



EVERGLADES NATIONAL PARK



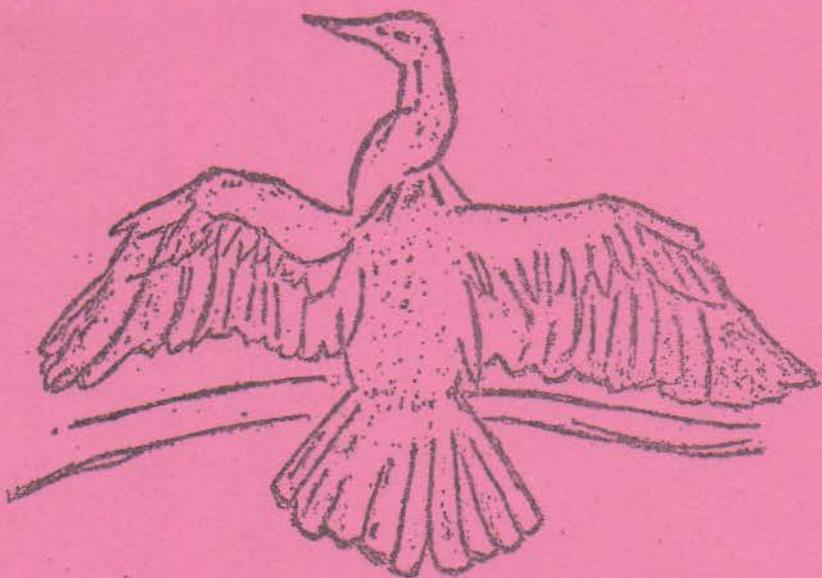
ANHINGA

&

GUMBO LIMBO TRAILS

NATIONAL ENVIRONMENTAL STUDY AREA

A TEACHERS' GUIDE



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TEACHERS' GUIDE TO THE ANHINGA TRAIL

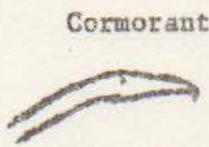
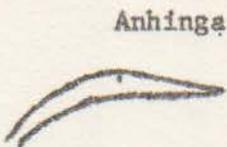
2. As you proceed along the trail, look for some birds in or near the water with long bills and long legs.

QUESTION: What do you think that these birds eat?

ANSWER: Crayfish, frogs and small fish.

QUESTION: Why do these birds have long legs and bills?

ANSWER: The long legs are for wading and the bills enable them to penetrate well below the surface of the water to catch crayfish, frogs and fish.



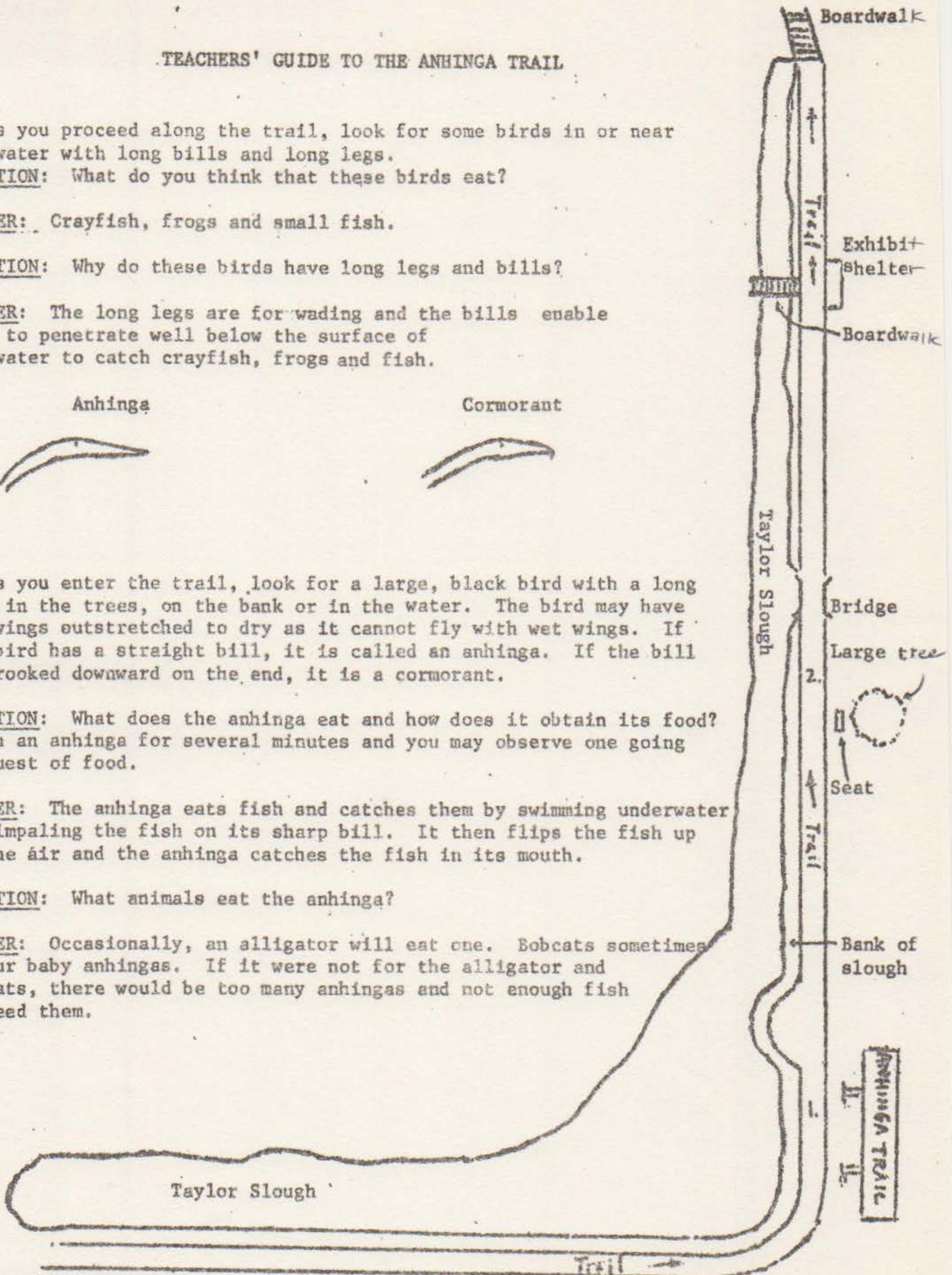
1. As you enter the trail, look for a large, black bird with a long neck in the trees, on the bank or in the water. The bird may have its wings outstretched to dry as it cannot fly with wet wings. If the bird has a straight bill, it is called an anhinga. If the bill is crooked downward on the end, it is a cormorant.

QUESTION: What does the anhinga eat and how does it obtain its food? Watch an anhinga for several minutes and you may observe one going in quest of food.

ANSWER: The anhinga eats fish and catches them by swimming underwater and impaling the fish on its sharp bill. It then flips the fish up in the air and the anhinga catches the fish in its mouth.

QUESTION: What animals eat the anhinga?

ANSWER: Occasionally, an alligator will eat one. Bobcats sometimes devour baby aningas. If it were not for the alligator and bobcats, there would be too many aningas and not enough fish to feed them.



Items in numerical order: Read from bottom of page up.

Royal Palm Visitor Center

TEACHERS' GUIDE TO THE ANHINGA TRAIL

4. QUESTION: Does anyone know what the gray growth on the trunk and limbs of the pond apple is?

ANSWER: It is lichen.

QUESTION: What two plants does the lichen consist of and what are their functions?

ANSWER: The lichen consists of an alga and fungus. 4. Pond Apple
The two plants are mutually dependent on each other. Tree with
The alga manufactures the food and the fungus absorbs gray lichen
the water necessary for both*them. The lichen is not on it
a parasite on the tree but only uses the tree for support.

3. As you walk out on the boardwalk, you likely will see some alligators.

QUESTION: Are alligators slow animals?

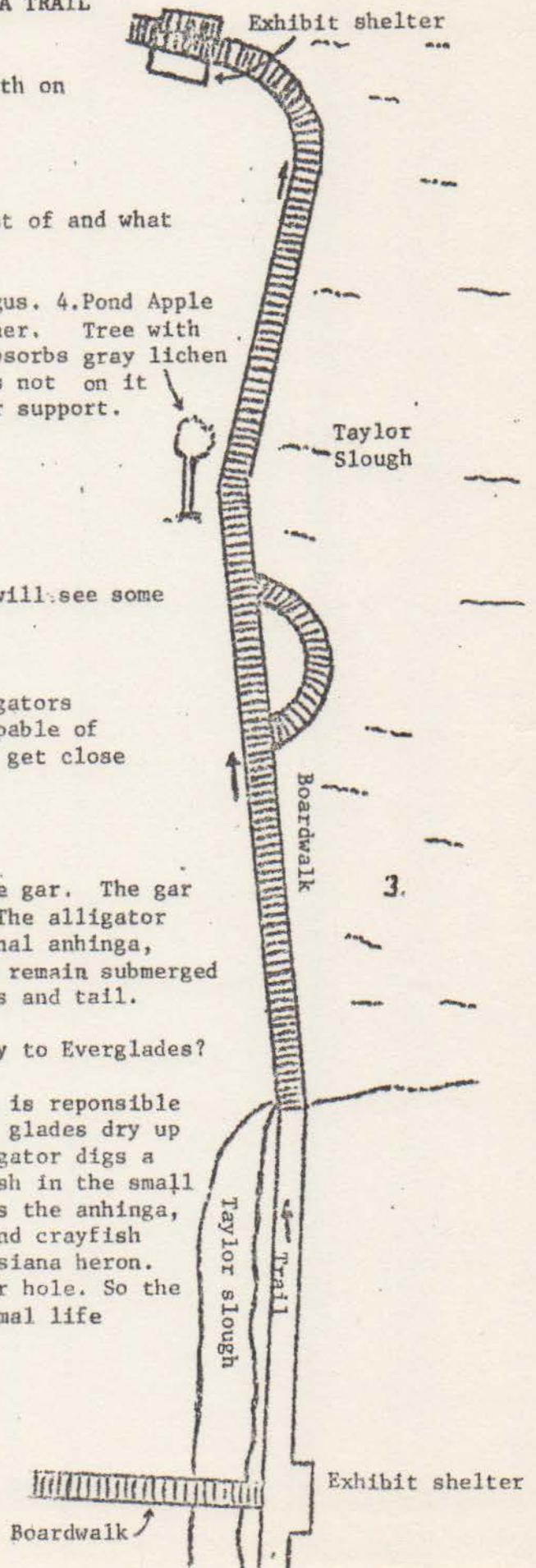
ANSWER: They can leap with amazing speed. Alligators can outrun humans for short distances and are capable of swimming very fast; as a result, we should never get close to them.

QUESTION: What do they eat?

ANSWER: A principal food of the alligator is the gar. The gar is the large, spotted fish with the long bill. The alligator also feeds on other fish, turtles and an occasional anhinga, blue heron, gallinule or coot. The alligator can remain submerged for 45 minutes and it has unusually powerful jaws and tail.

QUESTION: Is the alligator an asset or liability to Everglades?

ANSWER: For every aquatic bird that it eats, it is responsible for sustaining the life of 10 or more. When the glades dry up during the fall, winter, and early spring, the 'gator digs a large hole of water in a shaded hammock. The fish in the small reservoir provide food for aquatic birds, such as the anhinga, little blue heron, egret and others. The frog and crayfish around the pond are fare for the racoon and Louisiana heron. Hawks feed on frogs and water snakes in the water hole. So the alligator is responsible for sustaining much animal life through the dry season.



5. On the boardwalk, you likely will see red-billed and white-billed, duck-like birds in the water. The red-billed birds are "gallinules" and these with white bills are "coots." "A white snoot means a coot." You probably will have seen some long-legged, long-billed aquatic birds and alligators on the trail already.

QUESTION: What characteristics do these animals have in common with the gallinules and coots and how are they different?

ANSWER: All of the animals get their food from the water, swim or else have long legs for deep wading. They have bills by which to catch their food or a large mouth, teeth and jaws (alligator) for the purpose. They differ in that some eat fish, others eat plants and still others eat frogs and snails. They also vary in size, shape and color, the alligator has a tough, scaly skin but the birds are covered with feathers.

6. The water gauge automatically plots a daily chart of the water level of the pond.

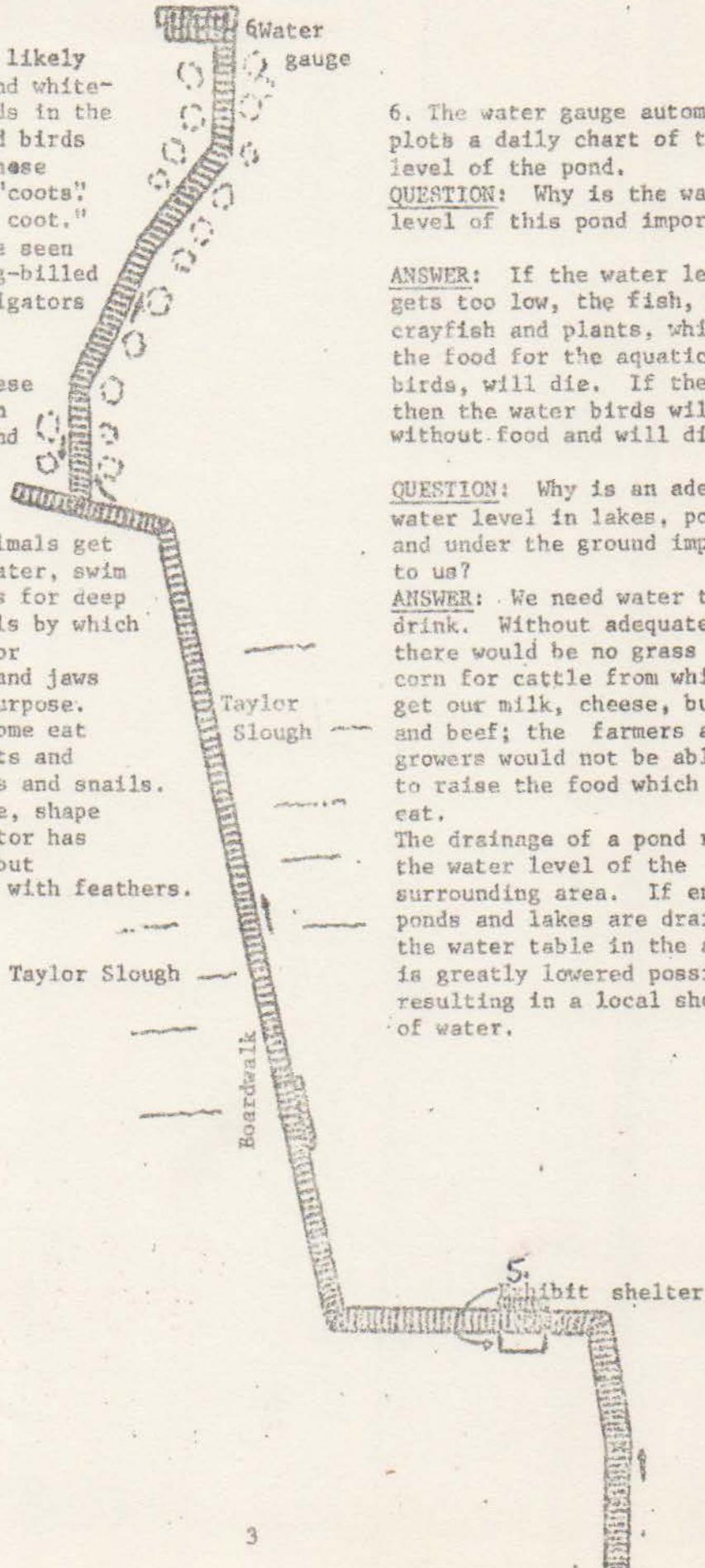
QUESTION: Why is the water level of this pond important?

ANSWER: If the water level gets too low, the fish, frogs, crayfish and plants, which are the food for the aquatic birds, will die. If they die, then the water birds will be without food and will die, also.

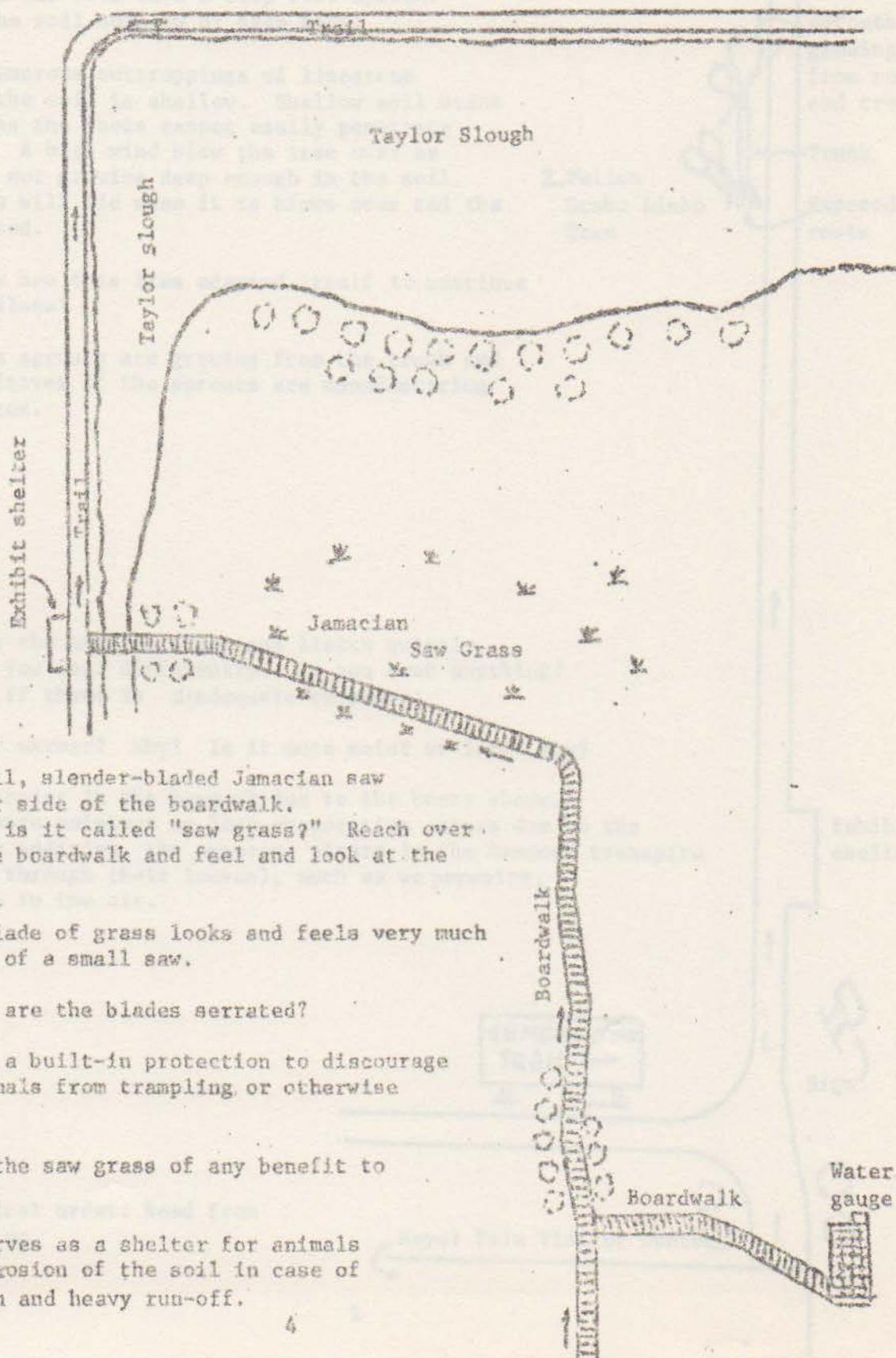
QUESTION: Why is an adequate water level in lakes, ponds and under the ground important to us?

ANSWER: We need water to drink. Without adequate water, there would be no grass and corn for cattle from which we get our milk, cheese, butter and beef; the farmers and fruit growers would not be able to raise the food which we eat.

The drainage of a pond reduces the water level of the surrounding area. If enough ponds and lakes are drained, the water table in the area is greatly lowered possibly resulting in a local shortage of water.



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Visitor Center



Notice the tall, slender-bladed Jamacian saw grass on either side of the boardwalk.

QUESTION: Why is it called "saw grass?" Reach over the side of the boardwalk and feel and look at the blade of it.

ANSWER: The blade of grass looks and feels very much like the blade of a small saw.

QUESTION: Why are the blades serrated?

ANSWER: It is a built-in protection to discourage humans and animals from trampling or otherwise damaging it.

QUESTION: Is the saw grass of any benefit to the glades?

ANSWER: It serves as a shelter for animals and prevents erosion of the soil in case of torrential rain and heavy run-off.

TEACHERS' GUIDE TO THE GUMBO LIMBO TRAIL

2. QUESTIONS: What caused the trees to fall over? Look around the base of the trunk and the roots of the tree. Does the tree have a deep root system? Why not? Is the soil shallow or deep here?

ANSWER: The numerous outcroppings of limestone indicate that the soil is shallow. Shallow soil means shallow roots as the roots cannot easily penetrate the hard rock. A high wind blew the tree over as the roots were not growing deep enough in the soil. Usually, a tree will die when it is blown over and the roots are exposed.

QUESTIONS: How has this tree adapted itself to continue to grow, regardless?

ANSWER: Large sprouts are growing from the trunk and roots and the leaves of the sprouts are manufacturing food for the tree.

1. As you enter the hammock, stop and listen quietly.

QUESTIONS: Do you feel differently? Do you hear anything? Lead questions if there is inadequate response:

Is it cooler or warmer? Why? Is it more moist or less? Why?

ANSWER: It is cooler in the hammock due to the heavy shade. There also is more moisture as less evaporation occurs due to the sun's rays. In addition, the numerous plants in the hammock transpire (release water through their leaves), much as we perspire, adding moisture to the air.

Gumbo Limbo
Tree in middle
of trail

2. Fallen
Gumbo Limbo
Tree

Sprouts
growing
from roots
and trunk

Trunk

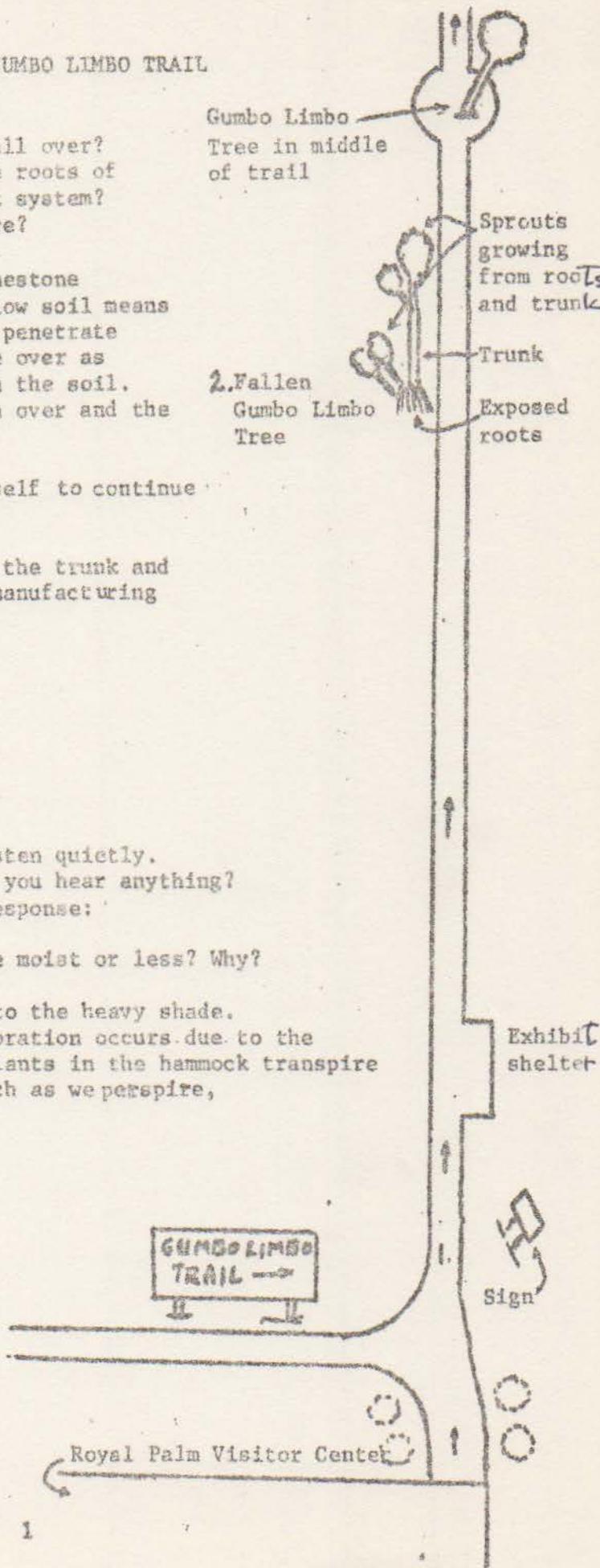
Exposed
roots

Exhibit
shelter

Sign

Royal Palm Visitor Center

Items in numerical order: Read from bottom of page up.



TEACHERS' GUIDE TO THE GUMBO LIMBO TRAIL

4. Holes near the trail on the right side.

QUESTION: Does anyone have any idea what might have caused these holes?

ANSWER: During the summer (rainy season), these holes fill with water. The rock in which the holes occur is limestone. When water and limestone come in contact with each other in the presence of decaying plants, a weak acid solution is formed. The acid very slowly dissolves the limestone creating a hole, called a solution pocket. Dead leaves from trees and other plants gradually fall into the solution pocket, decay and form soil in which small plants can grow. As the process continues, the soil gets deeper until eventually trees can grow in the larger solution pockets.

QUESTION: What is causing the log to decay?
Examine the trunk carefully.

ANSWER: On the right side of the trunk near the trail is a brown bracket fungus. The roots of the fungus dig into the trunk, loosen the bark and cause it to slough off. Spores from other fungi probably will light on the trunk, and help further loosen the trunk. Notice that further up this trunk leaves have fallen, decayed and produced soil. At least one small plant is growing out of the soil. The roots of the plant will further aid in loosening the trunk. Rain also is instrumental in causing a gradual deterioration of the trunk. The roots of the moss, which abound on the trunk, contribute to loosening the trunk so that it will gradually decay and become soil. It appears that small animals, such as mice and rats, might have burrowed into the butt of the trunk by the trail and dug out some wood so as to possibly build a nest. The pulverized wood, which resulted from their digging, quickly will decay and become soil.

Ferns
metal
sign

Solution
pockets

Brown Bracket
fungus

3. Large, green
decaying tree
trunk

Gumbo Limbo
metal sign

Gumbo Limbo
Tree in
middle of trail

6. Peer up into the large live oak tree and you will notice some small brown, deadlooking plants on one of the limbs where the oak forks.

QUESTION: Do you believe these plants are dead?

ANSWER: No, they are very much alive but, during dry weather, they assume a dried - up appearance to conserve moisture. These plants are called resurrection ferns as, when it rains, they will revive and turn green.

QUESTION: Do you think that the resurrection fern is a parasite?

ANSWER: The fern is dependent on the oak only for physical support so it is not a parasite. It receives its moisture and nutrients from the air; hence, it is an "air plant" or "epiphyte."

5. As you walk along the trail, look for a large web with a big yellow spider in it. This is known as a golden web spider as it builds a circular web which appears golden when the sun shines on it.

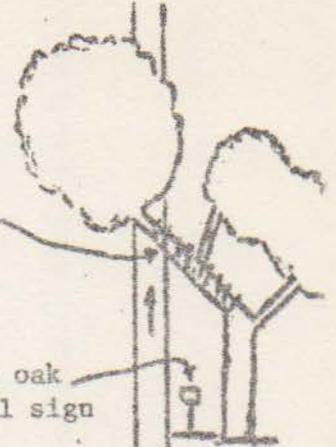
QUESTION: Why do you think that the spider builds its web in the hammock?

ANSWER: The lush growth of plants attracts insects and the web is built so as to trap insects for the spider's food as they fly through the hammock. In addition, the hammock canopy shields the spider from the intense rays of the sun, the direct impact of heavy raindrops and the vegetation in the hammock reduces the velocity of a high wind before it reaches the web.

6. Resurrection

ferns growing on trunk of live oak tree

Live oak metal sign



Large solution pocket

Part of dead tree trunk

Large, dead tree

5

Ferns metal sign

Solution pockets



9. Notice the heavy growth of plants in the pond.

QUESTION: What might originally have stimulated the profuse growth of the plants in the pond?

ANSWER: Detergents containing phosphates, sewerage or possibly some fertilizer could have been dumped into the pond in the past, adding more nutrients and stimulating the plant growth.

QUESTION: What eventually would have happened if the pollutants had continued being discharged into the pond.

ANSWER: The plants probably would have completely taken over the pond.

6. The plant is called "poisonwood" because contact with it and the sap causes rash and blisters. Poisonwood leaves are dark green and frequently have splotches on them. This particular plant has orange spots on the trunk.

7. QUESTION: Why do you believe that this strip originally was cleared?

Walk 50 feet or so to the left and the same distance to the right examining the ground to the edge of the clearing.

ANSWER: This is what remains of the old Homestead to Flamingo highway, used in the 1930s. It was paved with asphalt.

QUESTION: Can you think of similarities and differences between old highways, such as this one, and new ones?

ANSWER: This old highway had an asphalt surface and many of the modern roads are paved with the same material. How do the widths compare? The new highways are wider as modern cars are larger. What would have happened to this old highway in the 1930s in case of a heavy rain? It would have been covered with water isolating communities from each other. How does the modern Park road, which you traveled on to get here, differ? The highway is constructed higher to prevent flooding.

