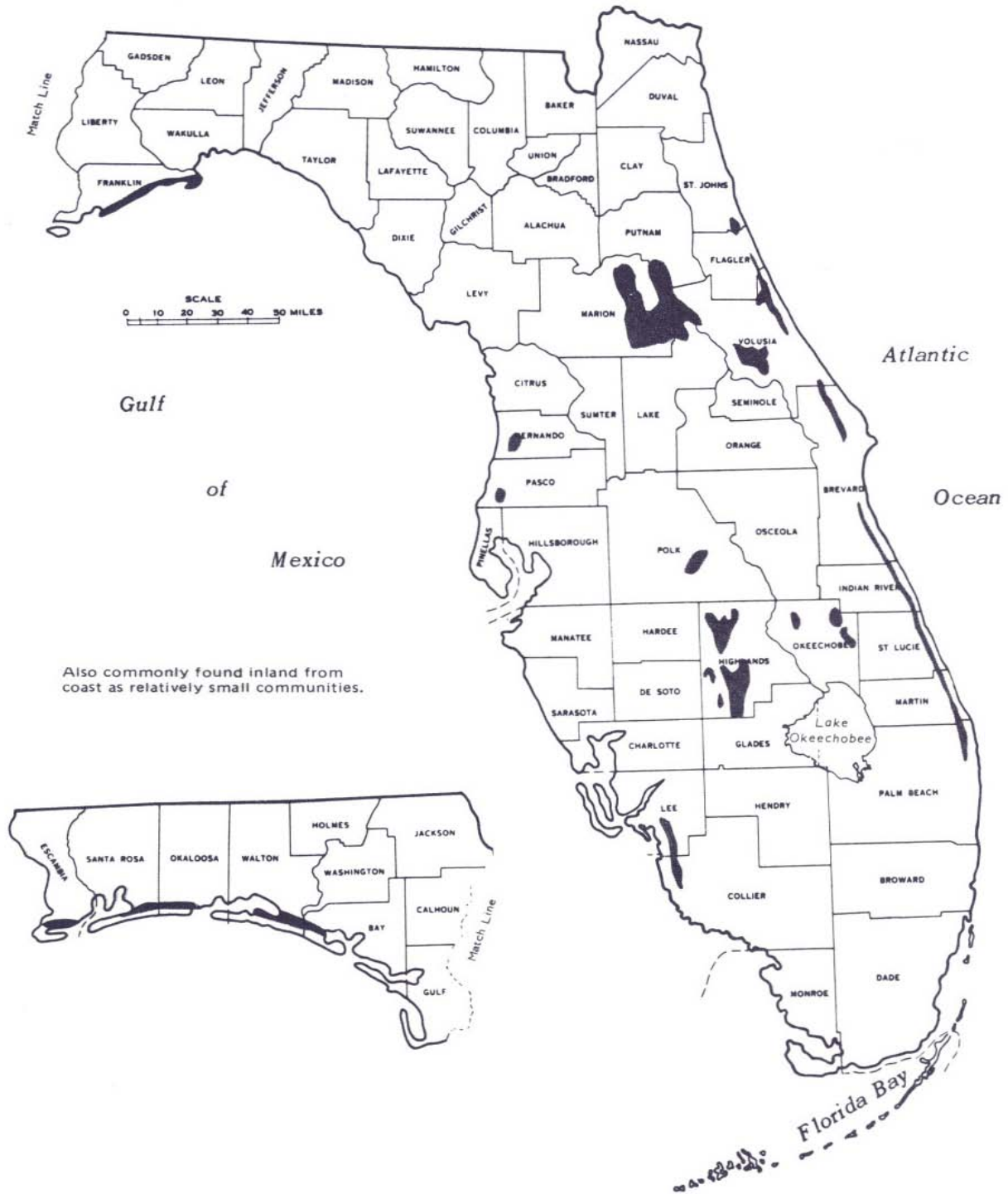


# 3 - SAND PINE SCRUB



Map prepared by U. S. Department of Commerce, Bureau of The Census. 1960, Corrected as of April 1965.  
 U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE  
 USDA-SCS-FORT WORTH, TEXAS 1981

FEBRUARY 1981 4-R-36720-3  
 FEBRUARY 1968 BASE 4-L-25770



Typical, even-aged  
Stand of sand pine,  
Pinus clausa

Sand pine scrub in  
South Florida often  
have fewer sand,  
pine, *Pinus clausa*,  
and more scrub than  
those farther north.



Dense understory of  
scrub oaks, saw palmetto  
and other shrubs.

## ECOLOGICAL COMMUNITY

### NO. 3 - SAND PINE SCRUB

#### OCCURRENCE

The Sand Pine Scrub ecological community occurs throughout Florida. It is most commonly found inland from the coast and in the central portion of the state in and around Marion County. Individual communities are generally small in size, i.e. several hundred acres. A large community, several thousands of acres in size, occurs just east of Ocala in the Ocala National Forest. It typically has a few smaller communities of wetland types interspersed throughout.

#### DESCRIPTION

This community occurs on nearly level to strongly sloping land. Water movement is rapid through the soil. It is easily identified by the even-aged stands of sand pine or by the thick scrubby oak growth.

##### 1. Soil

The soils are nearly level to strongly sloping, deep, acid, somewhat poorly to excessively drained and coarse textured throughout. Representative soils include: Archbold, Daytona, Duette, Hobe, Paola, Pomello, Resota, St. Lucie, Satellite, and Welaka. Appendix A contains information on correlation of soil series with the appropriate ecological community.

##### 2. Vegetation

The natural vegetation of this community may be typically even-aged sand pine trees with a dense understory of oaks, saw palmetto, and other shrubs. Ground cover under the trees and shrubs is scattered and large areas of light colored sand are often noticeable. In other cases, the sand pine are scattered or absent, with oaks being the dominant vegetation. Satellite soils, which have a high water table for part of the year, support scrubby growth also, but the myrtle oak, Chapman oak, and sand pine become infrequent and gallberry becomes prominent. Plants which characterize this community are:

TREES - Bluejack oak, Quercus incana; Chapman oak, Quercus chapmannii; Myrtle oak, Quercus myrtifolia; Sand live oak, Quercus virginiana var. geminata; Sand pine, Pinus clausa

SHRUBS - Dwarf huckleberry, Gaylussacia dumosa; Gopher apple, Chrysobalanus oblongifolius; Prickly pear, Opuntia spp.; Saw palmetto, Serenoa repens

HERBACEOUS PLANTS AND VINES - Grassleaf golden aster, Heterotheca graminifolia;

GRASSES AND GRASSLIKE PLANTS - Yellow indiagrass, *Sorghastrum nutans*,  
Low panicum, Panicum spp.

Information about plants which occur in specific ecological communities is in Appendix B.

3. Animals

Animals found in this community are adapted to high temperatures and droughty conditions. The wildlife food production is low. Dense vegetation provides good escape cover for animals such as the white-tailed deer. The palmetto and various species of oaks provide good food when they are fruiting. Gopher apple is also a good wildlife food plant.

Typical animals of the sand scrub are:

MAMMALS - Deer

BIRDS - Towhee, great crested flycatcher, scrub jay, Bachman's sparrow

REPTILES - Black racer, gopher tortoise, scrub lizard, sand skink

AMPHIBIANS - Gopher frog

Information on animals known to occur in specific ecological communities is in Appendix C.

LAND USE INTERPRETATIONS

1. Environmental Value as a Natural System

The sand scrub is a fire-based community. Understory vegetation is dense and fuel supplies build up in the trees. The thick understory creates a pathway for fire to the crowns of the trees. Fire normally occurs every 20 to 40 years. Sand pines have a low resistance to fire and the high density, even-aged stands make fire devastating. Cones of the sand pine require the heat of a fire to open and release seeds. This method of regeneration helps to form even-aged stands. Without occasional fire, this community would tend to become a type of upland hammock community.

The sand scrub is a valuable ecological community. The coarse textured, excessively well drained soils make the community important in aquifer recharge. It is a unique ecosystem which gives it an important scientific value. Heat and drought stress response by plants and animals are often studied on these sites. Uncontrolled fire and damage to vegetation by excessive foot or vehicle travel have adverse effects on the community.

Sand scrubs are good producers of sand pine and some areas are utilized for commercial wood production. Intensive management for wood production will not cause excessive damage to the community if good silvicultural practices are applied.

Adverse soils conditions make it infeasible to convert this community to cropland. It has been converted to some extent for citrus production in South Florida. This community has fair to good value for wildlife escape cover with proper management.

Areas of sand scrub communities, except in the Ocala National Forest, are rapidly declining. Favorable conditions for residential use and proximity to the coast make them prone sites for real estate development.

2. Rangeland

This community supports a fairly dense stand of trees and shrubs and therefore has a limited potential for producing native forage. Livestock do not use this site if other ecological communities are available. For sites in excellent condition the average annual production of air dry plant material varies from 1,500 to 3,500 pounds per acre. The variation depends on plant growth conditions. From 15 to 40+ acres are usually needed per animal unit depending upon amount and type of forage available. The relative percentage of annual vegetative production by weight is 40 percent grasses, 40 percent trees and shrubs and 20 percent herbaceous plants and vines.

3. Wildlifeland

This community is suited for deer and turkey, especially for use as escape cover. Many birds inhabit this area including warblers, rufous-sided towhees, great crested flycatchers, scrub jays, and quail. Several varieties of native legumes furnish food (seeds) for bird life. The palmetto, gopher apple and various species of oak provide good food when they are fruiting. Timber harvest and other disturbances increase wild life food value by increasing the amount and types of herbaceous plants and by sprout production.

4. Woodland

This community has a low potential for commercial wood production. There are severe equipment limitations and moderate seedling mortality problems due to loose, well to excessively well-drained and infertile soil conditions. Sand pine is a commercial species suitable for planting. It has a potential annual growth of approximately 0.5 cords per acre in North Florida. South of Hernando County in the west and Orange County in the east, the potential annual growth is 0.4 cords per acre.

5. Urbanland

The moderately well to excessively well drained areas have few limitations for urban development. The somewhat poorly drained Satellite soils, although very droughty in the surface layers, have a water table at 20 inches for part of the year and has more limitations. Vegetation is difficult to establish because of the infertile, coarse textured, and droughty surface soils. Water moves rapidly through the soil. Intensive vegetation establishment and maintenance methods, including irrigation are needed for best results. Without vegetation, wind erosion can be a problem during and after construction. Water erosion control and water retention facilities are usually not needed.

Plants native to the community should receive preference for beautification and landscaping. This is because they are more easily established and require less maintenance. Some of the trees are live oak, sand live oak, sand pine, turkey oak, and Eastern red cedar. Some of the shrubs are Adam's needle, coral bean, Carolina holly, gopher apple, pawpaw, prickly pear cactus, rosemary, saw palmetto, and shining sumac. Some of the herbaceous plants are aster, beebalm, croton, blanketflower, blazing star, golden aster, goldenrod, lupine, morning glory, and sunflower.

The most important urban wildlife are birds such as warblers, towhee, great crested flycatcher, and scrub jay. Gopher tortoise, sand skink, scrub lizard, and snakes are some of the reptiles using this habitat. Undisturbed areas provide good escape cover for all forms of wildlife.

ENDANGERED AND THREATENED PLANTS AND ANIMALS

The following endangered or threatened plants may occur in this community:

SHRUBS - Four-petal pawpaw, Asimina tetramera; Pygmy fringetree, Chionanthus pyfmaea

HERBACEOUS PLANTS AND VINES - Curtis milkweed, Asclepias curtissii; Dancing-lady orchid, Oncidium variegatum; Florida bonamia, Bonamia grandiflora

The following threatened wildlife species may be found in or around this community:

MAMMALS - Goff's pocket gopher, Geomys pinetis goffi

BIRDS - Florida scrub jay, Apelocoma coerulescens coerulescens

REPTILES - Blue-tailed mole skink, Eumeces egregius lividus; Sand skink, Neoseps reynoldsi; Short-tailed snake, Stilosoma extenuatum



Jonathan Dickinson State Park (Martin County)

Photo by Gary Knight

### **Scrubby Flatwoods**

**Description:** Scrubby flatwoods have an open canopy of widely spaced pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto, often interspersed with areas of barren white sand. Principal canopy species are longleaf pine (*Pinus palustris*) and slash pine (*P. elliottii*) in northern and Central Florida, and South Florida slash pine (*P. elliottii* var. *densa*) south of Lake Okeechobee. The shrub layer consists of one or more of the four scrub oaks, sand live oak (*Quercus geminata*), myrtle oak (*Q. myrtifolia*), Chapman’s oak (*Q. chapmanii*), and scrub oak (*Q. inopina*), and typical shrubs of mesic flatwoods including saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), rusty staggerbush (*Lyonia ferruginea*), fetterbush (*L. lucida*), coastalplain staggerbush (*L. fruticosa*), and deerberry (*Vaccinium stamineum*). The shrub layer of scrubby flatwoods is not solely comprised of oaks; grasses and dwarf shrubs make up a substantial portion of the cover. Grasses include wiregrass (*Aristida stricta* var. *beyrichiana*), broomsedge bluestem (*Andropogon virginicus*), and little bluestem (*Schizachyrium scoparium*); dwarf shrubs include dwarf live oak (*Quercus minima*), runner oak (*Q. elliottii*), dwarf huckleberry (*Gaylussacia dumosa*), gopher apple (*Licania michauxii*), and shiny blueberry (*Vaccinium myrsinites*). A variety of forbs, many typical of drier types of mesic flatwoods, are present including coastalplain honeycomb-head (*Balduina angustifolia*),

narrowleaf silkgrass (*Pityopsis graminifolia*), October flower (*Polygonella polygama*), and sweet goldenrod (*Solidago odora*). Bare sand openings are often present but are generally small.

Scrubby flatwoods occur on slight rises within mesic flatwoods and in transitional areas between scrub and mesic flatwoods. Soils of scrubby flatwoods are moderately well-drained sands with or without a spodic horizon. Examples of soil types include Pomello and Satellite sands.

**Characteristic Set of Species:** longleaf pine, slash pine (or South Florida slash pine), sand live oak, myrtle oak (or scrub oak), Chapman's oak, saw palmetto, wiregrass

**Rare Species:** Three rare plants are found primarily in scrubby flatwoods. Florida goldenaster (*Chrysopsis floridana*) and large-plumed beaksedge (*Rhynchospora megaplumosa*) are endemic to west-central Florida, and pine pinweed (*Lechea divaricata*) is endemic to central and southern portions of peninsular Florida. Other rare plants that occur in scrubby flatwoods include Carter's warea (*Warea carteri*) and nodding pinweed (*Lechea cernua*) in the central peninsula, and large-leaved jointweed (*Polygonella macrophylla*) in coastal scrubby flatwoods of the Florida Panhandle.

Scrubby flatwoods are inhabited by many of the same rare animal species found in scrub. These include Florida mouse (*Podomys floridanus*), Florida scrub-jay (*Aphelocoma coerulescens*), gopher tortoise (*Gopherus polyphemus*), and associated tortoise commensal species such as the Florida gopher frog (*Rana capito*).<sup>413</sup>

**Range:** Like scrub, scrubby flatwoods is largely confined to Florida. It occurs throughout the state except in extreme South Florida where limestone is close to the surface.

**Natural Processes:** Since it has a more continuous ground cover, scrubby flatwoods burns more readily than scrub<sup>413</sup> and somewhat less readily than mesic flatwoods and it would thus naturally have burned at frequencies intermediate between the two. Light ground fires in the surrounding mesic flatwoods tend to enter the scrubby flatwoods and extinguish, leading to a patchwork of recently burned and unburned portions, a situation which has been found to be favorable for scrub-jays.<sup>32</sup>

For oak scrub on the Lake Wales Ridge a natural return interval between 8 and 15 years has been suggested based on requirements of the Florida scrub-jay.<sup>443</sup> An interval of 1-5 years is suggested for mesic flatwoods in the same area.<sup>258</sup> Since re-sprouting stems of scrub oak (*Quercus inopina*) in this region become reproductive at 3 years and reach peak reproduction at 5 years,<sup>308</sup> burning at intervals consistently less than 5 years could diminish acorn production and decrease food available for wildlife. Menges<sup>268</sup> observed a lower limit fire return interval in scrubby flatwoods of three years, based on fuel accumulation levels, but commented that frequent fires may exhaust carbohydrate reserves. Thus fire intervals greater than 5 years, but less than 15 years, likely would have been most common in scrubby flatwoods; the intervals were also likely highly variable, dependent upon yearly environmental conditions and fuel accumulation rates.

**Community Variations:** Scrubby flatwoods on the Lake Wales Ridge may contain scrub oak (*Quercus inopina*) in addition to the other three shrubby oaks commonly found in scrub. In Florida, tarflower (*Bejaria racemosa*), scrubland goldenaster (*Chrysopsis subulata*), fragrant eryngo (*Eryngium aromaticum*), and wild pennyroyal (*Piloblephis rigida*) are found only in peninsular scrubby flatwoods, whereas false rosemary (*Conradina canescens*) and cottony goldenaster (*Chrysopsis gossypina*) are found only in the Panhandle scrubby flatwoods.

**Associated Communities:** Scrubby flatwoods are associated with and often grade into mesic flatwoods, scrub, dry prairie, or sandhills. Scrubby flatwoods differs from mesic flatwoods and dry prairie in the presence of shrubby oaks characteristic of scrub (i.e., *Quercus myrtifolia*, *Q. geminata*, *Q. chapmanii*, and *Q. inopina*). It differs from scrub in the presence of wiregrass, a greater abundance of saw palmetto, and/or the presence of typical flatwoods shrubs such as gallberry and fetterbushes (*Lyonia* spp.). Structurally it differs from scrub in its lack of a continuous cover of shrubby oaks. Scrubby flatwoods differ from sandhill by the absence or relatively low cover of deciduous oaks such as turkey oak (*Quercus laevis*) or bluejack oak (*Q. incana*).

**Management Considerations:** Scrubby flatwoods probably naturally had a high variability of fire return intervals intermediate between that for mesic flatwoods and that of scrub. In some areas understory re-growth may be so rapid as to require a temporary fire return interval as short as three years.<sup>268</sup> However, intervals of more than 5 years and less than 15 years would allow for maximal acorn production while preventing the oaks from attaining heights



unfavorable to Florida scrub-jays. Within these upper and lower limits, variability in season and frequency of prescribed fires to produce a mosaic of burned and unburned patches would be most desirable for maintaining high biotic diversity in this community. Invasive exotic plants that can displace native species in disturbed scrubby flatwoods include Natal grass (*Melinis repens*), cogon grass (*Imperata cylindrica*), and downy rose-myrtle (*Rhodomyrtus tomentosa*).

**Exemplary Sites:** Bald Point State Park (Franklin County), Wekiwa Springs State Park (Orange County), Three Lakes Wildlife Management Area (Osceola County), Jonathan Dickinson State Park (Martin County), St. Marks National Wildlife Refuge (Wakulla County), Lake Wales Ridge State Forest (Polk County), Split Oak Forest Mitigation Park Wildlife and Environmental Area (Orange County)

**Global and State Rank:** G2/S2?

**Crosswalk and Synonyms:**

Kuchler	112/Southern Mixed Forest
Davis	2/Pine Flatwoods
SCS	6/South Florida Flatwoods
	7/North Florida Flatwoods
Myers and Ewel	Flatwoods - scrubby, xeric, or dry flatwoods
SAF	71/Longleaf Pine - Scrub Oak
	72/Southern Scrub Oak
	84/Slash Pine
	111/South Florida Slash Pine
FLUCCS	411/Pine Flatwoods
	419/Other Pines

Other synonyms: In contrast to this treatment, scrubby flatwoods on the Lake Wales Ridge<sup>3</sup> and Welaka area<sup>227</sup> has been defined to include stands with a continuous cover of scrub oaks and little wiregrass. In this treatment such vegetation would be included under scrub.

# 6 - SOUTH FLORIDA FLATWOODS



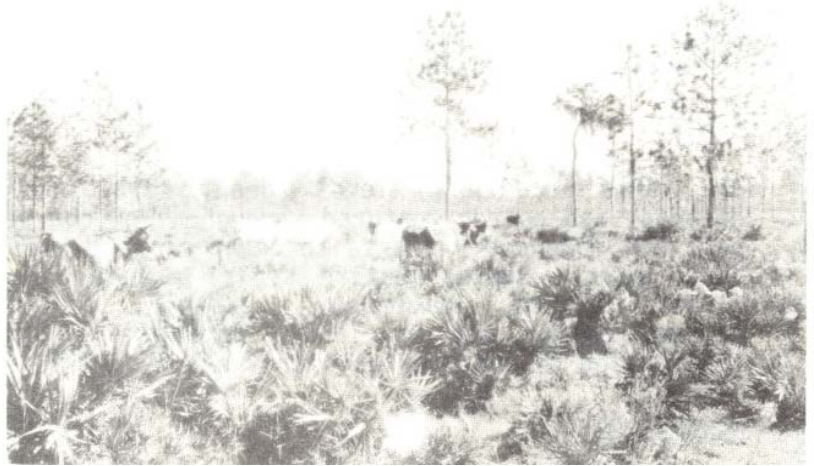
Map prepared by U. S. Department of Commerce, Bureau of The Census, 1960, Corrected as of April 1965.  
 U. S. DEPARTMENT OF AGRICULTURE. SOIL CONSERVATION SERVICE  
 USDA-SCS-FORT WORTH, TEXAS 1981

FEBRUARY 1981 4-R-36720-6  
 FEBRUARY 1968 BASE 4-L-25770



Although numbers of trees vary greatly in different locations, South Florida flatwoods are typically savannas, a type of community intermediate between grassland and forest.

South Florida flatwoods are used extensively for range.



Areas north and west of Lake Okeechobee have few trees.

## ECOLOGICAL COMMUNITY

### NO. 6 - SOUTH FLORIDA FLATWOODS

#### OCCURRENCE

The South Florida Flatwoods ecological community occurs throughout south and central Florida. The northern limit of its occurrence is approximately on a line from Levy County on the west to St. Johns County on the east. This community covers more land area than any other in south Florida. Individual communities may comprise several thousand acres and are typically interspersed with smaller communities of other types, especially wetlands.

#### DESCRIPTIONS

This community occurs on nearly level land. Water movement is very gradual to the natural drainageways, swamps, marshes, and ponds associated with this community. During the rainy season, usually June through September, this community may have water on or near the soil surface. It is easily identified by the flat topography and pine and palmetto vegetation.

#### 1. Soil

The soils are nearly level, deep, acid, poorly to somewhat poorly drained, and coarse textured throughout or coarse textured in the upper part and moderately coarse textured or moderately fine textured in the lower part. Representative soils include: Braden, Eaton, Electra, Eldred, Heights, Immokalee, Lawnwood, Myakka, Nettles, Palmetto, Pomona, Smyrna and Waveland. Appendix A contains information on correlation of soil series with the appropriate ecological community.

#### 2. Vegetation

The landscape position of this community affects plant-water relationships and causes slight differences in plant composition from wetter to drier areas. Although these differences are recognized, they are not significant enough to delineate as separate communities. The natural vegetation of this community is typically scattered pine trees with an understory of saw palmetto and grasses. Some areas in south Florida have few, if any, trees. These areas are often called prairies or dry prairies. The largest of these areas occur north and west of Lake Okeechobee. Plants which characterize this community are:

TREES - Live oak, Quercus virginiana; Slash pine, Pinus elliottii; South Florida slash pine, Pinus elliottii var. densa

SHRUBS - Ground blueberry, Vaccinium myrsinites; Gallberry, Ilex glabra; Saw palmetto, Serenoa repens; Tarflower, Befaria racemosa; Shining sumac, Rhus copallina; Wax myrtle, Myrica cerifera; Blackberry, Rubus spp.

GRASSES - Chalky bluestem, Andropogon capillipes; Creeping bluestem, Schizachyrium stoloniferum; Lopsided indiagrass, Sorghastrum secundum; South Florida bluestem, Schizachyrium rhizomatum; Low panicum, Panicum spp.; Pineland threeawn, Aristida stricta

Information about plants that occur in specific ecological communities is in Appendix B.

### 3. Animals

The South Florida Flatwoods is host to a diverse and numerous wildlife population. Many larger animals are found in areas where the flatwoods join other communities. These ecotones provide nesting sites, den sites, food and cover.

Typical animals of the flatwoods are:

MAMMALS - Armadillo, eastern cottontail rabbit, cotton rat, deer, skunks, racoon, opossum

BIRDS - Bachman's sparrow, Bobwhite quail, brown-headed nuthatch, meadowlark, pileated woodpecker, pine warblers, red-bellied woodpeckers, rufous-sided towhee, yellow-throated warblers

REPTILES - Eastern diamondback rattlesnake, pygmy rattlesnake, yellow ratsnake

AMPHIBIANS - Oak toad, chorus frog, pinewoods tree frog

Introduced feral hogs are common in much of the community. Information about animals known to occur in specific ecological communities is in Appendix C.

## LAND USE INTERPRETATIONS

### 1. Environmental Value as a Natural System

Fire and Water are the major stress conditions of this community. Fire controls hardwoods and promotes the natural regeneration of pine. Removal of fire will cause a successional move to a hardwood community.

Flatwood communities are good cellulose producers and the original areas of predominantly longleaf pine have been logged. Areas in the northern part of the community are extensively used for timber production. Intensive management for pulp production can cause major changes in the vegetation. Without proper consideration this results in a low diversity of plants and an adverse change in some wildlife populations.

Native forage production is good with proper management. Use for rangeland has only a light effect on the community if properly managed. Chopping and similar range practices result in more grass and fewer shrubs. With sufficient cover left, the resulting increase in diversity usually leads to an increase in types and amount of wildlife.

This community has good wildlife values, especially with proper management. It is especially important as a wildlife buffer zone between urban areas occurring on better drained sites.

Water control practices and improved management techniques have facilitated the use of flatwoods for improved pasture, vegetables, citrus, and urban development. This is especially true in south Florida.

2. Rangeland

This ecological community has the potential for producing significant amounts of high quality native forage such as creeping bluestem, chalky bluestem, and indiangrass. It is Florida's most important community for the production of cattle on native range. For sites in excellent condition, the average annual production of air dry plant material varies from 3,000 to 6,000 pounds per acre. The variation depends on plant growth conditions. From 4 to 18+ acres are usually needed per animal unit depending upon amount and type of forage available. There will be little forage available if the canopy cover exceeds 60 percent. The relative percentages of annual vegetative production by weight is 75 percent grasses and grasslike plants, 15 percent trees and shrubs, and 10 percent herbaceous plants.

3. Wildlifeland

The South Florida Flatwoods community is well suited for deer, quail, and turkey. It is fair for squirrels and well suited for many songbirds, particularly warblers. It is also well suited for bobcat, skunks, opossums, and raccoons. It is poorly suited for dove.

4. Woodland

This community has a moderate potential productivity for commercial wood production. There are moderate equipment limitations and seedling mortality due to wet soil conditions. The commercial species suitable for planting is slash pine. Potential annual growth is 0.9 cords per acre. The potential annual growth for longleaf pine is 0.5 cords per acre. Potential productivity is 18 percent less for soils south of a line from Hernando County in the West to Orange County in the east.

5. Urbanland

This community is subject to high water tables during the rainy season and has limitations for urban development. Water management systems are required for urban uses. It is often difficult to establish

vegetation on steep channel side slopes and infertile soil and special techniques may be required. Without vegetation, erosion and sedimentation is often a problem in some water management systems. Wind erosion is a problem in unvegetated areas. This is especially severe in the spring.

Native plants can be used for beautification and require minimum establishment and maintenance. Some of the trees are American holly, cabbage palm, common persimmon, live oak, longleaf pine, and slash pine. Some of the shrubs are American beauty berry, coontie, coral bean, partridge pea, pawpaw, saw palmetto, shining sumac, tarflower, and southern wax myrtle. Some of the herbaceous plants are blazing star, Catesby's lily, grassleaf golden aster, hibiscus, iris, meadow beauty, sunflower, and zephyrlily.

The most important urban wildlife are songbirds like warblers. Undisturbed areas also provide good escape cover for all forms of wildlife.

### ENDANGERED AND THREATENED PLANTS AND ANIMALS

The following endangered or threatened wildlife species may be found in or around this community:

MAMMALS - Florida panther, Felis concolor coryi; Mangrove fox squirrel, Sciurus niger avicennia

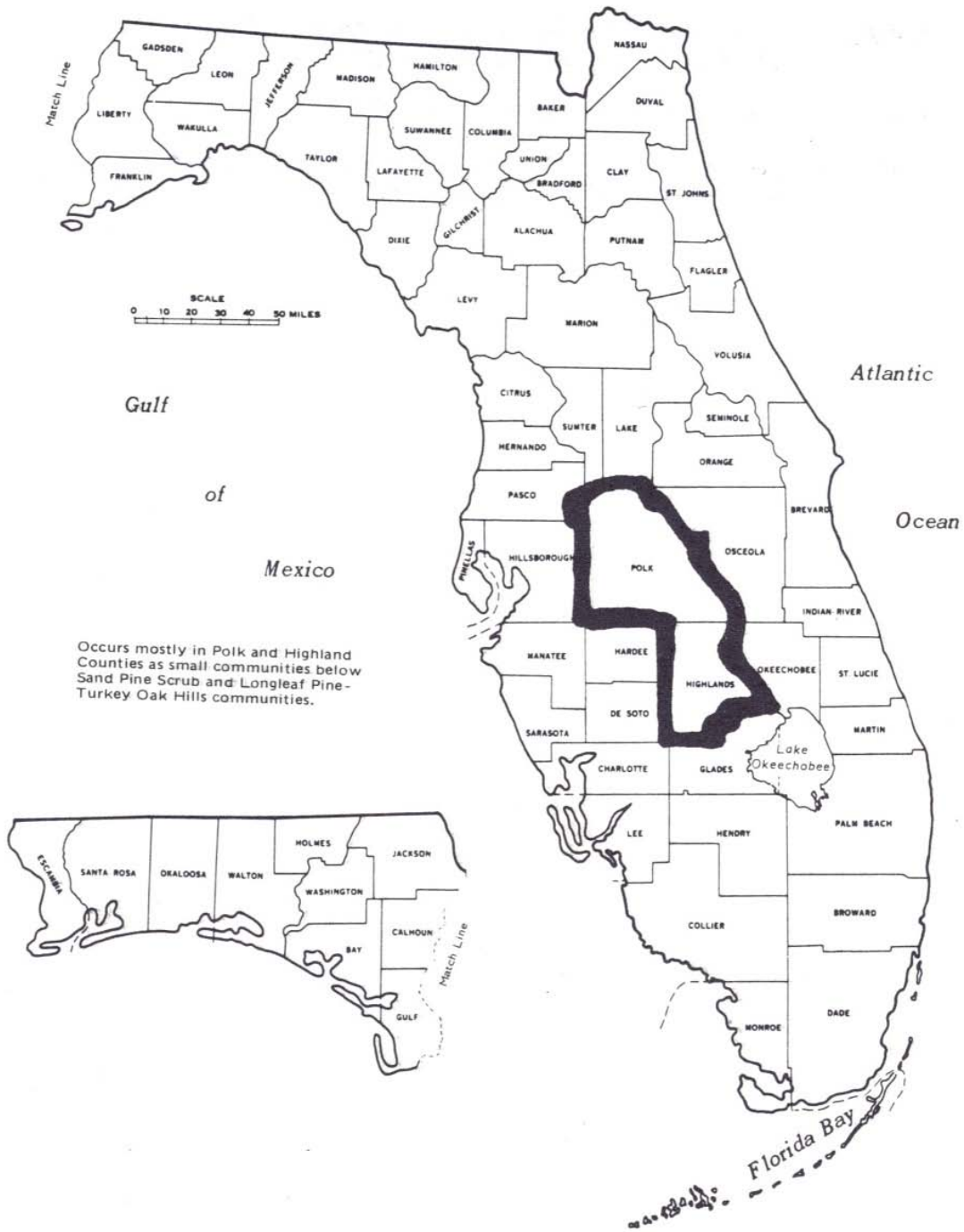
BIRDS - Crested caracara, Polyborus plancus; Florida grasshopper sparrow, Ammodramus savannarum floridanus; Southeastern kestrel, (Sparrow hawk), Falco sparverius paulus; Red-cockaded woodpecker, Picoides borealis; Bald eagle, Haliaeetus leucocephalus; Florida sandhill crane, Grus canadensis pratensis

REPTILES - Eastern indigo snake, Drymarchon corais couperi

The following endangered or threatened plant species may be found in this community:

Beautiful pawpaw, Deeringothamnus pulchellus

# 10 - CUTTHROAT SEEPS



Map prepared by U. S. Department of Commerce, Bureau of The Census • 1960, Corrected as of April 1965.  
 U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE  
 USDA SCS-FORT WORTH, TEXAS 1981

FEBRUARY 1981 4-R-36720-9  
 FEBRUARY 1968 BASE 4-L-25770





Dense cutthroat grass is the most prominent feature of this community at this Polk County site.



Scattered slash pine trees over a dense ground cover of cutthroat grass typifies the appearance of this.

## ECOLOGICAL COMMUNITY

### NO. 10 - CUTTHROAT SEEPS

#### OCCURRENCE

The Cutthroat Seeps ecological community is found mostly in Polk and Highlands Counties. It occurs to a limited extent in adjoining counties. Individual size of the community is normally less than 100 acres. Much of the original community has been destroyed and developed to intensive uses.

#### DESCRIPTIONS

This community occurs on nearly level to gently sloping or depressed areas where water seeps from the adjacent Sand Scrub and Longleaf Pine-Turkey Oak Hills communities. The soil profile is wet most of the time.

##### 1. Soils

The soils are nearly level to gently sloping, poorly drained, deep and coarse textured throughout. The Basinger, Ona, and St.Johns soil series are representative of this community. Appendix A contains information on correlation of soils series with the appropriate ecological community.

##### 2. Vegetation

The appearance of this community is distinctive. It has open scattered pine trees, isolated saw palmetto and wax myrtle and a dense cover of cutthroat grass that stays green the year round. Plants which characterize this community are:

TREES - Slash pine, Pinus elliottii

SHRUBS - Wax myrtle, Myrica cerifera

GRASSES - Cutthroat grass, Panicum abscissium; Chalky bluestem, Andropogon capillipes; Creeping bluestem, Schizachyrium stoloniferum; Maidencane, Panicum hemitomom; Toothache grass, Ctenium aromaticum; Low panicums, Panicum spp.

Information about plants that occur in specific ecological communities is in Appendix B.

##### 3. Animals

Typical animals include:

MAMMALS - Bobcat, cottontail rabbit, deer, racoon, skunks, opossum

BIRDS - Woodpeckers, several songbirds

REPTILES - Pygmy rattlesnake, yellow rattlesnake

Information on animals known to occur in specific ecological communities is in Appendix C.

## LAND USE INTERPRETATIONS

### 1. Environmental Value as a Natural System

Seepage water from the higher elevated and better drained areas is the controlling factor of the Cutthroat Seep ecological community. Development in and around this site causes changes in water quality and quantity which usually result in wide changes of plant composition.

These areas are not generally used for woodlands due to wetness, plant composition and difficulty of harvest. They are sometimes used for woodland if part of a larger flatwoods area. Native forage production is very good with proper management. Rangeland use has only a slight effect on the community. Range practices will result in an increase of grasses and reduction of shrubs. Wildlife values are good, especially with improved wildlife management practices. Its different plant composition from surrounding communities offers good cover and food for wildlife.

Environmental values are especially important. Water from better drained areas "seeps" out to the ground surface at these communities. They then serve as natural drainageways and help to improve water quality by the filtering action and nutrient uptake of plants.

### 2. Rangeland

This ecological community has the potential for producing significant amounts of good quality forage. For sites in excellent condition, the average annual production of air dry plant materials varies from 6,000 to 9,000 pounds per acre. This variation depends on plant growth conditions. From 4 to 16+ acres are usually needed per animal unit depending upon amount and type of forages available. The relative percentage of annual vegetative production by weight is 80 percent grasses and grasslike plants, 10 percent trees and shrubs, and 10 percent herbaceous plants.

### 3. Wildlifeland

Cutthroat seeps are well suited for deer, turkey, and songbirds. They are fair for quail and good for many mammals, such as skunks, opossums, and raccoons. Reptiles such as rattlesnakes find suitable habitat in the community. It is poorly suited for squirrel and dove.

### 4. Woodland

This community has a moderate potential productivity for commercial woodland production. There are severe equipment limitations and

seedling mortality due to wet soil conditions. There are no commercial species suitable for planting. Potential annual growth of existing slash and pond pine is at 0.4 cords per acre.

5. Urbanland

This community is subject to high water tables and has limitations for urban development. Intensive water management systems are required for urban uses. It is often difficult to establish vegetation on steep channel side slopes and infertile soil. Special techniques are usually required in these situations. Without vegetation, erosion and sedimentation is usually a problem. Wind erosion is also a severe problem in the spring on unvegetated areas.

Native plants can be used for beautification and require minimum establishment and maintenance. Some of the trees are cabbage palm, longleaf pine, pond pine, and slash pine. Some of the shrubs are saw palmetto and wax myrtle. Some of the herbaceous plants are aster, ferns, iris, meadow beauty, partridge pea, and sunflower.

The most adapted urban wildlife is birds. Undisturbed areas provide good escape cover for many forms of wildlife.

ENDANGERED AND THREATENED PLANTS AND ANIMALS

The following endangered or threatened wildlife species may be found in or around this community:

MAMMALS - Florida panther, Felis concolor coryi

BIRDS - Southeastern kestrel, Falco sparverius; Red-cockaded woodpecker, Picoides borealis; Florida sandhill crane, Grus canadensis pratensis; Bald eagle, Haliaeetus leucocephalus

REPTILES - Eastern indigo snake, Drymarchon corais couperi

***PINE FLATWOODS and DRY PRAIRIE*** – mesic or hydric pine woodland or mesic shrubland on flat sandy or limestone substrates, often with a hardpan that impedes drainage



Avon Park Air Force Range (Polk County) with cutthroat grass (*Panicum abscissum*) understory

Photo by Katy NeSmith

### **Wet Flatwoods**

**Description:** Wet flatwoods are pine forests with a sparse or absent midstory and a dense groundcover of hydrophytic grasses, herbs, and low shrubs. The pine canopy typically consists of one or a combination of longleaf pine (*Pinus palustris*), slash pine (*P. elliottii*), pond pine (*P. serotina*), or South Florida slash pine (*P. elliottii* var. *densa*). The subcanopy, if present, consists of scattered sweetbay (*Magnolia virginiana*), swamp bay (*Persea palustris*), loblolly bay (*Gordonia lasianthus*), pond cypress (*Taxodium ascendens*), dahoon (*Ilex cassine*), titi (*Cyrilla racemiflora*), and/or wax myrtle (*Myrica cerifera*). Shrubs include large gallberry (*Ilex coriacea*), fetterbush (*Lyonia lucida*), titi, black titi (*Cliftonia monophylla*), sweet pepperbush (*Clethra alnifolia*), red chokeberry (*Photinia pyrifolia*), and azaleas (*Rhododendron canescens*, *R. viscosum*). Saw palmetto (*Serenoa repens*) and gallberry (*I. glabra*), species also found in mesic flatwoods sites, may be present. On calcareous sites cabbage palm (*Sabal palmetto*) is common, both in the subcanopy and shrub layers. Herbs include wiregrass (*Aristida stricta* var. *beyrichiana*), blue maidencane (*Amphicarpum muhlenbergianum*), and/or hydrophytic species such as toothache grass (*Ctenium aromaticum*), Curtiss' sandgrass (*Calamovilfa curtissii*), cutover muhly (*Muhlenbergia expansa*), coastalplain yellow-eyed grass (*Xyris ambigua*), Carolina redroot (*Lachnanthes caroliniana*), beaksedges (*Rhynchospora chapmanii*, *R. latifolia*, *R. compressa*), and pitcherplants (*Sarracenia* spp.), among others. In central Florida in the vicinity of the Lake Wales Ridge, cutthroat grass (*Panicum abscissum*) can be dominant (see Variants).

Wet flatwoods often occur in the ecotones between mesic flatwoods and shrub bogs, wet prairies, dome swamps, or strand swamps. Wet flatwoods also occur in broad, low flatlands, often in a mosaic with these communities.

The relative density of shrubs and herbs varies greatly in wet flatwoods. Shrubs tend to dominate where fire has been absent for a long period or where cool season fires predominate; herbs are more abundant in locations that are frequently burned. Soils and hydrology also influence relative density of shrubs and herbs. Soils of shrubby wet flatwoods are generally poorly to very poorly drained sands and include such series as Rutledge/Osier; these soils generally have a mucky texture in the uppermost horizon.<sup>136</sup> Examples of typical soils in grassy wet flatwoods are loamy sands of the Leefield and Plummer Series.<sup>410</sup>

**Characteristic Set of Species:** slash pine, pond pine, large gallberry, fetterbush, sweetbay, wiregrass, toothache grass

**Rare Species:** Most rare plants are found in grassy wet flatwoods. In the Florida Panhandle these include pine-woods bluestem (*Andropogon arctatus*), southern milkweed (*Asclepias viridula*), Curtiss' sandgrass (*Calamovilfa curtissii*), wiregrass gentian (*Gentiana pennelliana*), Panhandle spiderlily (*Hymenocallis henryae*), white birds-in-a-nest (*Macbridea alba*), bog tupelo (*Nyssa ursina*), Apalachicola dragon-head (*Physostegia godfreyi*), pine-woods wild petunia (*Ruellia pedunculata* ssp. *pinetorum*), and Florida skullcap (*Scutellaria floridana*). In the peninsula of Florida, these include purple honeycomb-head (*Balduina atropurpurea*), Bartram's ixia (*Calydorea coelestina*), hartwrightia (*Hartwrightia floridana*), lake-side sunflower (*Helianthus carnosus*), and cutthroat grass (*Panicum abscissum*). Found in both the Panhandle and peninsula are St. John's blackeyed susan (*Rudbeckia nitida*) and white-flowered wild petunia (*Ruellia noctiflora*).

In Gulf, Liberty, and Gadsden counties, Chapman's rhododendron (*Rhododendron chapmanii*) may be found in shrubby wet flatwoods in ecotones between mesic flatwoods and shrub bogs or basin swamps. In wet flatwoods dominated by cabbage palm, hand fern (*Ophioglossum palmatum*) may be found growing in old leaf bases on cabbage palms and celestial lily (*Nemastylis floridana*) may be evident after recent burns.

Rare animals dependent on this community include three species associated with small wetlands in a flatwoods matrix: the frosted flatwoods salamander (*Ambystoma cingulatum*), found east of the Apalachicola/Flint Rivers, the reticulated flatwoods salamander (*A. bishopi*), found west of these rivers,<sup>317</sup> and the Panama City crayfish (*Procambarus econfinae*) found only in Bay County. The latter creates burrows in open, temporarily inundated depressions in wet flatwoods associated with redroot, lesser creeping rush (*Juncus repens*), and yellow-eyed grasses.<sup>207</sup>

Wet flatwoods, like shrub bogs and basin swamps, often occupy large areas of relatively inaccessible land, providing suitable habitat for the Florida black bear (*Ursus americanus floridanus*). In Lee and Charlotte counties in southwest Florida, red-cockaded woodpecker (*Picoides borealis*) colonies are concentrated in wet flatwoods; the mangrove fox squirrels (*Sciurus niger avicennia*) also use this habitat for foraging and nesting.<sup>21</sup>

**Range:** Wet flatwoods are common throughout most of Florida except at the very southernmost tip in the Everglades and Florida Keys where limestone is near the surface. Outside of Florida, wet flatwoods with similar characteristic species are found in the outer coastal plain from South Carolina to Mississippi,<sup>286</sup> with disjunct occurrences in Louisiana and Texas.<sup>38</sup>

**Natural Processes:** The variations of vegetation structure and composition of wet flatwoods in Florida likely reflect variations in soil characteristics, hydrology and fire. The general historic fire frequency in pinelands across the southeastern U.S. coastal plain is estimated to be every 1-3 years.<sup>131</sup> This interval is frequent enough to maintain grassy wet flatwoods and inhibit invasion by shrubs<sup>91</sup> and is consistent with management of longleaf pine systems.<sup>183,231</sup> Wet flatwoods that are naturally shrubbier and dominated by slash pine or pond pine may have had longer fire return intervals, or perhaps a few periods of longer intervals, on the order of 5-7 years,<sup>231</sup> or up to 5-10 years,<sup>144</sup> in order to allow the pines to establish and shrubs to proliferate.

South Florida slash pine seedlings have a grass stage and are more tolerant of frequent fire than slash pine found in central and northern Florida. South Florida winters are considerably warmer and drier than those in North Florida and wet flatwoods in this region alternate between being completely flooded to completely dry on a seasonal basis.<sup>21</sup> Wet flatwoods supporting South Florida slash pines burned at intervals of around 4 years.<sup>231</sup>

**Community Variations:** In addition to the widespread type of wet flatwoods, there are two variants.

Variants: CUTTHROAT GRASS FLATWOODS – On and near the Lake Wales Ridge cutthroat grass may replace wiregrass as the dominant species in the ground layer.

CABBAGE PALM FLATWOODS – In some areas where limestone or calcareous substrates are near the surface, cabbage palm may form an understory to the pine canopy. Loblolly pine may also be present. Herbaceous species may include hairawn muhly, sawgrass (*Cladium jamaicense*), saltmeadow cordgrass (*Spartina patens*), black bogrush (*Schoenus nigricans*), blue maidencane, and sand cordgrass (*Spartina bakeri*). Examples of this type, which is sometimes referred to as “sweet flatwoods” in reference to the less acid soils, can be found in at the St. Marks National Wildlife Refuge in coastal Wakulla County, in the upper St Johns River drainage and in inland areas of Charlotte County, among other areas.

**Associated Communities:** Shrubby wet flatwoods can be similar to shrub bog, but differs in the having only a thin (< 1 inch) layer of muck, if any, and dominance by shrubs other than titi and black titi. The presence of a more than just a few, scattered pines differentiates grassy wet flatwoods from wet prairie and depression marsh. Wet flatwoods can be distinguished from mesic flatwoods by the presence of hydrophytic herbs (such as coastalplain yellow-eyed grass and redroot), shrubs (such as titi, black titi and sweet pepperbush), and trees (sweetbay, swamp bay, and pond cypress) and the absence or low frequency of saw palmetto.

**Management Considerations:** Fire suppression policies practiced from the 1930s to the 1960s<sup>429</sup> allowed shrubs in wet flatwoods to proliferate and to expand into adjacent wet prairies and depression marshes. Evidence from early aerial photographs, surveyors’ notes from the general land office surveys of the mid-1800s, as well as early descriptions in soil surveys, can often help managers determine where shrub and hardwood encroachments have taken place.

Fires at too long intervals (5-10 years) can lead to an increase in woody species cover and decline in grasses and forb cover. It is uncertain whether increased fire frequency alone is adequate to restore areas heavily invaded by shrubs and trees as a result of lack of fire.<sup>92</sup> In some cases physical removal or mowing of woody vegetation may be necessary; however, these actions are much more costly than prescribed fire and can cause damage to soil structure and desirable vegetation, particularly perennial grasses and forbs. Many factors other than frequency of fire, such as season of fire, pre- and post-fire soil moistures, groundwater levels, weather, and plant size or age at the time of fire, can greatly influence tree mortality<sup>425</sup> and vegetation responses to fire.<sup>17</sup> Fire in the growing season can reduce the stature of woody vegetation, particularly hardwoods,<sup>390</sup> prevent increases in shrub densities (although it may not reduce stem densities),<sup>92</sup> and promote flowering of herbaceous groundcover.<sup>326</sup>

Drainage, either directly by ditching or indirectly by drawdown of the water table, and soil disturbance render wet flatwoods in South Florida vulnerable to invasion by the exotic melaleuca (*Melaleuca quinquenervia*) which may be difficult to control once established since fire and herbicide treatments stimulate its seed release.<sup>205</sup> Other invasive species in wet flatwoods include cogon grass (*Imperata cylindrica*) and Brazilian pepper (*Schinus terebinthifolius*).

**Exemplary Sites:** Bradwell Bay Unit of Apalachicola National Forest (Wakulla County), Post Office Bay Unit of Apalachicola National Forest (Liberty County), St. Marks National Wildlife Refuge (Wakulla County), Tosohatchee Wildlife Management Area (Orange County), Triple N Ranch Wildlife Management Area (Osceola County), Fred C. Babcock-Cecil M. Webb Wildlife Management Area (Charlotte County), Picayune Strand State Forest (Collier County), Jonathan Dickinson State Park (Martin County)

**Global and State Rank:** G4/S4

**Crosswalk:**

Kuchler	112/Southern Mixed Forest
Davis	2/Pine Flatwoods
SCS	/South Florida Flatwoods
	7/North Florida Flatwoods
	8/Cabbage Palm Flatwoods
Myers and Ewel	Flatwoods - wet flatwoods and seepage savannas
SAF	74/Cabbage Palmetto
	84/Slash Pine
	85/Slash Pine - Hardwood
	98/Pond Pine
FLCFC	411/Pine Flatwoods
	419/Other Pines
	428/Cabbage Palm
	622/Pond Pine
	624/Cypress - Pine - Cabbage Palm
	630/Wetland Forested Mixed

Other synonyms: pine savanna<sup>57</sup>; hydric pine flatwoods<sup>21,136</sup>; boggy flatwoods<sup>57</sup>; wetland pine savannas<sup>38</sup>



Grass-dominated wet flatwoods, Apalachicola National Forest (Liberty County)

Photo by Gary R. Knight



# 12 - WETLAND HARDWOOD HAMMOCKS



Map prepared by U. S. Department of Commerce. Bureau of The Census • 1960, Corrected as of April 1965.  
U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

FEBRUARY 1981 4-R-36720-12  
FEBRUARY 1968 BASE 4-L-25770

USDA SCS-FORT WORTH, TEXAS 1981



Distant view of a typical wetland hardwood hammock in Taylor County.



Interior of a wetland hardwood hammock.



In some areas, cabbage palms are predominant, such as in this area near the coast.

## ECOLOGICAL COMMUNITY

### NO. 12 - WETLAND HARDWOOD HAMMOCKS

#### OCCURRENCE

The Wetland Hardwood Hammock ecological community is scattered east and west of the Central Florida Ridge, extending northwesterly into the panhandle. It predominates in the region from Hillsborough County to Wakulla County. One of the largest areas is along the Gulf Coast north of the Withlacoochee River.

#### DESCRIPTION

This community is a wetland forest on poorly drained soils, soils subject to constant seepage, or soils with high water tables. It has an evergreen appearance since it is dominated by the laurel, live, and water oaks, and cabbage palm. In many areas red cedar is also one of the dominants. The deciduous sweet gum is one of the trees. Red maple, various bays, and cypress also occur but these species are not dominant in this community. Topography is low and nearly level. These hammocks are not flooded for as long a period of time as are associated swamp hardwoods. The swamp hardwoods community is often found within depressional areas of the wetland hardwood hammock. Wetland hardwood hammocks may be distinguished from bottomland hardwoods by the dominant plant species and the type of flooding. If the inundating water derives chiefly from river overflow, it is a bottomland hardwood; if inundated by local rainfall, it is wetland hardwood hammock.

#### 1. Soils

Soils associated with this community are nearly level, somewhat poorly and poorly drained and have loamy subsoils and sandy surfaces. Many of these soils have very thick sandy and surface and subsurface layers. Representative soils include Aripeka, Coxville, Herod, Matmon, Megget, Nutall, Oleno, Portsmouth, and Plummer. Appendix A contains information on correlation of soil series with the appropriate ecological community.

#### 2. Vegetation

This community supports a luxurious growth of vegetation with a diversity of species. Although supporting plants that are found in both drier and wetter sites, this community has definite flora characteristics. Plants which characterize this community are:

TREES - Cabbage palm, Sabal palmetto; Hawthorns, Craetaegus spp.; Laurel oak, Quercus laurifolia; Live oak, Quercus virginiana; Red bay, Persea borbonia; Red maple, Acer rubrum; Sweetbay, Magnolia virginiana; Sweetgum, Liquidambar styraciflua; Water oak, Quercus nigra; Southern Magnolia, Magnolia grandiflora

SHRUBS - Wax myrtle, Myrica cerifera; Witchhazel, Hamamelis virginiana; Saw palmetto, Serenoa repens

HERBACEOUS PLANTS AND VINES - Cinnamon fern, Osmunda cinnamomea; Crossvine, Bignonia capreolata; Poison ivy, Toxicodendron radicans; Royal fern, Osmunda regalis; Spanish moss, Tillandsia usneoides; Virginia creeper, Parthenocissus quinquefolia; Wild grape, Vitis spp.; Yellow jessamine, Gelsemium sempervirens

GRASSES AND GRASSLIKE PLANTS - Beaked panicum, Panicum spp.; Chalky bluestem, Andropogon capillipes; Eastern gamagrass, Tripsacum dactyloides; Longleaf uniola, Chasmanthium sessiliflorum; Maidencane, Panicum hemitomon

A list of plants that may occur in this community are in Appendix B.

3. Animals

Wildlife species include:

MAMMALS - Bobcat, deer, skunk, mink, opossum, otter, raccoon, wild hog, gray squirrel

BIRDS - Mississippi kite, owls, turkey, red-shouldered hawk, woodpeckers, and numerous songbirds

REPTILES - Green anole

Information on animals known to occur in specific ecological communities is in Appendix C.

LAND USE INTERPRETATIONS

1. Environmental Value as a Natural System

Wetland hardwood hammocks have high recreational values for hunting, hiking, and nature study. They also have important aesthetic benefits. Water quality and quantity control is one of the most important benefits provided, particularly in the coastal areas.

2. Rangeland

This community has a low potential for producing forage due to the dense forest canopy of hardwoods and associated cabbage palms. These sites provide protection from cold weather and shade during hot summer periods for livestock. For sites in excellent condition, the annual production of air dry plant material varies from 1,500 to 3,500 pounds per acre. The variation depends on plant growth conditions. From 12 to 35 acres are usually needed per animal unit depending upon amount and type of forage available. There will be little forage available when the canopy cover exceeds 60 percent. The relative

percentage of annual vegetation production by weight is 40 percent grasses and grasslike plants, 40 percent trees and shrubs, and 20 percent herbaceous plants.

3. Wildlifeland

Wetland hardwood hammocks are one of the most productive and diverse wildlife habitats. This community is good habitat for wild hogs, deer, turkey, black bear, gray squirrel, woodpeckers, owls, and furbearers. It is poor for quail and dove and fair for many songbirds. It is good for reptiles and amphibians, being moist most of the year.

4. Woodland

There has been considerable acreage of wet hardwood hammocks converted to pine production.

Drainage is needed for optimum growth of pines. The drainage and conversion destroys this community as a viable unit. With the value of hardwoods increasing, much of the remaining acreage may stay in hardwood production. However, new markets are needed for hardwood production, such as furniture stock, to keep these areas in hardwood production.

This community has a moderately high potential productivity for commercial wood production. There are moderate equipment limitations and seedling mortality due to wet soil conditions and plant competition. The commercial species for planting are slash pine and loblolly pine. Potential annual growth is 1.2 and 1.0 cords per acre respectively. Potential productivity is 18 percent less for soils south of a line from Hernando to Orange Counties.

5. Urbanland

This community is subject to high water tables during the rainy seasons and has limitations for urban development. Water management systems are required for urban uses. It is usually difficult to establish vegetation on steep channel side slopes and infertile soil. Special planting and management techniques may be required. Without vegetation, erosion and sedimentation is often a problem in water management systems. Wind erosion can also become a problem in unvegetated areas. This is especially severe in the spring.

Native plants can be used for beautification and require minimum establishment and maintenance. Some of the trees are American holly, cabbage palm, dahoon holly, fringetree, hawthorns, live oak, loblolly bay, loblolly pine, longleaf pine, red maple, slash pine, southern magnolia, redcedar, sugarberry, swamp chestnut oak, sweetgum, and water oak. Some of the shrubs are American beautyberry, shining sumac, yaupon holly, sawpalmetto, and wax myrtle. Some of the herbaceous plants are aster, blackeyed Susan, coneflowers, dayflower, rose-mallow, meadowbeauty, and sunflower.

The most important urban wildlife is songbirds and squirrel. Undisturbed areas provide good escape cover and travel routes for deer, turkey, raccoon, and similar forms of wildlife.

### ENDANGERED AND THREATENED PLANTS AND ANIMALS

Threatened or endangered plants include:

HERBACEOUS PLANTS - Adder's tongue fern, Ophioglossum palmatum; Auricled spleenwort, Asplenium auritum; Climbing dayflower, Commelina gigas; Cuplet fern, Dennstaedtia bipinnata

Threatened or endangered animals may include:

MAMMALS - Florida black bear, Ursus americanus floridanus; Florida panther, Felis concolor coryi



Big Bend Wildlife Management Area (Taylor County)

Photo by Ann F. Johnson

### **Hydric Hammock**

**Description:** Hydric hammock is an evergreen hardwood and/or palm forest with a variable understory typically dominated by palms and ferns occurring on moist soils, often with limestone very near the surface. While species composition varies, the community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover of grasses and ferns. The canopy is dominated by swamp laurel oak (*Quercus laurifolia*) and/or live oak (*Q. virginiana*) with varying amounts of cabbage palm (*Sabal palmetto*), American elm (*Ulmus americana*), sweetbay (*Magnolia virginiana*), red cedar (*Juniperus virginiana*), red maple (*Acer rubrum*), sugarberry (*Celtis laevigata*), sweetgum (*Liquidambar styraciflua*), and water oak (*Q. nigra*). Cabbage palm is a common to dominant component of hydric hammock throughout most of Florida. Loblolly pine (*Pinus taeda*) may be frequent in some areas, but slash pine (*Pinus elliottii*) is less frequently encountered. In addition to saplings of canopy species, the understory may contain a number of small trees and shrubs. American hornbeam (*Carpinus caroliniana*) is often frequent, and various other woody species may be present including swamp dogwood (*Cornus foemina*), small-leaf viburnum (*Viburnum obovatum*), common persimmon (*Diospyros virginiana*), swamp bay (*Persea palustris*), wax myrtle (*Myrica cerifera*), dwarf palmetto (*Sabal minor*), American beautyberry (*Callicarpa americana*), and needle palm (*Rhapidophyllum hystrix*). Vines may be frequent and diverse; common species are eastern poison ivy (*Toxicodendron radicans*), peppervine (*Ampelopsis arborea*), rattan vine (*Berchemia scandens*), trumpet creeper (*Campsis radicans*), climbing hydrangea (*Decumaria barbara*), yellow jessamine (*Gelsemium sempervirens*), greenbriers (*Smilax* spp.), summer grape (*Vitis aestivalis*), and muscadine (*Vitis rotundifolia*). Herb cover, when present includes mostly graminoids and ferns with the following species commonly encountered: sedges (*Carex* spp.), woodoats (*Chasmanthium* spp.), smooth elephantsfoot (*Elephantopus nudatus*), Carolina

scalystem (*Elytraria caroliniensis*), woodsgrass (*Oplismenus hirtellus*), maiden ferns (*Thelypteris* spp.), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis* var. *spectabilis*), toothed midsorus fern (*Blechnum serrulatum*), netted chain fern (*Woodwardia areolata*), and Virginia chain fern (*Woodwardia virginica*). Epiphytes such as golden polypody (*Phlebodium aureum*), air-plants (*Tillandsia* spp.), and shoestring fern (*Vittaria lineata*) increase in frequency to the south along with other more subtropical shrubs such as myrsine (*Rapanea punctata*), and wild coffee (*Psychotria nervosa*; species list developed in part from Vince et al.<sup>423</sup>).

Species composition is mainly influenced by flooding patterns. In saturated and frequently flooded environments, hydrophytic trees such as swamp tupelo (*Nyssa sylvatica* var. *biflora*) become more abundant. Frequency and depth of inundation have a pronounced effect on oak canopy composition as well, with saturated soils supporting more swamp laurel oak, and areas of infrequent flooding supporting more live oak.<sup>423</sup> Increased salinity is a factor often limiting certain species. Rises in terrain as well as ecotones to mesic hammock and upland hardwood forest induce a greater cover of upland species, specifically southern magnolia (*Magnolia grandiflora*), pignut hickory (*Carya glabra*), and saw palmetto (*Serenoa repens*).

Hydric hammock occurs on low, flat, wet sites where limestone may be near the surface and soil moisture is kept high mainly by rainfall accumulation on poorly drained soils. Periodic flooding from rivers, seepage, and spring discharge may also contribute to hydric conditions.<sup>423</sup> Soils are variable, usually somewhat acidic to slightly alkaline with little organic matter, and in all cases, alkaline materials are available in the substrate.<sup>423</sup> In the extensive Gulf Hammock region shallow loamy soils (Waccasassa series) formed by marine sediments overlie a layer of Oligocene limestone near the surface that frequently outcrops.<sup>157,409</sup> Deeper soils over limestone (Aripeka series) and deep sands with calcium carbonate nodules and shell fragments underlie many hammocks in peninsular Florida.<sup>409</sup> These substrates are conducive for the growth of calciphiles characteristic of hydric hammock (red cedar, rattan vine, etc.). Hydric hammock is inundated only for short periods following heavy rains. The normal hydroperiod is seldom over 60 days per year. Fire may be rare or occasional depending on several factors including how often the surrounding community burns and hammock size.

**Characteristic Set of Species:** swamp laurel oak, live oak, cabbage palm, red cedar

**Rare Species:** Rare plants occurring in hydric hammock include auricled spleenwort (*Asplenium erosum*), Chapman's sedge (*Carex chapmanii*), hay scented fern (*Dennstaedtia bipinnata*), Tampa vervain (*Glandularia tampensis*), Florida hasteola (*Hasteola robertiorum*), star anise (*Illicium parviflorum*), hand fern (*Ophioglossum palmatum*), plume polypody (*Pecluma plumula*), terrestrial peperomia (*Peperomia humilis*), pinewoods dainties (*Phyllanthus liebmannianus* ssp. *platylepis*), and pinkroot (*Spigelia loganioides*). Hydric hammock is important habitat and foraging grounds for an array of rare animals including Gulf hammock dwarf siren (*Pseudobranchius striatus lustricolus*), spotted turtle (*Clemmys guttata*), eastern indigo snake (*Drymarchon couperi*), limpkin (*Aramus gularauna*), short-tailed hawk (*Buteo brachyurus*), swallow-tailed kite (*Elanoides forficatus*), yellow-crowned night-heron (*Nyctanassa violacea*), black-crowned night-heron (*Nycticorax nycticorax*), Sherman's short-tailed shrew (*Blarina carolinensis shermani*), Homosassa shrew (*Sorex longirostris eionis*), Southeastern bat (*Myotis austroriparius*), Florida black bear (*Ursus americanus floridanus*), Florida long-tailed weasel (*Mustela frenata peninsulae*), and Gulf salt marsh mink (*Neovison vison halilimnetes*).

**Range:** Hydric hammock is restricted to Florida and coastal Georgia.<sup>423</sup> It mainly occurs in the Florida peninsula north of the Everglades and is most extensive between Pasco and Wakulla counties, with only small occurrences further west immediately adjacent to salt marshes. Hydric hammock is less widespread on the east coast, but may be found on the St. John's River floodplain and just inland of salt marshes along the northeastern coast. Many other small hydric hammocks are scattered throughout the state, particularly along spring runs. The range of inland hammocks extends to approximately Alachua County.

**Natural Processes:** Fire is not considered an important component of hydric hammock dynamics; however, they do burn occasionally. Cabbage palms are fire tolerant and intense fires favor this species. Live oak can survive low intensity fires, but red cedar is highly susceptible to fire. Flooding duration and frequency are primary factors in species composition. While most hydric hammock trees are at least somewhat adapted to flooding, the ranges of tolerance vary according to timing and depth of inundation.<sup>423</sup>

**Community Variations:** Along the Gulf coast where hammock and flatwoods vegetation grades into salt marshes, salinity levels allow the persistence of only a subset of the hydric hammock vegetation, particularly cabbage palm, live oak, and red cedar. These coastal hydric hammocks extend west along the Florida Panhandle at least to the



Apalachicola basin and may be mixed stands of palms, oaks and loblolly pines.<sup>328</sup> Small stands of hammock that are surrounded by marsh or prairie are known as prairie hammocks, and are common along the St. John's River. Isolated stands of Atlantic white cedar (*Chamaecyparis thyooides*) are known to occur in at least a few hydric hammocks in Central Florida.

Two commonly occurring variants of hydric hammock are recognized here.

Variants: COASTAL HYDRIC HAMMOCK – Strips of hammock immediately bordering salt marsh or other coastal communities. Species composition is limited by salinity to mostly cabbage palm, live oak, and red cedar.

PRAIRIE HYDRIC HAMMOCK – Isolated pods of trees occurring within a larger matrix of pyrogenic vegetation, usually floodplain marsh. Dominant trees are cabbage palm, live oak, and red cedar with an open sparse understory. Prairie hammock burns more frequently and is often completely dominated by cabbage palm. Also see Mesic Hammock in this guide for description of prairie mesic hammock.

**Associated Communities:** Hydric hammock often grades into, or may be difficult to differentiate from, mesic hammock, bottomland forest, alluvial forest, swamps, and baygall. Hydric hammock may be distinguished from mesic hammock by its species composition that is dependent on occasional flooding.<sup>367</sup> Both are typically oak-dominated. However, since mesic hammock is less saturated and does not flood frequently, it supports a higher frequency of southern magnolia and pignut hickory, and often has a shrub layer of saw palmetto.

Alluvial forest, influenced primarily by periodic flooding from rivers, tends to have a greater abundance of trees characteristic of riverine habitats, particularly water hickory (*Carya aquatica*) and overcup oak (*Quercus lyrata*), although the transition may be gradual where hydric hammock and alluvial forest occur in the same floodplain.<sup>438</sup> Hydric hammock may occur finely intermixed with either basin or floodplain swamp. Although cypress and tupelo may be present in hydric hammock, they are not dominant trees.

Perhaps the most difficult distinction to draw is between hydric hammock and bottomland forest, a community usually found in broad floodplains or along primary streams. Both have a similar species composition and may be found in the same general situations, but bottomland forest generally lacks the cabbage palm and red cedar components found in most hydric hammocks. Baygall is maintained by continual seepage from surrounding uplands and is dominated by bay species – loblolly bay (*Gordonia lasianthus*), sweetbay, and red bay (*Persea borbonia*) – rather than an oak/cedar/cabbage palm assemblage. Soils are more acid with a higher organic matter than the slightly acidic to neutral soils of hydric hammock.

**Management Considerations:** Preservation of good quality hydric hammock is important for a variety of reasons. In addition to the aesthetic qualities of the community that promote outdoor tourism, these hammocks provide valuable habitat for game animals that rely on the large production of oak mast. The canopy and forest floor of hydric hammocks act to reduce soil erosion. During heavy rains, sheet flow is slowed across the forested floor of a hammock, allowing greater absorption into the soil. Hammocks adjacent to salt marshes function to protect inland areas from damaging hurricane winds.<sup>367,438</sup>

Selective logging of the natural canopy trees such as live oak and red cedar has been a continual disturbance to hydric hammock, and although forest structure may have been impacted by these activities, species composition does not seem to have been greatly altered.<sup>367</sup> A greater threat has come from the conversion of hydric hammock into pine plantation. Soil damage caused by site preparation and logging is particularly detrimental in hydric hammock, forming ruts and canals that increase surface water runoff and, consequentially, soil erosion. Once planted, the time required to return to a natural stand depends on the intensity of the site preparation prior to planting. Crowded thickets of weedy shrubs and vines generally dominate clearcut hammocks for many years; however, with the removal of the planted pine canopy, hammock trees may re-establish a natural stand by re-seeding or resprouting from remaining trees.<sup>367</sup>

Projected rises in sea level over the next century threaten coastal hydric hammock. While adult cabbage palms may persist for years following increased saltwater flooding, regeneration of stands eventually halts and palm forests are replaced by salt marsh.<sup>440</sup>

Effective conservation management of hydric hammock primarily consists of maintaining natural hydrology and controlling exotic plant invasion. Ditching and water control structures should be avoided and existing ones should be removed or filled. Any activity that requires the use of heavy machinery should be limited to dry periods when the soil is not saturated, thereby reducing rutting which can cause unnatural water channelization.

Exotic plants and animals pose significant problems in hydric hammock. This community may be the most preferred habitat of feral hogs (*Sus scrofa*).<sup>367</sup> Control of this species is not only important in order to reduce competition with native wildlife, but also to minimize soil disturbance which decreases diversity of native ground cover within hydric hammock. Soil disturbance and canopy openings allow the spread of exotic invasive plants, particularly Brazilian pepper (*Schinus terebinthifolius*), skunk vine (*Paederia foetida*), camphor tree (*Cinnamomum camphora*), Japanese climbing fern (*Lygodium japonicum*), old world climbing fern (*L. microphyllum*), white-flowered wandering jew (*Tradescantia fluminensis*), sword fern (*Nephrolepis cordifolia*), Caesar's weed (*Urena lobata*), and cogon grass (*Imperata cylindrica*). Once established these species require costly efforts for control or removal.

**Exemplary Sites:** Waccasassa Bay Preserve State Park (Levy County), Chassahowitska Wildlife Management Area (Hernando County), Lower Hillsborough River Flood Detention Area (Hillsborough County), St. Marks National Wildlife Refuge (Jefferson County), Triple N Ranch Wildlife Management Area (Osceola County), Highlands Hammock State Park (Highlands County), Bulow Creek State Park (Volusia County)

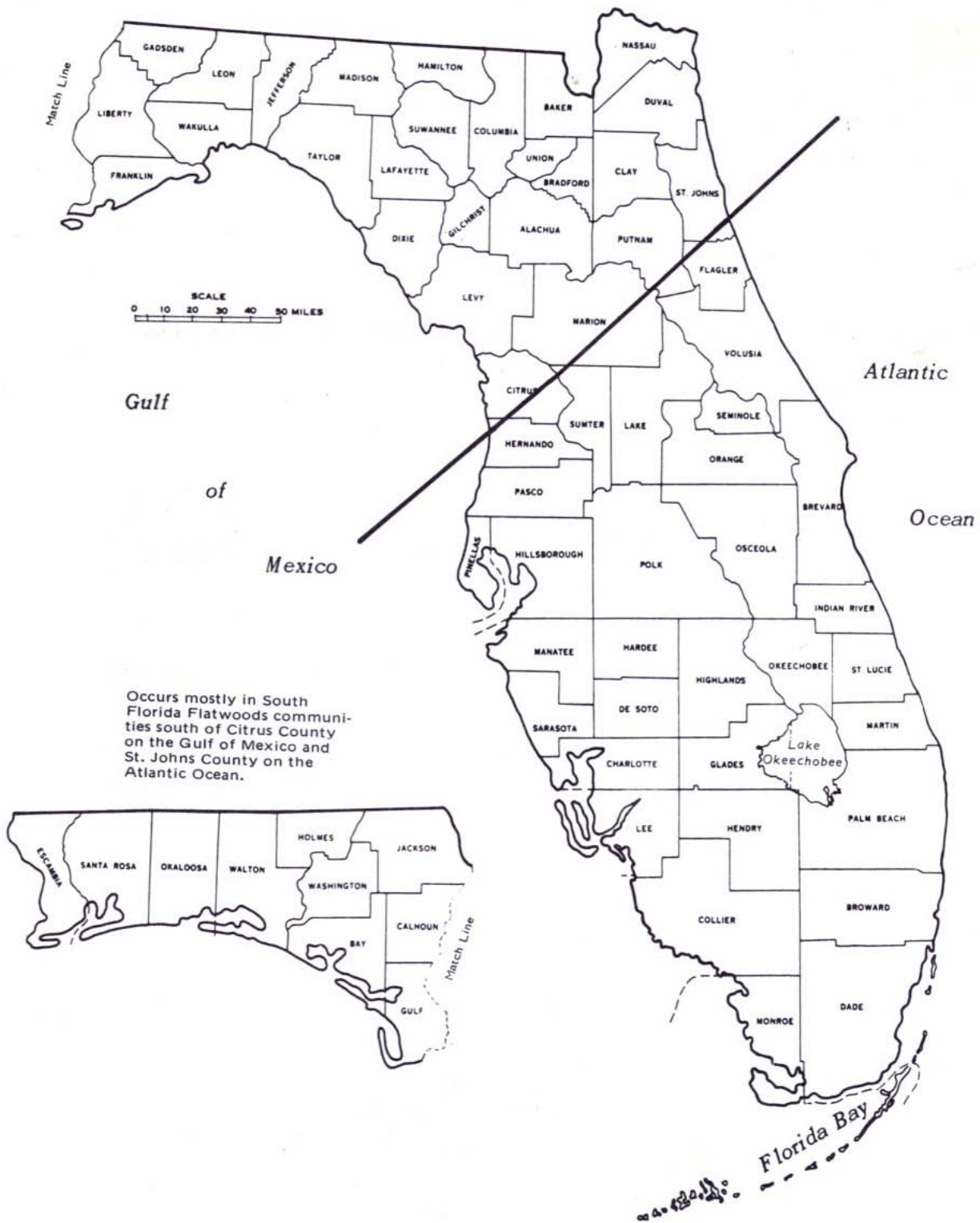
**Global and State Rank:** G4/S4

**Crosswalk and Synonyms:**

Kuchler	113/Southern Floodplain Forest
Davis	8/Swamp Forests
	12/Hardwood Forests
SCS	12/Wetland Hardwood Hammocks
	13/Cabbage Palm Hammocks
Myers and Ewel	Hydric hammocks
SAF	73/Southern Red Cedar
	74/Cabbage Palmetto
FLUCCS	617/Mixed Wetland Hardwoods

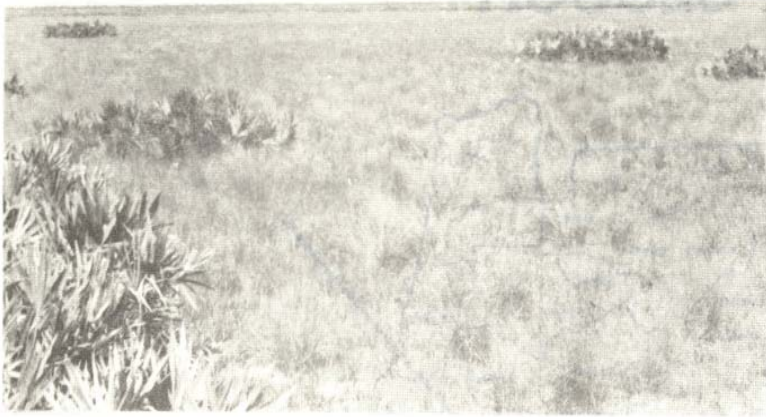
Other synonyms: wet hammock, Gulf Hammock

# 26 - SLOUGH



Map prepared by U. S. Department of Commerce, Bureau of The Census, 1960, Corrected as of April 1965.  
 U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE  
 USDA SCS-FORT WORTH, TEXAS 1981

FEBRUARY 1981 4-R-36720-26  
 FEBRUARY 1968 BASE 4-L-25770



A typical slough of south Florida presents an open vista, dominated by grasses and sedges.

Sloughs typically occur as relatively narrow drainage ways interspersed through south Florida flatwoods Communities.



Sand cordgrass, Spartina bakeri, is common on overgrazed slough areas.

## ECOLOGICAL COMMUNITY

### NO. 26 - SLOUGH

#### OCCURRENCE

The Slough ecological community occurs throughout central and south Florida, but especially in the latter. Individual communities vary widely in size. Most serve as drainageways for water during periods of heavy and prolonged rainfall. This community occurs mostly within the south Florida flatwoods ecological community.

#### DESCRIPTION

This community appears as an open expanse of grasses, sedges, and rushes in an area where the soil is saturated during the rainy season. Most sloughs are relatively long and narrow and slightly lower in elevation than the surrounding flatwoods or hammocks.

#### 1. Soils

Soils commonly associated with this community are nearly level and poorly drained with coarse textured surfaces underlain by clay or sand. Representative soils are: Anclote, Basinger, Charlotte, Placid, and Pople. Appendix A contains information on correlation of soil series with the appropriate ecological community.

#### 2. Vegetation

Grasses are the most common plants found in sloughs. Sedges and rushes also occur, with scattered shrubs in some locations. Plants that characterize this community are:

SHRUBS - St. Peters wort, Ascyrum stans

HERBACEOUS PLANTS - Pickerel weed, Pontederia cordata; Sundew, Drosera spp.; Marsh pink, Sabatia spp.; Meadowbeauty, Rhexia spp.; Milkwort, Polygala spp.; Yellow-eyed grass, Xyris spp.

GRASSES AND GRASSLIKE PLANTS - Beak rushes, Rhynchospora spp.; Blue maidencane, Amphicarpum muhlenbergianum; Bluejoint panicum, Panicum tenerum; Bottlebrush threeawn, Aristida spiciformis; Panicum, Dichanthelium dichotomum; Low panicum, Panicum s pp.; Sand cordgrass, Spartina bakeri; Sloughgrass, Scleria spp.; Soft rush, Juncus effusus

Information about plants which occur in specific ecological communities is in Appendix B.

### 3. Animals

Sloughs are host to a diverse wildlife population. Many larger animals occur where sloughs join flatwoods and hammocks. Typical animals of the sloughs are:

MAMMALS	- Bobcat, deer, gray fox, marsh rabbit, opossum, cotton rat, raccoon
BIRDS	- Bobwhite quail, cranes, egrets, herons, ibis, meadowlark, red-shouldered hawks, snipe
REPTILES	- Cottonmouth moccasin, eastern diamondback rattlesnake, pygmy rattlesnake, ringneck snake, yellow rat snake
AMPHIBIANS	- Frogs (chorus, cricket, grass, pig), salamanders

Information on animals known to occur in specific ecological communities is in Appendix C.

## LAND USE INTERPRETATIONS

### 1. Environmental Value as a Natural System

Sloughs serve as natural drainageways during high water periods. As such, they have great value in improving water quality by natural processes. They also retain water, help slow down water flows, and thereby increase water quantity and improve water quality.

Fire and artificial water level fluctuations are the major factors affecting these areas. Variations in the natural sequences of either event will change the slough's diversity and productivity. With the exclusion of fire or permanent water level reduction, the plant succession will be to a wooded community.

Native forage production is good with proper management. Use for rangeland has only a slight effect on the community if properly managed. The community has good wildlife values, especially with proper management. The installation of water control practices have facilitated the use of some sloughs for improved pasture, vegetables, and citrus.

### 2. Rangeland

This ecological community has the potential for producing significant amounts of high quality forage such as blue maidencane, chalky bluestem and bluejoint panicum. For sites in excellent condition, the average annual production of air dry plant material varies from 4,000 to 8,000 pounds per acre. This variation depends on plant growth conditions. From 3 to 16+ acres are usually needed per animal unit depending upon amount and type of forage available. The relative percentages of annual vegetative production by weight is 90 percent grasses and grasslike plants, 10 percent herbaceous plants.

2. Wildlifeland

This community is productive in regards to food for bobwhite quail, deer, and wading birds. Its low growing vegetative growth provides poor cover for most wildlife species, but this is often offset by the "edge effect" of this community when it is located with flatwoods.

4. Woodland

This community is not recommended for commercial woodland unless water control measures are provided.

5. Urbanland

This community is subject to high water tables, especially during the rainy seasons. This causes limitations for urban development and water management systems are required. It is often difficult to establish vegetation on steep channel side slopes and infertile soils. Special planting techniques may be required. Without adequate vegetation, erosion and sedimentation is usually a problem. Severe wind erosion can also occur, especially in the spring.

Native plants can be used for beautification and require minimum establishment and maintenance. Some of the shrubs are sawpalmetto and waxmyrtle. Some of the herbaceous plants are aster, coneflower, iris, marsh pink and meadowbeauty.

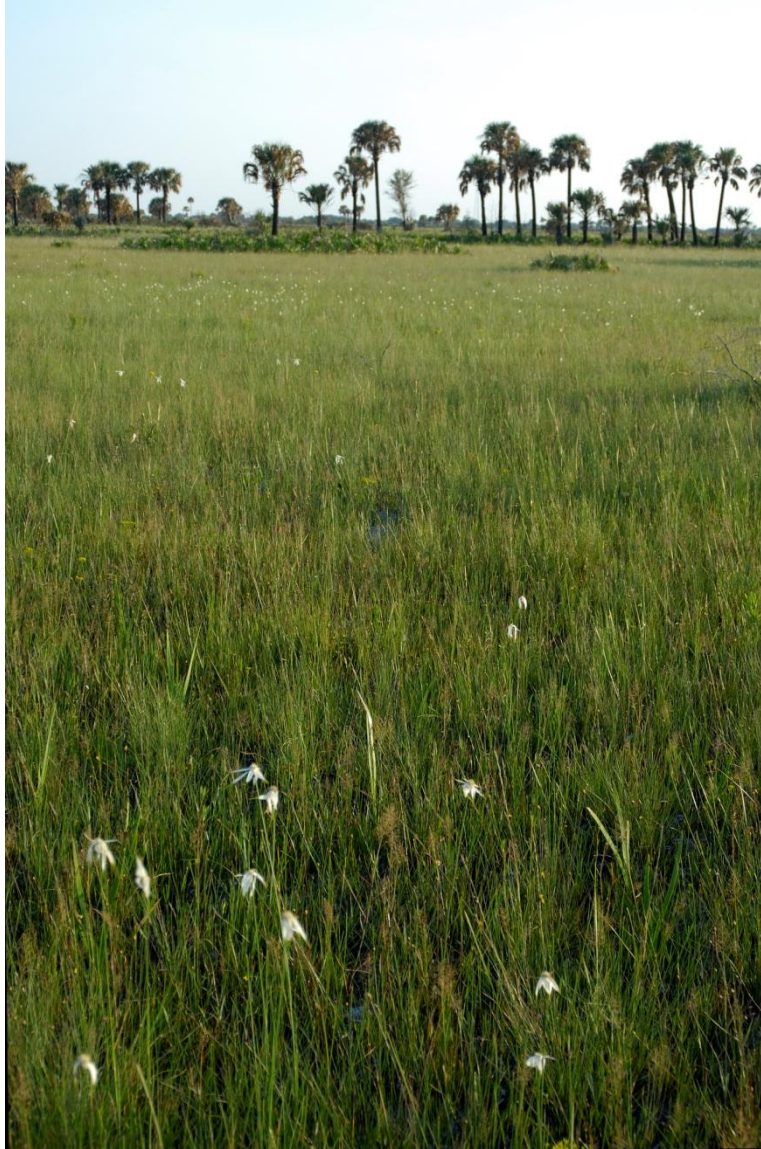
The most important urban wildlife are songbirds and wading birds. Undisturbed areas are important as refuge areas for many forms of wildlife.

ENDANGERED AND THREATENED PLANTS AND ANIMALS

Threatened or endangered animals include:

MAMMALS - Florida panther, Felis concolor coryi

BIRDS - Dusky seaside sparrow (Brevard County only), Ammodramus maritimus nigricens; Florida sandhill crane, Grus canadensis pratensis



Kissimmee Prairie Preserve State Park (Osceola County)

Photo by Gary Knight

## **Wet Prairie**

**Description:** Wet prairie is an herbaceous community found on continuously wet, but not inundated, soils on somewhat flat or gentle slopes between lower lying depression marshes, shrub bogs, or dome swamps and slightly higher wet or mesic flatwoods, or dry prairie. It is typically dominated by dense wiregrass (*Aristida stricta* var. *beyrichiana*) in the drier portions, along with foxtail club-moss (*Lycopodiella alopecuroides*), cutover muhly (*Muhlenbergia expansa*), yellow butterwort (*Pinguicula lutea*), and savannah meadowbeauty (*Rhexia alifanus*). In the wetter portions, wiregrass may occur with, or be replaced by, species in the sedge family, such as plumed beaksedge (*Rhynchospora plumosa*), featherbristle beaksedge (*R. oligantha*), Baldwin's nutrush (*Scleria baldwinii*), or slenderfruit nutrush (*S. georgiana*), plus longleaved threeawn (*Aristida palustris*). Also common in wetter areas are carnivorous species, such as pitcher plants (*Sarracenia* spp.), sundews (*Drosera* spp.), butterworts (*Pinguicula* spp.), and bladderworts (*Utricularia* spp.). Other characteristic species in this community include toothache grass (*Ctenium aromaticum*), pineland rayless goldenrod (*Bigelowia nudata*), flattened pipewort (*Eriocaulon compressum*), water cowbane (*Oxypolis filifolia*), and coastalplain yellow-eyed grass (*Xyris ambigua*).

Wet prairies in northern Florida and the calcareous variant in south-central Florida are some of the most diverse communities in the United States, with an average of over 20 species per square meter in some places and over 100



total species in any given stand.<sup>46,208,294,307,426</sup> Factors contributing to this diversity include subtle spatial differences in moisture conditions across the wet prairie and temporal differences in fire and flooding regime from year to year, which favor different species and prevent any one species from excluding the others.

Wet prairie is noted for its many showy flowering herbs including false foxgloves (*Agalinis* spp.), grass pinks (*Calopogon* spp.), pipeworts (*Eriocaulon* spp.), rein orchids (*Platanthera* spp.), milkworts (*Polygala* spp.), meadowbeauties (*Rhexia* spp.), rosegentians (*Sabatia* spp.), yellow-eyed-grasses (*Xyris* spp.), white-top sedge (*Rhynchospora latifolia*), and composites in the genera *Balduina*, *Carphephorus*, *Coreopsis*, *Eupatorium*, *Eurybia*, *Helenium*, *Helianthus*, *Rudbeckia*, *Solidago*, and *Symphyotrichum*. Re-sprouting short shrubs that grow intermixed with the grasses, include two species of St. John's wort (*Hypericum brachyphyllum*, *H. myrtifolium*), evergreen bayberry (*Myrica caroliniensis*) and, in Panhandle Florida, bog tupelo (*Nyssa ursina*). A few stunted trees of slash pine (*Pinus elliotii*), pond cypress (*Taxodium ascendens*), or swamp tupelo (*Nyssa sylvatica* var. *biflora*) may be present. In northern Florida clumps of wetland shrubs such as titi (*Cyrilla racemiflora*), coastal sweet pepperbush (*Clethra alnifolia*), myrtle-leaved holly (*Ilex cassine* var. *myrtifolia*), and large gallberry (*Ilex coriacea*) are also seen.

Wet prairie usually occurs on acidic, nutrient-deficient, saturated soils. Soil series associated with wet prairies in the Panhandle include Plummer fine sands, Rutledge sandy loams, and Bladen sandy loams with clay subsoils.<sup>410,432</sup> In the Florida peninsula, wet prairies, including those dominated by cutthroat grass,<sup>16</sup> are often found on poorly drained Basinger fine sands.<sup>307</sup> Calcareous wet prairies are found in Central and south-central Florida on circum-neutral Felda or Wabasso fine sands with sandy loam subsoils.<sup>262,307</sup>

**Characteristic Set of Species:** pitcherplants, wiregrass, blue maidencane, cutthroat grass, wiry beaksedges, flattened pipewort, toothache grass, water cowbane, yellow-eyed grasses, pineland rayless goldenrod

**Rare Species:** The Panhandle is a hotspot for rare plants of the wet prairie community with 25 out of the 30 rare species found in this community; 12 of these are endemic to the Panhandle (Table 1).

The rare Morse's flightless grasshopper (*Gymnoscirtetes morsei*) is known only from open boggy habitats in northern Florida.

**Range:** Wet prairie occurs throughout Florida except for extreme South Florida where limestone soils predominate.<sup>307</sup> Outside Florida, wet prairies (also known as pitcher plant bogs) are found in the southeastern coastal plain from eastern Texas to North Carolina.<sup>128,256,426</sup> Wet prairies in the Panhandle are closest floristically to other areas in the East Gulf Coastal Plain, i.e. pitcher plant bogs in Mississippi, Alabama, and southwestern Georgia.<sup>155,294,382</sup>

**Natural Processes:** Natural fires likely entered wet prairie from surrounding pinelands and burned through them when they were dry enough to carry fire. Hermann<sup>168</sup> estimates a natural fire return interval of 2-3 years where wet prairie vegetation is adjacent to mesic/wet flatwoods or sandhill in the Apalachicola National Forest. A similar fire interval was also determined by Huffman<sup>183</sup> for mesic flatwoods near the Panhandle coast from an analysis of fire scars on pine stumps. In the absence of fire, shrubs and trees invade wet prairie and shade out the light-loving herbaceous species. A further indication of their dependence on fire is the requirement for fire to stimulate flowering in many wet prairie herbs, including two of the dominant grasses, wiregrass and cutthroat grass.<sup>284</sup>

The nutrient-poor, acid sands of wet prairie in the Panhandle make these habitats a center for both carnivorous plant diversity and for diversity of arthropod species dependent on them. At least 16 arthropod species are obligate associates of the genus *Sarracenia*<sup>352</sup> including three species of moth in the genus *Exyra* (*E. fax*, *E. ridingsii*, and *E. semicrocea*) and a mosquito (*Wyeomyia smithii*).

**Community Variations:** Species present in Panhandle wet prairies and not in those of the peninsula include thistleleaf aster (*Eurybia eryngiifolia*), Chapman's aster (*Symphyotrichum chapmanii*), Florida pineland spurge (*Euphorbia inundata*), and Chapman's butterwort (*Pinguicula planifolia*). In the peninsula, Curtiss' dropseed (*Sporobolus curtissii*), blue maidencane (*Amphicarpum muhlenbergianum*), cutthroat grass (*Panicum abscissum*), or Gulf hairawn muhly (*Muhlenbergia sericea*) may also be dominants or co-dominants with wiregrass.

Three common variants of wet prairie occur within Florida.

**Variants:** CUTTHROAT SEEP – Wet prairies dominated by the endemic cutthroat grass occur along the eastern and western edges of the Lake Wales Ridge in Central Florida and are characterized by many wildflowers in common with other acidic wet prairie areas. They are maintained in saturated condition by water seeping out from the deep sands of the Lake Wales Ridge onto adjacent lower flat lands.

CALCAREOUS WET PRAIRIE – In central and south-central peninsular Florida wiregrass may co-occur with Gulf hairawn muhly as a dominant species in wet prairies where calcareous substrate is not far below the surface and soils are circum-neutral.<sup>307</sup> Other calcium-loving species found in these prairies include pineland heliotrope (*Heliotropium polyphyllum*), sweet shaggytuft (*Stenandrium dulce*), and starrush white-top (*Rhynchospora colorata*).

PITCHERPLANT PRAIRIE – Wetter portions of wet prairies in the Panhandle are often characterized by dense stands of tall pitcherplants, primarily yellow pitcherplant (*Sarracenia flava*) near the Apalachicola River and white-top pitcherplant (*S. leucophylla*) to the west. Other species of pitcherplants found in this variant include sweet pitcherplant (*S. rubra*), parrot pitcherplant (*S. psittacina*), and Gulf purple pitcherplant (*S. rosea*).

**Associated Communities:** Wet prairie has many species in common with seepage slope and differs mainly in its occurrence on low, gently sloping terraces surrounded by mesic or wet flatwoods, or dry prairie, rather than on steeper slopes surrounded by sandhill or upland pine communities. Wet prairies are maintained in saturated condition by lateral seepage of groundwater, but, unlike seepage slopes, their water table is not perched above the level of the normal water table. Wet prairie differs from depression and basin marshes in having a relatively complete cover of wiregrass, cutthroat grass, nutrush (*Scleria* sp.), blue maidencane, or wiry beaksedges and in being inundated only to very shallow depth, if at all. It differs from the grassy form of wet flatwoods in having no, or only a very sparse, cover of pines. It differs from the wetter forms of dry prairie in the absence of upland shrubs such as saw palmetto (*Serenoa repens*), dwarf live oak (*Quercus minima*), or gallberry (*Ilex glabra*).<sup>307</sup> The calcareous variant of wet prairie differs from marl prairie, which is found in South Florida and may also be dominated by Gulf hairawn muhly, in having a more continuous herbaceous cover, without limestone exposed extensively at the surface, and without standing water or periphyton mats characteristic of marl prairie.<sup>424</sup>

**Management Considerations:** In the absence of fire, woody shrubs may encroach on wet prairie from both the bordering uplands (e.g. gallberry, wax myrtle [*Myrica cerifera*]) and wetlands (e.g. peelbark St. John's wort [*Hypericum fasciculatum*], titi [*Cyrilla racemiflora*], and black titi [*Cliftonia monophylla*])<sup>168</sup> and eventually shade out the sun-loving herbaceous species. Hermann<sup>168</sup> cites one area in the Apalachicola National Forest where fire had been absent for 12-15 years (based on ring counts of titi stems), where shrubs had invaded and the cover of herbaceous wet prairie species was reduced to 15-20 percent of the area, compared to 100 percent cover of herbaceous species in a nearby area burned every 2-4 years. A study comparing extent of shrub cover on geo-rectified aerial photographs of Apalachicola National Forest from the 1930s with current aerials shows expansion of shrubs into formerly grassy areas.<sup>171</sup>

Wet prairies are sensitive to relatively slight physical alterations to the soil surface which can permanently alter the hydrology.<sup>168</sup> Such disturbances include soil rutting within the prairies caused by trampling, vehicles, plowed fire lanes, or other heavy equipment damage, placing roads and ditches near the prairies and hog rooting. These disturbances can cause major changes in species composition that require expensive restoration to repair.<sup>276</sup>

**Exemplary Sites:** Tarkiln Bayou Preserve State Park (Escambia County), Garcon Point Water Management Area (Santa Rosa County), Apalachicola National Forest (Apalachicola Unit; Liberty County), Avon Park Air Force Range (Highlands and Polk counties), Three Lakes Wildlife Management Area and Triple N Ranch Wildlife Management Area (Osceola County), Kissimmee Prairie Preserve State Park (Okeechobee County)

**Global and State Rank:** G2/S2

**Crosswalk and Synonyms:**

Kuchler	112/Southern Mixed Forest
Davis	13/Grasslands of Prairie Type
	2/Pine Flatwoods
SCS	10/Cutthroat Seeps
	23/Pitcher plant bog
Myers and Ewel	Freshwater Marshes - wet prairies
	Flatwoods - wet flatwoods and seepage savannas
SAF	N/A
FLUCCS	310/Herbaceous
	641/Wet Prairies

Other synonyms: moist pine barrens<sup>155</sup>; grass-sedge savannah<sup>57</sup>; grass-sedge seepage bog<sup>57</sup>; pine savanna<sup>132</sup>; wet savanna<sup>208</sup>; pitcher plant bog<sup>128</sup>

Table 1. Rare species in wet prairie community.

<b>Panhandle Endemic</b>	<b>Panhandle and northern peninsula</b>
<i>Arnoglossum album</i>	<i>Asclepias viridula</i>
<i>Cuphea aspera</i>	<i>Linum westii</i>
<i>Eriocaulon nigrobracteatum</i>	<i>Parnassia grandifolia</i>
<i>Gentiana pennelliana</i>	<i>Platanthera integra</i>
<i>Harperocallis flava</i> *	<i>Ruellia noctiflora</i>
<i>Justicia crassifolia</i>	
<i>Nyssa ursina</i>	<b>Northeast Florida</b>
<i>Oxypolis filifolia</i> ssp. <i>greenmanii</i>	<i>Balduina atropurpurea</i>
<i>Physostegia godfreyi</i>	<i>Cleistes divaricata</i>
<i>Pinguicula ionantha</i> *	
<i>Scutellaria floridana</i> *	<b>Peninsular Florida Endemic</b>
<i>Verbesina chapmanii</i>	<i>Hartwrightia floridana</i>
	<i>Helianthus carnosus</i>
<b>Panhandle</b>	<i>Panicum abscissum</i>
<i>Dichantherium nudicaule</i>	
<i>Lachnocaulon digynum</i>	
<i>Lilium iridollae</i>	
<i>Macranthera flammea</i>	
<i>Parnassia caroliniana</i>	
<i>Sarracenia rubra</i>	
<i>Sarracenia leucophylla</i>	
<i>Xyris scabrifolia</i>	

\* Federally listed species