



Pa-hay-okee boardwalk provides sweeping views of "River of Grass".
GERRIE F. CALL

Saving the Glades

A wood stork silently wades shallow waters like a drum major in slow motion. Bill submerged, its great dark head sweeps back and forth across shallow, murky waters. Look closely, because this dramatic wading bird is endangered. Its significant decline symbolizes the magnitude of environmental threats stalking today's Everglades. "River of Grass" was the description affixed to this gently sloping landscape in the 1940s by pioneering conservationist Marjory Stoneman Douglas. Within the park this river still flows slowly toward bay and gulf. Its grandeur is now severely threatened, however, and the death of the Everglades could occur. This is the first national park created to protect a threatened ecological system.

South Florida surfaced only since the Ice Age. The rock beneath this park is just 6,000 to 8,000 years old and in its infancy. Nowhere in the park does the landscape top eight feet above sea level. And this subtropical region enjoys no source of water but the rains that fall on it. The same rains that fall on south Florida today once ran off the backs of our wood stork's forebears, but the similarity ends there. Now, extensive canal and levee systems shunt off much of the life-giving bounty of the rain before it can

reach 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 human-managed floodwaters inundate Everglades creatures' nests or eggs and disperse seasonal concentrations of the wading birds' prey. Added to these problems is the presence of pollutants from agriculture and other human activities. Waters from agricultural runoff affect vegetation patterns unnaturally. High levels of mercury are present at all levels of the food chain, from the fish in the marsh, through raccoons and alligators, to the Florida panther, a species so endangered that fewer than 10 persist in the park. One panther found dead in the park contained mercury levels that would be toxic to humans. Everglades alone among U.S. national parks holds three international designations: International Biosphere Reserve, World Heritage Site, and Wetland of International Importance. But how much longer will "River of Grass" remain an apt description?

After years of drainage and alterations, efforts to save the remaining Everglades and restore some semblance of their original function are underway.



We Need Water!

National parks are not islands of land; outside events can shape their fates. Water management is the critical issue for the Everglades, whose watershed begins in central Florida's Kissimmee River basin. Summer storms flooding there once started a shallow, wide river flowing southward to the Gulf of Mexico. Elaborate water controls now disrupt the natural flow. Short of clean water at critical seasons, and in the correct quantities, the Everglades will die.

In 1989 Congress extended the park's eastern boundary to protect the eastern Shark River Slough, historically one of the most important areas sustaining the park's biological abundance and diversity. Since then, in the Comprehensive Everglades Restoration Plan, Congress has authorized the world's largest environmental restoration project. Requiring 30 years to accomplish, this plan seeks to return water to more natural patterns of quantity, timing, and distribution throughout the south Florida ecosystem. Federal and state funds will support this unprecedented effort. As waters return to the natural system, it will also be important to address serious water quality issues. Created in 1947, the park was established to save a portion of the Glades, but its future depends on a healthier and more naturally functioning ecosystem in the entire region, where a burgeoning human population thirsts for the same water that wood storks need to survive. We must construct a balance among competing demands of urban, industrial, and agricultural development, with a restored Everglades as a centerpiece. Nothing is yet saved for good; the Everglades' fate remains our mandate.

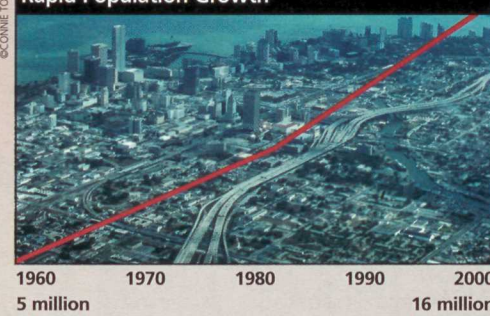
Threats to the Park

Regional Growth

Development of South Florida has made people and the Everglades ecosystem competitors for a finite water supply. Today, 900 people move to Florida daily; 39 million people vacation here some year; 12 million come in winter's dry

season as 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.

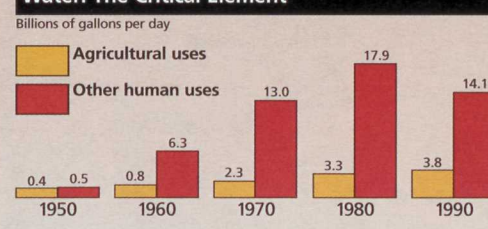
Rapid Population Growth



Demand for Water

Florida's daily population increase of 900 residents creates new demands to supply 200,000 more gallons of freshwater every day. Added square miles of building and paving reduce rainwater penetration into aquifers, the water-bearing layers

Water: The Critical Element



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. Excess nutrients 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 cannot find

Water Quality

In park waters the excess nutrients from agricultural runoff destroy mats of composite algae called periphyton. These algae are the primary producers in the Everglades food web and provide both food and

Canals Disrupt Historic Water Flow

below ground that store water that wells may tap. Residents of Florida's west coast increasingly resort to drinking desalinated water. Freshwater sources there no longer suffice—even for piping practical distances. Agriculture not only makes demands on water supplies but also threatens them. One dairy cow creates raw waste daily equivalent to that of 20 city residents. Varieties of agricultural runoff deplete water supplies with excess nitrogen, phosphorus, pesticides, herbicides, and fungicides. Depletion of fresh-

water supplies in coastal areas raises the specter of saltwater intrusions into inland aquifers. A freshwater head from rain normally creates a positive pressure that keeps saltwater out of coast aquifers. When freshwater supplies go way down, however,

saltwater can intrude, with dire consequences both for water supplies and the ability of soils to grow plants. Humans, of course, cannot drink saltwater, and it can destroy plumbing and appliances.

The Freshwater Cycle

South Florida's freshwater supply 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. Slow and rain-driven, the natural cycle of freshwater circulation historically built up in shallow Lake Okeechobee. (It averages 12 feet deep and covers 730 square miles.) Thus began the flow of the

Historic Water Flow

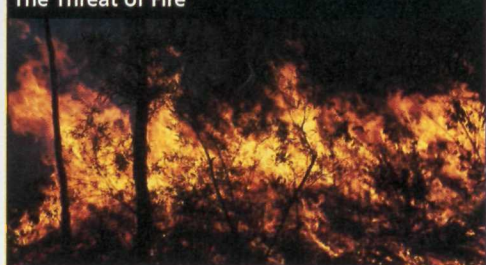


50-mile-wide, shallow River of Grass. One to three feet deep in the slough's center but six inches deep elsewhere, it flowed south 100 feet per day across Everglades sawgrass toward mangrove estuaries of the Gulf of Mexico. A six-month dry season followed. Everglades plants and animals are adapted to alternating wet and dry seasons. Water cycle disruptions ruin crucial feeding and nesting conditions.

Fire's Historic Role

Everglades ecosystems evolved with natural fire and are adapted to its patterns. However, fire may pose new threats as water shortages make plants and soils newly vulnerable to more destructive burning.

The Threat of Fire



Impact on Plants and Animals

Problems connected with the quality, quantity, timing, and distribution of water ripple throughout the Everglades. Numbers of wading birds nesting in colonies in the southern Everglades have declined 93 percent since the 1930s—from 265,000 to just 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 the rich Florida Bay nurseries for the state's shellfish industry.

Wet and Dry Seasons

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

Endangered snail kite birds feed on the aquatic apple snail. Low-water conditions, human-caused or natural, reduce snail and snail kite populations. In the early 1960s only 20 to 25 snail kites remained in North America because of prolonged drought. Snails lay eggs above water in the wet season. If managers release more water, snails fail to reproduce.

Exotics invade Native trees such as mangroves and cypress are being replaced by exotic (introduced) species from other countries. Florida largemouth bass share their nesting beds with tilapia and oscar, fish imported from Africa and South America. As the Everglades yields to plants and fish introduced by humans, native species diminish.

The Wood Stork as Indicator

As a result of ecosystem changes, the wood stork was placed on the federal Endangered Species list in 1984. Its feeding behavior explains its predicament. Wood storks feed not by sight but by touch—"tactolocation"—in shallow and often muddy water full of plants. Fish can't be seen in those conditions. Walking slowly forward the stork sweeps its submerged bill from side to side. Touching prey, mostly small fish, the

bill snaps shut with a 25-millisecond reflex action, the fastest known for vertebrates.

Only seasonally drying wetlands concentrate—mostly in drying ponds—rough fish to provide the 440 pounds a pair of these big birds requires in a breeding season. When natural wetlands cycles are upset by human water management, wood storks fail to nest successfully.



Key to Illustration



Freshwater habitat
1 Wood stork, 2 saw grass, 3 swamp lily, 4 periphyton, 5 bluegill, 6 crayfish, 7 Florida gar, 8 largemouth bass, 9 purple gallinule on spatterdock, 10 pinnae 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 barred owl, 18 slash pine, 19 white-tailed deer, 20 royal palm, 21 orchid, 22 Florida panther, 23 strangler fig, 24 strap fern.

Small elevation changes define Everglades plant communities. Pine and hammock ridges lie only three to seven feet above sea level. Maximum elevation in the Everglades is only eight feet.

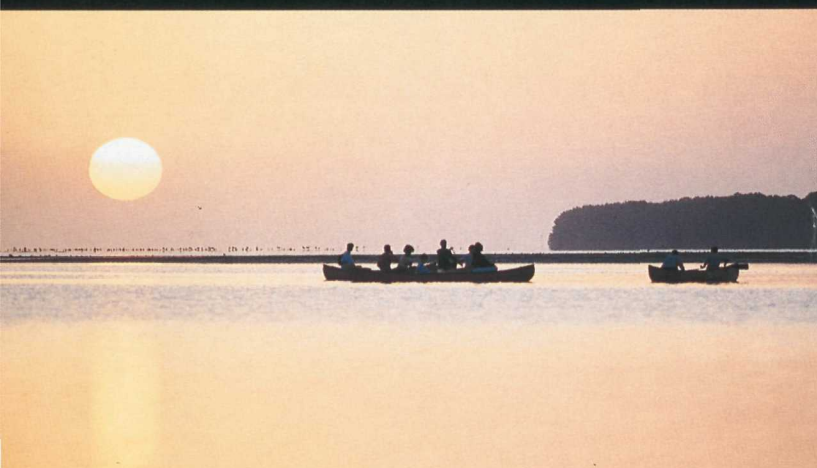
Saltwater habitat
25 Great white heron, 26 American crocodile, 27 loggerhead turtle, 28 turtle grass, 29 manatee, 30 pink shrimp, 31 mangrove snapper, 32 blue crab, 33 red mangrove with coon oysters on prop root, 34 brown pelican, 35 osprey, 36 roseate spoonbill, 37 southern bald eagle.

Migratory Bird Routes

Migratory birds use Everglades National Park both as critical wintering area and as a stopover. Species include the Cape May warbler, peregrine falcon, bobolinks, and tree swallows.

COLOR ILLUSTRATION: NICK ROBERT HYMES

Exploring the Everglades



Canoeists at sunrise, Florida Bay



Ranger-led hike near Pa-hay-okee



Anhinga



Walking on the Pinelands Trail



Wood stork (left) and ibis



Tent camping at Flamingo

©CONNIE TOOPS

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

The best way to visit 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 the 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. Birds 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 1/2-mile loop trail, offers one of the best opportunities to view wildlife, including alligators and birds, up close. The Gumbo Limbo Trail, a 1/2-mile loop, winds through a jungle-like tropical hardwood hammock reshaped by Hurricane Andrew in 1992. Along the main park road the Pinelands Trail, a 1/2-mile loop, explores a subtropical pine forest maintained by fire. The pinelands are the most diverse land habitat in south Florida. At Pa-hay-okee Overlook a 1/2-mile boardwalk leads to an observation tower offering a panoramic view of the "River of Grass." A 1/2-mile boardwalk at Mahogany Hammock crosses the glades and loops through a subtropical tree island with massive mahogany trees. The West Lake Trail, a 1/2-mile boardwalk, loops deep into a forest of salt-tolerant, prop-rooted mangrove trees. At Flamingo's Eco Pond a short walk leads to a wildlife-viewing platform. At Shark Valley the

Bobcat Boardwalk, a 1/4-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. Coldwater showers only are available at Flamingo; fees are charged in winter. Recreational vehicles are permitted, but there is no electrical, water, or sewage hookups. **Wilderness camping permits** are required for all backcountry sites and are issued no more than 24 hours in advance; fees are charged seasonally.

Lodging The only lodging in the park is at Flamingo; some facilities may be closed in summer. Additional lodging is available outside the park.

For More Information

Park information: Everglades National Park, 40001 State Road 9336, Homestead, FL 33034-6733; 305-242-7700; www.nps.gov/ever. Visit the National Park Service website at www.nps.gov.

For a publications catalog contact the nonprofit Florida National Parks and Monuments Association at the park address, call 305-247-1216, or order on the Internet: www.nps.gov/ever/fnpma.

Flamingo Lodge motel and cabins, marina and store, boat tours, and rentals, contact: Flamingo Lodge, Marina and Outpost Resort, Flamingo, FL 33030; 800-600-3813 or 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 Tour Concession, P.O. Box 120, Everglades City, FL 34139; 239-695-3311.

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, such as 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 such as raccoons can be dangerous. For your safety, watch for poisonous snakes: diamondback and pygmy rattlesnakes, water moccasins, and coral snakes. Remember: do not damage, remove, or disturb any 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 park-wide. Be care-

ful of your footing; mucky soil, sharp-edged pinnae rock, and holes can 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 or in amphitheaters. Hunting and the use or possession of firearms is prohibited. **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** The operation of personal watercraft, known by such terms as 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.

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Mapping Everglades Ecosystems

color key Marine and Estuarine (seagrass, hardbottom, corals) Coastal Marsh Mangrove Cypress Coastal Prairie Freshwater Slough Pineland Freshwater Marl Prairie Hardwood Hammock

