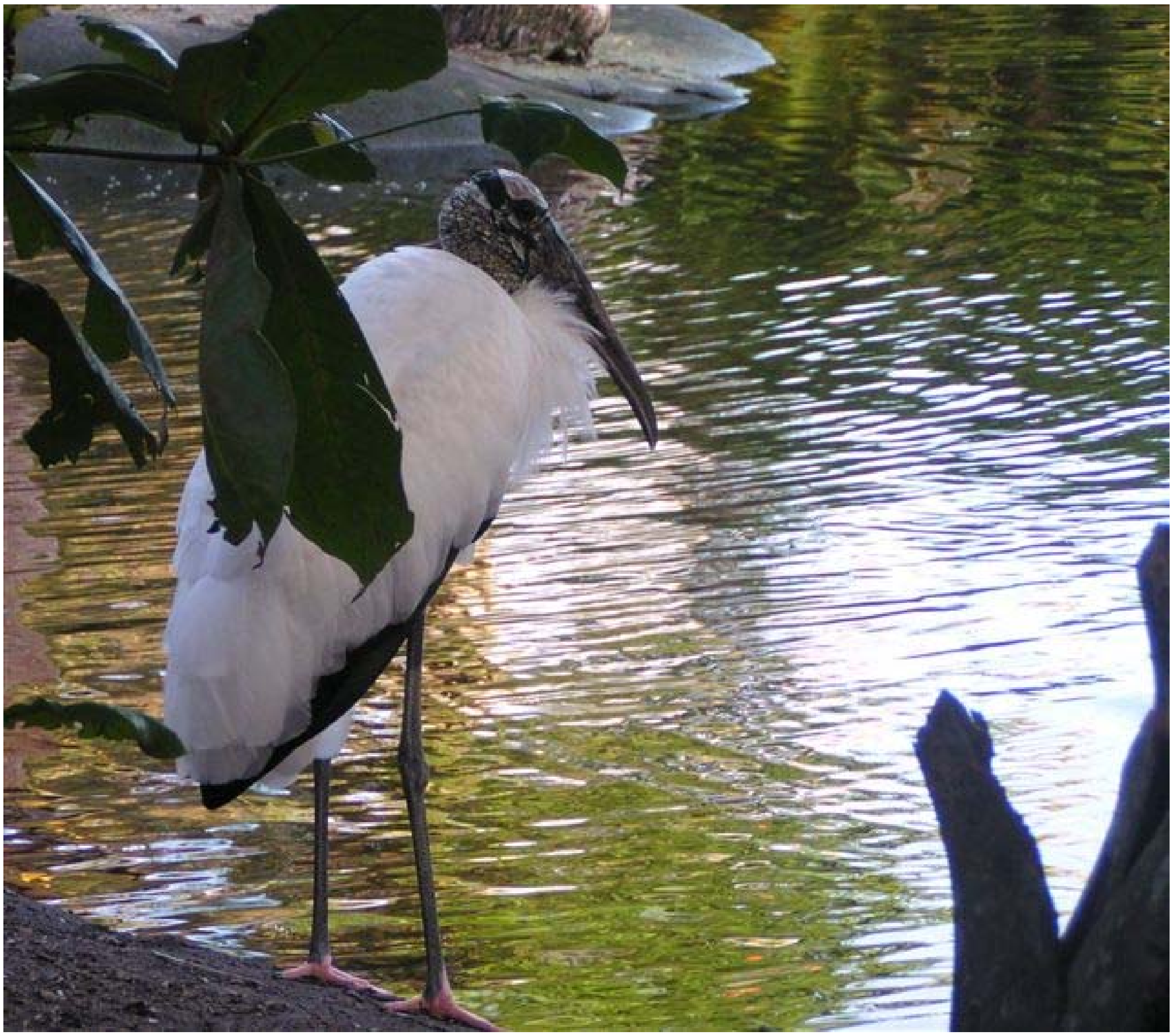
THE FLORIDA WOOD STORK; AN INDICATOR SPECIES



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FIGURES

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Wood storks (Mycteria Americana) were a common sight in Florida's wetlands at a time when many of Florida's wading birds were hunted nearly to extinction for their plumage. The plumage trade was outlawed and wading birds were making a comeback,

yet ironically, the wood stork population was on a decline. In the 1930's, the wood stork population in the United States was approximately sixty thousand. Today, the National Audubon Society estimates that there are only four thousand to five thousand six hundred nesting pairs. Conditions such as hydrological changes, ecological shifts, geological transformations, and atmospheric modifications have played a significant role in the rapid decline of the wood stork. This paper explores the global systems that affect the wood stork's survival. It will show how Florida's altered landscape has disturbed the highly sensitive relationship between the wood stork and the natural cycles of Florida's wetlands.

As a result of the rapid decline, the wood stork was officially listed an endangered species in 1984. Research has shown that the most significant reason for the decline of the wood stork is inadequate reproduction (Van Meter 19). In order for the wood stork to survive and reproduce effectively, ideal feeding and breeding conditions are essential. As water levers drop throughout the marshlands due to prolonged dry periods, fish that are critical to the wood stork's diet concentrate in pools of water. They provide the nutrition that is necessary for wood stork survival. During the breeding season, a pair of wood storks requires approximately four hundred and forty pounds of fish for themselves and their young (Van Meter 8). The availability of this food affects all phases of their breeding and nesting cycles.

Successful reproduction depends on ample summer rains to saturate the land. By the end of the rainy season, it is imperative that the rains taper off, so that the waters can recede. When the water levels reach a certain level, egg laying will occur regardless of the calendar date. This breeding schedule is so synchronized, that any changes can negatively impact the wood stork's reproductive success. Nesting failures can result from excessive dry periods during the rainy season, an over abundance of rains during the dry season, or inappropriate management of water levels.

Since the beginning of the 20th century, more that half of the wetlands in Florida have been drained and transformed into farms, pastures, and suburbs (Figure 1). Canals were constructed to reduce the effects of flooding during hurricanes. The water management districts control most of the remaining wetlands and water resources in Florida. These parcels are managed for a number of uses including flood control, gaming, agriculture, industry, mining, and urban needs. All of these changes have significantly influenced wood stork populations.

These landscape alterations have also affected Florida's soil systems. Normally, soils change slowly under natural conditions. Modifications of the soil substrate, such as plowing and strip-mining have created soils and land features that were unknown to Florida in the past. These newly created soils are more likely to support new ecosystems where non-native species, such Melaleuca, Australian Pines, and Brazilian Pepper are the dominant plant species. Importation of exotics such as these has adversely impacted wood stork habitat.

Of the eleven soil orders found in the United States, seven are found in Florida (Figure 2). The wood stork nests in habitats such as pine flatwoods, prairies, cypress domes, and mangrove swamps. Soils that compose these habitats can be classified as histosols and spodosols. Histosols contain organic materials, such as muck or peat that are often found in the Everglades Agricultural Area. Spodosols have a spododic horizon, which has organic material combined with aluminum and/or iron accumulation (Myers 48). Much of the Big Cypress Swamp, a primary wood stork habitat, is composed of spodosol soils. The Florida Everglades and associated areas are considered to be critical habitat for wood storks (Figure 3).

It seems that relationships among swamps, wetlands, and upland areas are poorly understood. Wetlands are typically found between upland and aquatic ecosystems.

Depending on the season, the amount of water they store and process varies. In the past, wetlands in South Florida were thought of as uninhabitable and lacking in value. It has been noted that, “Wetlands are among the most important ecosystems on the Earth. In the great scheme of things, it was the swampy environment of the Carboniferous Period that produced and preserved many of the fossil fuels on which we now depend” (qtd. in Wetlands 153). Moreover, Florida’s natural ecosystems perform a wide variety of important functions. They purify air and water, regulate climate, detoxify and decompose wastes, regenerate soil fertility, and produce and maintain biodiversity.

The development and alteration of Florida’s wetlands has led to severe consequences in the ecosystem (Figure 4). Figure 5 illustrates the annual loss of wetlands. Many of the remaining wetlands are now polluted with pesticides and toxic chemicals, over enriched from nutrients in fertilizers and sewage, and show signs of saltwater intrusion. Such contamination affects the wetland’s ability to function properly. In order for a wetland area to maintain productivity, hydrologic conditions must be in tune with all of the other natural cycles. Hydrology is vital for the maintenance of a wetland’s structure and function. In addition, it influences many abiotic cycles, such as soil anaerobiosis and nutrient availability.

Peat deposits found in wetland areas contribute significantly to global atmospheric carbon dioxide levels. Research indicates that this global carbon balance has been altered due to agricultural modifications if peatlands (Mitch 526). Futhermore, human activities such as the usage of automobiles and burning of fossil fuels have increased air pollutants such as sulfates, nitrates, and carbon dioxide. These chemicals have significantly contributed to conditions such as acid rain and the effects of global warming. Global warming indirectly affects the wood stork by shifting the natural cycles that it depends upon, creating a change in its ecosystem, and therefore contributing to the reduction of food supply and habitat.

Global systems that affect the wood stork's survival such as such as hydrological changes, ecological shifts, geological transformations, and atmospheric modifications have played a significant role in the rapid decline of the wood stork. Florida's altered landscape for the sake of growth has disturbed the highly sensitive relationship between the wood stork and the natural cycles of Florida's wetlands. "Wood storks are so closely attuned to the natural cycles of Florida's wetlands that their well being is an indicator of the health of our wetlands themselves" (qtd. in Florida's Wood Storks, 2000). Conservation efforts must begin with saving wood stork habitat; however doing so has political, economic, and social impacts. As Florida's population continues to grow, these issues will need to be addressed in greater depth. It is crucial to preserve wetlands, so that the wood stork and all other wetland species can continue to maintain existing populations.

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Wood Stork Distribution in the U.S. http://www.mbr.nbs.gov/bbs/htm96/trn626/tr1880.html

Figure 1

Distribution of Wood Storks in the U.S.

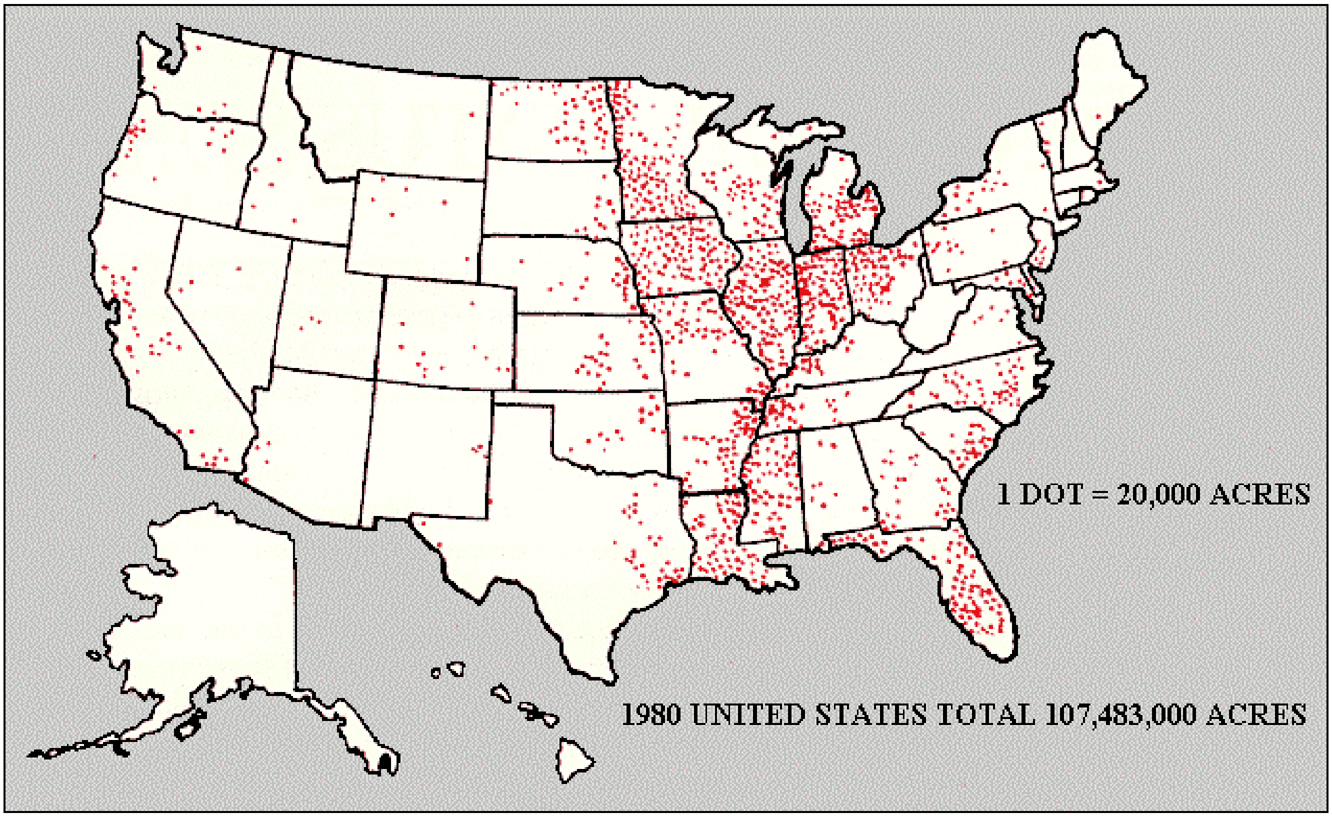

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Figure 2

Major Soil Orders

Entisol	dominance of mineral soil materials, absence of distinct horizons	all climates, any vegetation, young soils, floodplains, glaciated areas, mountains
Inceptisol	texture finer than loamy; little translocation of clay, often shallow, little development of horizons	all climates and vegetation, developing soil
Vertisol	dark clay soils, wide deep cracks when dry	areas with clay textured parent material
Aridisol	dry for extended periods, low in humus, high in bases	desert and semiarid regions
Mollisol	surface horizons dark brown to black with soft consistency, rich in bases	semi-humid regions, native grassland vegetation
Spodosol	light gray, whitish A on top of black or reddish B	cool, humid regions, coniferous forests
Alfisol	shallow humus, translocation of clay, low bases, well developed horizons	humid, temperate regions, deciduous and coniferous forests
Ultisol	intensely leached, strong clay translocation, low bases	warm humid to tropical climate, forest vegetation
Oxisol	highly weathered soils, red, yellow, gray	tropical and subtropical climate and vegetation
Histosol	high organic content	bogs, marshes, muck
Andosol	volcanic origin, not weathered	volcanic regions, especially tropical

Figure 3

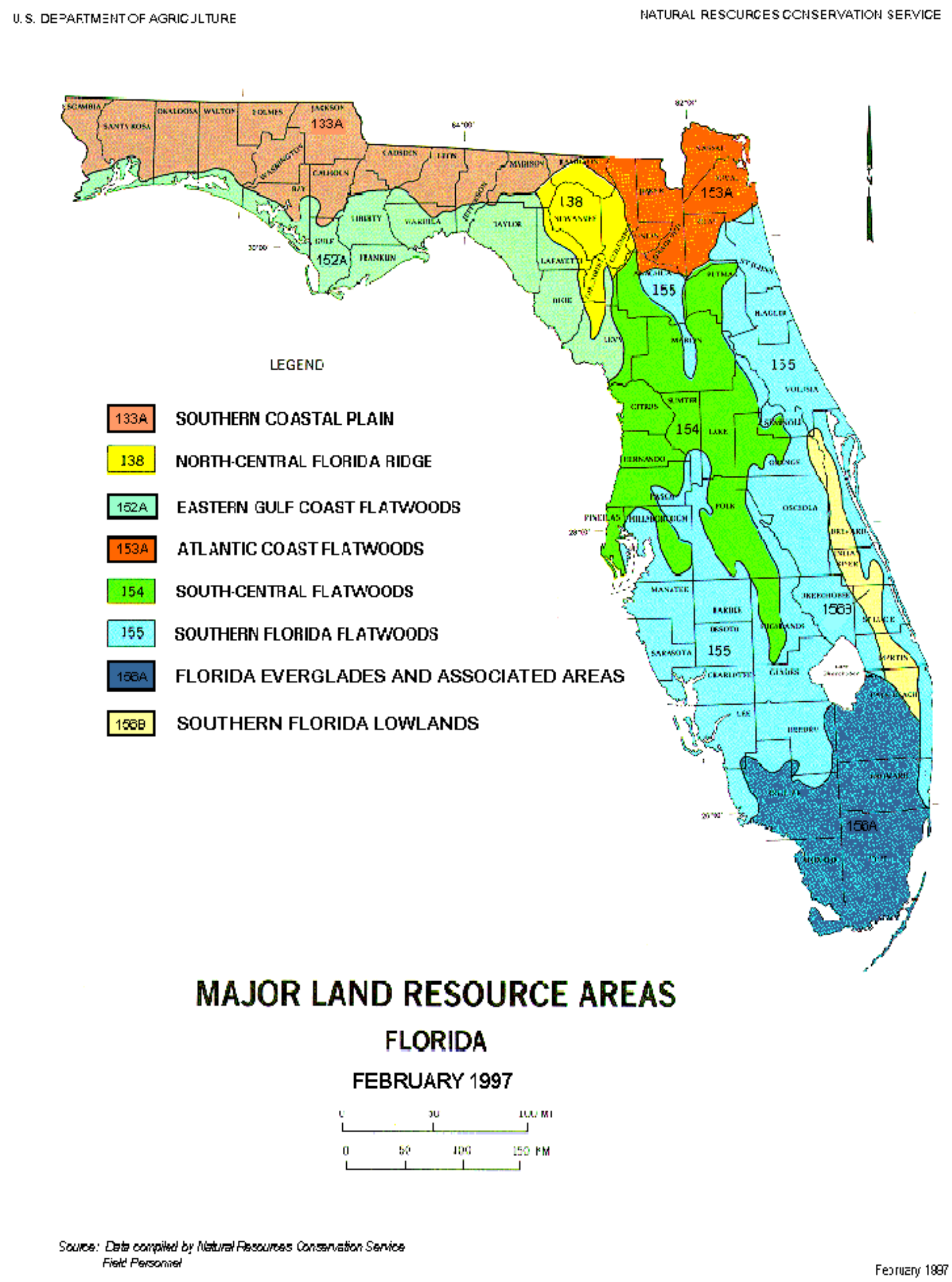

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Figure 4.

Changes in land cover and drainage in south Florida - predevelopment and today.

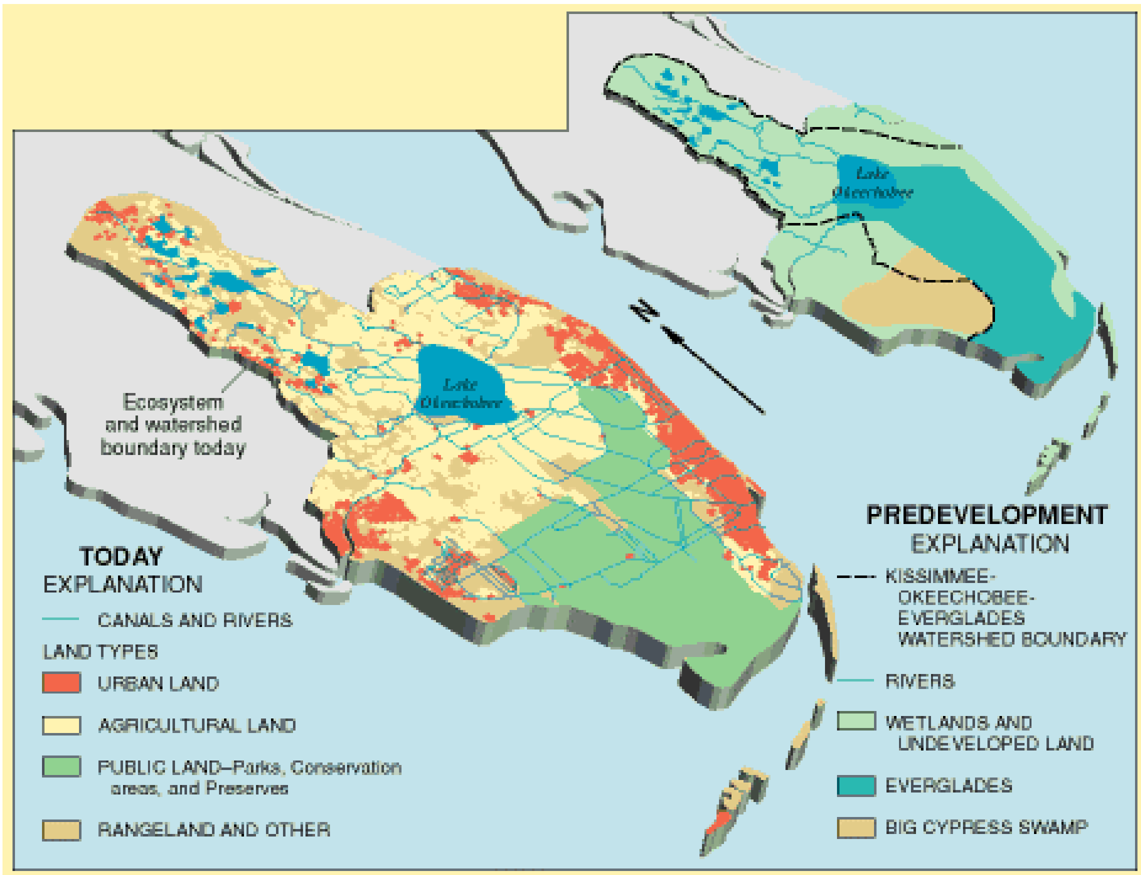
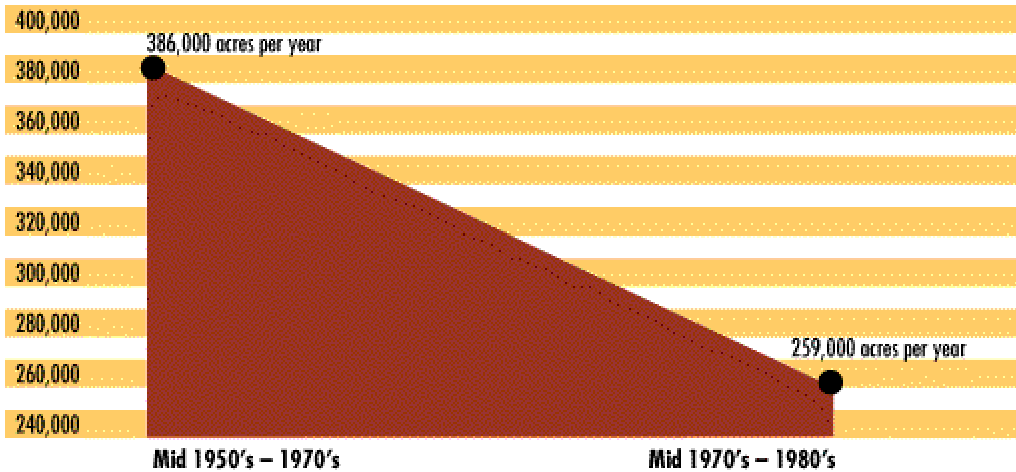


Figure 5.
All wetlands in the Southeast: Average annual loss



Study area: Southeast Region of the U.S. Fish and Wildlife Service