Everglades Geology Reading

In addition to changes in the watershed caused by the extensive water-management system, other land-use changes have affected the movement of water in south Florida. Draining and filling in wetlands for agricultural use and paving for extensive urbanization have increased runoff and the risk of flood. In the past, wetland areas were like sponges, storing great quantities of water and serving as a flood control.

**Look at the following video (1:51):** [What is limestone?](https://www.youtube.com/watch?v=GHLZHijEr7c)

Today, much of south Florida is underlain by limestone. The surface topography reflects the underlying geology. Low areas associated with limestone erosion allow for water to pond, thus supporting the wetlands environments necessary for peat deposition. The sequence of freshwater and marine limestones provide a record of sea-level rise and fall over the geologic history of the Everglades. Also, the Everglades themselves lie in a basin that was most likely an ancient atoll-like structure that formed a lagoon (atoll: a ring-shaped reef, island, or chain of islands formed of coral). The higher regions that allowed for the development of the Everglades wetlands are fossil reefs. The process of limestone deposition in the area began about 5 million years ago. During the last 5 million years, the sequence of marine and freshwater limestones preserved the record of seawater inundation of south Florida.

**Watch this (1:21):** [Why does Florida get so many sinkholes?](https://www.youtube.com/watch?v=LDoDlVIGC8k)

About 5,000 years ago, post-glacial rise in sea level slowed enough to allow the build-up of coastal structures, which impounded freshwater in the lowlands that are not the Everglades.

The Everglades have evolved since then as a result of the deposition of peats and marls (mixture of 35-65 percent clay and 65-35 percent calcium carbonate formed under marine or freshwater conditions known as calcitic muds.)

**Take a look (2:31):** [What is a peat bog?](https://www.youtube.com/watch?v=kYqygTcO-YQ)

Just as geologists use limestone to determine past conditions in the south Florida region, they also use peat cores to reconstruct the more recent history of the region. Peat is a chemical filter that holds a number of cations and anions (cations & anions are positively and negatively charged particles). Scientists have used these peat cores to document the build-up of pollutants in the Everglades over the past 100 years.

USGS scientists are using peat cores to study peat accumulation rates and the change in peat chemistry in the Everglades from 1961 to the present. They have sampled two sites in Water Conservation Area 2. The first area shows a shift from saw-grass to cattail vegetation (cattails are invasive weeds) due to the increased nutrient input it receives from canal water. Peat accumulation near the canal has nearly doubled in this area. The second area, with near-pristine, low-nutrient conditions, shows slower rates of peat accumulation. The differences in these areas are recorded in peat cores as differences in preserved plant material and differences in peat chemistry. Since 1961, peat chemistry shows increases in phosphorous, sulfur, copper, and zinc that probably originated from agricultural activities where they have been applied as fertilizer.

The south Florida ecosystem is one of the most threatened ecosystems in the Nation. The greatest impacts on the ecosystems may have resulted from the construction of a complex canal and levee system to control flooding and supply freshwater. This system has drained over half of the Everglades and altered the flow of freshwater into Florida Bay. Without enough standing water, the ecosystem supports half as much aquatic life, thus the Everglades can no longer feed the storks, alligators, and other animals that once flourished. Many people believe the lack of water and the change in how and when it flows are the causes for a declining population of wading birds and a collapse of nesting activities, and major changes in plant communities as “weedy” species, such as cattails, invade the wetlands.

**Recent Video that Explains How to Fix it (3:41):** [Restoring the Everglades](https://www.youtube.com/watch?v=n1PSWlxo6ZI&t=112s)

Restoring the Everglades begins with returning its water. Plans are being developed to reestablish the natural hydrology of the south Florida ecosystem so that water patterns in parts of the historic Everglades more closely resemble those that existed about 150 years ago, before significant human intervention.

A second major restoration effort involves removing nutrients from agricultural waste water. In 2004, the State legislature mandated a project that would construct artificial marshes around the agricultural area to filter phosphorus from the water. The third restoration effort is removal of non-native plants that crowd out indigenous species and reduce wildlife habitat.

For most of its geologic history, Florida was under water. The shells of millions of sea animal form the layers of limestone that blanket the State. The peninsula rose above sea level about 20 million years ago. Even then, the southern portion remained largely submerged, until the buildup of coral and sand around its rim blocked out the sea, leaving dense marine vegetation to decay and form the peaty soil of the present-day Everglades.

Dependent on rain for freshwater, the subtropical stretch of the peninsula receives 40 to 65 inches a year. But this flat, porous limestone land has little surface storage capacity, and after evaporation, transpiration, and runoff, only a fifth of the rainwater remains to recharge underlying aquifers and shallow lakes.

South Florida’s climate is rainy, hot and humid. The average annual temperature is about 75 degrees Fahrenheit. Freezing temperatures are rare. Annual rainfall averages about 53 inches — more than half of which occurs from June through September.

Recall that geologic maps show the surface distribution of rock formations in an area. You can use a geologic column to identify the oldest and youngest formations in the area. Remember the oldest formations will be at the bottom of the column and the newest will be at the top. There are geologic maps of the Everglades that reveal its history of formation.