Mineral Resources of the Coastal Plain: Region 3

Mineral Deposit Processes

The dominant processes taking place in the Atlantic Coastal Plain and Gulf Coast of the Southeastern United States are sedimentary, weathering and erosion processes. Erosion and deposition by modern and ancient rivers, and along shorelines during higher sea levels, formed numerous placer concentrations of heavy minerals along the inland margin, interior, and offshore of the Coastal Plain.

The Southeast has been largely tectonically inactive for about 150 million years. The dominant geologic processes operating during this time have been weathering and erosion. Most of the Coastal Plain region has eroded to a gently-tilted plain. Fluctuating sea levels in the Cretaceous, Tertiary, and Quaternary, left thick, extensive sedimentary deposits along the Coastal Plain.

Metallic Mineral Deposits

Although not mined commercially, numerous concentrations of heavy mineral sands have been identified in ancient river and beach deposits along the western margin of the Coastal Plain and offshore on the continental shelf. Deposits of rutile, ilmenite, monazite, zircon ($ZrSiO_4$), and gold have been investigated in North and South Carolina. Although minor production has occurred in the past, these deposits are currently considered not economical to mine, occur in environmentally sensitive or urban areas.

Non-Metallic Mineral Deposits

A residual product of weathering in the Cretaceous carbonate rocks is bauxite. Bauxite is a clay-like mixture of several minerals, but dominantly gibbsite ($Al(OH)_3$). Mined primarily as an ore of aluminum, most bauxite ore contains 45-55% Al_2O_3. Bauxite deposits are found in Georgia, Alabama, Tennessee, and Virginia. Small scale production has continued in Alabama to the present. Southeast bauxite deposits are generally small and of limited potential.

Phosphate is present in Coastal Plain sediment ranging in age from the mid-Tertiary through the Quaternary, and extends along the Atlantic coast from the Chesapeake Bay to Florida. The highest grade and most extensive deposits occur in the Miocene formations of North Carolina and Florida, which together account for about 95% of domestic production of phosphate and about half of global production. Phosphates are used primarily to make fertilizers, but are also used in the manufacture of phosphoric acid, detergents, food additives, pesticides, soft drinks, and other products. The Aurora phosphate operation at Lee Creek in Beaufort County, North Carolina is the largest integrated phosphate mining and chemical plant in the world (Figure 5.18).

There are thick salt (NaCl) sequences underlying much of the Gulf Coast related to early rifting of Pangea and the formation of the Gulf of Mexico during the Triassic and Jurassic periods. Salt is currently only mined, though, in Alabama. Bentonite is currently mined in Mississippi and

Alabama. Bentonite is an altered volcanic ash that originated from Cretaceous volcanoes in the central and western US. The ash was blown into the Southeast region by prevailing winds.

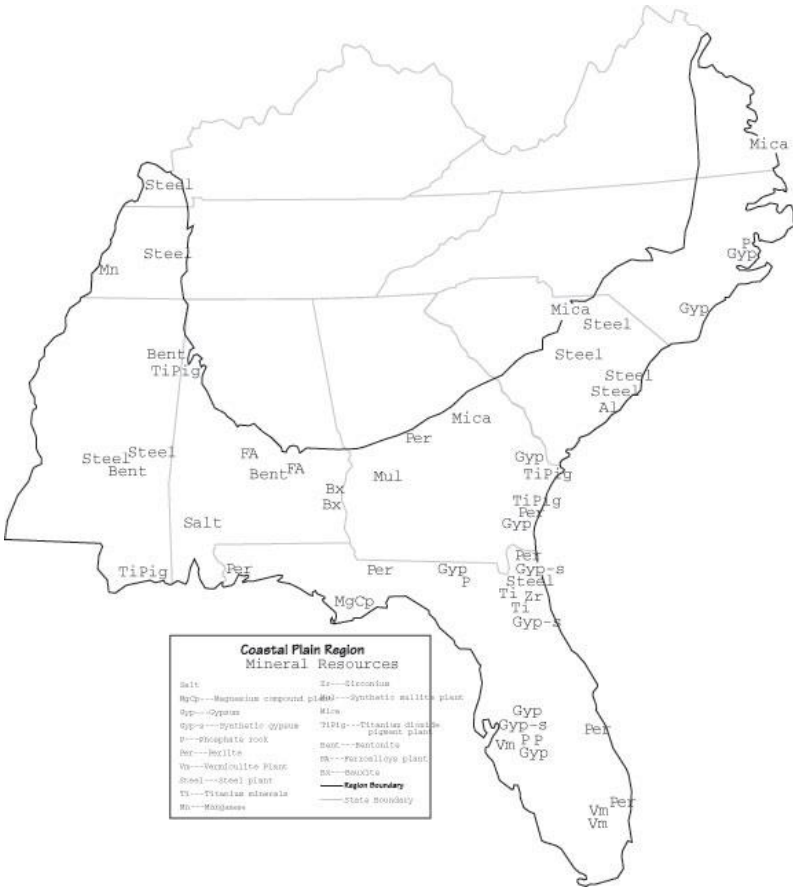

Figure 5.17: Principal current mineral-producing localities of the Coastal Plain region. Figure adapted from [1998 United States Geological Survey State Mineral Information](#).

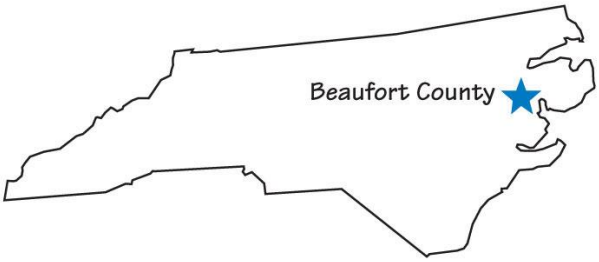

Figure 5.18: The largest integrated phosphate mine and chemical plant in the world is located in Beaufort County, NC.

Why are there Steel Plants in the Coastal Plain?

There are several reasons, depending on when and where you are looking. Southeastern iron foundries and steel mills of the 17th to 19th centuries were kind of all over the place, but many were fueled by ìbogî iron ore mined from coastal swamps and Triassic basin coal. Steel mills of the late 19th and 20th centuries were more dependent on imported iron and coal, and tended to be near the ocean on navigable rivers. They also need lots of fresh water.

Source: http://www.geology.teacherfriendlyguide.org/index.php/minerals-se/region-3-coastal-plain