

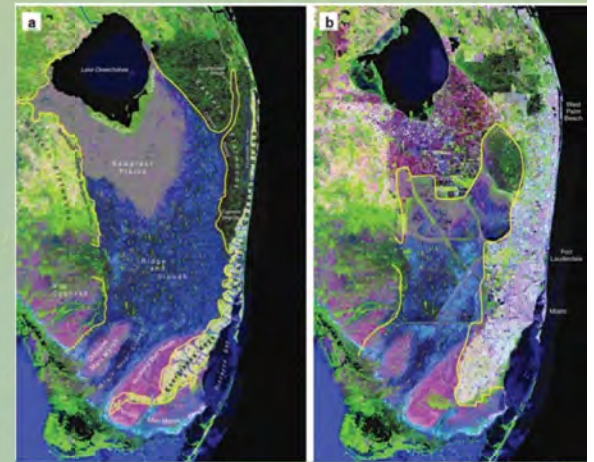
The Southeast



The Florida Everglades and Sea-Level Rise

Visitors to Everglades National Park come to marvel at vast swamps that are home to wading birds, alligators, wood storks, Florida panthers, and manatees. But the region known as the Everglades has undergone dramatic changes over the past 100 years, shrinking to half its original size. These changes are primarily the result of human manipulation and pollution of the region's most critical resource—water. There are ongoing efforts to restore the ecosystem, but increasing water temperatures, changes in precipitation, and more extreme storms will likely make restoration more difficult.

One major change that could affect the Everglades and other unique ecosystems is sea-level rise. Sea-level rise can increase the salt content of existing bodies of fresh water and could cause existing dry ecosystems to find themselves under water by the end of this century. Some regions of the Gulf Coast are simultaneously being affected by sea-level rise and subsidence, or sinking, of the land. In these areas, the water level is projected to rise 2–4 feet over this century—reconfiguring shorelines and fragmenting barrier islands.



Reconstructed satellite images show the Everglades of the 1850s (left) and present day (right). The yellow lines are the historical and current border of the Everglades ecosystem.

Image courtesy of the South Florida Water Management District.



Mangroves like this one are specially adapted to living at the edge of the ocean. But rising seas may soon threaten these and other coastal ecosystems.



Coral Reefs

The coral reefs of Biscayne National Park, just miles from downtown Miami, Florida, attract more than half a million visitors per year. In addition to drawing crowds for their dazzling natural beauty, coral reefs play some important roles in the marine ecosystem. For example, they provide key habitat for fish and act as a protective barrier for nearby shores. Unfortunately, overfishing, pollution, and coastal development are already degrading reefs off the Florida Keys and in other tropical U.S. waters. Climate and associated changes pose an increasing threat to their survival.

A partially bleached coral. Coral bleaching, which results from warmer water temperatures, can be deadly to the corals if it lasts too long.

Image courtesy of NOAA.

The shallow tropical waters in which most corals are found are warming. Heat stress causes corals to expel the symbiotic algae that provide their primary source of nutrition, leaving only the white “bones” of the corals behind. This process, called coral bleaching, can be lethal to the coral if it lasts too long. Coral bleaching, which has increased in recent decades, becomes worse as high temperatures last longer and longer.

Corals are also being affected by ocean acidification, which is caused by the increase in carbon dioxide in the atmosphere. This affects the ability of marine organisms to build their shells and skeletons. Ocean acidification is likely to slow, or even stop, the growth of coral over this century. This would not only affect the corals themselves but also put in jeopardy the survival of the myriad species found only on coral reefs.

Northward Movement of Tropical Species

Tropical species are moving northward into the southern United States, delighting bird and butterfly watchers alike. Former migrants like the rufous hummingbird and the Mexican green jay have become year-round residents in Alabama and Texas, respectively. Florida has five new species of tropical dragonfly, and many tropical butterflies normally confined to Mexico are starting to breed as far north as Austin, Texas.

Some tropical species, like this rufous hummingbird, are moving northward to the delight of bird and butterfly watchers in the Southeast.

Image courtesy of Dean E. Briggins, U.S. Fish and Wildlife Service.

