	65	165
126	-051230002	SRWMD	Water Well	30	00	46.99	83	09	09.99	Mayo	80	69
127	-041212002	SRWMD	Water Well	30	09	17.99	83	04	35.99	Mayo NE	55	80
128	-041130001	SRWMD	Water Well	30	06	46.99	83	15	29.99	Day SE	70	64
129	-041130002	SRWMD	Water Well	30	06	10.99	83	15	28.99	Day SE	75	65
130	-041131002	SRWMD	Water Well	30	05	11.80	83	15	28.08	Day SE	77	90
131	-041132004	SRWMD	Water Well	30	05	19.99	83	14	39.99	Mayo	70	165
132	-041134002	SRWMD	Water Well	30	05	27.99	83	12	37.99	Mayo	58	60
133	-041129004	SRWMD	Water Well	30	06	15.99	83	14	42.99	Mayo	64	50
134	-041123003	SRWMD	Water Well	30	06	59.99	83	11	25.99	Mayo	55	48
135	-041124005	SRWMD	Water Well	30	07	25.99	83	10	07.99	Mayo	55	68
136	-041128001	SRWMD	Water Well	30	06	14.99	83	13	24.99	Mayo	51	185
137	-041128002	SRWMD	Water Well	30	06	44.99	83	13	52.99	Mayo	48	38
138	-041119006	SRWMD	Water Well	30	07	32.98	83	14	56.14	Dowling Park	67	70
139	-051215002	SRWMD	Water Well	30	02	37.99	83	06	14.99	Mayo SE	60	180
140	-051204001	SRWMD	Water Well	30	04	40.99	83	07	15.99	Mayo SE	52	83
141	-051205001	SRWMD	Water Well	30	04	43.60	83	07	54.75	Mayo	74	86
142	-051206002	SRWMD	Water Well	30	04	50.99	83	09	12.99	Mayo	60	83
143	-041120004	SRWMD	Water Well	30	07	20.99	83	14	16.99	Mayo	50	58
144	-041110002	SRWMD	Water Well	30	09	11.99	83	12	18.99	Dowling Park	68	68
145	-041113001	SRWMD	Water Well	30	07	58.99	83	10	50.99	Dowling Park	55	115
146	-051116002	SRWMD	Water Well	30	03	18.99	83	13	37.99	Mayo	78	84
147	-051124001	SRWMD	Water Well	30	02	26.99	83	10	37.99	Mayo	80	55
148	-051202006	SRWMD	Water Well	30	04	50.99	83	05	37.99	Mayo SE	50	75

Map ID #	*Archived ID #	Data Source	Data Type	LATITUDE DD	MM	SS	LONGITUDE DD	MM	SS	1:24,000 Quadrangle	Elev. (Feet)	Total Depth (Feet)
149	-051115010	SRWMD	Water Well	30	02	48.99	83	12	17.99	Mayo	80	57
150	-041034003	SRWMD	Water Well	30	05	07.99	83	18	14.99	Day SE	85	110
151	-041036002	SRWMD	Water Well	30	05	07.99	83	16	55.99	Day SE	80	66
152	-041036003	SRWMD	Water Well	30	05	18.99	83	15	58.99	Day SE	80	192
153	-041107002	SRWMD	Water Well	30	09	15.99	83	15	19.99	Day	70	160
154	-041025004	SRWMD	Water Well	30	06	02.99	83	16	10.99	Day SE	73	120
155	-051112001	SRWMD	Water Well	30	03	41.99	83	10	23.99	Mayo	74	170
156	-051113008	SRWMD	Water Well	30	02	39.99	83	09	54.99	Mayo	75	40
157	-051114001	SRWMD	Water Well	30	03	05.99	83	11	09.99	Mayo	76	60
158	-051101002	SRWMD	Water Well	30	04	54.99	83	09	55.99	Mayo	55	100
159	-051101007	SRWMD	Water Well	30	04	41.99	83	11	00.99	Mayo	70	175
160	-041016003	SRWMD	Water Well	30	08	10.99	83	19	50.99	Day	87	165
161	-041023007	SRWMD	Water Well	30	07	28.99	83	18	02.99	Day SE	80	95
162	-041023008	SRWMD	Water Well	30	07	17.99	83	17	39.99	Day SE	80	95
163	-041013002	SRWMD	Water Well	30	07	49.99	83	16	14.99	Day	80	102
164	-041013005	SRWMD	Water Well	30	08	21.99	83	16	27.99	Day	76	123
165	-051106005	SRWMD	Water Well	30	04	47.99	83	15	32.99	Day SE	80	191
166	-051001001	SRWMD	Water Well	30	04	54.99	83	16	27.99	Day SE	80	98
167	-050906001	SRWMD	Water Well	30	04	19.99	83	27	59.99	Fenholloway	71	379
168	-021329008	SRWMD	Water Well	30	16	56.99	83	01	53.00	Live Oak West	90	147
169	-031317003	SRWMD	Water Well	30	13	52.99	83	02	37.99	Mayo NE	90	125
170	-031319004	SRWMD	Water Well	30	12	35.99	83	03	07.99	Mayo NE	88	100
171	-031304004	SRWMD	Water Well	30	15	30.99	83	01	01.00	Live Oak West	100	161
172	-021333005	SRWMD	Water Well	30	15	59.09	83	01	41.50	Live Oak West	101	86
173	-021327006	SRWMD	Water Well	30	16	55.19	83	00	32.70	Live Oak West	95	89
174	-031219001	SRWMD	Water Well	30	12	58.99	83	08	53.99	Dowling Park	86	78
175	-031221001	SRWMD	Water Well	30	12	17.99	83	07	11.99	Mayo NE	80	105
176	-011329003	SRWMD	Water Well	30	22	21.99	83	02	28.00	Live Oak West	100	130
177	-011331004	SRWMD	Water Well	30	21	41.99	83	02	52.00	Live Oak West	100	115
178	-031226007	SRWMD	Water Well	30	11	18.99	83	05	01.99	Mayo NE	75	180
179	-031205005	SRWMD	Water Well	30	15	34.99	83	07	00.00	Falmouth	90	240
180	-011331007	SRWMD	Water Well	30	21	21.99	83	03	50.00	Live Oak West	100	120
181	-011333002	SRWMD	Water Well	30	21	20.99	83	00	50.00	Live Oak West	148	147
182	-011315001	SRWMD	Water Well	30	23	39.19	83	00	40.10	Fort Union	135	205
183	-031129004	SRWMD	Water Well	30	11	27.99	83	14	04.99	Dowling Park	60	75
184	-031135003	SRWMD	Water Well	30	10	30.99	83	10	59.99	Dowling Park	75	82
185	-031136001	SRWMD	Water Well	30	11	14.38	83	10	13.94	Dowling Park	80	78
186	-031203002	SRWMD	Water Well	30	15	11.99	83	06	08.00	Live Oak West	90	96
187	-031118005	SRWMD	Water Well	30	13	15.99	83	15	32.99	Day	70	132
188	-021321008	SRWMD	Water Well	30	17	26.09	83	01	34.00	Live Oak West	99	90
189	-021320007	SRWMD	Water Well	30	18	06.99	83	02	17.00	Live Oak West	91	76
190	-021315006	SRWMD	Water Well	30	18	41.99	83	00	43.00	Live Oak West	95	120
191	-011233008	SRWMD	Water Well	30	20	53.99	83	07	40.00	Falmouth	85	112
192	-011213001	SRWMD	Water Well	30	23	33.59	83	03	56.95	Fort Union	108	100
193	-011225001	SRWMD	Water Well	30	21	57.99	83	03	55.00	Live Oak West	100	102
194	-031111001	SRWMD	Water Well	30	14	22.41	83	11	52.07	Dowling Park	85	84
195	-031113001	SRWMD	Water Well	30	13	12.99	83	10	38.99	Dowling Park	87	80
196	-031114001	SRWMD	Water Well	30	13	13.63	83	11	08.17	Dowling Park	80	87
197	-021317001	SRWMD	Water Well	30	18	34.99	83	01	58.00	Live Oak West	102	108
198	-011226002	SRWMD	Water Well	30	21	47.99	83	05	19.00	Live Oak West	100	155

Map ID #	*Archived ID #	Data Source	Data Type	LATITUDE DD	MM	SS	LONGITUDE DD	MM	SS	1:24,000 Quadrangle	Elev. (Feet)	Total Depth (Feet)
199	-011230002	SRWMD	Water Well	30	21	46.99	83	08	58.00	Falmouth	79	140
200	-011209001	SRWMD	Water Well	30	25	12.99	83	06	58.00	Fort Union	89	80
201	-011211002	SRWMD	Water Well	30	24	48.99	83	05	17.00	Fort Union	150	160
202	-011203001	SRWMD	Water Well	30	25	55.99	83	06	53.00	Fort Union	49	80
203	-031036001	SRWMD	Water Well	30	10	26.99	83	16	05.99	Day	80	90
204	-031101001	SRWMD	Water Well	30	15	14.99	83	10	02.00	Falmouth	89	160
205	-021305003	SRWMD	Water Well	30	20	43.99	83	02	15.00	Live Oak West	101	160
206	-021308001	SRWMD	Water Well	30	19	34.99	83	02	25.00	Live Oak West	100	95
207	-021235002	SRWMD	Water Well	30	15	40.99	83	05	16.00	Live Oak West	89	104
208	-021231001	SRWMD	Water Well	30	16	30.12	83	09	12.47	Falmouth	86	80
209	-011125001	SRWMD	Water Well	30	22	02.99	83	10	34.00	Falmouth	72	50
210	-011104003	SRWMD	Water Well	30	26	05.99	83	13	55.00	Ellaville	80	75
211	-031026004	SRWMD	Water Well	30	11	41.99	83	17	26.99	Day	86	60
212	-031024008	SRWMD	Water Well	30	12	55.99	83	16	51.99	Day	80	220
213	-021213001	SRWMD	Water Well	30	18	36.99	83	04	43.00	Live Oak West	100	136
214	-021215001	SRWMD	Water Well	30	18	48.39	83	06	18.17	Live Oak West	90	87
215	-021217001	SRWMD	Water Well	30	18	38.99	83	08	49.00	Falmouth	83	75
216	-021220004	SRWMD	Water Well	30	17	36.99	83	08	11.00	Falmouth	85	210
217	-021222001	SRWMD	Water Well	30	17	45.86	83	06	05.28	Live Oak West	81	191
218	-021135001	SRWMD	Water Well	30	16	03.99	83	11	13.00	Falmouth	80	225
219	-011034001	SRWMD	Water Well	30	21	19.99	83	18	11.00	Madison SE	85	85
220	-011035001	SRWMD	Water Well	30	20	59.19	83	17	11.40	Madison SE	88	78
221	-011036001	SRWMD	Water Well	30	21	03.99	83	16	24.00	Madison SE	92	65
222	-011013001	SRWMD	Water Well	30	23	56.99	83	16	29.00	Lee	95	80
223	-021202004	SRWMD	Water Well	30	20	34.99	83	05	17.00	Live Oak West	90	100
224	-021204001	SRWMD	Water Well	30	20	47.99	83	07	04.00	Live Oak West	81	255
225	-021133001	SRWMD	Water Well	30	15	48.99	83	13	27.00	Falmouth	73	84
226	-021127001	SRWMD	Water Well	30	16	47.99	83	12	51.00	Falmouth	68	80
227	-011015002	SRWMD	Water Well	30	23	52.99	83	18	34.00	Lee	90	82
228	-011016001	SRWMD	Water Well	30	23	57.99	83	19	18.00	Lee	93	85
229	-021122001	SRWMD	Water Well	30	17	31.99	83	12	07.00	Falmouth	70	75
230	-021125001	SRWMD	Water Well	30	16	36.99	83	10	25.00	Falmouth	80	170
231	-021002002	SRWMD	Water Well	30	20	23.99	83	18	01.00	Madison SE	92	63
232	-021005002	SRWMD	Water Well	30	20	49.99	83	20	05.00	Madison SE	95	65
233	-021008003	SRWMD	Water Well	30	19	39.99	83	20	11.99	Madison SE	95	90
234	-011010004	SRWMD	Water Well	30	24	38.99	83	18	30.00	Lee	90	75
235	-011004001	SRWMD	Water Well	30	25	22.99	83	19	45.00	Lee	98	110
236	-011004006	SRWMD	Water Well	30	25	51.99	83	19	32.00	Lee	101	95
237	-011005001	SRWMD	Water Well	30	26	05.99	83	20	52.00	Lee	100	145
238	-011005002	SRWMD	Water Well	30	25	58.99	83	20	13.00	Lee	95	126
239	-011001001	SRWMD	Water Well	30	25	37.99	83	16	58.00	Lee	93	78
240	-011002002	SRWMD	Water Well	30	25	23.99	83	17	20.00	Lee	97	92
241	-011002004	SRWMD	Water Well	30	25	58.99	83	17	18.00	Lee	102	85
242	-010907001	SRWMD	Water Well	30	24	52.99	83	28	01.99	Madison	145	140
243	-031035002	SRWMD	Water Well	30	10	23.99	83	17	57.99	Day	82	80
244	-031035004	SRWMD	Water Well	30	10	52.99	83	17	33.99	Day	85	80
245	-031205007	SRWMD	Water Well	30	14	58.99	83	08	39.00	Dowling Park	95	120
246	-031211002	SRWMD	Water Well	30	14	31.99	83	05	11.89	Mayo NE	85	84
247	-031219004	SRWMD	Water Well	30	12	48.99	83	07	29.99	Mayo NE	85	138
248	-031303007	SRWMD	Water Well	30	15	42.99	83	00	17.00	Live Oak West	100	127

Map ID #	*Archived ID #	Data Source	Data Type	LATITUDE DD	MM	SS	LONGITUDE DD	MM	SS	1:24,000 Quadrangle	Elev. (Feet)	Total Depth (Feet)
249	-031330002	SRWMD	Water Well	30	11	49.99	83	03	40.99	Mayo NE	83	152
250	-041025005	SRWMD	Water Well	30	06	05.99	83	16	36.99	Day SE	80	105
251	-041201003	SRWMD	Water Well	30	09	32.99	83	03	51.99	Mayo NE	80	120
252	+011017001	SRWMD	Water Well	30	28	55.99	83	20	20.00	Lee	100	200
253	-041209003	SRWMD	Water Well	30	08	50.99	83	07	41.99	Dowling Park	60	77
254	-041210001	SRWMD	Water Well	30	09	00.99	83	06	16.99	Mayo NE	66	66
255	-041226003	SRWMD	Water Well	30	06	49.99	83	05	04.99	Mayo SE	50	100
256	-010911005	SRWMD	Water Well	30	24	48.99	83	23	24.00	Madison	100	112
257	-031318003	SRWMD	Water Well	30	13	01.78	83	03	32.45	Mayo NE	87	140
258	-031318002	SRWMD	Water Well	30	13	15.91	83	03	19.99	Mayo NE	87	140
259	+011329001	SRWMD	Water Well	30	27	37.99	83	02	34.00	Fort Union	87	190
260	-051108001	SRWMD	Water Well	30	03	49.99	83	13	56.99	Mayo	80	140
261	-051203003	SRWMD	Water Well	30	05	02.99	83	06	07.99	Mayo SE	45	140
262	-051208001	SRWMD	Water Well	30	04	05.59	83	08	16.70	Mayo	69	71
263	+011308001	SRWMD	Water Well	30	29	51.99	83	02	15.00	Fort Union	70	146
264	+011316001	SRWMD	Water Well	30	29	00.19	83	01	48.70	Fort Union	100	167
265	+011316002	SRWMD	Water Well	30	28	47.99	83	01	19.00	Fort Union	89	229
266	+011234001	SRWMD	Water Well	30	26	41.99	83	06	52.00	Fort Union	71	71
267	+011216001	SRWMD	Water Well	30	29	24.99	83	07	37.00	Ellaville	110	110
268	+011226001	SRWMD	Water Well	30	27	10.99	83	05	50.00	Fort Union	60	46
269	+011211005	SRWMD	Water Well	30	29	55.99	83	05	33.00	Fort Union	110	130
270	+011208002	SRWMD	Water Well	30	29	50.99	83	08	18.00	Ellaville	114	165
271	+011119001	SRWMD	Water Well	30	28	03.99	83	15	24.00	Lee	105	120
272	+011121002	SRWMD	Water Well	30	27	56.47	83	13	56.92	Ellaville	73	76
273	+011117004	SRWMD	Water Well	30	29	29.30	83	14	44.79	Ellaville	70	92
274	+011028003	SRWMD	Water Well	30	27	11.82	83	19	56.11	Lee	122	120
275	+011030001	SRWMD	Water Well	30	27	37.99	83	21	33.00	Lee	110	165
276	+011034001	SRWMD	Water Well	30	26	38.99	83	18	55.00	Lee	100	105
277	+011035002	SRWMD	Water Well	30	26	55.99	83	17	27.00	Lee	90	214
278	+011035003	SRWMD	Water Well	30	26	31.99	83	17	11.00	Lee	100	85
279	+011109001	SRWMD	Water Well	30	29	44.91	83	13	49.68	Ellaville	82	65
280	+011021006	SRWMD	Water Well	30	28	07.99	83	19	16.00	Lee	120	177
281	-011223004	SRWMD	Water Well	30	22	53.99	83	05	43.00	Fort Union	100	120
282	-011327002	SRWMD	Water Well	30	22	35.99	83	0	30.00	Fort Union	150	200
283	-021101002	SRWMD	Water Well	30	20	47.99	83	10	48.00	Falmouth	77	82
284	-021113002	SRWMD	Water Well	30	18	50.99	83	10	30.00	Falmouth	73	164
285	-021201001	SRWMD	Water Well	30	20	02.99	83	04	38.00	Live Oak West	100	175
286	-021229003	SRWMD	Water Well	30	16	52.99	83	08	07.00	Falmouth	90	235
287	-021232002	SRWMD	Water Well	30	15	56.99	83	08	04.00	Falmouth	90	120
288	-021310006	SRWMD	Water Well	30	19	34.99	83	00	07.00	Live Oak West	110	146
289	+010813001	SRWMD	Water Well	30	28	48.99	83	28	12.99	Madison	105	115
290	+010813002	SRWMD	Water Well	30	29	23.99	83	28	13.99	Madison	110	135
291	-011011020	SRWMD	Water Well	30	24	34.99	83	17	31.00	Lee	90	98
292	-011321003	SRWMD	Water Well	30	23	12.99	83	01	46.00	Fort Union	120	160
293	+011129002	SRWMD	Water Well	30	27	12.99	83	14	28.00	Ellaville	90	170
294	-041315007	SRWMD	Water Well	30	08	14.33	83	00	17.52	Mayo NE	92	77
295	-041131006	SRWMD	Water Well	30	05	33.99	83	15	39.99	Day SE	75	95
296	-011118007	SRWMD	Water Well	30	24	21.99	83	15	46.00	Lee	90	145
297	-011214003	SRWMD	Water Well	30	23	54.99	83	05	42.00	Fort Union	100	95
298	+011218001	SRWMD	Water Well	30	29	16.99	83	09	18.00	Ellaville	80	125

Map ID #	*Archived ID #	Data Source	Data Type	LATITUDE DD	MM	SS	LONGITUDE DD	MM	SS	1:24,000 Quadrangle	Elev. (Feet)	Total Depth (Feet)
299	-051333009	SRWMD	Water Well	30	00	09.47	83	01	04.89	Mayo SE	46	50
300	-051333010	SRWMD	Water Well	30	00	32.83	83	01	12.78	Mayo SE	38	38
301	-051328002	SRWMD	Water Well	30	01	29.72	83	01	26.42	Mayo SE	31	170
302	+010918003	SRWMD	Water Well	30	29	14.99	83	27	50.99	Madison	160	135
303	+010922005	SRWMD	Water Well	30	28	38.99	83	24	23.00	Madison	150	165
304	-021223003	SRWMD	Water Well	30	17	34.99	83	05	15.00	Live Oak West	90	160
305	-041317001	SRWMD	Water Well	30	08	17.42	83	02	42.15	Mayo NE	77	63
306	+011117014	SRWMD	Water Well	30	28	56.83	83	13	58.24	Ellaville	72	38
307	+011120008	SRWMD	Water Well	30	28	35.37	83	14	10.19	Ellaville	69	30
308	+011030002	SRWMD	Water Well	30	27	32.89	83	21	08.86	Lee	130	122
309	+011118005	SRWMD	Water Well	30	29	19.36	83	15	43.24	Lee	108	115
310	+011130003	SRWMD	Water Well	30	27	02.61	83	15	42.78	Lee	98	110
311	-011022006	SRWMD	Water Well	30	23	08.99	83	18	29.00	Lee	80	125
312	-021321012	SRWMD	Water Well	30	18	09.99	83	01	38.00	Live Oak West	100	130
313	-041222005	SRWMD	Water Well	30	07	07.99	83	06	01.99	Mayo SE	50	170
314	-010924001	SRWMD	Water Well	30	23	27.99	83	22	59.99	Madison	98	100
315	-051330007	SRWMD	Water Well	30	01	33.99	83	03	15.99	Mayo SE	50	75
316	-041129008	SRWMD	Water Well	30	06	38.99	83	14	40.99	Mayo	65	245
317	-041132008	SRWMD	Water Well	30	05	46.99	83	14	47.99	Mayo	70	120
318	-051001005	SRWMD	Water Well	30	04	53.99	83	16	00.99	Day SE	80	173
319	-051111016	SRWMD	Water Well	30	04	04.99	83	11	09.99	Mayo	75	145
320	-051207011	SRWMD	Water Well	30	04	05.99	83	08	57.99	Mayo	65	130
321	-051214015	SRWMD	Water Well	30	03	03.99	83	05	36.99	Mayo SE	60	75
322	-051215004	SRWMD	Water Well	30	03	17.99	83	06	01.99	Mayo SE	45	220
323	-051225006	SRWMD	Water Well	30	00	57.99	83	04	13.99	Mayo SE	65	225
324	+010915005	SRWMD	Water Well	30	29	10.99	83	24	10.00	Madison	140	163
325	+011019005	SRWMD	Water Well	30	28	11.99	83	21	16.00	Lee	100	98
326	+010933010	SRWMD	Water Well	30	26	37.99	83	25	40.99	Madison	130	130
327	-011001002	SRWMD	Water Well	30	25	57.99	83	23	24.00	Madison	100	132
328	-011115001	SRWMD	Water Well	30	23	48.99	83	12	22.00	Ellaville	80	170
329	-011120001	SRWMD	Water Well	30	22	48.99	83	14	19.00	Ellaville	80	178
330	-041025008	SRWMD	Water Well	30	06	26.99	83	16	17.99	Day SE	80	110
331	-041119010	SRWMD	Water Well	30	07	32.26	83	15	41.09	Day	75	270
332	-051207010	SRWMD	Water Well	30	03	34.99	83	09	01.59	Mayo	75	200
333	-021307003	SRWMD	Water Well	30	19	44.99	83	03	48.00	Live Oak West	90	129
334	-031110001	SRWMD	Water Well	30	14	04.99	83	12	31.99	Dowling Park	85	195
335	-031223003	SRWMD	Water Well	30	12	45.14	83	05	47.30	Mayo NE	90	270
336	-031332004	SRWMD	Water Well	30	10	31.99	83	02	42.99	Mayo NE	90	130
337	-011012012	SRWMD	Water Well	30	24	25.99	83	16	20.00	Lee	80	95
338	-021309005	SRWMD	Water Well	30	19	43.99	83	01	03.00	Live Oak West	100	220
339	-031320002	SRWMD	Water Well	30	12	22.99	83	02	32.99	Mayo NE	105	170
340	-031330004	SRWMD	Water Well	30	11	43.99	83	03	02.99	Mayo NE	85	220
341	-031330005	SRWMD	Water Well	30	11	47.99	83	23	02.99	Day NW	85	165
342	-041305004	SRWMD	Water Well	30	10	04.99	83	01	55.99	Mayo NE	90	190
343	+010812001	SRWMD	Water Well	30	29	53.99	83	28	52.99	Madison	110	165
344	-041206001	SRWMD	Water Well	30	09	56.99	83	09	36.99	Dowling Park	72	200
345	-041206002	SRWMD	Water Well	30	09	54.99	83	09	09.99	Dowling Park	74	92
346	-041114004	SRWMD	Water Well	30	08	26.99	83	10	56.99	Dowling Park	70	200
347	-031217002	SRWMD	Water Well	30	13	49.99	83	08	03.99	Dowling Park	95	142
348	-051322003	SRWMD	Water Well	30	02	31.44	83	00	36.35	Mayo SE	50	51

Map ID #	*Archived ID #	Data Source	Data Type	LATITUDE DD	MM	SS	LONGITUDE DD	MM	SS	1:24,000 Quadrangle	Elev. (Feet)	Total Depth (Feet)
349	-051322002	SRWMD	Water Well	30	02	10.80	83	00	10.38	Mayo SE	52	46
350	-051201007	SRWMD	Water Well	30	05	06.66	83	04	30.90	Mayo SE	39	40
351	-011309002	SRWMD	Water Well	30	25	09.19	83	01	01.20	Fort Union	90	145
352	-051103003	SRWMD	Water Well	30	04	56.69	83	12	54.39	Mayo	60	170
353	-051123003	SRWMD	Water Well	30	01	57.99	83	10	54.99	Mayo	80	130
354	-051235004	SRWMD	Water Well	30	00	42.99	83	04	45.99	Mayo SE	70	50
355	-011106002	SRWMD	Water Well	30	25	34.99	83	15	52.00	Lee	90	220
356	-011001003	SRWMD	Water Well	30	25	28.99	83	16	29.00	Lee	90	220
357	-011001004	SRWMD	Water Well	30	25	56.99	83	16	21.00	Lee	90	220
358	-041111006	SRWMD	Water Well	30	09	04.45	83	11	35.20	Dowling Park	74	66
359	-021210004	SRWMD	Water Well	30	20	01.43	83	06	52.59	Live Oak West	78	59
360	-021214003	SRWMD	Water Well	30	18	56.51	83	05	40.38	Live Oak West	88	74
361	-051210016	SRWMD	Water Well	30	04	17.61	83	06	22.58	Mayo SE	57	51
362	-031224004	SRWMD	Water Well	30	12	36.30	83	04	29.80	Mayo NE	92	160
363	+011024002	SRWMD	Water Well	30	28	06.99	83	16	45.00	Lee	90	200
364	+011024003	SRWMD	Water Well	30	28	33.99	83	16	44.00	Lee	110	220
365	-011116003	SRWMD	Water Well	30	23	43.99	83	13	43.00	Ellaville	80	195
366	-011319002	SRWMD	Water Well	30	22	56.99	83	03	06.00	Fort Union	90	115
367	-021124002	SRWMD	Water Well	30	17	54.99	83	10	47.00	Falmouth	80	170
368	-051109008	SRWMD	Water Well	30	03	51.46	83	12	57.53	Mayo	79	60
369	+011126002	SRWMD	Water Well	30	27	36.99	83	11	12.00	Ellaville	80	295
370	-011121002	SRWMD	Water Well	30	22	51.99	83	13	13.00	Ellaville	80	395
371	-011119001	SRWMD	Water Well	30	22	34.99	83	15	22.00	Lee	90	95
372	-011121001	SRWMD	Water Well	30	22	51.99	83	13	44.00	Ellaville	80	245
373	-011129002	SRWMD	Water Well	30	21	59.99	83	14	49.00	Falmouth	80	228
374	-031026008	SRWMD	Water Well	30	11	15.99	83	17	24.99	Day	80	90
375	+011135002	SRWMD	Water Well	30	26	19.99	83	11	13.00	Ellaville	70	120
376	+011135003	SRWMD	Water Well	30	26	52.99	83	11	07.00	Ellaville	70	220
377	+010917002	SRWMD	Water Well	30	29	11.99	83	26	12.00	Madison	120	132
378	-011035006	SRWMD	Water Well	30	21	44.99	83	18	02.00	Madison SE	90	95
379	+011113005	SRWMD	Water Well	30	29	24.99	83	10	28.00	Ellaville	110	150
380	+011226005	SRWMD	Water Well	30	27	10.99	83	04	57.00	Fort Union	70	132
381	-011328003	SRWMD	Water Well	30	22	39.99	83	01	16.00	Fort Union	130	195
382	-021124001	SRWMD	Water Well	30	18	01.99	83	10	23.00	Falmouth	80	270
383	-041322003	SRWMD	Water Well	30	07	09.99	83	00	44.99	Mayo SE	80	175
384	-041327001	SRWMD	Water Well	30	06	49.99	83	00	29.99	Mayo SE	85	225
385	-051309003	SRWMD	Water Well	30	04	12.99	83	00	52.99	Mayo SE	55	140
386	+011126001	SRWMD	Water Well	30	27	12.99	83	11	42.00	Ellaville	80	120
387	-011120002	SRWMD	Water Well	30	22	25.99	83	14	44.00	Falmouth	80	520
388	-021220005	SRWMD	Water Well	30	18	01.99	83	08	44.00	Falmouth	90	152
389	-021228004	SRWMD	Water Well	30	16	35.99	83	07	01.00	Live Oak West	90	172
390	+011010002	SRWMD	Water Well	30	29	48.99	83	18	42.00	Lee	100	180
391	-041118007	SRWMD	Water Well	30	08	28.99	83	15	50.99	Day	75	145
392	-011116005	SRWMD	Water Well	30	23	43.99	83	13	13.00	Ellaville	80	148
393	-011116006	SRWMD	Water Well	30	24	02.99	83	13	26.00	Ellaville	80	190
394	-011121003	SRWMD	Water Well	30	23	17.99	83	13	13.00	Ellaville	80	245
395	-031136003	SRWMD	Water Well	30	10	25.99	83	10	10.99	Dowling Park	75	92
396	-031217001	SRWMD	Water Well	30	13	21.99	83	08	25.99	Dowling Park	95	195
397	-031219005	SRWMD	Water Well	30	12	39.99	83	09	29.99	Dowling Park	80	120
398	+011216007	SRWMD	Water Well	30	29	11.99	83	06	55.00	Fort Union	90	145

Map ID #	*Archived ID #	Data Source	Data Type	LATITUDE DD	MM	SS	LONGITUDE DD	MM	SS	1:24,000 Quadrangle	Elev. (Feet)	Total Depth (Feet)
399	+011013004	SRWMD	Water Well	30	29	25.99	83	16	29.00	Lee	120	180
400	-051211006	SRWMD	Water Well	30	03	59.99	83	05	30.99	Mayo SE	45	135
401	-041133005	SRWMD	Water Well	30	05	39.99	83	13	15.99	Mayo	60	130
402	-051216013	SRWMD	Water Well	30	02	58.99	83	07	18.99	Mayo SE	70	295
403	-021010001	SRWMD	Water Well	30	19	14.99	83	18	32.00	Madison SE	90	200
404	-021015004	SRWMD	Water Well	30	18	38.99	83	18	32.00	Madison SE	90	245

*NOTE: Suwannee River Water Management District (SRWMD) **Archived ID #** is the well's township, range, and section location. The format is as follows: + or – indicates township north (+) versus south (-); there is no need to include an east / west indicator for the range, as the entire SRWMD is east of the Prime Meridian. Following the +/- are 6 digits representing the township, range, and section (TTRRSS), and finally a 3 digit unique identifier assigned consecutively to each well within a given section to differentiate wells with the same +/- and 6 digit number.

For example: **-031224004** means Township 03 South, Range 12 East, Section 24, unique well 004.