



Aningas are among the many species of birds viewed along the aptly named Anhinga Trail

NPS/S. Rubin

## 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 like a robot on an assembly line. Mixed metaphors of wild nature and human technology befit this endangered wading bird. Its dramatic decline in numbers symbolizes the magnitude of environmental threats stalking today's Everglades. "River of Grass" was the description affixed to this gently sloping, mostly level landscape in the 1940s by pioneering conservationist Marjory Stoneman Douglas. Within the park this river still flows slowly toward sea and gulf.

Its grandeur is now severely threatened, however, and the death of the Everglades could occur. The rock beneath this first national park created to protect a threatened ecological system is just 6,000 to 8,000 years old and in its infancy. South Florida surfaced only since the Ice Age. Nowhere do Everglades landscapes top 8 feet above sea level. And like some low island, this subtropical region enjoys no source of water but the rains that fall on it. Everglades alone among our hemisphere's national parks holds 3 international designations: International Biosphere Reserve, World Heritage Site, and Wetland of International Significance. But how much longer will "River of Grass" remain an apt description? 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 the life-giving bounty of the rain before it can reach the national park, which makes up only one-fifth of the historic Everglades. At times the 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 unnaturally pent-up, 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. Nutrient-enriched waters from agricultural runoff affect vegetation patterns. High levels of mercury are identified in all levels of the food chain, from the fish in the marsh through raccoons and alligators. The problem extends to the Florida panther, a species so endangered that its numbers may be less than 30 in the entire state. Fewer than ten persist in the park. A panther with mercury levels that would be toxic to humans was found dead in Everglades National Park.



### We Need Water!

National parks are not islands of land; outside events 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.

Solutions are underway, but the fate of the Everglades still hangs in the balance. In one of the world's largest ecosystem restoration projects, Congress has extended the park boundary to protect the eastern Shark River Slough. Historically it hosted higher concentrations of wading bird nesting populations than any other park location. The enlargement should help turn around the 93 percent decline these species have suffered by restoring critical, suitable habitat. The National Park Service and the State of Florida have agreed to be partners in enforcing existing water quality regulations to address water quality problems. The Park Service is working with the U.S. Army Corps of Engineers and other water management jurisdictions to adopt natural rainfall models of manipulating water supplies. Created in 1947, the park was established to save the 'Glades, but real problems continue to beset this landscape. Although much is being done, continuing pressures associated with urbanization, industry, and agriculture require a constant search for additional solutions. A burgeoning human population thirsts for the same water that wood storks need to survive. Nothing is yet saved for good; the Everglades' fate remains our mandate.

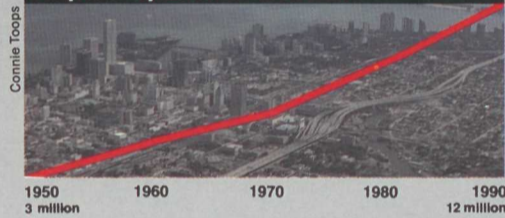
## Threats to the Park

### Regional Growth

Development of South Florida has made people and the Everglades ecosystem competitors for a finite water supply. Today, 300 people move to Florida daily, 39 million people vacation here some years; 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.

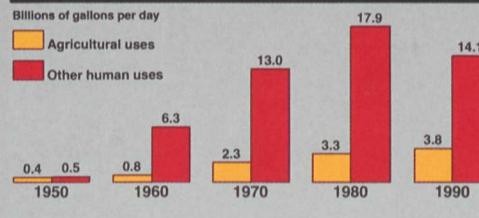
### Rapid Population Growth



### Demand for Water

Florida's daily population increase of 300 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



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 spoil water supplies with excess nitrogen, phosphorus, pesticides, herbicides, and fungicides. Depletion of fresh-

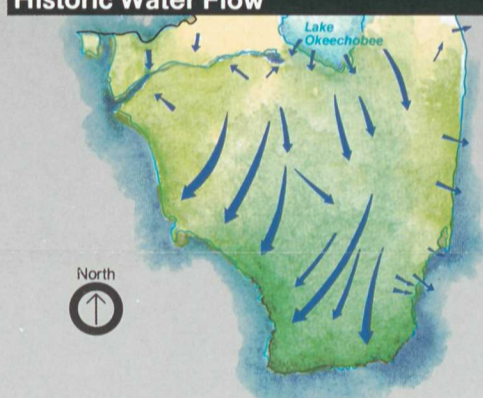
water supplies in coastal areas raises the specter of saltwater intrusions into inland aquifers. A freshwater head from rain normally creates a positive pressure that keeps saltwater out of coastal aquifers. When freshwater supplies go way down, however, saltwater can in-

trude, 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 May through October. Evaporation, transpiration, and runoff consumes 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 50-mile-wide,

### Historic Water Flow



shallow River of Grass. One to 3 feet deep in the slough's center but 6 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.

### The Threat of Fire



Glenn Van Nimwegen

### 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.

## 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 have declined from 6,000 nesting birds to just 500 since the 1960s. 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 kite nests 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 yield to human-introduced plants and fish, native species diminish.

### The Wood Stork As Indicator

Given present trends, wood storks may no longer nest in South Florida by the year 2000. Their feeding behavior explains their predicament. Wood storks feed not by sight but by touch—tactile location—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 enough 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. The wood stork—which stands over 3 feet tall, has a 5-foot wing spread, and weighs 4 to 7 pounds—was placed on the federal Endangered Species list in 1984.



### Key to Illustration



### Freshwater habitat

1 Woodstork, 2 saw grass, 3 swamp lily, 4 periwinkle, 5 bluegill, 6 crayfish, 7 Florida gar, 8 largemouth bass, 9 purple gallinule on spatterdock, 10 pinnacle rock, 11 alligator, 12 ibis, 13 zebra butterfly, 14 Everglades kite with apple snail, 15 black vulture.

### Hardwood hammock

16 Air plant, 17 gumbo limbo with 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.

### Saltwater habitat

Small elevation changes define Everglades plant communities. Pine and hammock ridges lie only 3 to 7 feet above sea level. Maximum elevation in the Everglades is only 8 feet.

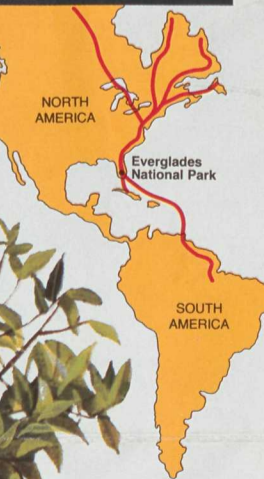
### Saltwater habitat

25 Great white heron, 26 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.

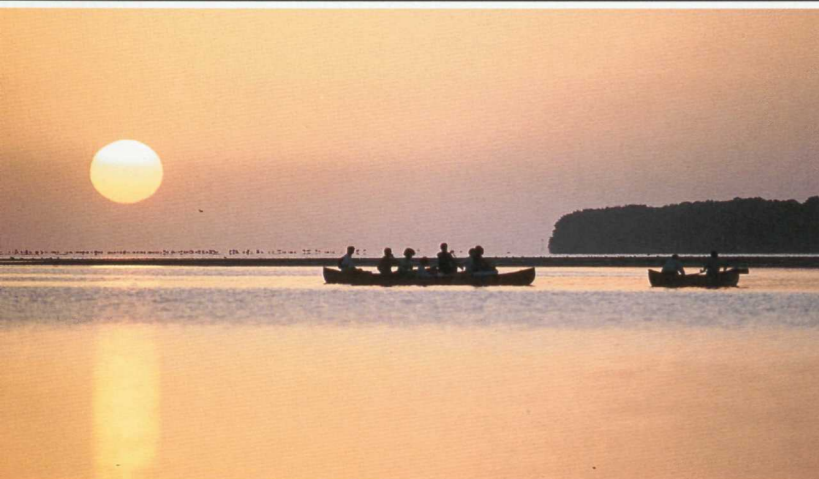
Color illustration by Robert Hyman

### 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.



# 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

Corrie Toops

Make your first stop in the park at one of its five 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, Shark Valley on the Tamiami Trail, and Chetkika.

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 several 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 1/4-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 beautiful 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 bay-head. At **Otter Cave** a one-mile round trip from the visitor center enters a subtropical hardwood hammock. **Check at park visitor centers** for information about longer hiking trails, biking, boating, fishing, canoeing, and the Wilderness Waterway.

**Camping** Long Pine Key, Flamingo, and Chetkika campgrounds offer drinking water, picnic tables, grills, restrooms, 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. **Backcountry 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

About the park contact: **Everglades National Park, 40001 State Road 9336, Homestead, FL 33034-6733; 305-242-7700; or [www.nps.gov/ever](http://www.nps.gov/ever)** on the internet. For a publications catalog, write or call the nonprofit **Florida National Parks and Monuments Association at the park address or call 305-247-1216**. For information about Flamingo Lodge motel and cabins, marina and store, boat tours, and rentals, write or call: **Flamingo Lodge, Marina and Outpost Resort, Flamingo, FL 33030; 800-600-3813 or 941-695-3101**. For tram tour information and reservations at Shark Valley, call **Shark Valley Tram Tours at 305-221-8455**. For boat tour and rental information at Everglades City/Gulf Coast, write or call: **Everglades National Park Boat Tours, P.O. Box 119, Everglades City, FL 33929; 800-445-7724 in Florida, or 813-695-2591**.

Accessibility information is available at visitor centers.

## 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 careful of your footing; mucky soil, sharp-edged pinnacle 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

