

## Colloquium Field Trip

### National Audubon Society's Corkscrew Swamp Sanctuary



#### Learning Objectives:

- Discuss the historical trends leading to preservation of habitat and species at Corkscrew.
- Describe the value of wetlands in protecting water quality, maintaining biodiversity and preserving the watershed.
- Describe the role and value of fire, water, elevation and other climatic events and how they impact the habitats at Corkscrew.
- Identify the main species from each habitat at Corkscrew.
- Identify sustainable and environmental initiatives at Corkscrew.

#### Key Concepts:

- **History: Key Environmental Events in Southwest Florida**
- **1900s -- Plume hunting** decimated the wading bird population throughout South Florida as poachers shot birds while they nested. Energized local citizens aware of the problem partnered with Audubon and began the campaign which ultimately ended this looming ecological disaster.
- **1920-50s -- Cypress logging** was in full gear as timber companies harvested old-growth bald cypress trees in the Fakahatchee Strand and throughout the Big Cypress region. In 1952 Joe Brown, a local resident, wrote a letter to the editor of the Miami herald which brought attention to the disappearance of the old-growth cypress. A campaign was begun by people who loved this magnificent forest and teaming with the National Audubon Society they raised enough money to purchase the remnant of old-growth bald cypress from the Lee Cypress Company and Collier Enterprises. Corkscrew protects approximately 700 acres of old-growth bald cypress forest which is the largest stand of virgin bald cypress in the nation. Some of the trees are estimated to be up to 700 years old.
- **1996 to present – Extensive drainage and diversion of water** in South Florida to accommodate agriculture and a growing population has caused widespread changes in natural communities, degrading habitat for many plant and animal species. Starting back in the mid-80s special interest groups concerned about fishing, oyster beds, wading birds, wetland losses, water quality, wildlife and other issues put pressure on our government to correct the hydrologic mess caused by short-sighted surface water manipulations. The Comprehensive Everglades Restoration Plan (CERP) was officially initiated by congress in 1996. Local, State and Federal governments, and private non-profit groups like the National Audubon Society work together to shape the restoration efforts to restore the hydrology in South Florida. Many opportunities exist for the public to get involved in the process. Get informed and get involved.
- **2005 - Pollution and habitat fragmentation** are hot topics as red-tide, fish kills and extensive development routinely make headlines. Governmental agencies wrestle with the establishment of targets for pollution levels, and how to regulate this pollution, which includes freshwater releases into saline estuaries. Efforts are underway to identify and protect the most important remaining fragments of natural habitat and to restore vital connections between these patches to benefit the threatened wildlife which depend on them. We are now fighting over the scraps and asking how much pollution is acceptable.

- **Corkscrew watershed-** The Corkscrew watershed begins at Lake Trafford in Immokalee which is rain fed. Water flows through Corkscrew Regional Ecosystem Watershed (CREW) where it then enters Corkscrew Swamp Sanctuary. Water continues to flow south and west to the Gulf of Mexico via the Cocohatchee River, Imperial River and Estero River. The Corkscrew watershed is considered the “Western Everglades” and directional flow of water has not been altered with dams or dikes to date.
- **Wet and Dry Seasons in South Florida** - Ecological communities in South Florida are defined predominately by rainfall, elevation and fire. Wet-season typically runs from May through October when roughly 80% of the years total precipitation falls. At Corkscrew this is around 46”. During this period, water levels rise, streams and ponds overflow their banks and marshes sloughs and wet-prairies fill. Water flows across the landscape throughout the Everglades and Big Cypress in vast slow moving sheets. Fish, amphibian and insect populations explode, establishing the foundation of a highly productive and complex food web. As rainfall declines and drought conditions set in water levels throughout South Florida drop. Small dimples in the otherwise very flat land surface act to trap fish in the receding pools at the edges of the numerous watersheds. This slow recession of water levels makes available the bulk of the food resources which wood storks and other wading birds depend on during nesting season. Foraging wood storks follow the progression of drying pools of water down the gentle slope of the landscape throughout the entire dry-season. When rainy season resumes, rising water levels dilute fish populations and foraging becomes more difficult. This prompts wood storks to abandon the area for more productive feeding grounds. And the cycle resets itself.

### **Boardwalk Habitats**

- **Pine Flatwoods:** Dominated by slash pine, saw palmetto and sabal palm, this is what most of Florida once looked like. These forests were created and maintained naturally by periodic fire. The pine flatwood habitat is high and dry, has sandy soil, and is only flooded a short period of time (30-60 days) during the peak of rainy season in the summer. It is home to large mammals such as bobcat, panther, white-tailed deer, and black bears. It is an ideal habitat for hawks, woodpeckers, cardinals, vireos, snakes, raccoon, armadillo and squirrels. CSS staff manages this habitat with prescribed fire and the treatment of exotic plants species such as Brazilian pepper and downy rose myrtle.
- **Wet Prairie:** Dominated by sand cord grass, sedges, rushes and other various types of herbaceous vegetation, wet prairies are the least flooded of marsh systems with a hydro period of 5-6 months per year. A combination of nutrient poor soil, fire and flooding keep this grass-dominated prairie form becoming a pine forest or cypress swamp. This habitat is also managed with prescribed fire and treatment of exotic plant species such as primrose willow and fragmites.
- **Pond Cypress:** Pond cypress trees grow along the edge of the wet prairie and are the dominant species as you head into the cypress swamp and the soil is saturated nearly 10 months of the year. This is a prime example of an ecotone where two habitats meet, creating an environment where species from each preferred habitat mingle together. Pond cypress trees are thinner than mature bald cypress trees and have a lighter bark. Early explorers would define them as “white cypress”. While they are not as large in diameter, pond cypress trees can be several hundred years old. They grow in soil that is less nutrient rich than the bald cypress slough and where the surface is closer to the limestone rock pond cypress trees will remain shorter. In deeper depressions pond cypress grow quite tall. This results in many pond cypress stands to appear dome-shaped. Scientists are still not in agreement whether pond cypress and bald cypress are two distinct species. DNA testing suggests they are and there is an obvious difference in their needle patterns, but they are known to hybridize and both are deciduous conifers. Understory plants include sawgrass, ferns, air plants, wax myrtle, strangler fig and a variety of flowering plants ranging from water lilies and pickerel weed to wild iris and bladderworts.
- **Bald Cypress:** The elevation continues to drop further into the cypress swamp and bald cypress trees become the dominant species. Bald cypress trees have a darker bark and were historically known as the “black cypress”. Corkscrew Sanctuary is home to the largest remaining continuous stand of virgin bald cypress in North America. Some trees are estimated to be as old as 700 years, tower up to 130 feet tall and have cypress knee root systems which aid in stability, oxygen exchange and possibly food storage. Natural cavities in the old growth trees provide homes for barred owls, screech owls, raccoons and snakes. Pileated, red bellied and downy woodpeckers also excavate homes in bald cypress. Corkscrew’s horseshoe-shaped bald cypress forest is home to the largest nesting colony of wood storks in North America.

Because cypress lose their needles in the winter, a sufficient amount of light filters to the forest floor and allows a rich diversity of plant life to thrive in the understory. Epiphytic orchids and air plants are abundant on cypress branches, as well as on pond apple and maple trees that are found in the swamp. Fallen logs and branches become nurseries for ferns, creating diverse microhabitats for insects, reptiles, amphibians and small mammals.

- **Lettuce Lake:** Deeper lakes are found in the heart of the cypress swamp where water lettuce, duckweed and salvinia are the dominant floating aquatic vegetation. The deeper water attracts gators, turtles and otters and is a rich feeding ground for wading birds during the drier winter months.
- **Allow some time for reflection-** By encouraging the students to simply stop, listen and reflect, even if for just a few minutes, you will be serving them the greatest gift of the swamp. Our students are constantly immersed in the hustle and bustle of traffic and hurried life-styles. Allow them to experience peace and quiet.

## **Sustainability**

- **Boardwalk Construction/Materials-** Corkscrew's boardwalk is a perfect example of using a sustainable resource to construct a boardwalk, which in turn protects our natural resources from the impact of visitation. Corkscrew's new boardwalk was opened in 1996 and is constructed of Ipe (*Tabebuia serratifolia*, trade name Pau Lope) purchased from CEMEX (Commercial Madeiras Exportaca'õ or Commercial Wood Exporters), a Brazilian company committed to an acceptable policy of sustainable harvesting. The boardwalk is expected to last 50 years or more. While other recycled materials were considered, IPE has twice the strength and five times the hardness of pine and is extremely fire resistant. It does not rot, decay or succumb to termites and is not chemically treated. The boardwalk weaves and winds, as trees that were 3" in diameter or more at the time of construction were left standing. This rule of thumb was also used when constructing the energy efficient Blair Audubon Center. The Blair Center and Corkscrew boardwalk also contribute model sustainable business practices. Visitor fees, merchandise sales, tuition income and charitable contributions help Corkscrew's staff manage this 13,000 acre gem to sustain the health of both wild and human populations.

**Living Machine-** Living Machines use water, sunlight, bacteria, plants and animals to treat and clean wastewater to make it suitable to recycle back into the toilets. The living machine converts ammonias (NH<sub>4</sub>) and then nitrates (NO<sub>2</sub>) into nitrites (NO<sub>3</sub>) that plants can utilize and then release as harmless nitrogen gas. The system mimics natural processes and demonstrates the ability of living organisms and wetland plants to filter nutrients and provide habitat. There are three main stages for water treatment in the living machine: First the water is filtered through anaerobic tanks under the butterfly garden. Next the water flows to the large aerated blue tanks opposite the entrance and is progressively cleaned as it passes through five tanks. It then flows into the last of the six tanks which is a clarifying tank. Remaining solids filter to the bottom of the clarifying tank and are sent back to the anaerobic tanks. The filtered water flows to the wetland plants. It is estimated that water in the aerobic stage of our system is cleaner than much of the drinking water in the world. Water is further filtered as it passes through the marsh system and is then chlorinated as required by law, and de-chlorinated prior to returning to the toilets. Approximately 90% of the water is recycled, while the other 10% is lost to evaporation or filtered to the on site drain field. This is an invaluable system that allows us to show students innovative technology built by observing natural cycles and systems. The living machine also represents water conservation and sustainability.

## **For more information, see these resources:**

**General Introduction to Corkscrew** – *Corkscrew Swamp Sanctuary* video approx. 30 minutes, produced by International Video Projects Incorporated. We have copies of this video in our Colloquium Library and available for checkout.

**Boardwalk** – *Corkscrew Swamp Sanctuary & Blair Audubon Center Field Guide*. We have enough copies in our Colloquium Library for all of your students to use in the field. Check them out with the Office Manager.

**Corkscrew Swamp Sanctuary Website** -- [www.corkscrew.audubon.org](http://www.corkscrew.audubon.org)

Audubon Society of Florida Website -- [www.audubonofflorida.org](http://www.audubonofflorida.org)

Southwest Florida Watershed Council -- [www.swfwc.org](http://www.swfwc.org)

**Comprehensive Everglades Restoration Plan (CERP)** -- [www.evergladesplan.org](http://www.evergladesplan.org)

**Living Machine** -- Additional information provided at the Corkscrew website at

<http://www.corkscrew.audubon.org/Information/LivingMachine.html>

**General Environmental** -- National Audubon Society Field Guide to Florida by Peter Alden, Rick Cech & Gil Nelson, copyright 1998, published by Alfred A. Knopf, New York. We have 8 copies for your use in the Colloquium Library. The Everglades Handbook: Understanding the Ecosystem by Thomas E. Lodge, Second edition copyrighted 2005, published by CRC Press LLC, Boca Raton, FL.

Ecosystems of Florida edited by Ronald L. Myers and John J. Ewel, copyrighted 1990, published by the University of Central Florida Press, Orlando, FL.

Priceless Florida: Natural ecosystems and Native Species by Eleanor Noss Whitney, D. Bruce Means and Anne Rudloe, copyrighted 2004, published by Pineapple Press, Sarasota, FL.

