

SOUTHERN FLORIDA WETLAND

EIGHTH IN A SERIES



N A T U R E A M E R I C A

WILD

W ABOUT THE WETLANDS

WILD ABOUT THE WETLANDS



RIVER OF GRASS



WET 'N' WILD FACTS
Create a wetland bulletin board with the "Wild About the Wetlands" poster in the center. Post the wet 'n' wild facts and students' work. Here are the first 3 facts: **Wetlands can be found on every continent except Antarctica.** Wetlands are located in nearly every corner of America. **The highest elevation in Everglades National Park is only 8' above sea level!**

Beneath the wetland vegetation, soils, and top layer of rocks are limestone rocks millions of years old, and, in some places, two miles thick. This underlying "platform" is slightly tilted to the south and west, creating a natural watershed, or area of land that drains to a larger body of water. The watershed begins in central Florida and drains into Lake Okechobee. Long ago, water poured from the lake after heavy rain and fed a meandering, 50-mile-wide "river" that flowed into the Gulf of Mexico. Today, dams and canals have disrupted this natural flow and reduced the volume of water flowing through the Everglades — the vast saw grass marsh that pioneering conservationist Marjory Stoneman Douglas called a "river of grass."

Place a piece of outdoor carpeting at the bottom of the slope to represent the wetland. What happens when water is poured down the watershed? Try pouring dry water (colored water representing pollution, bits of paper or plastic, small sticks) down the slope. Peek under the carpet. Do the pollutants seep through to the groundwater? (The vegetation filters out most of the impurities.)

OPENING
When it rains really hard, where does the water go? Today we're going to begin a series of lessons about wetlands. By the end of these lessons you'll be able to tell what a wetland is, what animals and plants live there, and what we can do to protect wetlands for future generations.

Wetlands contribute to ecosystems in many ways. They control flooding by slowly releasing water into the surrounding areas. Groundwater, which is filtered by the vegetation and soil, seeps through the ground and recharges underground aquifers. Tree roots stabilize riverbanks. Wetlands also provide habitats for abundant wildlife and are beautiful places for recreational activities.

COMMUNITY CONNECTION
Contact your county soil and conservation district office and state fish and wildlife service to obtain wetland/watershed maps of your locale. As a homework assignment, invite students to visit a local wetland and record what they find (e.g., floating plants, nearby trees, animal tracks, waterbirds, floating insects, mud, predators, prey, amphibians, signs of people, animal homes).

MINI-LESSON
As you talk, stop periodically to ask these questions: What is a wetland? What is a watershed? How do wetlands benefit us? What kinds of wetlands can you find in this area? How do people in this community use the wetlands?

WATERSHED EXPERIMENTS
You will need a spray bottle with water, an aluminum cake pan, 2 pieces of outdoor carpeting, local watershed maps, dirt, and modeling clay.

EXTENSION ACTIVITIES
You will need a computer with Internet access, small index cards, and drawing paper.

1 Visit <http://www.nps.gov/ever/ed/activities/46activity/46eactive.htm>, a site created by the National Park Service. Try the "We're Sponging Off the Everglades" activity.

2 Students demonstrate what they've learned about wetlands and watersheds by writing true/false statements on small index cards to use for the "Wetland Walkabout" game at the end of the unit.

3 Draw a map of the school yard. Identify possible watersheds. Check for accuracy after the next rainstorm.

The 2006 issuance in the Nature of America stamp series features a southern Florida wetland. Wetlands are places where water constantly saturates the soil or regularly covers it. They include marshes, saw grass prairies, swamps, and estuaries. Marshes are grassy areas covered by shallow water. Swamps contain trees, bushes, and periphyton algae, the building blocks of wetland food chains. An estuary is where freshwater and ocean water mix.

1 Have students cup their hands with the palms facing upward. The fingers represent high elevations (hammocks); the creases represent waterways. Gently spray their palms with water. Where does the water collect? These are miniature examples of watersheds.

2 In an aluminum cake pan, use modeling clay or packed dirt to create an inclined watershed.

Southern Florida wetlands, such as the Everglades, began forming only a few thousand years ago, following a rise in sea levels after the last Ice Age.



We Call the Southern Florida Wetlands "Home"

Plants: sedge, saw grass, reed, cypress, black mangrove, red mangrove, white mangrove, marshweed, poisonwood, sabal palm, royal palm, saw palmetto, slash pine, giant wild pine, coontie, poison ivy, coco palm, pond apple, wax myrtle, pickerelweed, cattail, bladderwort, spatterdock lily, West Indian mahogany, gumbo-limbo, moonflower, live oak, red maple, hackberry, night-blooming cistanche (torchlily), buttonwood, red bay, white stopper, coastal plain willow, resurrection fern, whisk fern, leather fern, cowhorn orchid, leafy vanilla orchid, butterfly orchid, clamshell orchid, stiff-leaved wild pine, Spanish moss, strangler fig.

Reptiles and Amphibians: American alligator, American crocodile*, Florida redbelly turtle, Florida box turtle, gopher tortoise, diamondback terrapin, Atlantic hawksbill turtle*, Atlantic ridley turtle*, green turtle*, Atlantic leatherback turtle*, Atlantic loggerhead turtle, eastern indigo snake, crayfish snake, brown water snake, cottonmouth, mangrove salt marsh snake, eastern coral snake, scarlet kingsnake, rat snake, pygmy rattlesnake, green anole, Florida reef gecko, island glass lizard, little grass frog, pig frog, dwarf siren salamander, oak toad.

Birds: white ibis, great white heron, great blue heron, little blue heron, tricolored heron, black-crowned night heron, yellow-crowned night heron, wood stork*, great egret, snowy egret, cattle egret, reddish egret, least bittern, Florida sandhill crane, glossy ibis, roseate spoonbill, red-cockaded woodpecker, Cape Sable seaside sparrow*, Florida grasshopper sparrow, cardinal, blue jay, meadowlark, bobwhite, red-bellied woodpecker, anhinga (snakebird), white-crowned pigeon, peregrine falcon*, red-shouldered hawk, barred owl, osprey, southern bald eagle*, short-tailed hawk, small kite*, American oystercatcher.

Insects and Spiders: Bahama swallowtail butterfly, zebra longwing, Schaus swallowtail butterfly*, Halloween pennant dragonfly, lubber grasshopper, golden orb weaver spider.

Mammals: white-tailed deer, bobcat, marsh rabbit, raccoon, opossum, gray fox, river otter, Florida panther*, West Indian manatee*, black bear, Everglades mink, round-tailed muskrat, mangrove fox squirrel, Key Largo wood rat*, Key Largo cotton mouse*.

Endangered species have an asterisk (*). Animals portrayed on the stamp pane are in boldface.

PHOTOS: TOP left to right: Halloween pennant dragonfly, red mangrove trees, anole, osprey. BOTTOM: Left to right: heron, swamp lily and saw grass, zebra longwing butterfly, alligators.

NURSERY OF LIFE

WET 'N' WILD FACTS
Southern Florida is the only place where alligators and crocodiles live side by side in the wild. Wood storks can grab fish within 25 milliseconds. Marsh rabbits swim. Gray foxes climb trees. The little grass frog (5/8") is the smallest frog in the United States. One square foot of water can contain 100,000 mosquitoes. A dwarf cypress tree can live 100 years.

OPENING
List 3 things that plants and animals need to survive. A southern Florida wetland like the Everglades is not only "a river of grass" but also a "nursery of life." It has everything that thousands of species need to survive, and today we're going to learn more about some of them.

MINI-LESSON
As you talk, ask these questions: Which animals/plants are familiar? Which are endangered? Can you find the animals/plants on the "Wild About the Wetlands" poster?

Because southern Florida has the largest mangrove forest and saw grass prairie in North America, it is home for thousands of different species. Roughly 70% of the plants have tropical origins. There are 1,000 kinds of seed-bearing plants and 120 species of trees. The marshes are dominated by sedges, grasses, and reeds. In the swamps, bald cypress trees are surrounded by "knees," strange roots sticking out of the water. Their limbs are draped with Spanish moss and trunks are decorated with epiphytes (air plants). Mangrove roots stabilize the shoreline and are strong enough to withstand hurricanes! They provide homes for fish, sea life, and birds. Forests of tropical hardwood trees grow on hammocks, limestone islands rising only a foot or two above the surrounding marshes. The standing water

and vegetation are home to hundreds of kinds of insects, spiders, reptiles, and amphibians. The state of Florida has 68 mosquito species; 43 of them are in Everglades National Park. These are gobbled up by more than 60 species of reptiles and amphibians and 275 species of fish. They have adapted to the alternating wet and dry conditions. During the dry season, walking catfish travel to new ponds by "walking" on their fins. Some wildlife species survive the dry period by gathering at "gator holes," groundwater-filled depressions dug out by alligators.

Plants, fish, and insects provide plentiful food for mammals and birds. Of the 25 types of mammals in Everglades National Park, the most famous is the Florida panther. Because of urban development and other threats, fewer than 100 panthers survive. The park is also a haven for 350 species of native and migratory birds. The white ibis is one of the most common wading birds. A pair of wood storks eats 440 pounds of fish during each nesting season! The snail kite feeds almost exclusively on the aquatic apple snail. Because of irregular water flow, the number of wading birds has decreased from 265,000 in the 1930s to 18,500 today! Too much water destroys alligator and snail eggs and scatters the fish the birds need to eat. Too little water harms the periphyton algae — the basis of wetland food chains.

WRITE ON
You will need large, colored index cards, pins, yarn, a computer with Internet access, a printer, reference books, and small index cards.

1 Conduct research about the plants and animals listed in the "What's on the Stamps?" and "We Call the Wetlands 'Home'" sections of the poster. Record facts on large index cards. Use pins and

yarn to connect the fact cards with poster illustrations. Print or draw pictures of other species to post on the bulletin board by their respective fact cards.

2 Students write true/false statements on small index cards to use for the "Wetland Walkabout" game at the end of the unit.

3 Create acrostic poems by writing the names of plants and animals vertically in all capital letters. For each letter, write a word or phrase describing the life-form.

EXTENSION ACTIVITIES
You will need flour, salt, water, cooking oil, measuring cups, tempera paint, paintbrushes, newspapers, paint shirts, wooden spoons, a bowl, and various art supplies.

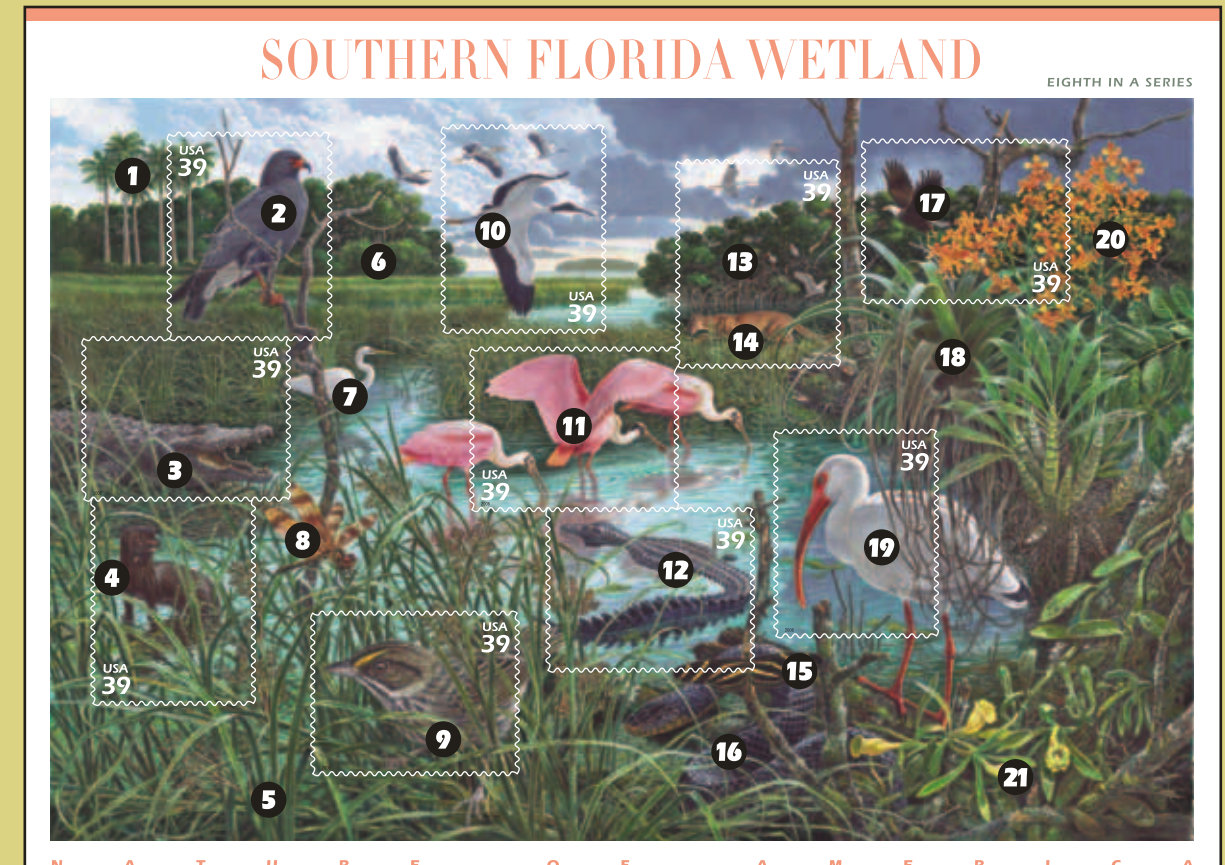
1 Create jigsaw puzzles by cutting apart printed or drawn pictures of wetland wildlife. Put the pieces inside envelopes. On the outside of each envelope, write 3 clues about the identity of the mystery wildlife.

2 Student teams act out the everyday actions and characteristics of wetland wildlife in their natural environment. Classmates guess what animals are being depicted.

3 Create watersheds, waterways, alligator holes, and hammocks from salt-flour clay (1 C. flour, 3/4 C. salt, 1/2 C. water), paint, and various other art supplies. To keep the clay malleable, add 1/4 C. cooking oil. Place the scenes side by side to create a large wetland.

LESSON 2

What's on the Stamps?



The stamp pane featuring a southern Florida wetland is the eighth in an educational series designed to promote appreciation of major plant and animal communities in the United States. The previous issuances in the Nature of America series were Sonoran Desert (1999), Pacific Coast Rain Forest (2000), Great Plains Prairie (2001), Longleaf Pine Forest (2002), Arctic Tundra (2003), Pacific Coral Reef (2004), and Northeast Deciduous Forest (2005). STAMP CREDITS: Illustration: John D. Dawson. Art direction and design: Ethel Kessler. POSTER CREDITS: Lesson plans created by Dr. Jacqueline Hansen, College of Education, Murray State University. Creative direction and graphic design: Frank Schultz-DePaolo, Public Affairs and Communications, United States Postal Service. Project Manager: Jean D. Schiedman, Stamp Services, United States Postal Service. Photo Editor: Michael Owens, PhotoArtist, Inc. Copy Editor: Linda Averitt, PhotoArtist, Inc. Production and print management: Dodge Color. PHOTO CREDITS: FRONT: Alligator © Steve J. Neuss/Silver Image; Heron sitting atop tree, Florida © Pat Canova/Silver Image. BACK: WE CALL THE SOUTHERN FLORIDA WETLANDS "HOME" section: Halloween pennant dragonfly © Dan Montesi/Silver Image; Red mangroves © Tom Sayer/Silver Image; Swamp lily and saw grass © Carlton Ward, Jr./Silver Image; Anole, osprey, heron, zebra longwing butterfly, alligators © 2006, JupiterImages Corporation. GAME sections: Snail kite © Jim Kern/The Kern Company. Dragonfly © Garrett Hubbard/Nature Daily News/Silver Image; Openmouthed alligator © Mary Applebaum/Silver Image; Florida panther © Barbara Magnuson/Larry Kimball; Basking alligator © 2006, JupiterImages Corporation. For more information about stamps and stamp products, visit the Postal Store at www.usps.com/shop or call 1-800-STAMP-24.

- 1. Royal Palm *Roystonea regia*
- 2. Snail Kite *Rostrhamus sociabilis*
- 3. American Crocodile *Crocodylus acutus*
- 4. Everglades Mink *Mustela vison*
- 5. Saw Grass *Cladium jamaicense*
- 6. West Indian Mahogany *Swietenia mahagoni*
- 7. Great Egret *Ardea alba*
- 8. Halloween Pennant Dragonfly *Celithemis eponina*
- 9. Cape Sable Seaside Sparrow *Ammodramus maritimus*
- 10. Wood Stork *Mycteria americana*
- 11. Roseate Spoonbill *Ajaia ajaja*
- 12. American Alligator *Alligator mississippiensis*
- 13. Red Mangrove *Rhizophora mangle*
- 14. Florida Panther *Puma concolor*
- 15. Zebra Longwing *Heliconius charitonius*
- 16. Eastern Indigo Snake *Drymarchon corais*
- 17. Bald Eagle *Haliaeetus leucocephalus*
- 18. Giant Wild Pine *Tillandsia ulmiculata*
- 19. White Ibis *Eudicramis albus*
- 20. Cowhorn Orchid *Cyrtopodium punctatum*
- 21. Leafy Vanilla Orchid *Vanilla phaeantha*

FRIENDS OF THE WETLANDS

WET 'N' WILD FACTS
About 75% of all the people in the world live in former wetlands and surrounding areas. America loses 60,000 acres of wetlands each year. Marjory Stoneman Douglas lived to be 108 years old.

grass" in half. Rainwater washes chemicals from farmers' fields into wetlands, and these can kill algae and many plants and animals. To make matters worse, many exotic, nonnative plants and animals are now competing with the native species for food and water.

OPENING
What are some ways we can save water at home? Why is it important to save water? We've learned that because of erratic rainfall and human activities, southern Florida wetlands may not have enough water to ensure the survival of thousands of plants and animals. Today we're going to talk about ways we can take care of these beautiful places so that people and animals can enjoy them for generations to come.

To save southern Florida's most famous wetland, one-fifth of the original "river of grass" was designated as Everglades National Park on December 6, 1947. The park was named a Biosphere Reserve in 1976, placed on the World Heritage List in 1979, and honored as a Ramsar Site (Wetland of International Importance) in 1987. In 1994, Congress earmarked \$250 million to restore this wetland area. What can you do to help protect the Everglades of southern Florida and the wetlands in your community?

ENVIRONMENTAL ACTIVITIES
You will need goldfish crackers, pieces of blue paper, an outdoor area, and jump ropes.

1 Invite a local environmentalist to speak about ways students can protect the wetlands in your community. Write a thank-you letter.

2 Visit <http://www.nps.gov/ever/ed/activities/46activity/46eactive.htm>. Try these activities: And Then There Were None: What Extinct or Endangered Species Am I?, Where Have Our Plants and Animals Gone?, and Please Don't Feed the Gators. Invite students to become "Young Friends of the Everglades" (<http://www.everglades.org/young.html>) or "National Park Service WebRangers" (<http://www.nps.gov/webangers/>).

3 Use jump ropes to cordon off a large area. Scatter goldfish crackers (fish) and blue paper (water). Which wood stork (student) can gather the most fish and water? Repeat the activity, decreasing the area (representing housing development, farming, road-building) and reducing the amount of fish and water (representing decreased water flow and more pollution). How have human actions impacted the wetland water flow and wildlife?

4 The people of River City, Florida, are deciding how to use the wetlands in their community. Conduct an informal debate with these roles: businessman, Realtor, townspeople, environmentalists, hunters, contractors, and transportation officials. How does each group think the wetlands should be used? Can they reach an agreement?

MINI-LESSON
For centuries, the Seminole and Miccosukee Indians have lived in balance with southern Florida wetlands by only using what they needed to survive. Not everyone has been a friend of the wetlands, though. For years, people killed roseate spoonbills and egrets for their feathers before officials created laws to protect the nesting colonies. Did you know that about 1,000 people move into Florida each day? They use up to 200,000 gallons of freshwater each day and encourage the building of new canals to drain wetlands and construct more houses and businesses. A million tourists visit the Everglades each year, too, further straining the water supply. This water usage has cut the size of the "river of

WRITE ON
You will need a computer with Internet access, reference books, writing materials, large chart paper, small index cards, and a graphic organizer with these columnar headings: see, hear, feel, touch.

Conduct research on one of these "Friends of the Wetlands": Marjory Stoneman Douglas (mother of the Everglades), Ernest F. Coe (father of the Everglades), John James Audubon (wildlife artist), John D. Dawson (Nature of America artist), and the Seminole and Miccosukee tribes. How did these people try to protect the wetlands? Complete a graphic organizer (see, hear, touch, feel) exploring what each "Friend of the Wetlands" would have experienced on the first visit to a wetland. Write a simulated journal entry from each person's perspective. Write true/false statements to use for the "Wetland Walkabout" game.



WETLAND WALKABOUT

Wade into the wet and wild world of a SOUTHERN FLORIDA WETLAND!

SETUP: You'll need one game board, one die, one set of wet 'n' wild cards, and a stack of student-generated true/false statements. Students can provide their own game board pieces (markers) or they can use pieces of small colored candy.

Directions: 1 Place your markers on START. 2 Roll one die. 3 The highest roll goes first. 4 Draw a true/false card. Read it aloud. Is it true or false? 5 If you are correct, roll the die and "walk" that number of alligator footprints. 6 If you are wrong, stay put. 7 When you land on a set of double alligator footprints, draw a wet 'n' wild card. Do what it says. 8 If you land on an occupied space, send the other player back 5 steps. 9 The first player to reach the alligator hole wins!

- You fill a trash bag with someone else's litter. Take another turn.
- You take a picture of a snail kite eating an aquatic apple snail. Go ahead 2 spaces!
- You see a beautiful Halloween pennant dragonfly but don't try to catch it. Go ahead 2 spaces.
- Rest in the shade of a red mangrove tree. Lose 1 turn.
- Tell another player 1 way to protect a wetland. Take another turn.
- You see an American alligator. Go back 2 spaces — and keep your eyes open!
- You forget your boots and sunscreen! Go back 3 spaces.
- You use a quiet voice so you won't disturb the wildlife. Go ahead 3 spaces.
- You see a Florida panther in the bushes. Stand still for 1 extra turn until it passes by.