

REFERENCE

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Open File Report 11
Geology of DeSoto County, Florida
by
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Florida Geological Survey
Tallahassee, Florida
1985

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PHYSIOGRAPHY

Several authors have discussed the physiography of the Florida peninsula. For the purposes of this report, White's (1970) classification will be utilized. The vast majority of DeSoto County lies within the DeSoto Plain (Fig. 1). Portions of the southwest corner of the county fall within the boundaries of the Gulf Coastal Lowlands.

Elevations within the county range from very near sea level in the southwest corner along the lower Peace River valley, to 90-95 feet in the northeast corner of the county. Elevations increase almost imperceptibly from the southwest toward the northeast. The topography tends to be flat with relatively steeper slopes in the vicinity of streams. Much of the interstream area is poorly drained. Many swamps, marshes and ponds are present throughout the county. The Peace River, Horse Creek and Joshua Creek are the major streams within the county.

DeSoto Plain

The DeSoto Plain is a very flat area located primarily in Manatee, Hardee, DeSoto, Highlands, Glades and Charlotte counties. White (1970) believes that the DeSoto Plain is a submarine plain probably formed under Pleistocene Wicomico seas (70 - 100 feet above present sea level). White (1970) cites the notable absence of relict shoreline features as evidence of the submarine origin of the DeSoto Plain.

Gulf Coastal Lowlands

The southwest corner of DeSoto County is located within the Gulf Coastal

Lowlands (White, 1970). The prominent topographic features of the Gulf Coastal Lowlands within DeSoto County include scarps and terraces developed during Pleistocene sea level stands and the entrenched Peace River Valley. Healy (1975a) shows two terraces within the Gulf Coastal Lowlands portion of DeSoto County. The Pamlico terrace is found at elevations of approximately 8-25 feet above mean sea level; the Talbot at 25-42 feet. Both of these terraces extend up the entrenched Peace River Valley. Except within the Peace River Valley, these "terraces" are poorly defined elevation zones. The flood plain of the Peace River lies as much as 30 feet below the surrounding upland surface in this area.

LITHO-STRATIGRAPHY

Surface and near surface sediments in DeSoto County consist of quartz sand, clay, limestone and dolomite. These sediments range in age from Oligocene (38-22.5 million years ago) to Holocene (10,000 years ago to present).

Oligocene Series

Suwannee Limestone

The Suwannee Limestone is present throughout DeSoto County in the subsurface. The Suwannee Limestone is a creamy white to light yellowish grey limestone, variably textured (wackestone to packstone), poorly to well indurated and variably recrystallized. The upper portions are highly fossiliferous (predominantly poorly preserved foraminifera, with molluscs, echinoids and corals). Moldic and vuggy porosity is common.

The top of the Suwannee Limestone is encountered at approximately 350 feet below mean sea level in the northeastern and northwestern corners of the county, and dips generally to the south and south-southeast. In the southeastern corner of the county, the top of the Suwannee Limestone is encountered at depths of approximately 700 feet below mean sea level (Scott, in press; Wilson, 1977).

The thickness of the Suwannee ranges from approximately 140 feet to over

400 feet within the county (Wilson, 1977). The thinnest portion is in extreme northeastern DeSoto County, while the thickest portion is along the central portion of the western edge of the county.

Miocene Series

Hawthorn Group

Scott (in press) has raised the Hawthorn from formation status to group status. The Hawthorn Group will include those sediments which in the past have been included in the Tampa, Hawthorn and Bone Valley formations. In DeSoto County, the Hawthorn Group consists of, in ascending order, the Arcadia Formation and the Peace River Formation.

Arcadia Formation

The Arcadia Formation (Scott, in press) is named after the town of Arcadia in DeSoto County. The type section designated by Scott (in press) is located in the core W#12050 (see Figure 4) between -96 feet M.S.L. and -216 feet M.S.L. The Arcadia Formation contains, in ascending order, the Nocatee and Tampa members and an unnamed member.

The Nocatee Member of the Arcadia Formation is named for the town of Nocatee in central DeSoto County and is present throughout DeSoto County. The sediments included in the Nocatee have previously been called the "sand and clay unit" of the Tampa Limestone (Wilson, 1977).

Lithologically, the Nocatee consists of a complexly interbedded sequence of variably phosphatic quartz sands, clays and carbonates (Scott, in press). The Nocatee is predominantly a clastic (sand and clay) unit. Quartz sands are typically fine to coarse grained, sometimes silty, clayey, calcareous or dolomitic and variably phosphatic (Scott, in press). Clay beds are common. The clays are variably quartz sandy and silty, phosphatic and calcareous to dolomitic. Carbonate beds are subordinate within the Nocatee (Scott, in press).

The top of the Nocatee Member of the Arcadia Formation within DeSoto County

is encountered at elevations which range from approximately -200 feet M.S.L. to approximately -450 feet M.S.L. (Scott, in press). The upper surface dips to the south and south-southeast. The thickness of the Nocatee within the county ranges from approximately 125 to slightly more than 200 feet.

The Tampa Member of the Arcadia Formation is lithologically similar to the type Tampa Formation of King and Wright (1979), but has a slightly greater phosphate content (1-3 percent) and greater areal extent (Scott, in press). The Tampa Member is a white to tan-colored, quartz sandy limestone with a carbonate mud matrix. Varying amounts of clay are usually disseminated throughout the rock (King and Wright, 1979; Scott, in press). Some beds within the Tampa Member contain more than 50 percent quartz sand. Dolomite is relatively uncommon within the Tampa Member (King and Wright, 1979; Scott, in press).

The Tampa Member is recognizable throughout most of DeSoto County, however the unit becomes indistinct due to a facies change in eastern DeSoto County and south of the DeSoto/Charlotte county line (Scott, in press).

The top of the Tampa Member is encountered between 150 and 200 feet below mean sea level in DeSoto County (Scott, in press). Thickness of the Tampa ranges from 50 to 100 feet (Scott, in press).

The upper (unnamed) member of the Arcadia Formation includes those sediments which in the past have been referred to as the "Hawthorn carbonate unit" (Scott, in press). Lithologically, these sediments consist of white to yellowish grey, quartz sandy, phosphatic and sometimes clayey, dolomites and limestones (uncommon). Occasional beds of carbonate rich quartz sand and thin clay beds are present.

The upper member of the Arcadia is present throughout DeSoto County. In those areas where the Tampa and Nocatee Members are not recognized, the entire formation remains undifferentiated. The top of the Arcadia Formation ranges

from near mean sea level in the northern part of the county to slightly more than 100 feet below mean sea level and dips generally in a south-southeast direction. Where the Arcadia is differentiated, the upper member is approximately 100 to 140 feet thick. The thickness of the entire Arcadia Formation, within the county, ranges from slightly less than 300 feet to more than 500 feet (Scott, in press).

Peace River Formation

The Peace River Formation (Scott, in press) in DeSoto County consists of those sediments which have been described in the past, as "upper Hawthorn clastics." The type section designated by Scott (in press) is well #12050 (section 16, township 38S, range 26E, DeSoto County) between +41 and -97 feet MSL. Lithologically, these sediments consist of yellowish-grey to light olive green interbedded phosphatic sands, clayey sands, clays and dolomite stringers.

The top of the Peace River Formation is found at or near mean sea level throughout much of the county (Scott, in press). In northwestern DeSoto County, however, the Peace River Formation is encountered at 50 feet above mean sea level. The base of the Peace River is gradational with the underlying Arcadia Formation, and is picked at the point where the sediments change from predominantly clastic to predominantly carbonate (Scott, in press).

The thickness of the Peace River Formation is approximately 50 feet in the northeastern and southwestern corners of the county. The Peace River thickens to more than 160 feet in the southeastern corner of the county. The Peace River dips, and thickens in a general south easterly direction.

Pliocene-Pleistocene Series

Undifferentiated Surficial Sands and Shell

Surficial deposits of Pliocene-Pleistocene age (5.3 to .01 million years

ago) blanket the county. Throughout the majority of the county, the surficial deposits consist of silty, clayey, shelly sands and variably indurated shell beds. The shell beds are generally limited to the southern third of the county. The undifferentiated surficial sands and shell range from 10-30 feet thick throughout the majority of the county. Surficial sediments thicken in the south central portion of the county and along the DeSoto/Highlands county line.

Clean quartz sand of Pleistocene age (1.6 to .01 million years ago) forms a veneer over the clayey shelly sands. These deposits consist of unconsolidated very fine to medium grained quartz sand. The sands are white to light brown in color and contain trace amounts of phosphate sand and limestone or shell fragments.

Holocene Series

Deposits of Holocene age (10,000 years ago to present) are primarily limited to present day stream flood plains, beaches, swamps, marshes and lakes. these sediments consist of sand, silt, clay and organic materials.

HYDROLOGY

Groundwater in DeSoto County is obtained from the surficial aquifer system, the intermediate aquifer system and from the Floridan Aquifer. The aquifers are separated by confining layers which restrict vertical water movement between the aquifer systems.

Surficial Aquifer System

The surficial aquifer consists primarily of quartz sand and includes the undifferentiated surficial sands and shell as well as the uppermost portions of the Peace River Formation. With the exception of some lithified shell beds, these sediments are unconsolidated.

The top of the surficial aquifer is the ground water table and water within the surficial aquifer is generally under unconfined conditions. The base of the

surficial aquifer system is formed by the clayey, less permeable beds of the Peace River Formation. The surficial aquifer system underlies essentially all of DeSoto County and is utilized primarily for domestic, lawn irrigation and stock watering supplies, where high flow rates are not required (Wilson, 1977).

Intermediate Aquifer System

The intermediate aquifer system contains water under confined conditions and consists primarily of the limestones and dolomites of the Arcadia Formation. The intermediate aquifer corresponds with the "upper unit of the Floridan Aquifer" of Wilson (1977). The upper confining layer of the intermediate aquifer system consists of the clayey sediments of the Peace River Formation. The lower confining layer consists of the Nocatee Member of the Arcadia Formation.

Within DeSoto County, the intermediate aquifer averages approximately 200 feet in thickness (Wilson, 1977). Typical wells yield up to several hundred gallons per minute, however, yield is highly variable (Wilson, 1977). The principal uses for wells developed in the intermediate aquifer are for domestic and public supply.

Floridan Aquifer

The Floridan Aquifer consists of the limestones and dolomites of the Suwannee Limestone and the underlying Ocala Group and Avon Park Limestone. The Floridan contains water under confined conditions. In DeSoto County, the upper confining layer consists of the Nocatee Member of the Arcadia Formation. The top of the Floridan is encountered at approximately 300 feet below mean sea level in the northwestern corner of the county and dips to approximately 750 feet below mean sea level in the southeastern corner (Buono and Rutledge, 1978).

Wells developed in the Floridan Aquifer yield large quantities of water, often in excess of 1000 gallons per minute (Wilson, 1977). The primary use of

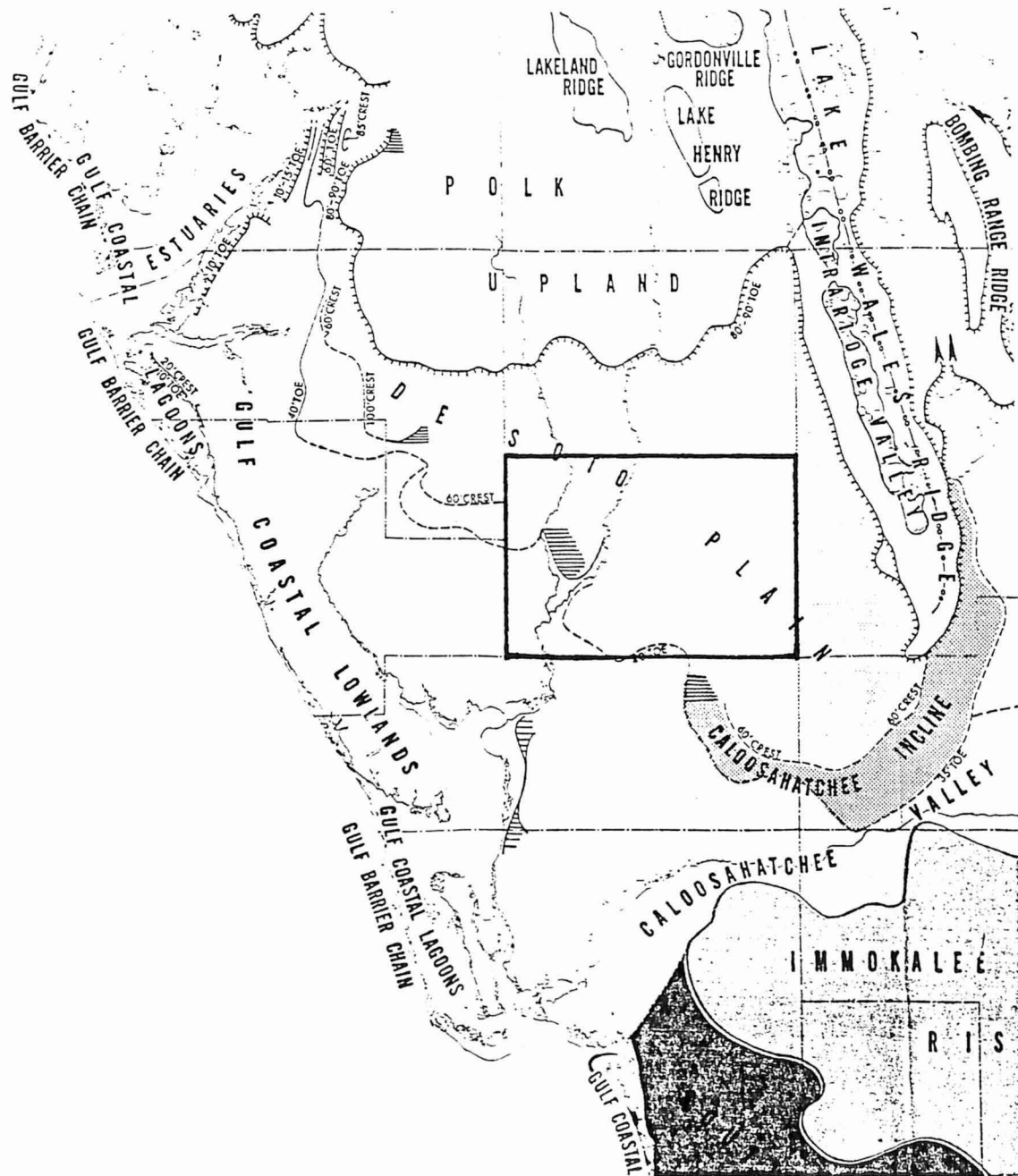
water from the Floridan is large scale inigation. Water quality of the Floridan Aquifer is generally poorer than in the surficial and intermediate aquifers. Water quality in both the Floridan and the intermediate aquifer decreases in a general southwesterly direction (Wilson, 1977).

Areas of Artesian Flow

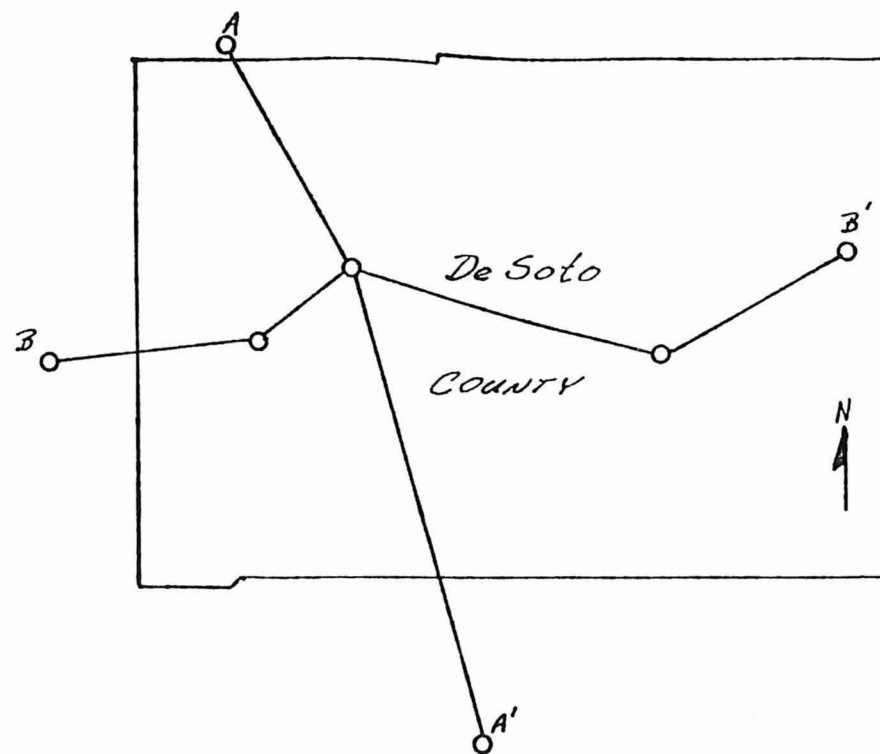
Both the intermediate and the Floridan aquifers are under confined conditions and may contribute to artesian flow. Healy (1975b) shows the southwestern portion of the county as an area of artesian flow. This area encompasses the entire Peace River Valley, portions of the Horse Creek and Joshua Creek drainages and the Gulf Coastal Lowlands as well as the southwestern edge of the DeSoto Plain. Barr and Schiner (1983) show potentiometric surface elevations of 40-50 feet above mean sea level for much of the same area.

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Physiographic Map
DeSoto County AND vicinity



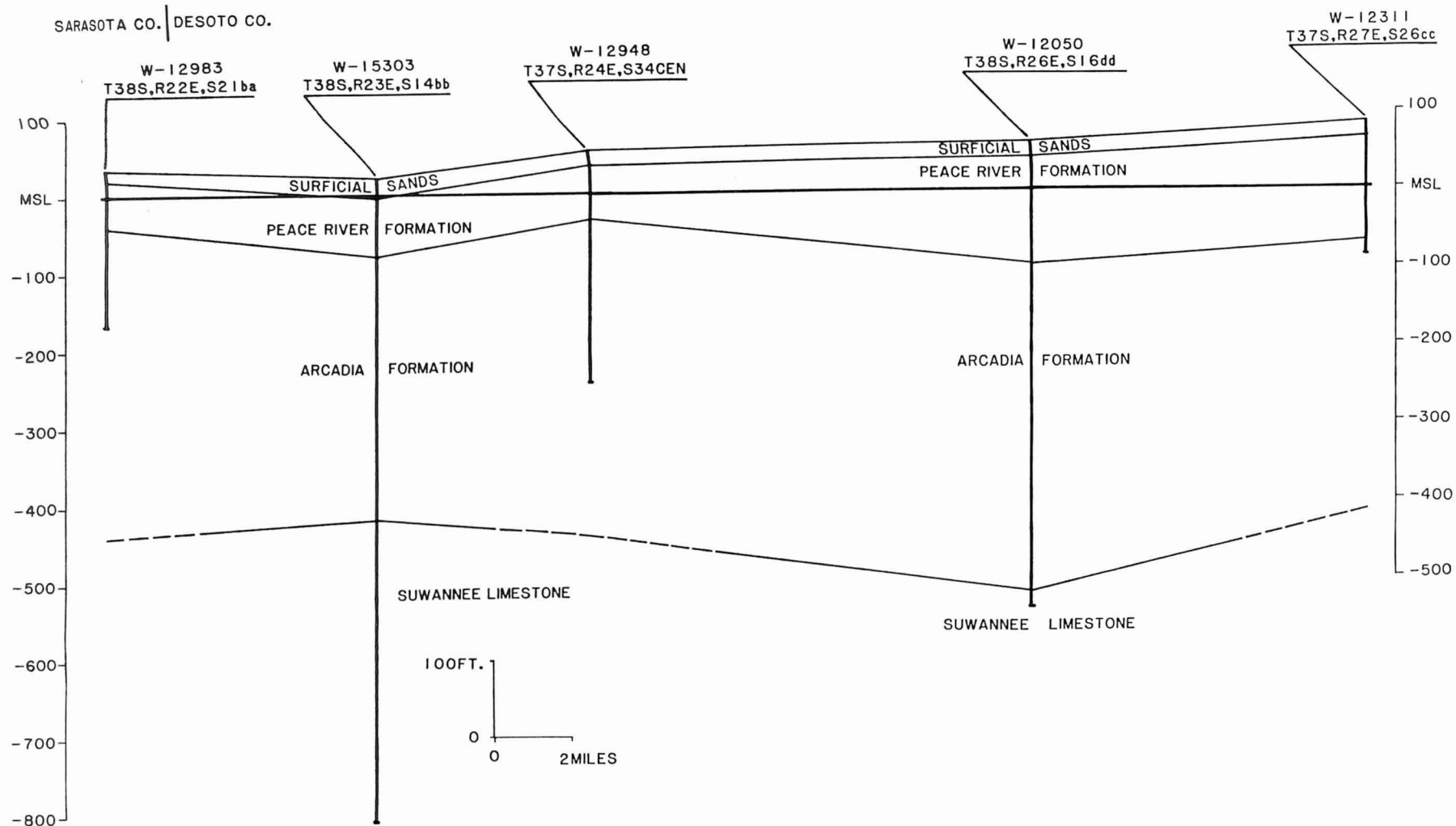
CROSS SECTION LOCATION MAP

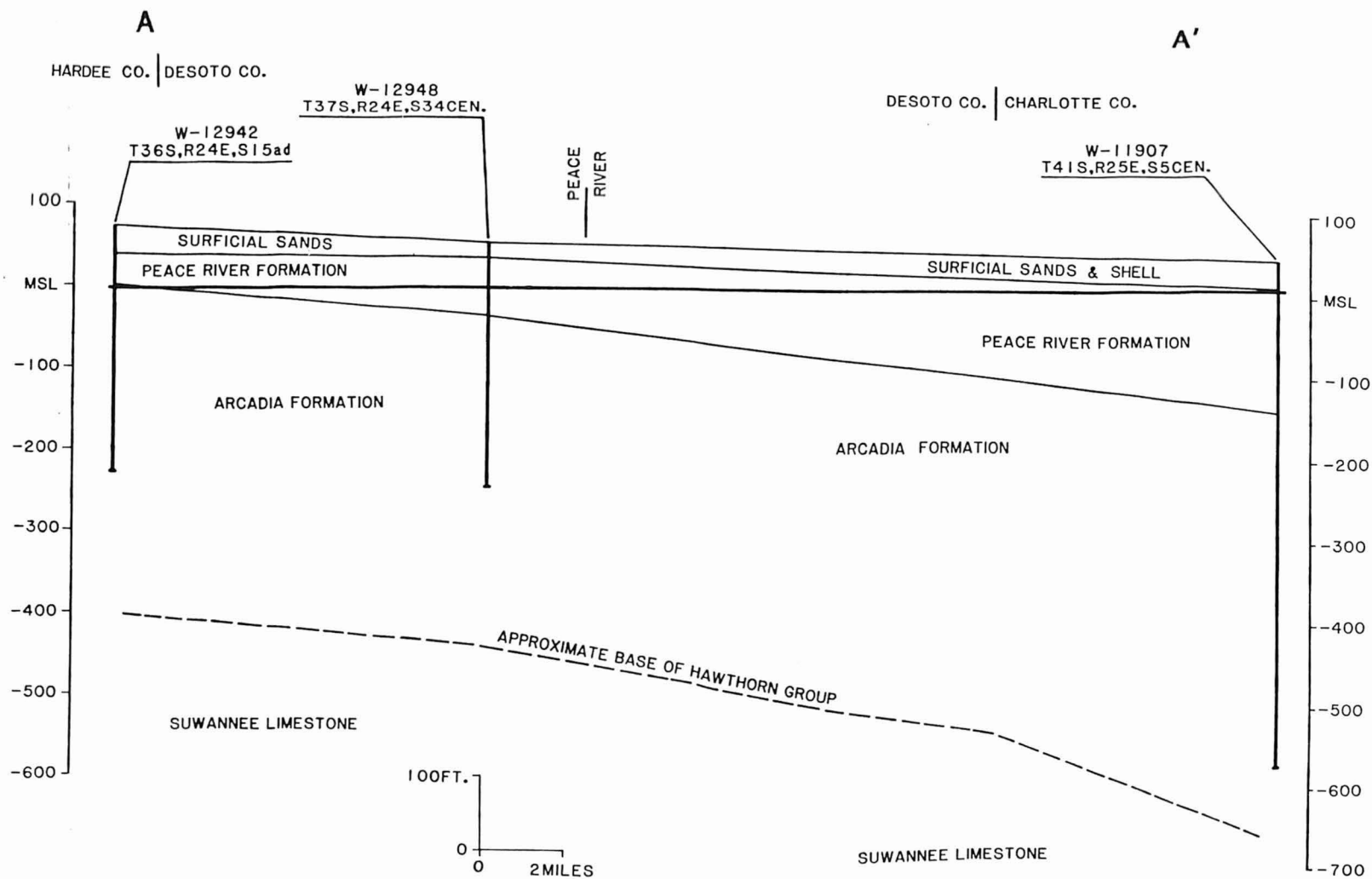
Fig. 2

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SARASOTA CO. | DESOTO CO.





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FLORIDA GEOLOGICAL SURVEY