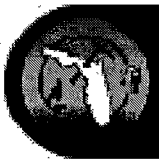

FLORIDA GEOLOGICAL SURVEY

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Florida Geological Survey
Steve R. Windham, Chief

Open File Report 9

Alum Bluff
Liberty County, Florida

by

Kenneth M. Campbell

Florida Geological Survey
Tallahassee, Florida
1985

OPEN FILE REPORT #9

ALUM BLUFF
LIBERTY COUNTY, FLORIDA

Walt Schmidt
Florida Geological Survey
903 W. Tennessee Street
Tallahassee, Florida 32304

LOCATION

Alum Bluff is one of the best natural geologic exposures in the state of Florida. It is located about two miles north-northwest of Bristol, in Liberty County, Florida. The bluff occurs along the east bank of the Apalachicola River in Township 1N, Range 8W, Section 24, in the NE and SE quarters (Figure 1).

The Nature Conservancy owns the Bluff area and adjacent land. Their land is protected by fence and locked gates. Permission to enter can be obtained by contacting their Bristol Office at P. O. Box 789, Bristol, Florida 32321, or calling (904) 893-4153. Land access to the bluff area can be obtained by going 1.4 miles north of the intersection of state routes 12 and 20 in Bristol, to the entrance of Skyland Ranch on the left (west). Travel this dirt road .2 mile where the Nature Conservancy gate will be encountered. Pass gate and follow the dirt road 2.7 miles to the Alum Bluff overlook (see Figure 1). Road condition may vary depending on the amount of rain recently received. Normally the sands are very loose and high centers occur in the road. Pickup trucks and vans should have no trouble, however a small car with low clearance may have.

The bluff is quite steep and the fossiliferous horizons are near the bottom. It is best to follow the bluff edge south until you reach a small drainage depression and decend from there. In summer the temperature and humidity can be very high. It is recommended to carry water along if you plan on being more than an hour or two.

The bluff can also be reached from the river by boat. There is a public launch about one mile upstream from the Route 20 bridge. This is accessible from Bristol on the east side of the river. The bluff is about three miles up river from the boat launch.

BACKGROUND

The middle to Late Tertiary deposits of the Florida Panhandle have been known since the late 1800's. They have been described on numerous occasions and have received the most attention from paleontologists attracted by their well preserved mollusk assemblages (predominately Neogene). Alum Bluff was first described by Langdon in 1889. Since that time other authors have described or named these units primarily based on their fossil assemblages. This location has been one of the primary outcrops used to establish the stratigraphic, paleoenvironmental and geologic history of the Florida Panhandle.

The sediments exposed at Alum Bluff include in acending order: the Chipola Formation; the Hawthorn Formation; the Jackson Bluff Formation; an unnamed sandy clay interval; an unnamed clayey sand interval; and a unit composed of the Citronelle Formation and reworked "terrace sands" (Figure 2). This section

has been described often by geologists and paleontologists, a few of the more complete descriptions include: Dall and Harris (1892); Dall and Stanley-Brown (1894); Maury (1902); Matson and Clapp (1909); Gardner (1926-1944); Cooke (1945); Rainwater et al. (1945); Puri (1953); Dubar and Beardsley (1961); Puri and Vernon (1964); Akers (1972); Banks and Hunter (1973); Huddlestun (1976); and Schmidt (1983).

FORMATIONS DISCUSSION

Chipola Formation - The name Chipola Formation was suggested by Burns in 1889 (in Dall and Harris 1892). He discovered and made large collections from shell beds exposed on the Chipola and Apalachicola Rivers. Dall and Stanley-Brown (1894) visited the area a few years later and called the formation the Chipola shell marl. Matson and Clapp (1909) included these beds as a member in their Alum Bluff Formation, and Gardner (1926) later promoted the member to a formation. In 1953, Puri referred to the Chipola as a facies of the Alum Bluff Stage; then with Vernon (Puri and Vernon 1964), they redefined it as a formation once again.

Fossils identified from the Chipola Formation include mollusks, benthic and planktonic foraminifera, ostrocods, corals, and calcareous nannofossils. Numerous authors have described the fauna. A summary of these references can be found in Schmidt and Clark (1980, p. 38). Planktonic foraminifera and calcareous nannofossils were used by Gibson (1967), Akers (1972) and Huddlestun (1976) to estimate the age of the sediments. It has been assigned to a Burdigalian age (late Early Miocene).

Hawthorn Formation - Dall and Harris (1892) in discussing the phosphoritic sediments being quarried near Hawthorne in Alachua County, Florida assigned them the name "Hawthorne Beds". Matson and Clapp (1909) later designated this unit the Hawthorn Formation. Pirkle (1956; and Pirkle et al. 1965) designated the Devil's Millhopper sink in Alachua County and Brooks Sink in Bradford County as cotype localities.

The Hawthorn Formation has been mapped into the Florida Panhandle by Cooke and Mossom (1929); Puri (1953); Vernon and Puri (1956); and others. It is considered Middle Miocene in age and thought to represent a deltaic or a pro-deltaic environment in the vicinity.

Jackson Bluff Formation - Puri and Vernon (1964) are credited with naming the Jackson Bluff Formation. They combined the Ecphora and Cancellaria biofacies because both are exposed at Jackson Bluff in Leon County, Florida. For a more complete historical record of nomeclatural changes leading up to current usage see Schmidt and Clark, (1980, p. 41-58). They include references citing paleontological descriptions and age correlations. Fossils from the Jackson Bluff include: numerous mullusk shells; corals; ostracods; echiniods; bryozoa; barnacles; benthic and planktonic foraminifera; and calcareous nannofossils, among others. Based on planktonic foraminifera, it has been concluded that the Jackson Bluff was deposited in the Middle to earliest Late Pliocene (Akers, 1972; Huddlestun 1976).

Dubar and Beardsley (1961) reported on the paleoecology of the Jackson Bluff Formation deposits from the Alum Bluff site. They concluded that the sediments were deposited in the inner neritic zone in less than 8 fathoms of waters. The shell bed they state; "was deposited in normal open shelf marine water during a minor transgression of the sea".

Sandy Clays and Clayey Sands - These sediments are responsible for the name of this local outcrop. "From the efflorescence of ferrous sulphate arises the name Alum Bluff" (Langdon, 1889 p. 322). This interval has been called the "aluminous clay" by several authors. Dubar and Beardsley (1961) have suggested that this interval was deposited in stagnant possibly lagoonal conditions. There is a absence of marine fossils and the sulphurous odor and carbonaceous nature of the sediments also lead to this conclusion.

Citronelle Formation - The Citronelle Formation was named by Matson (1916, p. 168) for outcrops near the town of Citronelle, in southwestern Alabama. In northwestern Florida it consists of fluvial, cross-bedded sands, gravels and clays, and post-depositional limonite. In the Alum Bluff vicinity this unit consists of cross-bedded quartz sands, sandy more massisve clay beds, clay pebbles, and brown to red iron stained bedded clayey sands. The age of the Citronelle has been difficult to ascertain due to the lack of fossil material (Isphording and Flowers, 1983). More recent reworking and other similar deltaic deposits make correlation and differentiation time consuming and questionable. Recent workers based on plant remains and stratigraphic position have put a Late Pliocene-Pleistocene age on these sediments.

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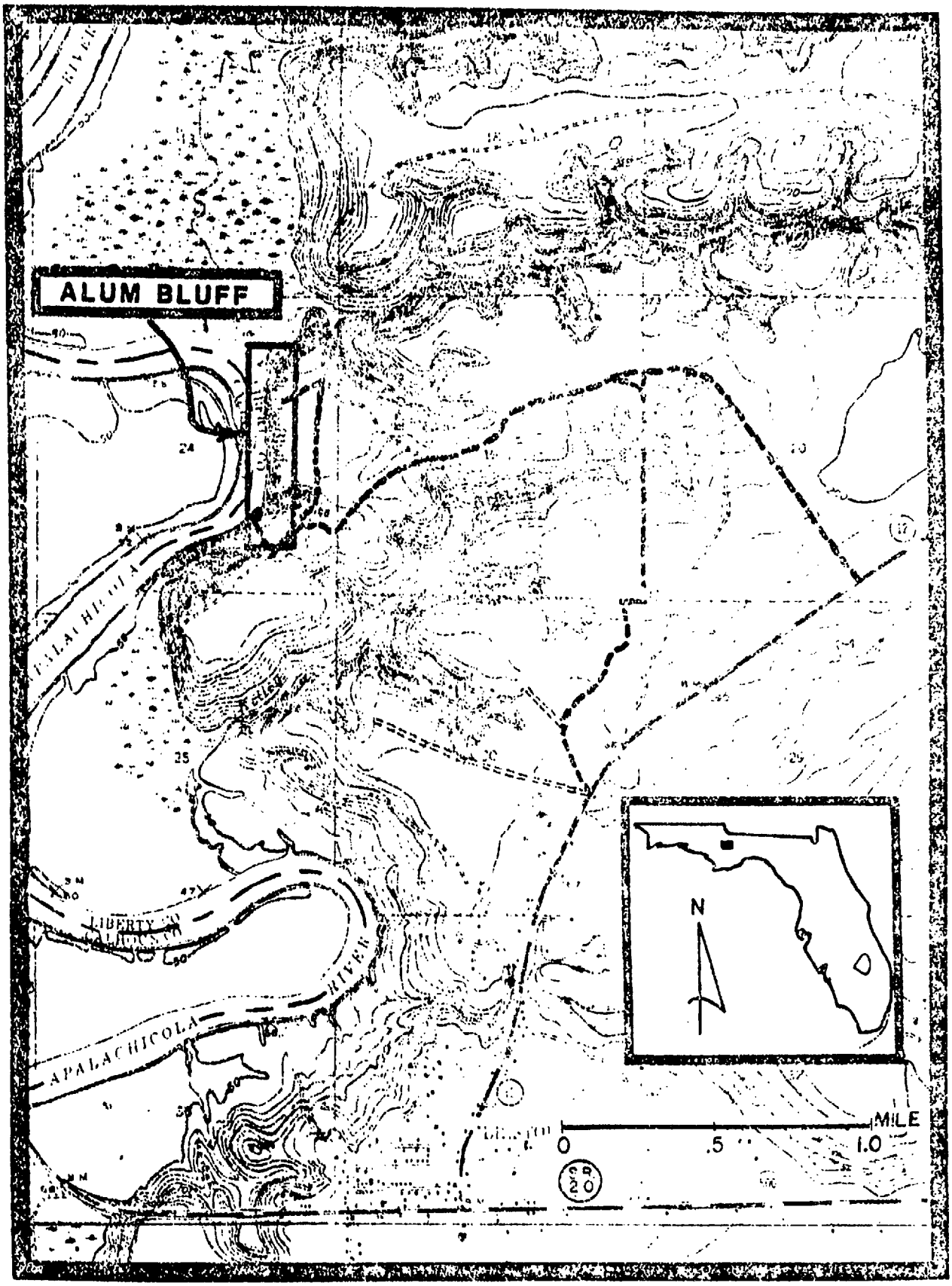
Figure 1 Part of the Bristol Quadrangle (1945)
Best route to Alum Bluff —~—

Figure 2 Geologic Section at Alum Bluff, (Revised after Dubar and Beardsley, 1961, p. 165).


ALUM BLUFF
APALACHICOLA RIVER
LIBERTY
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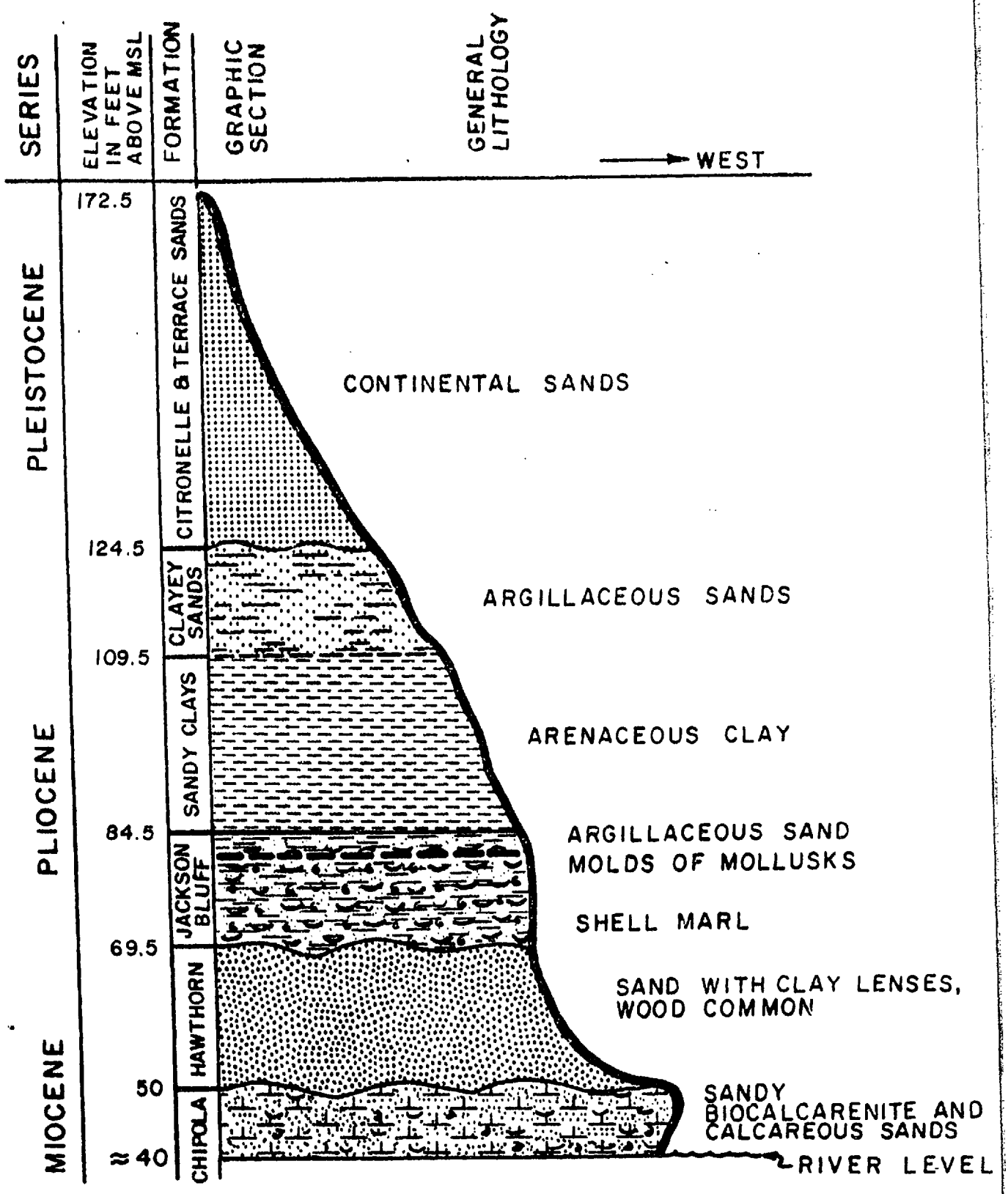
1.0
MILE
CR 20

ALUM BLUFF STRATIGRAPHIC DESCRIPTION

Cirtonelle Formation and Terrace Sands	Thickness (ft.)
Unconsolidated to poorly consolidated, tan to yellow orange and red brown, poorly sorted, mottled and cross-bedded, clayey, fine to gravel size quartz sands.	48
Clayey Sands	
Poorly consolidated, red, yellow and gray clayey, variegated quartz sands.	15
Sandy Clays	
"Aluminous Clay" named by Dall (1894). Poor to moderately consolidated, greenish gray, micaceous, limonitic, sandy clays.	55
Jackson Bluff Formation	
Moderately consolidated, green gray to bluish gray, glauconitic, phosphoritic, mollusk shell rich, sandy clay and clayey sands. This is type locality of the "Ecphora facies".	15
Hawthorn Formation	
Moderately consolidated, gray to yellow and white, variegated, cross-bedded, and laminated, clayey sands. This interval contains fossil leaves, wood fragments and carbonized logs.	20
Chipola Formation	
The lowermost beds exposed at Alum Bluff. Moderately consolidated, tan-brown to yellow, calcareous sands with numerous mollusk shells and an excellent microfauna. The base of the unit is not exposed. The Chipola forms the prominent ledge along the river.	10
Total Thickness Approximately	133


SERIES
ELEVATION IN FEET ABOVE MSL
FORMATION
GRAPHIC SECTION
GENERAL LITHOLOGY
WEST
PLEISTOCENE
PLIOCENE
MIOCENE
172.5
124.5
109.5
84.5
69.5
50
≈ 40
CITRONELLE & TERRACE SANDS
CLAYEY SANDS
SANDY CLAYS
JACKSON BLUFF
HAWTHORN
CHIPOLA
CONTINENTAL SANDS
ARGILLACEOUS SANDS
ARENACEOUS CLAY
ARGILLACEOUS SAND MOLDS OF MOLLUSKS
SHELL MARL
SAND WITH CLAY LENSES, WOOD COMMON
SANDY BIOCALCARENITE AND CALCAREOUS SANDS
RIVER LEVEL