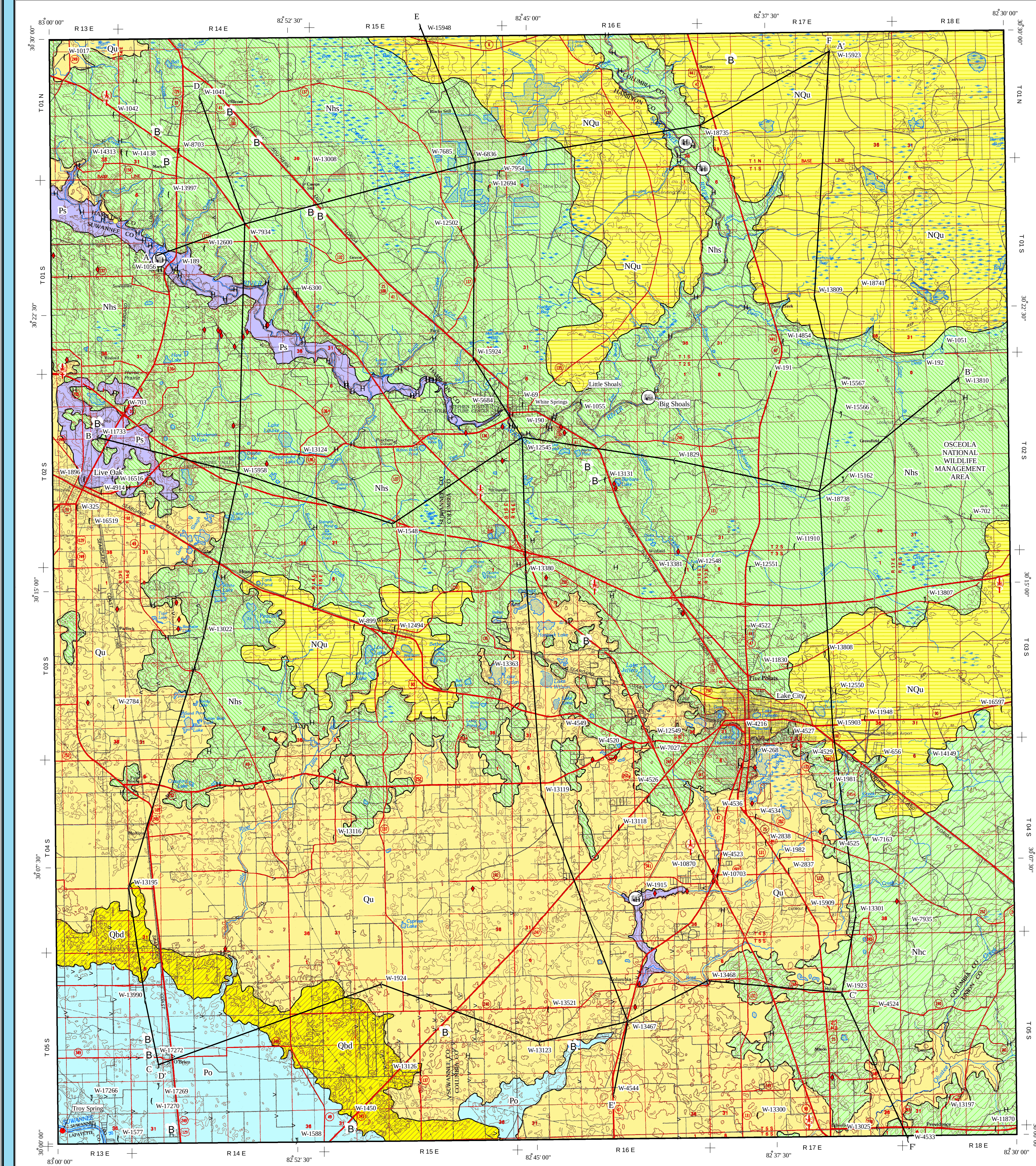




SELECTED PHOTOGRAPHS FROM STUDY AREA



Photo 1. Exposure of Stateville Formation along Suwannee River; Water Level of 51.02' reported at U.S.G.S. Gage Station, White Springs, FL., May 9, 2006.
Located at: T. 01 S, R. 17 E, S. 06
Photo by Richard C. Green

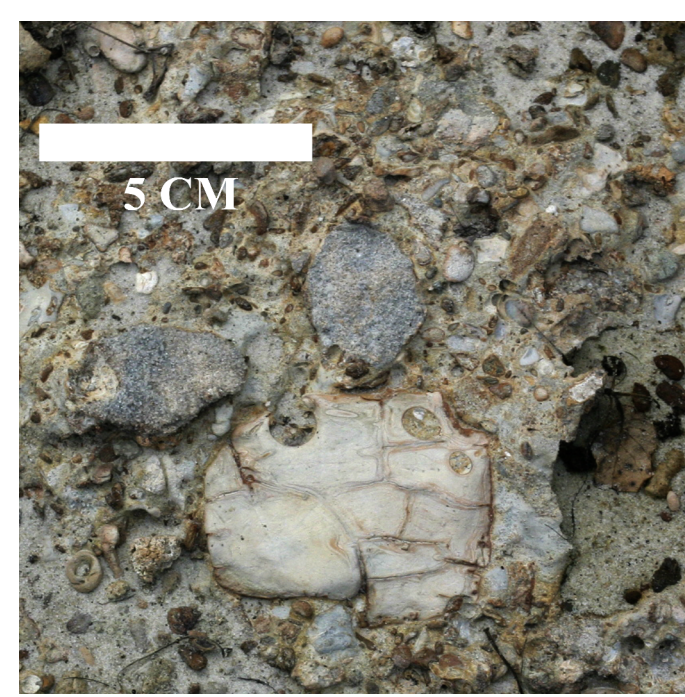


Photo 2. Close-up of Hawthorn Group ledge exposed at water level. Water Level of 51.02' reported at U.S.G.S. Gage Station, White Springs, FL., May 9, 2006.
Located at: T. 01 N, R. 16 E, S. 36
Photo by Richard C. Green



Photo 3. STATEMAP Crew at Big Shoals, Suwannee River. Water Level of 51.02' Reported at U.S.G.S. Gage Station, White Springs, FL., May 9, 2006.
Back row(L-R): S. Petrushak, D. Paul, & R. Green.
Front row(L-R): T. Greenhalgh, J. Balsillie, & J. Bryan.
Photo by Richard C. Green



Photo 4. William L. Evans III examines Suwannee Limestone exposure.
Located at: T. 04 S, R. 16 E, S. 27
Photo by Richard C. Green

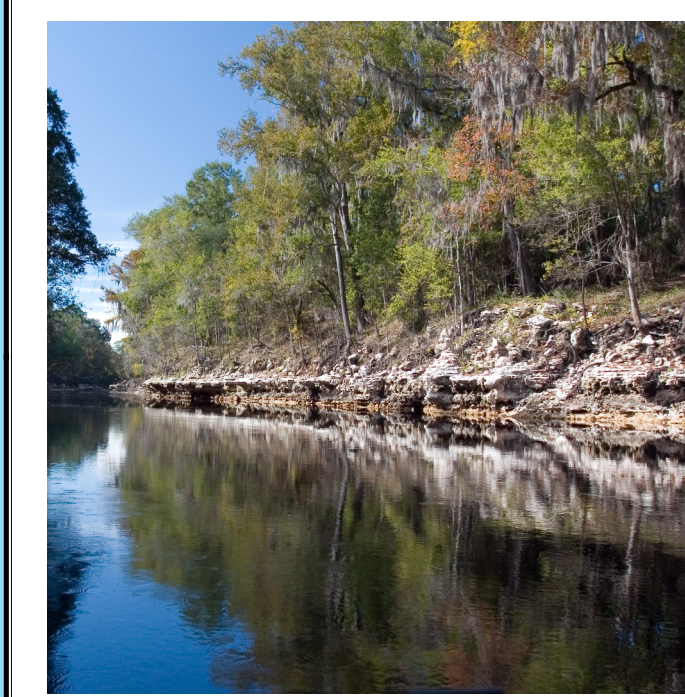


Photo 5. Exposure of Suwannee Limestone along Suwannee River; Water Level of 51.79' reported at U.S.G.S. Gage Station, White Springs, FL., Nov. 17, 2005.
Located at: T. 01 S, R. 14 E, S. 17
Photo by Richard C. Green

OPEN-FILE MAP SERIES NO. 97-01

GEOLOGIC MAP OF THE WESTERN PORTION OF THE U.S.G.S. 1:100,000 SCALE LAKE CITY QUADRANGLE, NORTHERN FLORIDA

2006

BY

RICHARD C. GREEN, P.G. #1776, DAVID T. PAUL, WILLIAM L. EVANS III, P.G., THOMAS M. SCOTT, P.G., AND STEVEN B. PETRUSHAK

LEGEND FOR GEOLOGIC MAP

Quaternary
Holocene
Pleistocene
Pliocene
Neogene
Miocene
Paleogene
Eocene

Quaternary Beach Ridge and Dune
Sediments exhibiting discernable beach ridges and dunes have been mapped separately from Undifferentiated Quaternary Sediments. These sediments consist of unconsolidated light gray to tan, moderately to well sorted, fine to medium quartz sand with a variable percentage of organic material.

Undifferentiated Quaternary Sediments
Light brown to tan, medium to fine quartz sand with variable admixtures of clay and organics, unconsolidated to poorly indurated, poorly to moderately sorted. This unit may contain significant amounts of clay and organics.

Undifferentiated Neogene / Quaternary Sediments
White to gray to orange to blue-green, fine to coarse grained, unconsolidated to poorly consolidated, poorly to moderately sorted, clean to clayey unconsolidated sands, sandy clays and clays with variable admixtures of organics. Undifferentiated Neogene/Quaternary sediments are siliciclastics that are separated from the Undifferentiated Quaternary Sediments solely on the basis of elevation (Scott, 2001). Pleistocene sea levels reached a maximum of approximately 100 feet (30.5 meters) above MSL (Colquhoun, 1969). These sediments are predominantly older than Pleistocene but include sediments worked during the Pleistocene. This unit may include fluvial and aeolian deposits.

Hawthorn Group**Stateville Formation of the Hawthorn Group**

Interbedded quartz sands, clays and dolostones, poorly to moderately indurated, poorly to moderately sorted. Phosphate grains are common to abundant in the unit. The unit is lithologically variable and beds may pinch out or interfinger both laterally and vertically. Outcrops of the unit in the study area are thin-bedded, and often cross-bedded, generally consisting of thinly interbedded beds of dolostone and clay alternating with beds of sand. This thin-bedded nature of the Stateville Formation is quite distinct in outcrops as seen along much of the Suwannee River in the northern portion of the study area.

Coosawatchie Formation of the Hawthorn Group

Poorly to moderately indurated, poorly to moderately sorted, gray to bluish-gray sandy clay or clayey and with phosphate grains, limestone, and dolostone. Lenses of relatively pure quartz sands, clays, or carbonate are not uncommon. This unit is lithologically variable and units may pinch out or interfinger both laterally and vertically. Outcrops of Coosawatchie Formation in the study area are typically very weathered and the lithology consists of reddish-brown to white, clayey, calcareous quartz sands to sandy clays with leached phosphate grains and limonitic and calcareous pebbles.

Suwannee Limestone

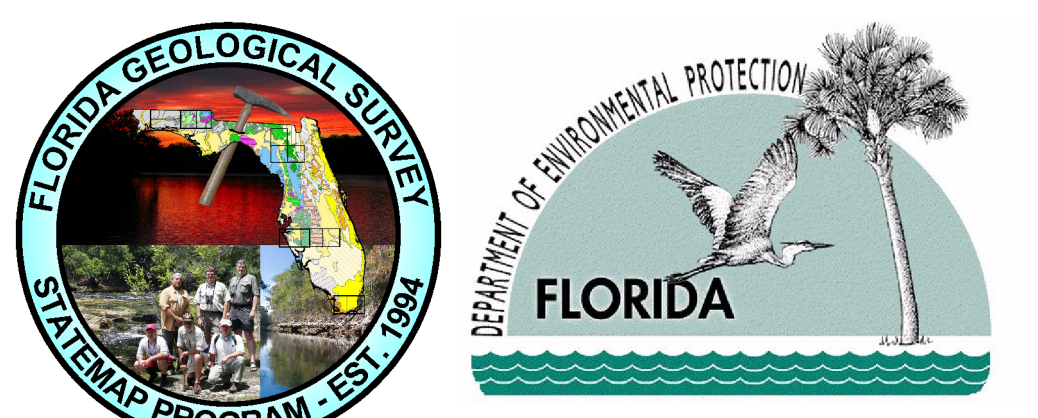
Cream to tan, crystalline, poorly to well indurated, poorly to well sorted, vuggy and muddy carbonate (grainstone to packstone) containing echinoids (such as *Rhyncholampas gouldii*), gastropods and pelecypods, as well as abundant benthic foraminifera. This unit is variably dolomitized, and the dolomite may be interbedded with limestone beds. Chert nodules may be present.

Ocala Limestone

White to cream-colored, fine to coarse grained, poorly to well indurated, poorly to well sorted, fossiliferous limestone (wackestone, packstone, and grainstone); may also include chert nodules. Lower Ocala may be dolomitized. Fossils include foraminifera (such as *Lepidocyclina* sp., *Heterostegina ocala*, and mollusks), bryozoans, mollusks, echinoids, corals, and algae.

This map was created using FDEP databases and data obtained from the Florida Geological Survey. It was completed August 31, 2006, by the Florida Department of Environmental Protection, Division of Resource Assessment & Management, Florida Geological Survey, Geological Investigations Section. This document was prepared for the presentation of the geologic information shown and is not intended to replace site-specific or use-specific investigations. The Florida Geological Survey does not guarantee this document to be free from errors or inaccuracies and disclaims any responsibility or liability for inappropriate change of scale or interpretations or decisions based thereon. Cooperatively funded by the Florida Geological Survey and the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under U.S.G.S. assistance award number 05-HQ-PA-0083. The views and conclusions in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

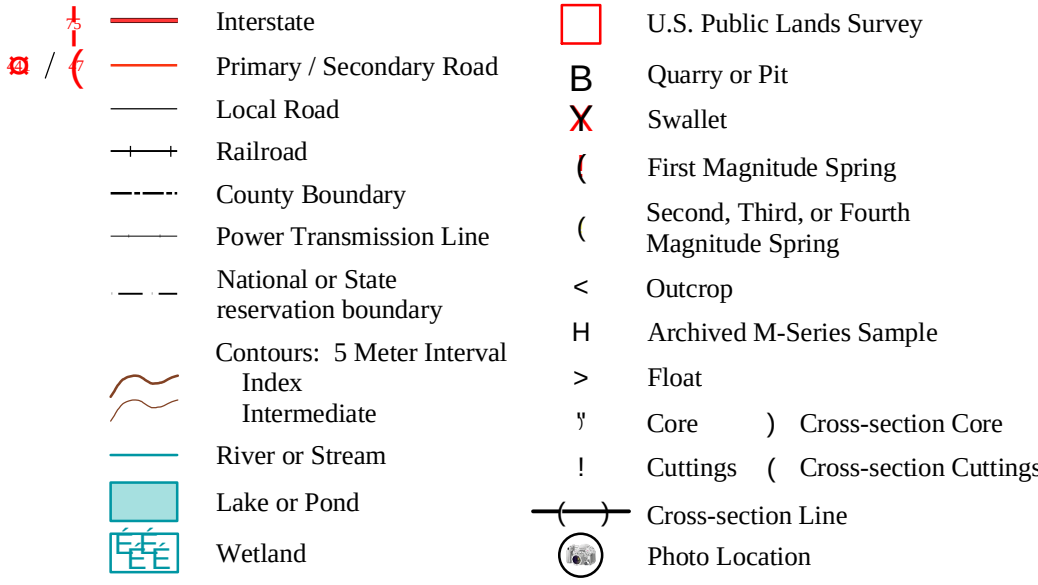
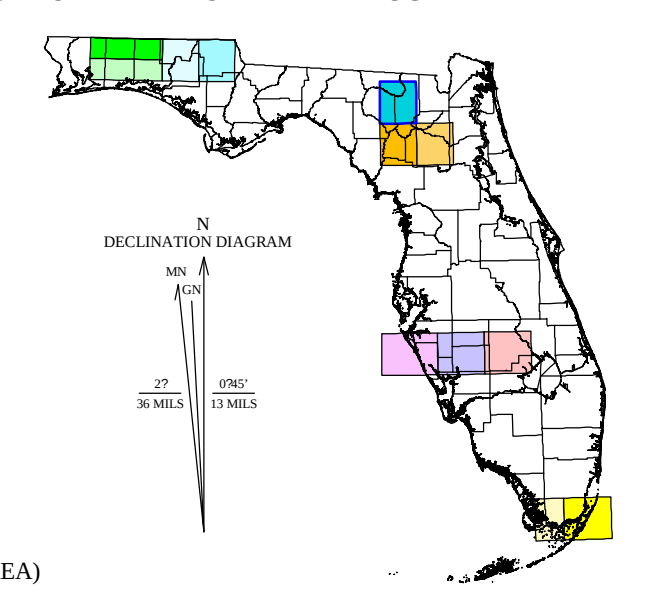
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Tallahassee, FL 32304-7700
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Walter Schmidt
State Geologist and Chief

Colleen M. Castille, Secretary

FLORIDA GEOLOGICAL SURVEY OPEN-FILE MAP SERIES
(O.F.M.S.) PRODUCED UNDER THE STATEMAP PROGRAM



Projection: FDEP Albers HARN North American Datum 1983 (NAD83)
Basemap: Georeferenced TIFF of U.S.G.S. 1:100,000-scale metric topographic map of Lake City, Florida

Geologic Discussion

The near surface geology of the western portion of the U.S.G.S. 1:100,000 scale Lake City quadrangle is composed of a complex mixture of carbonate and siliciclastic sediments ranging in age from Eocene to Holocene. 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 western portion of the Lake City quadrangle is located within the Suwannee River basin. In this area, the Suwannee River and its tributaries contain numerous documented springs, including one first magnitude spring (Troy Spring, in the southwestern corner of the study area). 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 shown 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 Florida's aquifer systems to contamination.

Several structural, sedimentological and geomorphic variables have affected the geology of the region. The Peninsular Arch, a structurally high area which affected deposition from the early Cenozoic through the Oligocene (Williams et al., 1977; Miller, 1986; Randazzo and Jones, ed., 1997), is the dominant subsurface feature in the Florida peninsula (Applin, 1951). The axis of the Peninsular Arch extends from southeastern Georgia to the vicinity of Lake Okechobee in south Florida in a general northeast to south-central 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 northeast 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).

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 composition.

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, 1988). Post-Miocene erosion, however, has removed sediments of the Hawthorn Group from much of the crest of the Ocala Platform, exposing Eocene and Oligocene carbonates (Cooke, 1945; Pirkle, 1956; Espenshade and Spencer, 1963; Brooks, 1966; and Scott, 1981). This is evident in the southwestern portion of the map area. Undifferentiated sediments have subsequently been deposited on the exposed Eocene carbonates. These consist of residual clays, sands, and aeolian sands deposited during the Pliocene to Holocene (Randazzo and Jones, ed., 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 large angles in a northeast-southwest trend (Vernon, 1951). Orientation of stream meanders along the Suwannee River demonstrates 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 two marine terraces within the study area: the Vicummi terrace at elevations of 70 to 100 feet (21.3 to 30.5 meters) above mean sea level (MSL) and the Sunderland/Okefenokee terrace at elevations between 100 and 170 feet (30.5 and 51.8 meters) above MSL. 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 Mason and Sanford (1913), Cooke (1931, 1939), Flinn (1940, 1971), MacNeil (1950), Alt and Brooks (1965), Pirkle et al. (1970), and Healy (1975).

According to Scott (in preparation), the study area falls within two geomorphic provinces - the Ocala Karst District and the Okefenokee Basin District (Plate 2, Figure 1). 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. Carbonate sediments ranging from the Middle Eocene Avon Park Formation of the Oligocene Suwannee Limestone lie at or near the land surface within this province.

The Ocala Karst District is dominated by dissolution sinkholes and shallow, bowl-shaped depressions, producing a rolling topography. Generally, a variably permeable siliciclastic cover allowed downward percolating groundwater to slowly dissolve the underlying limestone, leading to cover-collapse sinkholes and cover-subsidence features. Cover-collapse sinkholes form either 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.

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. 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. White (1970) referred to the portion of the Ocala Karst District within the study area as the Gulf Coastal Lowlands.

The Okefenokee Basin District is recognized based on topography, drainage characteristics and the general lack of karst features. The Lake City Ridge subdivides the district into northern and southern basins. 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. Where the Okefenokee Basin District makes the transition to the Ocala Karst District, the land becomes well drained and has more relief. The basin extends into Florida from Georgia and is recognized from Baker, Hamilton, and Columbia Counties on the north, southwards into northern Alachua County. Trail Ridge lies along the eastern boundary of the Okefenokee Basin. White (1970) referred to this district as a portion of the Northern Highlands.

Elevations vary within the district from approximately 100 feet (30.5 meters) to more than 190 feet (57.9 meters) above MSL, where the Suwannee River occurs within the district, elevations along the river may be less than 50 feet (15.2 meters). Miocene Hawthorn Group (Nh) sediments to Plio-Pleistocene siliciclastics underlie the district. The Stateville Formation of the Hawthorn Group (Nh) occurs at or near the surface in the western portion of the district. Undifferentiated Plio-Pleistocene siliciclastics (NQn) underlie the eastern portion of the district and form the Lake City Ridge.

The study area has been subdivided topographically into five regional physiographic units: 1) the Branford Karst Plain, 2) the Alachua Karst Hills, 3) the Lake City Ridge, 4) the Northern Okefenokee Basin, and 5) the Southern Okefenokee Basin. The first two physiographic units are part of the Ocala Karst District, while the last three units are part of the Okefenokee Basin District (Plate 2, Figure 1) (Scott, in preparation).

The Branford Karst Plain, located in the southern to southwestern and northwestern portion of the map area (Plate 2, Figure 1), extends south to the Santa Fe River on the Gilchrist County line (Scott, in preparation; Evans, et al., 2004). In the northwestern area, the Branford Karst Plain occupies the Suwannee River Valley. The elevations range from less than 25 feet (7.6 meters) above MSL along the Suwannee River to more than 100 feet (30.5 meters) above MSL. The Upper Eocene Ocala Limestone is near the surface in southern and southwestern part of the map area along with silicified float boulders, remnants of the Lower Oligocene Suwannee Limestone. The Suwannee Limestone is exposed or near the land surface in the Suwannee River valley.

Within the map area, the Alachua Karst Hills extend from Columbia County to central Suwannee County with elevations from approximately 55 feet (16.8 meters) to over 200 feet (61.0 meters) above MSL (Scott, in preparation). The karst hills are well drained and formed in response to karstification of uplands covered by Hawthorn Group and undifferentiated sediments.

The Lake City Ridge, present along the eastern boundary of the map area, separates the Okefenokee Basin District into northern and southern segments. It appears to be a barrier island or spit and is truncated by, and therefore older than, Trail Ridge (Pirkle and Pirkle, 1964). It is composed of undifferentiated Plio-Pleistocene siliciclastic sediments. Elevations of the Lake City Ridge range from 150 to 200 feet (45.7 to 61.0 meters) above MSL. Sinkholes are present only on the western portion of the ridge in the transition zone with the Alachua Karst Hills of the Ocala Karst District.

The Northern Okefenokee Basin lies to the north of the Lake City Ridge, the Alachua Karst Hills and the Branford Karst Plain. Northeast of the study area, the Okefenokee Swamp occupies much of the northern portion of the Okefenokee Basin 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. Elevations of the basin range from less than 50 feet (15.2 meters) along the Suwannee River to more than 150 feet (45.7 meters) above MSL on some of the hills. 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 Stateville Formation of the Hawthorn Group (Nh) is at the surface in the western part of the basin (the northern portion of the map area). Karst features are uncommon throughout most of the basin. Karst features occur primarily in the transition zone with the Ocala Karst District where the Hawthorn Group is thin and breached by sinkholes.

The Southern Okefenokee Basin lies to the south of the Lake City Ridge along the southeastern corner of the map area.

area. Relief is more pronounced in the southern basin with well-drained, low hills with intervening swampy lowlands. Elevations in the basin range from less than 75 feet (22.9 meters) near Okeefe Creek to more than 100 feet (48.8 meters) above MSL on some of the hills. There are a series of erosional dissected ridges (paleo-barrier islands) which mimic the shape of the Lake City Ridge east of the map area in the Southern Okefenokee Basin. The basin is underlain by the Coosawatchie Formation of the Hawthorn Group (Nh) and undifferentiated Plio-Pleistocene siliciclastics (NQn). The swampy nature of the low-lying area is due to the low permeability of the Hawthorn Group sediments. Karst features are present in the transition zones with the Ocala Karst District and the Central Lakes District.

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 or undifferentiated Neogene/Quaternary sediments (NQn) 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. Following conventions by the International Commission on Stratigraphy (<http://www.stratigraphy.org>), sediments formerly assigned to the Tertiary Era (T) on prior maps are now referred to as either Paleogene (P) or Neogene (N) units here.

The Upper Eocene Ocala Limestone (Ps), first described by Dall and Harris (1892), is the oldest unit encountered in the present study. It is a biogenic marine limestone comprised largely of foraminifera, mollusks, echinoids and bryozoans. Based on lithological differences it can be informally subdivided into an upper and lower unit (Scott et al., 1991). This subdivision, while often apparent in cores and quarries, is difficult to ascertain in cuttings. As a consequence of this, the geologic unit does not break out the upper and lower Ocala Limestone.

The upper unit is typically white to cream, fine to coarse-grained, poorly to well-indurated, poorly sorted, very fossiliferous limestone (wackestone, packstone, and grainstone). Fossils commonly include large foraminifera, 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 mollusks, smaller foraminifera, bryozoans, algae, mollusks, and echinoids. Portions of the upper Ocala Limestone have been locally replaced by silica upon erosion large boulders may remain as residual float. Chert is often seen in fractures and joints in caves and within quarries. The most likely source of silica is from weathering of the Hawthorn Group sediments (Williams et al., 1977). 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 (Alshuler et al., 1963; Mitchell, 1965; and Asseff, 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.

The top of the Ocala Limestone, which is often karstified, ranges from 65 feet (19.8 meters) above MSL in W-13195 (cross section D-D') to 180 feet (57.3 meters) below MSL in W-15923 (cross section A-A' and F-F'). The complete thickness of the Ocala Limestone was not penetrated in wells for the cross sections in this study. The Ocala Limestone is unconformably overlain by the Suwannee Limestone in the northern and western portions of the study area, by the Coosawatchie Formation of the Hawthorn Group (Nh) in the southeastern portion of the study area, and undifferentiated Quaternary sediments (Qu) in the southern and western portions of the study area.

The Oligocene Suwannee Limestone (Ps) named by Cooke and Mansfield (1936) for exposures of limestone along the Suwannee River from White Springs to Ellaville (see Photo 5, below left) unconformably overlies the Ocala Limestone throughout much of the study area. The Suwannee Limestone is primarily a 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 are commonly found in the south-central portion of the study area, indicating that it once covered much of the southern portion of the map area.

The top of the Suwannee Limestone ranges from 115 feet (35.1 meters) above MSL in W-11733 (cross section B-B') and surface exposures in the vicinity of Live Oak, Florida to 135 feet (41.1 meters) below MSL in W-11923 (cross sections A-A' and F-F'). The Suwannee Limestone ranges in thickness from less than 10 feet (3.1 meters) in W-1829 (cross section B-B') to 180 feet (54.9 meters) in W-11733 (cross section B-B'). The unit is unconformably overlain by sediments of the Miocene Hawthorn Group (Nh) in the northern portion of the map area. Evidence from cuttings and field data indicates that isolated remnants of the Suwannee Limestone may occur throughout the southern portion of the map area (see W-13301; cross section F-F').

Within the map area, the Miocene Hawthorn Group (Nh) is composed of the Coosawatchie Formation (Nh), the Stateville Formation (Nh), the Marks Head Formation (Nh), and the Penny Farms Formation (Nh). Only the Coosawatchie Formation (Nh) and the Stateville Formation (Nh) are mappable in the study area. The Marks Head Formation (Nh) and the Penny Farms Formation (Nh) are only identifiable in the subsurface and in limited exposures along the Suwannee River (not mappable at this scale). See Scott (1980) for a more complete discussion of the Hawthorn Group. Differentiation of these formations, while often apparent in cores, quarries, and outcrops, is difficult to ascertain in cuttings. As a consequence of this, the geologic cross sections depict undifferentiated Hawthorn Group (Nh).

Hawthorn Group sediments are encountered throughout most of the study area, where they unconformably overlie either the Ocala Limestone or the Suwannee Limestone. Sediments of the Hawthorn Group are brought 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; Pirkle, 1956; Espenshade and Spencer, 1963; Brooks, 1966; and Scott, 1981). Fossils in the Hawthorn Group are sparse but include vertebrate remains, corals, and mollusks. Williams et al. (1977) reports that the most commonly found fossils are oysters and coral heads. Silicified coral heads were commonly observed in hill exposures and stream beds in the northwestern portion of the map area during field work.

The Coosawatchie Formation of the Hawthorn Group (Nh) is present in the southeastern portion of the map area, and consists of poorly indurated gray to bluish-gray sandy clay or clayey sand with phosphate grains, and calcite to dolomitic carbonates. Lenses of relatively pure quartz sands, clays or limestone are not uncommon. This unit is lithologically variable and beds may pinch out or interfinger both laterally and vertically. Outcrops of the Coosawatchie Formation in the study area are typically very weathered and consist of reddish-brown to white, clayey, calcareous quartz sands to sandy clays with leached phosphate grains and limonitic and calcareous pebbles. The top of the Coosawatchie Formation ranges from 175 feet (53.3 meters) above MSL in exposures in hills southeast of Lake City, to less than 100 feet (30.5 meters) in the vicinity of Olussee Creek. The Coosawatchie Formation ranges up to 150 feet (45.7 meters) thick in wells in the southeastern corner of the map area.

The Stateville Formation (Nh) conformably overlies and interfingers with the Coosawatchie Formation (Nh) in the map area. The contact is recognized by the occurrence of less carbonate and more phosphate in the Stateville Formation, as well as the thin bedded nature of the Stateville Formation (Scott, 1988). The transition from the Coosawatchie Formation to the Stateville Formation is present in the southeastern portion of the map area in the vicinity of Lake City. The Stateville 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 or interfinger both laterally and vertically. Outcrops of the Stateville 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. This thin-bedded nature of the Stateville Formation is quite distinct in outcrops as seen along much of the Suwannee River in the map area north and east of White Springs (see Photo 1, left).

The top of the Stateville Formation ranges from 175 feet (53.3 meters) in exposures in hills south of Live Oak to less than 50 feet (15.2 meters) along parts of the Suwannee River. The Stateville Formation ranges up to 247 feet (75.3 meters) in thickness in the northeastern portion of the map area (W-15948; cross section A-A' and F-F').

The Hawthorn Group is unconformably overlain by undifferentiated Neogene/Quaternary sediments (NQn) in several parts of the map area. These sediments are white to gray to orange to blue green, fine to coarse grained, unconsolidated to poorly consolidated, clean to clayey unconsolidated sands, sandy clays, and clays with variable admixtures of organics. These sediments are siliciclastics which are separated from the Undifferentiated Quaternary Sediments (Qu) solely on the basis of elevation (Scott, 2001). Pleistocene sea levels reached a maximum of approximately 100 feet (30.5 meters) above MSL (Colquhoun, 1969). These sediments, which may include fluvial and aeolian deposits, are predominantly older than Pleistocene but include sediments worked during the Pleistocene.

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 present in a band along the southwestern portion of the map area.

Undifferentiated Quaternary sediments (Qu) lie unconformably on either the Eocene Ocala Limestone (Ps), the Oligocene Suwannee Limestone (Ps), the Coosawatchie Formation of the Hawthorn Group (Nh), or the Stateville Formation of the Hawthorn Group (Nh), throughout the southern portion of the study area. These sediments generally consist of sandy clays and clayey sands, aeolian dune sands, and often include weathered and silicified boulders of the Ocala Limestone and Suwannee Limestone.