STATE OF FLORIDA
STATE BOARD OF CONSERVATION
DIVISION OF GEOLOGY

FLORIDA GEOLOGICAL SURVEY
Robert O. Vernon, *Director*

REPORT OF INVESTIGATIONS NO. 39

RECONNAISSANCE OF SPRINGS AND SINKS IN WEST-CENTRAL FLORIDA

By
W. S. Wetterhall

Prepared by the
UNITED STATES GEOLOGICAL SURVEY
in cooperation with the
FLORIDA GEOLOGICAL SURVEY
and the
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Tallahassee
1965

FLORIDA STATE BOARD OF CONSERVATION

LETTER OF TRANSMITTAL

Florida Geological Survey

Tallahassee

January 28, 1965

Honorable Haydon Burns, *Chairman*
Florida State Board of Conservation
Tallahassee, Florida

Dear Governor Burns:

The Florida Geological Survey has published as its Report of Investigations No. 39, "Reconnaissance of Springs and Sinks in West-Central Florida." This study was prepared by W. S. Wetterhall, a geologist with the U. S. Geological Survey, working in cooperation with this department and the Southwest Florida Water Management District.

The report locates and describes 52 springs and sinks, and gives selective chemical analyses of the water and the rate of flow measured at the springhead or traversing the sink. These springs and sinks are not only important as recreational sites, but contribute to the availability of water resources of the area. This report should be well received by the citizens of Florida.

Respectfully yours,

Robert O. Vernon
Director and State Geologist

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RECONNAISSANCE OF SPRINGS AND SINKS IN WEST-CENTRAL FLORIDA

By
W. S. Wetterhall

ABSTRACT

The many springs in west-central Florida discharge large quantities of water. Flows of more than 100 cubic feet per second from several springs and the lesser flow of most of the springs are derived from the limestones that comprise the Floridan aquifer. Vertical zonation of permeability and the southwest dip of the geologic formations tend to control the depth of springs and, to a degree, their distribution. South of the latitude of New Port Richey, most of the springs flow from the Tampa Formation.[1] Northward from New Port Richey to about the latitude of Weekiwachee Springs, the permeable zone near the bottom of the Suwannee Limestone yields the flow of most of the springs. The several springs from Weekiwachee Springs north flow from either the Suwannee Limestone or from older, deeper formations probably from dolomite in the Avon Park Limestone. Water from those springs that discharge from the Suwannee Limestone is murky in contrast with the clear water that rises from the deeper limestones.

Lake Tarpon, southeast of Tarpon Springs, drains intermittently through a sink in the lake bottom that connects with Tarpon Springs in Spring Bayou about 2 miles to the northwest. The conditions under which drainage begins and ends are variable, being an interrelated set of water levels in the lake, in Spring Bayou, and in the aquifer and the relative densities of water in the various parts of the system.

Waters from springs are of either calcium carbonate or sodium chloride type or a mixture of the two. The concentration of dissolved material ranges from about 100 to 15,000 parts per million. Chloride content ranges from about 4 to more than 9,000 parts per million. The higher concentrations of chloride occur near the coast.

The report locates and describes 52 springs and sinks and gives rate of flow and quality of water information for selected springs.

INTRODUCTION

PURPOSE AND SCOPE

Because of the large number of springs and sinks in the report area, a knowledge of their role and effect on the hydrology is

[1]The stratigraphic nomenclature in this report conforms to the usage of the Florida Geological Survey and differs in part from that of U.S. Geological Survey.

important to any study appraising water resources. For this reason, a preliminary reconnaissance study of springs and sinks was made. The report provides information about the size, shape, location, the geologic and hydrologic setting, and the flow of 52 inventoried springs and sinks.

The distribution of the inventoried springs bears no relation to the distribution of springs in the area but rather reflects the limited time that was available for the study and the limited accessibility of most of the area.

A generalized geologic cross section, prepared from a study of well cuttings and electric logs on file at the Florida Geological Survey, is presented as are the results of three dye-tracer tests and a stage-tidal relation for two sinks.

LOCATION AND EXTENT OF THE AREA

The area discussed in this report lies between latitude 28°00′ and 28°45′ N., and between longitude 82°30′ and 82°50′ W. (See fig. 1.) The area includes the northern 6 miles of Pinellas County, the western parts of Pasco and Hernando counties, and the southern part of Citrus County. Part of the Gulf of Mexico is included to show the location of submarine springs.

PREVIOUS REPORTS

Sellards (1908, p. 86) estimated the flow of Weekiwachee Springs at 200 cfs (cubic feet per second) in the earliest known published report that contained data for springs in the area.

Ferguson and others (1947), as part of a state-wide inventory of the larger springs in Florida, described Chassahowitzka Springs (842-234-A, p. 54), Weekiwachee Spring (831-234-A, p. 74), Seven Springs (812-239-A, p. 136), and Hudson Spring (821-242-A, p. 136). In addition, Ferguson and others (op. cit., p. 77) mentioned two other springs in the area; Bobhill Spring (826-238-A) and Mud Spring (832-237-B). Heath and Smith 1954, p. 38-42) described the drainage of Lake Tarpon and Taylor (1953) described the drainage in more detail with description of some of the springs and sinks in the vicinity of Lake Tarpon.

Measurements of the flow of Weekiwachee Springs (831-234-A) and Little Spring (830-234-A) prior to 1961 are published in U.S. Geological Survey Water-Supply Papers and subsequent flow measurements will appear in annual reports entitled "Surface Water Records of Florida: Streams."

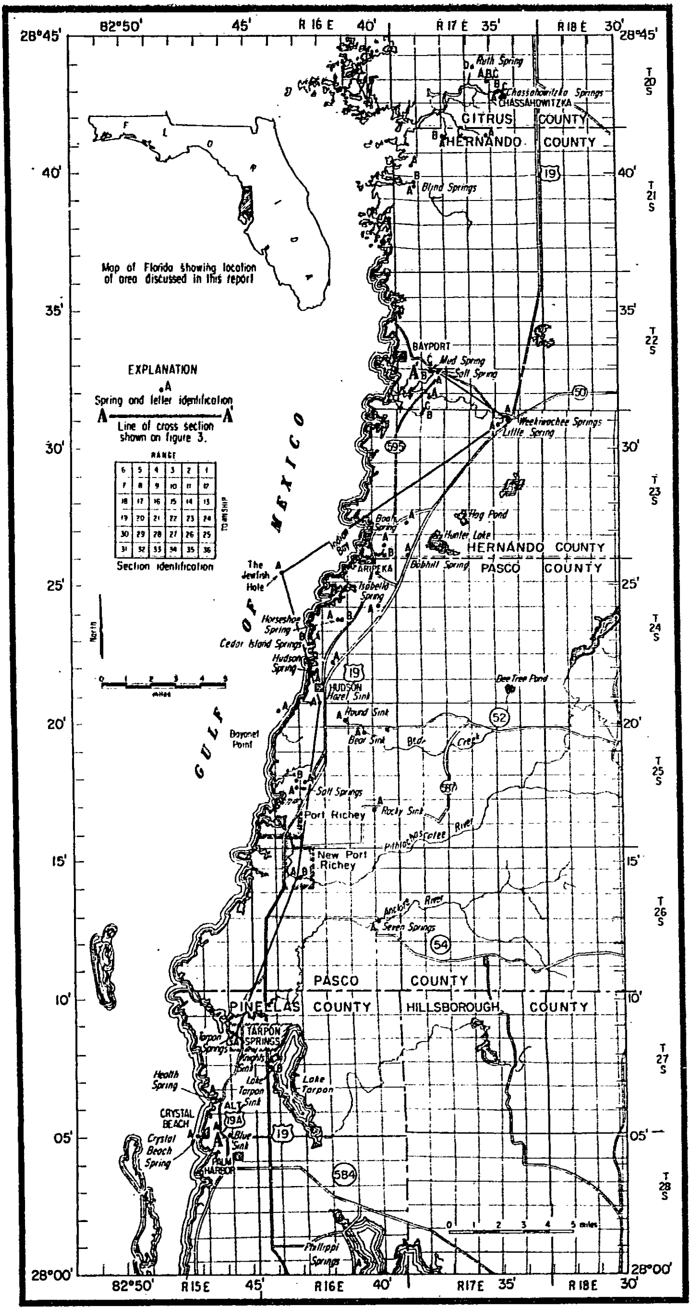

Figure 1. Map of west-central Florida showing location of springs and sinks.

Six of the springs, with analyses of water, were reported by Wetterhall, (1964, p. 17).

NUMBERING SYSTEM

The springs and sinks shown in figure 1 were assigned numbers based on the location and the order in which they were inventoried within a minute of latitude and longitude. The numbering system is explained in figure 2.

ACKNOWLEDGMENTS

Appreciation is extended to the owners of properties who allowed access to springs and sinks and to the local residents who assisted in the location of many of the springs and in the collection of data. Without the cooperation of these people, the collection of the data would not have been feasible.

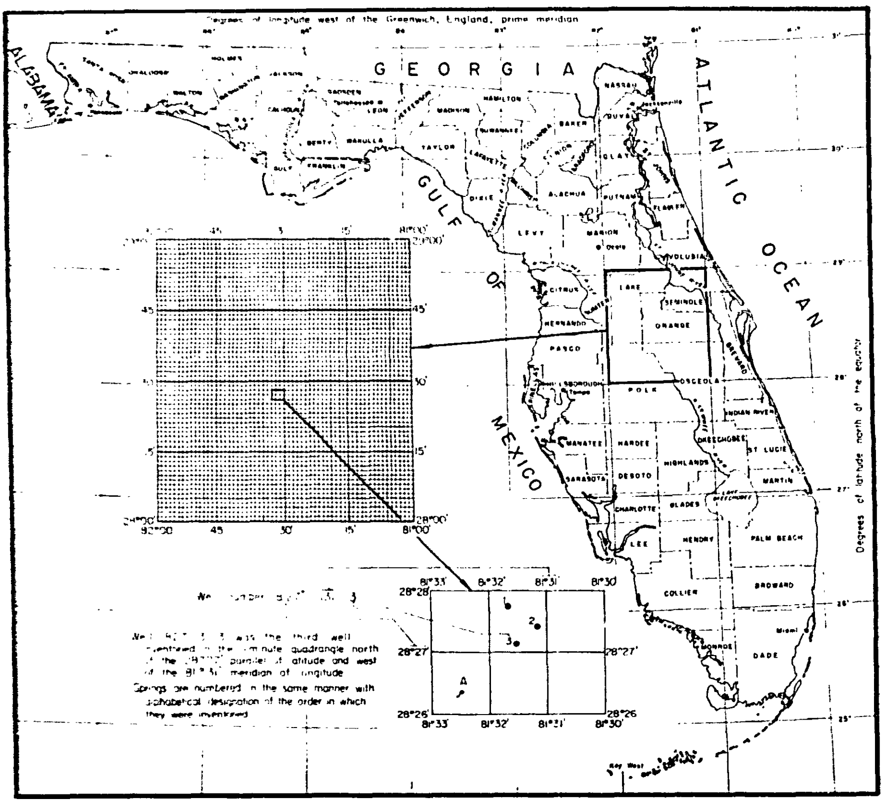

Figure 2. Explanation of spring and sink-numbering system.

The investigation was under the supervision of M. I. Rorabaugh and C. S. Conover, successive district engineers of the Ground Water Branch of the U.S. Geological Survey in Florida.

GEOGRAPHY

CLIMATE

Precipitation on the area averages about 52 inches per year, of which about 35 inches falls during the 5-month period—May through September. July is the wettest month and November the driest.

The average annual temperature is 72°F. Frost may be expected 24 days per year. The minimum temperature of 17°F may be expected twice in 25 years and a temperature of 25°F may be expected 23 times in 25 years.

TOPOGRAPHY

The area lies in the Terraced Coastal Lowlands of Vernon (1951, p. 36-41), a subdivision of the Coastal Plain Province. Marine terraces, formed during Pleistocene time, and sand dunes are the dominant topographic features.

The submarine bottom and adjacent coastal marshlands slope gently from about 10 feet below sea level to about 4 feet above sea level. The 2-foot scarp at about 4 feet above sea level is the landward limit of the coastal swamp. Above the scarp, a limestone plain with a thin muck, clay, and sand cover extends inland to a major 10-foot escarpment that rises quite abruptly as a sand dune complex from about 10 feet above sea level. This scarp is the boundary between the hardwood hammock belt below and the sandy pine and oak forest above.

Islands in the coastal swamp and in the hammock belt are residual limestone mounds or sand dunes that rise as much as 30 feet above the surrounding surface. Most of the dunes in the hammock are not shown on topographic maps but can be detected on aerial photographs by the difference of texture and shade imparted to the photograph by the vegetation that grows on the dune. Inland from the scarp at an altitude of about 20 feet, the surface is a subdued karst modified by sand dunes. The dunes generally are disposed about the northeastern sides of lakes or depressions in crescent-shaped masses of small irregular dunes.

Drowned valleys and relict islands that bear the flora of higher areas inland indicate that the coast is being slowly submerged in the Gulf of Mexico.

DRAINAGE

Disposal of rainfall from the surface is effected by evapotranspiration, downward movement, and surface runoff.

Evapotranspiration is the transfer of water to the air from water surfaces by evaporation and from living plants by the process known as transpiration. Evaporation from the land surface occurs during and soon after rains while the surface is wet. Transpiration occurs continuously, the water being derived from the zone of soil moisture or the zone of saturation by the plant's roots.

Downward movement of rainwater to the zone of saturation may occur by percolation of water through the surficial sands and clays or by direct flow through sinks or other breaches in the overburden.

Surface runoff occurs when the amount of rainfall exceeds the amount disposed of by evapotranspiration and downward movement of water into the zone of saturation.

The amount of evapotranspiration varies with the variety and density of plant growth, climate, and the area of exposed wetted surface. Losses by evapotranspiration are smallest in the near barren dune covered areas and largest in the dense forests and marshes. Most of the water transpired by the coastal marshes and forests is derived from the Floridan aquifer. The upward moving artesian ground water probably supports the hardwood growth on relict islands in the salt-water marsh.

Downward movement of rainwater to the zone of saturation and subsequent disposal by coastward movement through the Floridan aquifer occurs throughout most of the area. Much of the rainfall percolates continuously through the sand and clay to the artesian aquifer. Drain sinks, which occur where relatively thick sand and clay are breached, are the principal points of entry of large slugs of water into the aquifer in short periods of time.

Surface runoff through streams to the Gulf of Mexico occurs in the southern part of the area where the clays that overlie the limestone are thick and continuous. Reduced downward percolation, resulting from the low permeability of clay, cause the Pithlachascotee River, the Anclote River, and a number of small, short streams to exist.

QUALITY OF WATER

The chemical character of water depends on the kinds and nature of dissolved materials contacted. The results of chemical analyses of waters from selected springs in the area are given in table 1. Additional information on the chemical character of water is given in the description of springs and sinks.

The concentration of chloride in waters from springs in the area ranges from 4 ppm (parts per million) in Little Spring (830-234-A) to more than 15,000 ppm in Crystal Beach Spring (805-247-A).

All spring waters in the area contain calcium, bicarbonate, and minor amounts of other materials derived from the limestone aquifer. Springs in and near the Gulf yield water that contains sodium, chloride, and other materials derived from salt water, in addition to calcium and bicarbonate.

If the sum of the equivalent percentages of calcium and bicarbonate exceeds 50, the water is classified as a calcium bicarbonate water in this report. Similarly, if the sum of the equivalent percentages of sodium and chloride exceeds 50, the water is classified as a sodium chloride water. All of the waters from springs in the area are quite definitely of one of the two types.

Concentrations of dissolved solids of spring waters tend to decrease with increasing distance from the coast and with increasing elevation of the piezometric surface.

GEOHYDROLOGY

Springs are a part of the hydrologic cycle—the regimen of water movement from the oceans to the air, to the ground, over and through the ground back to the ocean.

Part of the rain that falls on the land surface moves downward through the ground to the zone of saturation and laterally to points of discharge.

The limestones which underlie the area, and through which the water moves, comprise the Floridan aquifer. If water in the aquifer is at atmospheric pressure and is free to rise and fall, the water occurs under nonartesian conditions and the water surface is referred to as the water table. If beds of material of low permeability restrict the vertical movement of water in a saturated aquifer and the pressure is greater than atmospheric, the water occurs under artesian conditions and the imaginary surface to which water will rise in wells is referred to as the piezometric surface.

Where the water table is higher than the piezometric surface of the artesian aquifer, water may move downward into the artesian aquifer. Such recharge of the aquifer can take place either through sinks that penetrate the confining beds or by percolation through the confining beds.

Where the piezometric surface of the artesian aquifer is higher than the water table, or the surface of a body of water, upward discharge of water may occur. Such discharge is termed seepage if it occurs over a large area. Flow from a natural opening in the land surface is termed springflow, and the opening is called a spring. The characteristics of a spring depend on the geology, hydrology, and location.

Springs in west-central Florida are situated in the limestones of the Floridan aquifer and derive their flow from the aquifer. Because springs are natural features, they reflect the solubilities of the limestone beds and the conditions under which the springs were formed.

The depth and thickness of the several geologic units that lie less than 600 feet below sea level are generalized in figure 3. The vertical openings of the springs shown on the cross section generally end at or near the bottom of a formation. Because of the southward dip of the formations, the springs may be grouped by source in a north-south distribution. Thus, most springs south of the latitude of New Port Richey end near the top of the Suwannee Limestone or are in the Tampa Formation and probably discharge water principally from the Tampa Formation.

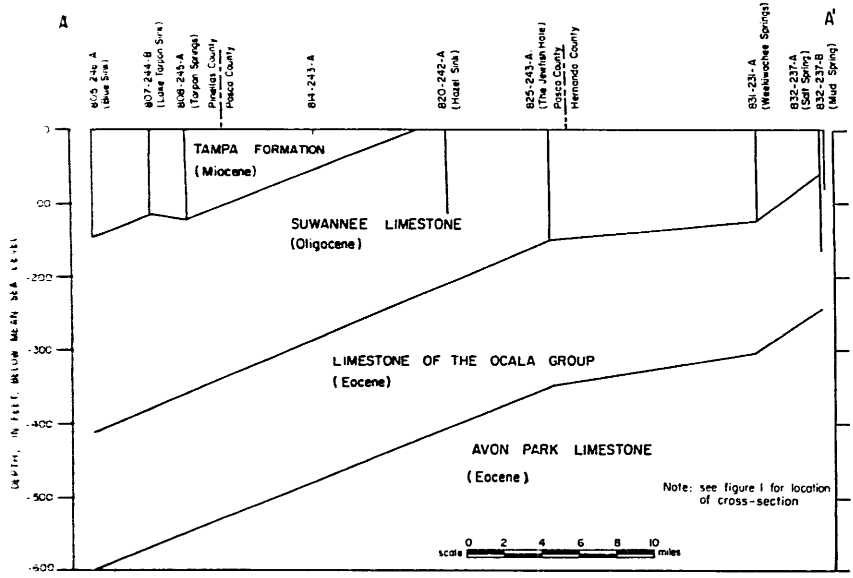

Figure 3. Geohydrologic section A-A'.

North from New Port Richey to about the latitude of Weekiwachee Spring, the springs terminate on various beds in the thick Suwannee Limestone and probably discharge water principally from the Suwannee Limestone.

The springs west of Weekiwachee Springs, between latitude 28°30′ and 28°33′, discharge about 500 cfs from the Floridan aquifer. The Suwannee Limestone is penetrated completely by several springs in this area which are known to originate below the bottom of the Suwannee Limestone. (See Mud Spring and Salt Spring on fig. 3.)

Mud Spring (832-237-B) probably terminates on the top of the Ocala Group. A generally westward cross current is reported in this spring below a depth of 50 feet.[2] The large flow of the spring and the reportedly rapid cross current indicate that the spring is part of a very large cavity system.

Previous studies of the characteristics of the Floridan aquifer have indicated the existence of highly permeable zones separated by less permeable zones. Below the Suwannee Limestone, the most probable source of the large quantities of water that flow from the deeper springs is the thick dolomite bed that lies about 150 feet below the top of the Avon Park Limestone. Throughout the general area this dolomite bed is the most permeable zone known. Weekiwachee Springs (831-234-A) and Salt Spring (832-237-A) probably derive their flow from the Avon Park Limestone. The source of flow of the several other springs in the area is not known.

The sparkling clear water that flows from the known deep springs contrasts sharply with the murky water from Mud Spring (832-237-B) and several other shallow springs that contain organic material. The growth of microorganisms in ground water may result from an increase in the oxygen content or from other material that favors the growth of the organisms. The enriched waters enter through the drain sinks that dot the area east of the spring and then move to the spring through cavities in the Suwannee Limestone that are virtually separate from the source of water of the deep springs.

North of Weekiwachee Springs, the springs probably derive their flow from rocks that lie above the middle of the Lake City Limestone which underlies the Avon Park Limestone. The lower part of the Lake City Limestone is usually impregnated with gypsum that would impart a high sulfate content to water with

[2]Oral communication; Mr. Carl Holder, Tampa, 1962.

which it came in contact. No waters of this type were found in the area.

An interesting hydrologic phenomenon relating to a spring is that which occurs during the natural draining of Lake Tarpon, southeast of the City of Tarpon Springs.

For many years the local residents had observed the intermittent flow of Tarpon Springs in Spring Bayou. Lake Tarpon was known to have several tributaries but no observable outflow. Taylor (1953), and Heath and Smith (1954) described the phenomenon and postulated an explanation. A summary of those reports and of additional data collected by the author follows:

Tarpon Springs (808-245-A) is the principal outlet of Lake Tarpon, the tributaries of which drain approximately 60 square miles of Hillsborough, Pasco, and Pinellas counties. The average flow into the lake is about 30 cfs. Because evaporation approximates rainfall on the lake, approximately 30 cfs of discharge from the lake is required to maintain the average lake level.

Some seepage from the lake bottom to the aquifer may occur, but most of the water that flows from tributaries into the lake is discharged through an underground conduit that connects Lake Tarpon Sink (807-244-B) in Lake Tarpon with Tarpon Springs (808-245-A) in Spring Bayou. Intermittent drainage of the lake occurs when the stage of the lake, ground water levels, tidal levels and density of water in the several parts of the system are such that salt water in the conduit begins to flow with a flushing action. Periods of draining last from about a week to about a month and usually begin when the lake stage is 2.5 to 6.4 feet above sea level. Drainage ceases when the lake stage is 1.2 to 3.1 feet above sea level. Following cessation of draining, the flow through the conduit reverses and some salt water flows into the lake. Cyclic flow of water into and out of the lake and Spring Bayou occurs during interdrain periods.

The chloride content of water from the lake ranges from about 150 to about 4,500 ppm depending on the residual predrain concentration of chloride in the lake water, the amount of salt water that entered the lake in the postdrain reverse flow, and the amount of rainfall and inflow through tributaries of the lake. Distribution of salinity is fairly uniform both horizontally and vertically throughout the lake.

The reason for this unusual drainage pattern was not known prior to 1953 when an investigation by the U.S. Geological Survey was completed. In the 1920's a water-treatment plant was constructed on the shore of the lake to supply water for the City of Tarpon Springs. The plant was abandoned shortly after completion because of the high chloride content of the lake water.

The effect of tidal fluctuation on water levels in Rocky Sink (816-239-A) and Isabella Spring (824-239-A) is illustrated in figures 4 and 5. The water levels in many other sinks and springs in the area fluctuate in response to tidal fluctuation in the gulf. Near the coast the effect is pronounced and the time between changes in the tide and changes in water levels in the aquifer is small. The effect of the tide diminishes and the time lag between the cause and the effect increases with increasing distance from the coast. The fluctuations of the water level in the sinks are caused by earth tides and by loading and unloading of the aquifer as the tidal waters advance and retreat from the coast. In addition to pressure transfer by tidal loading and unloading of the aquifer, some water is interchanged between the gulf and the aquifer where the water level in the aquifer is below high tide.

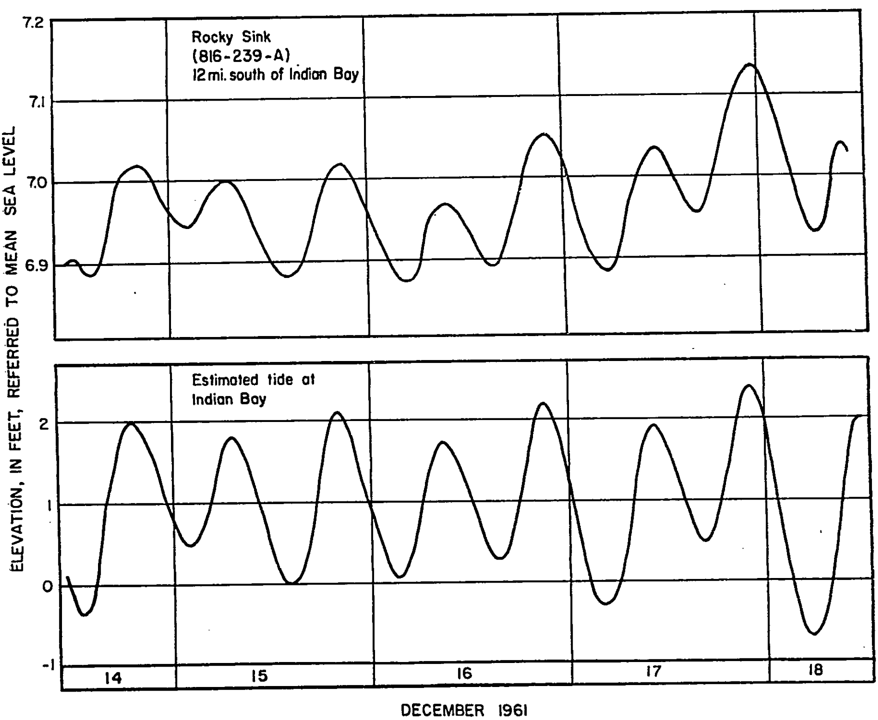

Figure 4. Water level in Rocky Sink (816-239-A) and estimated tide at Indian Bay.

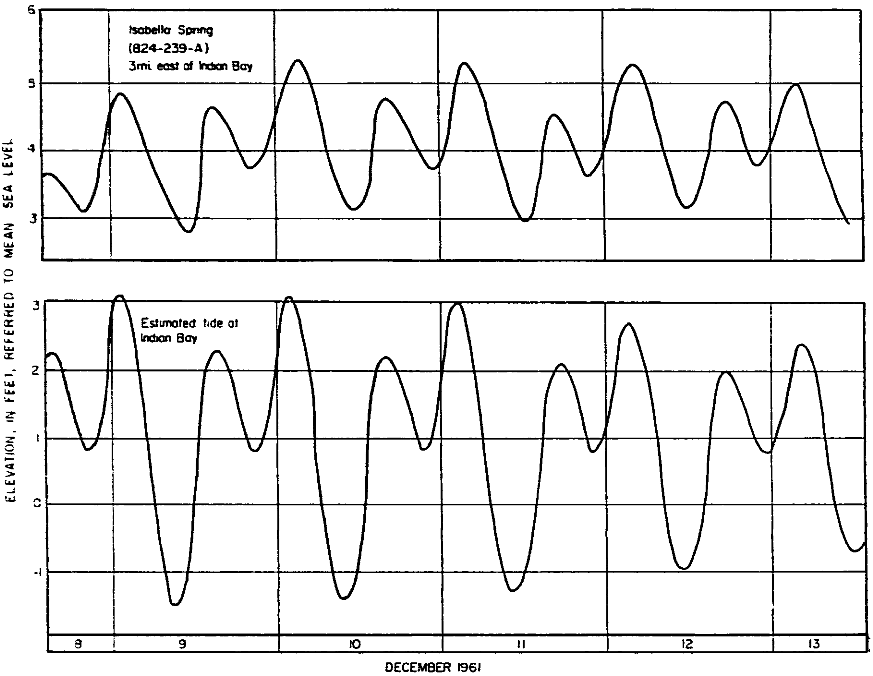

Figure 5. Water level in Isabella Spring (824-239-A) and estimated tide at Indian Bay.

Because the above processes all produce similar changes in water level in sinks and springs, a direct method is necessary to determine whether water is interchanging between a sink and the gulf. For this purpose a dye, hidacid fluorescein, was introduced to a few sinks directly or to streams that flowed into sinks. The latter method allowed constant feed of dyed water to a sink over extended periods of time to assure the detection of the dye by daily visits to probable points of discharge of the dyed water.

Dye was used to find or confirm the connection between Knights Sink (807-244-A) and Tarpon Springs (808-245-A), between the several subterranean conduits in the run of Salt Springs (817-243-A), and between Round Sink (820-241-A) and Spring (820-243-A). Attempts to trace the flow of Rocky Sink (816-239-A) and Bear Sink (819-240-A) were unsuccessful. The dye allowed detection of the cyclic flow of water to and from the aquifer in Isabella Spring (824-239-A) and demonstrated the effect of rainfall on the movement of water in the aquifer for that area.

DESCRIPTION OF SPRINGS AND SINKS

Information relating to each spring and sink is grouped systematically to allow the report to be used for ready reference.

The number and name serve to identify the spring or sink. The number is based on latitude and longitude. (See fig. 2.) In addition to the location indicated by the number, the locations are referenced to General Land Office surveys based on quarter-quarter section, township, and range. Supplementary descriptions further pinpoint the locations.

The description of a spring or sink includes information about the general size, shape, depth, and other data. Most of the distances were estimated but depths were measured by weighted tape or fathometer.

800-240-A. PHILLIPPI SPRING

Location.—Pinellas County. SE¼SE¼ sec. 27, T. 28 S., R. 16 E., about 200 feet east of the west shore of Safety Harbor, 0.2 mile southeast of the north gate of Phillippi Park 0.3 mile southeast of the junction of County Road 80 with State Highway 590, and 1.3 miles southeast of the junction of State Highways 580 and 590.

Description.—A concrete curb 3 feet in diameter and 2 feet high has broken off on the shoreward side to about 0.4 foot above the filled land surface. The spring has ceased flowing because of the persistence of vandals who have filled the opening with rocks and trash more frequently than park personnel could remove it. The author observed flow from the spring in the late 1920's and up to 1940. Park personnel report that the spring has not flowed since before 1959.

Discharge.—The estimated flow in 1940 was 10 gpm.

Quality.—The water tasted salty in 1940.

Use.—None.

805-246-A. BLUE SINK

Location.—Pinellas County, SE¼SE¼ sec. 35, T. 27 S., R. 15 E., about 0.8 mile north of Palm Harbor, 1,100 feet north of U. S. Highway 19 at the junction of a dirt road to the sink, 50 feet east of the dirt road, and 50 feet north of a dirt trail.

Description.—The pool is about 80 feet in diameter at the surface. The bottom slopes irregularly toward a vertical hole about 15 feet in diameter in a rock ledge. Below the rock ledge the hole expands to an undetermined diameter (estimated by a diver to be 50 feet) to a depth of 111 feet. A small mound of sand and a water-logged tree rest on a landing at 111 feet. On the southwest side of the landing, a hole, large enough to swim in but not measured, extends to a depth of 150 feet. Below 150 feet the hole changes to an elongate inclined cavity that continues downward an undetermined distance at perhaps 60 degrees from the vertical.

Discharge.—A pumping station on the southwest side of the sink has pumped 1,000 gpm for as long as a week without appreciably lowering the water level. A small amount of surface water and shallow ground water is drained by the sink.

Quality of Water.—The chloride content of water near the surface was 360 ppm on August 30, 1962, 86 ppm on October 3, 1946, and 388 ppm on June 25, 1945. The chloride content of water from near the bottom was 11,300 ppm on October 3, 1946, 13,300 on September 20, 1946, and 595 on June 25, 1941. The quality of the water reportedly does not seriously deteriorate after one week of pumping at 1,000 gpm. In the late 1930's and early 1940's, the water reportedly was too salty for irrigation of citrus. Mr. George McCall, Pinellas County Sanitation Engineer, reports that water in a turbid layer between depths 125 to 130 feet contains more than 37 ppm of hydrogen sulfide. This is about 10 times the concentration of hydrogen sulfide previously reported in waters in Florida.

Use.—Irrigation.

805-247-A. CRYSTAL BEACH SPRING

Location.—Pinellas County, NW¼NE¼ sec. 3, T. 28 S., R. 15 E., at Crystal Beach in the bottom of St. Joseph Sound about 1,000 feet southwest of the shore at the west end of Florida Boulevard. The spring is noted on U.S. Coast and Geodetic Survey Chart 858.

Description.—The rim of the spring is about 50 feet in diameter. The maximum depth was 18 feet below the water surface in a hole about 10 feet in diameter. The general bottom depth in the spring is about 14 feet.

Discharge.—Not measured—probably on the order of 5 or 10 cfs at low tide.

Quality of Water.—14,000 to 16,000 ppm chloride on September 19 and 20, 1946. A sample from 16-foot depth on September 30, 1962 contained 11,000 ppm chloride. Temperature 84°F.

Use.—None.

806-246-A. HEALTH SPRING

Location.—Pinellas County, NW¼SE¼, sec. 26, T. 27 S., R. 15 E., at town of Wall Springs about 500 feet northwest of the Atlantic Coast Line Railroad track and 1,200 feet northwest of U.S. Highway 19A at the road to the spring in Wall Springs, 3 miles south of Tarpon Springs.

Description.—The spring basin slopes toward the spring which is about 10 feet deep. A low curb about 30 feet in diameter encloses the spring. Water from the spring flows under the curb through a rectangular opening into a swimming-wading pool complex. The swimming and wading pools discharge into a partially curbed swimming hole, about 1 acre in area, that is separated from the salt water of Boggy Bayou by a dike. The flow from the swimming hole is regulated by a gate valve and reverse flow is prevented by a flap valve.

Discharge.—Measured flow was 6.14 cfs on November 10, 1947; 11.2 cfs on August 22, 1949; 16.5 cfs on August 23, 1949; 1 cfs on May 2, 1956; and 4.52 cfs on November 3, 1960.

Quality of Water.—67 ppm chloride on September 20, 1946.

Use.—Bathing and drinking.

807-244-A. KNIGHTS SINK

Location.—Pinellas County, NW¼NE¼ sec. 19, T. 27 S., R. 16 E., about 1.3 miles south of State Highway 582 and 0.2 mile south of the south city limit of Tarpon Springs; about 100 feet west of the west shore of Lake Tarpon and 800 feet east of U.S. Highway 19.

Description.—The sink pond is about 100 feet long and 80 feet wide. The sides of the sink are fairly steep from the top of the ridge that surrounds the sink, to a depth of 1 to 20 feet below the water surface. A nearly vertical hole extends from the rim at 10-20 feet to a general bottom depth of about 60 feet. The northwest side of the hole is 75 feet deep. Water enters and leaves the sink through a horizontal opening below the vertical or overhanging wall. Dye studies indicate that Knights Sink is connected with the underground drain that connects Lake Tarpon Sink (807-244-B) with Tarpon Springs (808-245-A).

Discharge.—Only small amounts of water flow into or out of the sink. The principal causes of outflow are declining stage of Lake Tarpon during a drain cycle with resultant decrease in storage in the sink, ebbing tide, and minor local ground water and surface water that enter the sink. Inflow is induced by rising tide, by rising stage of Lake Tarpon, and by evapotranspirative losses from the sink.

Quality of Water.—In June 1945 during an interdrain period, the following chloride concentrations were noted: 432 ppm at surface, 1,810 ppm at 40 feet, and 19,300 ppm at the bottom. At this time the water near the surface of Lake Tarpon contained more than 4,000 ppm chloride. The small amount of fresh water derived from rainfall and from local surface and ground water inflow apparently maintains the observed stratification of dense salty water and fresh water.

Use.—None.

807-244-B. LAKE TARPON SINK

Location.—Pinellas County, NW¼NE¼ sec. 19, T. 27 S., R. 16 E., in the bottom of Lake Tarpon about 60 feet east of the west shore of the lake, 1.3 miles south of State Highway 582 and about 200 feet southeast of Knights Sink (807-244-A).

Description.—The sink is irregular in shape, about 250 feet wide and 300 feet long at a depth of 10 feet below the lake surface when the lake stage is 2 feet above mean sea level. The generally west and south sides slope moderately from the rim to a depth of about 40 feet then slope steeply but very irregularly toward the deep on the west side of the depression. The west and north slopes are steep or vertical from a depth of about 20 feet to the bottom. The deep is a small vertical hole about 20 feet deep below general bottom depth of 95 feet below mean sea level along the west side of the sink. Lake Tarpon Sink is probably the eastern end of the underground conduit system that connects Tarpon Springs (808-245-A).

Discharge.—Flow to and from the lake through the sink approached 200 and 150 cfs, respectively, during a period of vacillating flow when the lake level was approximately 1.5 feet above mean sea level. The flow from the lake during the early part of the drain cycle has not been determined.

Quality of Water.—Salt water from Tarpon Spring (808-245-A) flows into Lake Tarpon through this sink during periods of reverse flow. Under such conditions, the sink contains water with about 18,000 ppm chloride. During drainage of the lake, the water in the sink is similar to that of the lake. During periods when the flow virtually stops, the chloride content of water near the top is the same as that of the lake, but the chloride content increases to perhaps 18,000 ppm as the bottom is approached.

Use.—None.

808-245-A. TARPON SRINGS

Location.—Pinellas County, SW¼SW¼ sec. 12, T. 27 S., R. 15 E., about 100 feet north and 150 feet west of the curb around Spring Bayou, near the west end of Tarpon Avenue and the north end of Bath Street in Tarpon Springs.

Description.—The rim of the kidney-shaped spring basin is about 130 feet long and 60 feet wide at a depth of 10 feet below mean sea level and is 125 feet deep at the deepest point. The north, east, and west sides slope steeply toward the spring to a depth of 60 feet, then drop vertically to about 100 feet. The south wall is vertical or overhung from 20 feet to 125 feet. The vertical hole below 60 feet is about 40 feet long and 20 feet wide. The floor of the hole slopes quite steeply toward the 125-foot deep on the south side. The spring opening is in the south wall near the bottom.

Tarpon Springs is the principal and probably the only drainage outlet for Lake Tarpon, about 1½ miles southeast of the spring. The unusual hydrologic phenomena associated with the flow of the spring are discussed in the section on Geohydrology.

Discharge.—The maximum flow of the spring was about 1,000 cfs on September 8, 1950 during a period while Lake Tarpon was draining. The sporadic periods of large flow last for 7 to 25 days. Reverse flow occurs at the high tide following cessation of the drainage of Lake Tarpon. This reversed flow was 146 cfs on October 10, 1946, on a falling tide. Between these definite types of flow, the spring vacillates with the tide.

Quality of Water.—During periods of lake drainage, the quality of the water in the spring approaches that of the lake water. The maximum chloride content observed was 16,100 ppm in a water sample from the bottom on June 24, 1945. The chloride content probably equals or exceeds 18,000 ppm, the concentration observed in Lake Tarpon Sink (807-244-B) during flow toward the sink from Tarpon Springs.

Use.—None.

812-239-A. SEVEN SPRINGS

Location.—Pasco County, NW¼NW¼ sec. 24, T. 26 S., R. 16 E., at Seven Springs, about 50 feet east of State Highway 54 and 150 feet south of the Anclote River, at the southeast corner of an abandoned swimming pool.

Description.—Only one of the "Seven" springs has flowed in recent years. The spring is curbed with 18-inch concrete pipe to a a depth of about 17 feet below the present land surface. Local residents report that the spring formerly supplied a swimming pool but was inadequate. The curb was practically filled with dry sand on April 4, 1962. Reported depth of water in the curb was 12 feet on May 3, 1946.

Discharge.—Almost no flow during drought of 1945, 13 gpm on May 3, 1946, 2.6 gpm on May 3, 1956, 18 gpm on November 3, 1960, 4.2 gpm on November 23, 1960, and no flow on April 4, 1962.

Quality—See table 1. Temperature 76°F on May 3, 1946; hydrogen sulfide odor.

Use.—None.

814-243-A and B

Location.—Pasco County, SE¼NE¼ sec. 8, T. 26 S., R. 16 E. In New Port Richey about 600 feet east of South Boulevard in the south bank of the Pithlachascotee River, about 15 feet south of the river. Spring 814-243-A is in the western fork and 814-243-B in the eastern fork of a spring run. Spring 814-243-B is about 15 feet east of spring 814-243-A.

Description.—The springs flow from beneath an overhanging shelf of dense, hard limestone about 3 feet thick. At high tide the river floods the springs to a depth of 2 feet.

Discharge.—Estimated flow of each spring was about 100 gpm on September 13, 1961.

Use.—None.

816-239-A. ROCKY SINK

Location.—Pasco County, NE¼SE¼ sec. 26, T. 25 S., R. 16 E., about 600 feet south of State Highway 587 at Bass Lake Subdivision which is 4 miles north and east along State Highway 587 from Congress Street in New Port Richey.

Description.—The sink is about 125 feet in diameter and 52 feet deep below the water surface at a stage of 13 feet above mean sea level. The deep is about 15 feet southwest of a large cypress tree on the north east bank of the sink.

The bank above the water surface on the north and west sides is a nearly vertical limestone wall. The east bank above the water surface is mostly clay. Rock prominences below the water surface form a rough shelf several feet wide.

At the south side, a stream flows into the sink from the chain of several lakes to the southwest, west, north, and northeast, in the order of distance from the sink. The stage of the sink fluctuated between 8.2 and more than 13 feet above mean sea level during the period August 1960 to September 1962. Minor fluctuations of the stage of the sink are related to the tide as shown in figure 4. The average fluctuation of the stage of the sink is about 6 percent of the tide in Indian Bay. The estimated flow of the stream and hence the discharge of the sink to the aquifer was 26 cfs on July 12, 1960 and 5 cfs on January 22, 1962. The measured flow was 14.5 cfs on September 10, 1962.

Quality.—The water in the stream at the sink was highly colored and contained 4 ppm chloride on September 10, 1962.

Use.—The sink drains five lakes and a large swampy area.

817-242-A

Location.—Pasco County, SE¼NW¼ sec. 21, T. 25 S., R. 16 E., 2.2 miles northeast of Port Richey, about 600 feet west of an old road 0.15 mile north of its junction with U.S. Highway 19 in the bottom of a drainage ditch about 5 feet from the east end of the ditch.

Description.—The spring flows from the rock through a thin sand cover to form a sand boil a few inches in diameter. The ditch drains directly to the Gulf of Mexico.

Discharge.—The estimated flow was 5 gpm on November 23, 1960.

Quality of Water.—The chloride content, based on a specific conductance of 2,050 micromhos, was 500 ppm on November 23, 1960.

Use.—None.

817-243-A. SALT SPRINGS

Location.—Pasco County, NE¼SE¼ sec. 20, T. 25 S., R. 16 E., about 1.6 miles north of Port Richey, 0.4 mile west of U.S. Highway 19, and 500 feet south of Salt Springs Road; on the south bank of a neck on the west side of a 1-acre pond, about 100 feet east of the easternmost natural bridge.

Description.—The spring opening, invisible from the surface, is an irregular hole in the vertical bank. The water flows 100 feet westward to a natural bridge where it enters a hole in a vertical bank, flows about 3 feet underground, and then emerges from a

Table 1. Chemical analyses of waters from springs in west-central Florida.

(Analyses by U.S. Geological Survey. Results in parts per million except specific conductance, pH, and color.)

Spring number	Spring name	Date of collection	Temperature (°F)	Silica (SiO_2)	Iron (Fe) In solution at time of analysis	Iron (Fe) Total	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids Residue at 180°C	Dissolved solids Sum	Hardness as $CaCO_3$ Calcium magnesium	Hardness as $CaCO_3$ Non-carbonate	Specific conductance (micromhos at 25°C)	pH	Color	Remarks
812-239-A	Seven	5- 3-56	75	13	0.01	----	58	4.1	5.2	0.5	204	2.0	8.5	---	0.1	-----	-----	164	0	318	7.7	15	
817-243-A	Salt	11-23-60	--	----	----	----	---	-----	-------	-----	134	-------	7,900	---	---	-----	-----	2,680	2,560	21,800	7.8	--	
817-243-B	Salt	5-17-62	77	----	----	----	---	-----	-------	-----	---	202	1,360	---	---	-----	-----	680	-----	4,710	---	--	
821-242-A	Hudson	5- 3-56	76	----	.01	----	189	393	3,290	106	179	857	6,030	---	1.0	-----	-----	2,090	1,940	16,900	7.5	10	
823-241-A	Horseshoe	11-28-60	74	----	----	----	---	-----	-------	-----	172	-------	2,300	---	---	-----	-----	885	740	7,240	7.2	--	
824-239-A	Isabella	11-14-61	74	----	----	----	---	-----	-------	-----	---	14	84	---	---	-----	-----	184	-----	571	---	--	
826-238-A	Bobhill	5-16-62	76	----	----	----	---	-----	-------	-----	---	4.0	7.0	---	---	-----	-----	106	-----	76	---	--	Sampled at low tide
826-239-A	Boat	5-15-62	75	6.7	.00	0.13	42	4.1	13	.8	136	7.6	21	0.1	.1	174	-----	122	10	295	7.7	5	
827-238-A		7-13-60	75	----	----	----	---	-----	-------	-----	104	-------	5.0	---	---	-----	-----	90	5	176	7.1	--	
830-234-A	Little	6-14-60	75	----	----	----	---	-----	-------	-----	150	-------	4.0	---	---	-----	-----	128	5	324	7.5	--	
831-234-A	Weekiwachee	5- 2-56	--	9.7	.01	----	48	6.8	3.1	.4	166	6.0	5.0	.3	.0	-----	161	148	12	283	7.9	5	
839-238-A	Blind	11-28-61	74	----	----	----	---	-----	-------	-----	---	1,220	9,200	---	---	-----	-----	3,060	-----	25,600	---	--	
841-236-A		11-29-61	74	----	----	----	---	-----	-------	-----	---	580	4,300	---	---	-----	-----	1,550	-----	12,900	---	--	Brown, flaky material suspended in water.
841-236-B		11-29-61	72	----	----	----	---	-----	-------	-----	---	492	3,700	---	---	-----	-----	1,360	-----	11,400	---	--	Brown, flaky material suspended in water, estimated flow 5 cfs.
841-236-C		11-29-61	75	----	----	----	---	-----	-------	-----	---	296	2,120	---	---	-----	-----	2,150	-----	7,060	---	--	Brown, flaky material suspended in water.
842-234-A	Chassahowitzka	4-20-62	75	9.2	.00	.01	52	2.7	140	5.5	176	36	250	.2	.9	684	-----	240	96	1,100	---	--	Slightly turbid
	Do.	4-26-62	75	----	----	----	---	-----	-------	-----	---	18	98	---	---	-----	-----	80	-----	625	---	--	Do.
842-234-B	Chassahowitzka	4-20-62	75	----	----	----	---	-----	-------	-----	---	166	1,180	---	---	-----	-----	530	-----	4,060	---	--	Do.
	Do.	4-26-62	75	8.9	.00	.27	76	83	656	26	180	156	1,200	.2	1.8	2,470	-----	531	384	3,900	---	--	Do.

Table 1—Continued

Spring number	Spring name	Date of collection	Temperature (°F)	Silica (SiO_2)	Iron (Fe) In solution at time of analysis	Iron (Fe) Total	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids Residue at 180°C	Dissolved solids Sum	Hardness as $CaCO_3$ Calcium magnesium	Hardness as $CaCO_3$ Non-carbonate	Specific conductance (micromhos at 25°C)	pH	Color	Remarks
842-234-C	Chassahowitzka	4-26-62	72	8.9	0.00	0.07	50	14	53	2.4	178	18	96	0.2	0.2	372	-----	182	36	632	---	--	
843-235-B		4-20-62	75	9.1	.01	.76	98	145	1,140	44	184	296	2,000	.2	.6	4,250	3,820	841	690	6,600	7.6	2	Turbid
843-235-D	Ruth	11-29-61	77	----	----	----	--	-----	-------	-----	---	130	975	---	---	-----	-----	470	-----	3,460	---	--	Sampled 3,000 feet downstream from spring.
	Do.	4-20-62	75	8.9	.01	.16	80	85	662	26	170	172	1,200	.2	.4	2,550	2,320	549	410	4,000	7.7	2	Turbid

hole in the opposite vertical bank. Dye placed in the water above this natural bridge emerges from the west side in 1½ minutes. The water flows about 75 feet westward to another natural bridge about 10 feet wide and emerges from 3 holes in the bottom of the sloping western side of the natural bridge. Dye placed in the water above this bridge emerges from the two vigorously boiling southwestern and southern holes in 2 minutes and from another smaller and sluggishly flowing northern hole in 2½ minutes. Flow reverses at high tide and salt water from the gulf flows into the spring. The spring run, known as Salt Springs Run, is a bayou of the Gulf of Mexico.

Discharge.—The measured outflow was 10.5 cfs on January 18, 1962. Inflow was not measured but is of the same order as outflow.

Quality of Water.—See table 1.

Use.—None.

817-243-B

Location.—Pasco County, SE¼NE¼ sec. 20, T. 25 S., R. 16 E., 2.2 miles northeast of Port Richey, about 0.7 mile west of an old road, 0.15 mile north of its junction with U.S. Highway 19 at the end of the south fork of a dirt road in a coastal hammock.

Description.—The spring flows from an irregular hole in the rock near the east side of the pool. The pool is indefinite in size because it merges with the surrounding swamp.

Discharge.—The flow was estimated at 2 cfs on May 17, 1962.

Quality of Water.—See table 1.

Use.—None.

819-240-A. BEAR SINK

Location.—Pasco County, SW¼NE¼ sec. 11, T. 25 S., R. 16 E., about 1,500 feet south of State Highway 52 and 1.7 miles east of U.S. Highway 19 at Bayonet Point community, at the site of historic 5-A sawmill and community, on the southside of the northward continuing channel of Bear Creek.

Description.—The sink is about 100 feet wide and 150 feet long. The maximum depth of 35 feet was measured about 30 feet from the west shore and 75 feet from the south shore. Another deep at the extreme south end of the pool receives sand slides from the actively slumping south wall. The bottom of the south deep at 30 feet was hard to the sounding lead and is probably rock. Numerous tree trunks and roots partially block both deeps.

Bear Creek enters the sink on the north side through a well developed channel. At high stage, the flow of the creek exceeds the drainage capacity of the sink, and the excess water flows into a stream channel that leads to Round Sink (820-241-A). The flow of the creek, as measured under such a condition on September 10, 1962, was 54.9 cfs at a bridge 1.7 miles upstream from Bear Sink, and the flow through the overflow channel about 600 feet downstream from Bear Sink was 13.5 cfs. By difference, the flow into Bear Sink was 41.4 cfs. The stage of the sink was about 3 feet above normal stage and 6 feet below the stage observed in December 1960. Normal stage of the sink is about 3 feet above mean sea level and at this stage the sink drains an estimated 10 or 15 cfs. Flow of the creek upstream from the sink diminishes to a trickle during dry periods. The stage of the sink fluctuates with the tide.

An attempt was made to trace the water that enters the sink to its point of emergence from the aquifer. On January 19, 1962, 13 pounds of hidacid fluorescein dye were put into the creek at several places upstream from the sink and into the sink. Dyed water entered the sink over a period of more than 24 hours. This reduced the probability of a single slug of dyed water being dispersed before it could be detected by daily inspection. A number of local residents observed the color of nearby springs at frequent intervals. Other accessible springs within several miles were checked daily for about 2 weeks. Springs that were not accessible by land were checked by helicopter or airplane every few days for about two weeks, then weekly for several months. No dye was observed to emerge from any of the springs along the coast or within 5 miles of the coast.

Either the dyed water was still in the aquifer or the point of discharge was beyond the area observed or the dye was so diluted that it escaped detection after discharge.

Quality of Water.—Water from Bear Creek at the sink contained 10 ppm chloride on September 10, 1962.

Use.—Drains several square miles in the basin of Bear Creek.

820-241-A. ROUND SINK

Location.—Pasco County, SE¼SE¼ sec. 3, T. 25 S., R. 16 E., about 1,000 feet north of State Highway 52 and a mile east of U.S. Highway 19 at Bayonet Point community.

Description.—The sink is about 100 feet in diameter. The sides are nearly vertical from the top of the bank to a depth of 20 to 40 feet. Near the center of the sink a vertical pipe or chimney about 20 feet in diameter bottoms at 60 feet.

During wet periods, the overflow of Bear Creek from Bear Sink (819-240-A) enters the sink via a swamp that lies to the southeast. The drainage capacity of the sink normally exceeds the inflow and the sink is the normal terminal of Bear Creek during wet periods. In 1960 and on one other occasion in the memory of old-time residents, the creek overflowed the sink and followed a poorly defined stream channel to the gulf.

On May 8, 1961, 8 pounds of hidacid fluorescein dye were dissolved in the sink when the inflow was about 0.5 cfs. During the next 2 weeks, the inflow ranged from about 0.2 cfs to about 1 cfs. No dye was observed in any of the local springs until an aerial check of spring 820-243-A, about 3 miles distant in the Gulf of Mexico, was made on June 8, 1961. The dye was emerging from the spring and gradually dispersing toward the northwest. A previous aerial check of the spring on June 2, 1961 was negative.

The dye water moved approximately 3 miles in 26 to 30 days. Assuming a rate of travel of 500 feet per day in a straight line distance and an average flow of 0.5 cfs, the cross-sectional area of the conduit would be 80 square feet or approximately that of a 10-foot pipe.

Use.—Drains overflow of Bear Creek from Bear Sink.

820-242-A. HAZEL SINK

Location.—Pasco County, NE¼NE¼ sec. 4, T. 25 S., R. 16 E., about 600 feet west of U.S. Highway 19, and 1 mile north of State Highway 52 at Bayonet Point community.

Description.—The sink is about 250 feet in diameter. The bank drops steeply from land surface to a few feet below the water surface very near the shore. The bottom then slopes rather erratically toward the center. A virtually circular opening about 100 feet in diameter near the center of the sink extends vertically from the irregular rim to a depth of 110 to 115 feet. The bottom is muddy.

Strips of aluminum foil, dropped into the sink near the middle of the deep opening, moved quite rapidly toward the west as they sank. The stage of the sink fluctuates with the tide.

Use.—None.

820-243-A

Location.—Pasco County. In the Gulf of Mexico 2 miles southwest of Hudson and 3,000 feet due west of the north point of Lighter Bayou in the line of sight of the coastline south of Bayonet Point.

Description.—The oval rim of the depression around the spring is about 100 feet long and 30 feet wide. From about 2 feet below the water surface at the rim the bottom slopes to the edge of the spring hole about 10 feet from the southeast end of the lobe. The spring is irregular in shape, about 6 feet in diameter, and more than 40 feet deep.

The spring is hydraulically connected with Round Sink (820-241-A). See discussion under Round Sink.

Discharge.—Not measured.

Quality of Water.—The chloride content, based on a specific conductance of 25,000 micromhos, was 8,500 ppm and the temperature 59° at a depth of 20 feet on December 5, 1960.

Use.—None.

821-242-A. HUDSON SPRINGS

Location.—Pasco County, NW¼SE¼ sec. 28, T. 24 S., R. 16 E., at Hudson at the head of Hudson Creek, about 130 feet west of Pine Street, 120 feet north of Hudson Avenue, and 3 feet west of the rock curb of the creek.

Description.—The spring flows from an irregular elongate hole in the northeast rock wall and boils up at the surface about 4 feet from the northeast end of the curb. The boil decreases as the tide rises but remains visible through the flood tide. At times the flow may reverse at high tide.

A possible former spring 40 feet east of this spring has been curbed to prevent flow. The depth was 17 feet in 1946 but the "sinkhole" has been filled with large boulders to about low tide level. Dye placed in this sink remained at constant concentration between May 2 and May 6, 1961. During this time, the sink flooded and drained with each tidal rise and fall. By May 10, 1961, the color had disappeared but none of the dye had been detected in the spring only 40 feet away. Many additional springs flow from the deepened portion of Hudson Creek about 1,000 feet west of this spring.

Quality of Water.—See table 1.

Use.—None.

822-241-A

Location.—Pasco County, SE¼NW¼ sec. 27, T. 24 S., R. 16 E., at Hudson, about 150 feet north of Stevens Avenue and 0.1 mile west of U.S. Highway 19; about 50 feet north and 60 feet east of the southwest corner of a basin in a canal.

Description.—The spring was formed by excavation of the basin in which it lies. The flow from the three openings produces a vigorous boil on the surface, especially at low tide.

Discharge.—The estimated flow was 30 cfs on August 22, 1960.

Quality of Water.—A sample taken from the bottom of the tidal basin 30 feet north of the spring on August 30, 1962, contained 1,150 ppm chloride. The water from the spring probably contains much less chloride than that of the tidal basin.

Use.—None.

822-242-A. CEDAR ISLAND SPRINGS

Location.—Pasco County, NW¼SE¼ sec. 21, T. 24 S., R. 16 E., about 1.1 miles north of Hudson, 1,200 feet north of Cedar Island Point, and 1,000 feet west of the shoreline at high tide.

Description.—The rim of the spring is irregularly elongate in a north-south direction. It is about 25 feet long and 15 feet wide at 2 feet below mean tide. The spring hole is an irregular vertical cavern in rock about 6 feet in diameter and 23 feet deep below tide. It lies about 5 feet from the northern rim of the spring.

Discharge.—No observable flow. Water temperature and chloride measurements indicate some flow.

Quality of Water.—The chloride content, based on a specific conductance of 14,000 micromhos, was 4,600 ppm, and the temperature 58°F at surface and 60°F at 20 feet on December 5, 1960. The chloride content, based on a specific conductance of 20,000 micromhos, was 4,600 and temperature 73°F at total depth on December 11, 1960.

Use.—None.

822-242-B. CEDAR ISLAND SPRINGS

Location.—Pasco County, NW¼SE¼ sec. 21, T. 24 S., R. 16 E., about 1.1 miles north of Hudson, 1,200 feet north of Cedar Island Point and 1,050 feet west of the shoreline at high tide; about 50 feet west of 822-242-A.

Description.—The rim of the spring is irregularly elongate in a north-south direction. It is about 15 feet long and 6 feet wide at 2 feet below mean tide. The spring hole is an irregular cavern in rock about 3 feet in diameter and 28 feet deep below tide. It lies about 5 feet from the northern rim of the spring.

Discharge.—No observable flow. Water temperature measurements indicate some flow.

Quality of Water.—Temperature 63°F at surface, 64°F at 20 feet, and 73°F at total depth; the chloride content, based on a specific conductance of 25,000 micromhos, was 8,500 ppm at total depth on December 11, 1960. The chloride content of the gulf water 1.7 miles west of the spring was more than 15,000 ppm based on a specific conductance of more than 40,000 micromhos on December 5, 1960.

Use.—None.

823-241-A HORSESHOE SPRING

Location.—Pasco County, SW¼NE¼ sec. 15, T. 24 S., R. 16 E., about 2.3 miles northeast of Hudson. The spring is on the edge of a tidal marsh, about 1 mile west of the intersection of State Highway 595 and the trail to the spring 2.1 miles northeast of Hudson.

Description.—The spring pool is horseshoe-shaped with several deeps from which former springs probably flowed. The present spring is an irregular elongate hole in the rock 10 feet long, 6 feet wide and about 25 feet deep below the water that lies in the bend of the horseshoe. The southeast side of the spring is a vertical rock wall from which the spring flows.

The water flows toward Fillman Bayou to the north through a spring run about 8 feet wide at the spring.

Discharge.—Flow estimated as 6.7 cfs on November 28, 1960.

Quality of Water.—See table 1.

Use.—None.

823-241-B

Location.—Pasco County, SW¼NE¼ sec. 15, T. 24 S., R. 16 E., about 2.3 miles northeast of Hudson. The spring is about 100 feet southeast of Horseshoe Spring (823-241-A) and about 1 mile west of the intersection of State Highway 595 and a trail to the spring about 2.1 miles northeast of Hudson.

Description.—The spring pool is about 5 feet wide at the head of a small spring run. The opening is obscured by grass and slime.

Discharge.—The flow of the spring was about one half cfs on November 28, 1960.

Use.—None.

824-239-A. ISABELLA SPRING

Location.—Pasco County, SW¼NW¼ sec. 12, T. 24 S., R. 16 E., about 1.4 miles southeast of Aripeka, 0.7 mile west of the junction of U.S. Highway 19 and State Highway 595 southeast of Aripeka, 0.3 mile southwest of State Highway 595 at a dirt trail leading to the spring, and 150 feet east of the trail. The spring is in the west end of Whitten Swamp which extends to U.S. Highway 19 on the east.

Description.—The spring opening is obscured by the dense shade afforded by the lush foliage of the trees. The pool is about 20 feet long and 15 feet wide. Several trees, submerged in the spring, prevent the measuring of depth from the bank. A stream bed leads eastward through Whitten Swamp. The spring flows vigorously on the incoming tide to flood the swamp, especially in the well developed stream channels. As the tide begins to ebb, the flow stops and the spring drains the swamp completely. The water level in the spring fluctuates about half a foot for each foot of tidal change at Indian Bay with a time lag of about half an hour to two hours. The fluctuation of the water level in the spring and the estimated tide at Indian Bay, 3 miles to the northwest, is shown in figure 5. The stage of the spring fluctuates between about 3 and 6 feet above mean sea level. The flow of the spring fills and empties a ground-water reservoir that is only imperfectly connected with the aquifer. On May 21, 1961, 3 pounds of hidacid fluorescein dye was put in the water as it entered the ground. Samples of water taken each day through May 30, 1961 contained the original concentration of dye. About an inch of rain fell the evening of May 31, 1961. The following day the dye had been reduced to half the original concentration. The dye entirely disappeared during the next few days but was not observed to emerge at any of the springs in the area during the following three months.

Discharge.—The cyclic flow of the spring varies between no flow at the changes in tide to about 15 cfs at maximum flow. The rate of flow varies with the magnitude of fluctuation of water levels so that the greatest rate and volume of flow would occur at spring tide and lesser flow at neap tide.

Quality of Water.—See table 1.

Use.—None.

825-243-A. THE JEWFISH HOLE

Location.—Pasco County, in the Gulf of Mexico about a mile west of Hammock point, 3 miles west-southwest of Aripeka, and about 600 feet south of the "Aripeka Channel," a shallow natural channel, a mile south of the marked channel, that is customarily used by local fishermen.

Description.—The rim of the spring is approximately circular in shape and about 40 feet in diameter at about 4 feet below mean tide. The bottom slopes toward the spring opening to a depth of about 10 feet below approximate mean tide. The spring hole is an irregular, vertical pipe about 15 feet in diameter and 148 feet deep below the general bottom which is about 4 feet below approximate mean tide.

Discharge.—A vigorous boil at low tide becomes a "slick" at high tide. The flow has not been measured. During the drought of 1961-62, the boil and slick ceased.

Quality of Water.—The chloride content, based on a specific conductance of 12,000 micromhos, was 3,800 ppm and the temperature 58°F on December 5, 1960.

Use.—None.

826-238-A. BOBHILL SPRING

Location.—Hernando County, SW¼SE¼ sec. 31, T. 23 S., R. 17 E., about 600 feet north of the Pasco County line and 1,000 feet west of U.S. Highway 19 in a hammock.

Description.—The spring is at the head of a rim in a pool about 6 feet wide. The opening is obscured by a metal barrel that has been sunk to the bottom so that the spring water could be obtained without contaminants from the surrounding pool. The vigorous boil is continuous. The water surface at the spring is about 10 feet above sea level.

Discharge.—The flow was about 3½ cfs on January 8, 1961.

Quality of Water.—See table 1.

Use.—The water from this spring supplied the drinking water for residents of Aripeka and vicinity for many years.

826-239-A. BOAT SPRING

Location.—Hernando County, NW¼SW¼ sec. 36, T. 23 S., R. 16 E., about 0.7 mile northeast of Aripeka at the head of Hammock Creek.

Description.—Five springs boil from solution-riddled rock that forms the bottom of the head pool. The owner reports that a diver established the direct connection of the holes with a common source of water at depth. The springs are in the northern half of the head pool which is about 40 feet long and 20 feet wide. A short narrow run connects the head pool with a sawgrass marsh, the stage of which fluctuates with the tide in Hammock Creek. The spring is being improved by excavation.

Discharge.—The flow at low tide was about 6 cfs on February 19, 1962.

Quality of Water.—See table 1.

Use.—None.

826-239-B

Location.—Hernando County, SE¼SW¼ sec. 36, T. 23 S., R. 16 E., about 280 feet north of the Pasco-Hernando County line, and about 2,600 feet east of State Highway 595 at the county line on Palm Island in Aripeka.

Description.—Three small springs occur in a line about 3 feet apart near the head of a pool which is about 8 feet wide. The pool flows into two runs that flow generally northeast. The northern run is about 6 feet wide and a foot deep and the eastern run is about 12 feet wide and 2.5 feet deep at the head pool. A larger spring flows from the bottom of the eastern run about 20 feet from the head pool. This run is bridged by ferns from the head pool to the larger spring and to the northeast is either bridged by ferns or runs underground. Dye placed in either run emerges upstream from a small bridge across the main run near Hammock Creek.

Discharge.—The estimated flow of the three small springs was 5 cfs on February 19, 1962. About a fourth of the spring flow was entering the westernmost run and the remainder was flowing toward the larger spring, the flow of which was not determined.

Quality of Water.—Not determined—does not taste salty.

Use.—None.

827-238-A

Location.—Hernando County, NW¼SE¼ sec. 30, T. 23 S., R. 16 E., about 1.4 miles north of the Pasco County line and 0.7 mile west of U.S. Highway 19, about 10 feet from the west end of a grassy swamp, about 600 feet east of a jeep trail, and about 0.1 mile north of a spring run at the crossing of the jeep trail.

Description.—The spring is seen as a sand boil in the grass that mats the low swampy area. The water flows in an indistinct path across the grassy area to a stream at the southeast side. This stream joins several other spring runs to form Indian Creek.

Discharge.—The estimated flow of the run at an alligator pen about 1,000 feet downstream from the spring was 1 cfs on July 13, 1960.

Quality of Water.—See table 1. The alligators in a display pen in the run of the spring lose patches of epidermis several days after being placed in the water.

Use.—Several houses and a hotel in the northern part of Aripeka use water from Indian Creek for domestic purposes.

830-234-A. LITTLE SPRING

Location.—Hernando County, NW¼SW¼ sec. 2, T. 23 S., R. 17 E., about 50 feet east of a sharp bend in a jungle trail half a mile west along the trail from Weekiwachee Springs; about 1,000 feet northwest of U.S. Highway 19 and 300 feet north of the north shore of a 20-acre lake, at the head of a sawgrass swamp and stream.

Description.—The spring pool is nearly circular, about 25 feet in diameter. The spring opening, near the center of the pool, is 40 feet deep, below the water surface. A small dam on the west side of the pool restricts flow to a single channel of Little Springs Run through the grass swamp to the Weekiwachee River about half a mile north of the spring.

Discharge.—The measured flow was 37 cfs on August 14, 1960 and 17.6 cfs on March 3, 1961. The flow of this spring is routinely measured along with the flow of Weekiwachee Springs (831-234-A).

Quality of Water.—See table 1.

Use.—Tourist attraction.

831-234-A. WEEKIWACHEE SPRINGS

Location.—Hernando County, SW¼NE¼ sec. 2, T. 23 S., R. 17 E., about 700 feet south of State Highway 50 and 250 feet west of U.S. Highway 19 at the head of the Weekiwachee River near the south end of a spring pool.

Description.—The spring pool is about 150 feet wide and 250 feet long with the flow from the northwest side of the pool forming the Weekiwachee River. The bottom of the spring pool slopes to a rock ledge at a depth of 10 feet. Below this ledge, a vertical hole about 50 feet in diameter bottoms on a rock ledge at a depth of 50 feet. Below this ledge the hole diameter is about 20 feet to a depth of 137 feet where the vertical hole bottoms on rock chips and sand. A cavity in the east side of the hole continues downward at an inclination of about 45°. Divers regularly go to a depth of 137 feet but report the velocity of the water emerging from the inclined cavity is too high to permit a person to swim into it.

Discharge.—Flow of the Weekiwachee River is measured about three-quarters of a mile west of the spring and includes the flow of Little Springs (830-234-A) and Weekiwachee Springs (831-234-A). The maximum and minimum measured flows for the period 1931-62 were 260 cfs on October 21, 1959 and September 9, 1960, and 101 cfs on July 24, 1956. The average of 264 flow measurements is 169 cfs.

Quality of Water.—See table 1.

Use.—Tourist attraction.

831-237-A

Location.—Hernando County, SE¼NW¼ sec. 32, T. 22 S., R. 17 E., about 1,000 feet from the north line and 2,100 feet from the west line of sec. 32, T. 22 S., R. 17 E.; at the head of a small run about 100 feet south of the Fish Hospital, a hole in a sharp bend of the Weekiwachee River 1,000 feet upstream from State Highway 595 bridge.

Description.—The spring is an almost perfectly cylindrical pipe about 3 feet in diameter and 40 feet deep. Water from the vigorous boil flows north through a channel about 3 feet wide and half a foot deep. The channel empties into the Weekiwachee River at a large hole 150 feet in diameter and 118 feet deep known as the Fish Hospital.

Discharge.—The flow was about 1½ cfs on May 22, 1962.

Use.—None.

831-237-B

Location.—Hernando County, NW¼NW¼ sec. 5, T. 23 S., R. 17 E., in a 25-foot diameter bay in Jenkins Creek about 200 feet downstream from the head of the creek; about 0.4 mile southeast of the State Highway 595 bridge over Jenkins Creek, 1 mile southwest of the State Highway 595 bridge over the Weekiwachee River, about 200 feet southwest of spring 831-237-C.

Description.—The spring is about 6 feet in diameter and 18 feet deep. Logs and other trash obscure the view of the spring opening. Water from the spring merges with that of spring 831-237-C to form Jenkins Creek.

Discharge.—The estimated discharge was 10 cfs on May 22, 1962.

Quality of Water.—The chloride content, based on a specific conductance of 5,500 micromhos, was 1,600 ppm on May 22, 1962.

Use.—None.

831-237-C

Location.—Hernando County, NW¼NW¼ sec. 5, T. 23 S., R. 17 E., at the head of Jenkins Creek about 0.4 mile southeast of the State Highway 595 bridge over Jenkins Creek, 1 mile southwest of the Weekiwachee River bridge; about 200 feet northeast of spring 831-237-B.

Description.—The spring pool is about 20 feet in diameter. A major run exits from the southeast side of the pool to form Jenkins Creek. A smaller run flows from the east side of the pool parallel to Jenkins Creek to enter the north side of the pool of spring 831-237-B.

Discharge.—The estimated discharge was 12 cfs in the larger run and 0.5 cfs in the smaller run on May 22, 1962.

Quality of Water.—The chloride content, based on a specific conductance of 5,000 micromhos, was 1,500 ppm on May 22, 1962.

Use.—None.

832-237-A. SALT SPRING

Location.—Hernando County, NE¼NE¼ sec. 29, T. 22 S., R. 17 E., at head of Salt Creek about 100 feet south of State Highway 50 and about 1,000 feet west of the intersection of State Highway 50 and State Highway 595, 1½ miles east of Bayport.

Description.—The head pool is about 40 feet in diameter with a run about 20 feet wide flowing southward from the south side of the pool. The irregular rocky sides of the pool below a depth of about 3 feet form an almost vertical hole about 10 feet in diameter and, with minor offsets and ledges, 165 feet deep. The vertical spring cavity becomes complex with depth and several alternate channels exist—some large enough to accommodate a diver. Several divers have lost their lives in the complex of rooms and shafts.

Discharge.—The measured discharge was 24.7 cfs on January 18, 1961.

Quality of Water.—The chloride content of water from the surface of the boil was 760 ppm and the temperature 74°F on December 16, 1960.

Use.—None.

832-237-B. MUD SPRING

Location.—Hernando County, NE¼NW¼ sec. 29, T. 22 S., R. 17 E., at head of Mud River about 400 feet south of State Highway 50, 1.3 miles east of Bayport, and 3,000 feet west of the intersection of State Highway 50 and State Highway 595.

Description.—The head pool of Mud River is about 400 feet in diameter with a 200-foot wide run flowing from the east side. The spring is near the southwest side of the pool about 15 feet east of a dock. The spring basin is elongate in a north-south direction and slopes irregularly toward the deep on the north, east, and south sides. The west side is essentially vertical to a depth of 82 feet. The general bottom in the vicinity of the deep is at a depth of 58 feet. Divers report a horizontal current flows westward at about 3 miles per hour at a depth of 50 feet. The bottom is obscured at all times by a brown flaky material, probably algal, that gives the river and spring the name "mud'. The spring has been known as Sulfur Spring.

Discharge.—The measured flow was 128 cfs on January 18, 1961.

Quality of Water.—The chloride content, based on a specific conductance of 23,000 micromhos, was 8,000 ppm at a depth of 58 feet, and the temperature 69°F on December 16, 1960.

Use.—Fishing and boat launching.

832-237-C

Location.—Hernando County, SE¼SW¼ sec. 20, T. 22 S., R. 17 E., about 500 feet north of a culvert under State Highway 50 about 600 feet west of Mud Spring (832-237-B), 1.2 miles east of Bayport, 3,600 feet west of the intersection of State Highway 50 and State Highway 595.

Description.—The spring pool is about 30 feet long and 10 feet wide in the bed of an intermittent creek. The spring was observed from the air only and no detailed information is available. The spring run flows south to a culvert under State Highway 50 where the flow was estimated and a sample taken.

Discharge.—The flow was about 5 cfs on December 16, 1960.

Quality of Water.—The chloride content, based on a specific conductance of 8,500 micromhos, was 2,700 ppm on December 16, 1960.

839-238-A. BLIND SPRINGS

Location.—Hernando County, SE¼NE¼ sec. 18, T. 21 S., R. 17 E., at the head of Blind Creek about 2.5 miles south of the mouth of the Chassahowitzka River at the Citrus-Hernando County line, about 1.5 miles upstream from the mouth of North Blind Creek.

Description.—The head pool of Blind Creek is about 100 feet in diameter. A run about 10 feet wide that flows from the east side of the pool widens to about 100 feet a short distance downstream. The rock floor of the spring basin slopes and drops vertically in variable increments to a distinct hole about 20 feet in diameter and 53 feet deep about 20 feet from the north side of the pool. A boil usually marks the location of the hole. A number of lesser springs issue from elongate solution enlarged joints or fractures in the floor of the spring basin and of the run near the basin. Highly colored water obscures the bottom below a depth of about 5 feet.

Discharge.—Because the head pool and the adjacent section of the run contain a complex of springs, the flow was measured about 400 feet downstream. The flow was 50.3 cfs on November 28, 1961. The flow of the entire complex of springs near the head of Blind Creek was estimated to be 200 cfs on November 28, 1961 (includes flow of 839-238-B and other springs not inventoried).

Quality of Water.—See table 1. The chloride content, based on a specific conductance of 14,000 micromhos, was 4,600 ppm at a depth of 50 feet, and the temperature 75°F on September 8, 1961.

Use.—None.

839-238-B

Location.—Hernando County, SE¼NE¼ sec. 18, T. 21 S., R. 17 E., about 800 feet downstream from the head pool of Blind Creek in a bay on the southwest side of the creek, 100 feet southwest of a 200-foot long island in the creek; about 2.4 miles south of the Citrus County line at the mouth of the Chassahowitzka River and 1.1 miles upstream from the mouth of Blind Creek.

Description.—The spring flows from beneath a rock ledge on the southwest side of a baylet in the southwest bank of Blind Creek.

Discharge.—Estimated flow was 50 cfs on November 28, 1961.

Use.—None.

840-238-A

Location.—Hernando County, NE¼SE¼ sec. 7, T. 21 S., R. 17 E., in the bed of Chub Creek 100 feet from the north shore, 50 feet from the south shore and 100 feet west of a point of land on the east side of a creek tributary to Chub Creek from the north, about 1.5 miles south of the mouth of the Chassahowitzka River and about 1 mile from the mouth of Chub Creek.

Description.—At low tide water boils from at least one of several fissures in the rock in the bottom of Chub Creek. A depression a few feet deep, about 20 feet long, and 10 feet wide, surrounds the spring's opening.

Discharge.—Probably less than 10 cfs.

Quality of Water.—The chloride content, based on a specific conductance of 19,000 micromhos, was 6,400 ppm and the temperature 75°F on September 8, 1961.

Use.—None.

841-235-A

Location.—Hernando County, NE¼SE¼ sec. 3, T. 21 S., R. 17 E., at the head of Crawford Creek about 2.7 miles upstream from the mouth of the creek at the Chassahowitzka River, located from aerial photographs.

Description.—This spring reportedly contributed most or all of the flow of Crawford Creek. The spring, not visited, is accessible with extreme difficulty. Large trees across the stream block entry by boat from the mouth and swampy ground makes approach by land difficult.

Discharge.—The flow of Crawford Creek, measured about 1.8 miles from the mouth and 300 feet upstream from a small tributary creek was 30.1 cfs on November 29, 1961. The flow was estimated to be approximately the same a quarter of a mile upstream from the measured section.

Quality of Water.—The chloride content, based on a specific conductance of 650 micromhos, was 110 ppm, and the temperature 74°F on November 29, 1961.

Use.—None.

841-236-A

Location.—Hernando County, SW¼NW¼ sec. 4, T. 21 S., R. 17 E., near the center of the 50-foot wide, hook-shaped head pool of Ryle Creek about 50 feet from the head, about 1.1 miles upstream from Garden Island and 0.5 mile south of the Citrus County Line.

Description.—The largest and easternmost of three springs in the head of Ryle Creek. Brown, flaky, probably algal, material suspended in the water obscures the bottom. A few hundred feet downstream from the springs, this material has accumulated to a depth of more than 6 feet, and in the vicinity of the springs the material masks most of the bottom. The deepest sounding was 20 feet near the boil of the spring.

Discharge.—Estimated flow of the spring was 5 cfs on November 29, 1961.

Quality of Water.—See table 1. The chloride content, based on a specific conductance of 9,500 micromhos, was 3,000 ppm, and the temperature 74°F on September 18, 1961. The water is more highly mineralized than that in nearby spring 841-236-B.

Use.—None.

841-236-B

Location.—Hernando County, SW¼NW¼ sec. 4, T. 21 S., R. 17 E., at the head of Ryle Creek about 40 feet northwest of 841-236-A, about 1.1 miles upstream from Garden Island and 0.5 mile south of the Citrus County line.

Description.—The sluggish boil of the spring emerges from the brown flaky silt that settles from the water wherever the velocity of the water decreases sufficiently.

Discharge.—Estimated flow was 5 cfs on November 29, 1961.

Quality of Water.—See table 1.

Use.—None.

841-236-C

Location.—Hernando County, SE¼NE¼ sec. 4, T. 21 S., R. 17 E., at the head of Blue Run, a tributary of Crawford Creek, about 0.7 mile upstream from its confluence with Crawford Creek, and about 2,800 feet south of the Citrus County line.

Description.—The head pool of the stream is about 100 feet wide and 600 feet long. The deepest spot sounded was 28 feet below the water about 10 feet from the rock ledge at the head of the pool. No boil was visible on November 29, 1961. The bottom of the pool is obscured by the milky turbidity of the water.

Discharge.—The measured flow was 9.1 cfs on November 29, 1961, about 1,100 feet downstream from the head of the head pool.

Quality of Water.—See table 1.

Use.—None.

842-234-A. CHASSAHOWITZKA SPRINGS

Location.—Citrus County, NE¼SW¼ sec. 26, T. 20 S., R. 17 E., in the Chassahowitzka River about 300 feet east of the end of State Highway 480 and about 1.8 miles west of U.S. Highway 19 at its junction with U.S. Highway 98.

Description.—The spring boils from the sand bottom along a crevice about 25 feet long and 34½ feet below the water surface. The bottom of the 150-foot diameter pool in the river slopes gently toward the spring, then becomes steep to vertical in a 50-foot wide cone.

Discharge.—The flow of the Chassahowitzka River is measured downstream from the mouth of Crab Creek about 600 feet west of Chassahowitzka Springs (842-234-A). Flow at that point is the composite of the flows of springs 842-234-A, 842-234-B, 842-234-C, and the one or more springs upstream from spring complex 842-234-C. In addition, some surface drainage and the flow of a canal are included in the measurement. Maximum measured flow was 140 cfs on November 9, 1960 and minimum measured flow was 54.6 cfs on November 8, 1935. The average of seven measurements, made between October 9, 1930 and November 9, 1960, is 94.2 cfs. The flow of spring 842-234-A alone was estimated to be on the order of 30 cfs on September 18, 1961.

Quality of Water.—See table 1. The chloride content of the water was 53 ppm and the sulfate content was 13 ppm on July 25, 1946. The disproportionate increase in chloride indicates a complex source of the salts in the water or variation of sampling techniques. The stream that flows across the spring probably contains less dissolved material than the water from spring 842-234-A.

Use.—Swimming.

842-234-B

Location.—Citrus County, NE¼SW¼ sec. 26, T. 20 S., R. 17 E. The three openings are about 10, 75, and 100 feet from the head of Crab Creek along the southeast bank near a wooden dock, and about 600 feet upstream from the mouth of the creek which is about 300 feet northwest of the end of State Highway 480 in Chassahowitzka.

Description.—The spring is a complex of three sub-round vertical holes about 3 feet in diameter and 10 to 17 feet in depth. Two horizontal crevices reported by Ferguson and others (1946, p. 54) were obscured by the turbid water and were not flowing vigorously enough to cause a boil on the surface on April 26, 1962.

Discharge.—The discharge of the three openings was on the order of 40 cfs on September 18, 1961 and 20 cfs on April 26, 1962.

Quality of Water.—See table 1. Ferguson and others reported the water to be clear in 1946; however, when visited in April 1961 the water was turbid.

Use.—Domestic supply for a summer home is pumped from the spring opening nearest the head of the creek.

842-234-C

Location.—Citrus County, NE¼SW¼ sec. 26, T. 20 S., R. 17 E. The several openings of this complex spring are in the bed of a spring run that flows into the north side of the Chassahowitzka River about 400 feet east of Chassahowitzka Springs (842-234-A) and about 700 feet east of the end of State Highway 480 in Chassahowitzka. Opening 1 is farthest downstream, about 30 feet north of a small island at the mouth. Other openings are spaced fairly evenly through the stream bed for about 200 feet upstream from opening 1.

Description.—Virtually the entire creek bottom is a spring complex for more than 100 feet upstream from the mouth of the run. The rock bottom consists of solution-riddled limestone with pipe-like holes a few feet deep, and many irregular fissures. The interconnection of all the various cavities is difficult to confirm but is apparent in many places. Farther upstream, the bottom is thinly covered by sand with numerous small boils in the sand. Sand remains in animated suspension in the high velocity water near the narrow deeper parts of most of the openings.

Discharge.—The discharge at the mouth of the run was on the order of 30 cfs on September 18, 1961. The observed springs were contributing probably 20 cfs of the total flow. The remainder was flowing in the run above opening 7, the farthest upstream of the observed openings.

Quality of Water.—See table 1.

Use.—None.

843-235-A

Location.—Citrus County, NE¼NE¼ sec. 27, T. 20 S., R. 17 E., at the head of Salt Creek, about 50 feet upstream from 843-235-B, about 1.4 miles northwest of the terminus of State Highway 480 at the Chassahowitzka River.

Description.—The spring pool which is about 4 feet wide forms the head of Salt Creek. The spring flows from a small irregular hole in the rock.

Discharge.—The estimated flow was 0.1 cfs on September 18, 1961.

Quality of Water.—The chloride content, based on a specific conductance of 5,500 micromhos, was 1,600 ppm, and the temperature 75°F on September 18, 1961. The water contains brown, flaky, material in suspension.

Use.—None.

843-235-B

Location.—Citrus County, NE¼NE¼ sec. 27, T. 20 S., R. 17 E., about 50 feet downstream from 843-235-A and the head of Salt Creek.

Description.—The spring manifests itself as a boil near the north bank of the creek. The bottom was obscured by turbidity and suspended brown, flaky material on September 18, 1961.

Quality of Water.—See table 1.

Use.—None.

843-235-C

Location.—Citrus County, NE¼NE¼ sec. 27, T. 20 S., R. 17 E., about 125 feet southwest of 843-235-A and the head of Salt Creek, near the center of the creek.

Description.—The spring is the southernmost visible boil in Salt Creek. Below the spring the creek widens into a bay with a tributary stream entering the northside. Specific conductance of the water from the tributary stream was 16,000 micromhos on September 18, 1961. Water from the three springs (843-235-A, B, and C) in the northern neck had a specific conductance of 6,500 micromhos. A specific conductance of 19,000 was recorded near the south side of the bay near an overhanging bank. A spring probably flows from beneath the bank.

Quality of Water.—The chloride content, based on specific conductance of 6,200 micromhos, was 1,900 ppm, and the temperature 75°F on September 18, 1961.

Use.—None.

843-235-D. RUTH SPRING

Location.—Citrus County, SW¼NW¼ sec. 22, T. 20 S., R. 17 E., at the head of the wide part of Potter Creek about three-quarters of a mile from the mouth.

Description.—The spring is an irregular hole 17 feet deep in the head of the 100-foot wide part of the creek. A small stream, probably a spring run, enters the north end of the wide run and flows across the spring pool.

Discharge.—The measured flow of Potter Creek was 31.7 cfs about 500 feet above the mouth on November 29, 1961. The estimated flow of the tributary to the head pool was 10 cfs. By difference the flow of Ruth Spring was about 22 cfs.

Quality of Water.—See table 1.

Use.—None.

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