The Fakahatchee Strand

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THE PLACE

The Fakahatchee Strand lies on the southwestern side of the tip of the Florida peninsula in Collier County. Specifically, this discussion will concentrate on the Fakahatchee Strand State Preserve supervised by the Department of Natural Resources of Florida.

The first published usage of the name "Fakahatchee" was on the Ives’ Military Map produced during the second Seminole War in 1856 where he said that the name meant "muddy creek". According to Simpson (1956), the name is from the Muskogee words "fakka" meaning clay or mud, and "hatchee" meaning creek. Recently it has been suggested that the term actually was a subdivision of the larger region the Seminoles called either "Okholwake" (bad water) or "Archenaho-taphe" (big slough (Muskogee for "little bad water") or, as someone has translated it, "boggy slough"). This in turn connects with the Devil's Garden and almost joins the Caloosahatchee River system that drains from the western side of Lake Okeechobee into the Gulf of Mexico. In short, the Strand is the southern terminus of a drainage system that begins many miles to the north. Directly north of the Strand is the "Ocaloacoochee" Slough (Muskogee for "little bad water", or, as someone has translated it, "boggy slough").

The lakes are connected with shallow channels difficult to distinguish from the air except by vegetation patterns (Klein et al., 1970). Topographically, these channels have allowed the Strand to be broken into the drainage source for three rivers: Fakahatchee River begins at Big Cypress Bend near the modern Seminole village, and drains into the Fakahatchee Bay. Historically, Big Cypress Bend was called "Fakahatchee" (Copeland, 1947). East River comes out of the main strand and drains westward into Fakahatchee Bay. Ferguson River begins near Three-Mile Swamp and empties into West Pass Bay. The Barron River Canal, which intercepts flow from the East Hinson Marsh and farther downstream from Fakahatchee Strand, and empties into Chokoloskee Bay at Everglades City (McElroy and Alvarez, 1975), has always been part of the Deep Lake Prairie system and technically not a part of the Fakahatchee Strand.

Fires. Fires did not historically play an important part in the interior of the Fakahatchee, but it has long been an element of the surrounding plant communities. Fires seem to have burned through the pinelands and prairies with a frequency of about 2 to 7 years before the historical period. From the time of the Seminole occupation in the early 1800s to present, humans have been an increasingly important source of fires. The Seminoles burned regularly to provide new grass for deer and other food animals, and the American immigrants continued the practice.

Fires are set annually by the local residents and burn through the prairies and pinelands. These are not a factor within the Strand itself because the higher moisture of the borders extinguishes them. During and after the logging period, however, there were some dramatic burns within the strand itself. The location of these burns may still be determined by examination of the plant communities, often dominated by willows.

HISTORY

Early. The earliest reports of the region are fragmentary and often center on the unusual royal palms. Probably the first record of royal palms in Fakahatchee was reported by J.C. Cooper in 1860 (Small, 1937). He said that Roystonea was found "in large groves, between Capes Sable and Romano," although he had not seen the trees personally. M.A. Curtis, in the late 1880s, said that there were "Little and Big Palm Hammocks" 15 and 25 miles east of Cape Romano (Small, 1928). At least one of these was probably within Fakahatchee. Pliny A. Reasoner collected his Serenoa arborescens (now known to be Acoelorraphe wrightii) in Fakahatchee in the spring of 1888. A.A. Eaton collected there in 1903, 1904, and again in 1906; Mr. James E. Layne was there in 1903. After three unsuccessful attempts, Small (1921) reached the "point of cypress" that Reasoner had visited and found living royal palms. Later Small (1928) wrote that "in the Fakahatchee Cypress there is a stretch of the royal-palms extending for fifteen miles north and south just west of Deep Lake.

John K. Small’s visit to the Strand in 1921, and a variety of people collected there from the 1930s to present.

John K. Small’s visit to the "point of cypress" is so well described that it is possible today to identify the exact site he visited (Small, 1921, 1928, 1937). In 1921, Small and his party came up Allen's River (called the Barron River Canal since 1923).
from Everglades City, crossed the prairie and entered a “point of cypress” of the Strand. Today this point is called Three-Mile Swamp, and it still contains the Royal Palm Hammock described by Small.

**Logging Phase**. Recent history has been highly disruptive within the Fakahatchee Strand. Starting in 1947 the Strand was logged for the cypress timber (Prestridge, 1947). Julie Jones (1983) has gathered the available data on times of logging and prepared a map of the sequence. We have information on the period between 1947 and 1952 when logging ended in the Strand.

Phase 1 went from 1947 to 1948; phase 2 from 1948 to 1950, phase 3 from 1950 to 1951 and phases 4 to 7 were accomplished in 1952. Note that Three-Mile Swamp and the Big Cypress Bend areas were not logged. Comparisons of the old trees in these areas make it possible to understand some of the conditions within the pre-logging portion of the Strand.

The logging went in phases over a period of about five years and it has been said that 5,000,000 board feet were removed during that time. To accomplish the removal of the timber, narrow-gauge railroad tracks were laid into each section as it was being logged. A special bed on one of the cars had a crane with a long chain in it dragging the downed logs to the train. Each tramway or railroad bed was 1650 feet from its nearest neighbor and the chain reached to the middle of these tracts. As the trees were dragged from the place they fell, they smashed everything they contacted and gouged tracks into the earth below.

**Recent**. The first attempt to preserve the Strand was apparently led by Daniel Beard in 1948 (Beard et al., 1948). This attempt failed, as did another led in 1964 by the Miami attorney and conservationist, Melvin Finn (Alvarez, 1978). The current road through the Strand was built about 1963 through the efforts of Winifred Jones, a county commissioner from Copeland. This road was placed on the old railway bed which had traversed the strand during the logging period.

Negotiations for purchasing the region including the Strand for the Fakahatchee Strand State Preserve began as a result of the Land Conservation Act of 1972 (Alvarez, 1978). These negotiations were with Gulf American (later G.A.C. Properties), who had acquired 75,000 acres from the Lee-Tidewater Cypress Company in 1966. Negotiations stopped when G.A.C. was prosecuted for illegal dredge and fill activities at Cape Coral and offered to pay for damages by trading land in the Fakahatchee. At that point Florida’s Environmentally Endangered Lands Program was initiated and outholdings began to be obtained through its auspices. Since most of the region has never been surveyed, it has been difficult to determine exactly the location of many of the state parcels.

### HISTORICAL VEGETATION

Fakahatchee Strand has been called the only cypress/royal palm forest in the world, but this appellation is misleading since it oversimplifies the complexity of the vegetation patterns. In fact, the Strand and its surrounding habitats form an extremely complex mosaic of plant communities which support species not found elsewhere within the United States.

The only vegetation map with any detail of the Fakahatchee Strand region in existence until recently was prepared by D. Graham Copeland and published by the Collier Board of County Commissioners in 1947. Comparisons of the aerial photographs taken in 1940 with this map show that Copeland made the map to the scale of the mosaic of prints of the various flights. He combined the detail possible on the photographs with his own considerable knowledge of the communities on the ground. This map forms the basis of modern names of various areas within the region and conforms well with the aerial photography.

**Changes**. From a comparison of the Copeland map and modern vegetation, it is possible to determine several differences between current and pre-logging vegetation stands. The most obvious comparison is that the physical location of most of the communities has not changed substantially in the almost 40 years since Copeland’s map, although there are some clear exceptions. Less obvious, and often not visible from maps, is that the species frequency in many areas has drastically changed.

Hammocks certainly existed before the Copeland map and during that time, as witnessed by the naming by J.K. Small and others of Royal Palm Hammocks. At least 21 isolated Royal Palm Hammocks are now visible in the Strand in addition to the complex central Royal Palm Hammock. These peripheral hammocks have from 10 to 90 trees in each, and the central hammock has an estimated 3000 adult trees. While the Strand is not the only historical stand of royal palms, it remains the only healthy population (Austin et al., 1979; Jones, 1983).

Associated with these hammocks are large, apparently old, oak trees (mostly laurel oak, Quercus laurifolia) with damaged limbs that make it appear that they have stood since before logging. Most of the tropical arborescent species are small and probably comparatively young. Their youth does not mean that they are recently arrived, but that cold and/or logging have removed their parents. All data indicate that the tropical species have been in the Strand for at least 100 years and probably considerably longer.

Several variants of swamp vegetation exist. These variants fall within the normal swamp communities and their serial [successional] stages expected within southern Florida. Salt water intrusion has allowed mangroves and salt marsh to extend north of Tamiami Trail, but not to reach the Strand. Certain areas that were listed by Copeland as prairies on the fringe of the Strand have grown up into cypress swamps.

Maple has become more common in some areas, and drainage and fires account for the addition of the trees (Alexander and Crook, 1974). The Twelve Mile Prairie of 1947, for example, has changed by growing up into Willow/Maple Swamp. This was further confused by having the place name moved to a new locality. Logging accounts for the decrease of large cypress trees (Alvarez, 1978; Jones, 1983), but in certain areas there has actually been an increase in the number of cypress from seedlings.

We are now able to separate Mixed Swamps from the other swamp types. Also found are popash, pond apple, and mixtures of popash/pond apple stands. These are interpreted as seral stages reflecting severe fires (popash) or deep water (pond apple) variations. Typically the mixed popash/pond apple stands have the shallower sites dominated by the ash and the deeper areas by the pond apple. At least the mixtures and pond apple stands are over 40 years old since the logging operations usually bypassed them. Some of these swamps have large hollow cypress trees scattered widely and...
irregularly through them. These trees were not cut since the loggers recognized that the hollow trunks would make them worthless.

We unite the pine and palms of Copeland into what we call Wet Prairie transitional. Islands of pines and palms still occur within the matrix, but the community is dominated by wet prairie plants.

One of the most outstanding features of recent human interruption of native systems occurs within modern Deep Lake Prairie just north of the towns of Copeland and Lee Cypress. Farming was an important enterprise in this vicinity prior the period of logging. A variety of winter vegetables was grown over several years (R.E. Brown, pers. comm.). Flights over this area now appear at first glance to be of undisturbed wet prairie habitat. Closer examination, however, shows that the farming rows still exist under the native plants. This is the only example we have seen of farmed prairie returning to mixed sawgrass and wet prairie species without some substantial invasion of plants from other habitats. The areas studied by Krauss (1983) in Everglades National Park were either invaded by exotic species or by swamp trees following cultivation. The whole problem of what causes different species to invade fallow fields needs further investigation.

**SPECIES**

**Tropical Disjuncts.** There are several tropical species disjunct from farther south that occur nowhere else in Florida. Among these are the ferns first collected by A.A. Eaton in the early 1900s: Asplenium serratum (1906), Campylo-sporium costatum (1904) and Thelypteris reticulata (1903). Later Lycopodium dichotomum was found (1934). Layne found the orchid Craniichis muscosa (1903) and later Lepanthopsis melanantha was found (Tompkins in 1931; Buswell in 1937). As recently as 1978, we found a tropical American fern, Thelypteris grandis A.R. Smith, in Fakahatchee known from nowhere else in the coterminous United States (Nauman, 1979).

**Floristics.** To date we have over 475 species of plants listed from a tract of land about 7 by 14 miles, or slightly less than 100 square miles (Austin et al., 1980; Austin et al., 1985). This richness is apparently not matched even in Dade and Monroe counties which have historically been considered the most tropical and interesting parts of Florida by many people. In this list are included 71 species of trees and shrubs, 45 species of orchids, 37 species of ferns, and 13 species of bromeliads (Hammer, 1977; Bennett, 1982).

Many of the plants present are of tropical affinity. About 69% (49 out of 71) of the trees are tropical, 88% (40/45) of the orchids, and 86% (32/37) of the ferns. In spite of the large numbers of tropical species, there is little that anyone would call a tropical plant community within the Strand. Mostly, there are pockets of tropical species within temperate communities. This overlap of tropical and temperate florals is one of the aspects of the region that makes it perpetually interesting to persons interested in natural history.

**MODERN HABITATS IN FAKAHATCHEE STRAND**

Plant habitats in the Fakahatchee Strand often are not clearly delineated and the vegetation of the Preserve is a complex mosaic. There are, however, four major habitats that can be recognized: wet prairie, marsh, hammock, and swamp. Each of these major habitats may be subdivided on the basis of species composition. These subdivisions are not necessarily equivalent successional stages and many intermediate stages can be recognized.

**Wet Prairie (WP).** This category includes several types of prairies and marshes of wet. Wet prairies and marshes have been mapped as a single unit (WP). These habitats are clearly distinguished in the field, but are not nearly as distinct on aerial photographs. Marshes are most common in the southern part of the Preserve just north of the Tamiami Trail. These are patches largely dominated by Typha spp. but expanses of Cladium jamaicense and Juncus spp. are also found.

On the 1973 aerial photography used to construct the vegetation map, marshes intergraded with wet prairies on a scale that was not practical for mapping. Recent field surveys reveal that the marsh habitat is more extensive than in 1973.

The compositional types of wet prairies found in the Strand show a strong north-south as well as east-west gradient. As with the other habitats in the Fakahatchee, the different types of prairies are not discrete, but vary continuously and have been mapped as a single unit, except for the transitional stage discussed below. Among the common species found in the wet prairies (WP) are: Bacopa spp., Crinum americanum, Coreopsis leavenworthii, Dichromena colorata, Eleocharis spp., Eriocaulon decangulare, Flaveria linearis, Hiptis alata, Juncus spp., Lachnanthes caroliniana, Pluchea rosea, Rhynchospora spp., Utricularia spp., and Xyris spp.

**Wet prairie transitional (WP1).** Most frequently this is a fringing prairie that has been at least partly degraded by frequent fires. Normally, it grows on the fringes of swamps, and these forests are often cypress heads or strands. This mixture can become even more complex and it is not uncommon to find a mixed swamp/cypress /wet prairie transitional phase. We interpret this last phase as an extension of our transitional wet prairie type.

Transitional wet prairie (WP1) is not dominated by a single set of species. Different compositions depend on the particular fire history and hydroporid of any site. In addition to the characteristic wet prairie species, Pinus elliottii, Sabal palmetto, Ludwigia spp., Myrica cerifera, Kosteletzya virginica, and Baccharis spp. may dominate this habitat.

**Low hammock (LH).** This is the most frequent hammock type in the region, although several variations occur. Some hammocks are almost entirely tropical in species composition, while others are almost entirely palms or temperate. It has not been practical to separate these on the map size-scale used.

Low hammocks (LH) are common in the Strand; indeed, they are more frequent than the map suggests due to problems with mapping at this scale. Often it is difficult to separate a low hammock from transitional hammocks. Hammocks are frequently dominated by Ficus spp., Quercus spp., Sabal palmetto, Roystonea elata, Persea borbonia, flex cassine and Chrysobalanus icaco. In one direction, this grades into a more tropical hammock with many West Indian species; in the other, it intergrades with swamp habitats. Especially common in the later category is the subcategory designated as mixed swamp (SW1). The best known hammocks are found in and around the Royal Palm Hammock area, but there are many others.

**Heads (H).** No attempt has been made
to identify the various types of tree islands, or heads, that occur within the region. Some are almost pure cypress heads, others are oak heads and even others are pine islands. Identification of each type is not practical on the scale mapped.

Heads (H) occur in virtually all of the habitat types mapped. Locally, the hunters make a distinction between hammocks and heads by the quantity of mast trees (Quercus spp.). Thus, a head is dominated by oaks and a hammock has other species. This system does not work well in the Strand because many of the hammocks are transitional between heads and some other habitat. In essence, we have lumped under a single category a variety of habitat types. Heads may be dominated by oaks, cypress, willow, popash, or pines. Most of these sites are so small on the scale used for mapping that we have not attempted separation. The composition of any head may be determined only by direct observation, and many change rapidly. In areas that were dominated by certain species during the beginning of this study, we have noted drastic changes due to single fires. Vegetation is not static, but constantly changes.

Disturbed sites (DS). Most of the sites mapped as this unit are in a recent stage of disturbance. Typical in this category are roadsides, mining operations, and car dumps. Old disturbance sites are usually mapped as the next recognizable unit. The areas we have designated as disturbed sites (DS) may be dominated by any number of species. Often common is Schinus terebinthifolius on certain lands. This treatment is misleading since most of the areas we have mapped as prairies show the influence of farming. Furrows from old farm plots are easily seen from the air, but the species present during our study were predominantly those of prairies. Roadsides and similar recently disturbed areas should obviously differ in species composition.

Swamps, of varying complexity (SW). Since there has been a long and drastic history of man-made interference with the vegetation, several stages may be recognized. We believe that these represent successional stages in most cases.

A large part of the Preserve is dominated by swamps of different types. Some of these are highly complex in spite of their recent history, while others are comparatively simple. Essentially all of the swamps may be characterized by one or more of the following species: Taxodium distichum, Annona glabra, Fraxinus caroliniana, Salix caroliniana, or Acer rubrum. There is a common association between Salix and Acer (willow/maple) and another between Annona and Fraxinus (pond apple/popash). Rarely, however, are these associations exclusive, and various combinations of species occur.

For simplicity we have divided the swamps into four types. Obviously, there are transitional stages, and it occasionally may be impossible to place any particular site into our scheme of nomenclature.

Swamps (SW1). These, from our best sources, seem to be areas with the least disturbance. A subcategory would be the main Strand, although there are numerous smaller strands.

The type we have called mixed swamp (SW1) is normally in the deepest portions of the various branches of the strands. Typically these mixed swamps are of highly complex species mixtures, ranging from Taxodium to Quercus. Since the terrain is uneven, the plants growing within a few feet of each other may differ greatly. It would be possible to subdivide this even further into the mixed swamp within the main (deepest) part of the strand, and those that are peripheral. We have elected not to make this separation.

Cypress transitional (SW2). Depending on the site, these strips of swamp dominated by cypress may be transitional to a variety of other habitats. The direction of transition is largely due to fire history over the past few decades. If fire has been kept out, the area may be expanding and diversifying toward mixed swamp. On the other hand, if fires have been frequent, the swamp may be shrinking and headed toward a wet prairie.

Cypress transitional (SW2) consists also of two similar habitat types that are not always distinct. One might be called the mixed swamp transitional, and the other mixed swamp/cypress transitional. Locations of these types are directly related to the frequency of fires and the abundance of standing water.

Willow/maple swamp (SW3). Most of these phases have been through a traumatic fire sometime within the past few decades. It would appear that most of these major fires were in the post-logging years following the late 1940s and early 1950s. Exact data are lacking. During our study, it has become apparent that the species richness of these habitats is increasing.

Willow/maple swamps (SW3) may be found in a variety of locations, but all that we have studied have recent histories of severe fires. Logging also may have been recent or associated with the fires, but situations vary. Typically this is one of the most easily recognized habitats within the forested part of the Preserve. The vegetation is often dense, and registers markedly different from other types on aerial photographs or when viewed from the air. We consider this as an early seral stage of the development of swamp vegetation within the Preserve.

Mixed swamp/cypress transitional (SW4). Typically this is a site where there is a mixed swamp central region, usually lower, and a higher cypress fringe. The higher fringe allows the area to dry out more often, making it more easily burned.

Mixed swamp/cypress transitional (SW4) in many ways is almost the same as wet prairie transitional (WP1). Often it is difficult to assign a particular spot to one category or the other, but typically ground observation has supported our classification because of a quantitative difference in the arboreal plants. WP1 habitats have fewer trees than SW4. This distinction may seem arbitrary, but we have been able to come to agreement about the classification, and we believe the distinction valid. This is probably one of the most dynamic of our categories since fires are often changing species present. Prairies have been in pretty much the same sites for the past four or more decades, but the forests are more susceptible to alteration.

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