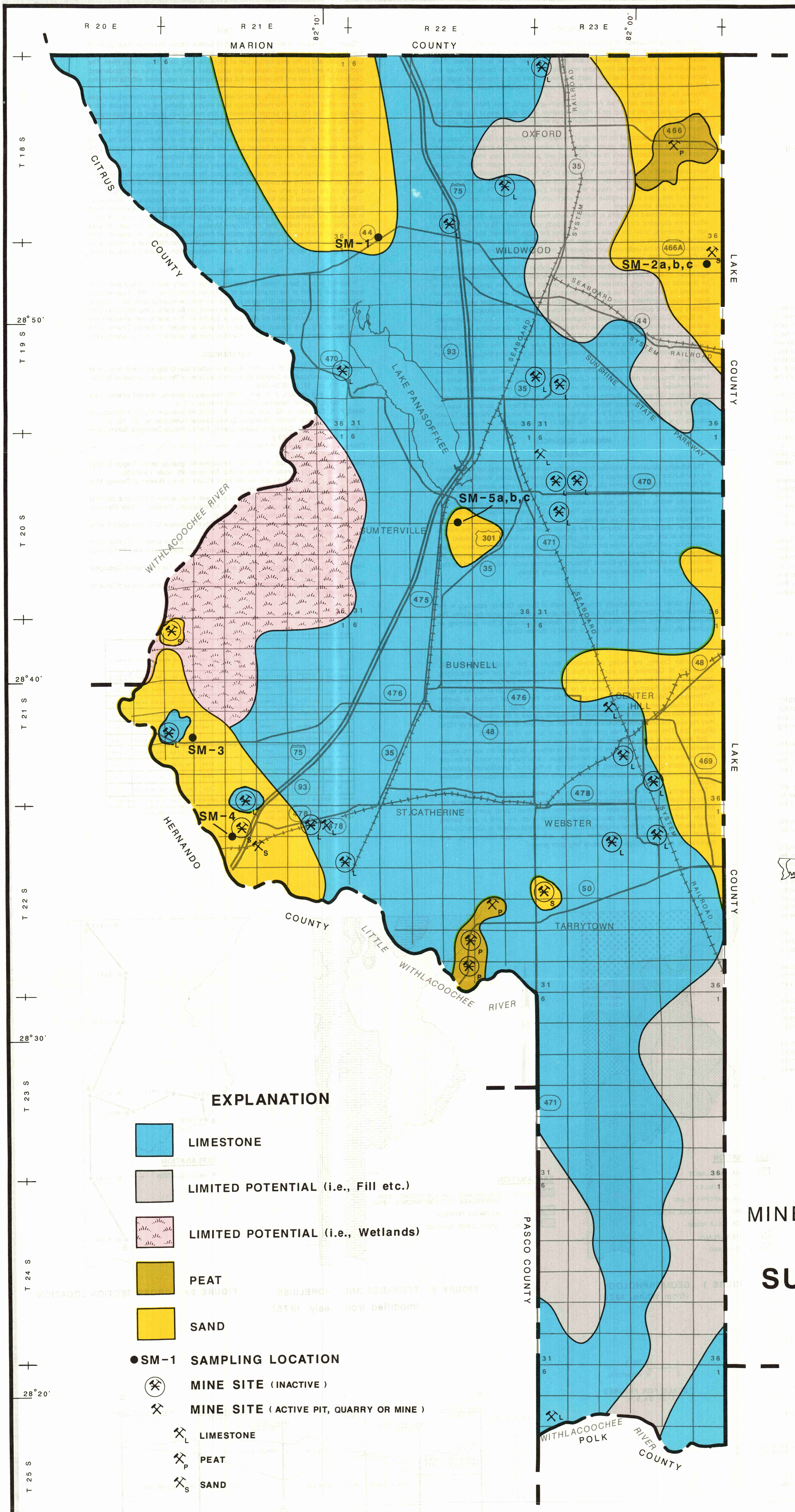
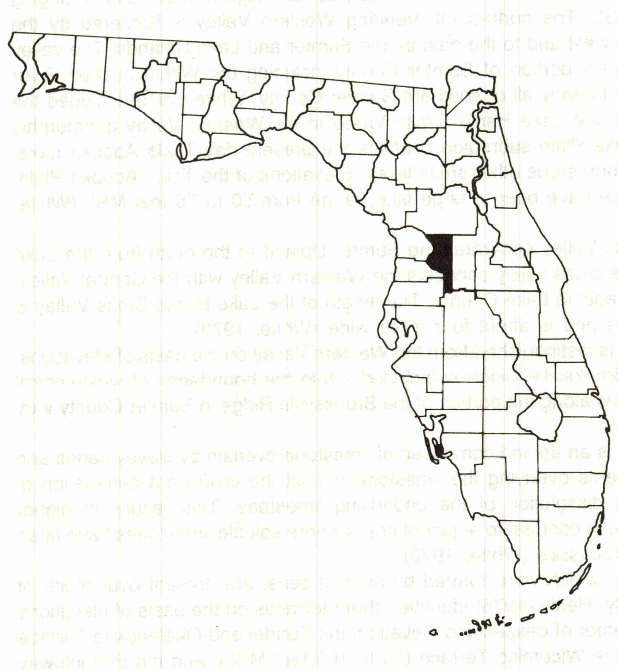
FLORIDA GEOLOGICAL SURVEY
DEPARTMENT OF NATURAL RESOURCES



EXPLANATION

- LIMESTONE
- LIMITED POTENTIAL (i.e., Fill etc.)
- LIMITED POTENTIAL (i.e., Wetlands)
- PEAT
- SAND
- ●SM-1 SAMPLING LOCATION
- MINE SITE (INACTIVE)
- MINE SITE (ACTIVE PIT, QUARRY OR MINE)
  - L LIMESTONE
  - P PEAT
  - S SAND

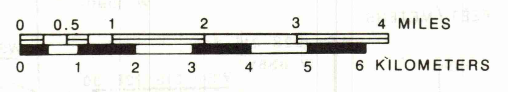


MINERAL RESOURCES OF

SUMTER COUNTY

FLORIDA

1988



SCALE

MAP SERIES NO. 113

MINERAL RESOURCES OF SUMTER COUNTY, FLORIDA

BY

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FLORIDA DEPARTMENT OF NATURAL RESOURCES

DIVISION OF RESOURCE MANAGEMENT

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SUMTER COUNTY

INTRODUCTION

In recent years, considerable attention has been focused on Florida's rapid development, the accompanying population increase and their effect on the state's important mineral resources. Frequently this development occurred in areas underlain by known mineral deposits, precluding future extraction of the minerals. The economics associated with these mineral resources represent substantial employment and income to the private sector as well as taxes to county and state governments. One response to this growing conflict between rapid growth and development of the state's mineral resources was in the form of legislation enacted by the Florida Legislature in 1985 requiring each county to establish a comprehensive land use plan. Additional guidelines and due dates were established by the 1986 Florida Legislature.

In response to this act and at the request of the Withlacoochee Planning Council, the Florida Geological Survey initiated a study of Sumter County's mineral resources. The objective of this report is to summarize and interpret geologic data (i.e., core and well cutting descriptions, geophysical logs, and data derived from field reconnaissance) in a format appropriate for use by city and county planners.

A knowledge of Sumter County's mineral resources is basic and integral to the process of initiating, developing and implementing an effective comprehensive land use plan. This information is essential to planners and officials in their analyses of urban and rural development in such areas as zoning, road construction and the establishment of waste disposal sites.

Factors used in evaluating the economic value of the county's known and potential mineral resources are varied, changing, and in many instances, interrelated; such conditions greatly complicate an accurate assessment. This evaluation process is inherently dependant on an extensive exploration program, which is a necessary precursor to mining in order to determine reserves, content and extent of specific mineral resources. In addition, such factors as operating expenses, transportation, beneficiation, reclamation and capital costs of mining must be included in the overall calculations.

Resource evaluation for this report is based on a number of sources including Florida Geological Survey reports and unpublished data, field reconnaissance, state and federal statistical data, company reports, questionnaires, and numerous discussions with mining company personnel and state and federal officials. Although detailed information on company statistics is confidential, information of a more general nature is readily available or can be reasonably extrapolated from existing data. The diversity of sources as well as their close association to the various aspects of resource evaluation lends substantial confidence to the general assessments and inferences of this report.

Metric Conversion Factors

To prevent the awkward duplication of English and metric units in this report, the following conversion factors are provided.

MULTIPLY	BY	TO OBTAIN
feet	0.3048	meters
miles	1.609	kilometers

GEOMORPHOLOGY

The following discussion of the geomorphology is summarized primarily from White (1970). Sumter County falls within the central (Mid-peninsular) physiographic zone of White (1970), which includes most of central Florida. It is an area characterized by ridges, valleys, and terraced coastal plains, which have been modified by differential solution of the underlying carbonates.

The Central Highlands, a subdivision of White's central geomorphic zone, encompasses all of Sumter County (Figure 1). This subdivision can be further divided in Sumter County into the Lake Upland and Sumter Upland,the Western Valley and the Brooksville Ridge. The Western Valley in Sumter County, in turn, includes the Tsala Apopka Plain and the Lake Harris Cross Valley (Figure 1).

The Lake Upland, lying along Sumter County's eastern edge and extending into neighboring Lake County, is dominated by relict beach ridges that have been reduced by weathering and dissolution of the underlying limestone (White, 1970). Elevations of the Lake Upland in Sumter County vary from 75 to 140 feet above mean sea level (MSL).

The Sumter Upland encompasses the northern and northeastern region of Sumter County and extends north into Marion County and east into Lake County. Elevations of the Sumter Upland in the study area range from 50 to 150 feet MSL.

The Western Valley is an area of low relief. It has poor drainage with elevations ranging from 50 to 100 feet MSL. The north-south trending Western Valley is bordered by the Brooksville Ridge to the west and to the east by the Sumter and Lake Uplands. The valley encompasses a substantial portion of Sumter County including the Withlacoochee River area, most of central and nearly all of southern Sumter County. White (1970) included the Tsala Apopka Plain and the Lake Harris Cross Valley in his Western Valley geomorphic region. The Tsala Apopka Plain subregion contains the present day Tsala Apopka Lake, Lake Panasoffkee, and numerous other small lakes. Elevations of the Tsala Apopka Plain, which is believed to once have been a large lake, range from 50 to 75 feet MSL (White, 1970).

The Lake Harris Cross Valley separates the Sumter Upland to the north from the Lake Upland to the south. The cross valley connects the Western Valley with the Central Valley, which lies farther to the east in Lake County. The length of the Lake Harris Cross Valley is approximately nine miles and is about four miles wide (White, 1970).

The Brooksville Ridge is distinguished from the Western Valley on the basis of elevations. A small portion of the Brooksville Ridge is included within the boundaries of west-central Sumter County. Elevations along the portion of the Brooksville Ridge in Sumter County vary from 50 to 80 feet MSL.

The Brooksville Ridge is an upland composed of limestone overlain by clayey sands and sandy clays. The sediments overlying the limestone restrict the downward percolation of water, thereby reducing dissolution of the underlying limestone. This results in higher elevations along the ridge in contrast to adjacent areas where soluble limestones have been subject to weathering processes (White, 1970).

Relict marine terraces, which were formed by ancient seas, are present over much of Florida. In Sumter County, Healy (1975) identified three terraces on the basis of elevations (Figure 2). They are, in order of descending elevation, the Sunderland-Okefenokee Terrace (100 to 170 feet MSL), the Wicomico Terrace (70 to 100 feet MSL), and the Penholoway Terrace (42 to 70 MSL).

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This public document was promulgated at a total cost of $1,548.00 or a per copy cost of $2.06 for the purpose of disseminating geologic data.

The well and quarry system used in this report uses the rectangular system of section, township and range for identification. The well or outcrop number consists of six parts: W for well or L for quarry, county abreviation, the Township, Range, and Section, and the quarter/quarter location within the section.

GEOLOGY

The following discussion of geology is primarily a summary of Deuerling and MacGill, (1981) and Campbell, (1984). Sumter County is underlain by igneous and metamorphosed basement rock at depths between 4,500 and 6,500 feet below land surface. Thick accumulations of carbonates (limestone and dolomite), overlie the basement rocks and dominate the rock column. In addition, siliciclastic sedimentary units comprised of sands, silts and clays occur at the surface and in the near-surface throughout much of the county (Figures 3a, 3b and 3c).

The Middle Eocene Avon Park Formation (Applin and Applin, 1944; Miller, 1986) is the oldest stratigraphic unit to crop out in Florida. However, in the study area of Sumter County this formation is only present in the subsurface as shown on cross section A-A' and B-B' (Figures 3b and 3c).

Campbell (1984) described the lithology of the Avon Park Formation in Sumter County as a dolomite, or a limestone with variable degrees of dolomitization. The formation is typically cream to brown colored, poorly to well indurated, and calcilutitic to very finely calcarenitic. Often the Avon Park Formation contains thin layers or specks of organic material, usually associated with the dolomitic facies. The fauna of the Avon Park Formation is comprised primarily of foraminifers, ostracods, corals, bryozoans and mollusk molds. These fauna are indicative of a shallow water marine environment (Vernon, 1951). Flora, consisting of varieties of sea-grass and mangrove leaves, which occur as storm deposits, are indicative of a shallow marine environment.

The oldest exposed sediments in Sumter County belong to the Ocala Group limestones which were deposited during the Late Eocene Epoch approximately 38 to 40 million years ago. In ascending order the Ocala Group includes the Inglis, Williston, and Crystal River Formations. For the purpose of this report these formations are not differentiated due to recrystallization of the sediments and because the contacts are gradational in the study area (K. Campbell, 1986, personal communication).

Vernon (1951) described the lithology of the lower portion of the Ocala Group as cream to light brown, chalky or silty to granular or recrystallized limestone. The lowest sections tend to be dolomitic and variably indurated. The upper portion of the Ocala Group limestone is described by Vernon (1951) as a white or cream to buff colored, soft, massive coquina of large discoid foraminifers within a calcilutite matrix. Although these upper sediments are typically soft and porous, they may be well indurated due to recrystallization.

In Sumter County, the Ocala Group is exposed along quarry walls, crops out in sinkholes, and occurs frequently as silicified rubble on the ground surface. Cross sections A-A' and B-B' (Figures 3b and 3c) show the areal extent of this group along the eastern and central regions of the county. Although data are sparse-to-absent in some areas of the county, the Ocala Group is present at the surface or in the shallow subsurface sediments throughout much of the county.

Siliciclastic sediments of the Miocene and younger epochs overlie the Ocala Group limestones throughout most of Sumter County (Figures 3b and 3c). These sediments are undifferentiated sands, clayey sands, silts, and clays. They vary in thicknesses from a few feet to almost 100 feet in the Sumter and Lake Uplands along the northeastern and eastern edges of the county. In contrast, better sorted, beach-like sand deposits occur in at least two areas of the county. On Figure 2 these areas are shown as two small Wicomico Terrace deposits, one in the north-central and the other in the west-central part of the county.

MINERAL RESOURCES

INTRODUCTION

The following discussion is intended to provide the reader with a generalized knowledge of the near-surface mineral resources of Sumter County. Several localities, including operating and abandoned mines and borrow pits, were visited in addition to areas where, based on the authors' knowledge, the possibility of resources might occur (Mineral Resources Map). Additionally, testing of geologic samples were conducted to determine the need for further investigations of potential sites. The Mineral Resources Map presents a geographic overview of the major mineral commodities identified in Sumter County. Factors such as thickness of overburden, and quality and volume of the deposit could affect the mining of the mineral commodity at any specific site. In contrast, geologic cross sections are extrapolated from cores and/or well cuttings to show the distribution and thickness of surface and near-surface stratigraphic units (Figures 3b and 3c). As a result, occasional variations between the geologic cross sections and the Mineral Resources Map may occur. A discussion of the clay, limestone, sand and peat resources of Sumter County follows.

Clay

Clayey sands occur sporadically throughout much of Sumter County, especially in the Sumter and Lake Uplands, the Tsala Apopka Plain, and the southern part of the county. The irregular nature and limited extent of the clay deposits preclude it from becoming an economically viable commodity. No clay is mined in Sumter County.

Limestone

In Sumter County, the mining of limestone occurs in the vicinities of Center Hill, Sumterville, St. Catherine, and along the Polk-Sumter County line. Four limestone mining operations in these areas are producing roadbase and lime from the Ocala Group (Mineral Resources Map). Reserves are reported to be sufficient for at least 20 to 30 more years.

Throughout Florida, the mining of limestone utilizes the open pit method. In Sumter County, scrapers remove the sand or clayey sand overburden, which in the mining regions is approximately 20 to 30-feet thick. However, the irregular surface of the underlying limestone may increase the overburden thickness to as much as 60 feet, as shown in well W-10250 (Figure 3b). This overburden has potential as a local source of fill material.

Soft limestone is easily removed by draglines and bulldozers; however, more indurated material requires blasting to fracture the rock before removal. Draglines are used to extract the limestone in mines that extend below the watertable. Large trucks then transport the rock to the processing plant for crushing and screening. In the plant, beneficiation processes remove impurities to improve the quality of the material to specifications required for finished products.

The potential uses of limestone are numerous and varied. For some of these uses the physical properties are of utmost importance while for others the chemical composition is the dominant requirement. Primary uses of limestone from the Sumter County quarry operations include roadbase material, gas desulfurization products which are used in coal burning power plants, and lime, a primary ingredient in the manufacture of cement. In Sumter County, several factors including good source quality, quantity, transportation costs, and marketability enhance prospects for future long term growth.

Sand

Quartz sand occurs at the surface over all of Sumter County. Maximum thicknesses of these sands occur in the northeastern and east-central regions of the county contiguous to Lake County and in the west-central part of the county near the Withlacoochee River. The northeastern and east-central deposits are associated with the Wicomico and Sunderland/Okefenokee Terraces and the west-central sand deposits are associated with the Wicomico Terrace.

During the course of this study, channel and spot sand samples were collected, analyzed and described (Table 1). The methodology used involved splitting the sand samples with a riffle splitter. The 100 gram sample obtained by this method was treated to remove organic and clay material before drying. After drying the samples were sieved using U. S. Standard Sieve Screens. The data obtained from screening these samples are presented in Table 1.

Data from the screen sieve analyses represent only one set of samples and not the entire deposit. However, information derived from Table 1 may aid the reader in determining the general usefulness of the particular deposit for industrial purposes.

Test results indicate that the sands are generally suitable for brick masonry, sand-cement riprap, sand-asphalt hot mix, and as sand seal coat. No tests were performed to determine if the sands in the county are suitable for glass sand. However, the presence of an iron oxide coating on the sand grains will probably preclude their use for manufacturing glass.

The Florida General Soils Atlas (Kolb, 1974) indicates that the Astatula soil association, found in the north-central portion of the county, and Chandler-Apopka soil association, found in northern and northeastern Sumter County, are good sources for construction materials. The atlas indicates further that the Tavares-Myakka, as well as the Pompano-Myakka associations, which are geographically scattered throughout the county, are good to fair as sand sources. It should be noted that in determining the suitability of soil associations for various purposes, an 80 inch interval of soil, measured from ground surface, is used.

Peat

Presently, peat is being mined in northern Sumter County east of Oxford and in the southwestern portion of the county west of Tarrytown (Bond, et al., 1986). Peat deposits occur when the accumulation of organic materials exceed the decomposition rate. Typically, to prepare for mining a peat bog, the area is dewatered and the surface vegetation is cleared away. Mining is accomplished by draglines or bulldozers. The peat is then shredded and stockpiled to dry. The current consumption of peat produced in Sumter County is for horticultural purposes, although some quantities may be suitable for energy applications.

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TABLE 1. SCREEN ANALYSES OF SAND IN SUMTER COUNTY, FLORIDA

DEPOSITS			LABORATORY TEST DATA SCREEN ANALYSIS SIEVE NO. AND CUMULATIVE WEIGHT PERCENT RETAINED							
SAMPLE NO.	LOCATION (T,R,SEC.)	METHOD OF SAMPLING	4	8	16	30	50	100	200	*FINENESS MODULUS
SM 1	18S,22E,33dd	SPOT	-	-	0.001	1.947	27.037	80.817	99.301	2.091
SM 2a	19S,23E,1db	CHANNEL	-	0.093	1.530	9.938	22.962	69.324	99.538	2.034
SM 2b	19S,23E,1db	CHANNEL	-	-	1.494	21.653	53.285	84.316	99.466	2.602
SM 2c	19S,23E,1db	CHANNEL	-	-	2.449	33.299	72.979	96.812	99.741	3.053
SM 3	21S,21E,20cc	SPOT	-	-	-	0.060	4.083	49.924	98.818	1.528
SM 4	22S,21E,4cd	SPOT	-	-	-	0.028	3.019	46.678	98.889	1.486
SM 5a	20S,22E,15dd	SPOT	-	-	0.033	2.136	30.022	87.572	99.514	2.193
SM 5b	20S,22E,15dd	SPOT	-	-	0.003	1.427	30.444	87.011	98.634	2.175
SM 5c	20S,22E,15dd	SPOT	-	-	0.054	2.359	29.350	82.286	97.093	2.111

*FINENESS MODULUS: A MEANS OF EVALUATING SAND AND GRAVEL DEPOSITS WHICH CONSISTS OF SIEVING SAMPLES THROUGH A STANDARDIZED SET OF SIEVES, ADDING THE CUMULATIVE WEIGHT PERCENTAGES OF THE INDIVIDUAL SCREENS, DIVIDING BY 100, AND COMPARING THE RESULTANT FINENESS MODULUS NUMBER TO VARIOUS SPECIFICATION REQUIREMENTS.(BATES AND JACKSON, 1980)

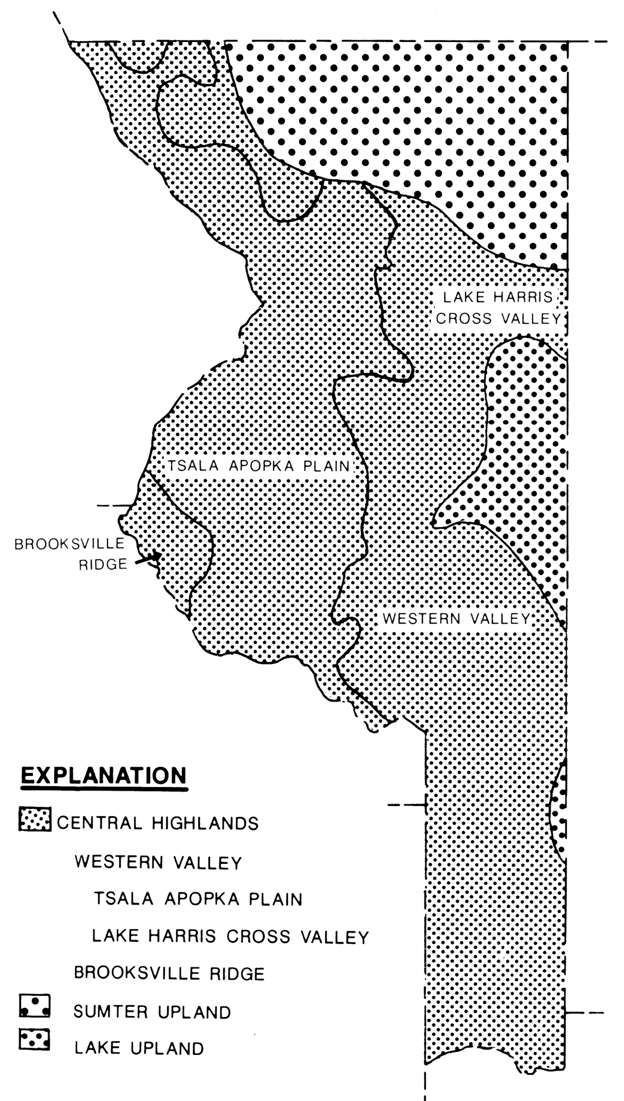

FIGURE 1 GEOMORPHOLOGY (from White, 1970)

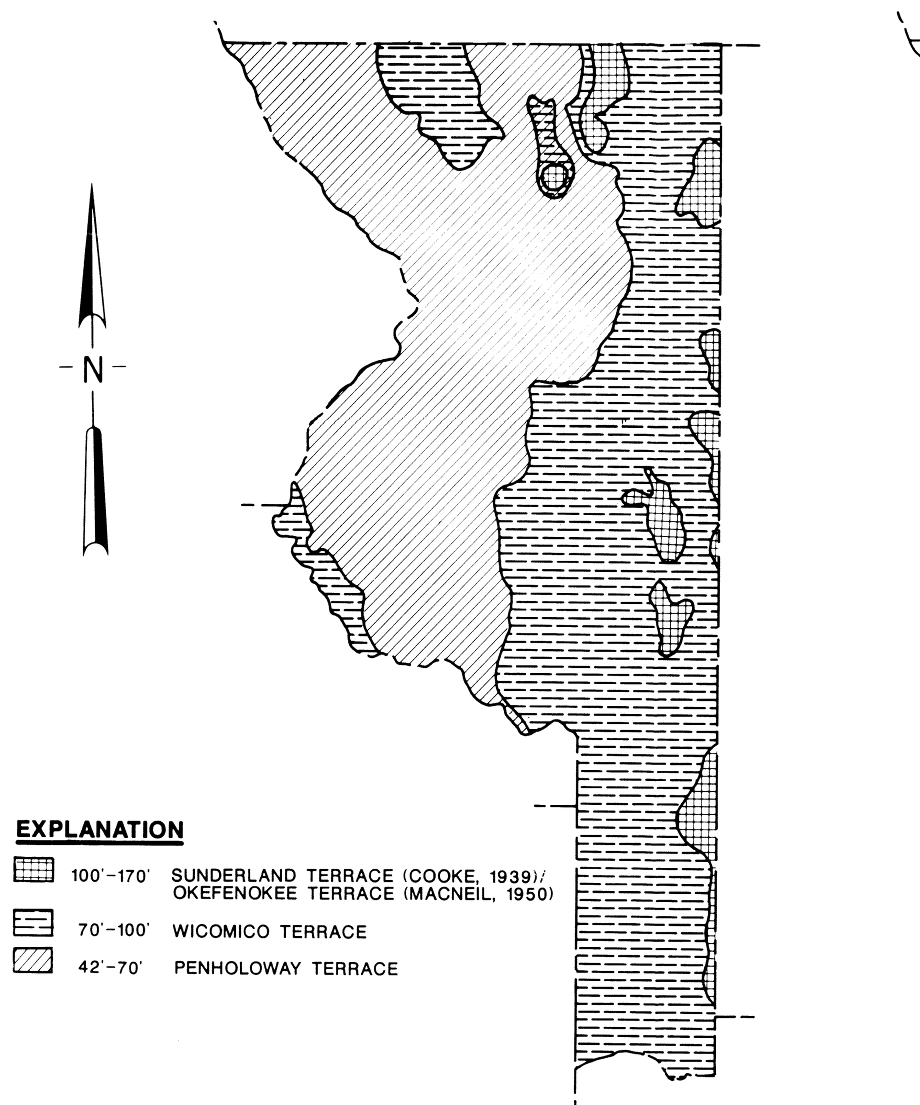

FIGURE 2 TERRACES AND SHORELINES (modified from Healy, 1975)

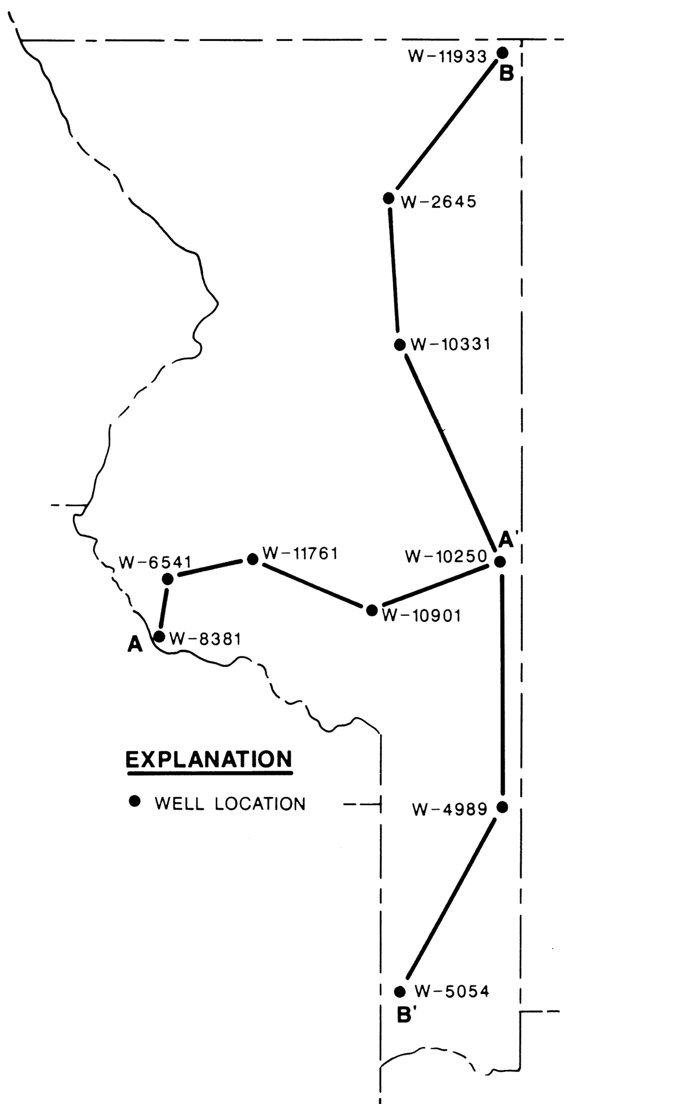

FIGURE 3a CROSS SECTION LOCATIONS

0 4 MILES
0 6 KILOMETERS

SCALE FOR FIGURES 1, 2, 3a,b,c

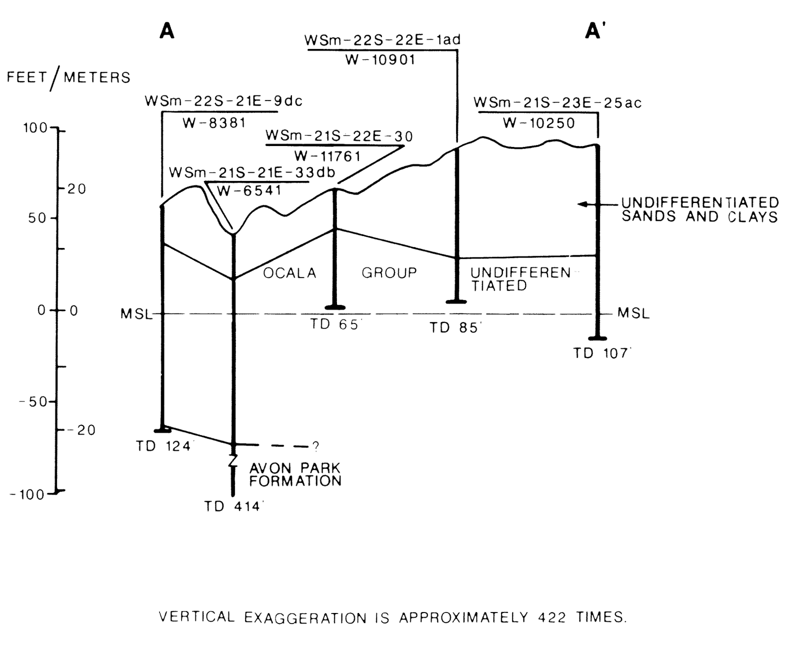

FIGURE 3b CROSS SECTION A-A'

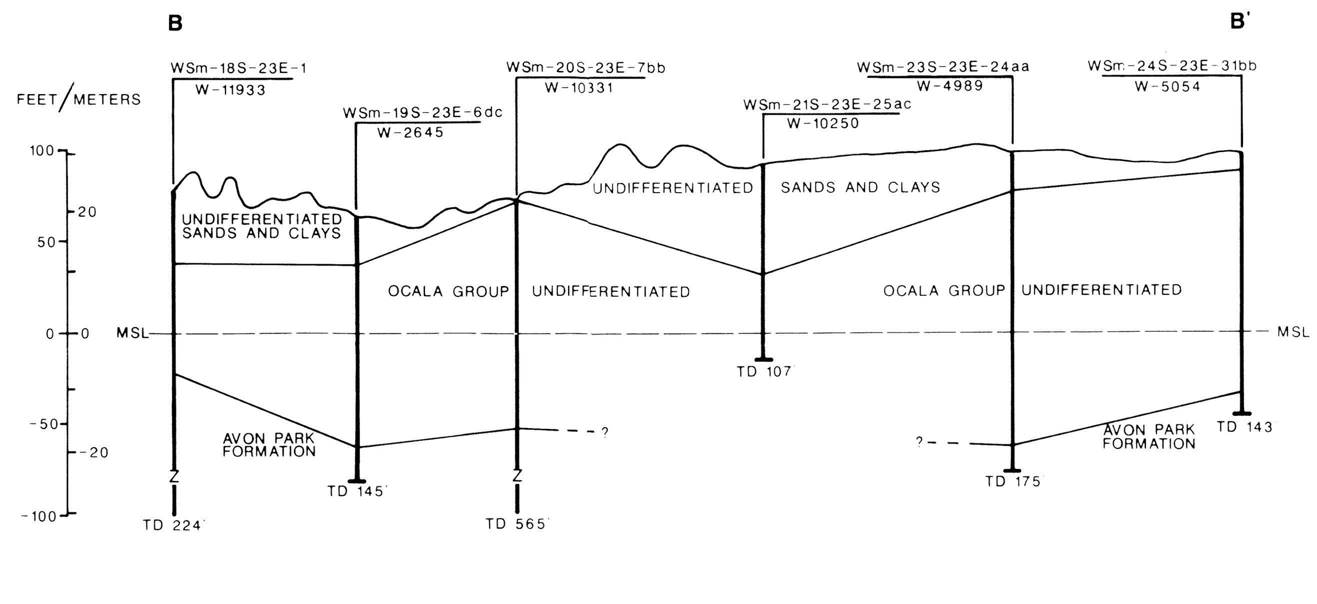

FIGURE 3c CROSS SECTION B-B'