USDA Natural Resources Conservation Service

Ecological site F154XA012FL
Wet Rich Forests And Woodlands

Last updated: 2/21/2024
Accessed: 05/17/2024

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: Mesic Flatwoods, Wet Flatwoods, Mesic Hammock, and Hydric Hammock (FNAI, 2010)

Ecological site concept

Wet Rich Forests and Woodlands occur in lowland and nearly level landscapes (slopes < 2%) on very deep, poorly drained soils with loamy or clayey subsoils. Soils include very deep, poorly drained, sandy over clayey or clayey, high base saturation map units (Eaton, Emeralda, Eureka, Eureka Variant, Meggett, Paisley series). Also included are very deep, poorly drained, sandy over loamy map units (Goldhead, Hicoria, Pelham series). This site is extensively mapped in the Central Valley, Tsala Apopka Plain, and Western Valley physiographic units.

Shallow seasonal high water table and available soil moisture, coupled with high soil fertility influence the distribution and composition of native vegetation of this site.

Associated sites

F154XA004FL	**Moist Sandy Pine-Hardwood Woodlands** These sites occur on higher landscape positions with better drainage classes

F154XA005FL	**Poorly Drained Upland Pine-Hardwood Forests** These sites occur on slightly higher landforms with similar drainage classes
F154XA007FL	**Moist Sandy Wet-Mesic Flatwoods** These sites occur on similar landforms with similar drainage classes
F154XA008FL	**Moist Sandy Scrubby Flatwoods** These sites occur on higher landscape positions with better drainage classes
F154XA011FL	**Wet Lithic Flatwoods And Hammocks** These sites occur on similar landforms with similar drainage classes, but will have lithic contact within 152cm

Similar sites

F154XA007FL	**Moist Sandy Wet-Mesic Flatwoods** These sites will occur on similar landforms with similar drainage classes, but will have lithic contact deeper than 152 cm with low subsoil clay content, affecting the types and amounts of vegetation grown

Table 1. Dominant plant species

Tree	(1) *Pinus elliottii* (2) *Pinus palustris*
Shrub	(1) *Quercus laurifolia*
Herbaceous	Not specified

Physiographic features

The physiography of MLRA 154 is among the best defined in Peninsular Florida with rolling topography consisting of ridges, hills, and dunes interspersed with low-lying valleys, depressions, and drainageways. The entire area is located within the Floridian Section of the Coastal Plain Province of the Atlantic Plain.

Elevation of this site varies between 20 to 131 feet (6 to 40 meters). This site occurs on sandy over loamy, sandy over clayey, and clayey, poorly drained soils on lowlands in central and west-central Florida. The topography of this site includes flats and broad interfluves between drainage systems or depressions, distinctive by level ground (0 to 2% slope).

This site has an isolated distribution with several distinct populations on the Central Valley, Tsala Apopka Plain, and Western Valley physiographic units. They occur as low lying areas adjacent to streams or as isolated delineations near the headwaters of tributaries to major streams.

Table 2. Representative physiographic features

Landforms	(1) Marine terrace > Interfluve (2) Marine terrace > Flat
Runoff class	Negligible to low
Flooding duration	Extremely brief (0.1 to 4 hours) to long (7 to 30 days)
Flooding frequency	None to frequent
Ponding frequency	None
Elevation	9–30 m
Slope	0–2%
Water table depth	8–38 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; typically, fewer than 30 days of the year have low temperatures below freezing.

Precipitation 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)	227-365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	1,295-1,346 mm
Frost-free period (actual range)	215-365 days
Freeze-free period (actual range)	324-365 days
Precipitation total (actual range)	1,270-1,372 mm
Frost-free period (average)	314 days
Freeze-free period (average)	357 days
Precipitation total (average)	1,321 mm

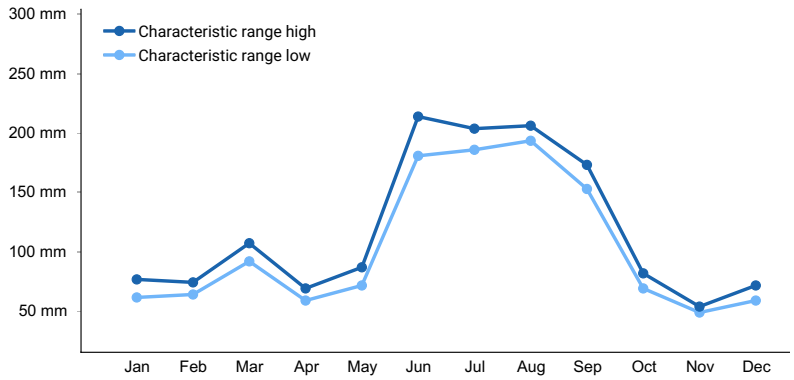

Figure 1. Monthly precipitation range

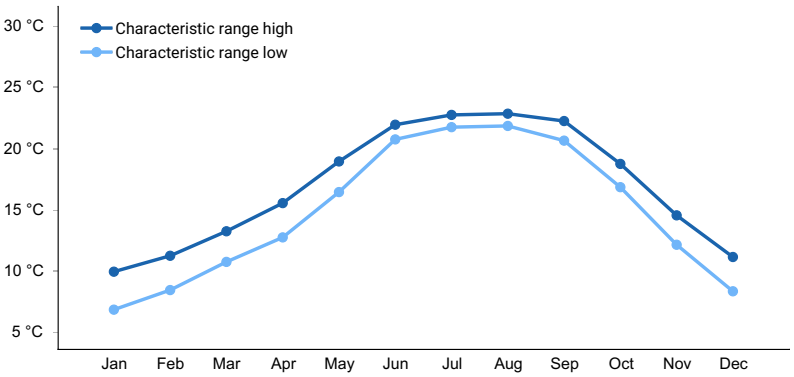

Figure 2. Monthly minimum temperature range

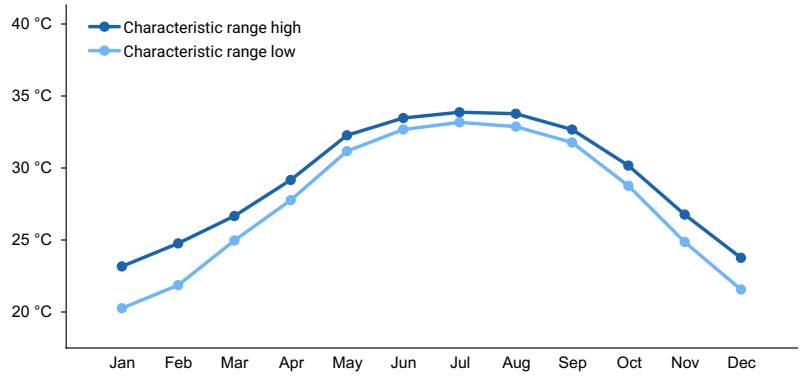

Figure 3. Monthly maximum temperature range

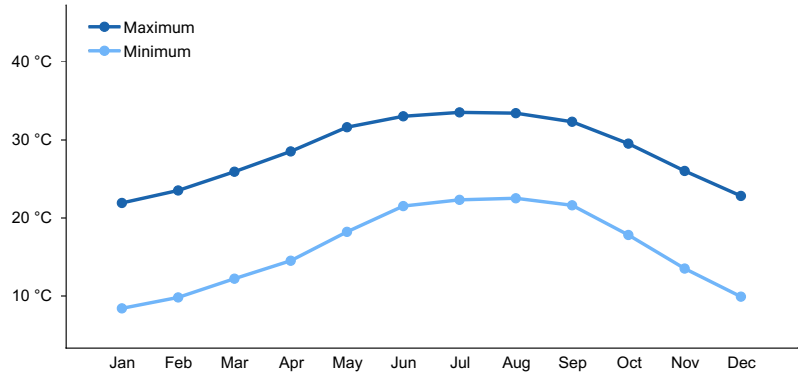

Figure 4. Monthly average minimum and maximum temperature

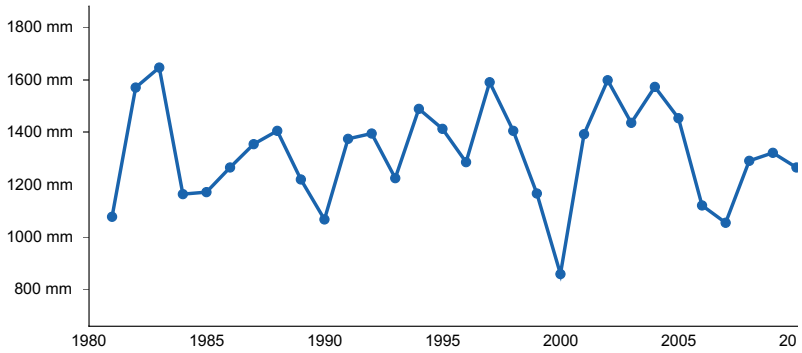

Figure 5. Annual precipitation pattern

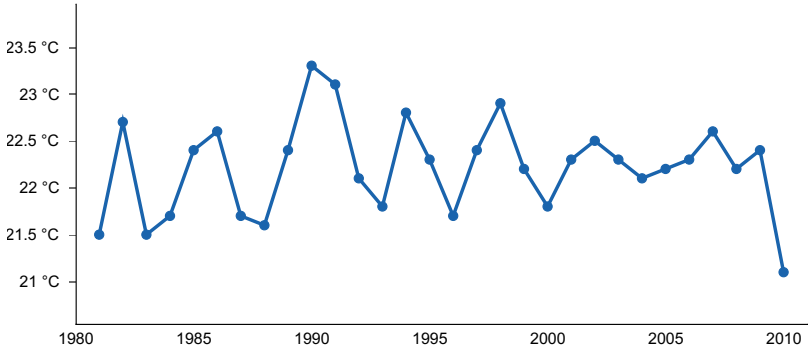

Figure 6. Annual average temperature pattern

Climate stations used

- (1) BARTOW [USC00080478], Bartow, FL
- (2) ARCHBOLD BIO STN [USC00080236], Venus, FL
- (3) AVON PARK 2 W [USC00080369], Avon Park, FL

- (4) GAINESVILLE 11 WNW [USC00083322], Gainesville, FL
- (5) MTN LAKE [USC00085973], Lake Wales, FL
- (6) LAKELAND [USW00012883], Lakeland, FL
- (7) ORANGE SPRINGS 2SSW [USC00086618], Fort Mc Coy, FL
- (8) SAINT LEO [USC00087851], San Antonio, FL
- (9) TARPON SPGS SEWAGE PL [USC00088824], Tarpon Springs, FL
- (10) CLERMONT 9 S [USC00081641], Clermont, FL
- (11) INVERNESS 3 SE [USC00084289], Inverness, FL
- (12) LAKE ALFRED EXP STN [USC00084707], Haines City, FL
- (13) LISBON [USC00085076], Leesburg, FL
- (14) PLANT CITY [USC00087205], Plant City, FL

Influencing water features

Hydrology of this site is largely determined by landform position and surface morphometry. The modal concept for this site are areas of linear flats and interfluves on lowland landforms that are typically surrounded by similar or drier environments. The site is situated on poorly drained soils that have an apparent water table less than 12 inches during wet periods.

This lowland concept receives water from only local precipitation. Water is discharged through the soil into the Florida Aquifer or through surface runoff to adjacent depressions or drainageways. A few areas may receive lateral recharge or runoff from adjacent higher-lying landforms. The low slope gradient, moderate to slow infiltration, and slow or very slow saturated hydraulic conductivity results in medium to very rapid surface runoff.

Soil features

Soils are poorly drained, sandy over clayey Arenic Albaqualfs (Eaton series), clayey Mollic Albaqualfs (Emeralda series) or Typic Albaqualfs (Eureka, Eureka Variant, Meggett, Paisley series) and loamy Arenic Endoaqualfs (Goldhead, Hicoria, Pelham series). These soils formed in sandy over loamy, sandy over clayey, or clayey marine sediments. Clay content of the argillic horizon is dominantly 30 to 60%. Soil mineralogy is dominantly mixed or smectitic.

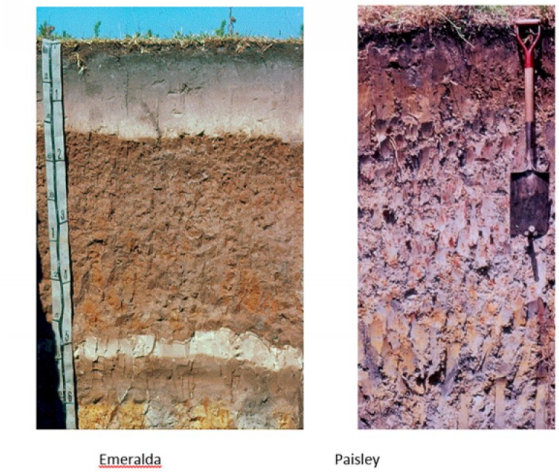

Figure 7. Representative soil profiles

Table 4. Representative soil features

Parent material	(1) Marine deposits
Surface texture	(1) Sand (2) Loamy sand (3) Loamy fine sand (4) Fine sandy loam
Family particle size	(1) Clayey
Drainage class	Poorly drained to 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)	8.89–16.26 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	1
Soil reaction (1:1 water) (0-101.6cm)	4.7–7.5
Subsurface fragment volume <=3" (0-101.6cm)	2–3%
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)	8.89–30.48 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
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)	0–3%
Subsurface fragment volume >3" (0-101.6cm)	Not specified

Ecological dynamics

The Wet Rich Forests and Woodlands concept includes a very broad range natural community vegetation and environment. In general, plant community structure and composition are influenced by high soil moisture available and fertility, in low level area in otherwise upland landscapes.

There is no single “reference site” condition for this concept, in that preliminary observation suggests this site encompasses a broad range of vegetation. The State and Transition Model (STM) presented here includes multiple “reference site” states; these are NOT successional phases. These are indicated by shaded boxes in the STM diagram. Field observation and data are necessary to determine the distinguishing edaphic and ecological factors of

these states.

In general, this broad and vaguely defined site includes several natural community types (as described by FNAI 2010): Wet Flatwoods, Mesic Flatwoods, and Hydric Hammock. Subtle difference in topography, hydrology, and proximity to water bodies probably influence the distinctive distributions of flatwoods vs. hydric hammock. Vegetation structure and composition varies with frequency and depth of seasonal inundation, with closed canopy forests of hydrophytic hardwoods inhabiting wettest conditions. Conversely, drier (and higher elevation) sites may support woodlands of pines and cabbage palms. Intermediate moisture and elevation conditions may support forests with pine-oak canopies.

Mesic and wet flatwoods are fire dependent communities. Their structure and composition are variably affected by fire regimes. Frequent fires (two to three per decade) are necessary for maintenance of natural flatwoods communities. Fire suppression is followed by succession to live oak dominated mesic hammock vegetation (FNAI, 2010).

Conversely, fire is very rare in the wetter environments of hydric hammock (also included in this site). Frequent flooding, high soil moisture, and closed canopy forests render hydric hammocks inhospitable to fire ignition and spread. Local flooding and ponding from precipitation influences community composition and ecological dynamics.

State and transition model

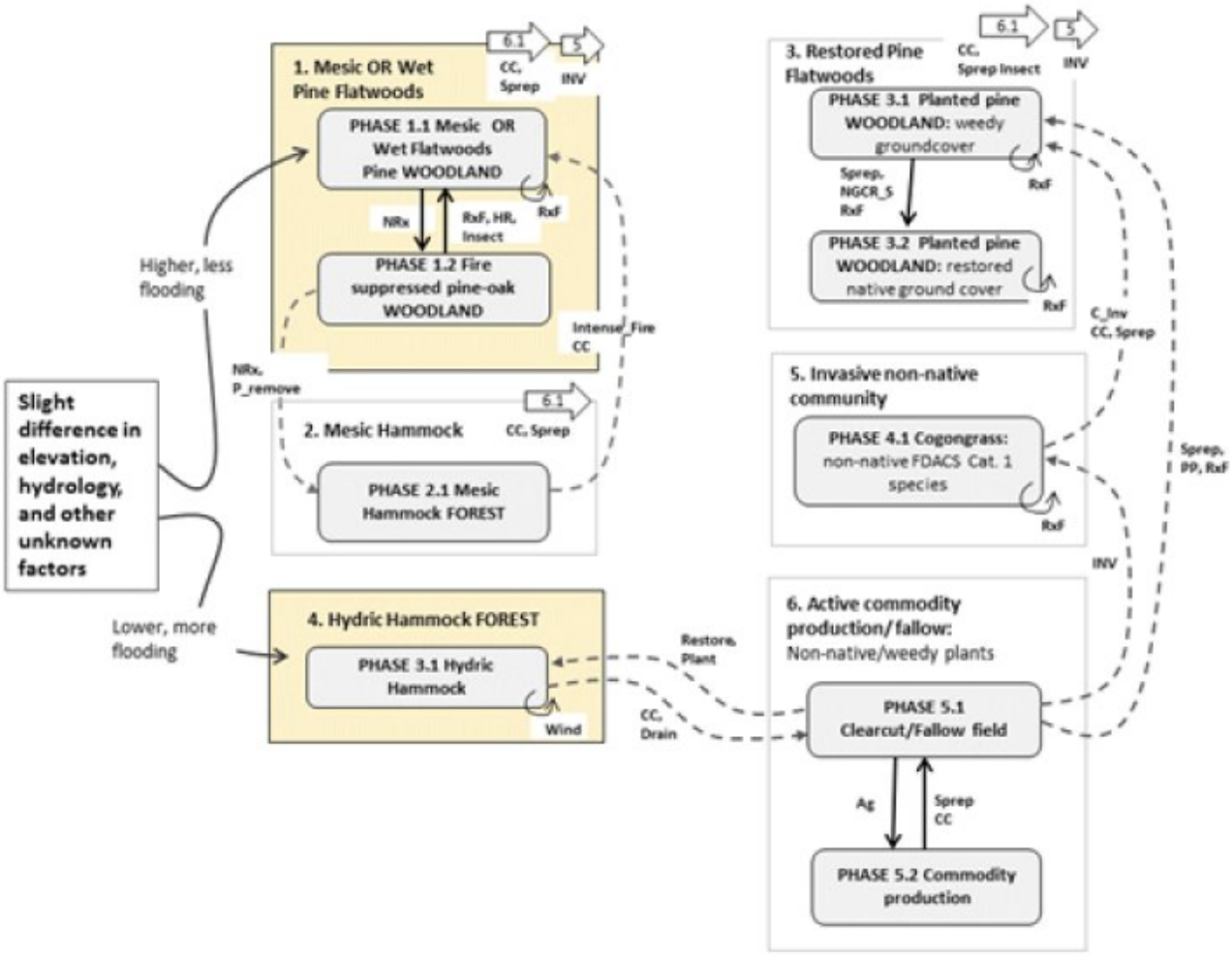

Figure 8. State and Transition Model

RxF	Frequent interval prescribed fire
NRx	Fire suppression, or very infrequent non-catastrophic fire
HR	Hardwood reduction (mechanical and chemical, no ground disturbance)
PP	Planted Pine
P_remove	Selective logging of pines
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
NGCR_S	Native ground cover restoration: active seeding
Drain	Permanent drainage via mechanical methods
Wind	Tree mortality and regeneration from strong winds and storms
Restore	Restoration of hydrology and landscape features in advance of planting
Plant	Artificial planting of native hardwood species
Ag	Various agricultural practices for crop cultivation

Figure 9. STM legend

State 1
Mesic OR Wet Flatwoods

The drier portions of this site support pine woodlands which are maintained by frequent fire regimes. This includes Mesic Flatwoods and Wet Flatwoods (FNAI 2010). Pine are dominant, and may include longleaf (P. palustris) and slash pines (P. elliottii). Mid- and understory woody vegetation includes hydrophytic oaks (*Q. nigra*, *Q. laurifolia*), saw palmetto, gallberry (*Ilex glabra*), blueberries (Vaccinium spp.). Ground cover vegetation includes many perennial bunch grasses, including wiregrass and bluestem species (Andropogon spp.), and many sedges and forbs.

State 2
Mesic Hammock

Mesic hammock result when fire regimes are altered or suppressed in mesic flatwoods (and maybe wet flatwoods). Live oak (*Q. virginiana*) overtakes pines and other hardwoods as the dominant species in a closed forest canopy. The midstory and ground cover are very dependent on soil moisture and hydrology, but in general is sparse. Cabbage palm may be a subcanopy dominant.

State 3
Restored Pine Flatwoods

State 3 variously describes a grasslands and pine woodlands consisting of seeded and planted native species, OR a mixture of native and non-native herbaceous species. Notably, this state describes conditions where native propagules have been extirpated following long term fire suppression and/or extensive soil disturbance associated with commodity land uses. Native plant populations are purposefully re-established in this state, for the purpose of ecological restoration. The phases of State 3 include grasslands and, if native pines are planted, woodlands with

herbaceous ground cover. These plant communities have restored ecological function and provide habitat for native wildlife species. Restoration of native grasses provides fine fuels for frequent ground fires and is necessary for restoration of ecological site dynamics. State 3 woodlands may provide suitable habitat for ground nesting birds and small mammals.

State 4
Hydric Hammock

State 4 represents a REFERENCE site condition of this sites STM. Hydric Hammock occur in the wetter portions of this concept. These are closed canopy forests of flood tolerant evergreen hardwoods and palms. Ponding and inundation are frequent, and related to rainfall and poorly drained and frequently saturated soils. Forest composition is influenced by flooding frequency and depth of inundation. Cypress (Taxodium spp.) may be infrequently present where flooding is more pronounced. More commonly, canopy species include swamp laurel oak (*Quercus laurifolia*), live oak (*Q. virginiana*), American elm (*Ulmus americana*), swamp blackgum (*Nyssa biflora*), sweetbay (*Magnolia virginiana*), red cedar (*Juniperus virginiana*), red maple (*Acer rubrum*), sugarberry (*Celtis laevigata*), sweetgum (*Liquidambar styraciflua*), and water oak (*Q. nigra*). Cabbage palm (*Sabal palmetto*) may be abundant in all forest strata. The mid- and under-story vegetation of hydric hammocks is variable, and depend on small scale variations in hydrology and topography. Common species include many ferns and vines, as well as hardwood saplings.

State 5
Invasive non-native plant community

State 5 describes a condition where one or several noxious non-native species has invaded and dominated the site. In the drier portions of this site, cogongrass is the most pervasive noxious invader. Cogongrass is not common in frequently inundated areas.

State 6
Active commodity production/Fallow fields

This state describes commodity land uses of the drier portions of this site, including cleared land, crop production and improved pastures. All phases of State 6 describe conditions following clearing and ground penetrating soil disturbance, to the degree that native ground cover is mostly absent. Generally these phases are characterized by the complete extirpation of native ground cover populations, including seed banks and dormant propagules, although native weedy species may persist (mostly annual species). Depending on the severity and frequency of ground disturbance, soil profile characteristics in the upper part of the soil may be altered.

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Contributors

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Approval

Charles Stemmans, 2/21/2024

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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	05/17/2024
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):**

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:

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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:**
