USDA Natural Resources Conservation Service

# Ecological site F154XA016FL
# Wet Mineral Alluvial Forest And Marshlands

Last updated: 2/21/2024
Accessed: 05/21/2024

## 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): 154X–South-Central Florida Ridge

MLRA 154 is entirely in Peninsular Florida, and contains 8,285 square miles. The landscape of MLRA 154 is characterized by a series of parallel, prominent sandy ridges of Pleistocene marine origin, including the Brooksville and Mount Dora Ridges. These North to South oriented parallel ridges are interspersed with more low lying physiographic provinces, including: upland hills, plains, valleys and gaps (Puri and Vernon 1964). The extreme western portion of the MLRA consists of thin belt of coastal lowlands and marshlands.

Many of the soils of MLRA 154 are Pleistocene or Holocene sands that are underlain with older, loamy Pliocene marine sediments (Cypresshead formation) or the clayey Miocene marine sediments (Hawthorne formation). A combination of marine depositional events and the dissolution of underlying limestone (karst geology) is responsible for surficial topography throughout Peninsular Florida.

## 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; 75c Central Florida Ridges and Uplands (Griffith, G. E., Omernik, J. M., & Pierson, S. M., 2013)

-Florida Natural Area Inventory, 2010 Edition: Floodplain Swamp, Floodplain Marsh, & Basin Swamp (FNAI, 2010)

## Ecological site concept

The central concept of the Wet Mineral Alluvial Forest and Marshlands is very deep and poorly drained soils formed from sandy, loamy, or clayey alluvium or marine deposits. These soils occur in floodplains or other drainageways associated with large water bodies. Landscapes are level, with slopes < 2%. This site includes flooded map units (phases) of the following soil series: Allanton, Astor, Basinger, Bluff, Chobee, Floridana, Holopaw, Leon, Malabar, Mascotte, Meadowbrook, Meggett, Osier, Ousley, Pickney, Placid, Riviera, Rutlege, Sapelo, Starke, Surrency, and Wesconnett. These map units occur in river and lake floodplains of the Central Valley, Duval Upland, Marion Upland, St. Johns River Offset, and Tsala Apopka Plain physiographic units.

## Associated sites

| | |
|---|---|
| F154XA013FL | **Histic Alluvial Forests**<br>These are very poorly drained alluvial concepts that will occur in organic soils, and will differ in physiographic positions, affect the types of vegetation and management strategies |

| | |
|---|---|
| F154XA014FL | **Histic Wetland Depressions**<br>These sites are very poorly drained depressional concepts that will occur on organic soils, resulting in different types and amounts of vegetation as well as management strategies |
| F154XA015FL | **Mineral Depressional Wetlands**<br>These are very poorly drained depressional concepts that will occur in mineral soils and will differ in physiographic positions, affect the types of vegetation and management strategies |
| R154XX017FL | **Wet Saline Marshes And Swamps**<br>These are very poorly drained tidal soils that will exist in intertidal landscape positions |

## Similar sites

| | |
|---|---|
| F154XA013FL | **Histic Alluvial Forests**<br>These are very poorly drained floodplain concepts that will occur in organic soils, and will differ in physiographic positions, affect the types of vegetation and management strategies |
| F154XA014FL | **Histic Wetland Depressions**<br>These are very poorly drained depressional concepts that will occur in mineral soils rather than organic soils, and will differ in physiographic positions, affect the types of vegetation and management strategies |
| F154XA015FL | **Mineral Depressional Wetlands**<br>These sites are very poorly drained depressional concepts that will occur on organic soils, resulting in different types and amounts of vegetation as well as management strategies |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | (1) *Taxodium distichum*<br>(2) *Nyssa biflora* |
| Shrub | (1) *Fraxinus pennsylvanica*<br>(2) *Acer rubrum* |
| Herbaceous | Not specified |

## Physiographic features

The entire concept distribution is located within the Floridian Section of the Coastal Plain Province of the Atlantic Plain. Elevation of this site varies between 10 to 197 feet (3 to 60 meters) above sea level and is situated in floodplains of major rivers and other overflow channels of major water bodies. Slopes are nearly level (0 to 2%), and soils are typically loamy and sandy alluvial or marine deposits. A few soils formed in clayey alluvial or marine deposits.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Marine terrace > Flood plain |
| Runoff class | Negligible to low |
| Flooding duration | Brief (2 to 7 days) to very long (more than 30 days) |
| Flooding frequency | Frequent |
| Ponding frequency | None |
| Elevation | 3–60 m |
| Slope | 0–2% |
| Water table depth | 0–15 cm |
| Aspect | Aspect is not a significant factor |

## Climatic features

The climate is characterized by humid subtropical with long hot summers and mild winters. In the winter months, Canadian air masses move across Peninsular Florida and produce cool, cloudy, rainy weather. Freezing temperatures are occasional in the northern MLRA areas, with typically less than 30 days of the year with

temperatures dropping below freezing.

Precipitation in the northern MLRA is distributed fairly evenly throughout the year. Average annual precipitation ranges from 45 to 55 inches. Highest monthly precipitation falls from June through October, with June through August being the wettest period. Winter rainfall is associated with cold fronts.

Hurricanes and tropical storms affect much of the MLRA 154 region. Catastrophic hurricanes make landfall along the Atlantic coast of Peninsular Florida on the order of two to four times per century. Strong winds and heavy rainfall affect the interior peninsula; rainfall from hurricanes and tropical systems vary widely but can exceed 20 inches from one storm. Hurricanes are most likely to occur between June and November and are most common in August and September.

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (characteristic range) | 238-365 days |
| Freeze-free period (characteristic range) | 365 days |
| Precipitation total (characteristic range) | 1,295-1,346 mm |
| Frost-free period (actual range) | 214-365 days |
| Freeze-free period (actual range) | 319-365 days |
| Precipitation total (actual range) | 1,270-1,372 mm |
| Frost-free period (average) | 313 days |
| Freeze-free period (average) | 356 days |
| Precipitation total (average) | 1,321 mm |

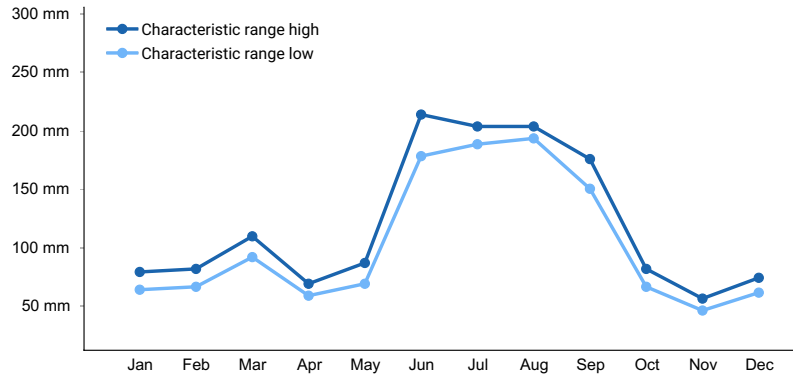



**Figure 1. Monthly precipitation range**

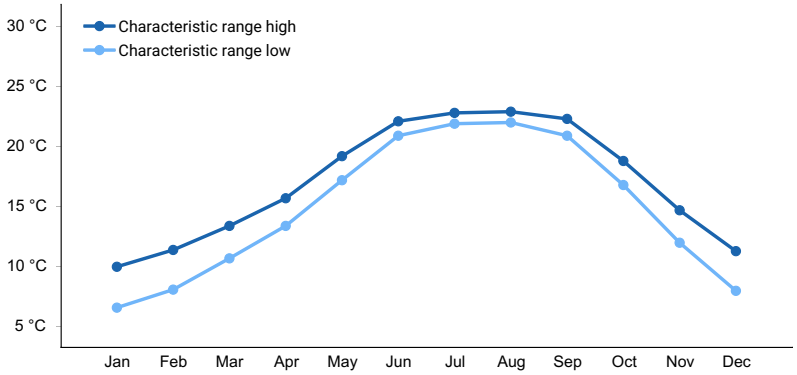



**Figure 2. Monthly minimum temperature range**

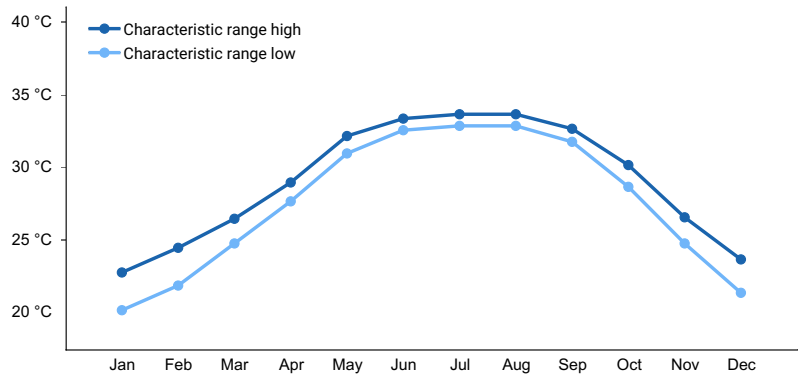



**Figure 3. Monthly maximum temperature range**

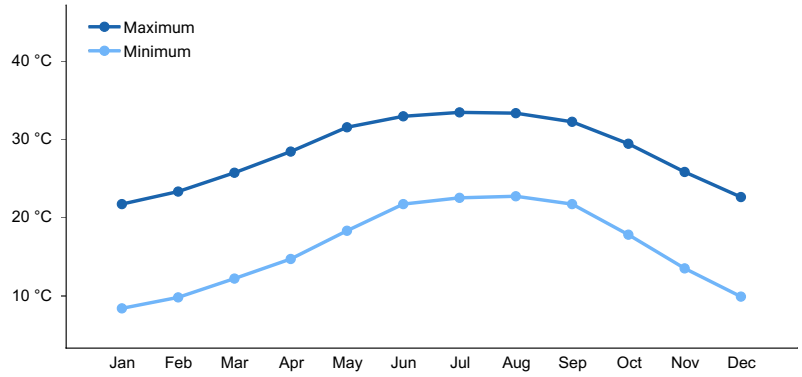



**Figure 4. Monthly average minimum and maximum temperature**

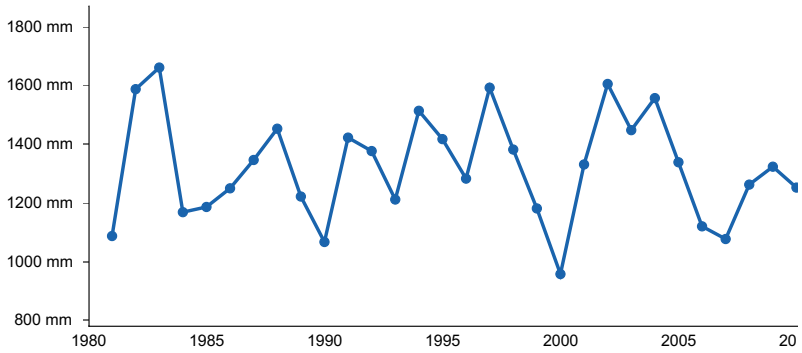



**Figure 5. Annual precipitation pattern**

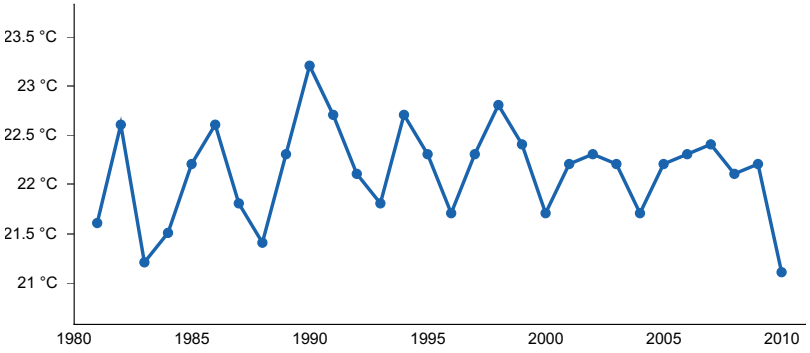



**Figure 6. Annual average temperature pattern**

## Climate stations used

- (1) BARTOW [USC00080478], Bartow, FL
- (2) GAINESVILLE 11 WNW [USC00083322], Gainesville, FL
- (3) AVON PARK 2 W [USC00080369], Avon Park, FL

- (4) LISBON [USC00085076], Leesburg, FL
- (5) LAKELAND [USW00012883], Lakeland, FL
- (6) BROOKSVILLE CHIN HILL [USC00081046], Brooksville, FL
- (7) SAINT LEO [USC00087851], San Antonio, FL
- (8) TARPON SPGS SEWAGE PL [USC00088824], Tarpon Springs, FL
- (9) CLERMONT 9 S [USC00081641], Clermont, FL
- (10) INVERNESS 3 SE [USC00084289], Inverness, FL
- (11) LAKE ALFRED EXP STN [USC00084707], Haines City, FL
- (12) ORANGE SPRINGS 2SSW [USC00086618], Fort Mc Coy, FL
- (13) PLANT CITY [USC00087205], Plant City, FL

## Influencing water features

This site is situated on soils that are seasonally flooded with flowing water. Many floodplains in this region occur are along two major river systems: the St. Johns River and Withlacoochee River, or their tributaries. Water enters the floodplains as runoff from nearby uplands, or from lateral recharge from surrounding soils. Water outflow is via evaporation, evapotranspiration, aquifer recharge, or flow to the Atlantic or Gulf of Mexico.

Flooding is seasonal and cyclical (in free flowing river systems) or is regulated by flood control structures. Flood waters originate in upper watersheds, from small tributaries, runoff, and lateral seepage from surrounding uplands. Floodwater movement in these low-gradient floodplain systems is generally slow, except in periods of extreme flooding (heavy rains, hurricanes). Slope gradient, linear or concave landform positions, and variable saturated hydraulic conductivity results in medium to very high surface runoff.

## Soil features

This concept includes a broad and diverse set of soil taxa: Aquolls, Aquods, Aqualfs, Aquults, Aquents, and Aquepts. The unifying feature of all soils is hydrology. Included are frequently flooded components (and phases) of the following soil series: Allanton, Astor, Basinger, Bluff, Chobee, Floridana, Holopaw, Leon, Malabar, Manatee, Mascotte, Meadowbrook, Meggett, Osier, Ousley, Pickney, Placid, Riviera, Rutlege, Sapelo, Starke, Surrency, and Wesconnett.

All of these series describe very deep, poorly to very poorly drained, sandy, clayey, or loamy soils formed in alluvial or marine sediments. The representative slope for the correlated soil components is 0 to 2%. Soil mineralogy is dominantly siliceous.

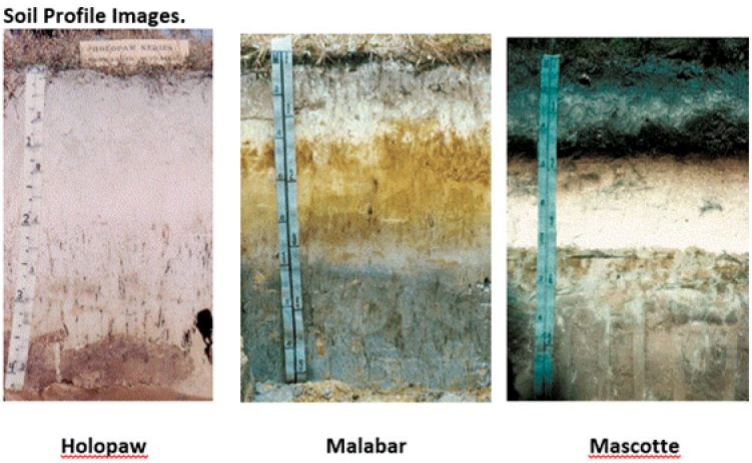



**Figure 7. typical soil profiles**

**Table 4. Representative soil features**

| | |
|---|---|
| Parent material | (1) Alluvium<br>(2) Marine deposits |
| Surface texture | (1) Fine sand<br>(2) Fine sandy loam |

| | |
|---|---|
| Drainage class | Very poorly drained |
| Permeability class | Slow to rapid |
| Soil depth | 203 cm |
| Surface fragment cover <=3" | 0% |
| Surface fragment cover >3" | 0% |
| Available water capacity (0-101.6cm) | 11.94–14.48 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0–5% |
| Electrical conductivity (0-101.6cm) | 0 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 1 |
| Soil reaction (1:1 water) (0-101.6cm) | 4.2–8 |
| Subsurface fragment volume <=3" (0-101.6cm) | 0% |
| Subsurface fragment volume >3" (0-101.6cm) | 0% |

**Table 5. Representative soil features (actual values)**

| | |
|---|---|
| Drainage class | Not specified |
| Permeability class | Not specified |
| Soil depth | Not specified |
| Surface fragment cover <=3" | Not specified |
| Surface fragment cover >3" | Not specified |
| Available water capacity (0-101.6cm) | 8.89–25.4 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0–20% |
| Electrical conductivity (0-101.6cm) | 0–2 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0–4 |
| Soil reaction (1:1 water) (0-101.6cm) | 3.5–8.4 |
| Subsurface fragment volume <=3" (0-101.6cm) | 0–5% |
| Subsurface fragment volume >3" (0-101.6cm) | Not specified |

## Ecological dynamics

The Wet Mineral Alluvial Forest and Marshlands concept includes several wetland natural communities, including forested swamps and herbaceous marshland. Although this site concept has broad compositional and structural variation, unifying features involve ecological processes linked to seasonal flooding and edaphic properties of fertile alluvium. Freely flowing flood waters hinder deposition of organic matter, thus mineral soils are common to this site.

Flooding regime is the most influential ecological process of this site. Floodplain forests and marshes are regularly inundated by flowing flood waters of adjacent rivers or other water bodies. Flows and aerobic conditions are variable in floodplains, depending on local site morphology and micro-topography. Backswamps and sloughs are flooded with slow moving (stagnant) water for extensive periods of time, resulting in highly anaerobic conditions. In contrast, flooding frequency and depths are more variable in point bars and river bends, leading to more aerobic conditions, nutrient flows and mechanical scouring.

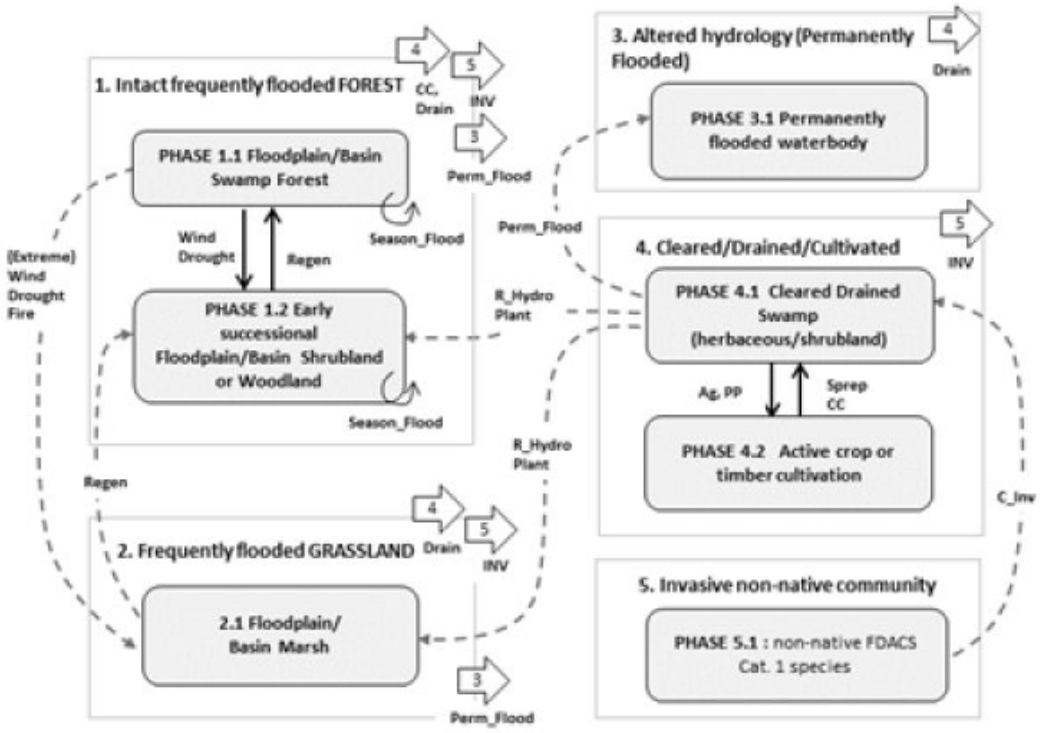
Natural vegetation of this site is described by three natural community types (FNAI 2010): Floodplain Swamp, Basin Swamp Forest, and Floodplain Marsh. The swamp forests have well developed canopies of hydrophytic trees which are often buttressed. Conversely, floodplain marshes are herbaceous dominated grasslands, with patchy shrubs and aquatic vegetation.

Swamp forests inhabit floodplains of permanently moving stream or rivers. In MLRA 154, it primarily occurs in the watersheds of the Withlacoochee and St. Johns Rivers. In addition to stream and river floodplains, swamp forests also occur adjacent to oxbow and overflow channels, in old stream beds, and backswamps.

Floodplain marshes occur in similar floodplain landscapes. Often, floodplain marshes are common near the mouth of larger rivers and grade into salt marshes. It is likely that variations in flooding regime dictate distribution of marsh vs. forest vegetation in floodplains (not soil types). Furthermore, infrequent catastrophic winds, fires and extreme flooding may affect forest and grassland distributions.

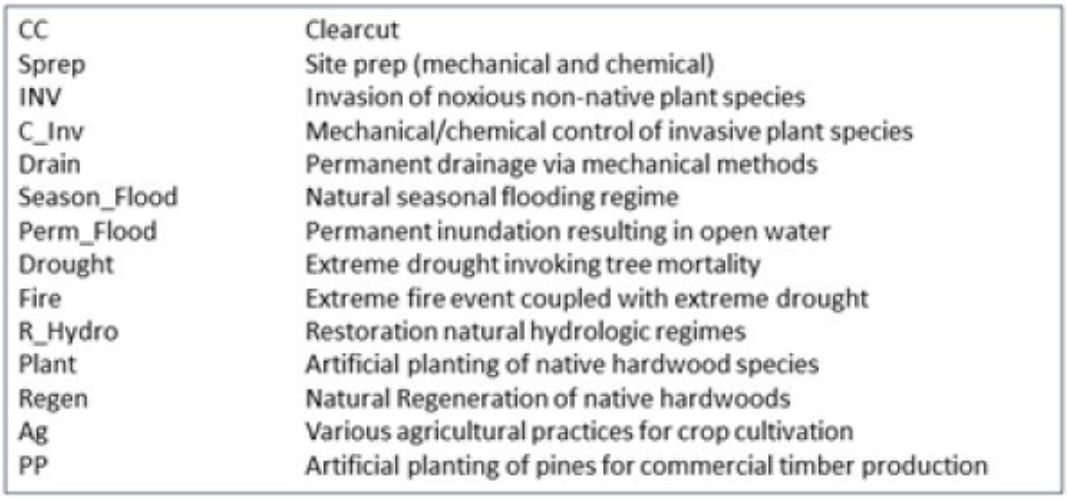
The State and Transition Model shown here includes forest and marsh vegetation as successional stages. However, this should be interpreted with caution, as successional relationships among floodplain communities is not well known.

## State and transition model




Note: Solid arrows denote transitions between phases within States, dashed arrows show transitions between States, block arrows indicate transitions which are possible for ALL phases within a State. Destination State denoted by number in block arrow

**Figure 8. State and Transition Model**



| | |
|---|---|
| CC | Clearcut |
| Sprep | Site prep (mechanical and chemical) |
| INV | Invasion of noxious non-native plant species |
| C_Inv | Mechanical/chemical control of invasive plant species |
| Drain | Permanent drainage via mechanical methods |
| Season_Flood | Natural seasonal flooding regime |
| Perm_Flood | Permanent inundation resulting in open water |
| Drought | Extreme drought invoking tree mortality |
| Fire | Extreme fire event coupled with extreme drought |
| R_Hydro | Restoration natural hydrologic regimes |
| Plant | Artificial planting of native hardwood species |
| Regen | Natural Regeneration of native hardwoods |
| Ag | Various agricultural practices for crop cultivation |
| PP | Artificial planting of pines for commercial timber production |

**Figure 9. STM legend**

## State 1
## Floodplain/Basin Swamp Forest

Forest composition of Floodplain and Basin Swamp Forests is dependent on flooding regime and landscape orientation. Bald cypress (T. distichum) occurs in swamp forests of seasonally flooded alluvial floodplains. Other canopy trees include water tupelo (*Nyssa aquatica*), swamp tupelo (*N. sylvatica* var. biflora), red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), and swamp laurel oak (Q. laurifolia). The mid- and under-story of floodplain swamp forests are variable, and depend on small scale variations in hydrology and topography. Common shrub species include: Virginia willow (*Itea virginica*), swamp dogwood (*Cornus foemina*), swamp doghobble (Leucothoe racemosa), myrtle dahoon (*Ilex cassine* var. myrtifolia), fetterbush (*Lyonia lucida*), wax myrtle (Myrica cerifera), and common buttonbush (*Cephalanthus occidentalis*). Herbaceous ground cover is also variable and usually sparse.

## State 2
## Floodplain/Basin Marsh

This wetland state is dominated by herbaceous vegetation with some low growing shrubs. Vegetation often appears to form “bands” which are coincident with length and duration of flooding. The center of larger depression marshes usually remain inundated year-round, and supports wetland and aquatic plants such as maidencane (*Panicum hemitomon*), pickerelweed (*Pontederia cordata*), bulltongue arrowhead (*Sagittaria lancifolia*), or sawgrass (Cladium jamaicense). Drier habitats of the outer zones support many species of beaksedges (Rhynchospora spp.), various grasses and low shrubs (several in the genus Hypericum).

## State 3
## Altered hydrology (Permanently Flooded)

This state describes permanently flooded conditions for this site. Permanent flooding may result from damming, or a natural event causing permanent inundation. Depending on the depth of permanent inundation, cypress will persist in an open water swamp with emergent aquatic vegetation, or all canopy trees will die over time.

### State 4
### Cleared/Drained/Cultivated

This state describes conditions related to land use conversion for community production. Drastic changes in hydrologic regime result from draining and clearing.

### State 5
### Invasive non-native community

State 5 describes a condition where one or several noxious non-native species has invaded and dominated the site.

## References


. Fire Effects Information System. http://www.fs.fed.us/database/feis/.

. 2021 (Date accessed). USDA PLANTS Database. http://plants.usda.gov.


## Other references


Brook, R. M. (1989). Review of literature on Imperata cylindrica (L.) Raeuschel with particular reference to South East Asia. International Journal of Pest Management, 35(1), 12-25.

Bryson, C. T., & Carter, R. (1993). Cogongrass, Imperata cylindrica, in the United States. Weed Technology, 7(4), 1005-1009.

Carr, S. C., Robertson, K. M., & Peet, R. K. (2010). A vegetation classification of fire-dependent pinelands of Florida. Castanea, 75(2), 153-189.

FNAI (2010). Guide to the natural communities of Florida: 2010 edition. Florida Natural Areas Inventory, Tallahassee, FL.

Gilliam, F. S., & Platt, W. J. (1999). Effects of long-term fire exclusion on tree species composition and stand structure in an old-growth Pinus palustris (longleaf pine) forest. Plant Ecology, 140, 15-26.

Glitzenstein, J. S., Streng, D. R., & Wade, D. D. (2003). Fire Frequency Effects on Longleaf Pine(Pinus palustris P. Miller) Vegetation in South Carolina and Northeast Florida, USA. Natural Areas Journal, 23(1), 22-37.

Glitzenstein, J. S., Platt, W. J., & Streng, D. R. (1995). Effects of fire regime and habitat on tree dynamics in north Florida longleaf pine savannas. Ecological Monographs, 65(4), 441-476.

MacDonald, G. E. (2004). Cogongrass (Imperata cylindrica)—biology, ecology, and management. Critical Reviews in Plant Sciences, 23(5), 367-380.

Schowalter, T. D., Coulson, R. N., & Crossley Jr, D. A. (1981). Role of southern pine beetle and fire in maintenance of structure and function of the southeastern coniferous forest. Environmental Entomology, 10(6), 821-825.

Puri, H. S., & Vernon, R. O. (1964). Summary of the geology of Florida and a guidebook to the classic exposures.

Yager, L. Y., Miller, D. L., & Jones, J. (2010). Susceptibility of longleaf pine forest associations in south Mississippi to invasion by cogongrass [Imperata cylindrica (L.) Beauv.]. Natural areas journal, 30(2), 226-232.

## Contributors

S. Carr
Rick Robbins

## Approval

Charles Stemmans, 2/21/2024

## 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 | 05/21/2024 |
| 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):**

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

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

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

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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:

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

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

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

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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:**

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17. **Perennial plant reproductive capability:**

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