

THE GEOLOGY OF TORREYA STATE PARK



**FLORIDA DEPARTMENT OF
NATURAL RESOURCES**

Leaflet No. 11

On the front cover:

A view of the Gregory House from the River. Note the floodplain surface and the tree roots exposed by erosion of the river bank.

Inside the back cover:

Map of Torreya State Park showing points of geologic interest.



Prepared by the

FLORIDA BUREAU OF GEOLOGY
DIVISION OF RESOURCE MANAGEMENT
FLORIDA DEPARTMENT OF NATURAL RESOURCES

1982

THE GEOLOGY OF TORREYA STATE PARK

by

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The pristine forest of Torreya State Park stands overlooking the Apalachicola River. Visitors to the park are greatly impressed by the natural beauty of this recreational area that is situated in the physiographic zone known as the Tallahassee Hills. This zone includes the higher elevations in the eastern Florida Panhandle. A great deal of the park's appeal is attributed to its rugged topography, with elevations varying from a low of approximately 50 feet above MSL (mean sea level) at the river to a maximum of 252 feet above MSL in the park's interior. The unspoiled natural setting is enhanced by numerous streams which traverse the park; many of which carry water only during heavy rains or sustained wet periods.

THE PROCESS OF EROSION

The rugged landscape of Torreya State Park, which is due to the process of erosion, vividly illustrates the dramatic changes that can occur as a result of the combined effects of such diverse weathering agents as water, dissolution, gravity, and wind on Florida's landscape. Although water has played an essential role in developing the beauty of the park, it can also present problems. The clayey sands, which form the highlands, retard infiltration of precipitation and enhance runoff. During periods of heavy rains, the numerous dry streams encountered in hikes through the park may quickly fill

with rain water collected along the higher ridges and steep slopes. These streams can become "torrents of water" rushing downstream, uprooting trees, and carrying roots and debris along with vast quantities of soil. This erosion is an ever-changing dynamic process, the results of which are visible in the park.

Runoff is not necessarily confined to the stream beds. It may flow down the sides of steep slopes causing slumping. Slump scours, channels cut in the steep slopes, can be seen below the Gregory House. The newly exposed sediments become susceptible to additional weathering and erosion. Eroded soil and rock continue their journey downslope, ultimately being transported by the Apalachicola River downstream to the Gulf of Mexico where the material is deposited.

THE RIVER

The present location of the Apalachicola River serves as a boundary separating two areas with different near-surface geology. West of the river, carbonate rocks (limestones and dolomites) are found near the land surface, while east of the river, carbonate rocks are overlain by a thick sequence of sands and clays with some limestone beds. These sands and clays form the major portion of the bluffs at Torreya State Park.

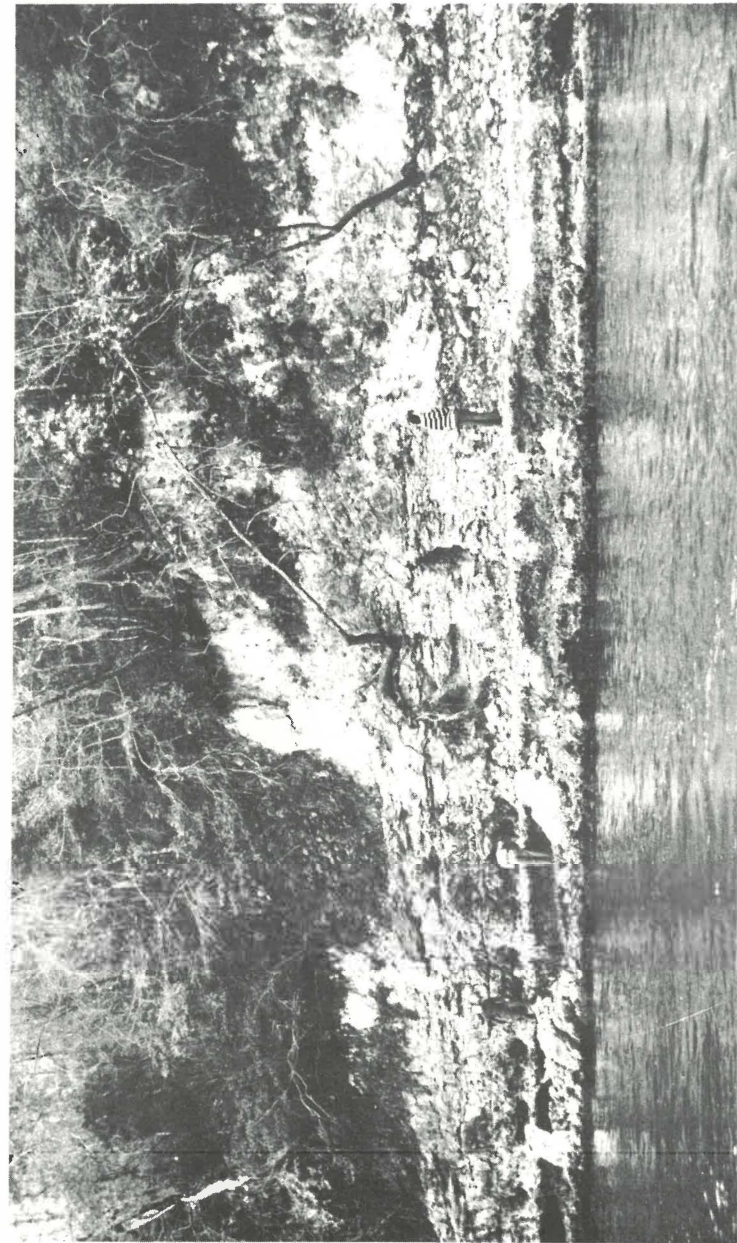
RIVER EROSION

The effects of river erosion are dramatically evident along the bluffs viewed from the campground, the Gregory House, and the Apalachicola Bluffs Trail. This trail, which starts at the Gregory House, follows along the bluff and down to the river. The bluffs are a topographic feature which can be found on the east side of the Apalachicola River from Lake Seminole at the north to the town of Bristol at the south, a distance of approximately 20 miles. Rising up to 150 feet in height, the bluffs have formed from a combination of geologic conditions and geomorphic processes (those which shape landforms) that have been dominated by the Apalachicola River. The Apalachicola River cuts into these highlands, widening its floodplain by the process known as lateral planation. In this process, rock and soil materials are eroded from the outside and downstream sides of river bends (meanders) while material is deposited on the inside and upstream sides. The result is a slow widening of the meander belt as well as a slow downstream migration of the meanders. Part of the floodplain can be seen starting below the Gregory House and extending downstream on the park side of the river. In addition, there are shallow channels cut in the floodplain that can be seen along the Apalachicola Bluffs Trail just to the west of the Gregory House. These are floodplain scour routes which may be the initial stage in the development of a new river channel, or may be the final remnant of an old channel.

Geologic conditions influence the river as the channel migrates and widens the floodplain. The rocks in this area dip to the southeast and cause the river to migrate slowly eastward as it cuts its channel. The lowlands, swamps, and river deposits on the west side of the river are remnants of former high ridge areas that have been eroded and lowered by the river over the years.

LIMESTONE EXPOSURES

As a result of these erosional forces and the subsequent removal of soil, park visitors can see the underlying limestone exposed at several sites in the park. The first exposure is encountered in the vicinity of the Confederate gun pits which are located on the bluff along the nature trail below the Gregory House (see map). This limestone, which formed from the hard shells of animals that died and accumulated on an ancient sea floor, is just visible at the ground surface. Other limestone exposures can be seen while hiking along the river bank below the Gregory House and near the River Bluff Primitive Camp. These outcrops, which are very prominent during extended dry periods and associated low river stages, are generally submerged and hidden from view by the river during years of normal precipitation.



A view of the limestone exposed at Rock Bluff near the River Bluff Primitive Camp.

FOSSILS

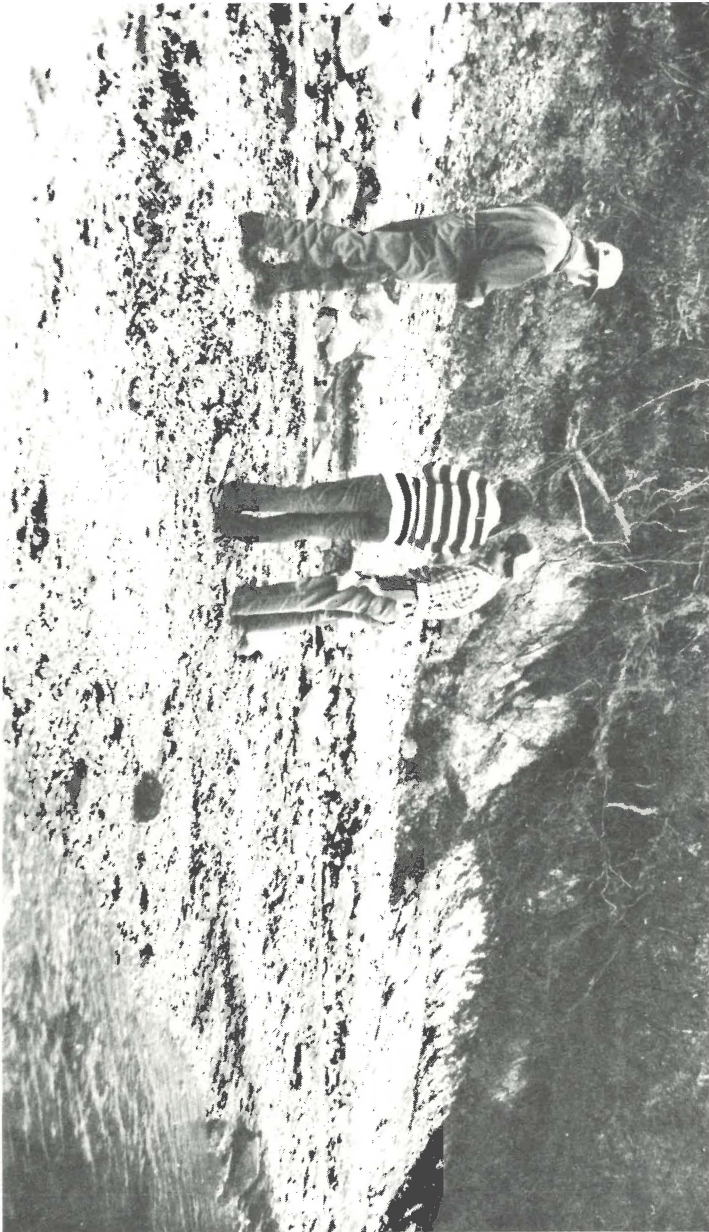
Torrey State Park offers a unique setting for an impressive array of plants and animals, some of which can be seen in the park's fossil record. This record, in part, has been preserved in the limestone which underlies the park. A cursory examination of this limestone may show little detail; however, when viewed under a microscope, this limestone is found to contain tiny fossil plants and animals. These relics of past life have enabled geologists to date the deposition of the sediments as having been laid down approximately 15 million years ago during a period of time known as the Miocene Epoch. In addition, an analysis of these microfossils enables a reconstruction of the park's environment during that period of time millions of years ago. Though it may be difficult to imagine, the limestone, which is exposed near the top of the Bluff, was, in fact, part of an ancient seafloor. The microfossils contained within the limestone are related to those that occur in a present day marine coastal setting. It is an indication that the present park area was covered by a relatively shallow ocean during this period of Florida's past. This interpretation is compatible with other studies which have indicated that much of Florida was covered by water during the Miocene Epoch.

UNIQUE OPPORTUNITY

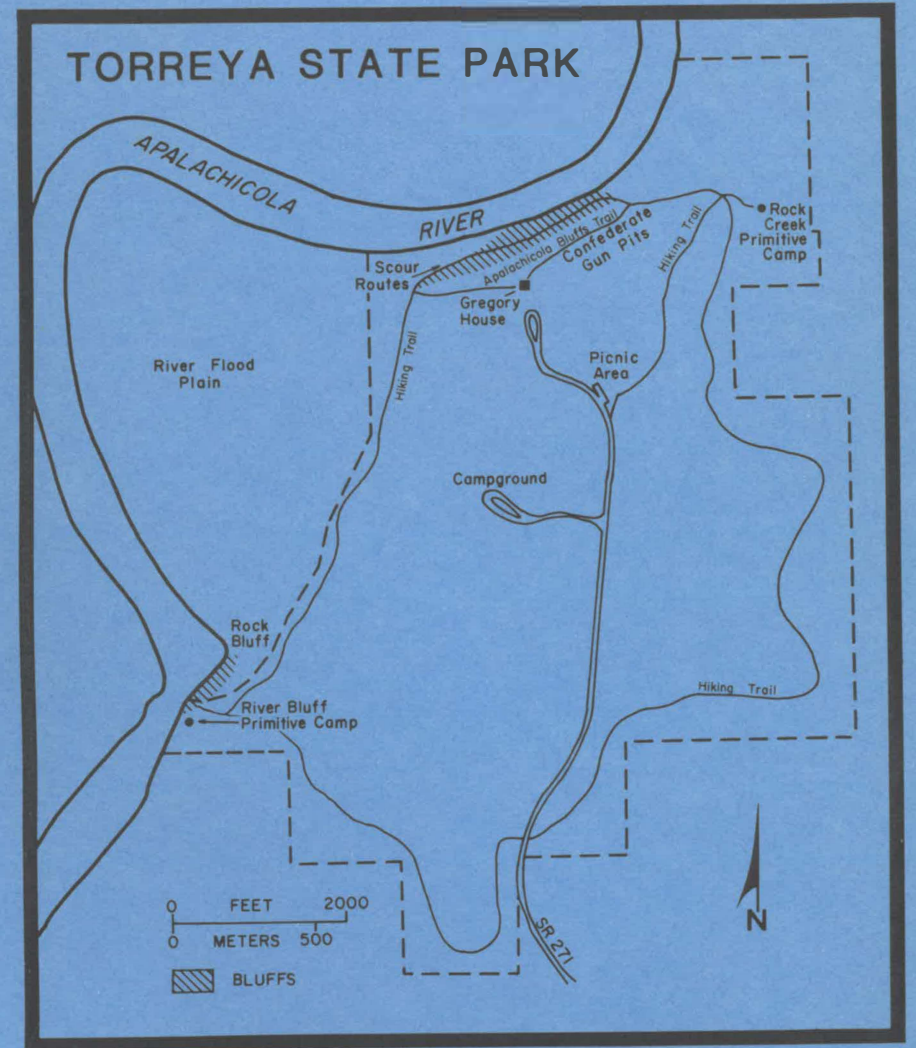
Torrey State Park offers visitors the opportunity to experience the beauty and natural wonder of a unique setting. As you walk along the numerous trails and paths within the park, we hope your enjoyment is enhanced by an increased understanding and awareness of the geologic forces that have molded and shaped this magnificent landscape over the millennia.



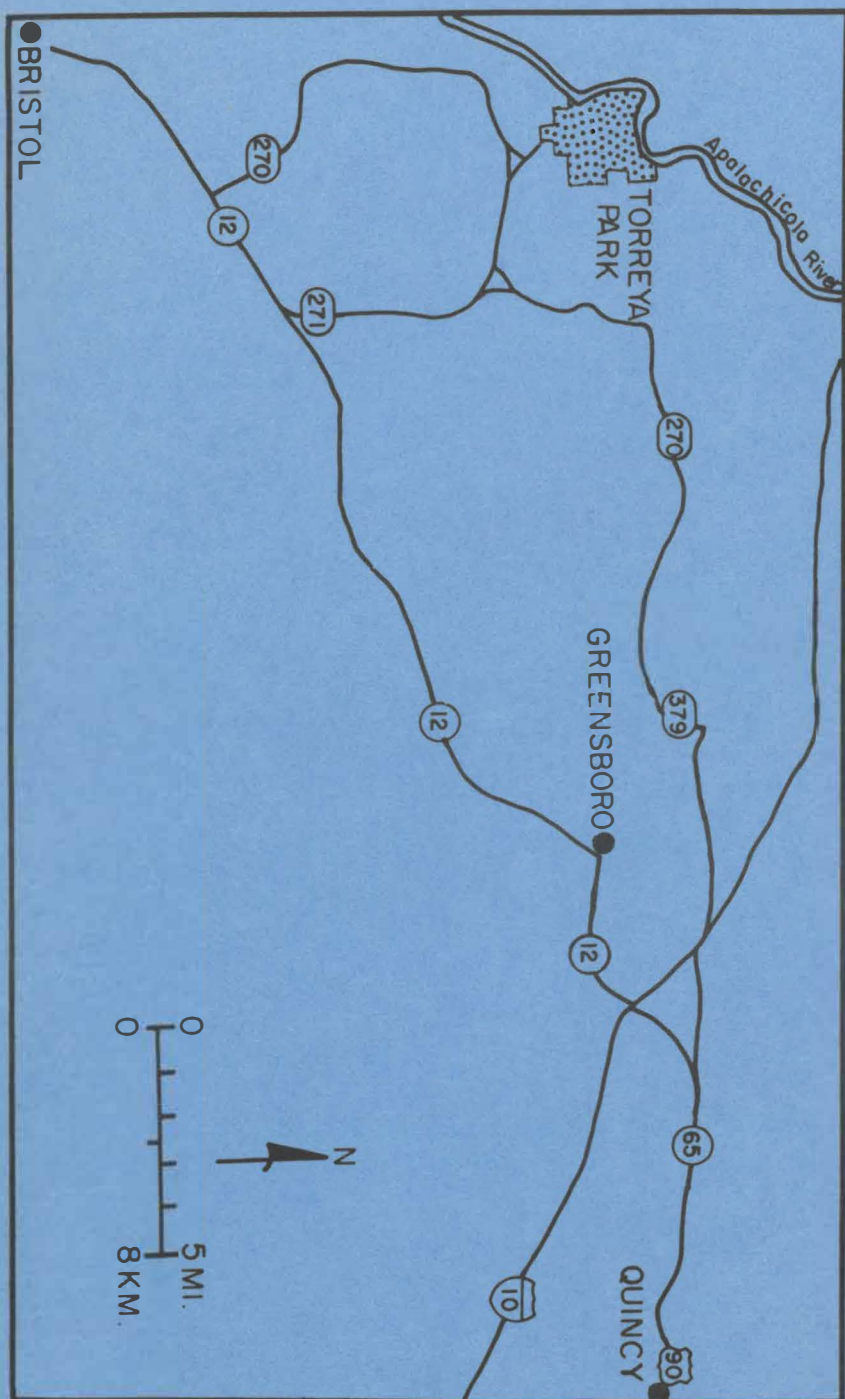
View of Rock Bluff (looking north) near the River Bluff Primitive Camp.



Geologists from the Florida Bureau of Geology examine the limestone outcrop at Apalachicola Bluffs, just upstream from the Gregory House. This outcrop is covered by the river except during very low water.



Map of Torreya State Park showing points of geologic interest.



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