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WATER-RESOURCES DATA INDEX FOR OSCEOLA NATIONAL FOREST, FLORIDA

OPEN-FILE REPORT 79-984

Prepared in cooperation with
U.S. BUREAU OF LAND MANAGEMENT
U.S. BUREAU OF MINES
U.S. FOREST SERVICE

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79-683

UNITED STATES

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

WATER-RESOURCES DATA INDEX FOR OSCEOLA NATIONAL FOREST, FLORIDA

By Paul R. Seaber and Robert W. Hull

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UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, Secretary

GEOLOGICAL SURVEY

H. William Menard, Director

For additional information write to:

U.S. Geological Survey
325 John Knox Road
Suite F-240
Tallahassee, Florida 32303

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WATER-RESOURCES DATA INDEX FOR OSCEOLA NATIONAL FOREST, FLORIDA

By Paul R. Seaber and Robert W. Hull

ABSTRACT

The U.S. Geological Survey conducted an intensive investigation from December 1975 to December 1977 of the geohydrology of Osceola National Forest. The primary purpose of that investigation was to provide the geohydrological understanding needed to predict the impact of potential phosphate industry operations in the forest on the natural hydrologic system. The investigation involved test drilling, implementation of a hydrologic monitoring network, water-quality sampling, comprehensive aquifer tests, and literature study. The numerous data obtained from the field investigations, laboratory analyses, and published and unpublished sources were published in summary form in an interpretive report (Miller and others, 1978, Impact of potential phosphate mining on the hydrology of Osceola National Forest, Florida: U.S. Geological Survey Water-Resources Investigations 78-6, 159 p.).

This report is an index to the type, source, location, and availability of the data used in the interpretive investigation. The report indexes the following water-resources data: geological, geophysical, ground water, surface water, quality of water, meteorological, climatological, aquifer tests, maps, photographs, elevations, and reference publications. The report also describes the manner of storage and retrieval of the data.

INTRODUCTION

Purpose and Scope

The U.S. Geological Survey conducted an intensive investigation from December 1975 to December 1977 of the geohydrology of Osceola National Forest (ONF) (fig. 1).

The primary purpose of that two-year investigation was to determine the characteristics of the hydrologic system of Osceola National Forest and surrounding areas, with concentration, in a regional sense, on the four-county area of Baker, Columbia, Hamilton, and Suwannee Counties, in order to provide the understanding needed to predict the impact of potential phosphate industry operations in the forest on the natural hydrologic system. Specifically, the investigation sought to define: (1) the geologic environment; (2) the relevant ground- and surface-water hydrology and their interrelation, including water-quality considerations; and (3) the effects of phosphate mining, processing, and waste disposal on the hydrologic system of Osceola National Forest. The investigation involved test drilling, implementation of a hydrologic monitoring network, water-quality sampling, comprehensive aquifer tests, and literature study.

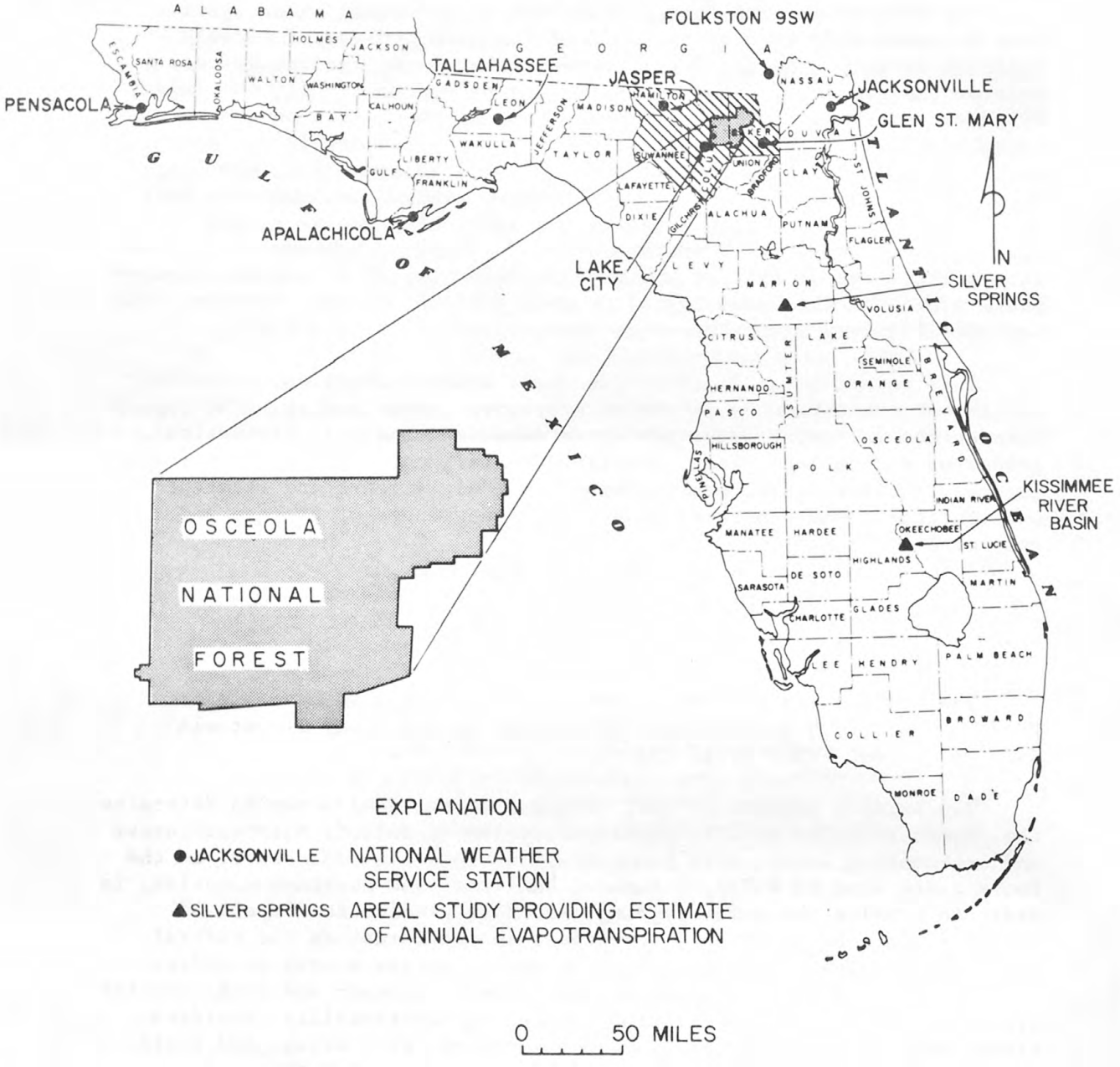

Figure 1.--Location of Osceola National Forest, Florida, the four-county regional area, National Weather Service stations, and areal studies in which estimates of evapotranspiration were derived.

The interpretive results of that investigation were published in 1978 by the U.S. Geological Survey in a 159-page Water Resources Investigation report (WRI 78-6) entitled "Impact of potential phosphate mining on the hydrology of Osceola National Forest, Florida" by James A. Miller, Gilbert H. Hughes, Robert W. Hull, John Vecchioli, and Paul R. Seaber. That interpretive report contains an evaluation of the effects that phosphate industry operations might have on the hydrologic system of the forest and environs. Some information is presented on the hydrologic effects of current mining activities on nearby private land in Hamilton County as a basis for evaluating potential changes to the hydrology of the forest should mining be permitted there.

The two-year investigation involved the collection, synthesis, and interpretation of numerous data obtained from field investigations, laboratory analyses, and published and unpublished sources and the data were published mainly in summary form in the interpretive report. This present report is an index to the type, source, location, and availability of the data used in the interpretive investigation. The references cited herein are those used by the authors of the interpretive report.

This report allows the identification, retrieval from storage, and, thus, the subsequent examination of all the original data used by the authors of the interpretive report. Therefore, interested readers of the interpretive report may secure the original data to make interpretations and to pursue interests of their own concerning the geology or hydrology of Osceola National Forest that were not dealt with in the interpretive report.

METHODS OF INVESTIGATION

The methods of investigation described below refer to those data-collection methods used in the Osceola National Forest interpretive study of Miller and others (1978). Additional information and explanation of water-data records are found in U.S. Geological Survey Water-Data Report FL-77-1, -4, "Water Resources Data for Florida--Water Year 1977" and similar editions for previous years.

Hydrogeology

Hydrogeologic data from within Osceola National Forest were meager prior to this investigation. Thus, a comprehensive test-drilling program was conducted in the Osceola National Forest. Ten sites, shown on figure 3 and listed in table 2 as ONF-1 through ONF-10, were selected for test drilling primarily on the basis of phosphate distribution as shown by the U.S. Forest Service (U.S. Department of the Interior, 1974, p. XI-5). Most sites are in areas known to be underlain by phosphate deposits with some locations chosen in poorly drained and some in well drained areas. Secondary considerations in site selection were to obtain a good geographic spread over the forest as a whole and to avoid areas where either drilling or subsequent water-level monitoring would interfere with forest-management practices.

Table 1.--Generalized description of hydrogeologic units in Osceola National Forest, Florida.

Hydrogeologic unit	Water bearing properties	Geologic unit		Age	Thickness (feet)	Lithology
Surficial aquifer	Water unconfined. Readily absorbs and stores precipitation until water table rises to land surface. Principal source of baseflow to streams draining forest. Uppermost member of Hawthorn Formation is hydraulically continuous with surficial deposits and forms lower part of surficial aquifer.	Unnamed		Post-Miocene	6-54	Medium-grained sand and blue-gray sandy clay. Local peat layers.
		A	Hawthorn Formation	Miocene	15-102	Brown phosphatic sand, yellow-brown to blue-gray clay, gray phosphatic shell limestone. Limestone more prominent in western part of forest.
Hawthorn confining unit	Because of comparatively low permeability, most of unit acts to retard the downward movement of water from the surficial aquifer to the Floridan aquifer. Member C yields small quantities of water under confined conditions. Basal limestone beds are not considered part of the Floridan aquifer in the Forest.	B			13-70	Green to greenish-gray massive clay. Often fractured. Black clay prominent.
		C			13-58	Green to greenish-gray fine- to medium grained sand. Contains clay and limestone to east of forest.
		D			5-43	Complexly interbedded shell limestone, clay, clayey sand, and fine-grained sandstone.
		E			14-73	Brown sandstone, tan to dark-brown limestone, dolomite, and argillaceous limestone. Fossiliferous, well indurated.
Floridan aquifer	Yields large quantities of water under confined conditions everywhere under Osceola National Forest.	Ocala Limestone*		Eocene	102+	White calcarenite at top, containing some green clay. Gray hard fractured limestone below. Penetrated 102 feet.

*The Suwannee Limestone of Oligocene age, which is part of the Floridan aquifer in places, was not found in the Osceola National Forest.

At each drilling site continuous coring was done through the entire thickness of the Hawthorn Formation (table 1). The Eocene beds comprising the Floridan aquifer were cored to a depth of 25 to 30 feet below their top if drilling conditions permitted. All of the 10 core holes were cased and completed as open-hole wells in the Floridan aquifer. A second shallower well was then completed at each site, and was screened either in the surficial aquifer or in permeable strata of the Hawthorn confining unit. Digital water-level recorders were installed on both the Floridan wells and the shallow wells and water-level data were collected during a 9- to 10-month period.

All cores taken were described megascopically on site and then processed in a sedimentation laboratory. The lithology and paleontology of the core samples were described in detail after examination with a binocular microscope. The mineralogy, cation-exchange capacity, and hydrologic parameters of selected cores from the aquifer-test site were analyzed by the U.S. Geological Survey Hydrologic Laboratory in Lakewood, Colorado.

Existing electric and induction-electric logs of oil-test wells near the boundaries of the forest were studied to determine the characteristics of pre-Eocene rocks, to outline the broad geologic framework of the area, and to identify the base of the Floridan aquifer. Natural gamma-ray logs were run in each deep test well drilled for this investigation, and single-point electric logs were run in four of these wells. An inventory of existing wells in and near the forest, conducted early in the investigation, revealed several water wells that penetrated the Floridan aquifer. Natural gamma-ray logs were run in these wells in order to obtain additional data on subsurface conditions in the area.

One of the ten test-drilling sites (ONF-2) was chosen for detailed aquifer testing to determine the vertical and horizontal hydraulic properties of the Floridan aquifer and the Hawthorn confining unit. Twenty-one observation wells for water-level measurements, two production wells, and three test holes for extensometer measurements were installed and instrumented at this aquifer-test site. Rainfall, air temperature, relative humidity, and barometric pressure were recorded at this aquifer-test site, in addition to water levels, from September 28, 1976, through May 20, 1977.

Surface Water

Twenty-four surface-water measuring sites were used in the Osceola National Forest study to interpret the surface-water hydrology. Six stream gaging sites were established, reestablished, or modified specifically for the investigation. Three of these sites were on streams that drain the forest and three were on streams that drain Hamilton County, two of which included drainage from the active phosphate mining area. The other eighteen stations were used for regionalization of surface-water characteristics for comparison with the forest area or to facilitate extrapolation of data.

Water Quality

Surface-water samples for chemical and physical analyses were collected monthly at the six newly-established sites. Additional samples were collected at these sites for analysis on a hydrologic event basis, that is, floods or low flows. Laboratory analytical determinations included major inorganic dissolved constituents; trace elements, or minor inorganic dissolved constituents, including radioactive components; nutrients; organic carbon; and suspended sediment. Standard field determinations were made of pH, dissolved oxygen, specific conductance, and temperature.

Ground-water samples obtained from all satisfactorily producing test wells in Osceola National Forest were analyzed for chemical and physical quality, as were samples obtained from selected wells in the existing mining area in Hamilton County. Parameters determined from the Osceola National Forest ground-water samples were the same as those determined from surface-water sites, except for dissolved oxygen and suspended sediment results. Ground-water samples obtained from wells in and around the forest and in the existing mining area were analyzed only for major constituents and for the standard field measurements (see table 6).

All water samples were collected and analyzed in accordance with the methods described by Brown, Skougstad, and Fishman (1970), Goerlitz and Brown (1972), and Fishman and Brown (1976). All water samples analyzed for dissolved constituents were filtered immediately after collection with a 0.45 micron filter.

SITE IDENTIFICATION

Each data-collection site is identified by a report map reference number, site number, and local station name or identifier. Ground-water sites are given a local station identifier and surface-water sites a local station name.

The numbers, names, and identifiers are identical to those used in the Osecola National Forest interpretive report of Miller and others (1978). However, some of the wording of the column heading designations has been changed on the tables used in this report from that used in the tables in the interpretive report. Ground-water sites in the interpretive report in table 5 in Miller and others, 1978 (p. 35-37), have the map reference numbers listed under the heading of local site/well number and site numbers listed under the heading of USGS site identification number. Surface-water sites in the interpretive report in table 4 in Miller and others, 1978 (p. 21-23), have the map reference numbers listed under the heading of station number, site numbers listed under the heading of downstream order number, and station names listed under the heading of name and location.

Ground-water Sites

The ground-water site numbering system for wells and test holes is based on a grid system of latitude and longitude (fig. 2). This system provides the geographic location of the well or test hole and a unique 15-digit number for each site. The first 6 digits of the site numbering system denote the degrees, minutes, and seconds of latitude, the next 7 digits denote degrees, minutes, and seconds of longitude, and the last 2 digits are a sequential number for sites located within a 1-second grid. Thus, in the event the latitude-longitude coordinates for two individual sites are identical, the last two sequential numbers serve to differentiate each particular site.

Ground-water sites have been given local station identifiers for report reference convenience. All wells and test holes designated ONF were installed by the U.S. Army Corps of Engineers under the direction of the U.S. Geological Survey during the course of the investigation. Test holes designated Shuter are exploratory holes drilled by the U.S. Geological Survey. Other wells or test holes are named for either a county, a town, an owner, or a nearby dominant landmark. Wells designated ONF-#, Floridan, Hawthorn, or Surficial are wells that were used to obtain continuous water-level records as part of the forest-wide hydrologic data network. The terms Floridan, Hawthorn, and Surficial identify the hydrogeologic unit in which the well is finished or screened. For the aquifer testing at local identifier site ONF-2, test holes designated as OBS were used as observation wells for ground-water levels, test holes designated as Prod. were used as production wells, and those designated as E-# were used for extensometer installations. For the oil-test wells, the first designation signifies the drilling company and the second designation signifies the lease owner, "Getty, #1 Marsh", for example. Each water-quality ground-water station has the same identification as the well or test hole from which the water-quality sample was obtained.

Surface-water Sites

Each surface-water gaging station, partial-record station, and water-quality station is assigned a unique station number by the U.S. Geological Survey. This number is an eight-digit number in downstream order beginning sequentially at the headwaters of the mainstream. The number is comprised of a 2-digit part or regional number followed by a 6-digit downstream order number. The part or regional number refers to an area whose boundaries coincide with certain natural drainage lines. Stations on tributaries are numbered between stations on the mainstream in the order in which those tributaries enter a mainstream. Thus, stations on tributaries entering above a mainstream station have lower numbers than the downstream mainstream station. Correspondingly, stations on tributaries to tributaries are numbered in a similar manner. All records for a drainage basin encompassing more than one state can be arranged in downstream order. Water-quality stations located at or near gaging stations or partial-record stations have the same station number as the gaging or partial-record station.

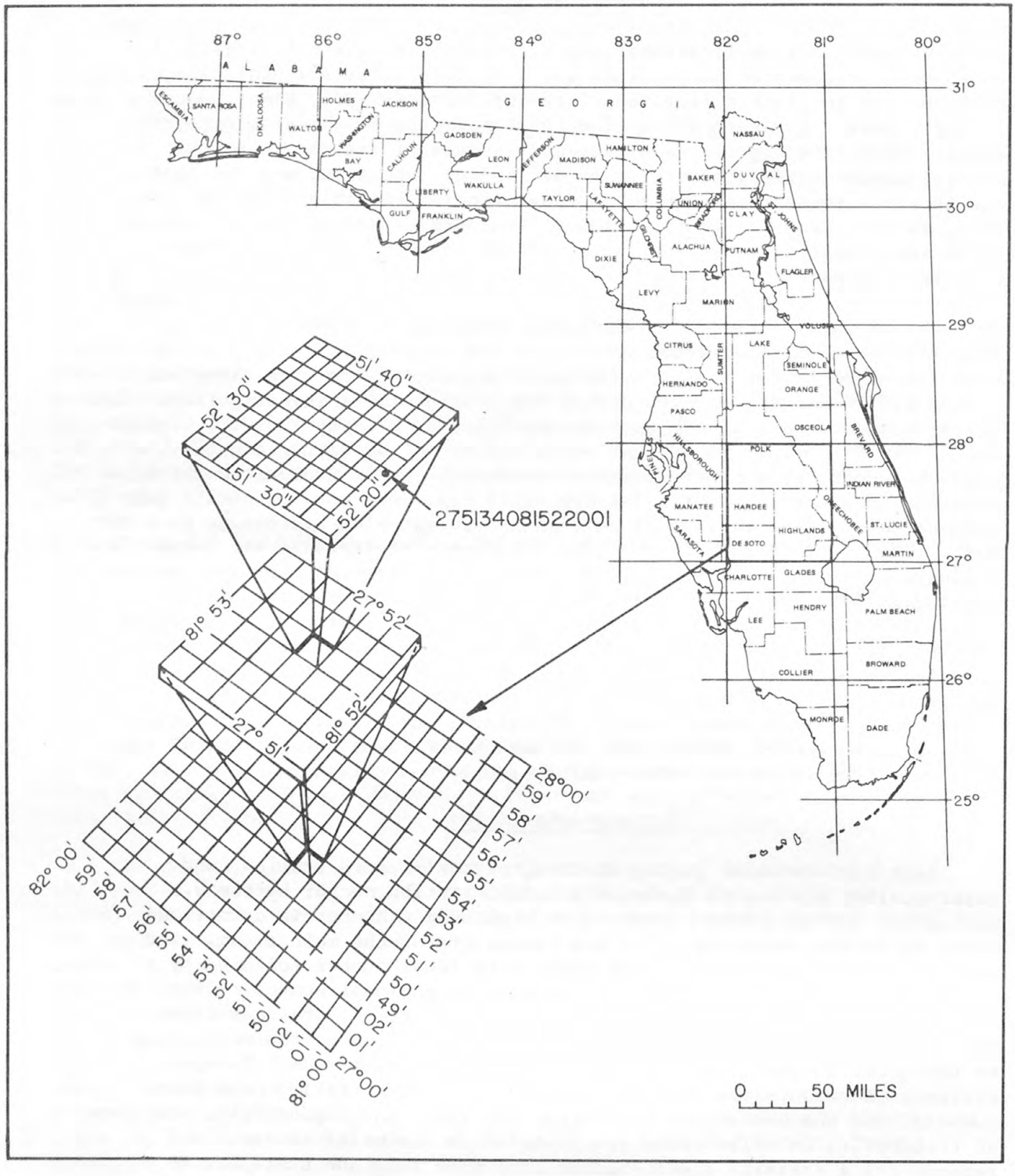

Figure 2.--Site numbering system for Florida.

Water-data measurements collected for some special purpose or reason at sites not included in the permanent gaging station or partial-record program are called measurements at miscellaneous sites.

Downstream order station numbers are not assigned to wells, test holes, nor to miscellaneous sites where only random water-quality samples or discharge measurements are taken. Surface-water stations not given a downstream order number are assigned a 15-digit number based on latitude and longitude, according to the system described for ground-water site numbering.

Surface-water sites are named for the stream on which they are located and a nearby town or city.

Additional information on station identification, including definition of terms, as well as an explanation of water-data records, is found in U.S. Geological Survey Water-Data Report FL-77-1, -4, "Water Resources Data for Florida--Water Year 1977" and similar editions for previous years.

WATER-RESOURCES DATA AVAILABILITY INDEX

This report is specifically designed to make available to users all information that was collected, processed, and used in the Osceola National Forest investigation. The report presents the data without interpretation, recommendation, or conclusion. The information falls into two categories. The first is information collected, processed, and published prior to the investigation, and the second is information collected during the course of the investigation.

The first type has been published in the reports listed under selected references (p. 36). Much of the data collected prior to the investigation has been published by the U.S. Geological Survey in a series of reports entitled "Surface Water Supply of the United States" (1900-1970), "Quality of Surface Waters of the United States" (1941-70), and "Ground Water Levels in the United States" (1940-74). These reports contain tabulations of discharge (streamflow), reservoir storage, chemical and biological analyses, sediment determinations, water temperatures, ground-water levels, and other information related to the area of direct concern to the Osceola National Forest interpretive study.

The publication of surface-water and water-quality data nationwide in U.S. Geological Survey Water Supply Papers was discontinued after 1970. In 1975, statewide rather than nationwide reports were declared to be the official data reports of the Water Resources Division in a new series called U.S. Geological Survey Water-Data Reports and the data for 1971 through 1974 have been incorporated into this new series to provide continuity. For Florida, the series of reports is entitled "Water Resources Data for Florida--Water Year 19__", and covers surface-water, ground-water, and water-quality data. These reports, sold by the National Technical Information Service, can be inspected in U.S. Geological

Survey libraries and in Water Resources Division offices in the State of the report. In the new series, which in Florida is comprised of four volumes with each volume covering a geographic portion of the State, all surface-water, water-quality, and ground-water data are combined in each volume. The geographic breakdowns are: volume 1--Northeast Florida; volume 2--South Florida; volume 3--Southwest Florida; and volume 4--Northwest Florida. For the Osceola four-county area, the data for Columbia, Hamilton, and Suwannee Counties are published in volume 4, and the data for Baker County in volume 1.

Much of the water-resources data collected during the Osceola National Forest investigation has been or will be published in this State Water-Data Report series beginning with water year 1976 (October 1, 1975 to September 30, 1976.

Geological and Geophysical

The wells and test holes from which geological and geophysical data were collected for the Osceola National Forest investigation are listed in table 2 by map reference number and their geographical location is shown on figure 3.

Core material obtained during the investigation at map reference number 2 is stored by the Water Resources Division, U.S. Geological Survey, Tallahassee. Samples from the cored test holes at map reference numbers 1 and 3 through 10 are stored by the Florida Bureau of Geology, Tallahassee, Fla. Samples from the "matrix" or potential phosphate ore zone were obtained by the Conservation Division of the U.S. Geological Survey for analysis of phosphate content at the U.S. Bureau of Mines laboratory at Tuscaloosa, Ala.

Geophysical logs were run by the U.S. Geological Survey logging unit in test holes at map reference numbers 2 through 10, as well as at water wells at map reference numbers 11 through 14 and 17 through 19. Originals of these logs are on file with the U.S. Geological Survey, Tallahassee, along with copies of logs from test holes at map reference numbers 1A, 1B, 15, and 16, which were logged by the St. Johns River Water Management District, Palatka, Fla. who retained the original logs. Test holes at map reference numbers 20 through 23 are oil-test wells. Copies of geophysical logs from these oil-test wells are on file at the Florida Bureau of Geology, Tallahassee.

Material obtained from the test hole at map reference number 2B was analyzed for particle size distribution by the Department of Geology, Florida State University, Tallahassee. Visual description, mineralogy (including clay mineralogy), particle size distribution, cation exchange capacity, and selected hydraulic properties were determined for eight cored intervals from the test hole at map reference number 2V by the U.S. Geological Survey Central Laboratory, Denver, Colo. The results of these analyses and descriptions are on file with the U.S. Geological Survey, Tallahassee.

Table 2.--Geological and geophysical data index.

Map reference number: See figures 3 and 6 for well and test hole locations.
Local identifier: OBS, observation well; Prod., production well, E-1, extensometer number 1.
Log: G, gamma-ray; E, electric; L, lithologic.

Map reference number	Site number	Local identifier	Material or data collected: Core (and diameter) 6"	2"	Washed sample	Log G	Log E	Log L	Microfauna slides
1A	302243082360201	ONF-1, Floridan	*		*	*	*	*	*
1B	302243082360202	ONF-1, Surficial			*				
2A	301933082350502	ONF-2, OBS. #1							
2B	301933082350501	ONF-2, OBS. #2	*		*	*		*	*
2C	301933082350503	ONF-2, OBS. #3			*				
2D	301933082350504	ONF-2, OBS. #4			*				
2E	301933082350505	ONF-2, OBS. #5			*				
2F	301933082350506	ONF-2, OBS. #6							
2G	301933082350507	ONF-2, OBS. #7			*				
2H	301933082350508	ONF-2, OBS. #8			*				
2I	301933082350509	ONF-2, OBS. #9			*				
2J	301933082350510	ONF-2, OBS. #10			*				
2K	301933082350511	ONF-2, OBS. #11							
2L	301933082350512	ONF-2, OBS. #12			*				
2M	301933082350513	ONF-2, OBS. #13			*				
2N	301933082350514	ONF-2, OBS. #14			*				
2O	301933082350515	ONF-2, OBS. #15			*				
2P	301933082350516	ONF-2, OBS. #16			*				
2Q	301933082350517	ONF-2, OBS. #17			*				
2R	301933082350518	ONF-2, OBS. #18			*				
2S	301933082350519	ONF-2, OBS. #19			*				
2T	301933082350520	ONF-2, OBS. #20			*				
2U	301933082350521	ONF-2, 8" Prod.							
2V	301933082350522	ONF-2, 18" Prod.	*		*	*	*	*	
2W	301939082352401	ONF-2, OBS. #21							
2X	301933082350523	ONF-2, E-1							
2Y	301933082350524	ONF-2, E-2							
2Z	301933082350525	ONF-2, E-3							
3A	302052082312401	ONF-3, Floridan	*		*	*	*	*	
3B	302052082312402	ONF-3, Hawthorn				*			
4A	301945082292201	ONF-4, Floridan	*		*	*	*	*	*
4B	301945082292202	ONF-4, Hawthorn			*				
5A	302115082232201	ONF-5, Floridan	*		*	*		*	
5B	302115082232202	ONF-5, Hawthorn				*			
6A	302251082194901	ONF-6, Floridan	*		*	*		*	
6B	302251082194902	ONF-6, Hawthorn				*			
7A	301702082271501	ONF-7, Floridan	*		*	*		*	*
7B	301702082271502	ONF-7, Surficial				*			

* Material or data collected: Data available.

Table 2.--Geological and geophysical data index.--Continued

Map reference number	Site number	Local identifier	Material or data collected: Core (and diameter) 6"	Core (and diameter) 2"	Washed sample	Log G	Log E	Log L	Microfauna slides
8A	301635082234001	ONF-8, Floridan	*		*	*		*	*
8B	301635082234002	ONF-8, Hawthorn				*			
9A	301437082324801	ONF-9, Floridan	*		*	*	*	*	
9B	301437082324802	ONF-9, Hawthorn				*			
10A	301307082355001	ONF-10, Floridan	*		*	*		*	*
10B	301307082355002	ONF-10, Surficial				*			
11	302620082173501	B-9, Floridan				*			
12	301535082166001	B-11, Floridan				*			
13	302009082362001	Thomas Road				*			
14	301031082381001	C-9, Floridan				*			
15	301823082354401	Shuter #1		*		*			
16	302136082351201	Shuter #2		*		*			
17	301228082335701	Forest Service				*			
18	301822082393901	New Hope School				*			
19	301253082363201	Gum Swamp Road				*			
20	300945082274001	National Turpentine, #1 Fee					*		
21	300930082343001	Sun, #1 Bishop					*		
22	301621082370601	Getty, #1 Marsh					*		
23	301340082360501	Getty, #2 Holmes					*		

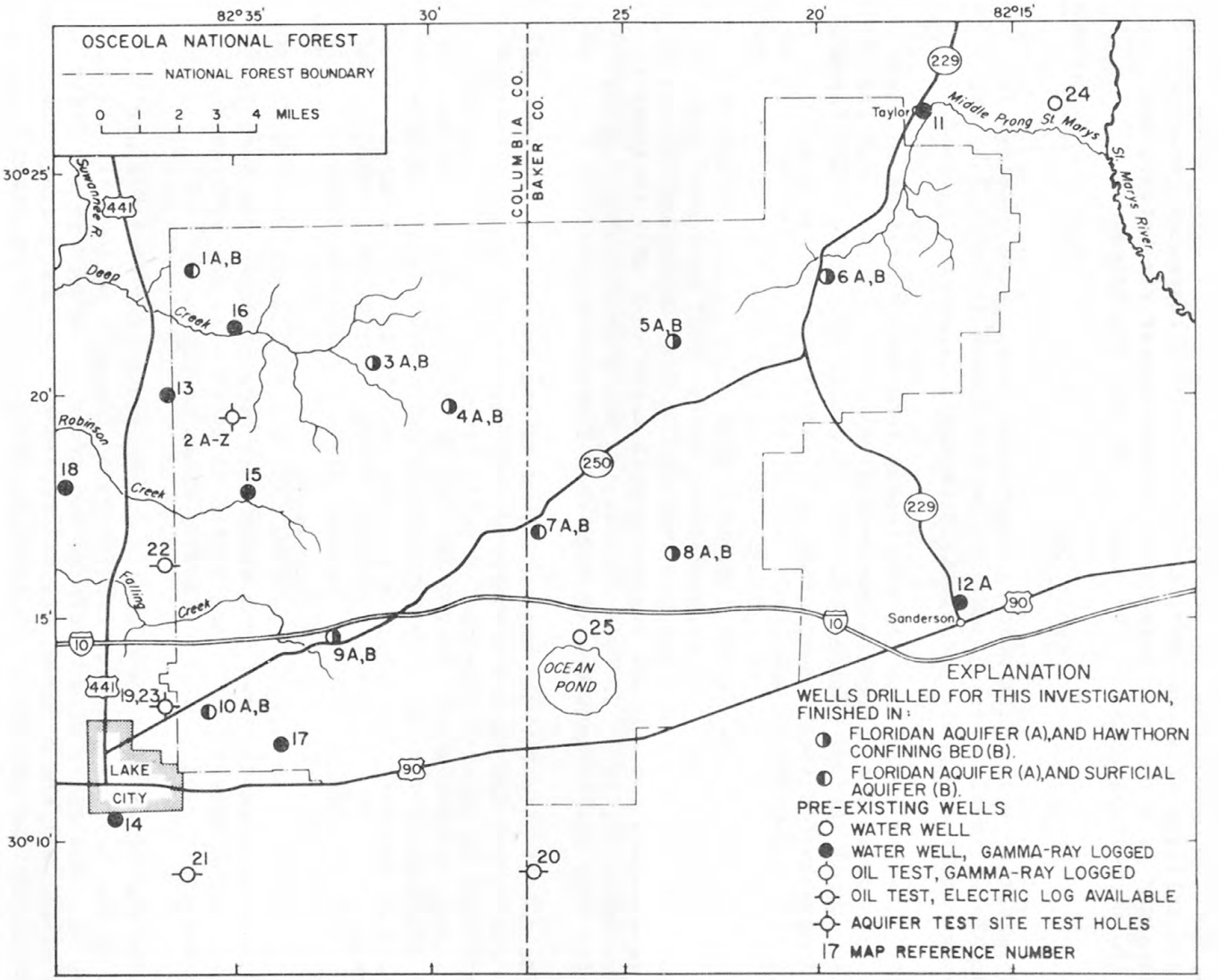

Figure 3.--Location of test holes and wells from which hydrologic, geologic, and geophysical data were obtained for the investigation of Osceola Naitonal Forest, Florida.

Washed samples from all cores processed in a sedimentation laboratory prior to lithologic description are stored with the U.S. Geological Survey, Tallahassee.

A U.S. Geological Survey Open-File Report 78-799 by James A. Miller, 1978, entitled "Geologic and geophysical data from Osceola National Forest, Florida" describes the detailed lithology of the cores taken from test drilling at sites ONF-1 through ONF-10, illustrates gamma-ray logs obtained from the test holes and from wells near the forest, and lists the microfauna obtained and identified from the cores.

Ground Water

Observation wells from which ground-water levels were obtained for the Osceola National Forest investigation are listed in table 3 by map reference number and their geographic location is shown on figure 3.

All data collected from the continuous recorders installed on these observation wells are stored in the central computer facilities of the U.S. Geological Survey, Reston, Va. The original digital recorder tapes and hydrographs for these observation wells are stored by the U.S. Geological Survey, Tallahassee.

Information concerning the location, site description, period of record (station history), instrumentation, water-level extremes, and current annual water levels are reported in the U.S. Geological Survey Water-Data Report for Florida beginning with water year 1977 (October 1, 1978-September 30, 1977) for all observation wells established specifically for this investigation with more than 3 months record.

The cutoff date for the data utilized in the interpretive report of Miller and others (1978) was March 1977, but water-level data collection has continued on several observation wells after that date. Observation wells at map reference numbers 1A, 1B, 3A, 3B, 6A, 6B, 9A, and 14 are active sites as of September 1978, equipped with continuous recorders and wells at map reference numbers 11, 12, 24, and 25 are measured bimonthly.

Surface Water

The surface-water sites from which data were obtained for Osceola National Forest investigation are listed in table 4 by map reference number and their geographic location is shown on figure 4.

Data collected from these continuous-record gaging stations are stored by the central computer facilities of the U.S. Geological Survey, Reston, Va. The daily mean discharge and stage are stored in the Daily Values File. All the original digital recorder tapes and hydrographs for these stations are stored by the U.S. Geological Survey,Water Resources Division, Tallahassee.

Table 3.--Ground-water data index.

Map reference number: See figures 3 and 6 for observation well locations.
Period of record: +-Active site as of September 1978.
Frequency of record: I-Continuous recorder instrument used;
B-Bimonthly measurement.

Map reference number	Site number	Local identifier	Period of record	Frequency of record
1A	1/ 302243082360201	ONF-1, Floridan	06/10/76- +	I
1B	1/ 302243082360202	ONF-1, Surficial	06/10/76- +	I
2A	1/ 301933082350502	ONF-2, OBS. 1	06/24/76-08/18/76	I
2B	1/ 301933082350501	ONF-2, OBS. 2	08/05/76-03/77	I
3A	1/ 302052082312401	ONF-3, Floridan	06/10/76- +	I
3B	1/ 302052082312402	ONF-3, Hawthorn	06/10/76- +	I
4A	1/ 301945082292201	ONF-4, Floridan	08/17/76-03-77	B
4B	1/ 301945082292202	ONF-4, Hawthorn	08/17/76-03/77	I
5A	1/ 302115082232201	ONF-5, Floridan	08/03/76-03/77	I
5B	1/ 302115082232202	ONF-5, Hawthorn	08/03/76-03/77	I
6A	1/ 302251082194901	ONF-6, Floridan	08/03/76- +	I
6B	1/ 302251082194902	ONF-6, Hawthorn	08/17/76- +	I
7A	1/ 301702082271501	ONF-7, Floridan	10/21/76-03/77	I
7B	1/ 301702082271502	ONF-7, Surficial	08/16/76-03/77	I
8A	1/ 301635082234001	ONF-8, Floridan	09/17/76-03/77	I
8B	1/ 30163582234002	ONF-8, Hawthorn	08/17/76-03/77	I
9A	1/ 301437082324801	ONF-9, Floridan	08/16/76- +	I
9B	1/ 301437082324802	ONF-9, Hawthorn	08/16/76-03/77	I
10A	1/ 301307082355001	ONF-10,Floridan	08/04/76-03/77	I
10B	1/ 301307082355002	ONF-10,Surficial	06/10/76-03/77	I
11	302620082173501	B-9, Floridan	10/63 - +	B
12	301535082162001	B-11, Floridan	08/63 - +	B
14	301031082381001	Columbia 9, Fla.	08/42; 06/48-+	B
24	302610082143001	B-12, Hawthorn	12/60 - +	B
25	301423082261101	B-15, Floridan	06/57; 12/60; 12/62 - +	B

1/ Stations established specifically for this investigation.

Table 4.--Streamflow data index.

Map reference number: See figure 4 for station location.
Period of record: +-Active site as of September 1978.
Frequency of record: I-Continuous recorder instrument used; D-Daily, W-Weekly, P-Other periodic (at least six times a year), Z-Data collected at an irregular or unspecified frequency.

Map reference number	Site number	Station name	Period of record (month and year)	Frequency of record
1	02228500	North Prong St. Marys River at Moniac, Ga.	01/21-12/23	D
			01/27-06/30	D
			07/32-06/34	D
			10/50-12/50	D
			12/50- +	I
2	1/ 02229000	Middle Prong St. Marys River at Taylor, Fla.	09/55-09/67	I
			04/76- +	I
3	02229500	South Prong St. Marys River near Sanderson, Fla.	09/55-12/60	D
4	02230500	South Prong St. Marys River at Glen St. Mary, Fla.	01/50-09/71	I
5	02231000	St. Marys River near Macclenny, Fla.	10/26-02/39	D
			02/39- +	I
6	02314500	Suwannee River at Fargo, Ga.	01/21-09/23	D
			01/27-12/31	D
			04/37-11/52	D
			11/52- +	I
7	1/ 02314986	Rocky Creek near Belmont, Fla.	08/70-05/76	P
			05/76- +	I
8	02315000	Suwannee River near Benton, Fla.	07/34-09/75	Z
			10/75- +	D
9	1/ 02315005	Hunter Creek near Belmont, Fla.	05/70-08/71	Z
			08/71- +	P
10	1/ 32315200	Deep Creek near Suwannee Valley, Fla.	05/65-04/76	Z
			04/76- +	I
11	1/ 02315392	Robinson Creek near Suwannee Valley, Fla.	04/76- +	I

Table 4.--Streamflow data index. (Continued)

Map reference number	Site number	Station name	Period of record (month and year)	Frequency of record
12	02315500	Suwannee River at White Springs, Fla.	05/06-12/08 02/27-07/32 08/32- +	D D I
13	1/ 02315520	Swift Creek at Facil, Fla.	08/69-05/76 05/76- +	P I
14	02315550	Suwannee River at Suwannee Springs, Fla.	1906 - 1960 11/60-09/74 10/74- +	Z D I
15	02317500	Alapaha River at Statenville, Ga.	01/21-06/21 10/31-11/52 11/52- +	D D I
16	02319000	Withlacoochee River near Pinetta, Fla.	10/31-12/41 12/41-08/72 08/72- +	D I D
17	02319500	Suwannee River at Ellaville, Fla.	01/27-06/32 06/32- +	D I
18	02321500	Sante Fe River at Worthington Springs, Fla.	10/31-07/53 07/53- +	D I
19	02322500	Sante Fe River near Fort White, Fla.	10/27-06/32 06/32- +	D I
20	02228700	Ocean Pond at Olustee, Fla.	12/74-12/76 01/77- +	D W
21	02315090	Roaring Creek near Belmont, Fla.	05/70-03/77	Z
22	02315450	Watertown Lk. at Watertown, Fla.	08/66-02/67	Z
23	301945082411800	Bell Spring	03/77- +	Z
24	301539082400600	Falling Creek at Winfield	03/77- +	Z
25	02323500	Suwannee River near Wilcox, Fla.	10/30-09/31 10/41-01/51 01/51- +	D D I

1/ Stations established specifically for this investigation.

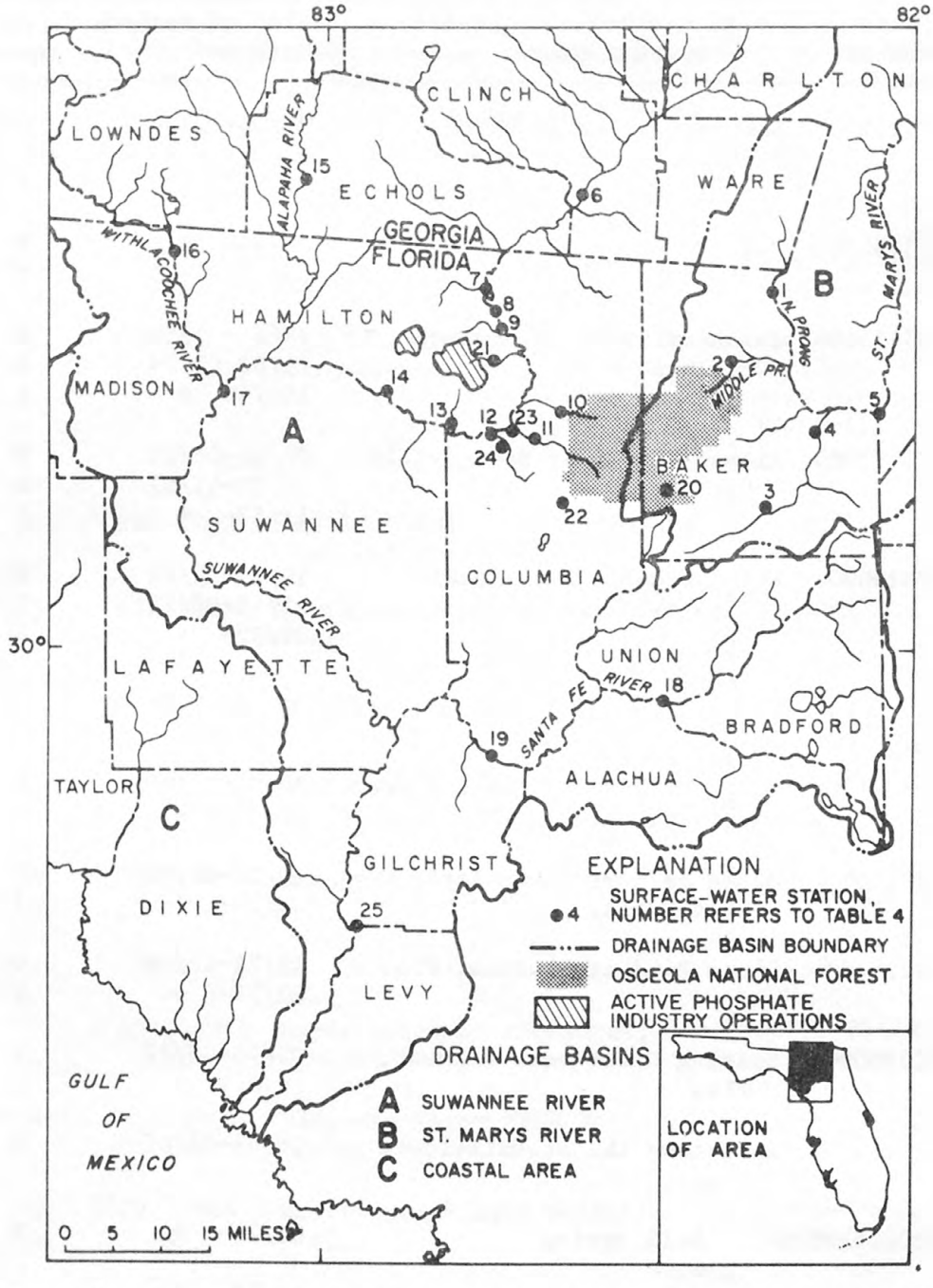

Figure 4.--Drainage basins in parts of north Florida and south Georgia and location of stations from which surface-water data were obtained for the investigation of Osceola National Forest, Florida.

The maximum and minimum discharges and gage height for each water year (October 1 to September 30), period of record, mean daily discharges, mean gage heights, and gaging station descriptions are published annually in the U.S. Geological Survey's Water-Data Report for Florida. Individual discharge measurements for partial-record stations and miscellaneous sites are also published annually in the same report. These measurements and records are kept on file by the U.S. Geological Survey, Tallahassee. All surface-water sites established specifically for this investigation were still in operation as of September 1978.

For surface-water sites where water-quality data are collected, the discharge and stage measurements are also stored with the chemical data in the Water Quality File of the Computer Center, U.S. Geological, Reston, Va., and the discharges are published annually in the water-quality records section of the Water-Data Report for Florida.

Quality of Water

Sites from which water-quality data were obtained for the Osceola National Forest investigation are listed by map reference number in table 5 for surface-water sites and in table 6 for ground-water sites. The geographic locations of the ground-water sites are shown in figure 3 and of the surface sites in figure 4, except for the locations of sites in the active mining area in Hamiliton County which are shown in figure 5. These tables indicate the date or dates during which the sampling occurred and the type of water-quality data collected at each site.

All the results of the water-quality analyses collected for the Osceola National Forest investigation are stored in the Water Quality File of the central computer facilities of the U.S. Geological Survey, Reston, Va., as well as by the U.S. Geological Survey, Tallahassee. These analyses are published annually in the U.S. Geological Survey Water-Data Report for Florida.

Continuous temperature and specific-conductance data were collected at the station on Swift Creek at Facil (map reference number 13, fig. 4). Daily maximums, minimums, and means for these data are stored in the Daily Values File of the central computer facilities of the U.S. Geological Survey, Reston, Va. The original digital recorder tapes and graphical plots of these data are stored by the U.S. Geological Survey, Tallahassee.

The mineral constituents and physical properties of waters analyzed by the U.S. Geological Survey include those that have a practical bearing on water use. The results of analyses generally include silica, iron, calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, fluoride, nitrate, pH, dissolved solids, and specific conductance. Aluminum, manganese, color, dissolved oxygen, and other dissolved constituents and physical properties are reported for certain waters. Microbiologic, organic components, and minor or trace elements are determined occasionally for some waters in connection with specific studies and the results reported. Nineteen selected trace elements were

Table 5.--Surface-water quality data index.

Map reference number: See figure 4 for station locations of sites outside the phosphate industry operations and figure 5 for station locations of sites within the phosphate industry operations in Hamilton County, Florida.

Stations 4-7 are Florida Department of Environmental Regulation station numbers. Stations 22-27 are spillway numbers in the phosphate industry operations. All can be considered specific source sites.

Period of record or date sampled: + Active site as of September 1978.

Data collected: * Data available.

Map reference	Site Number	Station name	Period of record (month & year or sample)	Data collected: Nutrients	Major constituents	Field determinations	Radiochemical parameters	Suspended sediments	Trace elements
		Sites outside the phosphate industry operations.							
2	1/02229000	Middle Prong St. Marys River at Taylor, Fla.	08/66-02/67	*	*	*			
			04/76-03/77	*	*	*	*	*	*
			04/77- +	*	*	*	*		*
7	1/02314986	Rocky Creek near Belmont, Fla.	10/70-03/76	*	*	*		*	
			04/76-03/77	*	*	*	*	*	*
			04/77- +	*	*	*	*		*
8	1/02315000	Suwannee River near Benton, Fla.	04/56-03/77	*	*	*			
			04/77- +	*		*			
9	1/02315005	Hunter Creek near Belmont, Fla.	11/67-03/76	*	*	*		*	
			04/76-03/77	*	*	*	*	*	*
			04/77- +	*	*	*	*		*
10	1/02315200	Deep Creek near Suwannee Valley, Fla.	03/76-03/77	*	*	*	*	*	*
			04/77- +	*	*	*	*		*
11	1/02315392	Robinson Creek near Suwannee Valley, Fla.	03/76-03/77	*	*	*	*	*	*
			04/77- +	*	*	*	*		*
12	1/02315500	Suwannee River at White Springs, Fla.	05/06-12/08	*	*	*			
			02/27-03/77	*	*	*	*	*	*
			04/77- +	*		*			
13	1/02315520	Swift Creek at Facil, Fla.	08/69-03/76	*	*	*		*	
			04/76-03/77	*	*	*	*	*	*
			04/77- +	*	*	*	*		*
14	1/02315550	Suwannee River at Suwannee Springs, Fla.	11/60-09/74	*	*	*			
			10/74-03/77	*	*	*		*	
			04/77- +	*		*			
20	02287000	Ocean Pond at Olustee, Fla.	08/66-03/77	*	*	*			

Table 5.--Surface-water quality data index. (Continued)

Map reference	Site Number	Station name	Period of record (month & year or sample)	Data collected: Nutrients	Major constituents	Field determinations	Radiochemical parameters	Suspended sediments	Trace elements
21	02315090	Roaring Creek near Belmont, Fla.	11/67-08/70	*	*	*			
			03/77- +	*	*	*	*	*	*
22	02315450	Watertown Lk. at Watertown, Fla.	08/66-03/77	*	*	*			
23 [1/]	301945082411800	Bell Spring	03/77- +	*	*	*			
24 [1/]	301539082400600	Falling Creek near Winfield, Fla.	03/77- +	*	*	*		*	
		Sites at the phosphate industry operations in Hamilton County, Florida.							
4	302505082472401	DER site #4	10/19/76- +	*	*	*	*	*	*
5	302548082480301	DER site #5	10/19/76- +	*	*	*	*	*	*
6	302430082472501	DER site #6	10/19/76- +	*	*	*	*	*	*
7	302512082470901	DER site #7	10/19/76- +	*	*	*	*	*	*
22	302744082441201	Spillway #22	10/18/76- +	*	*	*	*	*	*
27	302743082463001	Spillway #27	10/18/76- +	*	*	*	*	*	*

[1/] Stations established, re-established, or modified specifically for this investigation.

Table 6.--Ground-water quality data index.

Map reference number: See figures 3 and 6 for station locations of sites outside the phosphate industry operations and figure 5 for station locations of sites within the phosphate industry operations in Hamilton County, Florida.

Map reference number	Site number	Local identifier	Date sampled	Data collected: Nutrients	Major constituents	Field determinations	Radiochemical parameters	Trace elements
Sites Outside the Phosphate Industry Operations								
1A	302243082360201	ONF-1, Floridan	11-14-76	*	*	*	*	*
1B	302243082360202	ONF-1, Surficial	11-13-76		*	*		
2A	301933082350502	ONF-2, OBS. #1	11-13-76		*	*		
2B	301933082350501	ONF-2, OBS. #2	11-11-76	*	*	*	*	*
2D	301933082350504	ONF-2, OBS. #4	11-13-76		*	*		
2E	301933082350505	ONF-2, OBS. #5	11-12-76	*	*	*	*	*
2F	301933082350506	ONF-2, OBS. #6	11-12-76	*	*	*	*	*
2H	301933082350508	ONF-2, OBS. #8	11-12-76		*	*		
2I	301933082350509	ONF-2, OBS. #9	11-11-76		*	*		
2K	301933082350511	ONF-2, OBS. #11	11-11-76		*	*		
2R	301933082350518	ONF-2, OBS. #18	11-12-76	*	*	*	*	*
2S	301933082350519	ONF-2, OBS. #19	11-12-76	*	*	*	*	*
2U	301933082350521	ONF-2, 8" Prod.	03-23-77		*	*		
2V	301933082350522	ONF-2, 18" Prod.	03-31-77		*	*		
3A	302052082312401	ONF-3, Floridan	11-10-76	*	*	*		
3B	302052082312402	ONF-3, Hawthorn	11-10-76	*	*	*		
4A	301945082292201	ONF-4, Floridan	11-15-76	*	*	*	*	*
4B	301945082292202	ONF-4, Hawthorn	11-15-76	*	*	*	*	*
5A	302115082232201	ONF-5, Floridan	11-16-76	*	*	*	*	*
5B	302115082232202	ONF-5, Hawthorn	11-16-76	*	*	*	*	*
6A	302251082194901	ONF-6, Floridan	11-16-76	*	*	*	*	*
6B	302251082194902	ONF-6, Hawthorn	11-16-76	*	*	*	*	*
7A	301702082271501	ONF-7, Floridan	11-15-76	*	*	*	*	*
7B	301702082271502	ONF-7, Surficial	11-15-76	*	*	*	*	*
8A	301635082234001	ONF-8, Floridan	11-17-76	*	*	*	*	*
8B	301635082234002	ONF-8, Hawthorn	11-17-76	*	*	*	*	*
9A	301437082324801	ONF-9, Floridan	11-14-76	*	*	*	*	*
9B	301437082324802	ONF-9, Hawthorn	11-14-76	*	*	*	*	*
10A	301307082355001	ONF-10, Floridan	11-09-76	*	*	*		
10B	301307081255002	ONF-10, Surficial	11-09-76	*	*	*		

Table 6.--Ground-water quality data index. (Continued)

Map reference number	Site number	Local identifier	Date sampled	Data collected: Nutrients	Major constituents	Field determinations	Radiochemical parameters	Trace elements
Sites within the Phosphate Industry Operations in Hamilton County, Florida								
C1	302626082470301	C-1	03-14-77		*	*		
C2	302634082470601	C-2	03-14-77		*	*		
M1	302612082460101	M-1	03-13-77		*	*		
M2	302616082460501	M-2	03-14-77		*	*		

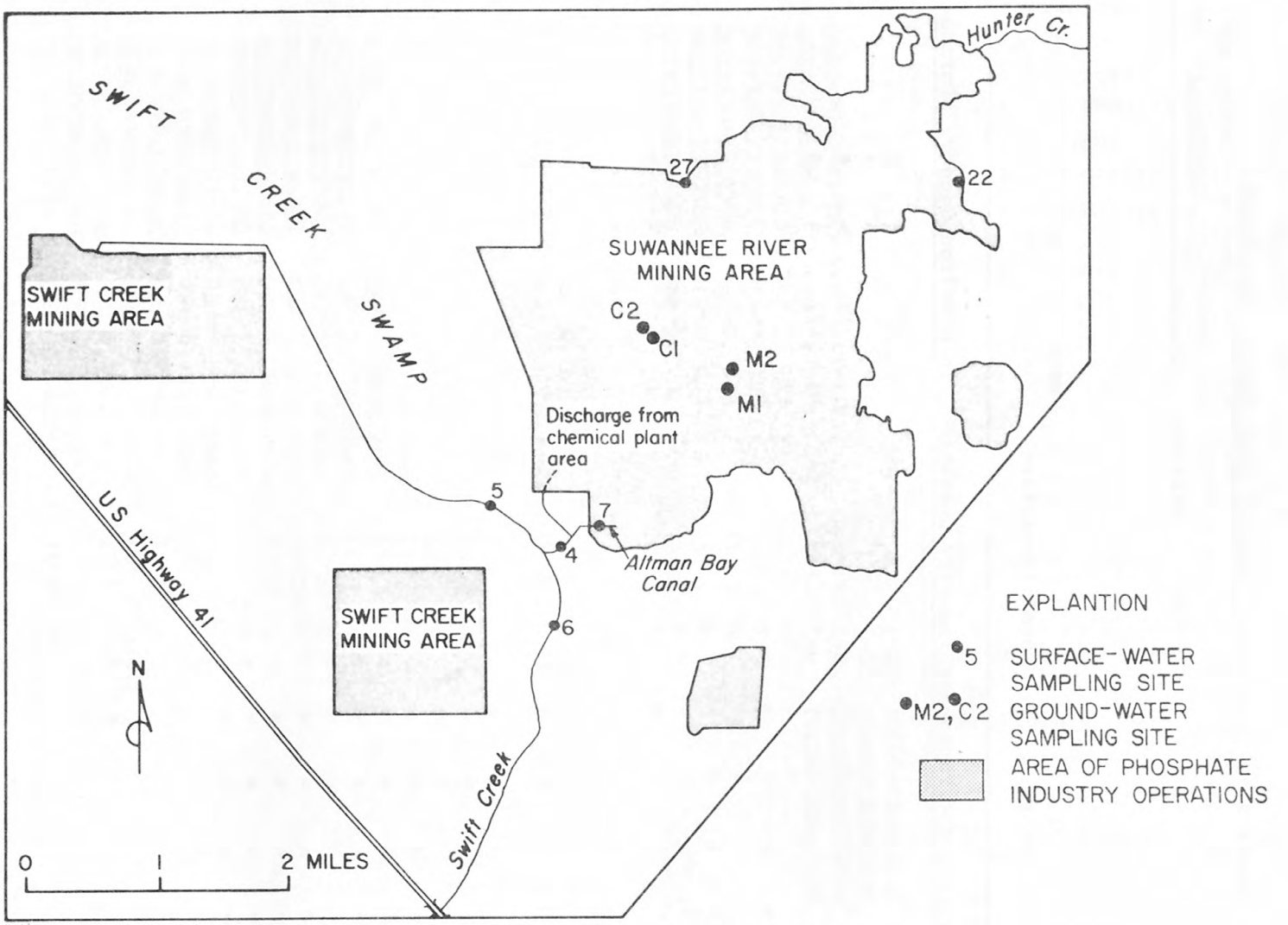

Figure 5.--Location of water-quality sampling sites at the phosphate industry operations in Hamilton County, Florida.

reported in Miller and others (1978). These are aluminum, arsenic*, barium, boron, cadmium*, chromium*, cobalt*, copper, iron, lead, lithium*, manganese, molybdenum*, nickel*, strontium, uranium, vanadium*, zinc, and radium-226, with the starred (*) constituents being reported for surface waters but not for ground waters. The Osceola National Forest investigation determined some constituents and properties of the waters which were not reported in the interpretive report of Miller and others (1978) because the determined concentrations were small, but which are included in the Water-Data Reports for Florida.

Meteorological and Climatological

The meterological and climatological sites from which data were obtained for the Osceola National Forest investigation are listed in table 7 and their geographic locations are shown on figure 1. These data are on library file at the U.S. Geological Survey, Tallahassee.

References given on table 7 for the U.S. Department of Commerce are for specific weather stations. These original records are stored by the National Oceanic and Atmospheric Administration, National Weather Service (formarly the U.S. Weather Bureau) at Asheville, North Carolina. The 1964 reference covers the years 1951 to 1960 inclusive, whereas those for 1961 and later years are annual reports. References to other publications refer to investigative and interpretive studies of an areal nature. The reference to the Florida State Board of Conservation (1954) covers the historic period of record up to 1952, inclusive.

Some climatological data were collected at the aquifer-test site ONF-2. These records are on file with the U.S. Geological Survey, Tallahassee.

Aquifer Tests

The types of water-level data collected from various wells and test holes during aquifer tests performed as part of the Osceola National Forest study are listed in table 8. Figure 6A shows a plan view and 6B a vertical section of the walls and test holes at the aquifer-test site ONF-2. Aquifer-pumping tests were performed on the Floridan aquifer and the Hawthorn Unit C in March 1977 (Miller and others, 1978, p. 89-95). The original data obtained from these aquifer-pumping tests were recorded on digital and magnetic tapes and are on file at the Regional Office of the U.S. Geological Survey, Denver, Colo. Additional test data, including site specific meteorological data, is stored by the U.S. Geological Survey, Tallahassee. Data collection for the aquifer tests began in October 1976 and continued through April 1977.

Maps, Photographs, and Elevations

The maps and aerial photographs used in the Osceola National Forest investigation are listed in table 9. Copies of all maps, aerial photos, photographs, and 35 mm slides are on file at the U.S. Geological Survey, Tallahassee.

Table 7.--Meteorological and climatological data index.

Data utilized: H, humidity; EP, evaporation; ET, evapotranspiration; PS, percent sunshine; SF, storm frequency; W, winds; AR, annual rainfall; MR, monthly rainfall; T, temperature.

Station name or area	Period of record or year of study	Published Data utilized	Source
Apalachicola Florida	1931-60 *	H, PS, SF, W, T	Department of Commerce, 1972, p. 15
Folkston Georgia	1952-75 *	AR	Department of Commerce, 1964, 1961-75
Glen St. Mary Florida	1952-75 *	AR	Department of Commerce, 1964, 1961-75
Jacksonville Florida	1931-60 *	H, PS, SF, W, T	Department of Commerce, 1972, p. 16
Jasper, Florida Florida	1952-75 *	AR	Department of Commerce, 1964, 1961-75
Kissimmee River basin, Florida	1931-46	ET	Langbein, 1955
Lake City, Florida	1927-75	AR	Fla. St. Bd. of Consv., 1954; Dept.
	1931-60	AR	of Commerce, 1964, 1961-75
	1936-65	AR	"
	1941-70	AR, MR	"
	1955-67	MR	Department of Commerce, 1964, 1961-75
	1966-75 *	EP, H, T	Department of Commerce, 1964, 1961-75

Table 7.--Meteorological and climatological data index. (continued)

Station name or area	Period of record or year of study	Published Data utilized	Source
Silver Springs, Florida	1968	ET	Faulkner, 1976
State of Florida	1946-55	EP	Kohler and others, 1959
Tallahassee, Florida	1931-60 *	H,PS, SF, W, T	Department of Commerce, 1972, p. 19

* Presently active station as of September 1978.

Table 8.--Aquifer-test data index.

Map reference number: See figures 2 and 6 for station location.

Map reference number	Site number	Local identifier	Form of water level data: Continuous charts	Hourly tape measure	Digital printout tapes	Magnetic cassette tapes	Computer graphical	Misc.	Instrumentation
2A	301933082350502	ONF-2, OBS. #1	*	*	*	*	*	*	transducer
2B	301933082350501	ONF-2, OBS. #2	*	*	*	*	*		transducer
2C	301933082350503	ONF-2, OBS. #3		*	*	*	*		transducer
2D	301933082350504	ONF-2, OBS. #4		*	*	*	*		transducer
2E	301933082350505	ONF-2, OBS. #5	*	*	*	*	*		transducer
2F	301933082350506	ONF-2, OBS. #6	*	*	*	*	*		transducer
2G	301933082350507	ONF-2, OBS. #7		*	*	*	*		transducer
2H	301933082350508	ONF-2, OBS. #8		*	*	*	*		transducer
2I	301933082350509	ONF-2, OBS. #9	*	*					Stevens graphic recorder
2J	301933082350510	ONF-2, OBS. #10	*	*	*	*	*		transducer
2K	301933082350511	ONF-2, OBS. #11	*	*					Stevens graphic recorder
2L	301933082350512	ONF-2, OBS. #12	*	*					Stevens graphic recorder
2M	301933082350513	ONF-2, OBS. #13	*	*	*	*	*		transducer
2N	301933082350514	ONF-2, OBS. #14		*	*	*	*		transducer
2O	301933082350515	ONF-2, OBS. #15	*	*	*	*	*		transducer
2P	301933082350516	ONF-2, OBS. #16	*	*	*	*	*		transducer
2Q	301933082350517	ONF-2, OBS. #17		*	*	*	*		transducer
2R	301933082350518	ONF-2, OBS. #18	*	*					Stevens graphic recorder
2S	301933082350519	ONF-2, OBS. #19	*	*					Stevens graphic recorder
2T	301933082350520	ONF-2, OBS. #20	*	*	*	*	*		transducer
2U	301933082350521	ONF-2, 8" Prod.		*	*	*	*		nitrogen-gas bubbler
2V	301933082350522	ONF-2, 18" Prod.		*	*	*	*		nitrogen-gas bubbler
2W	301939082352401	ONF-2, OBS. #21	*	*					Stevens graphic recorder
2X	301933082350523	ONF-2, E-1		*	*	*	*		extensometer
2Y	301933082350524	ONF-2, E-2		*	*	*	*		extensometer
2Z	301933082350525	ONF-2, E-3		*	*	*	*		extensometer
13	302009082362001	Thomas Road						*	Fischer-Porter digital recorder

* Data available.

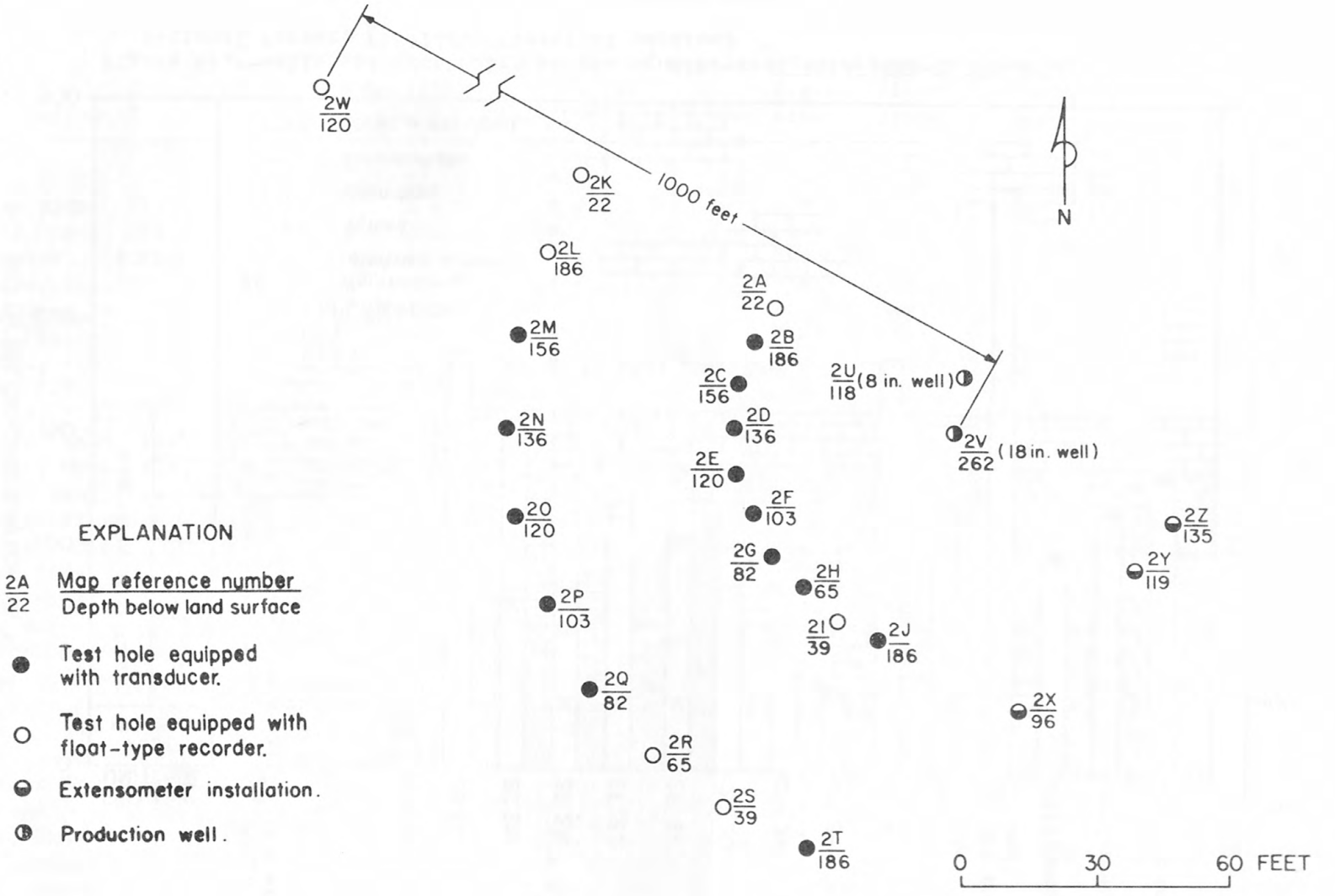

Figure 6a.--Wells and test holes at the aquifer-test site (ONF-2) Osceola National Forest, Florida. (Plan view)

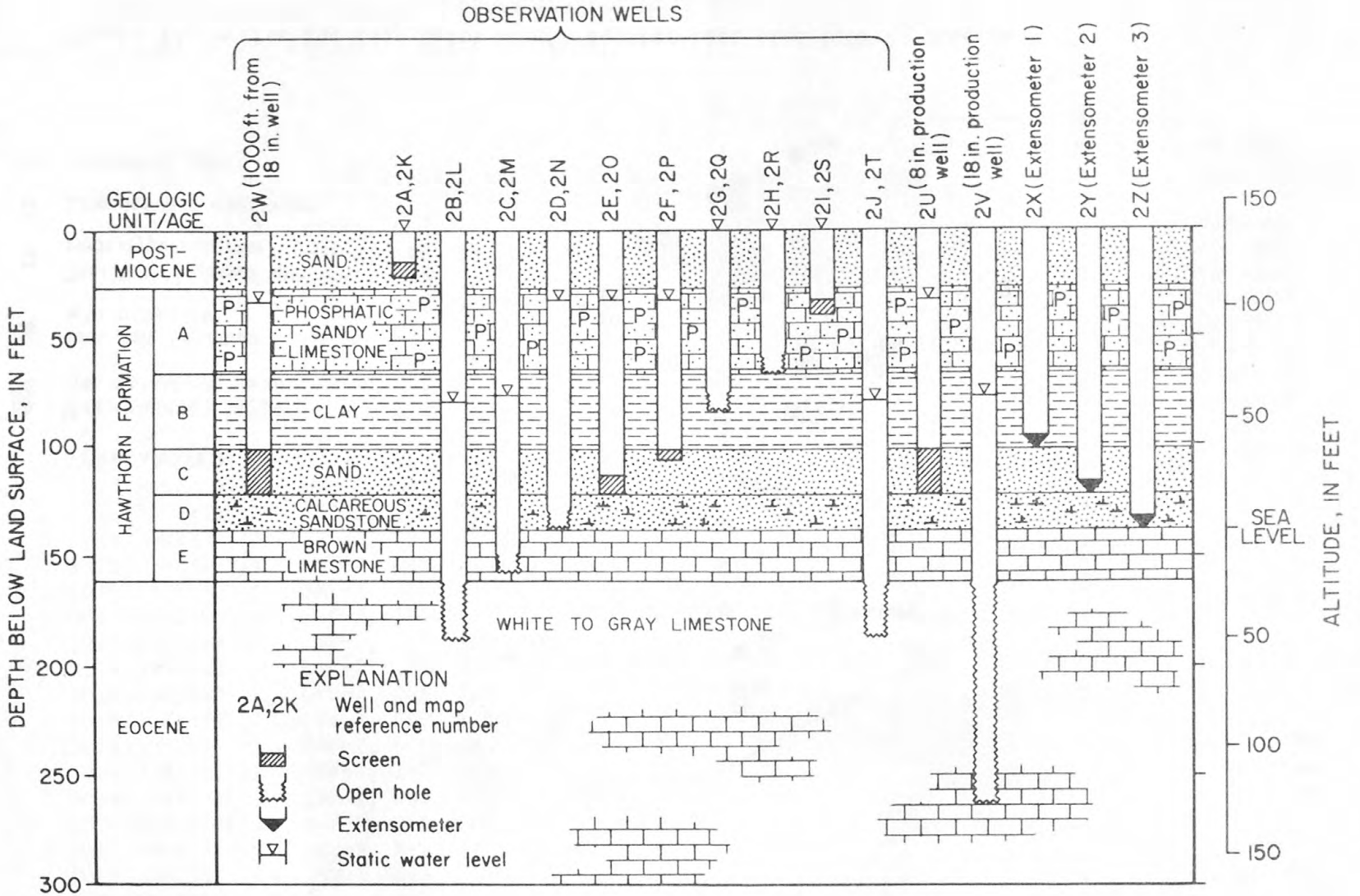

Figure 6b.--Wells and test holes at the aquifer-test site (ONF-2) Osceola National Forest, Florida. (Vertical section)

Table 9.--Map and aerial photograph index.

Name/Location	Aerial photo[1/]	Topographic map scale		Miscellaneous maps			Source
		1:24,000	1:250,000	Vegetation	Flood prone	Other	
Benton, Fla.	321	*		-	*		
Big Gum Swamp, Fla.	376	*		*	*		
Cypress Creek, Fla.	301	*		-	*		
Deep Creek, Fla.	348	*		*	*		
Fairview, Fla.	347	*		*	*		
Fargo, Ga.; Fla.	320	*		-	*		
Genon, Fla.	302	*		-	*		
Hillcoat, Fla.	290	*		-	*		
Jasper, Fla.	289	*		-	*		
Jennings, Fla.	-	*		-	*		
Lake City East, Fla.	349	*		*	*		
Lake City West, Fla.	323	*		-	*		
Live Oak East, Fla.	291	*		-	*		
Northeast Florida Geologic map	-	-		-	-	*	After Vernon and Puri, 1965
Olustee, Fla.	377	*		*	*		
Osceola National Forest, Fla.							
Base map	-	-		-	-	*	U.S. Forest Service, 1964
Mining lease application areas	-	-		-	-	*	U.S. Dept. of Interior, 1974
Phosphate deposits	-	-		-	-	*	U.S. Dept. of Interior, 1974
Two potential mining units layout of	-	-		-	-	*	Cole, 1977
Sanderson Northwest, Fla.	375	*		*	*		
Sanderson North, Fla.	406	*		*	*		
Sanderson South, Fla.	407	*		*	*		
Taylor, Fla.	405	*		*	*		
White Springs East, Fla.	322	*		*	*		
White Springs West, Fla.	-	*		-	*		
Valdosta, Ga.; Fla. (NH 174)	-	-	*	-	-		Army Map Service, 1954

[1/] Reference numbers used by the commercial firm of Mark Hurd Aerial, Inc., Minneapolis, Minnesota, for their index of Florida.

Photographs and slides (35 mm) of activities associated with the study include scenes of drilling and coring of test holes, aquifer-testing site selection, ground-level reconnaissance, low-level air reconnaissance, active phosphate industry operations, and other investigation-related activities.

Leveling notes taken during determinations of elevations on wells, gaging stations, and point elevations are also on file at the U.S. Geological Survey, Tallahassee.

The topographic maps used are those published by the U.S. Geological Survey. Vegetation maps are those prepared by the U.S. Forest Service. Flood-prone maps were prepared by the U.S. Geological Survey, Tallahassee. Other map sources are as listed in the remarks column. The aerial photograph index numbers used in table 9 refer to those designated and produced by Mark Hurd Aerial Surveys, Inc.,[1/] Minneapolis, Minn. These aerial photographs are only available by purchase from Mark Hurd Aerial Surveys, Inc.

COMPUTERIZED DATA STORAGE AND RETRIEVAL

Almost all the data collected and used in the Osceola National Forest interpretive investigation are stored in Reston, Va., in the U.S. Geological Survey central computer system referred to as the National Water Data Storage and Retrieval System (WATSTØRE). This system was established in November 1971 to provide an effective and efficient data management system. The system is operated and maintained on the central computer facilities of the Survey at its National Center in Reston, Va. Data may be obtained from WATSTØRE through any of the Water Resources Division 46 District offices. General inquiries about WATSTØRE may be directed to: Chief Hydrologist, U.S. Geological Survey, 437 National Center, Reston, VA 22092; specific inquiries to: District Chief, Water Resources Division, U.S. Geological Survey, Suite F-240, 325 John Knox Road, Tallahassee, FL 32303, (904) 386-1118 or (FTS) 946-4251.

The WATSTØRE system consists of several files in which data are grouped and stored by common characteristics and data-collection frequencies. Currently, files are maintained for the storage of: (1) surface-water, quality-of-water, and ground-water data measured on a daily or continuous basis, (2) annual peak stage and discharge values for streamflow stations, (3) chemical analyses for surface- and ground-water sites, and (4) geologic and inventory data for ground-water sites.

[1/] The use of the company name in this report is for identification only and does not imply endorsement by the U.S. Geological Survey.

In addition, an index file of sites for which data are stored in the system is also maintained. A brief description of each index file is given below to facilitate data requests:

Station Header File: All sites for which data are stored in the Daily Values, Peak Flow, and Water Quality files of WATSTØRE are indexed in the Station Header File. It contains information pertinent to the identification, location, and physical description of the water-measuring sites.

Daily Values File: All water-data parameters measured or observed either on a daily or on a continuous basis and numerically reduced to daily values are stored in the Daily Values File. Instantaneous measurements at fixed-time intervals, daily mean values, and statistics such as daily maximum and minimum values also may be stored. This file contains data for streamflow values, river stages, reservoir contents, water temperatures, specific conductance values, sediment concentrations, sediment discharges, and ground-water levels.

Peak Flow File: Annual maximum (peak) streamflow (discharge) and gage height (stage) values at surface-water sites comprise the Peak Flow File.

Water Quality File: Results of analyses of water samples that describe the chemical, physical, biological, and radiochemical characteristics of both surface and ground waters are contained in the Water Quality File. These analyses may contain data for more than 200 different constituents.

Ground-Water Site Inventory File: This ground-water file is maintained within WATSTØRE independent of the files listed above, but it is cross-referenced to the Water Quality File and the Daily Values File. It contains inventory data about wells, springs, and other sources of ground water; the data included are site location and identification, geohydrologic characteristics, well-construction history, and one-time field measurements such as water temperature.

Water data, as compiled by the Survey, are used in many ways by decision makers for the management, development, and monitoring of our water resources. Thus, in addition to its data processing, storage, and retrieval capabilities, WATSTØRE can provide, upon request, a variety of useful data products to meet diverse needs. These products range from the simple retrieval of data in tabular form to complex statistical analyses. A minimal fee plus the actual computer cost incurred in producing a desired product is charged to the requester. Cost estimates for these products may be obtained from the U.S. Geological Survey, Tallahassee. A brief description of each product is given below:

Computer-Printed Tables: Users most often request data from WATSTØRE in the form of tables printed by the computer. These tables may contain lists of actual data or condensed indexes that indicate the availability of data stored in the files. A variety of formats are available to display the many types of data.

Computer-Printed Graphs: Computer-printed graphs for the rapid analysis or display of data are another capability of WATSTØRE. Computer programs are available to produce bar graphs (histograms), line graphs, frequency distribution curves, X-Y point plots, site-location map plots, and other similar items by means of line printers.

Statistical Analyses: WATSTØRE uses the Geological Survey collection of computer programs known as SAS (Statistical Analysis System) to provide extensive analyses of data such as regression analyses, analysis of variance, transformations, and correlations.

Digital Plotting: WATSTØRE also makes use of software systems that prepare data for digital plotting on peripheral, offline plotters available at the central computer site. Plots that can be obtained include hydrographs, frequency distribution curves, X-Y point plots, contour plots, and three-dimensional plots.

Data in Machine-Readable Form: Data stored in WATSTØRE also can be obtained in machine-readable form for use on other computers or for use as input to user-written computer programs. These data are available in the standard storage format of the WATSTØRE system or in the form of punch cards or punch-card images on magnetic tape.

In addition to WATSTØRE, most of the water-quality data collected is entered directly into the Storage and Network System (STORET) of the U.S. Environmental Protection Agency. The water quality control information system also includes information on municipal and industrial waste facilities, water quality standards compliance, fish kills, oil spills, construction costs, and other related data for the EPA and its cooperating agencies. For information concerning STORET write to: U.S. Environmental Protection Agency, Office of Water and Hazardous Materials, Washington, D.C. 20460, or U.S. Environmental Protection Agency, Office of Water Programs, STORET User Assistance Section, Room 927 East Tower, 4th and M Streets S.W., Washington, D. C. 20460.

Additional water data information concerning this or other areas of study may be obtained through the National Water Data Exchange (NAWDEX) which is centrally managed by a Program Office located within the U.S. Geological Survey Water Resources Division in Reston, Va. A variety of services are provided by NAWDEX to assist users to identify needed water data, to locate these data, and to refer users to the proper sources for obtaining the data. It is not a function of NAWDEX to become a repository of water data. Instead, the data held by NAWDEX members are indexed by the Program Office to provide a central source of information on water

data available from a large number of organizations. This information is provided through a computerized Water Data Sources Directory maintained in the U.S. Geological Survey computer system in Reston, Va., which is accessible by many local assistance centers by remote computer terminals. For additional information concerning the NAWDEX program or its services, contact: Program Office, National Water Data Exchange (NAWDEX), U.S. Geological Survey 421 National Center, 12201 Sunrise Valley Drive, Reston, VA 22092, telephone: (703) 860-6031, FTS: 928-6031.

Inquiries as to the availability of data from the Osceola National Forest investigation may be directed to the District Chief, Water Resources Division, U.S. Geological Survey, Tallahassee, FL 32303.

PUBLICATIONS AND REFERENCES

Publications

Publications of the U.S. Geological Survey used in the Osceola National Forest interpretive investigation are available to the public. Professional Papers and Water-Supply Papers are sold by the Superintendent of Documents, Washington, D. C. 20402. Circulars are free on application to the U.S. Geological Survey, Reston, VA 22092. Hydrologic Investigations Atlases and other maps are sold by the U.S. Geological Survey, Branch of Distribution, 1200 S. Eads St., Arlington, VA 22202. For those interested in forthcoming reports, subscriptions to a monthly list "New Publications of the Geological Survey" are available free on application to the U.S. Geological Survey, 329 National Center, Reston, VA 22092. Open-file reports are available for consultation in the Florida and Reston, Va., offices of the U.S. Geological Survey. Copies ordinarily are not reproduced for distribution; however, some reports have been reproduced for distribuiton in limited quantities. Topographic maps are published and distributed by the U.S. Geological Survey Map Information Office, Washington, D.C. They may be purchased from the Distribution Section, U.S. Geological Survey, 1200 Eads St., Arlington, VA 22202.

Publications of the Florida Bureau of Geology are published by the Division of the Interior Resources, Florida Department of Natural Resources. For a current list of reports with instructions for ordering, contact the Chief, Bureau of Geology, Florida Department of Natural Resources, 903 West Tennessee Street, Tallahassee, FL 32303.

Many publications are out of print. These publications, along with the journal articles listed in the references, may be found in many public and school libraries, particularly state university libraries. The public is urged to use the public libraries whenever possible because most publications are limited in number and many early reports are out of print and available only through these libraries.

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
325 John Knox Rd--Suite F240
Tallahassee, Florida 32303

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