



Saving the Glades

A wood stork silently wades shallow waters like a drum major in slow motion. Bill submerged, its great head sweeps the shallow, murky waters. Look closely: this dramatic wading bird is endangered. Its decline symbolizes what vast environmental threats stalk today's Everglades. Recent changing sea level exposed South Florida, whose bedrock is only 100,000 years old and overlain by sediments no older than 6,000 years. No park elevation tops eight feet above sea level. "River of Grass" was the name given this gently sloping landscape by conservationist Marjory Stoneman Douglas in the 1940s. In the park this river still flows slowly toward bay and gulf, but its grandeur is threatened. This is the first national park that was created to protect a threatened ecological system.

This subtropical region's only source of water is the rain that falls on it. But extensive canal and levee systems now shunt off much life-giving water before it reaches Everglades National Park. At times water control structures at the park boundary are closed,

and no water nourishes the wood stork's habitat. Or, alternately, water control structures are opened and the human-managed floodwaters inundate nests or eggs of Everglades creatures and disperse the seasonal concentrations of the wading birds' prey. Pollutants from agriculture and other human activities only add to these problems. Agricultural runoff alters natural vegetation patterns. High levels of mercury haunt all levels of the food web, from fish in marshes, through raccoons and alligators, to Florida panthers, a species so endangered that not even 10 persist in the park. A panther found dead here had mercury levels toxic to humans. Everglades alone of US national parks holds three world designations: International Biosphere Reserve, World Heritage Site, and Wetland of International Importance. But how much longer will "River of Grass" be an apt description?

After years of drainage and alterations, efforts to save the remaining Everglades and to restore a semblance of their original function are underway. In 1989 Congress extended the eastern



We Need Water!
National parks are not islands—outside events shape their fates. Water management is the key issue for the Everglades, whose watershed begins in the Kissimmee River basin in central Florida.

Summer storms flooding there once sent a shallow, wide river flowing southward to the Gulf of Mexico. Elaborate water controls now disrupt the natural flow, but without clean water at the critical seasons and in the right quantities, the Everglades will die.

Pa-hay-okee boardwalk provides sweeping views of the "River of Grass."

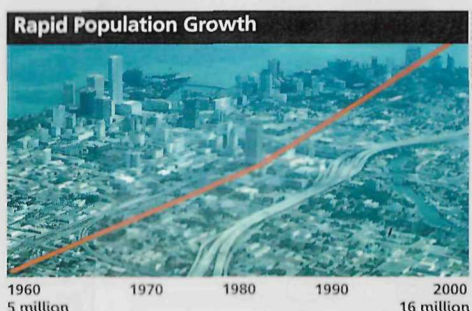
park boundary to protect the eastern Shark River Slough, which is historically important to sustain the park's biological abundance and diversity. Then, in the Comprehensive Everglades Restoration Plan, Congress authorized the world's largest environmental restoration project. Requiring 30 years to accomplish, the plan seeks to return water to more natural patterns of quantity, timing, and distribution throughout the South Florida ecosystem. Federal and state funds support this unprecedented effort. As waters return to the natural system, it will also be important to address serious water quality issues.

The park was created in 1947 to save part of the Glades, but its future depends on a healthier, more naturally functioning ecosystem in the entire region, where burgeoning human population thirsts for the same water that wood storks need to survive. We must create a balance among the competing demands of urban, industrial, and agricultural development, with a restored Everglades as its centerpiece. Nothing is yet saved for good; the Everglades' fate remains our mandate.

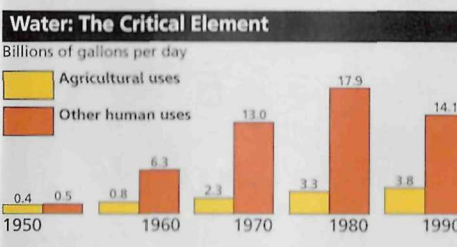
Threats to the Park

Regional Growth
South Florida development has made people and the Everglades ecosystem compete for a finite water supply. Each day, 800 people move to Florida; 39 million people vacation here some years; 12 million come in winter's dry season

when water supplies naturally drop. The historic Everglades—four-fifths lies outside the park—feels this population pressure. Only California, New York, and Texas today outstrip Florida in population.



Demand for Water
Florida's daily population increase of 800 residents creates new demands to supply 200,000 more gallons of fresh water every day. Added square miles of building and paving reduce rainwater penetration into aquifers, the water-bearing layers beneath.



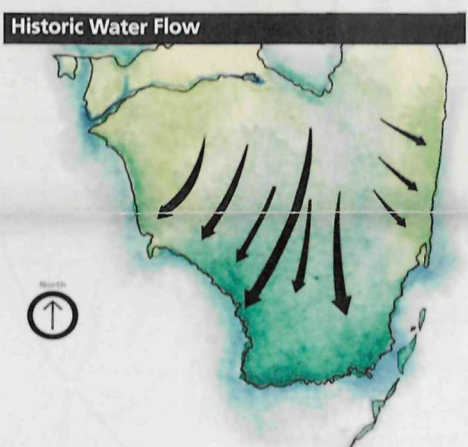
low ground that store water that wells may tap. Many residents of Florida's west coast drink desalinated water now. The freshwater supplies aren't enough—even for piping practical distances. Agriculture not only makes demands on the water supply but threatens it. One dairy cow will create as much raw waste every day as 20 city residents.

A variety of agricultural runoff pollutes water supplies with excesses of nitrogen, phosphorous, pesticides, herbicides, and fungicides. Depleted

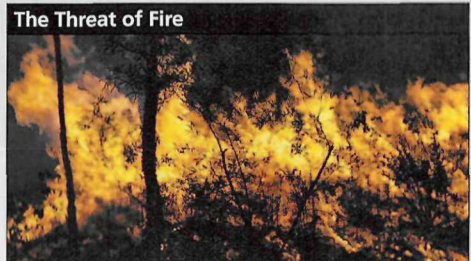
the fresh water in coastal areas can make salt water intrude into inland aquifers. A freshwater head from rain normally creates positive pressure keeping salt water out of coast aquifers. But as freshwater supplies go down, salt water can intrude,

with dire consequences both for water supplies and the soil's ability to grow plants. Humans cannot drink salt water, which can also destroy plumbing and a variety of appliances.

The Freshwater Cycle
South Florida fresh water comes from rain on the Kissimmee River basin and southward, mostly between May and October. Evaporation, transpiration, and runoff consume four-fifths of the 40 to 65 inches per year.



flow of the 50-mile-wide, shallow River of Grass. One- to three-feet deep in the slough's center, but six-inches deep elsewhere, it flowed south 100 feet per day across the Everglades savgrass toward the mangrove estuaries of the Gulf of Mexico. A six-month dry season then followed.



Fire's Historic Role
Everglades ecosystems evolved with natural fire and are adapted to its patterns. But fire may pose new threats—as water shortages make plants and soils newly vulnerable to fires that are more destructive than they used to be.

Impact on Plants and Animals

Problems with the quality, quantity, timing, and distribution of water ripple throughout the Everglades. Numbers of wading birds nesting in southern Everglades colonies declined 93 percent since the 1930s—from 265,000 to only 18,500. Endangered wood storks declined from 5,000 nesting birds in the 1960s to as few as 500 nesting birds in the 1980s. Also threatened are rich Florida Bay nurseries for the state's shellfish industry.

Wet and Dry Seasons
Many animals have adapted to alternating wet and dry seasons. When water supply manipulations are ill-timed with natural patterns, disaster can result. Alligators build nests at the high-water level. If more water is released into the park, their nests are flooded and eggs destroyed. Endangered

snail kites eat aquatic apple snails. Low-water levels, human-caused or natural, reduce snail and snail kite populations. In the early 1960s just 20 to 25 snail kites were left in North America, because of prolonged drought. The snails lay eggs above water in the wet season. If managers release more water, then snails fail to reproduce.

Invasive Species
Native trees, like mangrove and cypress, are being replaced by invasive (introduced) species from other countries. Florida largemouth bass share nesting beds with tilapia and oscar, African and South American fish. As the Everglades yields to human-introduced plants and fish, native species are diminished.



Water Management
Four water management factors are critical to the Everglades and its wildlife.

Quality Water runoff from farms brings excess nitrates and phosphates into the park. These reduce beneficial algae and promote unnatural growth of marsh vegetation.

Quantity and Timing
When too much water enters the park at the wrong season, alligator



nests are flooded, and wading birds can't find concentrated sources of food for feeding young.

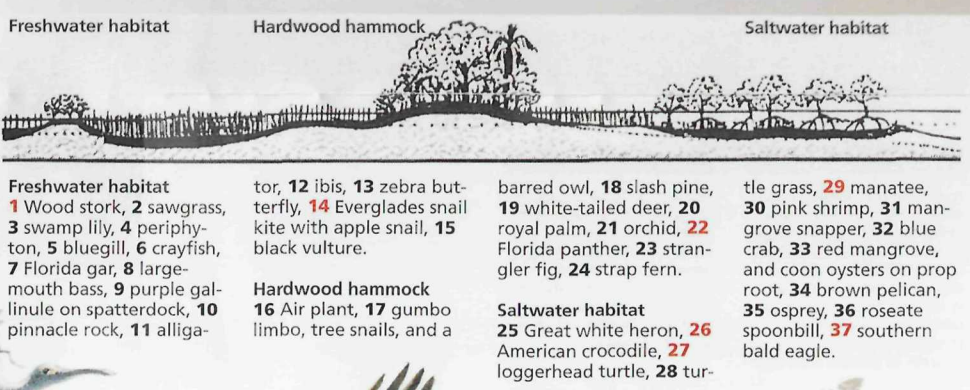
Distribution With too little water, much of the park can't produce small aquatic organisms that anchor the food web.

Water Quality
In park waters, excess nutrients from agricultural runoff destroy the mats of composite algae known as periphyton. The algae are primary producers in the Everglades food web and provide food and oxygen for small aquatic organisms. In the dry season mats of algae hold critical moisture that helps many small organisms, including some fish eggs and snails, survive the dry months until rains come again. Saltwater intrusion

also changes water quality. When the freshwater supply runs low, saline water penetrates the aquifer and upsets the ecological system.

Mercury pollution from unknown sources is also a growing problem.

Key to the Color Illustration: Small elevation changes define Everglades plant communities.



Freshwater habitat
1 Wood stork, 2 sawgrass, 3 swamp lily, 4 periphyton, 5 bluegill, 6 crayfish, 7 Florida gar, 8 largemouth bass, 9 purple gallinule on spatterdock, 10 pinelake rock, 11 alligator, 12 ibis, 13 zebra butterfly, 14 Everglades snail kite with apple snail, 15 black vulture.

Hardwood hammock
16 Air plant, 17 gumbo limbo, tree snails, and a barred owl, 18 slash pine, 19 white-tailed deer, 20 royal palm, 21 orchid, 22 Florida panther, 23 strangler fig, 24 strap fern.

Saltwater habitat
25 Great white heron, 26 American crocodile, 27 loggerhead turtle, 28 turtle grass, 29 manatee, 30 pink shrimp, 31 mangrove snapper, 32 blue crab, 33 red mangrove, and coon oysters on prop root, 34 brown pelican, 35 osprey, 36 roseate spoonbill, 37 southern bald eagle.

The Wood Stork as Indicator Species
Because of ecosystem changes, wood storks were listed as federal Endangered Species in 1984. How it feeds explains why. It feeds not by sight but by touch, tacto-location, in shallow, often muddy water full of plants. The fish can't be seen.

Walking slowly forward the stork sweeps its submerged bill from side to side. Touching its prey, mostly small fish, the bill snaps shut with

a 25-millisecond reflex action, the fastest reflex known for vertebrate species.

Only seasonally drying wetlands concentrate—mostly in drying ponds—enough fish to provide the 440 pounds that a wood stork pair requires in a breeding season.

When human water management upsets the natural wetlands cycles, wood storks fail to nest successfully.



Exploring the Everglades



Canoeists at sunrise, Florida Bay

© GLENN VAN NIMMESEN

Ranger-led hike near Pa-hay-o-kee

© CONNIE TOOPS

Anhinga

NPS © T. CAVLEY

Walking on the Pinelands Trail

NPS © CONNIE TOOPS

Wood stork (left) NPS © D. LEE

Tent camping at Flamingo

© CONNIE TOOPS

Make one of the park's four visitor centers your first stop here. The staff can answer questions about facilities and activities and help you plan how to best use your time. Informative publications about south Florida national parks are sold at visitor centers. An entrance fee is charged at the main park entrance and at Shark Valley on the Tamiami Trail.

The best way to see the park is to take time to walk the boardwalks and trails along the main park road and to join in ranger-led events. Naturalists give talks and lead hikes, canoe trips, tram tours, and campfire programs. Ask at a visitor center for schedules; events may change daily. At Everglades City the Gulf Coast Visitor Center is the park's western saltwater gateway. Narrated boat tours explore pristine Ten Thousand Islands and coastal mangrove. At Shark Valley the wildlife-viewing tram tour through sawgrass prairie includes a stop at a 65-foot tower for spectacular views. Birding and alligator viewing rank among the park's best here.

Activities and Facilities
Walking Trails Experience the diversity of Everglades environments by walking short, wheelchair-accessible trails from parking areas throughout the park. At Royal Palm the Anhinga Trail, a ½-mile loop trail, offers one of the best opportunities to view wildlife, including alligators and birds, up close. The Gumbo Limbo Trail, a ½-mile loop, winds through a jungle-like tropical hardwood hammock. Along the main park road the Pinelands Trail, a ½-mile loop, explores a subtropical pine forest maintained by fire. The pinelands are the most diverse land habitat in south Florida. At Pa-hay-o-kee Overlook a ¼-mile boardwalk leads to an observation tower with a panoramic view of the River of Grass. A ½-mile boardwalk at Mahogany Hammock crosses the Glades and loops through a subtropical tree island with massive mahogany trees. The West Lake Trail, a ½-mile boardwalk, loops deep into a forest of salt-tolerant, prop-rooted mangrove trees. At Flamingo's Eco Pond a short walk offers possible wildlife-viewing. At Shark Valley the Bob-

cat Boardwalk, a ¼-mile walk from the visitor center, loops through sawgrass prairie and a bayhead. At Otter Cave a one-mile round trip from the visitor center enters a subtropical hardwood hammock.

Check at the park visitor centers for more information about accessibility, longer hiking trails, biking, boating, fishing, canoeing, and the Wilderness Waterway.

Camping Long Pine Key and Flamingo campgrounds offer drinking water, picnic tables, grills, restrooms, dump-stations, and tent and trailer sites. Warmwater showers and electrical hookups are available at Flamingo; fees are charged in winter. Recreational vehicles are permitted. **Wilderness camping** permits are required for all back-country sites and are issued no more than 24 hours in advance; fees are charged seasonally.

Lodging Lodging is not available in the park now but can be found outside the park.

Regulations and Safety
Please help us protect the Everglades by practicing good outdoor manners. Put litter in trash receptacles; backcountry users must carry out all their litter. Observe safety and courtesy rules and enjoy your visit in a way that lets others enjoy theirs. Report fires, accidents, violations, or unusual incidents to a park ranger. **Plants and Animals** After years of protection many animals, like alligators, lose their natural fear of people. You can view them up close, but this does not mean they are tame. They are wild. **Do not disturb or feed wildlife.** Even friendly looking animals like raccoons can be dangerous. Watch for poisonous snakes: diamondback and pygmy rattlesnakes, water moccasins, and coral snakes. Large, non-poisonous, invasive Burmese pythons are very dangerous. **Do not damage, remove, or disturb plants.** Plants and animals are protected by law. Watch for poisonous plants: poison ivy, poisonwood, and manchineel. **Hiking Off Trails** Off-trail hiking or wading is permitted parkwide. Watch your footing; mucky soil, sharp-edged pinnacle

rock, and holes make walking tricky. Show someone your schedule and planned route before you leave. **Driving** Maximum driving speed is 55 miles per hour; reduced speeds are posted. Pull completely off roadways onto the wide shoulder to view wildlife. Drive slowly and alertly to avoid hitting animals crossing roads. **Fire, Pets, and Hunting** Be careful with fires and do not smoke on trails. Use self-contained cooking stoves at backcountry campsites. Pets must be physically restrained and are not allowed on trails, in amphitheaters, or at backcountry campsites. Hunting is prohibited; for firearms regulations see the park website. **Airboats, Swamp Buggies, and All-Terrain Vehicles** Use of these special vehicles is prohibited in most areas of the park. Check with a ranger. **Personal Watercraft** Operating personal watercraft—like wave runner, jet ski, sea-doo, or wet bikes—is prohibited in all park waters. **Cultural Resources** All cultural and historic artifacts in the park are protected by law.

More Information
Everglades National Park
40001 State Road 9336
Homestead, FL 33034-6733
305-242-7700
www.nps.gov/ever

For a publications catalog write to the nonprofit Florida National Parks and Monuments Association at the park address, call 305-247-1216, or order online at www.evergladesassociation.org.

Flamingo Marina and store, boat tours, and rentals are available. Flamingo Lodge and cabins are closed due to 2005 hurricane impacts. Contact Flamingo Marina, Flamingo, FL 33030; 239-695-3101.

Shark Valley tram tour information and reservations call: 305-221-8455.

Everglades City/Gulf Coast boat tour and rental information contact: Everglades National Park Boat Tours, PO Box 119, Everglades City, FL 34139; 239-695-2591.

Everglades is one of over 400 parks in the National Park System. To learn more about parks and the National Park Service programs in America's communities please visit www.nps.gov.

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Mapping Everglades Ecosystems

