USDA Natural Resources Conservation Service

Ecological site R156BY010FL
Histisol Floodplain Marshes and Swamps

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 156B–Southern Florida Lowlands

This area is in the Floridian section of the Coastal Plain province of the Atlantic Plain. It is on nearly level lowlands. A few hummocks rise 3 to 6 feet (1 to 2 meters) above the general level of the landscape. Elevation ranges from near sea level to 26 feet (8 meters).This area is a dominantly wetland ecosystem that has been heavily influenced by human activity. It supports hummock and slough wetland vegetation. Remaining native savanna and scrub areas consist of native grasses, forbs, sedges, and a few scattered pines. Slash pine and cabbage palm are the dominant overstory species. Saw palmetto, cordgrasses, and bluestems make up the understory. Major wildlife species include white-tailed deer, feral hog, gray fox, raccoon, opossum, armadillo, rabbit, tree squirrel, wild turkey, bobwhite quail, mourning dove, Florida mallard, and woodpecker.

Classification relationships

All portions of the geographical range of this site falls under the following ecological / land classifications including:

-Environmental Protection Agency's Level 3 and 4 Ecoregions of Florida: 75 Southern Coastal Plain; 75d Eastern Florida Flatwoods (Griffith, G. E., Omernik, J. M., & Pierson, S. M., 2013)

-Florida Natural Area Inventory, 2010 Edition: Floodplain Marsh, Floodplain Swamp, Shrub Bog, Baygall (FNAI, 2010)

-Soil Conservation Service, 26 Ecological Communities of Florida: 17- Cypress Swamp, 22- Shrub Bogs- Bay Swamps, 25- Freshwater Marsh and Pond (Florida Chapter Soil and Water Conservation Society, 1989)

Ecological site concept

The Histisol Floodplain Marshes and Swamps ecological sites are very poorly drained sites that are seasonally inundated for four to eight months out of the year. This community consists of forested and non-forested wetlands found on frequently flooded organic soils. These are found adjacent to riverine and lacustrine systems that will flood during the rainy season (June to September). Fire is rare but not completely absent, and is used to maintain community structure and composition. Much of this natural community has been drained or altered and used for commercial production. This ecosite is typically seen along the Upper St. Johns River in the central and northern portions of this MLRA.

Associated sites

R156BY011FL	**Mineral Floodplain Marshes and Swamps** The Mineral Floodplain Marshes and Swamps ecosite may occur immediately adjacent to the Histisol Floodplain Marshes and Swamps ecosite. The Mineral Floodplain Marshes and Swamps ecosite consist of mineral soils that are in similar landscape positions and flooded long enough to develop hydric conditions.

F156BY030FL	**Wet Hardwood Forests** The Wet Hardwood Forests ecosite occur as knolls or small islands which are found in slightly higher landscape positions. These communities are closed canopy wetlands forested dominated by oaks and palms and will generally be small is extent found within the Histisol Floodplain Marshes and Swamps ecosite.
F156BY040FL	**Sandy Pine Flatwoods and Hammocks** The Sandy Flatwoods and Hammocks ecosite are poorly drained communities that may occur in higher landscape positions adjacent to the floodplain. The Sandy Flatwoods and Hammocks will generally grade into the Histisol Floodplain Marshes and Swamps ecosite with the presence of stunted trees or form a sharp transitional boundary.
F156BY041FL	**Sandy Over Loamy Pine Flatwoods and Hammocks** The Sandy over Loamy Flatwoods and Hammocks ecosite are poorly drained communities that may occur in higher landscape positions adjacent to the floodplain. The Sandy Flatwoods and Hammocks will generally grade into the Histisol Floodplain Marshes and Swamps ecosite with the presence of stunted trees or form a sharp transitional boundary.
R156BY100FL	**Subaqueous Freshwater Riverine Habitats** The Subaqueous Freshwater Riverine Habitats ecosite is site is found in the lowest landscape position and will be dominates by emergent, floating, or subaqueous species. These riverine communities will be a major contributor to the flooding conditions and organic soil formation of the Histisol Floodplain Marshes and Swamps ecosite.
R156BY150FL	**Subaqueous Freshwater Lacustrine Habitats** The Subaqueous Freshwater Lacustrine Habitats ecosite is found in the lowest landscape position and will be dominates by emergent, floating, or subaqueous species. These lacustrine communities will be a major contributor to the flooding conditions and organic soil formation of the Histisol Floodplain Marshes and Swamps ecosite.

Similar sites

R156BY011FL	**Mineral Floodplain Marshes and Swamps** The Mineral Floodplain Marshes and Swamps ecosite may be confused with the Histisol Floodplain Marshes and Swamps ecosite due to similar landscape position, flooding hydroperiods, and similar management, but will differ due to changes in soil properties. The Mineral Floodplain Marshes and Swamps is dominated by hydric mineral soils rather than histisols, which will produce different production values for forgeable species.
R156BY020FL	**Histisol Isolated Marshes and Swamps** The Histisol Isolated Marshes and Swamps ecosite may be confused with the Histisol Floodplain Marshes and Swamps ecosite due to similar soil properties, but will differ in landscape position and dominant hydroperiods. These differences will change management strategies for conservation practices and prescribed grazing activities.

Table 1. Dominant plant species

Tree	(1) *Taxodium* (2) *Quercus virginiana*
Shrub	(1) *Lyonia lucida* (2) *Morella cerifera*
Herbaceous	(1) *Cladium mariscus ssp. jamaicense* (2) *Rhynchospora*

Physiographic features

These sites occur on large linear concave areas that are highly protected and subject to extended flooding hydroperiods along the floodplains of riverine or lacustrine systems, such that undecomposed organic matter accumulates and non-hydrophytic vegetation is excluded. Freshwater marshes occur in the lowest position of this landscape whereas cypress swamps occur in slightly higher positions (elevation changes may range a few centimeters to inches), both holding water for long periods of time, except in extreme droughts. This ecosite is

primarily found influenced by the meandering St. Johns River, with headwaters starting in the central portion of this MLRA as marshes and lakes, flowing north to the Atlantic Ocean in Duval County. Due to small elevation changes this river has little to no current, creating large amounts of histisol flooded marsh and swamp habitat.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Dip (2) Talf
Geomorphic position, terraces	(1) Tread
Slope shape across	(1) Concave
Slope shape up-down	(1) Linear (2) Concave
Landforms	(1) Coastal plain > Marine terrace (2) Marine terrace > Swamp or marsh (3) Marine terrace > Flood plain (4) Marine terrace > Flood-plain step (5) Marine terrace > Stream terrace
Runoff class	Medium to high
Flooding duration	Long (7 to 30 days) to very long (more than 30 days)
Flooding frequency	Frequent
Ponding duration	Very long (more than 30 days)
Ponding frequency	Frequent
Elevation	0–33 ft
Slope	0–1%
Ponding depth	0–30 in
Water table depth	0 in
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Medium to high
Flooding duration	Long (7 to 30 days) to very long (more than 30 days)
Flooding frequency	None to frequent
Ponding duration	Brief (2 to 7 days) to very long (more than 30 days)
Ponding frequency	None to frequent
Elevation	0–33 ft
Slope	0–1%
Ponding depth	0–30 in
Water table depth	0–6 in

Climatic features

The climate of east central Florida is warm and temperate getting an average annual precipitation amount of 40 to 62 inches (1,015 to 1,575 millimeters). About 60 percent of the precipitation occurs from June through September. The center of the area is the driest part. Most of the rainfall occurs as moderate-intensity, tropical storms that produce large amounts of rain from late spring through early autumn. Late autumn and winter are relatively dry. The average annual temperature is 73 to 78 degrees F (23 to 25 degrees C). The freeze-free period averages 365 days.

Table 4. Representative climatic features

Frost-free period (characteristic range)	365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	54-60 in
Frost-free period (actual range)	365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	52-62 in
Frost-free period (average)	365 days
Freeze-free period (average)	365 days
Precipitation total (average)	56 in

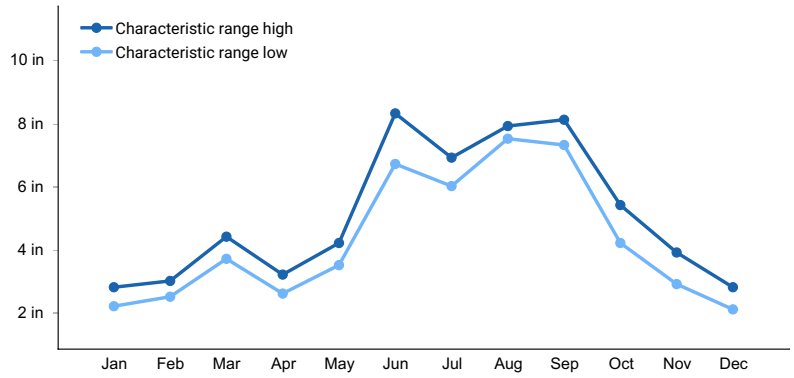


Figure 1. Monthly precipitation range

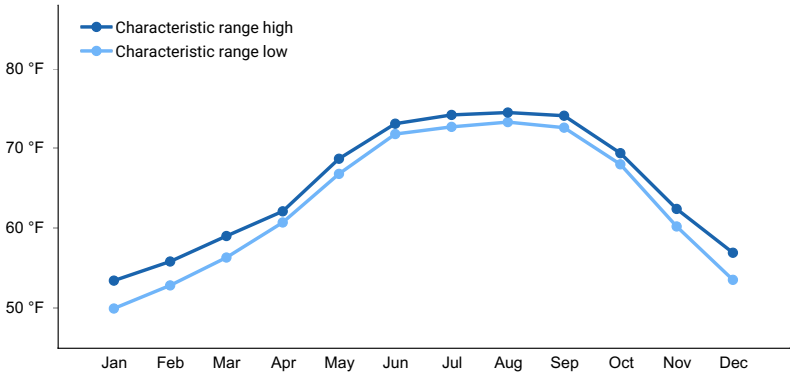


Figure 2. Monthly minimum temperature range

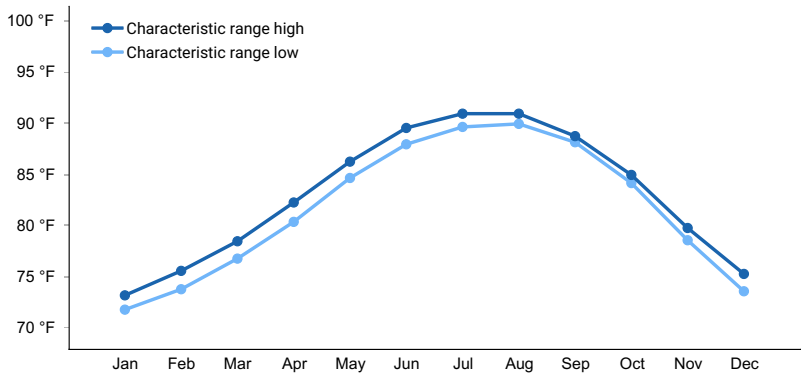


Figure 3. Monthly maximum temperature range

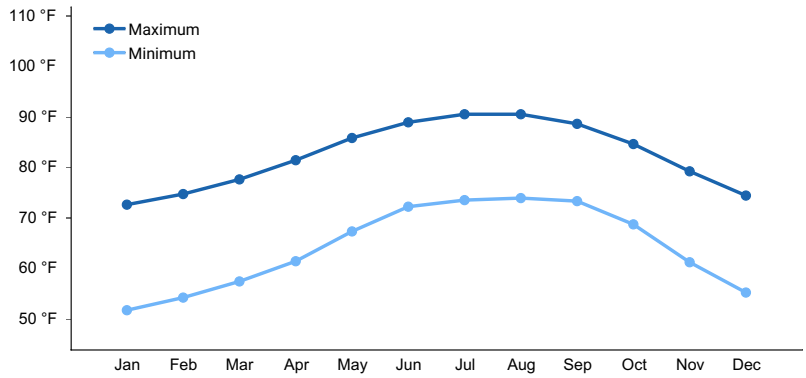


Figure 4. Monthly average minimum and maximum temperature

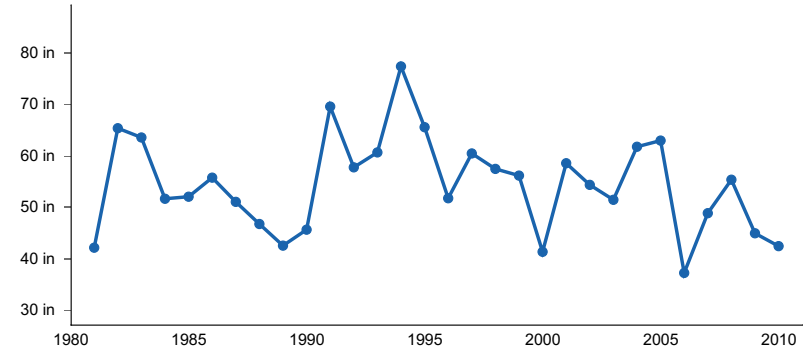


Figure 5. Annual precipitation pattern

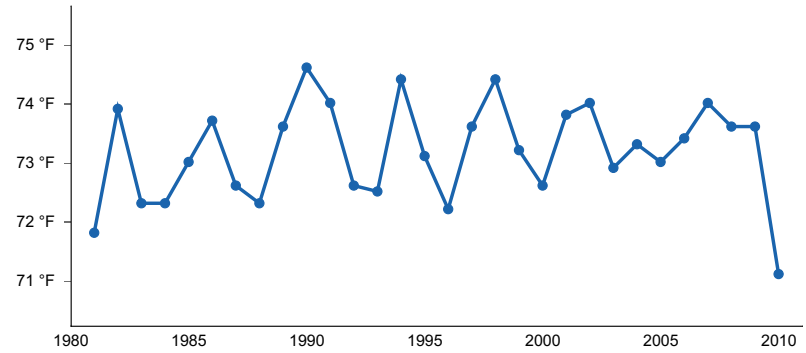


Figure 6. Annual average temperature pattern

Climate stations used

- (1) TITUSVILLE [USC00088942], Titusville, FL
- (2) MELBOURNE INTL AP [USW00012838], Melbourne, FL
- (3) FOREVER FLORIDA [USC00083026], Saint Cloud, FL
- (4) VERO BEACH 4SE [USC00089219], Vero Beach, FL
- (5) FT PIERCE ST LUCIE CO INTL AP [USW00012895], Fort Pierce, FL
- (6) FT PIERCE [USC00083207], Fort Pierce, FL
- (7) PORT SALERNO 5W [USC00087304], Stuart, FL
- (8) CANAL POINT USDA [USC00081276], Belle Glade, FL
- (9) PALM BEACH GARDENS [USC00086764], Palm Beach Gardens, FL
- (10) WEST PALM BEACH INTL AP [USW00012844], West Palm Beach, FL

Influencing water features

This site is occupied by marshes or swamps, and slight changes in hydrology are the main drivers of vegetative differences. Marshes are typically homogenous in grass species throughout, shifting species as slight changes in elevation (along the scale of centimeters) may create a slightly shorter or longer hydroperiod. Average hydroperiods of surface water in this ecosite range from four to eight months per year. These areas occur along the floodplains of

rivers and tributaries, receiving much of their water from the adjacent waterbody. Due to the flat landscape and high rainfall during the summer months, much of the water comes as overflow from the waterbody resulting in the flooded environment. Water may also come as sheet water flow from upland communities attributing to the flooded environment. These concepts will often hold standing water before moving slowly across the landscape as a massive sheet water flow.

Long-term changes in hydrology, such as drainage or drought, may change the species composition and allow for the growth of hydrophytic trees such as cypress, shifting the community to a swamp. If the area is extensively drained it can be converted to highly productive pasture or agriculture land, much of what the land use of this MLRA is. If the the long-term hydroperiod is increased (naturally or anthropogenically), species may succeed to more hydrophytic grasses until the area can no longer support these species and results in a permanently flooded waterbody.

Wetland description

Wetland Description: Cowardin
System: Palustrine
Subsystem: N/A
Class: Emergent/ Forested Wetland

Soil features

These are hydric histisol soils that formed under conditions of saturation, with extended hydroperiods during the growing season. This site occurs on very poorly drained flooded soils. These soils are typically composed of nutrient deficient acidic to alkaline highly organic soils directly over siliceous bedrock. Diagnostic subsurface horizons are absent. Much of this ecosite is found along the floodplain or headwater basin for the upper St. Johns River and is inundated during periods of high water flow. Due to the very slow moving water and very little elevation and slope change along the St. Johns River, alluvial materials may not always be found in the soil profile. Representative soils may include the flooded phases of Micco, Everglades, and Terra Ceia.

**As more SDJR projects are completed for this MLRA, soils association may change due to the differences between county lines, changing the total acres for this ecosite.

Table 5. Representative soil features

Parent material	(1) Marine deposits (2) Herbaceous organic material (3) Organic material (4) Alluvium
Surface texture	(1) Highly organic, mucky
Drainage class	Very poorly drained
Permeability class	Moderate to rapid
Depth to restrictive layer	80 in
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-80in)	4.3–9.1 in
Calcium carbonate equivalent (0-80in)	0–5%
Electrical conductivity (0-80in)	0 mmhos/cm
Sodium adsorption ratio (0-80in)	1

Soil reaction (1:1 water) (0-80in)	6.3–8.1
Subsurface fragment volume <=3" (0-40in)	0%
Subsurface fragment volume >3" (0-40in)	0%

Ecological dynamics

The information presented in this ecological site description (ESD) and state-and-transition model (STM) were developed using archaeological and historical information, published and unpublished scientific reports, professional experience, consultation with technical experts, and NRCS inventories and studies. The information presented represents a complex set of plant community dynamic and environmental variables. Not all scenarios or plants are represented and included. Key indicator plants, animals, and ecological processes are described to help guide land management decisions and actions.

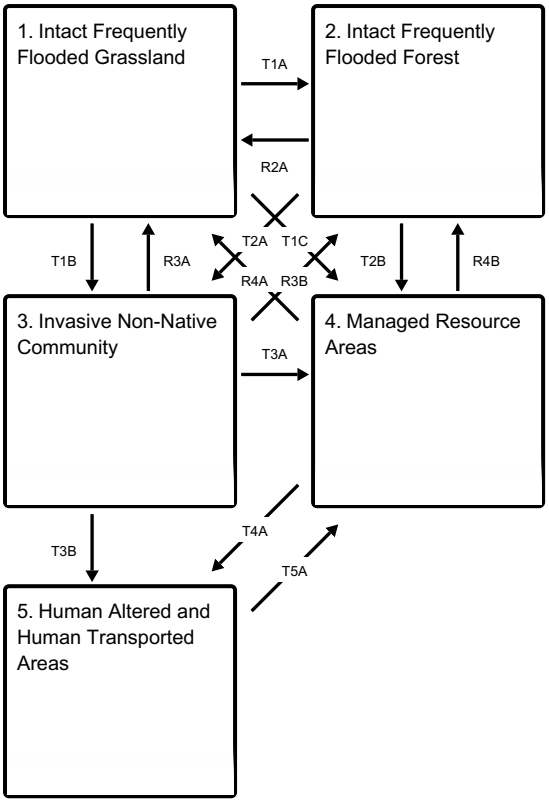
This Provisional Ecological Site (PES) includes several wetland natural communities, including forested swamps and herbaceous marshland. Although this PES concept has broad compositional and structural variation, the unifying features involve ecological processes linked to very deep and very poorly drained organic soils along floodplains that flood frequently. Flooding timing and duration is seasonally influenced, depending on the flooding source.

Histisol freshwater marshes and prairies that inhabit frequently flooded areas are typically adjacent to the stream or river channels, with very slight changes in elevation characterized by change in species composition. Factors such as absence of fire or lower hydroperiods may allow for the growth of hydrophytic trees such as cypress, which are often buttressed. As these overstory species become dominant, they shade out the understory, leading to sparse, usually patchily distributed and limited to slightly higher rises.

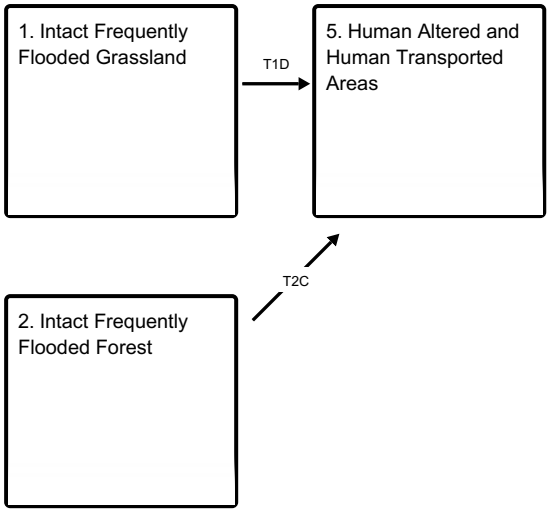
Natural ecological processes are most influenced by flooding regimes and associated nutrient flows. Floodplain forests and marshes are regularly inundated by the slow, almost stagnant, flowing flood water of adjacent rivers or other water bodies, and much of the management required for these communities are dependent on restoring the hydrology of the area. This may include filling in canals and ditches that were once used to drain the area for commercial production. Long flooding hydroperiods on this site often result in highly anaerobic conditions, allowing for the development of histisols. Fire also plays an important role in these communities, which often were started by lightning strikes during the summer months in upland communities. Natural fire regimes have a shorter fire return interval in the marshes, along the scale of every few years, to prevent invasive species and woody encroachment. Swamps have longer intervals due to the shaded conditions and less fuel to burn. During periods of extreme drought, fire may burn the organic soil, lowering the elevation, and shift the system to a permanently flooded waterbody.

State and transition model

Ecosystem states

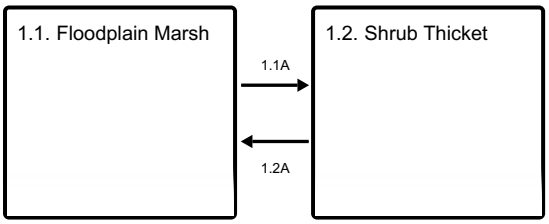


States 1, 5 and 2 (additional transitions)



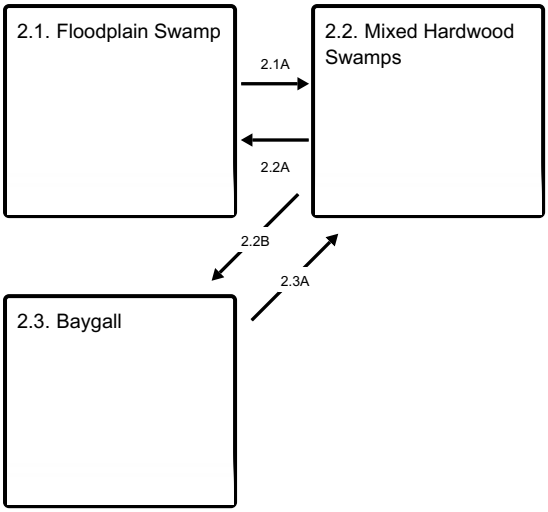
T1A - Woody Species Development
T1B - Invasion of Non-Native / Exotic Species
T1C - Modify for Desired Land Use
T1D - Human Alteration / Transportation of Materials
R2A - Woody Species Removal
T2A - Invasion of Non-Native/ Exotic Species
T2B - Modify for Desired Land Use
T2C - Human Alteration / Transportation of Materials
R3A - Removal of Unwanted Species
R3B - Removal of Unwanted Species
T3A - Modify for Desired Land Use
T3B - Human Alteration / Transportation of Materials
R4A - Landscape and Habitat Restoration
R4B - Landscape and Habitat Restoration
T4A - Human Alteration / Transportation of Materials
T5A - Modified Land Restoration

State 1 submodel, plant communities



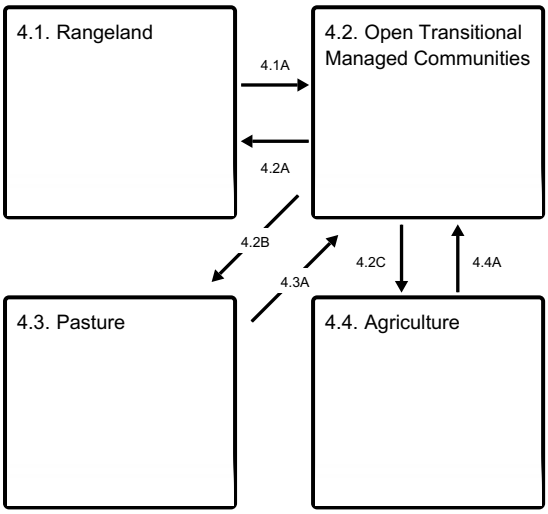
1.1A - Absence of Fire / Decreased Inundation
1.2A - Removal of Plants / Fire Reintroduction

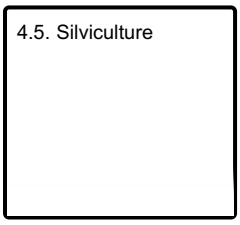
State 2 submodel, plant communities



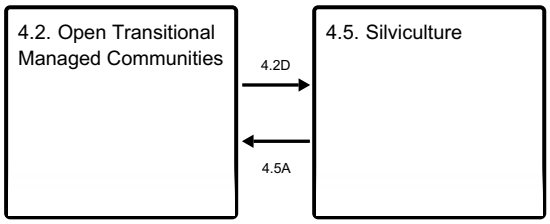
2.1A - Decrease of Long Term Hydroperiod
2.2A - Removal of Undesirable Species
2.2B - Decrease of Long Term Hydroperiod
2.3A - Removal of Undesirable Species

State 4 submodel, plant communities



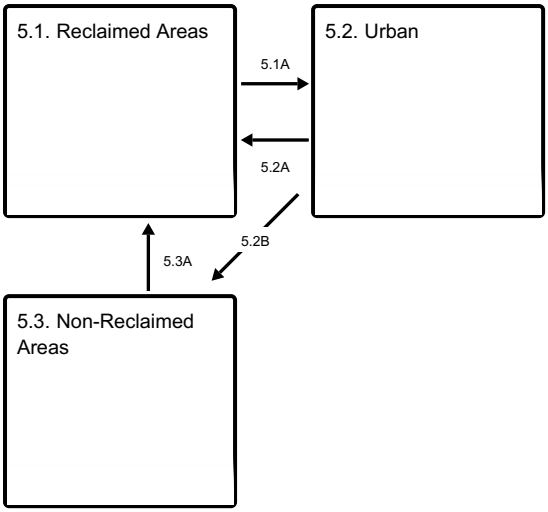


Communities 2 and 5 (additional pathways)



4.1A - Land Use Conversion Practices
4.2A - Habitat restoration
4.2B - Pasture Establishment
4.2C - Agricultural Preparation
4.2D - Silviculture Preparation
4.3A - Land Use Conversion Practices
4.4A - Land Use Conversion Practices
4.5A - Land Use Conversion Practices

State 5 submodel, plant communities



5.1A - Urban Development

5.2A - Land Restoration

5.2B - Industrial/ Urban Development

5.3A - Land Restoration

State 1
Intact Frequently Flooded Grassland

This state is characterized by a hydroperiod of four to eight months and is typically dominated by hydrophytic grasses and sedges along vast open expanses. Communities closer to the flooding waterbody will have slightly longer hydroperiods than sites found furthest from the flooded waterbody. Shorter hydroperiods are found furthest from the waterbody and are less frequently flooded. They are continuously wet but rarely inundated soils on slightly higher elevations. Relatively longer hydroperiods support more homogenous grassland communities. The main drivers in this community consist of hydrology and fire regimes, relying on short fire return intervals of 1 to 2 years to maintain its grass and shrub community.

Characteristics and indicators. This state is characterized by large expanses of grasslands and shrublands found on histisols adjacent to a waterbody that floods.

Community 1.1
Floodplain Marsh

Floodplain marshes occur along river floodplains and are dominated by herbaceous vegetation and/or shrubs. Species composition usually shifts the further away from the open water, allowing for shrubs to begin to grow. The highest part of the marsh is often a drier, wet prairie-like zone with a large diversity of graminoid and forbs. Floodplain marshes are found along rivers and streams from just below the headwaters to the freshwater portions of tidally influenced river mouths. This marsh type also occurs in river overflow channels and lakes with both input and output of river flow. This community is found along the floodplains of rivers such as the St. Johns and other smaller inclusions throughout this MLRA. This marsh is similar in vegetation to other freshwater marshes such as depression marshes or basin marshes (found as provisional ecological sites in MLRA 156B: Histisol Isolated Marshes and Swamps and Mineral Isolated Marshes and Swamps) but is primarily distinguished by its landscape position within a floodplain influenced by river flow, even if only during high flood stages. While basin marshes are found along headwaters, they do not receive any water from the river, whereas floodplain marshes lie directly in the rivers course and are influenced by the rivers flow.

Resilience management. Directly influenced by flat topography, slow drainage, and periodic river flooding, these marshes are inundated for roughly 120 to 350 days per year, with most of the marsh inundated over 250 days. Hydrologic alterations to the river system can sometimes drastically alter the system. This system depends on river flooding to provide oxygenated water for aquatic species to utilize large portions of the marsh. Fires are infrequent within this community as it is inundated for the majority of the year and is often found adjacent to a river, in this case the St. Johns River or its tributaries, but any fire that does burn the marsh helps limit shrub invasion.

Maintenance or restoration of hydrology is important for floodplain marsh management, with channelization leading to a loss of plant diversity and more homogeneous plant species as water levels are stabilized. Prescribed fires may help with prevention of shrubby species. While not common, cattle grazing has been used along floodplain marshes due to the high diversity of plant species that cattle can forage. While during periods of extreme drought peat fires may transition other marsh communities to sloughs, a peat fire will open this community, creating a wider portion of river or open floodplain lake.

Dominant plant species

- sand cordgrass (*Spartina bakeri*), grass
- Jamaica swamp sawgrass (*Cladium mariscus ssp. jamaicense*), grass
- maidencane (*Panicum hemitomon*), grass
- beaksedge (*Rhynchospora*), grass
- bulltongue arrowhead (*Sagittaria lancifolia*), other herbaceous
- pickerelweed (*Pontederia cordata*), other herbaceous
- bladderwort (*Utricularia*), other herbaceous
- yellow pond-lily (*Nuphar lutea ssp. advena*), other herbaceous
- rush (*Juncus*), other herbaceous

Community 1.2
Shrub Thicket

Shrub thickets consists of dense stands of broadleaf evergreen shrubs, vines, and short trees, one to five meters tall depending on time since fire, with or without an overstory of scattered pine or bay trees, growing in mucky soil where water is usually less than a foot deep. They are often found along the border of upland communities and lower wetland communities in poorly drained areas. The larger the shrub species have grown the longer fire has been kept from this community.

Resilience management. Shrub thickets develop when fire is excluded from the reference community, allowing for the growth of shrubby species to thrive. Regular fires tend to extinguish themselves in shrub bogs, protecting the lower wetland community. Fire intervals are estimated to occur only during drought periods, along the order of every 10 to 20 years, in which the shrubs respond by either resprouting from the rhizome if the root is not killed, or shifting to an open water community if the roots are killed. This community can expand with the assistance of physical disturbances such as logging and ditching to surrounding communities.

Dominant plant species

- common buttonbush (*Cephalanthus occidentalis*), shrub
- American elm (*Ulmus americana*), shrub
- Carolina ash (*Fraxinus caroliniana*), shrub
- coastal plain willow (*Salix caroliniana*), shrub
- large gallberry (*Ilex coriacea*), shrub
- inkberry (*Ilex glabra*), shrub
- wax myrtle (*Morella cerifera*), shrub
- greenbrier (*Smilax*), other herbaceous

Pathway 1.1A
Community 1.1 to 1.2

This transition is driven by the absence of fire from the reference community along with the alteration of natural hydrology. Exclusion of fire from the reference system has to be long enough for the establishment of woody species (estimated 12 to 15 yrs) which shades out the herbaceous layer. This in part with the alteration of hydrology from impacts to this community or surrounding communities can cause the growth of woody species. This is not a homogeneous process due to changes in microtopography which can create a mosaic of unevenly aged shrubs and prairie habitat.

Pathway 1.2A
Community 1.2 to 1.1

This transition is driven by the removal of shrubby species and maintenance of the restored community through natural hydrology and fire regime. Removal of the shrubs would be required to remove the shading canopy which would help reestablish grassy/ herbaceous growth. Reintroduction of natural fire cycles may help diversity of the area and prevent regrowth of shrubby species.

State 2
Intact Frequently Flooded Forest

The natural (native) vegetation of this state is mainly dominated by Bald Cypress and Pond Cypress (*Taxodium distichum* and *T. ascendens*, respectfully). Occasional fire contributes to the maintenance of a cypress dominated community; without fire, hardwood invasion and peat accumulation create a mixed hardwood and cypress swamp, and under certain conditions the stand may convert to a hardwood forest. Along the floodplain of a river or creek, an even-aged stand of cypress trees may be present throughout. These organic soils create a unique environment that increases species diversity and structural development in forested wetland communities.

Characteristics and indicators. This state is characterized by nearly pure stands of cypress trees (Taxodium spp.) that are distinguished by buttressed trunks. They have smaller, younger trees along the periphery of the swamps furthest from the waterbody contributing to its flooding conditions. These will often form an even-aged stand of cypress trees of relative width and height.

Resilience management. This state is maintained by both stressors from water and fire. Inundation ranges from 100 to 300 days per year which only allow hydrophytic tolerant species to survive. Drainage of this site can allow for the invasion of non-native and exotic species and transition the site to a more mesic hardwood community. Fire may be rare in this community, naturally extinguishing itself along the fringes of swamps found adjacent to pyrogenic communities. Interior swamps are very rarely subject to fire due to extreme soil saturation, but is possible during periods of extreme drought, causing peat fires and transitioning the area to a nonforested community.

Community 2.1
Floodplain Swamp

Floodplain swamps are cypress dominated swamps located within floodplains of any permanently moving river or stream, ranging from narrow strips to expansive stands. This swamp often immediately borders the stream or river channel, but can be restricted to oxbows, overflow channels, old stream beds, and back swamps. The knees to the cypress trees are most commonly present and characteristic of this site, with an open ground surface or sparsely covered in leaf litter. Floodplain swamps can show historic river flows of meanders and oxbows that have long since filled in. While similar to the other cypress communities in this state by hydrology, natural processes, and vegetation, they differ by landscape position. These other cypress communities include two provisional ecological sites within MLRA 156B, Histisol Isolated Marshes and Swamps and Mineral Isolated Marshes and Swamps. These ecosites will consist of three major cypress communities: Basin Swamps, Strand Swamps, and Dome Swamps. Basin swamps differ from floodplain swamps by occurring in large landscape depressions. Strand swamps differ by being found along limestone troughs east and south of Lake Okeechobee. Dome swamps are typically isolated depression swamps within a surrounding pyrogenic landscape or within a larger swamp community.

Resilience management. This site also lacks fire as a driving factor, due to the wetness and proximity of the river. Extreme drought in the dry season can allow the peat layer to burn, causing mass mortality of the cypress trees. This system is mainly influenced by water, with anaerobic conditions inhibiting breakdown of organic matter allowing for the accumulation of peat. Seasonal flooding of the floodplain redistributes nutrients throughout the system, providing nutrients for downstream systems such as estuaries.

Dominant plant species

- bald cypress (*Taxodium distichum*), tree
- Virginia sweetspire (*Itea virginica*), shrub
- coastal plain willow (*Salix caroliniana*), shrub
- airplant (*Tillandsia*), other herbaceous
- lizard's tail (*Saururus cernuus*), other herbaceous
- swamplily (*Crinum*), other herbaceous
- cinnamon fern (*Osmunda cinnamomea*), other herbaceous
- royal fern (*Osmunda regalis var. spectabilis*), other herbaceous

Community 2.2
Mixed Hardwood Swamps

Hardwood swamps are dominated by a mix of hydrophytic hardwood trees including bays and cabbage palms. This state occurs on low, wet sites and has short hydroperiods that are inundated seldom over 60 days per year, but are maintained on a consistently saturated peat substrate. These communities form when fire is excluded from cypress swamps for an extended period, allowing organic matter accumulation to create shallower depressions in the landscape, shortening the hydroperiod. With greater accumulation of organic matter and a shortened hydroperiod, hardwood vegetation can become established and, over time, shade out the existing vegetation. Shading from the newly established hardwood species will perpetuate organic matter accumulation and moist soil conditions, favoring this state, continuing the expansion of these communities.

Resilience management. The main influencing factors in this state consist of fire regimes and hydrology. Human alterations to surrounding communities can inadvertently drain these sites, making them susceptible to catastrophic fires, in which the organic matter accumulation will be lost, reverting the community back to cypress swamp vegetation or to shrub thickets, depending on the root damage from the fire. Increases in hydrology will shift the community back towards a cypress swamp as the hardwood species can tolerate some flooding but not the same amount as cypress. Drainage will allow for invasive species to become established that can outcompete the native vegetation.

Dominant plant species

- bald cypress (*Taxodium distichum*), tree
- laurel oak (*Quercus laurifolia*), tree
- red maple (*Acer rubrum*), tree
- pond cypress (*Taxodium ascendens*), tree
- swamp bay (*Persea palustris*), tree
- cabbage palmetto (*Sabal palmetto*), tree

Community 2.3
Baygall

Baygall, also referred to as bay swamps or bay heads, are evergreen forested wetlands of bay species in a floodplain with deep peat soils that are acidic within a well developed forest. They typically develop on wet soils in depressions and in stagnant drainages that maintain a saturated peat substrate via seepage, rainfall, or capillary action. This community varies in size and can range from small tree islands within marsh or prairie communities to many acres within a mature forest. They develop when fire has been excluded from cypress swamps, allowing organic matter to accumulate and creating a positive feedback that allows the establishment of bays. Cypress swamps are very similar to baygalls, with many instances of intermediate stages between these communities primarily caused by fire and logging history. However, cypress swamps experience greater water fluctuation and greater water depths than baygalls

Resilience management. As the bay species grow, the shade intolerant cypress species are inhibited which shifts vegetation and soil conditions to favor shade tolerant species to germinate and grow in low light conditions.

Dominant plant species

- swamp bay (*Persea palustris*), tree
- sweetbay (*Magnolia virginiana*), tree
- loblolly bay (*Gordonia lasianthus*), tree
- bald cypress (*Taxodium distichum*), tree
- southern magnolia (*Magnolia grandiflora*), shrub
- wax myrtle (*Morella cerifera*), shrub
- greenbrier (*Smilax*), other herbaceous
- osmunda (*Osmunda*), other herbaceous
- chainfern (*Woodwardia*), other herbaceous
- sphagnum (*Sphagnum*), other herbaceous

Pathway 2.1A
Community 2.1 to 2.2

The overarching driver which may allow for a community transition is the decrease of the long term hydroperiod. This is a wide variety of alterations which may shift species composition to allow for the growth of hardwood species. This may include abiotic factors such as drought, absence of fire, or any other events that can alter the water table, or species composition to allow for the introduction of unwanted species. This can also include biotic factors such as hog rooting or human introduction that can bring in these native but undesirable species to the reference community.

Pathway 2.2A
Community 2.2 to 2.1

Mechanical, biological, and chemical removal strategies include removing the unwanted species through various mechanisms. Localized knowledge for community species composition is needed for specific management. Mechanical removal might include roller chopping, harvesting, or cutting and removal of invasive species. Chemical removal might include aerial dispersal from planes, or basal bark injection treatments.

Context dependence. Mechanical, biological, and chemical removal of unwanted species is a time dependent process, with removal types taking long times to be considered effective.

Pathway 2.2B
Community 2.2 to 2.3

The overarching driver which may allow for a community transition is the decrease of the long term hydroperiod. This is a wide variety of alterations which may shift species composition to allow for the growth of hardwood species. This may include abiotic factors such as drought, absence of fire, or any other events that can alter the water table, or species composition to allow for the introduction of unwanted species. This can also include biotic factors such as hog rooting or human introduction that can bring these native but undesirable to the reference community species in.

Pathway 2.3A
Community 2.3 to 2.2

Mechanical, biological, and chemical removal strategies include removing the unwanted species through various mechanisms. Localized knowledge for community species composition is needed for specific management. Mechanical removal might include roller chopping, harvesting, or cutting and removal of invasive species. Chemical removal might include aerial dispersal from planes, or basal bark injection treatments.

Context dependence. Mechanical, biological, and chemical removal of unwanted species is a time dependent process, with removal types taking long times to be considered effective.

State 3
Invasive Non-Native Community

This state consists of Florida Department of Agriculture and Consumer Services (FDACS) Non-Native Category 1 Species list . More information on these species list can be found: https://www.fdacs.gov/content/download/63140/file/Florida%E2%80%99s_Pest_Plants.pdf or by contacting the UF / IFAS Center for Aquatic and Invasive Plants (http://plants.ifas.ufl.edu/), the UF / IFAS Assessment of Non-native Plants in Florida's Natural Areas (https://assessment.ifas.ufl.edu/), or the FWC Invasive Plant Management Section (http://myfwc.com/wildlifehabitats/invasive-plants/). These species are common in areas where natural processes are interrupted via hydrology or fire regimes. The introduction of these species pose serious threats to endangered and threatened habitats and plants within Florida as they become outcompeted for habitats and nutrients.

Characteristics and indicators. Non-Native species include species that exist outside of Florida's natural range and introduced to the state by people, weather, or any other means.

Resilience management. This state can be found as a part of any other state and can completely destroy the

native habitat if not properly managed. Restoration to natural communities after exotic invasion include practices such as mechanical, biological, and chemical removal.

State 4
Managed Resource Areas

The following communities comprise the major land uses in the United States and the land uses receiving the majority of the conservation treatment that address soil, water, air, plant, and animal resources within the USDA.

Characteristics and indicators. These land uses consist of areas that are not completely naturalized (i.e. native habitat) and have been anthropogenically altered for commodity production.

Community 4.1
Rangeland

Rangelands are described as lands on which the indigenous vegetation is predominately grasses, grass-like plants, forbs, and possibly shrubs or dispersed trees. Existing plant communities can include both native and introduced plants. Primary export from Florida ranges are cattle and have been present in the state since their first introduction by Spanish explorers in 1521. This is the reference community for this state because it requires very little alterations to the landscape for grazing species. Rangelands provide a diversity of ecosystems and also provide a diverse and significant production of economic benefits and ecosystem goods and services. Livestock production along with sustainable wildlife populations provide for the major direct economic benefits, but also tourism, recreational uses, minerals/energy production, renewable energy, and other natural resource uses can be very significant. Vital ecosystem contributions include clean water, clean air, fish/wildlife habitat, as well as intangible considerations such as historical, cultural, aesthetic and spiritual values. The dominant range community correlates with the 1994 FOTG Range Site Description 156BY010FL- 156B Freshwater Marsh and Pond. Plant Community Composition List is derived from 156BY010FL.

Resilience management. Grazing, by both domestic livestock and wildlife, is the most common ecological management process, with fire and weather extremes also being significant ecological factors. For information regarding specific cattle grazing techniques please contact your local NRCS office.

Dominant plant species

- bald cypress (*Taxodium*), tree
- red maple (*Acer rubrum*), tree
- swamp bay (*Persea palustris*), tree
- common buttonbush (*Cephalanthus occidentalis*), shrub
- wax myrtle (*Morella cerifera*), shrub
- willow (*Salix*), shrub
- maidencane (*Panicum hemitomon*), grass
- southern cutgrass (*Leersia hexandra*), grass
- Muhlenberg maidencane (*Amphicarpum muehlenbergianum*), grass
- broomsedge bluestem (*Andropogon virginicus*), grass
- American cupscale (*Sacciolepis striata*), grass
- hairy bluestem (*Andropogon longiberbis*), grass
- panicgrass (*Panicum*), grass
- sedge (*Carex*), grass
- Jamaica swamp sawgrass (*Cladium mariscus ssp. jamaicense*), grass
- jointvetch (*Aeschynomene*), other herbaceous
- irisleaf yelloweyed grass (*Xyris laxifolia var. iridifolia*), other herbaceous
- pickerelweed (*Pontederia cordata*), other herbaceous
- whitehead bogbutton (*Lachnocaulon anceps*), other herbaceous
- dotted smartweed (*Polygonum punctatum*), other herbaceous
- dogfennel (*Eupatorium capillifolium*), other herbaceous
- marsh rose gentian (*Sabatia dodecandra var. dodecandra*), other herbaceous
- aster (*Aster*), other herbaceous
- bulltongue arrowhead (*Sagittaria lancifolia ssp. lancifolia*), other herbaceous

Table 6. Ground cover

Tree foliar cover	0-1%
Shrub/vine/liana foliar cover	0-1%
Grass/grasslike foliar cover	80-100%
Forb foliar cover	0-20%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	–
>0.5 <= 1	–	–	–	–
>1 <= 2	–	–	–	0-20%
>2 <= 4.5	–	–	80-100%	–
>4.5 <= 13	0-1%	0-1%	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Community 4.2
Open Transitional Managed Communities

This is an area that is managed to maintain open land before shifting to another community. These communities are often used as transitional periods from one practice to another and could lead to an abandoned / fallow field.

Community 4.3
Pasture

Pasture is a land use type having vegetation cover comprised primarily of introduced or enhanced native forage species that is used for livestock grazing. Pasture vegetation can consist of grasses, legumes, other forbs, shrubs or a mixture. The majority of these forages are introduced, having originally come from areas in other states or continents. Most are now naturalized and are vital components of pasture based grazing systems. Pasture lands provide many benefits other than forage for livestock. Wildlife use pasture as shelter and for food sources. Well managed pasture captures rainwater that is slowly infiltrated into the soil which helps recharge groundwater. Many small pasture livestock operations are near urban areas providing vistas for everyone to enjoy. It is especially important as livestock grazers continue to experience extraordinarily high fuel and other input costs. This community correlates with the 2013 Florida Forage Suitability Group G156BC645FL (Organic Soils in Depressions and on Flood Plains). All values and growth curves are captured directly from G156BC645FL.

Resilience management. Pastures receive periodic renovation and cultural treatments such as tillage, fertilization, mowing, weed control, and may be irrigated or drained. For more information regarding specific pasture

management please contact your local NRCS office.

Dominant plant species

- limpograss (*Hemarthria altissima*), grass
- maidencane (*Panicum hemitomon*), grass
- St. Augustine grass (*Stenotaphrum secundatum*), grass
- Muhlenberg maidencane (*Amphicarpum muehlenbergianum*), grass
- shyleaf (*Aeschynomene americana*), other herbaceous

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	7275	8412	9550
Forb	2000	2500	3000
Total	**9275**	**10912**	**12550**

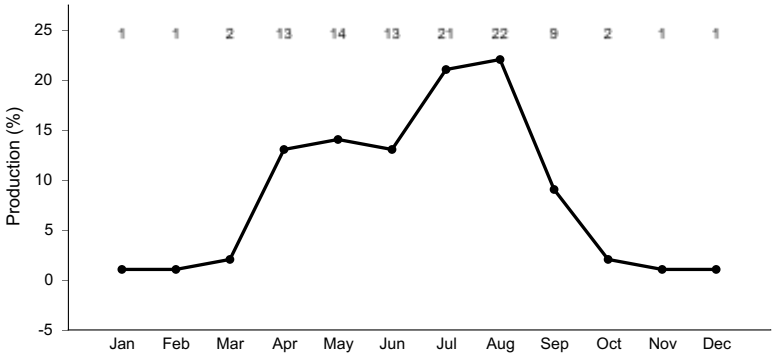


Figure 8. Plant community growth curve (percent production by month). FL0014, Limpograss. Growth Curves and Dry Matter Distribution for Introduced Warm Season Perennial Grass: Limpograss (Hemarthria altissima).

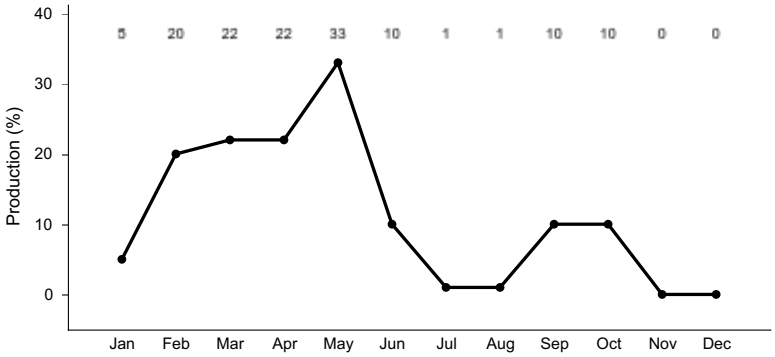


Figure 9. Plant community growth curve (percent production by month). FL0019, Maidencane. Growth Curves and Dry Matter Distribution for Native Warm Season Perennial Grass: Maidencane (Panicum hemitomon).

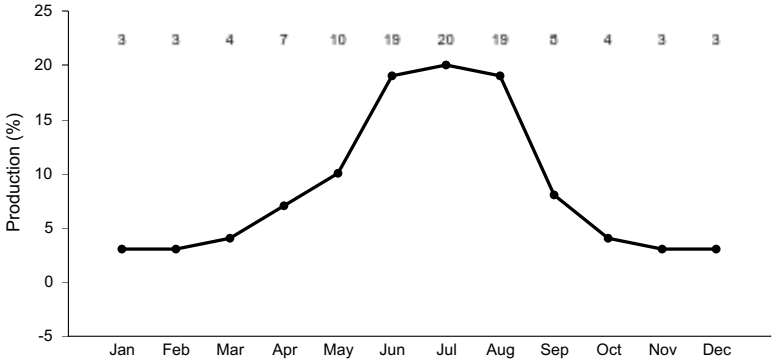


Figure 10. Plant community growth curve (percent production by month).

Community 4.4
Agriculture

The agriculture industry includes cultivated crops, aquaculture, and apiculture. Cultivated cropland includes areas used for the production of adapted crops for harvest. These areas comprises land in row crops or close-grown crops that are in a rotation with row or close-grown crops. Primary exports from Florida consist of fruits, greenhouse and nursery products, sugar cane, and the signature export of citrus. Aquaculture includes the cultivation and maintenance of aquatic plants, aquatic reptiles, crustaceans, food/ ornamental fish, shellfish, and other miscellaneous species for harvesting. Apiculture includes the maintenance of honeybees and hives to provide beeswax, honey/ other edible bee products, crop pollination services, and sales of bees to other beekeepers. These areas have been modified with land use conversion practices and hydrologic management to fit the growers needs.

Resilience management. Major natural resource concerns facing cropland include: (1) erosion by wind and water, (2) maintaining and enhancing soil quality, (3) water quality from nutrient and pesticides runoff and leaching, and (4) managing the quantity of water available for irrigation. For more specific information regarding cropland please contact your local NRCS office.

Community 4.5
Silviculture

Silviculture is land used in controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society such as wildlife habitat, timber, water resources, restoration, and recreation on a sustainable basis. These are forestry practices that include thinning, harvesting, planting, pruning, prescribed burning and site preparation, for managed goals such as wildlife habitat creation or harvesting. Many managed silvicultural lands in Florida include tree plantations for growth of tropical ornamental species such as palms; and lumber, pulp, and paper species such as slash pine, longleaf pine, cypress, and eucalyptus. This community also include management practices of agroforestry, the intentional mixing of trees and shrubs into crop and/or animal production systems to create environmental, economic and social benefits. This is included in this community and not any other state because the primary management is for tree species. This may include practices such as riparian forest buffers, windbreaks, forest farming, silvopasture, and alley cropping.

Resilience management. Management of silvicultural lands require specific prescriptions based on the management goals for the stand, and may include thinning, harvesting, planting, pruning, prescribed burning and site preparation. For more information regarding specific management for silviculture practices please contact your local NRCS office.

Pathway 4.1A
Community 4.1 to 4.2

This pathway is driven by land use conversion practices that prepare for modified land use. In some circumstances, conversion might include removing the existing vegetation and habitat.

Pathway 4.2A
Community 4.2 to 4.1

This pathway is driven by the restoration of the native habitat for the use of rangeland. This includes restoration of both the hydrology and landscape in advance of re-vegetating native species. This is a time-consuming process and often results in slightly altered community structure and composition more susceptible to invasive or undesirable plant establishment. Once restored to a natural capacity the introduction of grazing species to the system creates a managed rangeland.

Pathway 4.2B
Community 4.2 to 4.3

This pathway is driven by preparing the land for pasture. This includes the planting of vegetation consisting of

grasses, legumes, other forbs, shrubs or a mixture that will provide preferred forage for managed grazing species.

Pathway 4.2C
Community 4.2 to 4.4

This pathway is driven by the preparation of land for agricultural uses. This change is dependent on the type of agricultural community being created, but often depends on the growing, maintenance, and cultivation of an agricultural product for consumers. This community may require modification to the land to fit the hydrologic requirement of the growing crop.

Pathway 4.2D
Community 4.2 to 4.5

This pathway is driven by the preparation of the land for silvicultural purposes. This change is dependent on the type of silvicultural product being cultivated, as many different practices require different growth requirements.

Pathway 4.3A
Community 4.3 to 4.2

This pathway is driven by land use conversion practices that prepare for modified land use. In some circumstances, conversion might include removing the existing vegetation and habitat.

Pathway 4.4A
Community 4.4 to 4.2

This pathway is driven by land use conversion practices that prepare for modified land use. In some circumstances, conversion might include removing the existing vegetation and habitat.

Pathway 4.5A
Community 4.5 to 4.2

This pathway is driven by land use conversion practices that prepare for modified land use. In some circumstances, conversion might include removing the existing vegetation and habitat.

State 5
Human Altered and Human Transported Areas

These areas include soils that were intentionally and substantially modified by humans for an intended purpose, commonly for terraced agriculture, building support, mining, transportation, and commerce. The alteration is of sufficient magnitude to result in the introduction of a new parent material (human-transported material) or a profound change in the previously existing parent material (human-altered material). They do not include soils modified through standard agricultural practices or formed soils with unintended wind and water erosion. When a soil is on or above an anthropogenic landform or microfeature, it can be definitely be associated with human activity and is assigned to a unique taxa, usually found as an "Urban land complex" within that communities' natural soil properties (e.g., Immokalee sand-Urban land complex, 0 to 2 percent slopes).

Characteristics and indicators. Evidence of these areas include soils with manufactured items (e.g. artifacts) present in the profile, human altered-materials (e.g., deeply excavated soils) or human-transported material (e.g., fill), and position on or above anthropogenic landforms (e.g., flood-control levees) and microfeatures (e.g., drainage ditches). Detailed criteria regarding the identification of anthropogenic (artificial) landforms, human-altered materials, and human-transported material are in the "Keys to Soil Taxonomy" (Soil Survey Staff, 2014).

Community 5.1
Reclaimed Areas

Reclaimed areas are areas that have been modified through anthropogenic means that are restored to a natural community. Areas that can be reclaimed are any intensity urban areas, and may be required to be reclaimed after

urban use (e.g., active mines must be reclaimed). These practices include the identification, removal, and stockpiling soil materials before altering the land, and revegetation and replacement of soil materials after altering the land. This also applies to nearby urban areas that have been adversely affected by the anthropogenic activities.

Community 5.2
Urban

This urban community consists of development for human use. Urban areas include a variety of land uses, e.g., inner city or urban core, industrial and residential areas, cemeteries, parks, and other open spaces; the overall function which may benefit the quality of human life. These often form an urban soil mosaic, where the natural landscape has been fragmented into parcels with distinctive disturbance and management regimes and, as a result, distinctive characteristic soil properties.

Resilience management. Within this community there are three different levels of urbanization, based off population dynamics, residential density, and intensity of development. These are labeled as low-intensity, medium-intensity, and high-intensity urban areas, which can eventually be split apart into its own separate state. Low-intensity urban areas may consist of single dwelling homes with little impact on the surrounding community which still somewhat represents the natural community (e.g., represents natural landscape, hydrology, and vegetation) , other examples of this are urban parks, cemeteries, or campgrounds with little urban development. Medium-intensity urban areas consist of larger urban dwellings with some natural features, but have been modified to meet urban needs (e.g., towns). High-intensity urban areas are areas of heavily modified areas with complete alterations of the natural landscape, hydrology, and vegetation to support a very large population, which once constructed is permanently altered (e.g., metropolis areas/ active mines).

Community 5.3
Non-Reclaimed Areas

Non-reclaimed areas are areas that have been modified through anthropogenic means that are unable to be restored to a natural or second-hand natural community. Areas that cannot be reclaimed are areas under active mining status or mined areas before the Phosphate Land Reclamation Act in 1975, which leaves shut down operations alone. These areas also include fallow mines that have been flooded and are now permanent bodies of water.

Pathway 5.1A
Community 5.1 to 5.2

Driven by clearing and developing the land for the desired community.

Pathway 5.2A
Community 5.2 to 5.1

Driven by the revegetation, reestablished hydrology, and replacement of displaced soil materials after altering the land.

Pathway 5.2B
Community 5.2 to 5.3

Driven from heavy industrial or urban development which causes the land to become non-reclaimable. This transition is rare due to the many environmental laws and regulations that must be followed when developing land.

Pathway 5.3A
Community 5.3 to 5.1

Driven by the revegetation, reestablished hydrology, and replacement of displaced soil material after altering the land.

Transition T1A

State 1 to 2

This transition is driven by the establishment of woody species. This may be driven naturally or anthropogenically. Natural drivers may be drought, which can lower the water table for an expanded period of time, allowing for hydrophytic species to root and become established. These will often have buttressed trunks as a result of long hydroperiods. Anthropogenic alterations include the drawdown of the water table for commodity products. As the species grow they may shade out the understory and convert the area to a swamp. The absence of fire can also lead to woody species development by failing to maintain community structure and composition.

Transition T1B
State 1 to 3

The invasion of non-native or exotic species can be driven by a multitude of different environmental factors such as hydrology or changes in fire regimes. Typically once a change in one of the two factors mentioned above occurs, non-native or exotic invasive species become established and begin to compete with native species for habitat and nutrients.

Constraints to recovery. Recovery from non-native or exotic invasive species may be difficult due to many adaptations which allow them to survive and outcompete in intolerable conditions. Localized knowledge for each species must be known for best removal of it without harming the native environment, and often different treatments must be applied over one given area.

Context dependence. Growth of non-native and exotic invasive species can be rapid following a change in a natural stressor such as fire or hydrology which might have once kept the invasive species at bay.

Transition T1C
State 1 to 4

Modify the land for the desired land use. This may include the establishment of grazing species or the modification of land for the cultivation of crops of other desired products. Due to the extreme wetness of this site, drawdown of the water table may be needed to meet the desirable community.

Transition T1D
State 1 to 5

This transition is driven by the alteration and/ or transportation of materials via anthropogenic means.

Restoration pathway R2A
State 2 to 1

This restoration to a grassland from a forest consists of removing the woody species, allowing for light to penetrate the ground surface and grasses in the existing seedbank to grow. This removal may consist of mechanical, biological, or chemical methods to clear an area.

Transition T2A
State 2 to 3

The invasion of non-native or exotic species can be driven by a multitude of different environmental factors such as hydrology or changes in fire regimes. Typically once a change in one of the two factors mentioned above occurs, non-native or exotic invasive species become established and begin to compete with native species for habitat and nutrients.

Constraints to recovery. Recovery from non-native or exotic invasive species may be difficult due to many adaptations which allow them to survive and outcompete in intolerable conditions. Localized knowledge for each species must be known for best removal of it without harming the native environment, and often different treatments must be applied over one given area.

Context dependence. Growth of non-native and exotic invasive species can be rapid following a change in a

natural stressor such as fire or hydrology which might have once kept the invasive species at bay.

Transition T2B
State 2 to 4

Modify the land for the desired land use. This may include the establishment of grazing species or the modification of land for the cultivation of crops of other desired products.

Transition T2C
State 2 to 5

This transition is driven by the alteration and/ or transportation of materials via anthropogenic means.

Restoration pathway R3A
State 3 to 1

Mechanical, biological, and chemical removal strategies include removing the non-native and exotic invasive species through various mechanisms. Localized knowledge for individual non-native or exotic invasive species is needed for specific management. Sometimes introduction of fire regimes may prevent or stop the growth of non-native or exotic invasive species, but many species are fire tolerant. Mechanical removal might include roller chopping, harvesting, or cutting and removal of invasive species. Chemical removal might include aerial dispersal from planes, or basal bark injection treatments.

Context dependence. Mechanical, biological, and chemical removal of unwanted species is a time dependent process, with removal types taking long times to be considered effective.

Restoration pathway R3B
State 3 to 2

Mechanical, biological, and chemical removal strategies include removing the non-native and exotic invasive species through various mechanisms. Localized knowledge for individual non-native or exotic invasive species is needed for specific management. Sometimes introduction of fire regimes may prevent or stop the growth of non-native or exotic invasive species, but many species are fire tolerant. Mechanical removal might include roller chopping, harvesting, or cutting and removal of invasive species. Chemical removal might include aerial dispersal from planes, or basal bark injection treatments.

Context dependence. Mechanical, biological, and chemical removal of unwanted species is a time dependent process, with removal types taking long times to be considered effective.

Transition T3A
State 3 to 4

Modify the land for the desired land use. This may include the establishment of grazing species or the modification of land for the cultivation of crops of other desired products.

Transition T3B
State 3 to 5

This transition is driven by the alteration and/ or transportation of materials via anthropogenic means.

Restoration pathway R4A
State 4 to 1

These practices include the restoration of both the hydrology and landscape in advance of revegetating the area (if needed).

Restoration pathway R4B

State 4 to 2

These practices include the restoration of both the hydrology and landscape in advance of revegetating the area (if needed).

Transition T4A
State 4 to 5

This transition is driven by the alteration and/ or transportation of materials via anthropogenic means.

Transition T5A
State 5 to 4

Modify the land for the desired land use. This may include the establishment of grazing species or the modification of land for the cultivation of crops of other desired products.

Additional community tables

Table 9. Community 4.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Introduced Warm Season Perennials**			11000–14500	
	St. Augustine grass	STSE	*Stenotaphrum secundatum*	14000–16000	–
	limpograss	HEAL5	*Hemarthria altissima*	8000–13000	–
2	**Native Warm Season Perennials**			3550–4600	
	maidencane	PAHE2	*Panicum hemitomon*	5000–6700	–
	Muhlenberg maidencane	AMMU2	*Amphicarpum muehlenbergianum*	2100–2500	–
Forb					
3	**Annual Warm Season Legumes**			2000–3000	
	jointvetch	AESCH	*Aeschynomene*	2000–3000	–

Animal community

This community provides little cover and forage for many animal species that depend on shorter hydroperiods and areas for nesting, but species do manage to survive in these communities. Many species have disappeared from these sites due to the intense urbanization and habitat fragmentation within this MLRA. Species list in given from similar sites correlated within the MLRA 155 further west where these habitats are better protected and remain in a more natural state. Common species include:

Mammals: Southern mink (southern Florida population; Mustela vision mink), Florida panther (Puma concolor coryi), marsh rabbit (Sylvilagus palustris), round-tailed muskrat (Neofiber alleni), coyotes (Canis latrans), bobcats (Lynx rufus), Cotton rats (Sigmodon hispidus), rice rats (Oryzomys palustris).

Birds: short-tailed hawk (Buteo brachyurus), great egret (Ardea alba), little blue heron (Egretta caerulea), snowy egret (E. thula), tricolored heron (Egretta tricolor), white ibis (Eudocimus albus), snail kite (Rostrhamus sociabilis plumbeus), limpkin (Aramus guarauna) least bittern (Ixobrychus exilis), wood stork (Mycteria americana), black-crowned night-heron (Nycticorax nycticorax), and glossy ibis (Plegadis falcinellus).

Reptiles: American alligator (Alligator mississippiensis), Florida banded water snake (Nerodia fasciata pictiventris), soft shelled turtle (Apalone ferox), striped mud turtle (Kinosternon bauri), eastern mud turtle (Kinosternon subrubrum), eastern mud snake (Farancia a. abacura), ribbon snake (Thamnophis sauritus sackenii), and cottonmouth (Agkistrodon piscivorus).

Amphibians: Southern leopard frog (Rana sphenocephala), green treefrog (Hyla cinerea), barking treefrog (Hyla

gratiosa), squirrel tree frog (Hyla squirella), southern dusky salamander (Desmognathus auriculatus), lesser siren (Siren intermedia), two-toed amphiuma (Amphiuma m. means), oak toad (Bufo quercicus), southern cricket frog (Acris gryllus dorsalis), pinewoods treefrog (Hyla femoralis), little grass frog (Pseudacris ocularis), and narrowmouth toad (Gastrophryne carolinensis).

Invertebrates: burrowing crayfish (Procambarus alleni), the tail-light damsel (Chrysobasis lucifer) and the blue strapped spreadwing (Lestes tenuatus).

In the wet season when much of this area is flooded, it may support fish species such as Mosquito fish (Gambusia spp.), yellow bullhead (Ameiurus natalis), swamp darter (Etheostoma barratti), sailfin molly (Mollienesia latipinna), flagfish (Jordanella floridae), least killifish (Heterandria formosa), bowfin (Amia calva), warmouth (Chaenobryttus coronarius), Florida gar (Lepisosteus spp.), and bluespotted sunfish (Enneacanthus gloriosus).

This community is very important for wildlife refuge area. It is well suited for waterfowl and wading birds. Aquatic animals may be found in large numbers. The permanent residents of cypress heads are relatively few, but much of the wildlife of the surrounding communities are dependent for these wetlands for breeding purposes and during periods of drought.

Hydrological functions

This ecosite was historically one of the most dominant ecosites within the MLRA, with multiple freshwater marsh and swamps dominating the landscape before the mid to late 1800s. Within 70 years, it is estimated that 70 percent of the fertile wetlands within these areas had been converted into agricultural fields to support the production of citrus, row crops, and beef cattle. Loss of wetland habitat reduced floodplain storage, allowing devastating floods in the central and southern parts of Florida in the 1920s and 1940s.

These communities serve as filters for water and will retain water during droughts and also help negate the effects of floods and hurricanes on inland communities. Due to urbanization needs, this area has lost much of its natural hydrology. In the southern portion of the MLRA extensive canals and ditches have been dug to make the land suitable for agriculture of citrus and other row crops. The upper St. Johns River basin maintains a more natural state due to protection of land but is still influenced by the surrounding urbanization. Much of the wetlands in the St. Johns headwaters are currently being maintained by the U.S. Army Corps of Engineers as long-term restoration projects to help reduce flooding, restore and maintain natural hydrologic cycles and protect water quality of the Upper St. Johns water basin, where the majority of this ecosite is found.

This area receives high amounts of rainfall, with flat topography small elevation changes draining the river very slowly. The river runs north from the headwaters in Indian River County to its mouth in the Atlantic Ocean in Duval County. Historically overflow from upland rainfall flooded adjacent swamps and marshes as well as the river channel, but modern urbanization has channelized the area to drain water effectively and convert the area to agricultural uses.

Recreational uses

This area provides a variety of opportunities for recreation including canoeing, kayaking, hunting, hiking, driving tours, bird watching, camping, fishing, photography, and off-roading vehicle (ORV) use in larger areas.

Wood products

This ecological site is not generally used for commercial woodland production; however, it has moderate potential productivity for areas that are drained and replanted for slash pine (Pinus elliottiii). Much of the mature cypress swamps were extensively logged during the early to mid 1900s during the war and the rebuilding effort after. The cypress were seen as very valuable for their resistance to decay. Cypress trees are capable of resprouting from a cut stump, however most of the regeneration is usually from remaining seeds that were not damaged during harvesting.

Other products

Due to the natural hydroperiod of this ecological site, year round grazing is not typically implemented, but rather

during the dry season when forgeable grasses are at peak production. Drainage of the surrounding community is typically seen when converting the area to agriculture or pasture. This site correlates with the "flooded" soil components of the 2013 Florida Forage Suitability Group "G156B645FL" and Range Site "156B Freshwater Marsh and Pond".

Inventory data references

Information presented was derived from NRCS clipping data, current and historical literature, field observations, and personals contacts with local, state and federal partners. This is a provisional level ESD and is subject to change as more information becomes available, for any questions please contact your local NRCS office.

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	05/11/2025
Approved by	Charles Stemmans
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**