



Florida's Treasured Landscape

With a mix of temperate and tropical, arid and wetlands, forests, grasslands, and islands, Florida is one of the most biologically rich states in the U.S., with 755 vertebrate species and over 30,000 invertebrate species. Florida boasts an incredible array of plants, wildlife, and unique habitats. The Everglades of South Florida, known as the "River of Grass," is a complex system of sawgrass marshes, cypress swamps and mangroves, home to egrets, storks, Florida panthers, crocodiles and countless other species. In the central part of the state, the Lake Wales Ridge consists of upland scrub and sandhills that are home to a variety of plants found nowhere else on earth, as well as rare animals like gopher tortoises and the endangered Florida scrub jay. Farther north, long-leaf pine forest, remnants of an ecosystem that once spread across much of the south, is an important component of Florida bear range and is essential habitat for the endangered red-cockaded woodpecker.



Photo: U.S. Geological Survey



Photo: NOAA/Satellite and Information Service

Climate Changes

Rising temperatures

According to the U.S. Global Change Research Program's 2009 report "Global Climate Change Impacts in the United States," temperatures in the Southeast region have already risen by about 2°F in the past 100 years, and are projected to rise by 4.5°F under the lowest emission scenarios and by up to 9°F—with summer temperatures rising up to 10.5°F – under the highest emission scenarios.

Precipitation Shifts

Much of the Southeast is projected to see small increases in precipitation over the next century. More important than amount, however, is the pattern of precipitation. Precipitation is projected to increase substantially over most of the Southeast in autumn but decline sharply over the rest of the year. Furthermore, a larger fraction of total precipitation is forecast to come in the form of large storm events. Already, over the past 50 years, the percent of precipitation falling in the heaviest events has increased 18% in the Southeast. These changes mean the region will have increased likelihood of flooding as well as stretches of drought, particularly in spring and summer. The intensity of hurricanes is also projected to increase,

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bringing large storm surges to coastal areas and damaging winds felt even in the heart of the state.

Sea Level Rise

Sea level rise is difficult to forecast over the long term, given uncertainties about the rate of melting from the ice sheets on Greenland and Antarctica. By the end of this century, sea level is projected to rise between 3 to 4 feet depending on the emissions scenario. Storm surges from hurricanes will also bring flooding to low lying areas.

Wildlife At Risk

Florida Panther

The Florida panther, Florida's state animal, is one of the most endangered mammals on earth. This subspecies of the mountain lion once ranged throughout the southeastern U.S., but now just one breeding population exists in the southern tip of Florida, south of the Calahoosatchee River. Florida panthers primarily eat white-tailed deer. They are also known to eat feral hog, rabbit, raccoon, armadillo and birds. Panthers are habitat generalists, meaning that they use a variety of habitat types, including forests, prairies and swamps.

The primary climate change threat to Florida panther is the effect of sea level rise. The panther's habitat in southern Florida is all at very low elevation above sea level. The three feet of sea level rise projected to occur by the end of this century will inundate 30% of existing panther habitat. Habitat loss and fragmentation are already a major threat to the panther; the permanent inundation of so much of its range would be devastating.



Photo: George Gentry, U.S. FWS

Cape Sable Seaside Sparrow

The Cape Sable seaside sparrow forages in freshwater marshes and once lived on the island from which it gets its name, but vacated its eponymous home by vegetation shifts following hurricanes in 1935 and 1960, and is now found exclusively in the mainland Everglades. Unusual storm surges during nesting season can cause breeding failure. This federally endangered subspecies of the seaside sparrow could follow Florida's Dusky seaside sparrow into extinction if projected sea level rise wipes out the freshwater marshes of the Everglades.



Photo: U.S. FWS

Key Deer

The threat of sea level rise is not limited to the Everglades. The Florida Keys, stretching over 150 miles west from the south tip of the state, are the remnants of an ancient coral reef, averaging just three to four feet in elevation. A rise in sea level of just 7 inches would affect nearly 60,000 acres of the island chain, two feet would wipe out 75 percent of the Keys, and the three to four foot rise predicted by 2100 could submerge the Keys entirely. Among the many unique species threatened by sea level rise here is the Key deer, an endangered subspecies of the white-tailed deer numbering between 300 and 800 individuals. Loss of habitat and collisions with vehicles have traditionally been the biggest threats to the Key deer. The establishment of Key Deer National Wildlife refuge on Big Pine and No Name Keys has helped abate those threats; however the Refuge, like the rest of the Keys, could be underwater in a century.

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Red-cockaded Woodpecker

The red-cockaded woodpecker once numbered in the millions, but has been dramatically reduced by the loss of longleaf pine habitat due to logging, clearing for agriculture, and suppression of the natural fire cycle, which allows hardwood trees to gain a foothold and overtake the pines. Currently occupying less than 3% of its original range, the woodpecker is listed as endangered.

Longleaf pine restoration, controlled burning, the installation of artificial nesting cavities, and the translocation of critically small populations, has helped stabilize the red-cockaded woodpecker population. Numerous threats remain, however, including several that may be exacerbated by climate change. For instance, Francis Marion National Forest, which at the time held the largest population of red-cockaded woodpeckers, suffered a direct hit by Hurricane Hugo in 1989 destroyed 87% of the nesting cavity trees within the Forest. And in 2001, Kentucky's population of red-cockaded woodpeckers was extirpated following a devastating outbreak of the southern pine beetle. Florida's red-cockaded woodpeckers could face similar threats.



Photo: Michael McCloy

Gopher Tortoise

Adapted to the dry, often fire-swept uplands of Florida, gopher tortoises, at first glance, may be better equipped to deal with a warming climate than many other species.

The tortoise is a pivotal animal in its natural community, the burrows they excavate provide permanent or temporary refuge to over 400 wildlife species. Their main threat is logging and conversion of their habitats to urban sprawl. However, the threat of climate change to this species may be primarily indirect. As sea level rise and storm surge render Florida's coastal areas less habitable, the next major real estate boom in the state and the pressure of human retreat inland from the coasts, will increase the relentless pressure on the gopher tortoises' remaining habitat.

Manatees

Manatees, a relative of elephants, are Florida's state marine mammal. While collisions with boats are perhaps the best-known cause of injury and death to manatees, they face other threats as well, including climate change. Since manatees prefer warm water, and rarely venture into waters below 68°F, it may seem paradoxical that they could be threatened by climate change. However, warming waters may allow tropical species of toxic algae, particularly those that cause red tides, to broaden their ranges and increase in frequency and severity. Red tides produce a poison called brevetoxin, which disrupt the function of electrical impulses between nerve cells.

The deaths of 39 endangered manatees in the lower Caloosahatchee River in 1982 coincided with a red tide that also killed large numbers of fish and double-crested cormorants. In 1996, 149 manatees died during another red tide. The affected animals showed inflammation and lesions of the nasal passages, lungs, liver, kidneys and brains, consistent with chronic brevetoxin poisoning. This toxin may be responsible for 17 percent of the annual mortality in manatees, and as Florida's waters warm, it could pose an even bigger threat to this federally listed endangered species.



Photo: Jim Reid, U.S. FWS

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Sea Turtles

Florida's waters are home to five species of sea turtles, the green, hawksbill, leatherback, loggerhead, and Kemp's ridley. All but the latter also nest on the state's shores, and four are listed under the Endangered Species Act (the loggerhead as threatened and the others as endangered). Among the many threats sea turtles face are coastal development, illegal capture and trade, pollution and pathogens, and entanglement in fishing lines or shrimp nets.

Climate change poses a unique threat to sea turtles, since the temperature at which the egg incubates determines the sex of the turtle. As global temperatures continue to rise, sea turtles could be faced with the reality of only females being born in clutches that are laid in sand with temperatures over 88.6 degrees Fahrenheit. Sea level rise and storm surge could also destroy sea turtle nesting sites.

Like manatees, sea turtles also suffer in red tide events. Strandings of sea turtles increase during red tides; investigations have revealed that dead turtles show elevated levels of brevetoxin and live turtles display symptoms of brevetoxin poisoning. The affected turtles include two federally threatened species, the loggerhead turtle and the green turtle, and one federally endangered species, the Kemp's ridley turtle.



Photo: U.S. FWS

Coral Reefs

Coral reefs only account for about one-tenth of one percent of the world's area, but harbor at least five percent of its known species. They are important nursery grounds for fish, and bring tremendous benefits ranging from tourism and recreation to coastal protection. Unfortunately, 27% of the world's coral reefs have been

destroyed by overexploitation, pollution, sedimentation and disease. Worse, another 30% may be lost in coming years. Evidence is mounting that climate change is exacerbating the threats to coral reefs, particularly the various diseases ravaging these unique environments.



Photo: NOAA

These remarkable systems depend on a symbiotic relationship between a tiny animal and an even tinier alga. In this symbiotic relationship, the coral animal, which is related to the jellyfish, provides the algae with carbon dioxide, the essential building block of photosynthesis, important nutrients like nitrogen and phosphorus, as well as a protected place to live and reproduce. In turn, the photosynthetic action of the algae provides the coral with up to 90% of its energetic requirements, as well as oxygen, a by-product of photosynthesis. Unusually high water temperatures upset this delicate relationship, causing the algae to be expelled from the coral. If they do not return, the coral bleaches and dies. Warm water also allows a number of pathogens to attack. Several species of bacteria thrive in the warmer waters, causing outbreaks of black band, white band, white pox, and other descriptively named diseases. One, called purple blotch, has even been attributed to a fungus carried by dust storms originating in northern Africa, as a result of extended – and probably climate-induced – drought there.

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Help Defenders Safeguard Wildlife from the Effects of Climate Change

There are many ways that you can take action to protect wildlife and take care of our shared environment. Defenders' community of activists is a powerful advocate for the protection of wildlife and wild places. Take action and join the fight.

Defenders of Wildlife – Washington, D.C. Headquarters
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