

WILDERNESS MINERAL POTENTIAL

Assessment of Mineral-Resource Potential in U.S. Forest Service Lands Studied 1964-1984

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G E O L O G I C A L S U R V E Y P R O F E S S I O N A L P A P E R 1 3 0 0

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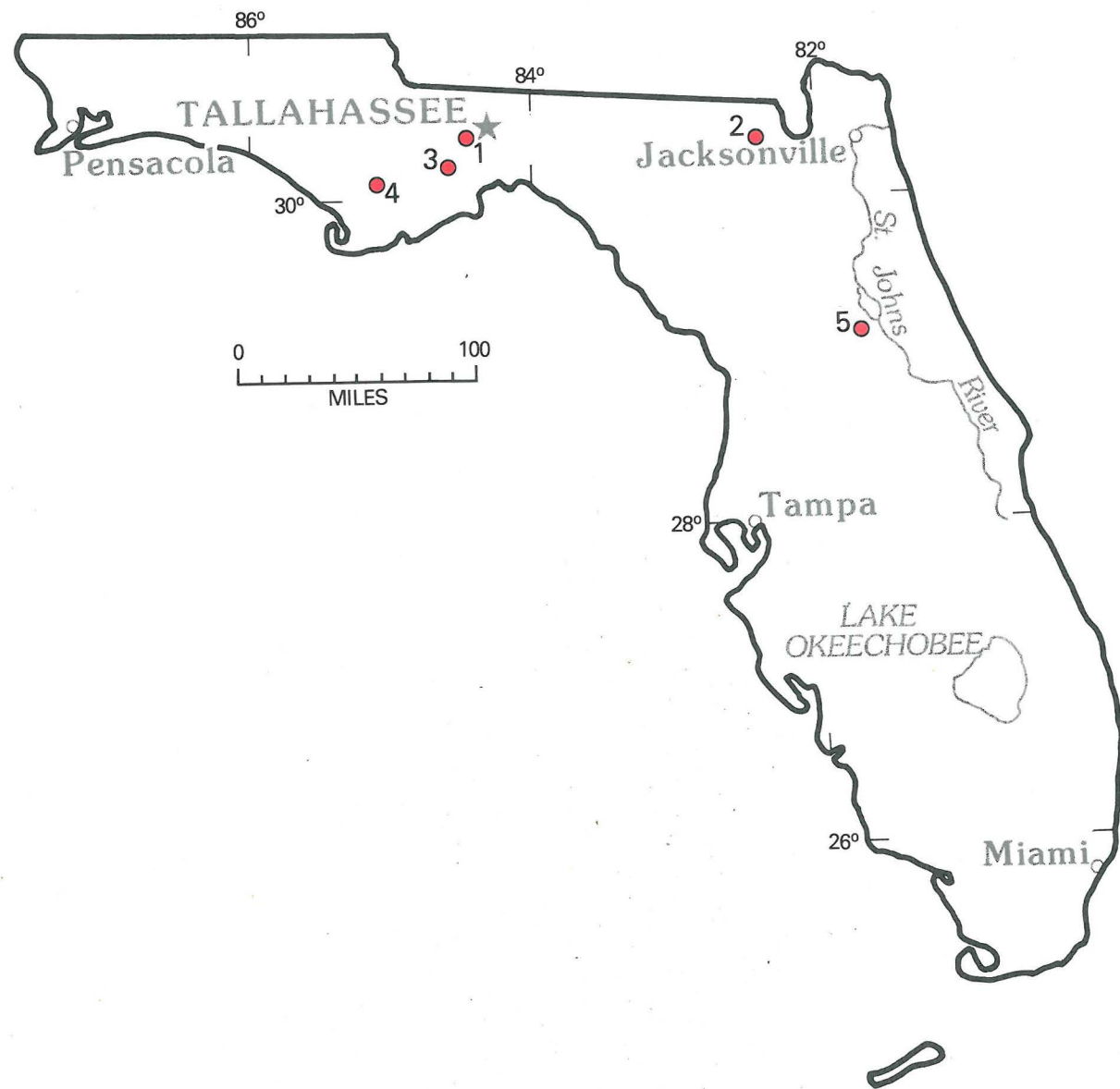


Cover design by Arthur Isom.

Diagrammatic east-west cross section of the United States.

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FLORIDA



Location of areas studied.

FLORIDA

Map
No.

Name of Area

- 3 Bradwell Bay Wilderness and Sopchoppy River Wilderness study area
- 1 Clear Lake Roadless Area
- 5 Farles Prairie and Buck Lake Roadless Areas
- 2 Natural Area Roadless Area
- 4 Savannah Roadless Area

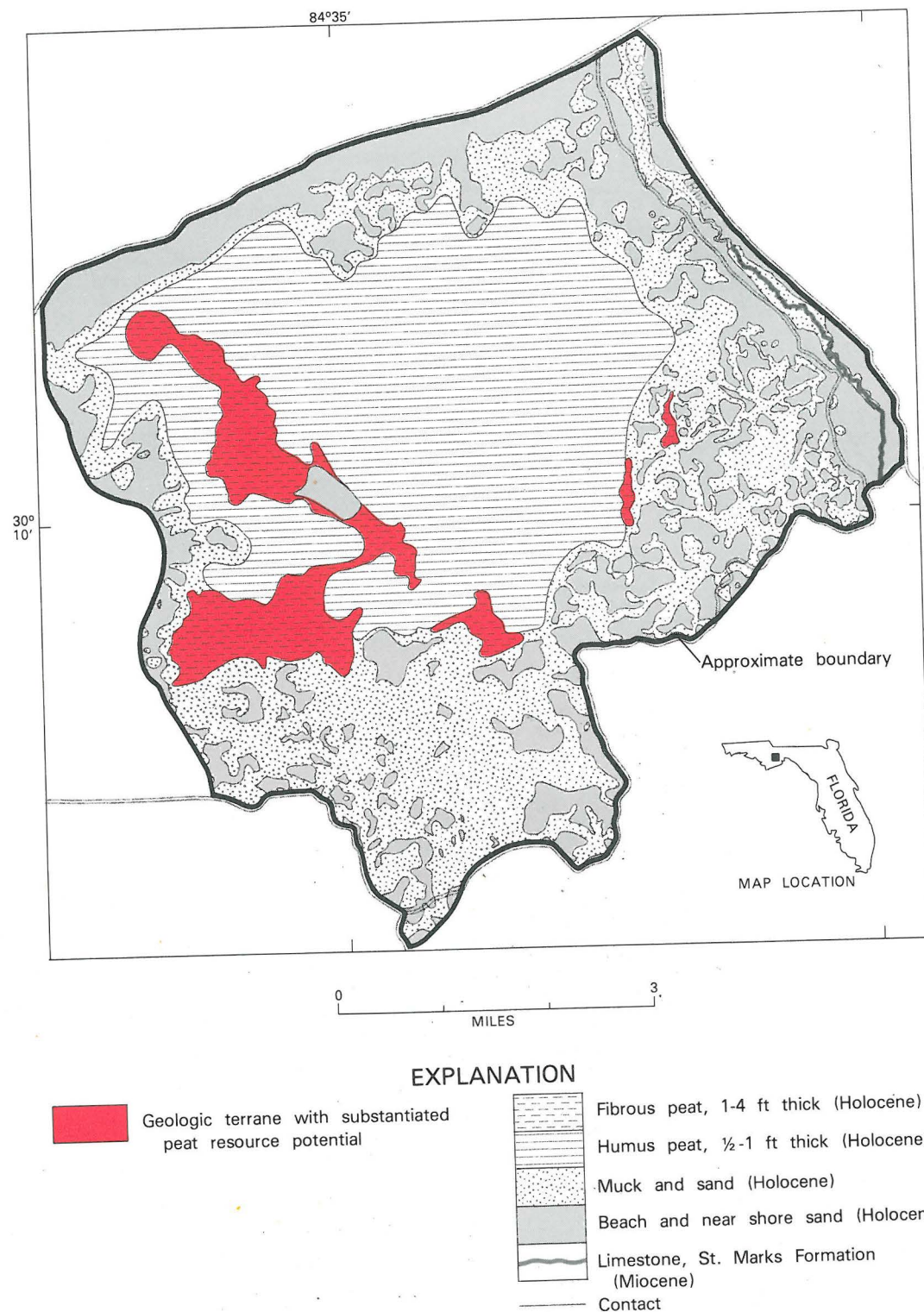


Figure 150.—Bradwell Bay Wilderness and the Sopchoppy River Wilderness study area, Florida.

BRADWELL BAY WILDERNESS AND THE SOPCHOPPY RIVER WILDERNESS STUDY AREA, FLORIDA

By CORNELIA C. CAMERON,¹ U.S. GEOLOGICAL SURVEY, and

PETER C. MORY, U.S. BUREAU OF MINES

SUMMARY

A survey to determine the mineral-resource potential, especially for oil, phosphate, fuller's earth, sand, and peat, was conducted in 1974 in the Bradwell Bay Wilderness and the Sopchoppy River Wilderness Study Area. On the basis of this survey, the entire area was concluded to offer little promise for the occurrence of mineral resources except the commodity peat. Approximately 136,000 tons of demonstrated peat resources, on a dry weight basis, are available in areas of substantiated peat resource potential from bay swamps in the area, but the deposits are shallow and widespread. Large quantities of quartz sand are available in ancient beach ridges and in deposits that were originally laid down in a shallow nearshore marine environment. Sieve tests show that the sand is generally too fine for mortar and masonry use; it is not suitable as moulding or glass sand because it lacks the required size grades and purity.

CHARACTER AND SETTING

The Bradwell Bay Wilderness and the Sopchoppy River Wilderness Study Area are within the Apalachicola National Forest, Wakulla County, Florida, approximately 20 mi southwest of Tallahassee. The Bradwell Bay Wilderness comprises 34 sq mi of swamp and pine woods bordered on the northeast by the Sopchoppy River Wilderness Study Area, a narrow strip of 2 sq mi along the river. The wilderness is one of many swamps in the Florida panhandle called "bays" because of the bay trees growing in them.

The wilderness and wilderness study area are in the East Gulf Coastal Plain which in this region is divided into two subprovinces, the Tallahassee Hills on the north and the Apalachicola Coastal Lowlands on the south. The Cody scarp is the east-west dividing line between the subprovinces. The surface from the toe of this scarp drops southward across the Bradwell Bay Wilderness to the modern shore line. Slight differences in altitudes in the swamps on this surface mark ancient beach ridges and spits, and a few low scarps.

The surface is covered by as much as 30 ft of sand and peat beneath a tangle of vegetation extending monoto-

nously in all directions. The Sopchoppy River flows southward from a flat-floored valley in the north through a narrow V-shaped valley cut in a sand-covered, deeply weathered limestone terrane along the eastern edge of the Bradwell Bay Wilderness. Bedrock exposures are limited to the banks and bed of the river. Here, weathering of limestone of the St. Marks Formation of early Miocene age forms karst topography, featuring honeycomb weathering and sinks. Older Oligocene and younger Miocene rocks are exposed in adjacent counties to the north and east and pre-Oligocene rocks are known only from drill holes in the surrounding areas.

MINERAL RESOURCES

The Hawthorn Formation, of middle Miocene age, from which phosphate and fuller's earth are chiefly produced in Florida, is not found in the Bradwell Bay Wilderness and the Sopchoppy River Wilderness Study Area; therefore, there is little promise for the occurrence of these resources. Some phosphate pellets, however, were found in auger holes in younger sands deposited in an estuary during Pliocene and early Pleistocene time. The sands were derived from older rocks presumably the Hawthorn Formation and do not constitute a resource for phosphate.

¹With contributions from James B. Cathcart and Philip J. Gerachi, USGS.

The Bradwell Bay Wilderness is about 175 mi east-southeast of the Jay oilfield in the western panhandle of Florida. Part of the production is from the Smackover Formation of Jurassic age, which is also the target formation for drilling in the vicinity of the wilderness. Four oil test holes have been drilled in the vicinity of the Bradwell Bay Wilderness but all proved to be unsuccessful. These four test holes, now abandoned, are alined along a northeast trend immediately northwest of the Bradwell Bay Wilderness. There is little promise for the occurrence of oil and gas in the Bradwell Bay Wilderness and Sopchoppy River Wilderness Study Area because although hydrocarbons may have been generated in the area, no evidence of an oil trap was found in the abandoned test wells to the northwest.

According to ASTM Committee, the term "peat" may be used only with respect to organic matter of geological origin, and not for lignite or other coal. According to the ASTM, peat forms mainly from dead plant remains through the agency of water in the absence of air; it is found in a bog, swampland, or marsh and has an ash content not exceeding 25 percent on a dry-weight basis. The peat deposits of the United States are currently being studied for use in agriculture as a soil conditioner and in horticulture as a packing material and growing medium. They are also being studied for potential gaseous and solid fuel potential.

The most favorable environment for peat accumulation in the Bradwell Bay Wilderness and Sopchoppy River Wilderness Study Area is the bay swamp which is characterized by the presence of sweetbay trees, which are protected from fire encroachment by surrounding swamps of cyrtolaceae shrubs that act as buffers. Elsewhere, bay swamps are adjacent to fire-prone pine-palmetto flatwoods and are subject to burning before much peat can accumulate. Within this most favorable type of area are an estimated 136,000 tons of peat on a

dry weight basis having an ash content of not more than 25 percent. However, the peat layer is discontinuous, only 1 to 4 ft thick, and drainage, clearing, and access problems are severe. Thicker peat in more accessible areas is available elsewhere in Florida.

Quartz sand from abandoned beaches can be found on terraces southeast of the wilderness and within Wakulla County. Quartz sand from a similar environment is also abundant in the wilderness, but fails to comply with acceptable ASTM standards for use in mortar and masonry. Nor is the sand recommended as a source of moulding and glass sands as defined by the American Foundrymen's Society. Beds of tidal-marsh deposits near the surface are contaminants.

The Florida-Georgia fuller's earth district, the major area for producing fuller's earth in the United States, is 24 mi north of the wilderness. The Hawthorn Formation, the principal host for fuller's earth deposits, has not been found in the Bradwell Bay Wilderness and Sopchoppy River Wilderness Study Area and there is little promise for the occurrence of fuller's earth resources.

SUGGESTIONS FOR FURTHER STUDY

Further study of the wilderness offers little promise for identifying mineral or energy deposits with resource potential.

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CLEAR LAKE ROADLESS AREA, FLORIDA

By SAM H. PATTERSON¹, U.S. GEOLOGICAL SURVEY, and

THOMAS M. CRANDALL, U.S. BUREAU OF MINES

SUMMARY

On the basis of a mineral survey in 1980 and 1981 the Clear Lake Roadless Area was concluded to offer little or no promise for the occurrence of mineral resources. The only commodity that has been mined in the area is clayey sand used in stabilizing USFS roads and in highway construction. Although there are large clayey sand resources in the Clear Lake Roadless Area, there are virtually unlimited resources of this material in the surrounding region. No peat more than a few inches thick occurs in the area. Limestone underlies all of the Clear Lake area but is under thick overburden. The region has been explored for heavy minerals and phosphate, but no resources have been found. There appears to be little promise for discovery of oil and gas in the Clear Lake area. However, the area and nearby lands have not been thoroughly tested for oil and gas, and the possibilities for discovery cannot be ruled out.

CHARACTER AND SETTING

The Clear Lake Roadless Area occupies about 10 sq mi in the Apalachicola National Forest, Leon County, Florida, which is in the Big Bend region about 10 mi southwest of Tallahassee. The area is bounded on the southwest by Florida Highway 267 and on the other sides by unimproved USFS roads.

The entire Clear Lake area is blanketed by unconsolidated sediments overlying a thick sequence of sedimentary rocks that were deposited in the eastern part of the Apalachicola embayment. The unconsolidated sediments consist of Pleistocene and Holocene clayey sand and soil, having a total thickness of about 35 ft. The formations that underlie the unconsolidated sediments and are in contact with them are the St. Marks and Hawthorn Formations of Miocene age and the Jackson Bluff Formation of Pliocene age. The St. Marks is composed of carbonate, the Hawthorn of sandstone, sandy limestone, and clayey sand, and the Jackson Bluff of a very fossiliferous dark clayey sand. The rocks that underlie the St. Marks Formation include about 2800 ft of Oligocene (includes Suwanee Limestone) and Paleocene beds and nearly 4000 ft of Cretaceous strata. Little is known about the older rocks below the Clear Lake area, but sedimentary formations of Jurassic and Triassic and probably early Paleozoic age as well as

crystalline rocks are present in the central part of the Apalachicola embayment and probably underlie the Clear Lake area.

The sedimentary formations underlying the Clear Lake area dip gently to the southwest toward the Apalachicola embayment which was formed by downwarping of crustal rocks. The central part of the embayment is filled with sediments of Triassic to Quaternary age having a thickness of more than 14,000 ft. No faults have been recognized in the Clear Lake area. However, strata have been disturbed in many places by slumping into solution cavities.

MINERAL RESOURCES

The geology of the area had been investigated by the Florida Bureau of Geology (Hendry and Sproul, 1966) and the mineral potential of the area was investigated by the USGS and the USBM in 1980 and 1981. Reports by Hendry and others (1982) and Crandall (1982) summarized herein provide the information on mineral-resource potential.

The only mineral material that has been produced in the Clear Lake area is clayey sand used in the construction of Florida Highway 267 and in stabilizing USFS roads. Although large quantities of clayey sand resources in the unconsolidated surficial material are present in the Clear Lake area, they are not shown on the

¹With contributions from C. W. Hendry, Jr., Florida Bureau of Geology and J. W. Sweeney, USBM.

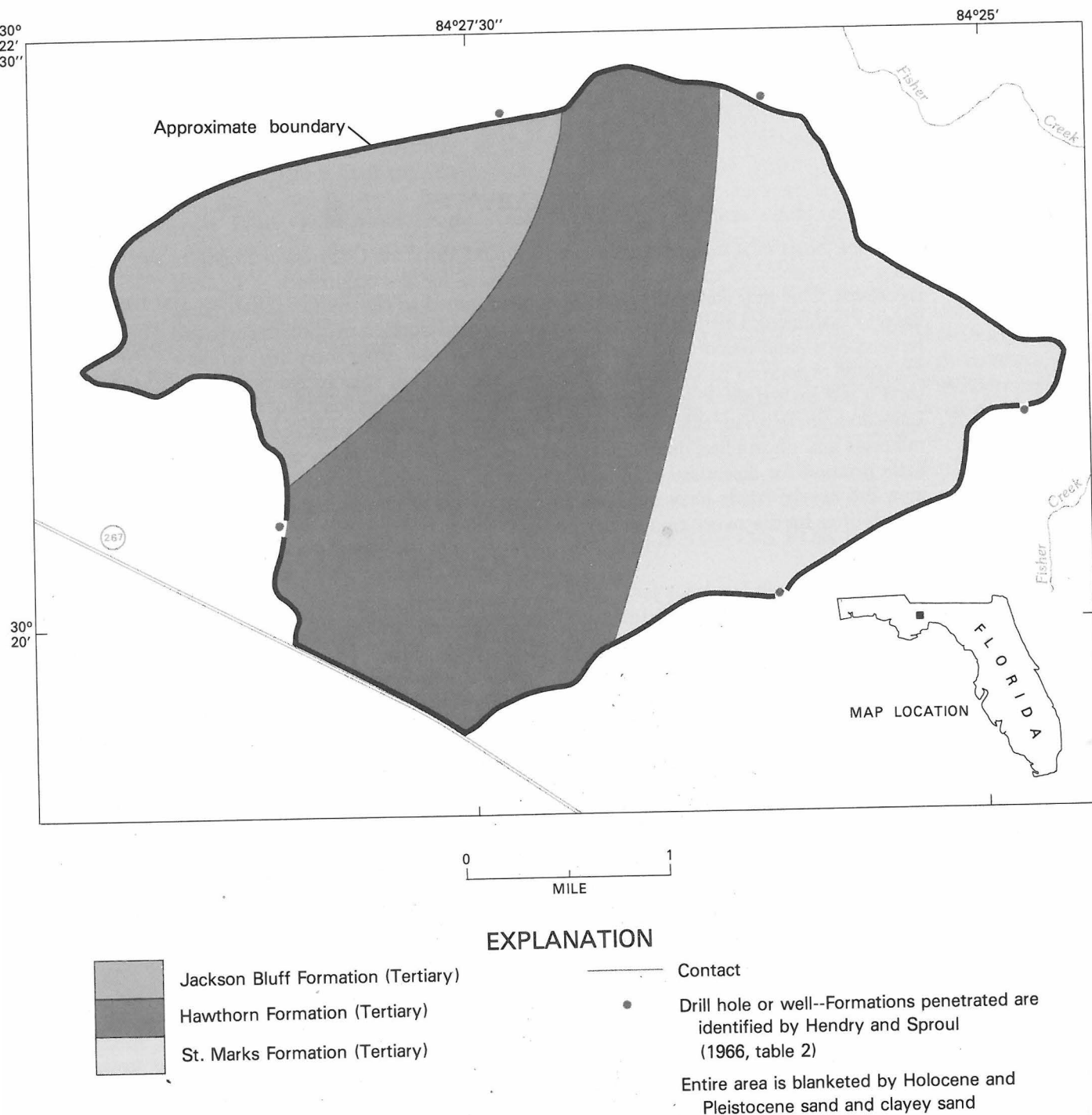


Figure 151.—Clear Lake Roadless Area, Florida.

map because virtually unlimited quantities of similar materials occur in the surrounding areas outside the roadless area.

Limestone in the St. Marks Formation occurs under about 35 ft of overburden in the eastern one-third of the Clear Lake area and under thicker overburden in the central and western parts of the area. This limestone resource is not shown on the map because similar rock under thinner overburden occurs in extensive areas east of the Clear Lake area. The limestone east of the area is also closer to potential markets in the Tallahassee area.

Other mineral resources either do not occur in the Clear Lake area or are too deeply buried and include common clay, fuller's earth, heavy minerals, phosphate, and sand and gravel. Very thin deposits of peaty material are present in the area, but they are too small and impure to be assessed as having mineral-resource potential.

The entire Clear Lake area has been leased for oil and gas in the past, but there were no active oil or gas leases or applications for leases in the area as of October, 1981. According to the reports and records of the Florida Bureau of Geology, many exploratory wells have been drilled in search for oil and gas in the region. To date, only a few shows of oil have been found, and all of the holes have been dry. At least 30 were deeper than 5000 ft and 15 were deeper than 10,000 ft. The deepest hole bottomed at 14,570 ft. Surprisingly, two of the shallow holes were reported (Hendry and Sproul, 1966, p. 105) to have good shows of oil. These two wells are located less than 20 mi from the Clear Lake Roadless Area.

Although there are no reasons for optimism about the discovery of oil and gas in and near the Clear Lake area, the possibilities cannot be completely ruled out. The principal reasons for the unfavorable outlook are the large number of dry holes in the region and the probable absence of the Jurassic Smackover Formation. Geologists believe that the Smackover Formation has the greatest promise for oil and gas in the region because it contains the oil and gas produced in the Jay field in the westernmost Florida panhandle and nearby fields in Alabama (Babcock, 1972). The Smackover has been

found to be present in several wells southwest of Clear Lake and is thought to underlie about 2000 sq mi in the region. However, the updip limit of this formation is shown by Applegate and others (1978, fig. 1) to be more than 15 mi west of the Clear Lake area in Liberty County. Reasons why some possibility remains for oil and gas discoveries in the study area include the following: (1) the shows of oil in dry holes east of the area, noted in the foregoing paragraph; and (2) uncertainty as to whether or not formations older than the Smackover may contain oil and gas.

The Clear Lake area has not been thoroughly explored for oil and gas and the possibility for either being present still exists.

SUGGESTIONS FOR FURTHER STUDIES

The blanket of unconsolidated surficial materials covering the Clear Lake area rules out the acquisition of significant additional geologic information by field studies, and the Florida Bureau of Geology has published a report on the geology of Leon County (Hendry and Sproul, 1966) in which the area is located. Accordingly, further evaluations of the mineral potential of the Clear Lake area are not warranted.

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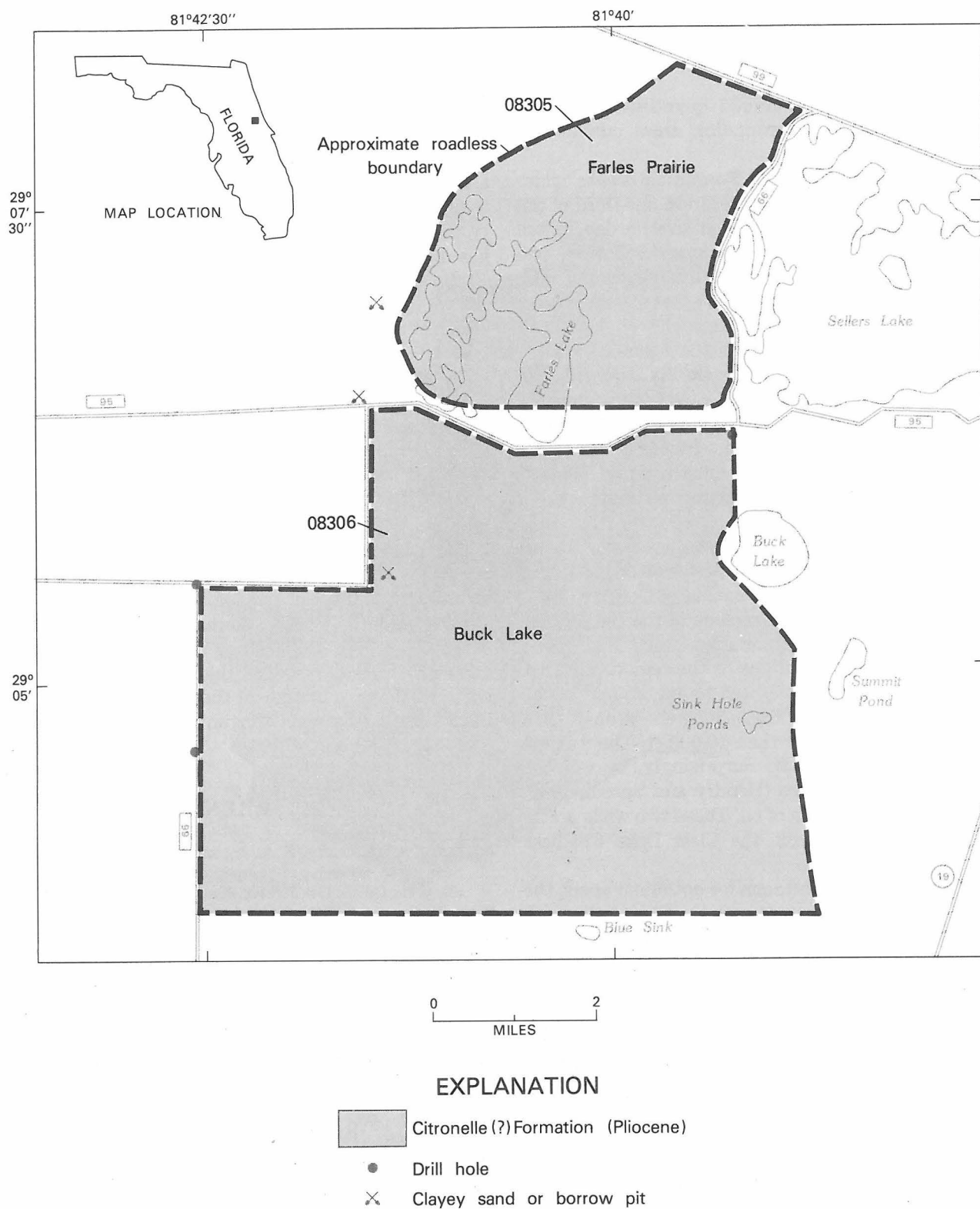


Figure 152.—Farles Prairie and Buck Lake Roadless Areas, Florida.

FARLES PRAIRIE AND BUCK LAKE ROADLESS AREAS, FLORIDA

By SAM H. PATTERSON, U.S. GEOLOGICAL SURVEY, and

THOMAS M. CRANDALL, U.S. BUREAU OF MINES

SUMMARY

Mineral surveys in 1980 and 1981 conducted by the USGS and USBM of the Farles Prairie and Buck Lake Roadless Areas showed little promise for the occurrence of metallic mineral or energy resources; the possibility for the occurrence of hydrocarbons, however, cannot be ruled out. The only mineral material that has been produced in the roadless areas is clayey sand used in stabilizing USFS roads. The large quantities of clayey sand occurring in the areas are not identified as resources because virtually unlimited resources are present in the surrounding region. Limestone underlies all of the two areas, but is too far from markets and under too much overburden for quarrying. Heavy minerals and phosphate are present in the two areas but are not sufficiently concentrated to be identified as resources.

CHARACTER AND SETTING

The Farles Prairie Roadless Area occupies about 3.4 sq mi and the Buck Lake Roadless Area about 8.9 sq mi in the Ocala National Forest, Marion County, Florida. The areas can be reached from Ocala by taking Florida Highway 40 east about 32 mi to Florida Highway 19 then south on this road to USFS Road 62 which leads through the U.S. Navy Tracking Station to the Farles Prairie Roadless Area.

The two roadless areas are in the Central Highlands physiographic province of Florida, and the topography is a modified karst with a thin veneer of windblown sand at the surface. Farles Prairie Roadless Area is an area of low sand hills in the eastern part and shallow lakes and flat prairies in the west. Buck Lake Roadless Area is almost entirely an area of low sand hills, and has only a few scattered ponds. Altitudes in the two areas range from 50 to 140 ft above sea level.

The mineral potential of the Farles Prairie and Buck Lake Roadless Areas was investigated by the USGS and the USBM in 1980 and 1981. Reports by Crandall (1982), Cathcart and Patterson (1983) and Cathcart and others (1983) provide information on the geology and mineral potential of the areas.

The surface of the Farles Prairie and Buck Lake Roadless Areas is blanketed by unconsolidated soil and sand. This surficial blanket is no more than 5 ft thick in most places, but is as much as 100 ft thick in sink hole fill-

ings. These surficial materials are underlain by a second unconsolidated blanket consisting of white, red, and orange sand that is 40 to 60 ft thick. The age of this unconsolidated layer is uncertain, but it is probably of Pliocene age and has been called the Citronelle(?) Formation. The Citronelle(?) rests unconformably on Miocene strata that consist of an unnamed upper Miocene formation and the middle Miocene Hawthorn Formation which is chiefly sand; both contain phosphate. The lower part of the Hawthorn contains considerable dolomite. The two Miocene units have been removed by erosion from parts of the Ocala National Forest, but they have a total thickness of as much as 200 ft in the Farles Prairie and Buck Lake Roadless Areas. About 4000 ft of sedimentary rocks ranging in age from Cretaceous to Eocene underlie the Hawthorn Formation and rest unconformably on an older basement of crystalline and Paleozoic sedimentary rocks.

MINERAL RESOURCES

No minerals have been mined in the Farles Prairie Roadless Area, and the only production in the Buck Lake Roadless Area has been clayey sand used in stabilizing USFS roads. Although large resources of clayey sand in the Citronelle(?) Formation are present in the two roadless areas, they occur as virtually unlimited resources in surrounding areas.

Phosphate deposits occur in the Hawthorn Formation and the unnamed upper Miocene formation in both areas. The deposits have been explored by widely spaced drill holes, including three holes drilled during this study. No significant deposits of phosphate have been found in the Ocala National Forest. The P_2O_5 content of samples of pebble fraction was only 13.1 percent and the results of analyses of samples collected during this investigation failed to indicate the presence of high-grade phosphate and no phosphate resource potential was identified.

Other minerals that are produced in the region of the Ocala National Forest either do not occur in the Farles Prairie and Buck Lake Roadless Areas or were not identified as resources in this study; these include limestone, fuller's earth, kaolin, heavy minerals, and peat. The Eocene Ocala Limestone underlies both areas but is too deeply buried to be quarried and large resources of this limestone are located in places much closer to markets. No fuller's earth or kaolin clays of sufficient purity to form valuable deposits occur in the two areas. One sample of common clay tested by the USBM had excellent ceramic properties, but it came from an interval 86–94 ft below the surface. Small amounts of heavy minerals occur in the unconsolidated surficial material, Citronelle(?) Formation, unnamed upper Miocene formation, and Hawthorn Formation. However, no concentrations sufficiently rich to be identified as resources were found. Organic rich muck and small accumulations of peaty material occur in some of the swamps in the two areas, but no low-ash peat deposits are present.

Oil and natural gas are produced from Lower Cretaceous Sunniland Limestone in southern Florida and from the Jurassic Smackover Formation in western Panhandle Florida. Jurassic beds are not present in the Ocala National Forest, and beds of Early Cretaceous

age, present both to the east and west, are missing in the area, where beds of Late Cretaceous age rest on Paleozoic rocks.

Several exploratory holes for oil and gas have been drilled in and around the Ocala National Forest, but all holes were dry and abandoned. There is little reason for optimism regarding possible oil and gas accumulations in the subsurface in Farles Prairie and Buck Lake Roadless Areas, because of the number of dry holes in the surrounding areas, and because rocks that contain oil and gas elsewhere in Florida are not present here.

SUGGESTIONS FOR FURTHER STUDY

Because of the blanket of surficial material covering the Farles Prairie and Buck Lake Roadless Areas little could be accomplished by further field observations, and drilling would be required to obtain much more information about geology. The principal potential valuable mineral in the area is phosphate, but information now available indicates there is little possibility for the occurrence of large high-grade deposits.

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NATURAL AREA ROADLESS AREA, FLORIDA

By SAM H. PATTERSON,¹ U.S. GEOLOGICAL SURVEY, and
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SUMMARY

Mineral surveys in 1980 and 1981 of the Natural Area Roadless Area, Florida, identified a substantiated resource potential for scattered low-grade phosphate deposits. The area has little promise for the occurrence of other mineral resources or oil and gas, although the possibilities for the occurrence of these two hydrocarbons cannot be ruled out. The only mineral material that has been produced in the area is clayey sand used in stabilizing USFS roads, but virtually unlimited quantities of similar material are present in the surrounding region. Peaty material is present in swamps in the roadless area, but none of it is thick or pure and no resource potential was identified. Limestone underlies all of the Natural Area Roadless Area but is under too much overburden for quarrying. Heavy minerals are present in the area but are not sufficiently concentrated to consider the area as having resource potential.

CHARACTER AND SETTING

The Natural Area Roadless Area occupies about 6.8 sq mi in the Osceola National Forest, Baker County, Florida. The area is 18 mi northeast of Lake City which is in northern peninsular Florida. The Natural Area Roadless Area is bounded by USFS Road 277 on the south and road 235 on the west. The surface of the roadless area is a flat swampy plain. The highest altitude is 133 ft above sea level and the lowest point is only about 10 ft lower.

The mineral potential of the area was investigated by the USGS and the USBM in 1980–81 (Crandall, 1981; Cathcart and others, 1983; and Patterson and others 1983).

The entire Natural Area Roadless Area is blanketed by unconsolidated sediments of Pleistocene and Holocene age, that overlie a sequence of Tertiary sedimentary rocks. The surficial sediments in swamps consist of peaty material and organic-rich muck. The shallow soils in the drier areas are rarely more than a 1 ft thick A horizon and consist chiefly of clayey sands. The swamp deposits and shallow soils are underlain by 25–35 ft of unconsolidated sand and clayey sand. Miocene rocks underlying the unconsolidated beds consist of an unnamed formation and the Hawthorn Forma-

tion, having a total thickness of 240–280 ft. Both of these formations contain phosphate. About 3300 ft of sedimentary rocks ranging in age from Cretaceous to Eocene underlie the Hawthorn Formation and rest unconformably on an older basement of crystalline and Paleozoic sedimentary rocks.

MINERAL RESOURCES

The only mineral material that has been produced in the Natural Area Roadless Area is clayey sand used in stabilizing USFS roads. Although large resources of clayey sand in unconsolidated surficial material are present in the roadless area, virtually unlimited quantities of similar material occur in surrounding areas.

Scattered phosphate deposits occur in the Miocene Hawthorn Formation and an unnamed upper Miocene formation in the Natural Area Roadless Area. The deposits have been explored by widely spaced drill holes. Preference right lease applications for phosphate have been filed on large acreages in parts of the Osceola National Forest located west and southwest of the Natural Area Roadless Area, but no lease applications have been filed for tracts within the area. Although the phosphate in the roadless area is low grade, the entire area has a substantiated phosphate resource potential.

Limestone in the Ocala Limestone underlies the entire

¹With contributions from James B. Cathcart and Cornelia C. Cameron, USGS.

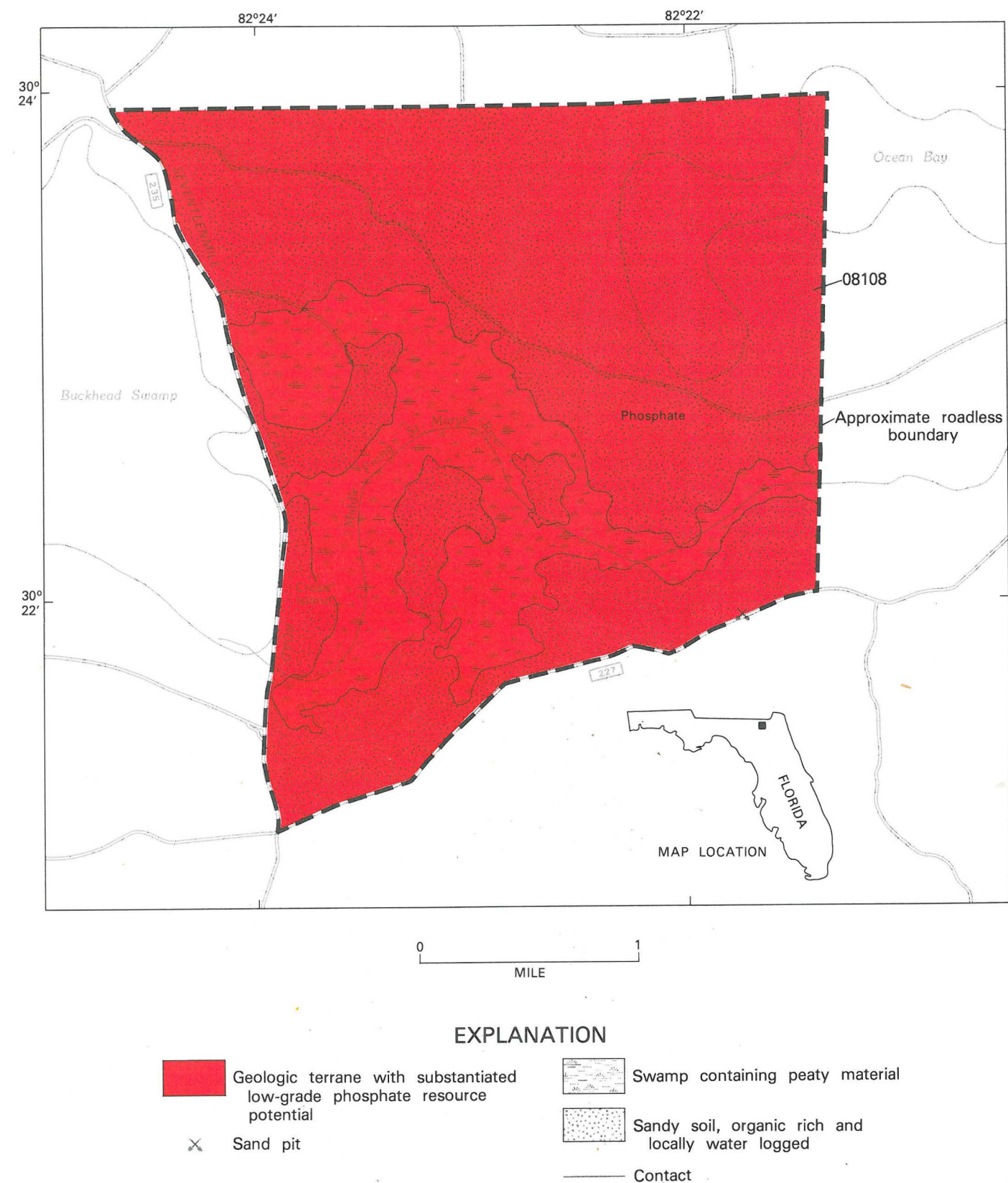


Figure 153.—Natural Area Roadless Area, Florida.

area, but is too deeply buried to be amenable to quarry.

Peat material occurs in swamps in the area, but the deposits generally contain more than 25 percent ash, the current maximum cut off in commercial quality peat.

Small quantities of heavy minerals occur in unconsolidated surficial sand in the Natural Area Roadless Area. However, these heavy-mineral accumulations are much lower in grade than deposits currently being mined in the Trail Ridge district of Florida, and no resource potential was identified.

According to the reports and records of the Florida Bureau of Geology, many exploratory holes have been drilled in the region surrounding the Osceola National Forest in search for oil and gas. To date, only a few shows of oil and gas have been found, and all of the holes have been dry. Only three of the 29 holes in the region were drilled deeper than 5000 ft; the deepest was 5862 ft, one hole was 4444 ft deep, and all other holes were less than 3500 ft deep. Thirteen of the dry holes penetrated Paleozoic strata. A driller's log of the St. Mary's River Oil Corporation well, located 35 mi northeast of the Natural Area Roadless Area, noted several shows of oil at depths between 1812 and 4795 ft and evidence of gas at two intervals.

Although no potential for oil and gas was identified in the Natural Area Roadless Area, the possibilities cannot be completely ruled out. The principal reasons for an unfavorable outlook are the large number of dry holes in the region and the absence of the formations that contain oil and gas in the fields in southern and western-most Florida. The oil in the southern Florida fields is in Lower Cretaceous formations, and in the Jay field in the western Florida Panhandle it occurs in the Jurassic Smackover Formation. In the vicinity of the Osceola National Forest, the lowermost Upper Cretaceous formation rests unconformably on Paleozoic rocks.

Some possibility remains, however, for the occurrence of oil and gas in deep rocks in the Natural Area Roadless Area. The Paleozoic rocks have not been adequately explored in the region of the Osceola National

Forest, and according to one authority, rocks of Paleozoic age in northern Florida and on the adjacent continental shelf should contain 100 million barrels of oil and 0.5 trillion cu ft of gas. The shows of oil and gas, like that in the St. Mary's River Oil Corporation dry hole located 35 mi northeast of the roadless area, suggest that valuable quantities of oil and gas may also be present in northern Florida. The westward thinning of Cenozoic and Upper Cretaceous formations and the wedging out of Lower Cretaceous beds are excellent conditions for the occurrence of updip pinch-out sedimentary traps. Whether or not traps of this type are present in the subsurface of the Osceola Forest is unknown, but if they exist, they might contain hydrocarbons.

SUGGESTIONS FOR FURTHER STUDIES

Because of the blanket of surficial material covering the Natural Area Roadless Area, little could be accomplished by further field investigations and drilling would be required to obtain information about the geology and to assess the oil and gas potential. Many drill holes would be needed to adequately evaluate the phosphate potential of the area. No reasons for investigating the possibilities for minerals other than phosphate are apparent.

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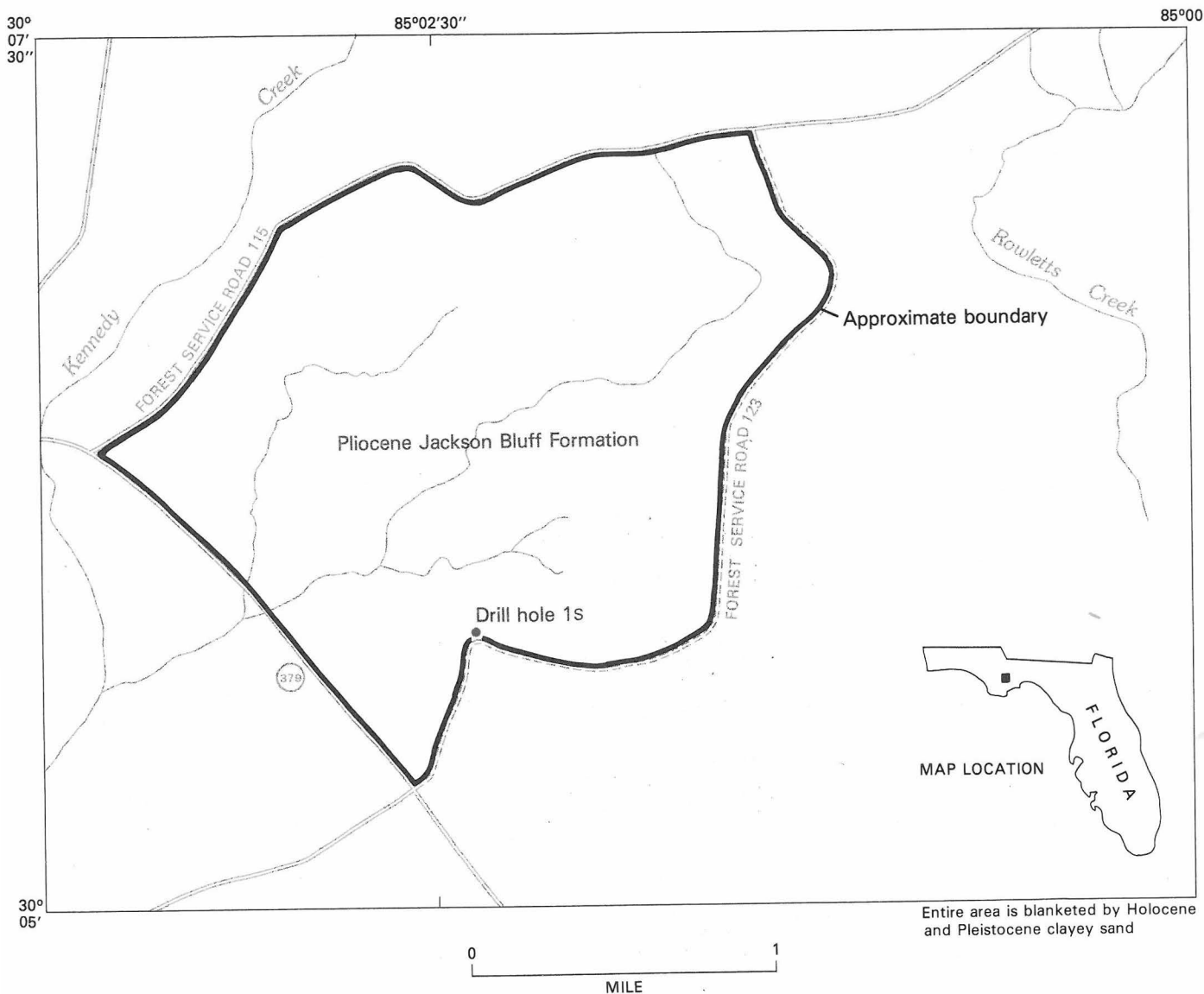


Figure 154.—Savannah Roadless Area, Florida.

SAVANNAH ROADLESS AREA, FLORIDA

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SUMMARY

On the basis of a mineral survey in 1980 and 1981 the Savannah Roadless Area was appraised to offer little promise for the occurrence of mineral resources. The commodities identified in the area are deposits of sand and gravel; however, they are deeply buried, far from potential markets, and more readily accessible material exists outside the roadless area. The possibility that oil and gas might occur in the Jurassic Smackover Formation or in other formations at depth cannot be ruled out.

CHARACTER AND SETTING

The Savannah Roadless Area occupies about 3 sq mi in the Apalachicola National Forest, Liberty County, Florida, which is in the Big Bend region about 50 mi southwest of Tallahassee. The area is in lowlands of the Gulf Coastal Plain at altitudes of 25–43 ft. It is bounded on two sides by USFS roads and on the third by County Highway 379. The area can be reached on County Highway 379 by traveling 6 mi northwest from Sumatra, a small village in southern Liberty County located on Florida Highway 65. No mineral materials other than clayey sand used in surfacing USFS roads and in highway construction have been produced within 25 mi of the Savannah area in recent years. In 1981 about 51 percent of the Savannah area was under simultaneous oil and gas lease, and an application for an oil and gas lease on an additional 6 percent of the area was on file.

The mineral potential of the Savannah Roadless Area was investigated by the USGS and the USBM in 1980 and 1981. Reports by Patterson and others (1982) and Crandall (1982), summarized herein, include the results of those studies.

The entire Savannah area is blanketed by unconsolidated sediments overlying a thick sequence of sedimentary rocks that were deposited in the Apalachicola embayment. The surficial blanketing material consists of a thin soil horizon overlying a thickness of about 60 ft of Pleistocene-Holocene sand, gravel, and clay strata. The surficial materials overlie the Pliocene Jackson Bluff Formation, which consists of coarse sand-to gravel-size

shell fragments, quartz sand, and clay, containing trace amounts of phosphate pellets, heavy minerals, and glauconite. The Jackson Bluff Formation forms the bedrock throughout the area and is underlain by a thick sequence of older sedimentary rocks.

The Savannah area is located in the central part of the Apalachicola embayment that was formed by the structural depression of crustal rocks to form a deep basin. The embayment was filled by Triassic to Quaternary sediments having a total thickness of more than 14,000 ft. Deeply buried strata along the axis of the embayment plunge about 65 ft/mi to the west-southwest. Shallow rocks, that were deposited after the embayment was mostly filled, dip only a few feet per mile toward the Gulf of Mexico. No faults have been recognized in the Savannah area.

MINERAL RESOURCES

The only mineral commodity in the Savannah area is a subsurface bed of sand and gravel in the unconsolidated surficial materials (Patterson and others, 1982). Cuttings from one drill hole (1S on map) showed this bed to be 13 ft thick, lying at a depth of 37 to 50 ft, and to consist mostly of remarkably pure angular quartz; only 17 percent of the sample was finer than coarse sand, and 28 percent was gravel. Although the sand and gravel is more suitable for construction and other uses than that produced elsewhere in Florida, it is far from possible markets, under excessive thicknesses of overburden and more readily available material exists outside the roadless area.

¹With contributions from Walter Schmidt, Florida Bureau of Geology.

Extensive deposits of clayey sand of the type used in road construction and stabilizing occur in the Savannah area, and the sand is dug intermittently in two pits located 2 mi south of the area. The clayey sand in the Savannah area was not identified as having resource potential as unlimited resources of such material are present in the surrounding region.

Other industrial minerals—limestone, common clay, peat, and fuller's earth—are presently or have in the past been mined or investigated in the Big Bend region, but they either do not occur in the Savannah Area or are deeply buried.

According to the reports and records of the Florida Bureau of Geology many exploratory wells have been drilled in search of oil and gas in the Big Bend region of Florida. To date, only a few shows of oil have been found, and all of the holes have been dry. Thirty of the holes bottomed at depths of more than 5,000 ft. Of these, 15 were deeper than 10,000 ft and the deepest bottomed at 14,570 ft. Surprisingly, two shallow dry holes, located about 50 mi east of the Savannah Area, were reported to have good shows of oil. Oil stains were found in the Smackover Formation and in a conglomeratic calcareous sandstone of the Norphlet Formation also of Jurassic age in a dry hole located 20 mi west-northwest of the Savannah area.

Although there are no reasons for optimism about the discovery of oil and gas in and near the Savannah area, the possibilities cannot be completely ruled out. Oil and gas are produced from the Smackover Formation in the Jay field in the westernmost Florida panhandle and nearby fields in Alabama. Therefore, this formation may have some potential for oil and gas in the Big Bend region. The Smackover Formation, however, has been intersected by several dry holes in parts of the Big Bend region lying to the east, south, and west of the Savannah area. Other reasons for not ruling out the potential

for oil and gas discovery in the Savannah Area include (1) the shows of oil in dry holes in the region noted in the foregoing paragraph, (2) uncertainties as to whether or not formations older than the Smackover may contain oil and gas, and (3) the geologic favorability of the region for the occurrence of both structural and sedimentary traps. The Savannah area and surrounding region has not been thoroughly explored, and insufficient data were obtained in this study to evaluate the oil and gas resource potential.

SUGGESTIONS FOR FURTHER STUDIES

Because of the blanket of surficial materials covering the Savannah Roadless Area the acquisition of further meaningful geologic information would require costly core drilling, and there seems to be little likelihood of discovery of valuable mineral deposits. The type of work that would be fruitful is the regional core drilling program now underway by the Florida Bureau of Geology, which includes several widely spaced drill holes. The products of this program will include significant improvement in knowledge of stratigraphy, structure, geologic history, and water- and mineral-resource potential of the region.

REFERENCES

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