

Everglades

National Park Service
U.S. Department of the Interior

Everglades National Park
Florida



Royal Palm Day Program Teacher's Guide



“There are no other Everglades in the world. They are, they have always been, one of the unique regions of the earth, remote, never wholly known.”

~ Marjory Stoneman Douglas



Table of Contents

1

Everglades Environmental Education	2
Royal Palm Day Program	3
Day Trip Schedule	4
Teacher Responsibilities	5
Pre-Visit Preparations	6
Chaperone Guidelines	8
Classroom Activities	10
Evaluations	12
Safety, Rules, Emergencies	13
Creepy Crawlies	14
Habitats	
Freshwater Slough	16
Sawgrass Prairie	18
Pine Rocklands	20
Hardwood Hammock	22
Resources	24

Acknowledgements



This guide is dedicated to those teachers who share their sense of wonder with their students.

Text: Original writing by Judy Visty.
Revisions by Camilla Sulak, Allyson Gantt, and Everglades Education staff.

Layout: Andrew Pringle and Nick Fuechsel

Photos by: Rodney Cammauf and NPS employees

Graphics by: Nate Shaw

Education Coordinator: Allyson Gantt

The production of this guide was made possible through the generous support of Toyota and the South Florida National Parks Trust.

Printed on recycled paper, October 2012.



2

Everglades Environmental Education

Everglades National Park

Everglades National Park (NP) was established in 1947 to protect the natural habitats of the Everglades Ecosystem. Everglades became the first national park to be created not for the grandeur of its landscape, but for the richness of its biodiversity. This globally significant 1.5 million acre national park is also designated as a World Heritage Site, an International Biosphere Reserve, and a Wetland of International Significance. Today, South Florida is home to one of the world's largest ecosystem restoration efforts, which seeks to maintain the region's abundance of life with properly managed water flow through the ecosystem's watershed.

Environmental Education

In 1971, Everglades NP began offering educational programs in partnership with local school districts. From humble beginnings grew one of the largest environmental education programs in the National Park Service. With four core programs and additional curriculum resources, Everglades NP hosts over 11,000 students annually.

Everglades Education Program

Day Programs

Shark Valley for 4th grade

Royal Palm for 5th-6th grades

Camping Programs

Hidden Lake for 5th-6th grades

Loop Road for 5th-6th grades

For information about our programs, guest speakers, in-school teacher workshops, curriculum resources, and loan materials, visit our website:

www.nps.gov/ever/forteachers



These curriculum-based programs are offered in close partnership with local classroom educators and are aligned with the Next Generation Sunshine State Standards.

Educators attend a workshop, organize a field trip, teach their students about the Everglades, co-lead an adventure in the park, and then follow up with reflective classroom activities. The support of these teachers allows the program to have a much greater impact than park staff alone could impart.

Program Goals

Park staff, teachers, and school administrators share responsibility for the Everglades Education Program. These partners have agreed upon the following goals:

- Acquaint the students of South Florida with the habitats of Everglades National Park including the hardwood hammock, the freshwater slough, the sawgrass prairie, and the pine rocklands.
- Develop in students an appreciation for their total environment, both natural and human made.
- Develop in students an understanding of Everglades National Park's value to the web of life in South Florida;
- Motivate students to actively participate in solving South Florida's environmental problems.

Royal Palm Day Program 3

Although these goals may not be achieved in their entirety during a single trip, classroom lessons can make even one park visit a significant step toward educating students as caretakers of South Florida's natural resources.

This guide will help you prepare for a field trip to the Royal Palm and Long Pine Key areas of the park. Use it as a reminder for material covered during the teacher workshop, a review of the habitats, and a reference for classroom activities and additional resources.

Thank you for your willingness to become a trip leader! We hope visiting your national parks will be a lifetime adventure.

Royal Palm Day Program

The general plan of the field trip remains the same from year to year. However, circumstances such as high water, mosquito levels, warm or cold weather, and the program emphasis of each individual ranger, result in some variability. The rangers will communicate the expectations and schedule for the day's events to the teacher. (Please see page 4 for a typical field trip schedule.)

Approximately one month before your visit, the education staff will contact



the lead teacher to confirm the details of your visit. Please be sure to inform him/her of any changes in teachers or group size.

Two park rangers will be waiting for a bus with up to 59 students. (If you are bringing 36 or fewer students, only one ranger will meet you.) When you arrive, rangers will board the bus, introduce students to the National Park Service and its mission, and briefly review the day's schedule and set program expectations. During a portion of this introduction, all teachers and chaperones will meet with one ranger to review the role of adults on the trip, distribute the teacher backpacks, and review any safety or logistical concerns for the day.

Once introductions are completed, students will disembark the bus and line up in their two classes (or groups.) At this point each ranger will pair up with one teacher and group of students. Lunches, backpacks, and other items should remain on the bus. Students are permitted to carry a water bottle on the trail.

After a quick restroom break, each class will assemble separately on the lawn with their teacher, chaperones, and assigned ranger. The ranger will lead an activity to introduce the theme of the program and explain the schedule for the day. Before heading out on the trail, the ranger will ask the teacher to divide the class into two groups. Each group should have about 15 students and at least one chaperone. The ranger will lead one of the groups on the Anhinga Trail, while the teacher leads the other group. The ranger will coordinate the time that everyone must return to the bus. In order to provide adequate time on the trails and for lunch, we are unable to stop at the gift shop or vending machines.

After all students return, the bus will follow the ranger vehicle to the picnic area at Long Pine Key. After a short lunch, each ranger will lead their class on the trail. Please follow the ranger's schedule to ensure that the bus leaves the park on time. Restrooms are available during lunch at the Long Pine Key picnic area.



Schaus Swallowtail

4 Day Trip Schedule

Schedule

The following schedule represents a typical trip. However, please keep in mind that changes in weather, wildlife, and/or transportation may require schedule adjustments. Flexibility is essential to having an enjoyable visit to the park.



8:30 am - 10:00 am Travel to the Park

Point out sights along the way that relate to the park story such as canals, isolated stands of pine trees, agricultural fields, and new housing developments. You may also want to review vocabulary words or ecological concepts. Or assign a scavenger hunt or other simple but instructive assignment for seatmates to complete during the trip.

10:00 am - 10:15 am Meet Park Rangers at Royal Palm

After a brief welcome to Everglades National Park, one ranger remains on the bus and talks to the students about expected behavior. The other ranger meets with the teachers and chaperones just outside the bus to review the plan for the day.

10:15 am - 11:30 am Anhinga Trail Activities

After leaving the bus, the students take a quick restroom break and each class joins their ranger. Each ranger leads an introductory activity for their class, and then the class splits into two groups. The groups, one led by the ranger

and the other by the workshop-certified teacher, will walk the trail observing wildlife and viewing the freshwater slough and sawgrass prairie habitats.

11:30 am - 11:45 am Travel to Long Pine Key

Rangers and teachers meet back at the bus and load the students to travel to Long Pine Key for lunch.

11:45 am - 12:15 pm Lunch

Each class eats lunch together, sitting on the grass with their ranger. The students, teachers, and chaperones are responsible for leaving the area clean.

12:15 pm - 1:25 pm Long Pine Key Activities

Each ranger leads their class through two higher elevation habitats: the pine rocklands and the hardwood hammock.

1:30 pm Bus Leaves the Park

(12:30 pm if school has early dismissal)



Ranger for a Day

Teachers participating in the Royal Palm day program should plan on leading a group (usually 12-18 students) on the trails. The ranger will lead the other half of the class and will coordinate the activities of both groups. Mandatory workshops prepare teachers for the adventure.

As themes and plans vary somewhat from field trip to field trip, rangers will begin by engaging the entire class in an activity to set the focus for the day.

Teacher Backpack

Each teacher is given a backpack at the start of the field trip. The backpack contains trail maps; bird, plant, and fish identification cards; an apple snail; a tree snail; limestone; a water bottle and sponge for a water quality and water conservation activity; measuring tape for demonstrating alligator and bird wing span measurements; and a small first-aid kit.



Planning Checklist

As you prepare for your day trip, please consider the following:

Your School's Field-Trip Policies

Teachers are responsible for making sure that all school system regulations regarding parental permission slips, travel authorizations/insurance, etc. are followed.

Chaperones

One adult (chaperone or teacher) per ten students (a 1:10 ratio) is required by Everglades National Park. Chaper-

one guidelines, in English and Spanish, are included on page 9 of this guide for teachers to copy, distribute, and review with them.

Nametags

For safety and courtesy, the rangers prefer to address students and adults by name. Even a single piece of masking tape with a participant's first name written on it in big letters works well. If you choose to make name tags as a pre-site activity, be sure they are legible and do not fall off easily.

Learning Groups

Before arriving at the park, divide each class into two groups of 12-18 students each. One group will visit the Anhinga Trail with the ranger and the other group with the lead teacher. Assign at least one chaperone to each group. (For example a class with 28 students would be divided into two groups of 14 students each.)



6

Pre-Visit Preparations

Lunch

School lunches or bag lunches with disposable items are best. Before leaving school, please label and organize the lunches by class to save time. Having lunches marked and organized for easy distribution will decrease the time spent passing them out and increase the time on the trail. The lunches must be able to fit into an area under the last bus seat. This space is about the same size as a box that holds copy machine paper.

One cooler per class is permitted for cold drinks. Remember, you will be out in the heat for 3-4 hours; if the school packs the lunches, we suggest you include water, juice, or cold drinks other than milk. If students pack their own lunches, remind them to bring an additional drink for lunch.

As a reminder, no one from the trip is allowed to use the vending machines at Royal Palm. Food and drinks to purchase are not available at the picnic site. Students and chaperones are responsible for leaving the picnic area clean.

What to Wear

Long pants, socks, and closed-toed shoes are required for both students and adults. Shoes should be comfortable for walking. No shorts, dresses, cropped pants, sandals, flip-flops, or open-toed shoes are allowed. Warm weather can make shorts and sandals tempting, but they are not permitted for safety reasons; long pants and proper footwear protect participants from biting insects and poisonous plants.

Inclement Weather

If rain or cold weather is in the forecast, please communicate with parents that



students should come properly dressed to be outside all day. Layers work best and can always be left on the bus if they are not needed.

Items To Leave Behind

Students are not permitted to bring cell phones, cameras, binoculars, electronics, video games, or money. These items distract the students and prevent them from fully experiencing the Everglades with their own senses. If you would like pictures of your field trip, please designate one chaperone

as the class photographer. Picture taking should not interfere with the learning experience or the schedule. Since the busy schedule of the day program does not allow time to visit the gift shop, money is not needed.

Insect repellent

Insect repellent is usually only needed during the fall months. One or two bottles per class should be sufficient. If mosquitoes are a problem, the rangers will adjust the schedule to spend less time in the hammock habitat.

Pre-Visit Preparations

Before your visit, be sure to discuss the rules, found on page 13, with your students.

When hands-on learning in the park reinforces concepts covered in the classroom, students have a more powerful learning experience. See pages 10-11 for suggestions on preparing your students for their visit.

Required Workshop

In order to connect the field trip experience to learning objectives, the Everglades Education Program employs team teaching. Teachers are expected to incorporate the field trip with pre- and post-site lessons in the classroom. During the field trip, teachers lead part of their class on the trail. To help teachers prepare for their park visit, park staff conduct mandatory one-day workshops onsite at the field trip location. At the workshop, teachers will:

- Learn about the program's logistics, schedule, and park rules.
- Acquire a familiarity with the habitats, wildlife, and trails that their students will experience on the field trip.
- Gather ideas for leading their students on the trail.
- Participate in curriculum-based activities that can be used for pre-site classroom preparation.

One teacher per class must attend the workshop before bringing students on the field trip. Typically two classes attend together, so two workshop-certified teachers are needed for the program. Other teachers or adults participating as leaders in the program are also welcome to attend. Day program



teacher workshops are six hours and are usually held on teacher workdays twice a year in October or November and January. Professional development credit hours may be available for participating.

Teachers who attend a workshop will be certified to bring students during the current year and the following school year. As long as you participate in programming at least once every two years, you will not need to attend another workshop. If you miss two years in a row, you will need to attend a workshop for a refresher on logistics, activities, and any new information.

Please note that each Everglades Environmental Education Program (Royal Palm, Shark Valley) requires a different workshop. Workshop enrollment is arranged when submitting a trip reservation form or by contacting the Everglades Education Office.

Program Registration and Scheduling

Information about our programs and online registration can be found on our website at www.nps.gov/ever/forteachers. Field trip registration typically begins in late August just before students return to school. Check the website during the summer for the exact date and time. Trip reservations

8

Pre-Visit Preparations

are filled on a first-come, first-served basis, and are finalized in early October. Program reservations fill up quickly, so we recommend that teachers visit the website prior to registration to learn what information they will need.

After submitting a program request, park education staff will contact the lead teacher to establish a date for the trip. Although we make every attempt to grant the requested date, being flexible increases the likelihood of securing a field trip. A waiting list is maintained in case of cancellations.

Day programs are offered Monday through Friday from late October through April, with the exception of federal holidays. For groups that have an alternative schedule for standardized testing, consider scheduling a trip during the FCAT testing period. Confirmation letters with program details must be signed by participating teachers and the school administrator and returned promptly. Please be sure to inform our office of any cancellations or changes in teachers or group size.

Transportation

Each school must arrange and pay for its own transportation to and from the park. Most schools use district-approved bus transportation. Some schools choose to transport children in private vehicles. Whichever method you choose, it must meet all school district safety regulations and care should be taken in safely packing and stowing lunches.

The South Florida National Parks Trust has been raising funds to help schools offset their costs for transportation to the park. Some bus funding may be available to schools in need and can be requested when registering for a program date. For those schools



receiving assistance, the park will notify the contracted bus company of the reserved dates. The maximum number of people allowed on a bus is 65 (59 students and 6 adults). Field trip participants, including adults, may not follow buses in private vehicles.

In order to cover afterschool routes, buses typically must leave the park no later than 1:30 pm (or 12:30 pm on Wednesday). To maximize your time in the park, plan to depart from school as early as possible in the morning.

Chaperones

Chaperones are an integral part of the field trip experience. They provide support to the park ranger and teachers as well as guidance for the students. Please encourage chaperones to assist in maintaining discipline and to be on the lookout for potential safety hazards. Like students, adults must wear long pants and closed-toed shoes.

We ask that adults refrain from using cell phones or vending machines and from smoking in front of the students. Chaperones should be reminded to be active participants in all program activities. When the adults are actively engaged and modeling attentive behavior, the students will follow. We encourage teachers to print copies of the chaperone guidelines, provided in English and Spanish, and review them with chaperones before arrival.

Chaperones may be parents, school staff, or other responsible adults. Chaperones are chosen by the lead teacher with a minimum of one adult for every ten students (1:10 ratio) and with a maximum of eight adults total. Too many adults can be a distraction during the visit, but a minimum is required to maintain a safe learning environment. Having a chaperone stand-by list ready in case of last minute cancellations is always recommended.



Chaperone Guidelines

Thank you for volunteering to chaperone Everglades National Park's Education program. You are an important partner in our program. We need your participation and cooperation for a successful trip to the Everglades.

Be an active participant.

Joining in on the activities allows you to interact with and set a good example for the students.

Students will need your guidance when preparing meals and cleaning up.

By jumping in to help and providing encouraging words, you will be teaching students how to be better helpers.

Students look to adults to set boundaries and provide leadership.

Chaperones are expected to comply with the same rules as the students. You will also be asked to help enforce rules. This includes wearing long pants, socks, and shoes at all times, respecting plants and animals (no harassing or removing), and showing respect for others.

Assisting with safety is one of the primary chaperone duties.

By watching over your group, you will help to ensure that everyone has a safe outing.

Guide the learning process.

Please help keep the group's attention focused on what the ranger or teacher is saying, and encourage the students to answer the questions.

Most importantly, go with the flow, adapt, and have fun in the Everglades! The students pick up on how you react—if you are having fun, they will too.

Guía para los Acompañantes

Gracias por ofrecerse como acompañante voluntario para el programa educativo del Parque Nacional de los Everglades. Usted es una parte muy importante de nuestro programa. Necesitamos su ayuda y cooperación para que la excursión a los Everglades sea todo un éxito.

Sea un participante activo.

El tomar parte en las actividades le permite tener contacto con los estudiantes y darles un buen ejemplo.

Los estudiantes necesitarán su ayuda para preparar las comidas y para la limpieza del campamento.

Al ofrecerse para ayudar y darles palabras de aliento, usted estará enseñando a los estudiantes como ayudar mejor a los demás.

Los estudiantes esperan que los adultos impongan límites y pautas a seguir.

Se espera que los acompañantes cumplan las mismas reglas que se les exige a los estudiantes. En ocasiones se necesitará su ayuda para hacer que estas reglas se cumplan que incluye el uso en todo momento de pantalones largos, medias, y zapatos, respetar las plantas y los animales (no se permite molestar ni sacar plantas o animales del parque), y respetar a las demás personas.

Ayudar con el cumplimiento de las reglas de seguridad es uno de los deberes principales de los acompañantes.

Al cuidar de su grupo, usted hará su parte para que todos tengan un paseo seguro y sin peligros.

Guíe el proceso de aprendizaje.

Por favor, ayude a mantener la atención del grupo concentrada en lo que el guardaparque o el maestro enseña y aliente a los estudiantes a contestar las preguntas.

¡Lo más importante es adaptarse, ir con la corriente, y divertirse en los Everglades! Los estudiantes se fijan en como usted reacciona. Si usted se divierte, ellos también lo harán.

10 Classroom Activities

Before Your Visit

This section provides suggestions on classroom activities and techniques to get you started in planning lessons to integrate the Everglades into your overall educational goals. Of course, we encourage you to use your imagination in building your lesson plans.

Pre-Site Activities

Pre-site preparation conducted by classroom educators prior to field trips is a crucial part of the program. If students learn about the Everglades before the trip, they will have the opportunity to make tangible connections with what they previously learned. Additionally, the ranger will be able to build on their prior knowledge instead of covering the basics.

Post-Site Activities

Follow-up classroom activities that allow for reflection on the experience are a great way to wrap up programming. We encourage teachers to conduct activities that allow students to share their experience and express their new awareness with others. Artwork, displays, reports, and essays are all great ways to keep students think-



ing and learning about their backyard national park.

Classroom Activities

The Everglades homepage www.nps.gov/ever, makes a great starting point for information about all aspects of the park. To assist you with classroom-based lessons, Everglades National Park has several curriculum guides with activities developed and tested by educators for more than twenty years. These activity guides are available on the park's website at www.nps.gov/everforteachers/curriculummaterials.

Predict, Observe, Explain

This strategy can be used in the classroom to predict what wildlife you will see on your field trip and in which habitats certain animals will be found. Record your predictions on the board or in notebooks. Observations can be made during the trip, and then discussed and compared to predictions afterwards. Were the original predictions accurate? What predictions can you make about wildlife activity at different times of the day and year? How about the future? Will habitats and wildlife populations change over time? What other evidence could you use to make more accurate predictions?

Plant and Wildlife Identification

Classification and identification are fundamental ecology skills. A variety of excellent materials are available online, from the Everglades Association, and through your school media center. Bird, plant, and fish identification cards will be available at the park in your teacher backpack. Pre-site classroom practice in describing a bird's beak, a leaf's shape, or the shape and color of a fish will prepare your students to amaze themselves in the field.

Creative Writing

Students who write reports on specific plants and animals before their field trip look forward to observing their research topic in real life.

Literature, History and Storytelling

Biographies of Marjorie Stoneman Douglas, Rachel Carson, John Muir and other conservation figures are available for students. Other books such as *The Lorax* by Dr. Seuss have themes that relate directly to parks and wildlife. The rich body of Native American literature and storytelling, found for



example in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac, provides imaginative multi-cultural material. Connecting the field trip visit to the experience early explorers may have had when they visited the same landscape makes an excellent tie-in to Florida's history and settlement. Fictional stories such as *The Missing Gator of Gumbo Limbo* by Jean Craighead George can also bring the Everglades to life. See page 24 of this guide for a list of media and web resources.



Barred Owl

Reflective Thinking

Research shows that students must be given an opportunity to assimilate what they have learned in order to move that information to long-term memory. In the interest of merging FCAT strategies with Everglades curriculum, many teachers use writing assignments as a post-site reflective exercise. Writing letters to friends, family, or community leaders is an activity that reinforces the concept that national parks belong to all citizens. Art projects or writing poetry (examples from *Sawgrass Poems* by Frank Asch) allow

students to express the powerful experience they have when they visit the park. Letters or artwork from students to the ranger also enable us to assess the effectiveness of our programs.

Role Playing

Role playing activities can be especially powerful for all learners. Several role playing scripts may be found in our online curriculum materials, but creating your own with your class takes learning to another level.

nature can serve both as a basis for social science as well as science lessons. Having students gather articles about Everglades restoration and other related current events connects their community to the park.

Online Resources

National Parks offer a variety of materials for teachers and students. Virtual visits, electronic field trips, and Web-Rangers provide technology-based experiences. Visit www.nps.gov and www.webrangers.us.

Photos and Videos

Photos and videos are available through the "Photos & Multimedia" section of the park's website at www.nps.gov/ever. The "For Teachers/Materials for Loan" section of the park website offers a Media Library for teachers to borrow and use in their classrooms. The Everglades Association also has a variety of videos for sale in visitor centers or online at www.evergladesassociation.org.

Everglades in the Media

National Parks and nature are common in advertising, a testimony to the sometimes subconscious value we place on natural areas. Collecting advertisements featuring animals and



12 *Evaluations*

Evaluations

In an effort to continually improve our programming, both the ranger and the teacher exchange evaluations after the day program. The following points are listed on the evaluations, but there is also space provided for general comments. Specific suggestions and honest comments, both on what worked and what did not, are welcome. If at any time you would like to discuss a concern about the field trip program with a supervisor, please contact the Everglades Education Office at (305) 242-7753.

Teacher's Evaluation of the Ranger

- The rangers showed concern for the safety of the participants.
- The rangers behaved and responded appropriately to students.
- The ranger-led program was easily understood, engaging, and age-appropriate.
- The rangers communicated appropriately with teachers and chaperones.
- The rangers facilitated a positive learning experience.
- The rangers were well prepared.
- The program met my teaching objectives.
- The bus was on time.
- The registration process was user-friendly.
- The trip confirmation email arrived in a timely manner.

Ranger's Evaluation of the Teacher

- Pre-site class preparation on the Everglades Ecosystem was evident.
- Class behavior and responsiveness to ranger staff was appropriate.
- Most of the group wore name-tags, were properly dressed, and did not bring prohibited items such as cameras, binoculars, phones, etc.
- There was a chaperone for every 10 students.
- Lunches were organized for easy distribution.
- Students and teachers took charge of clean up after lunch.
- There was compliance with the bus regulation of a maximum of 65 passengers.



Sawgrass in Bloom



Safety, Rules, and Emergencies

Safety

Our program has a number of rules and protocols to ensure that everyone has a safe visit and that the park and its inhabitants are protected. Providing a framework of rules during a pre-visit discussion will make enforcement during the field trip much easier. Please share the following with your students before you leave school.

Protect Our National Park

Remind your students and chaperones that in a national park, collecting or damaging any plants or animals is prohibited.

Respect...

- ...the wildlife. Feeding or harassing animals in the park is illegal. Remember that these are wild animals. Maintaining a safe distance of at least 10 to 15 feet between people and animals is recommended. In addition to protecting ourselves, this also protects the wild nature of the animals.
- ...the plants. Picking flowers or breaking off leaves damages the plants. Collecting pine cones,



Ghost Orchid

feathers, rocks, or other natural objects is not allowed in Everglades NP or any national park.

- ...the right of others to enjoy Everglades National Park. Loud noises and disruptive behavior may disturb wildlife or other visitors.
- ...each other. When the ranger or teacher is talking or a student is answering a question, everyone should listen.
- ...the adults. Remind students to always stay with their group. Each

group should be led by a teacher or ranger, with an adult chaperone at the end.

Leave No Trace

Except for one water bottle each, we ask students to leave all belongings on the bus. This helps keep our trails clean. Likewise, after lunch, your group is responsible for picking up all pieces of trash and crumbs. Food, sugary drinks, and gum are prohibited on the trails.



Emergencies

Park rangers carry radios and can request emergency medical assistance. If a student in your group is injured or falls ill, notify a ranger immediately. For minor injuries, you or the ranger may use the first-aid kit from the teacher backpack. If a child is not feeling well, assign an adult chaperone to stay with him or her. Instead of calling 9-1-1 for an emergency in the park, dial 305-242-7740 for our 24-hour Park Communication Center.

14 *Creepy Crawlies*

'Gators and Spiders and Ants... Oh My!

It is common for even experienced outdoor people to arrive at the Everglades expecting swarms of nasty animals and aggressively poisonous plants. The reality is a lot less glamorous. Yes, Everglades has alligators, crocodiles, four species of venomous snakes, an abundance of spiders, and plants that can cause an unpleasant skin rash. Nevertheless, more than a million people visit the park each year and experience no ill effects. Students often thrive on a hint of danger. Understanding the creatures and plants that present a hazard to humans will help you build upon students' natural curiosity.

Alligators

Since it is illegal to feed alligators in Everglades National Park, they do not associate humans with food. In less frequented areas, they often retain the natural caution of wild animals, moving away as humans approach. In high visitor use areas such as the Anhinga Trail, alligators become accustomed to the presence of people. Do not, however, make the mistake of viewing these animals as tame. The distance

between an alligator and an observer should never be less than twice the alligator's total length. Alligators are strong and agile animals. Always treat them with respect.

Crocodiles

Rare and shy, crocodiles prefer brackish water areas. You will not see crocodiles along the Anhinga Trail because it is a freshwater habitat. Crocodiles do frequent Flamingo as well as the remote area 15 to 18 miles downstream from Royal Palm, where Taylor Slough flows into Florida Bay.

Fire Ants

These ants thrive in disturbed areas, building large sandy mounds that dot lawns and trail edges. Field trip participants need to watch their feet, as stepping on an ant mound will bring forth a parade of angry ants with a painful bite. Fire ants are one of the many invasive, non-native species in South Florida. Non-native means they were imported from somewhere else and invasive means they are spreading rapidly. Invasive species - whether insect, plant, animal or fish - often lack

the natural biological controls that keep them in check in their native environment. Several invasive species, including Brazilian pepper (a large shrub), Burmese pythons, and African jewelfish are dramatically altering the ecology of some parts of the Everglades.

Scorpions

Scorpions are common in the pine rocklands. They move through the leaf litter hunting at night, but spend their day under logs or under tree bark. The good news is that scorpions eat insects, including cockroaches! As their bite is painful to humans, students take care to only put their hands where they can see them.

Snakes

There are 26 species of native snakes in the Everglades, but only four are venomous. The most commonly seen snake on this field trip is the brown water snake, a nonpoisonous variety with blotchy brown skin, typically observed sunning itself along the Anhinga Trail. Because snakes feel vibrations from the ground with their bodies, they are likely to move away from the thunderous footsteps of an approaching school group. Most school years pass without a single sighting of a venomous snake on any of the Royal Palm day programs.

Spiders

Spiders are found everywhere on earth, but are especially common in warmer climates. All spiders kill their prey by injecting venom. They then use juices from their digestive glands to liquefy the insides of the prey before sucking it into their mouths. Spiders dine mostly on insects. None eat humans, so biting a human is a desperate attempt



Brown Water Snake



Golden Silk Orbweaver

at self-defense since it wastes precious venom. The two North American spider species considered to be poisonous to humans are the brown recluse and the black widow, but neither have been seen by participants on this field trip. On the other hand, students will have an excellent opportunity during their visit to examine the webs of common orb weavers such as the golden silk orbweaver and the orchard spider.

Bees and Wasps

Fuzzy bumblebees, shiny black carpenter bees, and slender bodied-wasps can all be seen on a Royal Palm day program. The insects in this group have stingers, but are unlikely to use them unless they feel trapped. Most bees are busy visiting flowers, and, like spiders, only sting in self-defense.

Poisonwood and Poison Ivy

Poison ivy grows as a small herbaceous plant or vine. It is quite common along the trail and around the mowed edges of the Long Pine Key picnic area. Its relative, poisonwood, is a shrub-tree native to the American tropics. Poisonwood shrubs and trees grow in the

Long Pine Key and Royal Palm areas. Your Everglades trip provides an excellent opportunity to teach students how to recognize these plants.

Both poison ivy and poisonwood have oils on the leaves and twigs that may cause an allergic reaction. Like most allergies, not everyone is equally affected, nor is the reaction immediate.

Usually the rash takes a few days to develop. Washing exposed skin with cold water and soap is often enough to prevent or reduce the irritation. Since school groups must stay on the trails, students who wear long pants, and exercise caution about what they touch, are not likely to make skin contact with these plants.

Although these plant species sometimes irritate humans, they are woven into the Everglades' web of life. The fruits of poisonwood and poison ivy are both eaten by birds. Poisonwood berries are, in fact, a preferred food of the rare White-Crowned Pigeon.

When teaching students about the hazardous plants and animals of the Everglades, we encourage you to emphasize respect rather than fear. As you and the adult chaperones teach by example, students will appreciate the value and enjoyment offered by the natural outdoors.



Poison Ivy

16

Habitats - Freshwater Slough

Slough

In the morning, groups walk the Anhinga Trail, passing along and over two wetland habitats. Wetlands are natural areas covered by water for one or more months of the year. The amount of time that water covers an area is referred to as its hydroperiod. Since the length of the hydroperiod influences what animals live in an area, habitat and hydroperiod are closely linked.

The Everglades is comprised primarily of a large, slow-moving river. The deepest sections of this river are called sloughs. In these areas, water lilies float on the water's surface. Turtles bask along its edges. Anhingas swim in its dark waters, surfacing with speared fish. Sloughs are special places in the Everglades landscape because they hold water even during the South Florida dry season (December to April). Except in the very driest years, sloughs have a hydroperiod that is year-round. During the dry part of the year, animals

swim, crawl, walk or fly from other habitats to be near the life-sustaining waters of the slough.

While on the Anhinga Trail, you will walk along a section of Taylor Slough. Like other natural drainages in South Florida, Taylor Slough flows southwest, following the underlying rock slope. Notice that your school bus actually crosses the slough on a bridge shortly after you enter Everglades National Park. The Shark River Slough is the other main slough that brings fresh water to the Everglades.

Taylor Slough has been altered by humans. The upper part of the slough, called the headwaters, is outside the park. For decades, the water level in upper Taylor Slough was lowered by draining the water into a canal system and by pumping it out of wells to irrigate crops in the nearby agricultural fields. In 1995, the farmland north of the park was purchased by the South Florida Water Management District so

that water flow to the park could be increased.

Before the park was established, people deepened and partially impounded a section of Taylor Slough along the Anhinga Trail so that it would hold water during drought. This human-altered part of the slough, near the buildings, looks like a lake. The most natural-appearing section of the slough can be found at the end of the boardwalk spur trail. Here the water flows in a wide channel. The channel may be a few feet deep in the summer wet season and nearly dry at the end of April before the rains come.

A water gauge just after the first trail bridge is easy for students to read. Water levels at this location typically vary from less than two feet during the dry season to four and a half feet during the wet season. Of course, this range could be exceeded during very wet or dry years. There is no "normal" for the Everglades; large variations in





rainfall and evaporation from year-to-year are characteristic of South Florida.

Watching Wildlife

The Anhinga Trail is one of the best places to watch wildlife in the world! The possibilities for practicing observation skills are limitless. All group leaders, both teachers and rangers, can help students act as “wildlife biologists,” by asking probing questions such as: How does an Anhinga maneuver underwater? What part of its body does an alligator use to swim? Why are fish digging with their tails in the sediment? What kind of bird is standing in the sawgrass? Can you find any apple snail eggs? To help guide the students, your onsite teacher backpack will have identification cards for fish, birds, and plants. Students are quick to match pictures to species. This exercise gives them confidence that they can learn for themselves, so don’t provide too much coaching! Again, practicing identification skills in the classroom ahead of time will pay large dividends when observing wildlife in the park.

Keep Your Distance

While viewing any type of wildlife, including alligators, emphasize to students that if the animal’s behavior is changing they are probably too close. Alligators raise their heads and move away if disturbed. Birds may signal their nervousness by raising their wings or shuffling their feet. Practice respect by watching for animal reactions, then back away if you are distracting them from feeding, resting, or preening.

Is That Bamboo?

The ten-foot tall grass plants along parts of the Anhinga Trail are called Common Reed or *Phragmites australis*. Other conspicuous plant species along the edge of the slough include coco plum, willow, cattail, buttonbush, and pond apple. If you have included plant study in your pre-site activities, students will be on the lookout for these plants that like to have their “feet” or roots wet. The plant identification card from your backpack will help in identifying plant species with bright flowers. Discuss with your class how habitats are most often characterized

by their common plants, which don’t move, rather than their animal species, which do move. While there may be some poison ivy, there’s very little poisonwood along the Anhinga Trail, so students can usually touch what they are seeing.

Wilderness Wheels

Although the wildlife usually steals the scene on the Anhinga Trail, the area provides the perfect opportunity for discussing some of the park’s human history. Your students may be able to guess how Native Americans and early settlers moved about this ecosystem prior to the development of roads and automobiles. The answer? Canoes, of course!

Miccosukee and Seminole Indians would fashion a cypress log into a long, flat, skinny boat. This vessel was not paddled, but poled by a person standing in the rear. This is a great example of how native people adapted to the Everglades environment.



18

Habitats - Sawgrass Prairie

Sawgrass Prairie

While Taylor Slough is wet most of the year, the adjoining sawgrass marsh usually dries out for a few months. Depending on the year's rainfall, the hydroperiod of sawgrass prairie ranges from six months to nearly continuous flooding. During the wet season, water depth in this prairie is typically one to one-and-a-half feet.

The sawgrass prairie is a landscape of contrasting scale. Towering thunderheads reflect in shallow pools of water and innumerable blades of sawgrass form a green backdrop brought to life by a solitary white bird.

Encourage students to peer over the railing and down into the sawgrass during your field trip. How deep is the water? You may be able to see small fish swimming and perhaps even a turtle or alligator. During the height of the wet season, fish and alligators follow the water and spread out across the sawgrass landscape. Life virtually explodes: crayfish, mosquitoes, frogs, fish, and snails colonize and reproduce

in the wet prairie. Periphyton, a thick mat of blue or blue-green algae, forms around submerged plants and objects. It is a micro habitat, home for insects and nearly microscopic animals.

Starting in November, the winter dry down usually begins in the sawgrass prairie as overland water flow diminishes and evaporation exceeds rainfall. When this happens, wading birds start hunting in the sawgrass for fish and other food left stranded or corralled into puddles by the receding water. Be sure your class is on the lookout for this food chain action. This sudden availability of food triggers nesting in birds like the woodstork.

Oxygen... Gasp!

Oxygen levels in Taylor Slough are affected by water temperature (warmer water holds less oxygen), water level, wind speed, and by the number of organisms, such as fish and algae, in the water. If you visit Taylor Slough near the end of a warm, dry period, you may see fish gasping desperately for oxygen. Although fish breathe most

efficiently through their gills, some, such as the native gar, are adapted to take some oxygen directly from the air. Consider with your students how useful this adaptation is in a habitat that periodically dries up. One non-native fish, the walking catfish, can even move over land from one drying pool to another, hopefully wetter, location.

How Long Is That Alligator?

Unlike people, alligators continue to grow throughout their lifetime. Adult alligators are usually at least six feet long. On average, males grow larger than females. For example, any alligator over ten feet is most likely a male. The record alligator in Florida measured 17 feet 5 inches long.

The skull size of an alligator is proportional to its overall length, so if you can see only the head in the water you can still estimate the size of the animal. Have the students estimate the distance from the tip of an alligator's snout to its eyes in inches. This number is approximately the same number in feet. For example, an alligator that



Habitats - Sawgrass Prairie

measures about five inches from snout to eyes is around five feet long from snout to tail.

An alligator's growth depends on the amount of food available and on how active it is during the year. Alligators do not hibernate, but when temperatures drop below 73 degrees, they are sluggish and seldom eat. If your field trip takes place on a cold and windy day, alligators may not be as visible, since they will tend to stay in the relatively warm waters of the slough. Under such conditions alligators can remain submerged for more than an hour.

Alligators typically eat between dusk and dawn, which is why they often appear to be doing "nothing" during the day. Challenge your students to notice the breathing or eye blinks of an otherwise lifeless-looking alligator. When feeding, alligators are opportunistic, eating fish, turtles, birds, even other alligators, or whatever is available. A large meal may take a week to digest, another reason alligators may not seem like they are doing much.

Bills and Feet

Your class is likely to see a variety of long-legged birds on their field trip. These birds, commonly called wading birds, hunt in shallow water for food not available on the shore. Several of these bird species look alike. However, if you focus on the bill shape and color of the bird's legs, feet, and bill you will start to sort them out. The ibis, for example, has a distinctly curved orange bill and reddish feet, but the snowy egret has a straight black bill and yellow feet.

Bill shape is an important clue to how a bird gets its food. The Anhinga bears a close resemblance to the Cormorant, both in its dark color and its behavior



as an agile underwater hunter. However, the Anhinga's bill is spear-shaped while the Cormorant has a hooked bill. The Anhinga normally impales its food while the Cormorant grabs its prey.

The overall size of the bird and its color are two other important identification clues. With a little practice, the bird identification cards from the teacher backpack make it possible for students to become more comfortable with identifying common Everglades birds.

Classroom activities that highlight identification traits and adaptations, through art projects or reports, will prepare the students to observe differences in species while on the trail. Whenever possible move past identification to adaptations with questions such as "Does the shape of the bill influence what a bird eats?" "How do different birds hunt?" "Can you think of any reason that yellow or pink feet would be useful to a wading bird?"



American Alligator

20

Habitats - Pine Rocklands

Pine Rocklands

The elevation of Long Pine Key is only about three feet above sea level, but that is high ground for the Everglades ecosystem. The term “key” in this case refers to the island-like outcropping of limestone rock that has a higher elevation than the surrounding wetlands. Your class will visit two habitats in the Long Pine Key area after lunch.

Unlike the slough and sawgrass prairie, the pine rocklands and hardwood hammock habitats are typically dry underfoot. Usually, standing water can be found only in solution holes, which are depressions in the limestone rock that collect rainwater. The uneven rock layer here is a continuation of the Atlantic Coastal Ridge, a relatively high geologic feature that follows the Atlantic shoreline in Broward and Miami-Dade Counties before ending southwest of Long Pine Key near Mahogany Hammock. Early Miami, as well as the first roads and railroads in South Florida, was built within the pine forests on the Atlantic Coastal Ridge.

The Long Pine Key picnic area is set in a stand of South Florida slash pines. Slash pines grow throughout Florida, but the subspecies found in Dade County has especially dense, sturdy



Roughleaf Velvetseed

wood. As Miami grew in the early 20th century, slash pines were used for lumber. The pine rockland habitat, higher in elevation than the sawgrass prairie, provided dry land all year long. Now it is mostly covered by homes and parking lots. Even some of the slash pines in the Long Pine Key area were selectively harvested from 1936 to 1947, before the Park was established. Many of the pines at Long Pine Key are second growth, but some of the bent or twisted ones may pre-date the park.

Just as we talk about endangered species, we can talk about endangered habitats. More than 98% of the Dade County pine forests have been removed. The few pine stands remaining outside the park have been impacted by invasive species and fire suppression. The Dade County pine rockland is a critically endangered habitat.

Fire

A healthy pine rockland thrives with recurring fire. The thin soil found in this habitat is enriched by the nutrients released during a fire. Slash pine seeds germinate quickly in the ashes. Fire burns away shrubby undergrowth, exposing young pine trees to the sun. The needles of the native slash pines provide protection for the developing buds, and the layers of flaky bark protect them during the heat of a burn. Notice how the older, tall pine trees have dropped their lower limbs, an adaptation which prevents fire from moving to the top or crown of the tree and destroying it.

Here in Everglades National Park, as well as in Big Cypress National Preserve, fire is used as a tool to ensure the continuation of the pine rockland habitat. Some lightning-caused fires that do not threaten buildings are



allowed to burn. If necessary, park rangers will start carefully controlled fires to remove invading plants and maintain or restore ecological balance. Plots in the Long Pine Key area are burned approximately every three to five years. Students can easily find blackened bark and stumps, evidence of past fires.

While slash pine is the dominant tree, the pine rockland is a habitat for many unique plants. In fact, this area has some of the rarest plant species in Florida. More common plants, such as saw palmetto and cabbage palm (aka Sabal palmetto) grow out of the rocky ground and are adapted for fire, putting forth new fronds from a woody

Habitats - Pine Rocklands 21

heart that grows close to the ground. The prickly leaves and lavender-colored flowers of the thistle will catch students' attention. You might also introduce your class to the roughleaf velvetseed. Living up to its name, it is fun and safe to touch. The leaves feel like sandpaper.

Compare the leaves in the pine rocklands to those that grow in familiar well-watered yards or school grounds. Pine rockland forest habitat is a sunny, dry place. Unlike landscaping in urban areas, most plant species growing here have adaptations for conserving water. Leaves are protected from water loss with waxy, tough surface coverings.

What Happens Without Fire?

The understory of the pine forest usually includes poisonwood, gumbo

limbo, satin leaf, lysiloma, and other examples of shrub-sized hammock trees. If fire is suppressed, these trees will begin to mature, grow, and shade out the young pines. After five to ten years the pineland may begin to resemble the other type of high ground habitat, a hammock. Also, when fire is suppressed, the amount of material available to burn increases. A fire burning through such heavy accumulated fuel may be hot enough not only to kill some pines but also the pine rockland ground cover, as well as the nearby hammock trees.

A Green World

While the morning hike features easy wildlife viewing, the afternoon part of the field trip takes the students to two types of forests with an abundance of plant life. This is an excellent oppor-



tunity to review some of the physical properties that characterize habitats: temperature, humidity, light, and wind speed. Notice how different these properties are in high ground habitats. The broad-leaved trees growing in hammocks create a shadier, cooler, calmer, and more humid environment, which in turn influences the kinds of wildlife (e.g. snakes, snails, and birds) that might be found there.

Even if you are a confident botanist, it is a mistake to try to identify all the plants you'll be seeing. Students will respond best if you focus on just a few readily identifiable species. We especially recommend that you teach students to identify poisonwood and poison ivy. (See page 17 for more information on these and other species that pose safety concerns.) Try to do this with minimum of fuss, as we notice students have an exaggerated fear of these plants. Once they know what not to touch, students can begin to handle leaves and bark on other plants found throughout the area safely. Emphasize, though, that plants should be examined without picking them.



Hardwood Hammock

The shady darkness of the hardwood hammock is a dramatic contrast to the glare of the pine rocklands. A hammock is a hardwood forest habitat that thrives on elevated ground in the Everglades. Hardwood means just what it says—the wood is hard. Pines, in comparison, have soft wood. Hardwood hammocks are often referred to as “tree islands” because of their elevation and shape when they occur surrounded by sawgrass prairies or sloughs.

In South Florida, where frosts are rare, hammocks include both temperate trees found in other parts of the US as well as tropical trees native to the West Indies. Tropical species such as the pigeon plum, gumbo limbo, mahogany,

and several kinds of bromeliads thrive here alongside temperate oaks and maples. The hammock habitat is characterized by high humidity and deep shade. The ground underfoot is soft and spongy from the accumulation of decades of fallen leaves. A faint, skunk-like, though not unpleasant, odor often scents the air. This aroma is emitted by one of the common hammock tree species, the white stopper, which gets its name for its use by pioneers as a treatment for diarrhea!

Just as the trees are tropical, so are some of the animals found in the hardwood hammock. Zebra butterflies patrol the pathway you’ll walk. Members of a tropical family called “long wings,” found throughout Central and South America, these butterflies have a distinctive shape. Tree snails, close



relatives of snail species that live in Cuba, are also seen. They graze during moist times on the algae and lichens that cover smooth-barked hammock trees. During the dry winter months, when most school groups visit, tree snails have often sealed themselves in one spot to conserve moisture. Touching them roughly may dislodge the snails and kill them.

The hardwood hammock habitat is an attractive one for people. Native people, including the Calusa Indians who lived here long ago, often set up camp on the cool, shady tree islands. Unfortunately, many of the hammocks that once dotted the Atlantic Coastal Ridge have been destroyed with the growth of our urban areas. However, little patches remain as refuges around some schools, city parks, and neighborhoods.

Borrow Pit Lake

The lake that adjoins the Long Pine Key picnic area is human-made and



was excavated to provide material for constructing the main park road. Although the lake is not strictly natural, its shoreline supports a characteristic Everglades mini-habitat called periphyton. Periphyton is the name given to the complex association of algae that frequently forms a mat-like covering in the wetlands of the Everglades. (Visiting Shark Valley, or going on a slough slog, will allow you to see periphyton in a more natural setting.)

Snails and plant-eating fish graze on periphyton, placing it at the very base of the food chain. The spongy structure of the mat also holds water well, sustaining small life forms through the dry season. The kinds of algae that thrive in the association are determined by water nutrient levels, so some of the controversy about Everglades' restoration focuses on this unusual community. If the base of the food chain is not doing well, then the whole Everglades food chain is not healthy.

Although periphyton is somewhat slimy, it is not sticky or smelly. If time permits during your field trip, have your students stay on the trail while you carefully step down to the water's edge and pick up a handful of the mat. The shore can be extremely slippery, so keep students back from the edge. Distribute a bit of periphyton to each



person so that everyone can examine its contents. It's alive! Often small crustaceans and insects can be seen moving around in the algae. When you are done with the activity, be sure to collect the periphyton from students and return it to the lake edge.

Where Panthers Prowl

The secretive Florida panther, also called a mountain lion or cougar in other parts of the country, occasionally frequents the Long Pine Key area. Generally, panthers hunt the deer that graze in the sawgrass prairies. Since the pine rockland area within Long Pine Key adjoins a short-hydroperiod prairie, it is a prime deer area. The pine forest offers cover for the panthers while they keep watch for deer.

Similarly, during the heat of the day, panthers may retreat to sleep in the cool, dense hammock nearby. The panther's behavior demonstrates a concept ecologists call the edge effect. Edges have high concentrations of wildlife because animals can move easily between habitats which offer them different resources that they need. Since panthers prefer to move about when light levels are low, it is very unlikely that you will see one during a field trip.

Listening to the Wild

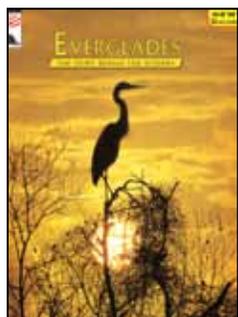
Park rangers have found from experience that most visitors appreciate the opportunity to listen to the natural sounds and the quiet found in a large wilderness area such as Everglades National Park. However, it can be a little tricky guaranteeing such an experience when managing 30 excited students! During the afternoon, the ranger working with your class will stop your group for a listening break. Encourage the students to close their eyes. This will better focus their hearing. Preparing your students in advance for what to expect on the field trip will help your group be quiet and attentive during this special time.



Florida Panther

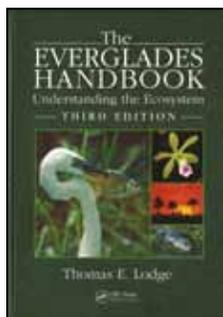
24 Resources

The following resources are just a few recommendations for educators and students to learn more about the Everglades.



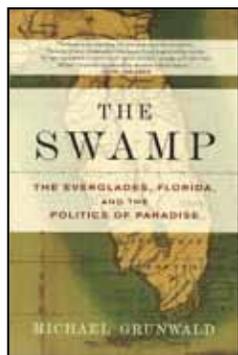
Everglades: The Story Behind the Scenery

Jack de Golia,
KC Publications,
1978



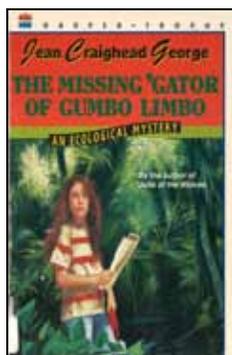
The Everglades Handbook

Thomas E. Lodge,
CRC Press, 2010
(3rd ed.)



The Swamp

Michael
Grunwald,
Pineapple
Press, 2006



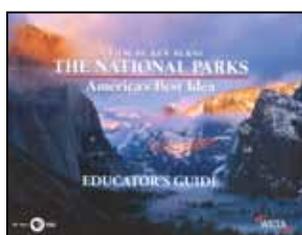
The Missing Gator of Gumbo Limbo

Jean Craighead
George
Harper, 1992



She's Wearing a Dead Bird on Her Head!

Kathryn Lasky,
Hyperion Books, 1995



The National Parks: America's Best Idea

Film and Educators Guide,
Ken Burns, PBS, 2009

Web Resources

Everglades National Park

www.nps.gov/ever

Big Cypress National Preserve

www.nps.gov/bicy

Biscayne National Park

www.nps.gov/bisc

Dry Tortugas National Park

www.nps.gov/dрто

South Florida Natural Resource Center

www.nps.gov/ever/naturescience/sfnrc.htm

FIU Everglades Digital Library

everglades.fiu.edu

USGS South Florida Information Access

sofia.usgs.gov/virtual_tour/kids

South Florida Water Management District

www.sfwmd.gov

Comprehensive Everglades Restoration Plan

www.evergladesplan.org

South Florida National Parks Trust

www.southfloridaparks.org

PBS Teachers, Exploring the National Parks

www.pbs.org/teachers/connect/resources/7261/preview



Everglades Association

www.evergladesassociation.org

The official cooperating association of Everglades NP, the Everglades Association, operates several bookstores in park visitor centers and also maintains an online store. Purchase orders from schools receive a 10% discount. The Everglades online store has an Educators and Childrens Books section.

“...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same... and... leave them unimpaired for the enjoyment of future generations.”

~ National Park Service Mission



Everglades National Park
40001 State Route 9336
Homestead, Florida 33034

Education Office
305 242-7753
www.nps.gov/ever/forteachers

EXPERIENCE YOUR AMERICA™

