

Alabama Physiographic Provinces – Part 3

The Cumberland Plateau Province

The Cumberland Plateau of north Alabama is an upland region that lies mainly south and east of the Highland Rim Province and northwest of the Valley and Ridge. It is best known for its coal mining, but it also contains some of Alabama's most scenic and unspoiled natural areas.

Along its northern edge near the Tennessee River, the Cumberland Plateau rises 500 feet or more above the level of the Highland Rim off to the west. A steep **escarpment** (a slope with a rapid change in elevation) separates the Plateau from the softer rocks that border the Tennessee River on either side. In most places the Cumberlands are capped by thick layers of highly resistant sandstone that have allowed them to withstand the ravages of time better than the soft limestone beneath the valley floors.

The central and southern portion of the Cumberland Plateau is known for an industry directly tied to geology—coal mining. Coal from the region northeast of Birmingham, near Jasper in Walker County, and from the Cahaba River valley supplied most of the fuel that brought Alabama its first industrial boom late in the 1800s with the birth of the steel industry. Even today coal from this area provides the energy used to generate most of the state's electrical power. The coal mined today primarily comes from surface mines, commonly called "**strip mines.**"

The rocks in the Cumberland Plateau are a mixed assortment of sedimentary rock types deposited during the part of Earth history known as the Coal Age, or Pennsylvanian Period. During this time just over 300 million years ago, this part of Alabama was a broad coastal lowland that was being buried under sheets of sediment eroding from new mountains that were beginning to be pushed up to the east by tectonic forces. These mountains were uplifted as part of the first major pulse of Appalachian mountain-building in Alabama. Layers of sandstone and shale were spread across the swampy lowlands that lay to the northwest. The coal mined today comes from the remains of forests of primitive plants that thrived in swampy, river flood plains and coastal marshes. These Coal Age rocks are different from the older rocks beneath them, in that they were deposited mostly in terrestrial (land) and fresh water settings rather than in ocean waters.

Most of the Cumberland Plateau is underlain by sedimentary rock layers that sit more or less horizontally, making ridge tops appear almost flat when viewed from a distance. At its western border where the rocks of the Cumberland Plateau dip beneath much younger strata of the Upper Coastal Plain, the topography is much less rugged.

The transition between these two provinces is barely noticeable near the city of Tuscaloosa. The Plateau's coal-bearing rocks dip gently beneath a Coastal Plain cover of dinosaur-age sand and gravel.

The Alabama's Upper Coastal Plain Province

Based on important differences in geological age, Alabama's Gulf Coastal Plain is sometimes divided into two sections—the Upper and the Lower Coastal Plain Provinces. The Upper Coastal Plain Province lies along and immediately south of the Fall Line. It is underlain by sedimentary strata that were spread along the northern margin of the Gulf of Mexico during the last part of the Mesozoic Era, also known as the Age of Dinosaurs. Major urban centers located in the Upper Coastal Plain Province include the cities of Montgomery, Selma, and Tuscaloosa.

In the heavily-forested northern portion of Alabama's Upper Coastal Plain, soils here are mostly derived from deep sands and clays. The southern half of the Upper Coastal Plain contains the Black Belt, a grassland area so different from the surrounding forests that it can be easily seen from outer space. The Black Belt is underlain by chalky rocks, which produce the rich, dark top soil from which the region gets its name. The weathering of chalk and the buildup of organic material from many generations of prairie grasses has created a black topsoil similar to that found in the Midwestern prairies. Much of this naturally fertile soil has been eroded down to its unweathered chalk bedrock.

The Lower Coastal Plain Province

The Lower Coastal Plain occupies a broad, curving swath across the southern part of the state, extending down almost to the coast. The region is built upon a thick series of mixed marine sediments that dip gently downward toward the Gulf. These sediments—generally too poorly lithified to be considered rocks in the usual sense of the term—were deposited along Alabama's Gulf of Mexico shoreline during the Cenozoic Era, the period following the extinction of the dinosaurs. The deposition of these younger sedimentary layers extended the state's land area southward more than a hundred miles onto what was once the shallow continental shelf of the Gulf of Mexico.

The Lower Coastal Plain, though generally level, has several sets of low hills underlain by more resistant sandstone and limestone. Most of the soils of the Lower Coastal Plain are derived from marine sands and clays. Except for Dothan in southeast Alabama, there are no large cities located in the Lower Coastal Plain. In addition to the Chattahoochee River on the state's eastern border with Georgia, two smaller rivers drain the Lower Coastal Plain. The Choctawhatchee and the Conecuh Rivers are the primary stream drainages for much of the south-central part of the state.

Alabama's Coastal Region

Alabama's Gulf of Mexico beaches, the Mobile-Tensaw Delta and the marshy lowlands along Mobile Bay are often considered to be a distinct physiographic province. This area is young land, geologically speaking, that is still undergoing fairly rapid change. Sediment supplied by the large river systems entering the Gulf here continues to build the Mobile Delta as it has for thousands of years. Storms at sea, tidal fluctuations, and longshore currents have sculpted this important **estuary**—a biologically rich area where fresh and salt water intermix into a landscape of barrier islands, shallow bays, mud flats, and salt marshes.

The marshy portion of the Mobile Delta that lies north of the Interstate 10 bridge and causeway is an important nursery for seafood species such as shrimp, crabs, oysters, and fish. The Mobile Delta begins north of the Bay's salty waters where the Tombigbee River begins to spread out into a complex of sluggish channels that include the Mobile River, which follows the western margin of the delta, the Tensaw, which diverges toward the eastern Bay, and many smaller channels that lie between. The tidal fluctuation of Mobile Bay extends many miles up this vast wetlands, even to the confluence (point of joining) the Alabama and Tombigbee Rivers.

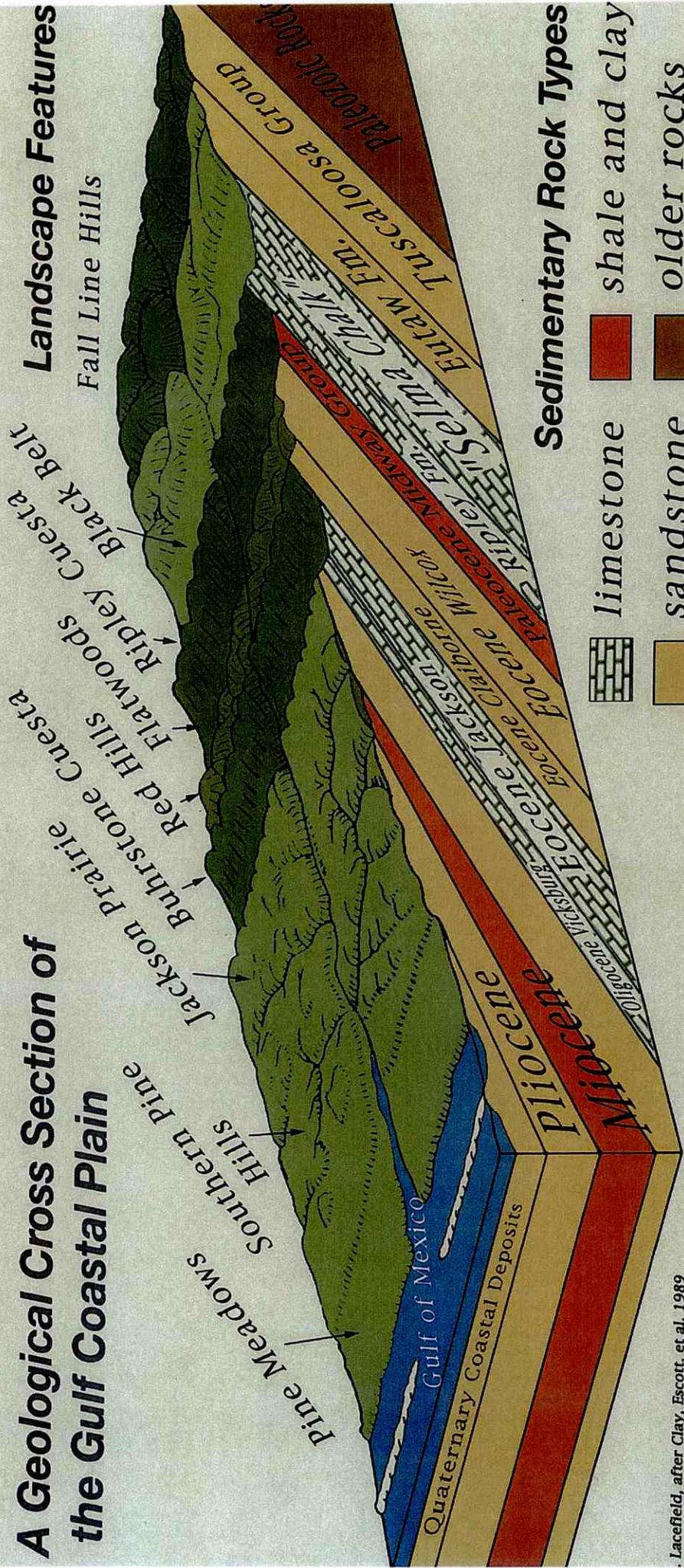
Barrier islands such as Dauphin Island and the beach fronts at Gulf Shores and Orange Beach are, at best, only transitional and temporary features dependent on changing sets of environmental and oceanographic conditions. Even minor coastal storms can bring about major changes in the shape of the coast line in these areas overnight. When viewed from a perspective of geological time, the superior forces of time and tide will ultimately decide the shape of this part of Alabama, rather than the land developers and coastal engineers who attempt to maintain it in its present form.

(Note: See following page for a pictorial representation of the Geological Cross Section of the Gulf Coastal Plain.)

Source: Reprinted with permission from educator and club member, Elliott A. Whitton, who researched and prepared (July 2013) this condensed version of material presented in Jim Lacefield's publication, Lost Worlds in Alabama Rocks.

Editor's Note: This article has been divided into three parts due to limited newsletter space. This is Part 3. Parts 1 and 2 appeared in the September 2013 and October 2013 editions of the *Rockhounds Herald*, respectively.

A Geological Cross Section of the Gulf Coastal Plain



Lacefield, after Clay, Escott, et al, 1989