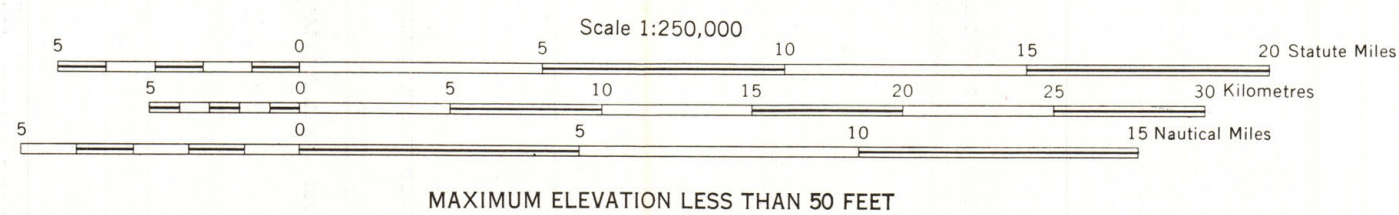




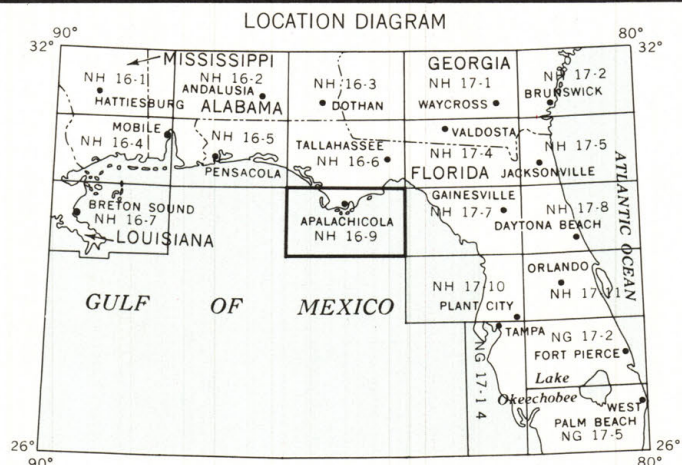
Each area outlined on this map may consist of more than one kind of sub-surface sediment. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

DEPARTMENT OF NATURAL RESOURCES
BUREAU OF GEOLOGY
This public document was promulgated at a total cost of \$2,776.95 or a per copy cost of \$1.11 for the purpose of disseminating geologic data.

- EXPLANATION**
- Med.-Fine Sand and Silt
 - Clayey Sand
 - Shelly Sand and Clay
 - Limestone
 - Dolomite



ENVIRONMENTAL GEOLOGY SERIES
APALACHICOLA SHEET



SECTIONIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

GRID ZONE DESIGNATION: 18R

300,000 M. SQUARE IDENTIFICATION

EJ	FJ	GJ	380
EH	FH	GH	
60	70		

TO GIVE A STANDARD REFERENCE ON THIS SHEET TO NEAREST 1000 METRES

SAMPLE POINT: EASTPOINT

1. Read letters identifying 100,000 metre square in which the point lies.
2. Locate first VERTICAL line to LEFT of point and read LARGE figure showing the line within the top or bottom margin, or on the line itself.
3. Locate first HORIZONTAL line below point and read LARGE figure showing the line within the left or right margin, or on the line itself.
4. Estimate meters from grid line to point. Estimate meters from grid line to point.

SAMPLE REFERENCE: 3210000

18R09091

APALACHICOLA, FLORIDA
1957
REVISED 1975

ENVIRONMENTAL GEOLOGY SERIES

APALACHICOLA SHEET

By
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FLORIDA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF RESOURCE MANAGEMENT
BUREAU OF GEOLOGY
Tallahassee
1978

INTRODUCTION

Development of guidelines for wise management of Florida's natural resources depends upon a good working knowledge of the State's geology as it relates to man's environmental problems. Management decisions must be based upon adequate geologic data for such fields as waste disposal, water resources management, land management, highway construction, geologic hazards, soils mapping, mining and reclamation. Environmental geologic maps provide the basic data needed for the creation and execution of sound programs in the above-mentioned fields. It is hoped that this map will not only serve the purpose for which it is intended, but will also serve as a base map for future presentation of geologically related data of a more specialized or local nature. The ultimate purpose of the State's environmental geology mapping program is to insure development of Florida's natural resources with the least possible environmental damage.

This map presents geologic data in such a way that it can be understood by persons not specially trained in the science of geology. Common rock types are shown as they occur from just below the soil zone to depths of expected use for most purposes. Mapping involved aerial photographic and topographic interpretation and field work (visiting quarries, borrow pits, canals, road cuts and other rock exposures) to provide the necessary data points. Use was also made of all published and unpublished data in the files of the Florida Bureau of Geology plus published reports of the U. S. Geological Survey and the U. S. Soil Conservation Service.

APALACHICOLA REGIONAL INTRODUCTION

Setting—The sediments in the Apalachicola Delta area plunge and thicken toward the west. These near-surface deposits consist of Miocene (25 million to 7 million years ago) limestones and clayey sands, and younger clay, sand and shell beds that were deposited during ancient sea level fluctuations.

The region has little surface relief, because most of the higher clayey sand hills and prehistoric dunes have been eroded down and re-worked by numerous fluvial and coastal processes throughout time.

Location and Extent—The Apalachicola Sheet only has three counties within its bounds, Franklin County, the southern two-thirds of Gulf County and the southeast corner of Bay County. North to south, the area measures about 15 miles (24 kilometers), east to west about 55 miles (88 kilometers). The area is bounded to the east, west and south by the Gulf of Mexico and to the north by Wakulla, Liberty and northern Gulf counties.

Gulf and Franklin counties total 1801 square miles (about 2862 square kilometers) although the northern part of Gulf County does not appear on this map.

Population and Development—The area covered by this map averages 16 people per square mile and is one of the most sparsely populated areas in Florida. Both Gulf and Franklin counties are growing slowly, with most major development occurring in the towns of Apalachicola and Carrabelle in Franklin County, and Port St. Joe in Gulf County.

Apalachicola was once the second largest American port on the Gulf until it was bombarded by Federal gunboats in the Civil War. It has since grown and along with Carrabelle and Port St. Joe, account for about 75% of the oyster landings in the State of Florida. These towns are noted principally for their fish production and other seafood, however, the timber industry and small amounts of farming and cattle raising also contribute to the local economy.

Transportation—There are no major interstate highways in the area; although, there are numerous state primary roads. The major east-west route is U. S. Highway 98 which runs along the coast. North-south roads in Franklin County include Route 67 and Route 65. In Gulf County, the major north-south roads include Route 30 and Route 71. Numerous county and other graded roads cross-cross the area. There are, however, areas of relatively little access, such as Tate's Hell Swamp in Franklin County and the Indian Swamp region in Gulf County.

The major towns have commercial bus line service and the City of Apalachicola also has a municipal airport. A small air strip also exists in Carrabelle. One railroad serves the area, the Apalachicola Northern Railroad, which runs north-south into Apalachicola and extends west to the town of Port St. Joe.

Climate—The climate for the three-county area is mild and humid with long warm summers and mild winters. The annual average temperature is 69 degrees F. (20 degrees C) with an average high of 82 degrees F. (28 degrees C.) in July and an average low of 54 degrees F. (12 degrees C.) in January. The wettest months are July, August and September, when thunder-showers of high intensity with as much as 3 or 4 inches of rainfall during a one-hour period blow in from the Gulf of Mexico. Occasional tropical storms and hurricanes threaten the area from the south.

GEOLOGY

The near-surface deposits of the Apalachicola area include Upper Miocene limestones, clayey sands and shell beds of the Choctawhatchee Stage, younger (Pliocene to Recent) clayey sands, and fine sands and silts, associated with ancient stream alluvium and ancient shoreline development.

Limestone is only visible at two locations, both of which are in north-central Franklin County (see outcrops of interest for locations). The limestone observed at these localities is an abundant fossiliferous rock composed of mollusk shells, foraminifera tests and numerous other fossil remains. The limestone is present throughout the entire map area at depth; however, it is only close to the surface within the eastern one-third of the map area. These sediments consist of sandy and slightly clayey limestone, and poorly indurated limestone (calcarene) and they are not as thickly bedded as are the deeper limestones. Numerous discontinuous beds of shells, clays and sands can be seen within the limestone unit. These small beds are not reflected in the cross sections because they are too small to warrant recognition on this scale.

The depth at which this limestone is first encountered is reflected by the structure contour map on the first limestone. This map also reflects the regional trend followed by this surface. It can be inferred from this map, by noting the thickening of the overlying sediments, that the depositional center, or the thickest accumulation of sediments, was to the southwest. Schnable (1966) has reported the possibility of tilting or subsidence being responsible for the structural trend observed in this area.

Dolomite is found near the surface at only one location. This occurs at the Florida State University Marine Laboratory just west of Turkey Point in Franklin County. Here a very sandy dolomite with numerous mollusk molds and casts can be seen forming a shallow groin near the marina. This material has been dredged from the dock area a short distance away.

The sediments overlying the limestone sequence are variable depending on their location, as shown on the cross sections. Commonly occurring near the coast is a shell bed composed of numerous pelecypods and gastropods contained in a sand and clayey sand matrix. This shell bed is continuous along the coast varying in depth from 20 feet (6 meters) near the Alligator Point area to as deep as 65 feet (19.5 meters) near Cape San Blas. A considerable amount of leaching has apparently taken place within this unit. Evidence of this manifests itself as rounded and solutioned shell fragments, partially dissolved microfossils, and the lack of any delicate calcareous tests of foraminifera and ostracods.

Near St. Vincent Sound another shell bed is present at the surface. This bed probably is not an extension of the deeper shell beds, but a separation deposit. This shell bed shows up on the map as a small area that parallels the coast and runs west along the St. Joe Bay coast.

Shell beds are also present throughout St. Joe Spit under the fine sand lithology and in the western end of the map area in Gulf and Bay counties. The sand overlying the shell beds varies between 15 and 20 feet (4.5 to 6 meters) thick. Other shell beds, probably of the same origin, exist under St. George Island, again under 10 to 20 feet (3 to 6 meters) of fine sands. Holocene coastal environments are probably responsible for these deposits.

A gravel and coarse sand unit is present immediately over the limestone and occurs downwind in the vicinity of St. Vincent Sound. As depicted on cross section B-B', this unit averages 100 feet (30 meters) thick and plunges to the southwest, as does the limestone. This lithology consists of gravel-size quartz fragments and coarse to medium size quartz sand. In addition, a matrix of clay, silt, mica and heavy minerals is present in varying amounts.

The two remaining lithic units, a clayey sand lithology and a medium to fine sand and silt lithology, dominate the surface of the environmental geologic map.

The clayey sand lithology found across the northern part of the map area consists predominantly of medium to fine grained quartz sand. Other sediments of secondary importance are clay, silt, heavy minerals, mica and organic debris.

The medium-fine sand lithology is predominantly fine grained quartz sand and silt. This unit, as well as the clayey sand unit, probably has its origin from Holocene sea level fluctuations and fluvial deposition. These processes reworked and winnowed the existing sediments leaving the predominantly clean sands behind.

Also present as small localized deposits are discontinuous peat beds. These beds are not large enough to show on this map scale, but, they warrant mention because of their potential hazard to construction. These deposits cover an area of only a few hundred square yards, are usually 5 to 15 feet (1.5 to 4.5 meters) deep, and consist of organic debris and clayey sand. The compressible nature of these deposits render them unreliable for support of heavy structures. Since the peat is usually not visible at the surface, being covered with sand, shallow foundation tests would be required to identify their areal extent.

In addition to the peat deposits, there are one-foot to three-foot (1/3 to 1 meter) thick beds of humate along the coast. Humate occurs generally as dark brown to black, firmly cemented sand, in an asphalt-like pavement along the shores of the Apalachicola Bay and St. Joseph Bay. This material is of late Pleistocene or Recent Age (1.5 million years ago to present) and probably formed in an ancient swamp when sea level was a few feet higher than at present.

PHYSIOGRAPHY

The Apalachicola Sheet falls in its entirety within the Gulf Coastal Lowlands Physiographic Province. There are, however, numerous small geomorphic features that have been named by Purf and Vernon (1964). They are the Gulf Barrier Chain, the Gulf Coastal Lagoon, Relfer Bars and Spits, and the Interleaved Swamps and Bays.

The Coastal Lowlands are low in elevation and generally poorly drained. Its common features, such as interleave swamps and relict sand bars, are usually oriented coast parallel, indicating a close control of their shape and form by marine forces.

Elevations in southern Gulf and Franklin counties rarely exceed 25 feet (7.5 meters). These low-lying areas are an expression of ancient marine terraces; a marine terrace is a surface of erosion or deposition formed along a coast by wave action. These terraces, being former bottoms of shallow seas, are normally covered with deposits of sand, clay silt and shells and are bounded along their inner margin by such shoreline features as beach ridges, wave cuts scarps, and offshore and bay bars.

The terraces in this area fall into two categories based on elevation. The 140 foot (43 meters) level is called the Silver Bluff Terrace, and from 10-25 feet (3 to 7.5 meters) level is called the Pamlico Terrace. The terraces are reflections of sea level fluctuations during past interglacial ages.

The Silver Bluff Terrace has been tentatively correlated with a sea level that was 8-10 feet (2.4 to 3 meters) higher than present, occurring about 4,000 or 5,000 years ago. The Pamlico Terrace has been identified in other parts of Florida, but is much more subtle in this area. Its age is considered late Pleistocene (Cooke, 1945).

A large amount of the land area on this sheet is covered by swamp. This is a result of two major factors. First, the clayey sands contain a large amount of fine grained material (clay and silt) which retards the movement of water through the sediments. This creates low permeability and as a result water tends to collect on the surface. Second, the very low relief in this area makes it difficult for surface water to run off the land surface. Consequently, drainage systems are poorly defined and swampy conditions prevail.

There are other elevated areas that tend to parallel the present coast. These are relict sand bars and they tend to be more sandy than the surrounding area. Brenneman (1957) studied two of these sand bodies and concluded that they may represent barrier islands in a very immature stage of development.

Surface drainage occurs through slow moving, meandering rivers and streams originating from the flat swamp areas. The major river in the area, the Apalachicola River, empties into the Apalachicola Bay, which in turn empties into the Gulf of Mexico. The Apalachicola Delta is a good example of an arcuate type delta; a type of delta that deposits sediments in its mouth blocking further passage and forcing new channels to be broken through elsewhere. The delta area of Franklin County also is very swampy and marshy.

Along the Gulf of Mexico, existing chain a barrier island chain are Peninsula Point, Dog Island, St. George Island, St. Vincent Island and St. Joseph Spit. St. George Island is connected to the mainland by Route 61A, which makes the island a favorite summer beach attraction to tourists. Peninsula Point and St. Joseph Spit are connected to the mainland with easy access. The State of Florida has a state park on St. Joseph Spit, the T. H. Stone Memorial State Park, where campers and bathers may enjoy the white sand beaches and striking dunes.

The soils of the Gulf Coastal Lowlands can be divided into two general types. The soils in the poorly drained interior area are sands and loamy sands and are often acid. The land is level with many ponds and swamps and consists mostly of flatwoods and grasslands. Potatoes, strawberries, vegetables and flowers grow well on drained lands. The better drained belts along the coast and in the higher locations inland consist of medium and fine sands. It supports a growth of longleaf pine and scrub growth of spruce pine, evergreen oak and palmetto.

ECONOMIC GEOLOGY

The development of mineral commodities in the Apalachicola area has not been conducted on a large scale. The sparse population and relatively slow growth of the area dictate limited use of the mineral resources.

Clayey sand finds the most use in Franklin and Gulf counties, used mostly for road fill material. The sporadic need for road base materials provides an insufficient market for commercial mining, therefore, the supply for this use is county owned. In addition, this material is used locally for foundation fill for small buildings.

In northeast Franklin County, there are two private pits where lime rock is mined for road fill. For road base, this limestone tends to hold up much better than the sandy material, especially in low areas where wash-outs are common.

Development of limestone in this area for road fill or possibly agricultural use would depend on specific test results, however, any development that would occur would take place in this eastern area where the limestone is close to the surface. This can be seen on the structure contour map prepared on the top of the first limestone.

Peat exists in small localized beds near the surface at many random locations. Any potential use of these deposits would be dependent on investigations of specific tracts, not regional studies.

Heavy mineral deposits may exist along the coast spits and bars. The ability to mine them would depend on their concentration and their location.

GROUND WATER

Occurrence—A portion of the water that falls as rain percolates downward into the underlying permeable sediments. This water is called subsurface water, but only that which is in the zone of saturation (where all interstitial spaces are filled with water) is called ground water.

Aquifers and Aquicludes—The ground water reservoir system is made up of both aquifers and aquicludes. An aquifer is a lithologic unit (s) that is able to yield usable quantities of water to wells and through which water moves with relative ease. An aquiclude is a lithologic unit (s) of lower permeability than an aquifer which retards the movement of water and which will not readily yield water to wells.

The Floridan Aquifer serves most of the water needs of this area through wells. The Floridan consists of limestones and dolostones of the Tertiary System and contains a number of confined water bodies that act as one hydrologic unit. Going from the northeast near Ochlockonee Bay to Cape San Blas in the southwest, the top of the Floridan Aquifer dips from sea level to several hundred feet deep. The structure contour map on this sheet reflects this trend, although the surface depicted by the map does not represent the top of the Floridan Aquifer. Below this surface (on the map) are beds and lenses of sand, clay and shell overlying the well bedded massive limestones of the Aquifer.

With an average annual rainfall of over 58 inches (145 centimeters) there is considerable local recharge to the aquifer through overlying sand and clayey sand beds. This along with subsurface water migration from upland and surface water recharge, provides an abundant supply of water.

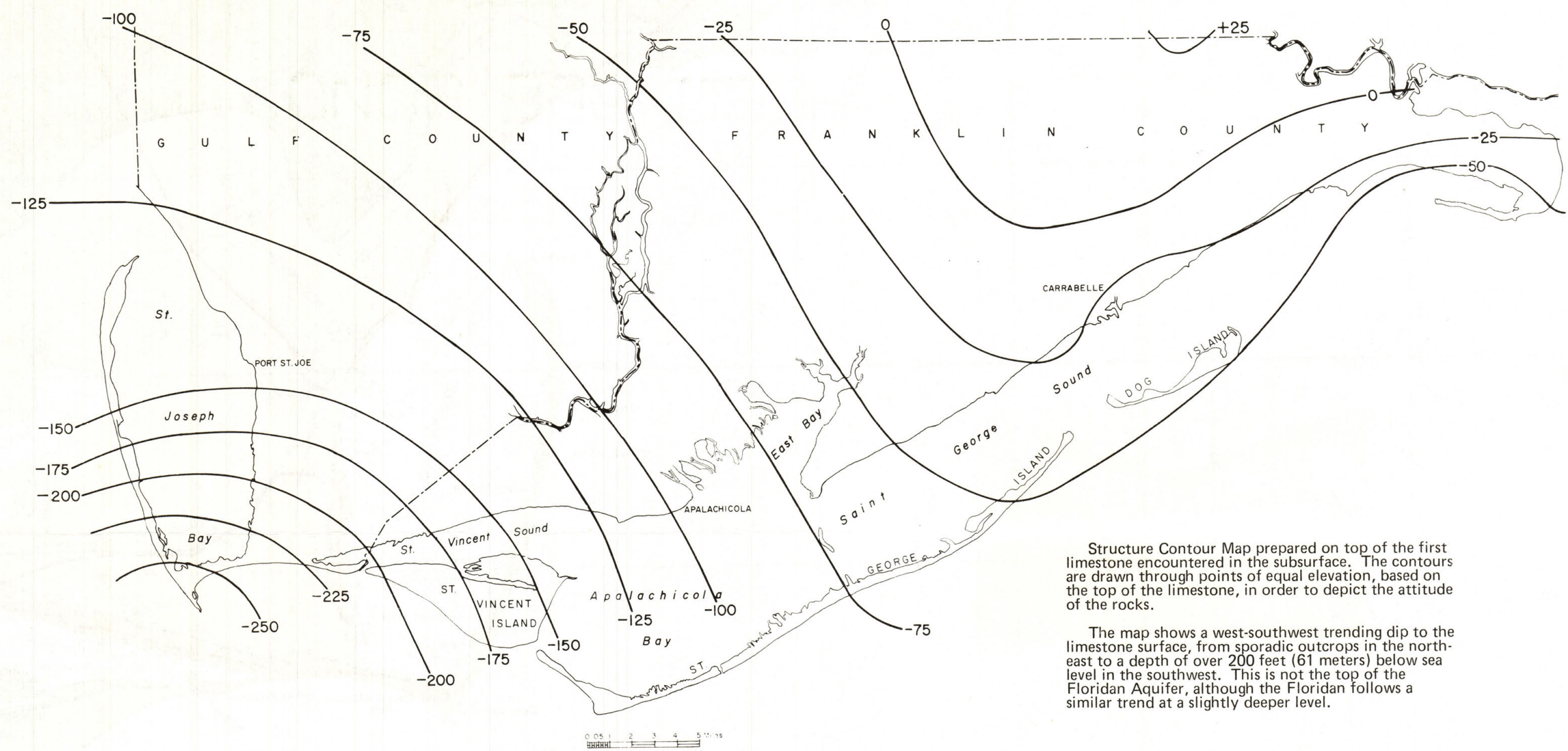
The sands, clays and gravels that lie over the limestone beds are a wedge-shaped deposit extending north and northeast into Liberty and Wakulla counties. These deposits thicken to the west from their thin outcrop along the eastern edge of the map. Small domestic supplies may be developed in this shallow unit, however, the volume and quality will be limited.

OUTCROPS OF INTEREST

1. Franklin County, Township 6 South, Range 3 West, Section 35, located at the Florida State University Marine Laboratory just west of Turkey Point. Here, forming a small groin (dredged from nearby), is a sandy dolomite with numerous fossil molds and casts of mollusk shells.
2. Franklin County, Township 6 South, Range 5 West, Section 34, northwest quarter. Here, just west of the dirt road, is a limestone pit owned by the Buckeye Cellulose Corporation. The material here consists of a hard calcarenite with abundant fossil remains.
3. Franklin County, Township 9 South, Range 9 West, Section 10, just off Route 30, is an old boat launch into St. Vincent Sound. Found at the water's edge is a two-foot (.6 meter) thick layer of black humate.
4. Gulf County, Township 6 South, Range II West, Section 3, northwest quarter. Where a small creek passes under Route 386, on the north side of the road, a good outcrop of the clayey sand lithology exists as a six-foot (1.8 meters) vertical exposure.

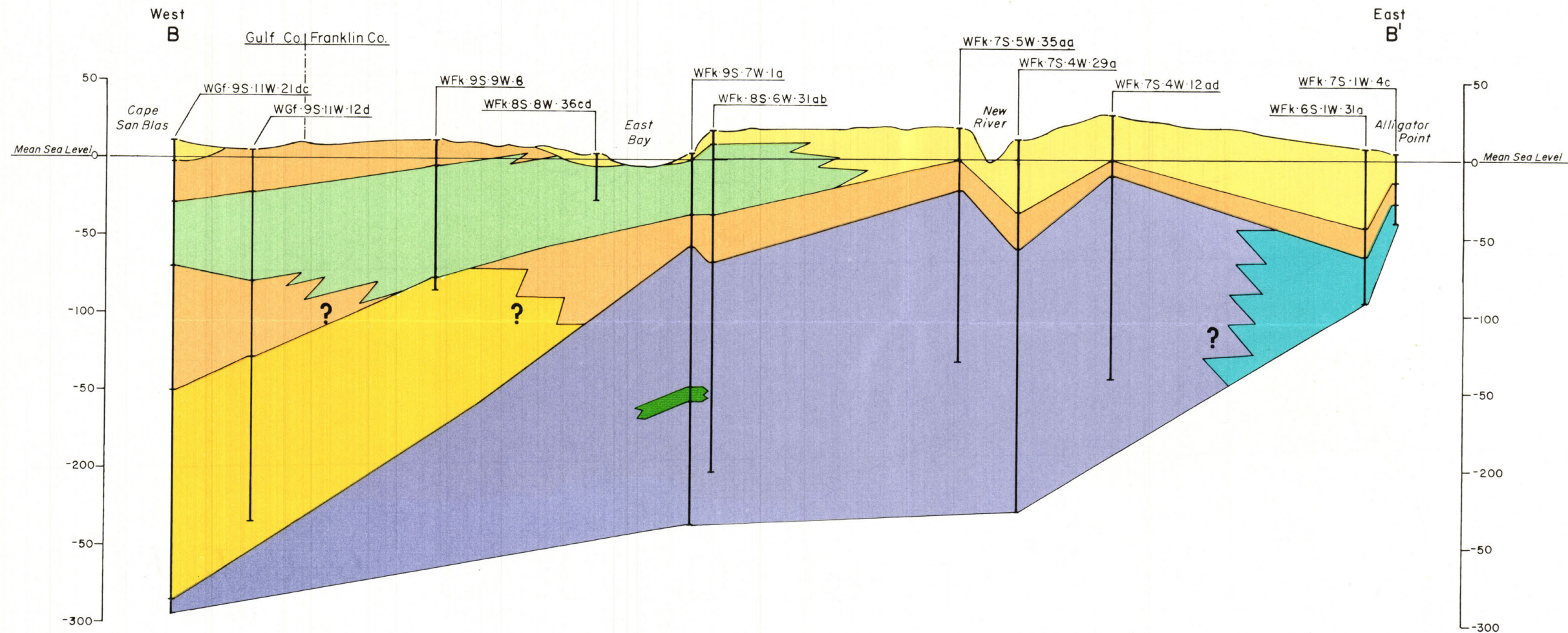
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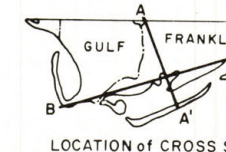
Structure Contour Map prepared on top of the first limestone encountered in the subsurface. The contours are drawn through points of equal elevation, based on the top of the limestone, in order to depict the attitude of the rocks.

The map shows a west-southwest trending dip to the limestone surface, from sporadic outcrops in the north-east to a depth of over 250 feet (81 meters) below sea level in the southwest. This is not the top of the Floridan Aquifer, although the Floridan follows a similar trend at a slightly deeper level.



EXPLANATION

- Gravel and Coarse Sand
- Fine Sand
- Clayey Sand
- Sandy Clay
- Shell Beds
- Limestone
- Limestone and Dolomite
- Dolomite



LOCATION OF CROSS SECTIONS

