



The Everglades

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The Everglades

- 25° North, 82° West, and 7ft.above sea level.
- Spans from Northern Florida near Lake Okeechobee south to Florida Bay.
- Total area is 19,430 square km.

A Unique Wetland

- The Everglades is a unique wetland due to its “sheet flow” ecosystem.
 - Receiving its nutrients and water from rainfall.
 - Making it independent of rivers and streams.
- Two Major Wetland Types: Swamps and Marshes.
 - Everglade swamps are: Mangrove and Cypress swamps.
 - Non-woody marshes make up Everglades.
 - Typical environments: Freshwater marshes, Wetland Tree Islands, Cypress Heads, and Tidal creeks.

History of the Everglades Hydrology

- Accumulation of Peat soil about 5000 years ago.
 - Sea levels rose, area to become Everglades could no longer drain properly.
 - Presence of surface water changed vegetation to marsh plants.
 - The Everglades vegetation advanced higher and higher into the uplands.
 - Created the Kissimmee-Lake Okeechobee-Everglades water shed.

Recent History

- Prior to 1850's no changes were made to the Everglades.
- 1850 The Swamplands Act authorized 20 million acres to be drained for urban growth.
- By 1891 major reclamation and drainage efforts started the "Cut 'n try" plan.
 - Would create major canals that would dissect the Everglades.
 - This would continue until the 1950's.
- From 1952-54 the old canals would be revamped to create major barriers for flood control.

Recent History Continued

- 1954-63 creation and completion of the Water Conservation Areas.
 - Created in order to stop sheet flow to Everglades and direct to urban areas.
 - Makes up the largest remnants of the Everglades which help to maintain hydrologic patterns and the indigenous species.
- 1965 to present
 - main agenda is to revamp the current WCA and levees to satisfy the water demand of the Everglades.

Florida Bay

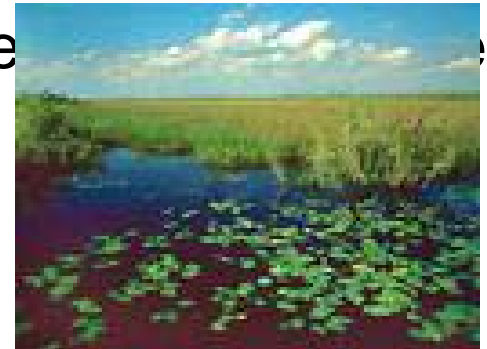
- Florida Bay is an example of the great effects that the hydrology has had on the Everglades.
 - Due to the lack of freshwater inflow.
 - Created an increase in the salinity levels.
 - Can see this in the Coral Banding which illustrates correlation between coral fluorescence and freshwater flow.

Restoration Efforts

- There are two main options:
- Marsh Buffer Strip East of Water Conservation Area
 - Urban and agricultural runoff would be pumped into buffer strip.
 - It would recharge the wells and maintain groundwater, and provide water restoration flow to the Everglades.
- Capture released water from Lake Okeechobee.
 - Would use flow ways from the EAA, would lessen consumption, act as a water quality treatment system, and reshape release from the lake to the Everglades.

“The River of Grass”

- The main water flow through the Everglades.
- A dense population of sawgrass sprouts through the water surface.
- In the summer wet season it is a wide grassy river.
- In the winter the edge of the slough is a dry grassland.
 - A slough supplies fresh water to different swamp.



Florida Bay

- The largest body of water in the Everglades. The coastal systems are unique because their combination of climatological and physiographic features occurs nowhere else.
- The marine bottom is covered by seagrass beds which are used by many species as feeding grounds, nurseries, and refuge.
- Inhabitants:
 - Oysters
 - Shellfish
 - Sponges
 - Fish
 - Shrimp

Mangrove Forests

- Found in the coastal channels and winding rivers around the tip of southern Florida.
- All three species of mangroves are found here.
 - Red mangroves (*Rhizophora mangle*)
 - Prop roots
 - Black mangroves (*Avicennia germinans*)
 - Pneumatophores
 - White mangroves (*Laguncularia racemosa*)
 - Rounded leaves

Mangrove Forests

- This estuary system is a valuable nursery for shrimp and fish.
- During dry months wading birds congregate to feed and nest.



Cypress Trees

- *Taxodium* spp. Is a deciduous conifer that can survive in fluctuating water levels.
- They often form dense clusters called cypress domes in natural water-filled depressions.
- Most flood tolerant of all species in Florida.



Hammocks

- Dense areas of hardwood trees that grow on natural rises of only a few inches.
- Due to slight elevation hammocks rarely flood and are protected from fires.
- Ferns and air plants thrive in the moisture rich air contained within the hammock.
- Inhabitants:
 - Mahogany (*Swietenia mahogoni*)
 - Gumbo limbo (*Bursera simaruba*)
 - Oak (*Quercus lyrata*)
 - Hackberry (*Celtis laevigata*)
 - Red Maple (*Acer rubum*)

Insectivorous Plants

- Four major species are found in the Everglades.
 - Bladderworts (*Utricularia*)
 - Sundews (*Drosera*)
 - Butterworts (*Pinguicula*)
 - Pitcher Plants (*Sarracenia* spp.)

Slash Pine

- In the dryer areas slash pine (*Pinus elliottii* var. *densa*) flourish.
- They can be rooted within soiled cracks on limestone ridges.
- The pinelands are the most diverse habitat in the Everglades, with an understory of saw palmettos and over 200 varieties of tropical plants.
- Inhabitants:
 - Cotton rat (*Sigmodon hispidus*)
 - Short-tailed shrews (*Blarina carolinensis*)
 - White tailed deer (*Odocoileus virginianus*)
 - 20-30 species of amphibians and reptiles

Invertebrates

- They are found in every area of the wetlands and are the base of the swamps food chains.
- Examples are leeches, worms, mites, spiders, and crustaceans.
- Invertebrates, especially insects and other arthropods, are common on the water surface and in the canopy.

Amphibians and Reptiles

- Can be found everywhere
 - Marbled salamander (*Ambystoma opacu*)
 - Bird-voiced tree frog (*Hyla avivoca*)
 - Alligators (*Alligator mississippiensis*)
 - Striped crayfish snake (*Regina alleni*)
 - Burrowing sirens (*siren spp.*)



Alligators

- They have a reciprocal relationship with the wetlands.
- They create “gator holes” .
 - The dirt and foliage thrown out of the hole can sustain trees and other vegetation.
 - The holes provide refuge for fish, which would otherwise not survive the winter drought.



Birds

- There are over 40 species of birds that use the wetlands year round or during migration periods.
- They tend to be near river swamps where insects, fish and fruits are plentiful.
 - Wood storks (*Mycteria americana*)
 - Herons
 - Wood ducks (*Aix sponsa*)
 - Wild turkey (*Meleagris gallopavo*)



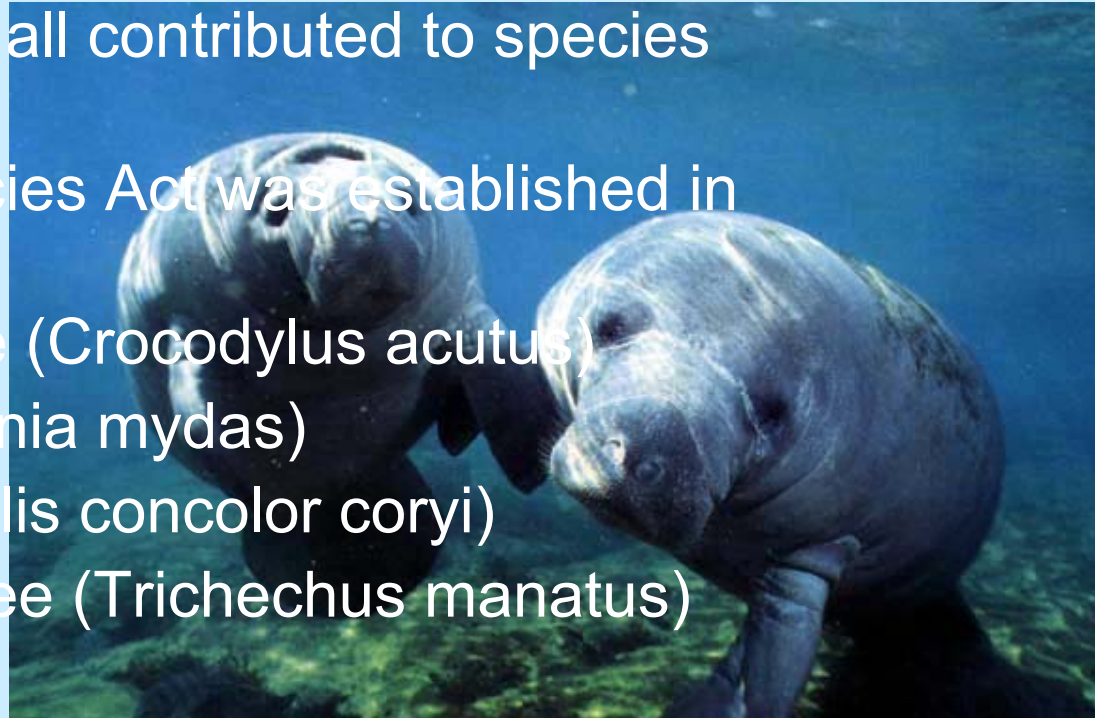
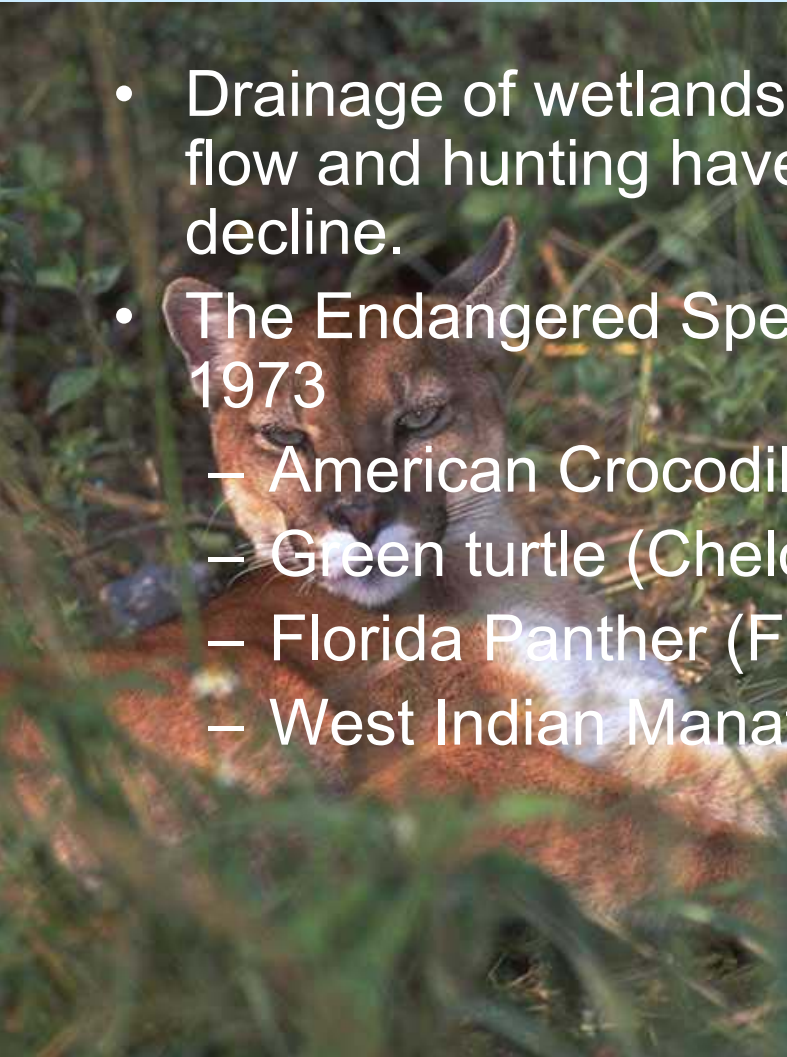
Mammals

- Raccoons (*Procyon lotor*)
- Florida panther (*Felis concolor*)
- River otters (*Lutra canadensis*)



Endangered Species

- Drainage of wetlands, alteration of overland water flow and hunting have all contributed to species decline.
- The Endangered Species Act was established in 1973
 - American Crocodile (*Crocodylus acutus*)
 - Green turtle (*Chelonia mydas*)
 - Florida Panther (*Felis concolor coryi*)
 - West Indian Manatee (*Trichechus manatus*)



Fires

- They help shape the unique ecosystems of the Everglades.
- Natural fires are due to lightning and occur every 25-30 years.
- When a fire burns an area it releases nutrients back into the soil, which helps new vegetation to grow and can be seen within a couple of days.
- Fires enable annual plants, low growing species and pine seedlings to take root in an otherwise overly competitive environment.

Fire management

- Early fire management was aimed at total suppression of wildfires.
- It was later learned that to maintain the Everglades biological diversity, fire is necessary.
- Today natural fires are let burn as long as it does not pose a threat to surrounding residence.
- The Everglades National Park became the first in the US to use prescribed fires.

Invasive Species

- Species that are not native to an area and are able to dominate an ecosystem because of little or no limiting factors.
- Able to out compete natives for both food and space
- Reduce species diversity in the ecosystems they invade.

Melaleuca Quinquenervia

- Native to Australia, New Guinea, and New Caledonia
- Originally brought to Florida for its ability to dry up swamps and was spread by planes throughout the Everglades

Invasion

- Characterized by a rapid growth rate, efficient reproduction and the ability to invade a wide variety of habitats.
- Can survive on any disturbed soil in Southern Florida and can tolerate flooding, moderate drought, and some salinity.
- It forms dense stands that have shown to decrease species diversity from 60-80%

Controls

- Pull by hand
- Girdle and inject the trunk with herbicide
- Leaf weevil (*Oxyops vitiosa*)
 - 1,600 weevils introduced to Florida in 1997
- Controls do not stop, but only slow down, the invasion.

Schinus terebinthifolius

- Common name Brazilian pepper
- Indigenous to the coasts of Brazil, Paraguay and Argentina
- Once sold as an ornamental for landscaping with a similar species still being sold.
- Has become prevalent in Florida and is threatening mangrove forests.

Invasion

- Can invade both disturbed and undisturbed areas
- Creates dense canopies that eliminate almost the entire herbaceous understory, especially in mangrove forests.
- High rate of seedling survival, usually 66-100%
- Allelopathic: suppresses the growth of the species by releasing toxins into the environment

Controls

- Multiple burnings
 - no seeds will germinate following a fire, however basal trunk and root sprouting can be aggressive
- Herbicides applied to the foliage and bark
- Insect predators are being looked at however non have been introduced
- Controls are both time consuming and costly

Casuarinas

- Three species
 - *Casuarinas equisetifolia*
 - *Casuarinas glauca*
 - *Casuarinas cunninghamiana*
- Native to Australia
- Introduced and widely cultivated in Florida for coastal landscaping

Invasion

- *Casuarina equisetifolia* most common
- Can withstand flooding and high salinity
- Produce dense stands that form thick carpets of needles and inhibit the growth of native species
- Seeds remain fertile up to a year, with a single tree producing thousands of seeds
- Taking over places in the last remaining nesting areas for the American crocodile

Controls

- Herbicides applied to girdled trees
- No other known control that works well

Conclusion

- The Florida Everglades is a unique wetland rich with both plant and animal species
- These habitats form a fragile ecosystem that has been greatly affected by both human and natural disturbances
- Actions must be taken quickly to ensure its survival