USDA Natural Resources
Conservation Service

Ecological site F153AY020NC
Moist Sands

Last updated: 2/12/2025
Accessed: 08/10/2025

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): 153A–Atlantic Coast Flatwoods

The MLRA notes section provides a brief description of the entire MLRA. This brief description of the entire MLRA is intended to provide some context about the MLRA that this ecological site resides within. A more complete description of the MLRA can be found in Ag Handbook 296 (USDA-NRCS, 2022).

This MLRA is found on the lower coastal plain and is known as the Atlantic Coast Flatwoods. This flat terrain is formed from marine terraces and fluviomarine sediments of Tertiary and Quaternary age. These marine terraces are younger to the east and are progressively older and higher inland to the west. Post formation these terraces have been crossed by widely meandering river and stream channels producing broad shallow valleys with many high order interfluves. All these factors combine to produce relatively flat landscapes that favor high water tables.

Many rivers and streams that flow through this area have headwaters that originate to the west in the upper coastal plain (MLRA 133A, Southern Coastal Plain) and piedmont (MLRA 136, Southern Piedmont) regions. Large river valleys are extremely flat and of great extent. Most surface water that originates from within the MLRA starts as blackwater in very low energy and subtle low-order channels. Most surface water emerges first as broad, very low energy, very low velocity sheet flow before accumulating in these very subtle channels. Local relief is generally less than 35 feet (10 meters), although some short, steep slopes border the stream valleys.

The dominant soil orders in MLRA 153A are Ultisols and Spodosols. The soils in this MLRA have a thermic temperature regime, an aquic or udic moisture regime, and

generally have siliceous mineralogy. They are generally very deep, well drained to very poorly drained, and loamy or clayey. The major soil suborders of the MLRA include: 1) Alaquods, which formed in marine sediments on flats and terraces and in depressions, 2) Albaquults, which formed in mixed alluvium and marine sediments on flats and terraces, 3) Haplosaprists, which formed in organic deposits over mixed marine and fluvial deposits, 4) Paleaquults, which formed in marine sediments on flats and in depressions, and 5) Paleudults, which formed in marine sediments on uplands.

MLRA 153A has a lengthy north-south extent. It runs parallel to the Atlantic coast and has a width of approximately 10 to 30 miles. The MLRA extends from the northeastern corner of Florida to southern Virginia. Five states are intersected by the MLRA, including Georgia (30 percent), South Carolina (28 percent), North Carolina (28 percent), Florida (10 percent), and Virginia (4 percent). The MLRA extent makes up about 30,319 square miles (78,527 square kilometers).

Because of climatic differences between the northern and southern reaches of the MLRA, vegetative communities vary with latitude. Overall, the MLRA is dominated by pine-oak forest vegetation. Loblolly pine, longleaf pine, slash pine, sweetgum, red maple, red oak, and white oak are dominant in the uplands. Water tupelo, pond pine, swamp blackgum, laurel oak, swamp chestnut oak, bald cypress, and red maple are dominant on the bottomland. Herbaceous understory species common to the MLRA include cutover muhly, toothache grass, little bluestem, and various panicums.

Major wildlife species of the MLRA include alligator, white-tailed deer, black bear, gray fox, red fox, bobcat, raccoon, skunk, opossum, otter, rabbit, squirrel, turkey, and bobwhite quail. The threatened and endangered gopher tortoise inhabits the southern portion of this MLRA. This area provides crucial habitat for neotropical migrants, migratory waterfowl, and wading birds along the Atlantic Flyway.

(USDA-NRCS, 2022)

LRU notes

Currently, Ecological Site Descriptions (ESDs) for MLRA 153A cover the full north-south range of the MLRA. However, climate variation across the north-south extent warrants the future development of Land Resource Unit (LRU) classifications to support more precise Ecological Site Descriptions.

Classification relationships

MLRA 153A overlaps with two level III EPA ecoregion concepts: 63) the Middle Atlantic Coastal Plain and 75) the Southern Coastal Plain. Under ecoregions 63 and 75 are a number of level IV concepts, of which several apply to MLRA 153A. These include: 63c) Swamps and Peatlands, 63e) Mid-Atlantic Flatwoods, 63h) Carolina Flatwoods, 63n) Mid-Atlantic Floodplains and Low Terraces, 75e) Okefenokee Plains, 75f) Sea Island

Flatwoods, 75g) Okefenokee Swamp, and 75i) Floodplains and Low Terraces. (U.S. EPA, 2013)

MLRA 153A overlaps portions of the US Forest Service Outer Coastal Plain Mixed Forest province (232). The MLRA 153A concept roughly corresponds to the western portion of the Atlantic Coastal Flatwoods (232C) and the southcentral portion of the Northern Atlantic Coastal Flatwoods (232I) sections. In combination with MLRA 153B, these two MLRAs correspond very closely to the full extent of sections 232C and 232I. (Cleland et al., 2007)

Based on the USGS physiographic classification system, most of MLRA 153A is in the Sea Island section of the Coastal Plain province, in the Atlantic Plain division. The northern quarter is in the Embayed section of the same province and division. The embayed barrier islands extend from the eastern shore of the Chesapeake Bay in Virginia to north of Charleston, South Carolina (Fenneman et al., 1946). The portion in North Carolina is referred to as the Outer Banks. Large bodies of brackish water, such as Pamlico and Albemarle Sounds, are on the inland side of the barrier islands. The Sea Islands extend from north of Charleston, South Carolina, to Jacksonville, Florida.

The reference community for this particularly site is approximately aligned with Pine Scrub Oak Sandhill (Schafale and Weakely, 1990) and Upland Pine (FNAI, 2010).

Ecological site concept

This site is characterized by sandy Entisol soils on local depressions within sandy coastal plain rises. The moist sands site is comprised of moderately well drained and somewhat poorly drained soils. Across this broad flat landscape, this site can be found in a few landscape positions. This site is typically associated with the dry sands site, and can typically be found in the same four distinct positions: 1) Carolina bay rims, 2) eolian deposits associated with broad river flood plain systems, 3) natural levees adjacent to stream channels, and 4) relict sandy shoreline features. The moist sands site is found in local depressions or at locations where the sands are mixed with finer-textured soil particles.

This site has the potential to support a variety of vegetation communities including pine and scrub oak. Historically, the vegetation communities on this site have been maintained by frequent low-intensity surface fires. Much of this site has been converted to alternative states, but the low productivity of these soils has led to some locations persisting in a forested state. Table 1 very briefly lists some of the most dominant vegetation on the reference community for this site. More detailed descriptions of community compositions are available in the State and Transition Model.

Associated sites

F153AY065NC	**Wet Clay Flats and Depressions** Moist sands often comprise a Carolina bay rim adjacent to, and higher on the local landscape than a wet clay flat or depression.
F153AY070NC	**Wet Spodosol Flats and Depressions** Moist sands often comprise a Carolina bay rim adjacent to, and higher on the local landscape than a wet Spodosol flat or depression.
F153AY080NC	**Wet Organic Soil Flats and Depressions** Moist sands often comprise a Carolina bay rim adjacent to, and higher on the local landscape than a wet organic soil flat or depression.
F153AY090NC	**Flooded Mineral Soil Flood Plains and Terraces** Moist sands often comprise an eolian deposit associated with, and higher on the local landscape than large expansive mineral soil flood plain systems in this MLRA.
F153AY100NC	**Flooded Organic Soil Flood Plains and Terraces** Moist sands often comprise an eolian deposit associated with, and higher on the local landscape than large expansive organic soil flood plain systems in this MLRA.
F153AY060NC	**Wet Loamy Flats and Depressions** Moist sands often comprise a Carolina bay rim adjacent to, and higher on the local landscape than a wet loamy flat or depression.
F153AY010NC	**Dry Sands** Moist sands are typically part of the same landform as dry sands. The moist sands site is found in local depressions or at locations where the sands are mixed with finer-textured soil particles.

Similar sites

F153BY020NC	**Moist Sands** This site is on very similar landforms but in an adjacent MLRA where the marine terrace surfaces are younger, less dissected, and more prone to tidal impacts.
R153BY110NC	**Coastal Strand, Beaches, and Dunes** Coastal strand landforms and relict shoreline features are often mapped as moist sands.

Table 1. Dominant plant species

Tree	(1) *Pinus palustris* (2) *Quercus marilandica*
Shrub	(1) *Gaylussacia dumosa* (2) *Cornus florida*

Herbaceous	(1) *Aristida stricta* (2) *Schizachyrium scoparium*

Physiographic features

This site is characterized by sandy Entisol soils in local depressions on coastal plain rises and flats. The moist sands site is found in local depressions within the 4 landforms listed below, or is at a location where the sands are mixed with finer-textured particles. Across this broad flat landscape, this site can be found in a few landscape positions. Most of this site can typically be found in four unique positions: 1) Carolina bay rims, 2) eolian deposits associated with broad river flood plain systems, 3) natural levees adjacent to stream channels, and 4) relict sandy shoreline features.

Table 2 summarizes physiography of the modal soil concepts. Table 3 summarizes physiography of all soils included in this description.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Marine terrace (2) Stream terrace (3) Ridge (4) Flat
Runoff class	Very low
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to rare
Ponding frequency	None
Elevation	8–90 m
Slope	0–4%
Water table depth	61–107 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Very low
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	8–90 m
Slope	0–5%
Water table depth	30–152 cm

Climatic features

The climate across MLRA 153A is generally warm, temperate, and humid with some maritime influences near the coast. The maximum precipitation occurs during summer. Rainfall is usually of moderate intensity. Occasionally, extreme weather events (e.g., northeasters, tropical storms, and hurricanes) produce large amounts of precipitation and destructive winds. On rare occasions snowfall occurs in the northern third of the area. The average annual temperature is 59 to 70 degrees F (15 to 21 degrees C), increasing to the south. (USDA-NRCS, 2022)

Table 4. Representative climatic features

Frost-free period (characteristic range)	222-237 days
Freeze-free period (characteristic range)	257-306 days
Precipitation total (characteristic range)	1,245-1,321 mm
Frost-free period (actual range)	211-241 days
Freeze-free period (actual range)	250-350 days
Precipitation total (actual range)	1,168-1,346 mm
Frost-free period (average)	229 days
Freeze-free period (average)	286 days
Precipitation total (average)	1,270 mm

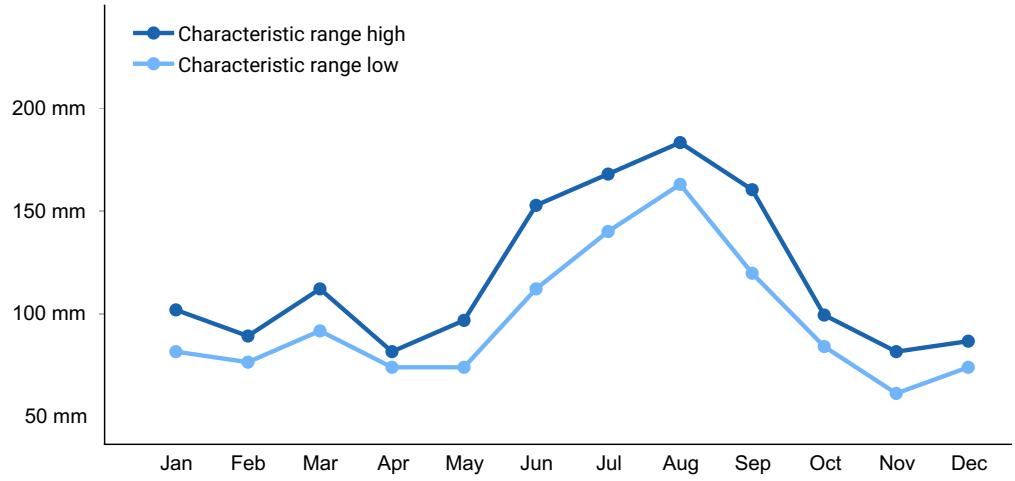


Figure 1. Monthly precipitation range

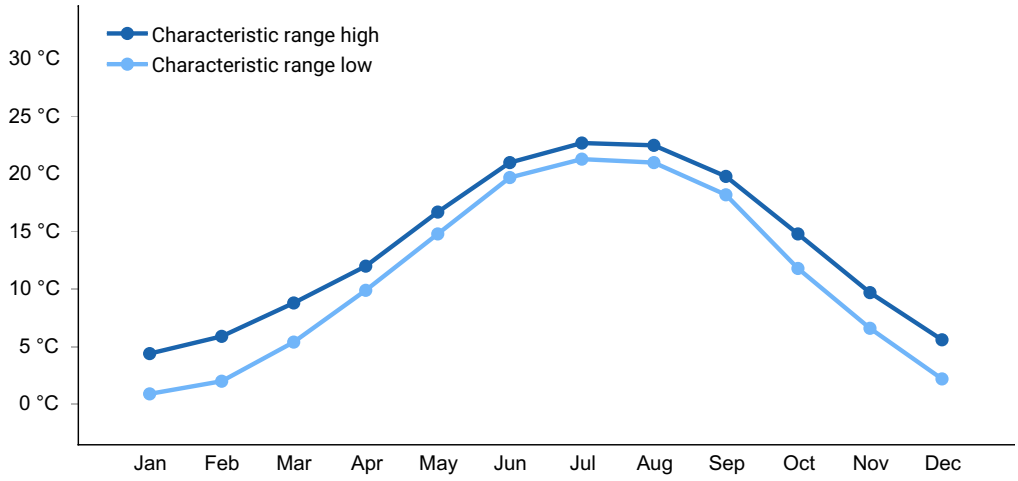


Figure 2. Monthly minimum temperature range

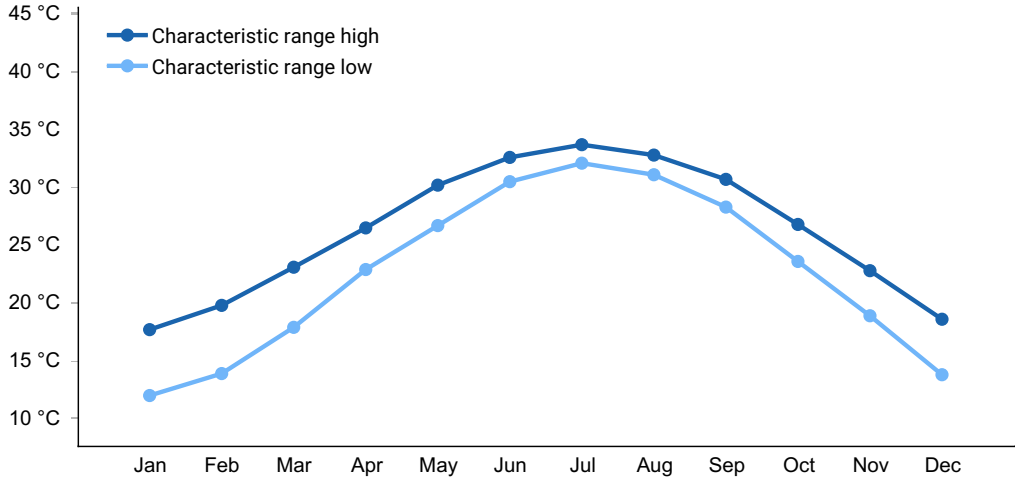


Figure 3. Monthly maximum temperature range

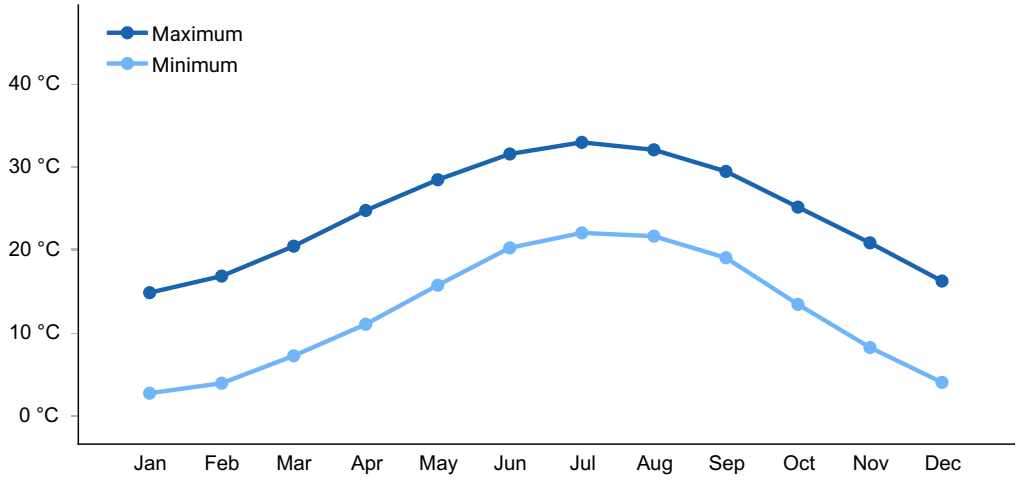


Figure 4. Monthly average minimum and maximum temperature

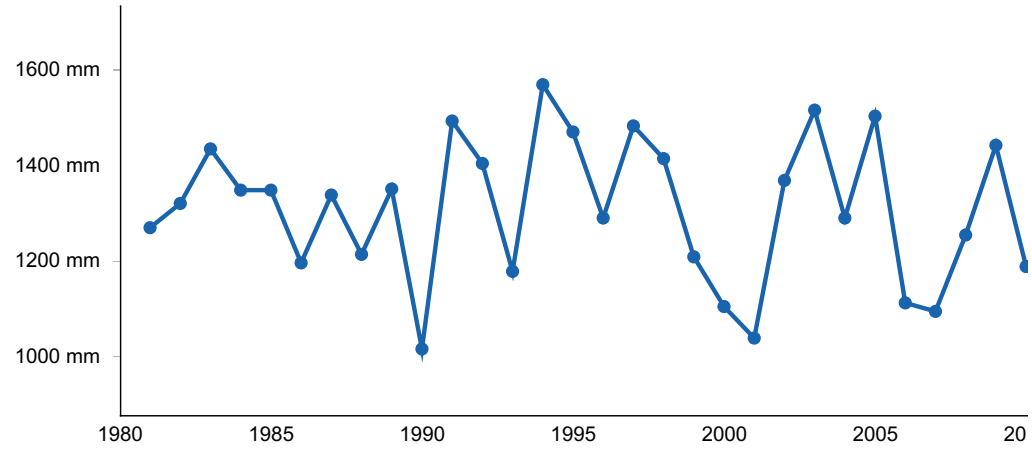


Figure 5. Annual precipitation pattern

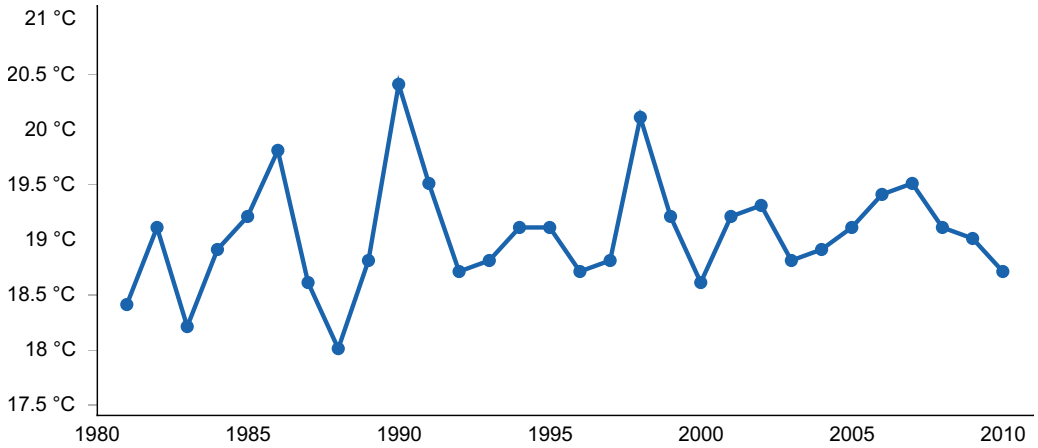


Figure 6. Annual average temperature pattern

Climate stations used

- (1) NEWPORT NEWS INTL AP [USW00093741], Newport News, VA
- (2) NEW BERN CRAVEN CO AP [USW00093719], New Bern, NC
- (3) CHARLESTON INTL AP [USW00013880], Charleston AFB, SC
- (4) FT STEWART [USC00093538], Fort Stewart, GA
- (5) JACKSONVILLE CECIL FLD NAS [USW00093832], Jacksonville, FL

Influencing water features

This site is variable, but most of this site can typically be found in four unique positions: 1) Carolina bay rims, 2) eolian deposits associated with broad river flood plain systems, 3) natural levees adjacent to stream channels, and 4) relict sandy shoreline features, three of which are heavily influenced by water features during development. Today, this site is mostly water shedding.

Wetland description

This site is not a wetland.

Soil features

The soils of this site are all primarily sandy, and most are Entisols. They are very deep and extremely acidic to slightly acidic. This site represents those sandy Entisol locations where soils are relatively moist. The soils on this site primarily range from moderately well drained to somewhat poorly drained.

Soil series on this site include: Chipley, Foxworth (moderately well drained), Klej, Ortega, Ousley, Pactolus, Ridgewood, and Seabrook.

Chipley is modal.

Table 5. Representative soil features

Parent material	(1) Marine deposits (2) Fluviomarine deposits (3) Eolian sands
Surface texture	(1) Fine sand (2) Sand (3) Loamy sand
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Rapid
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	3.3–8.38 cm
Soil reaction (1:1 water) (0-25.4cm)	3.6–6.5
Subsurface fragment volume <=3" (0-101.6cm)	0%
Subsurface fragment volume >3" (0-101.6cm)	0%

Table 6. Representative soil features (actual values)

Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Moderately rapid to rapid
Soil depth	203 cm
Surface fragment cover <=3"	0%

Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	2.29–9.91 cm
Soil reaction (1:1 water) (0-25.4cm)	3.5–6.5
Subsurface fragment volume <=3" (0-101.6cm)	0–6%
Subsurface fragment volume >3" (0-101.6cm)	0%

Ecological dynamics

The most dominant ecological driver on this site is fire; frequency, intensity, and seasonality in all of it's combinations. The variation in vegetation communities that occur on this site are mostly the consequences of fire history. For example, longleaf pines are well adapted to periodic low intensity surface fires on short return intervals. In this ESD, longleaf pine and scrub oak is the reference community, because it represents the dominant precolonial forest community. It is probable that longleaf pine and oak sandhills were a cultural state maintained by indigenous civilizations but, in most locations today, they no longer dominate the landscape. Historically, the use of fire by indigenous civilizations may have been extensive. Some limited wildfire and prescribed fire occur today, but fire suppression has been the norm since the 20th century.

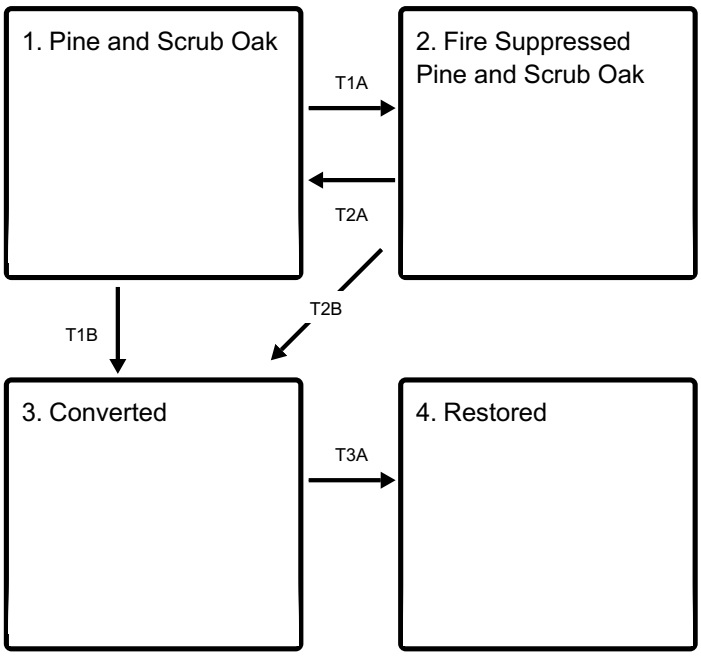
In comparison to the Dry Sands site (R153AY010NC), the soils on this site have a higher content of finer particle sizes, hold more available water, and support a higher diversity of plants. This site is transitional between the Dry Sands and more moist upland sites on well drained finer textured Ultisols (F153AY030NC and F153AY035NC).

Due to the infertile nature of the soils, many locations of this site remain in forested conditions today.

(FNAI, 2010; Peat and Allard, 1993; Schafale and Weakley, 1990)

State and transition model

Ecosystem states



T1A - Lack of fire

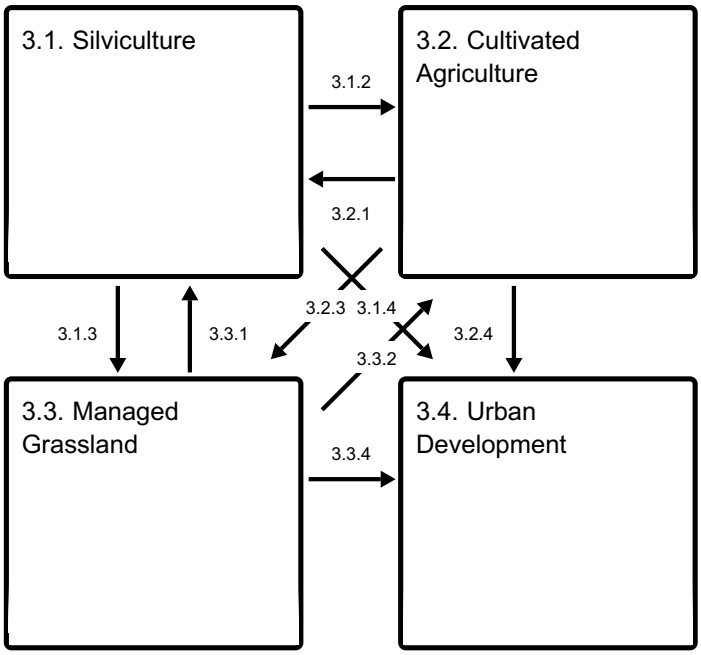
T1B - Land use conversion

T2A - Reintroduction of fire

T2B - Land use conversion

T3A - Restoration

State 3 submodel, plant communities



3.1.2 - Establishment of cultivated agriculture

3.1.3 - Establishment of managed grassland

3.1.4 - Urban development

3.2.1 - Establishment of trees for silviculture

3.2.3 - Establishment of managed grassland

3.2.4 - Urban development

3.3.1 - Establishment of trees for silviculture

3.3.2 - Establishment of cultivated agriculture

3.3.4 - Urban development

State 1
Pine and Scrub Oak

These woodlands are characterized by an open canopy of longleaf pine above a sparse midstory and understory of scrub oaks and a moderate to dense groundcover of a diversity of grasses and other herbaceous plants. (FNAI, 2010; Peat and Allard, 1993; Schafale and Weakley, 1990)

Resilience management. This community is maintained by fires on a return interval of 1 to 3 years. Fires at this return interval maintain both vegetation and fuels so that the overall vegetation community is well adapted to the resulting fire intensity. Longleaf pine is well adapted to frequent low intensity surface fires. These fires allow a few hardwoods to become large trees, but maintain most of the hardwoods in a shrub lifeform as sprouts are killed back by each fire. These fires stimulate both productivity and diversity of the grasses and herbs.

Dominant plant species

- longleaf pine (*Pinus palustris*), tree
- blackjack oak (*Quercus marilandica*), tree
- bluejack oak (*Quercus incana*), tree
- sand post oak (*Quercus margaretta*), tree
- flowering dogwood (*Cornus florida*), tree
- sassafras (*Sassafras albidum*), tree
- common persimmon (*Diospyros virginiana*), tree
- dwarf huckleberry (*Gaylussacia dumosa*), shrub
- pineland threeawn (*Aristida stricta*), grass
- Beyrich threeawn (*Aristida beyrichiana*), grass
- little bluestem (*Schizachyrium scoparium*), grass

State 2
Fire Suppressed Pine and Scrub Oak

These woodlands are characterized by a dense and closed canopy of scrub oaks and other hardwoods, with or without an open emergent canopy of longleaf pine above. The shade cast by the oaks and other hardwoods decreases shrub, grass, and herbaceous diversity and cover. (FNAI, 2010; Peat and Allard, 1993; Schafale and Weakley, 1990)

Resilience management. This community develops as fire return intervals exceed 3 years on a consistent basis for a long period of time. The size and cover of oaks and other

hardwoods increase as time since fire increases. The shade cast by the broadleaf trees decreases shrub, grass, and herbaceous diversity and cover.

Dominant plant species

- blackjack oak (*Quercus marilandica*), tree
- bluejack oak (*Quercus incana*), tree
- sand post oak (*Quercus margaretta*), tree
- longleaf pine (*Pinus palustris*), tree
- flowering dogwood (*Cornus florida*), tree
- sassafras (*Sassafras albidum*), tree
- common persimmon (*Diospyros virginiana*), tree
- dwarf huckleberry (*Gaylussacia dumosa*), shrub
- pineland threeawn (*Aristida stricta*), grass
- Beyrich threeawn (*Aristida beyrichiana*), grass
- little bluestem (*Schizachyrium scoparium*), grass

State 3
Converted

Community 3.1
Silviculture

Native forests are typically converted to silvicultural systems in order to facilitate timber production. The application of artificial regeneration is common. The timber industry in the Southeast has artificially expanded the ecological footprint of loblolly pine in particular.

Dominant plant species

- loblolly pine (*Pinus taeda*), tree

Community 3.2
Cultivated Agriculture

Relatively infertile soils renders cultivated agriculture a difficult proposition on this site, but some crops are relatively well suited, especially with irrigation. Some areas are cultivated for peanuts, watermelons, and other truck crops.

Community 3.3
Managed Grassland

Lands converted in order to support pasture and/or hayland management.

Community 3.4
Urban Development

Lands developed to urban land use conditions.

Pathway 3.1.2
Community 3.1 to 3.2

Establishment of cultivated agriculture

Pathway 3.1.3
Community 3.1 to 3.3

Establishment of managed grassland

Pathway 3.1.4
Community 3.1 to 3.4

Urban development

Pathway 3.2.1
Community 3.2 to 3.1

Establishment of trees for silviculture

Pathway 3.2.3
Community 3.2 to 3.3

Establishment of managed grassland

Pathway 3.2.4
Community 3.2 to 3.4

Urban development

Pathway 3.3.1
Community 3.3 to 3.1

Establishment of trees for silviculture

Pathway 3.3.2
Community 3.3 to 3.2

Establishment of cultivated agriculture

Pathway 3.3.4

Community 3.3 to 3.4

Urban development

State 4
Restored

Restoration efforts might include revegetation and reintroduction of periodic fire. There is increased interest in restoration of longleaf pine and it's associated vegetation communities including the application of prescribed and controlled fire. However, it is unclear whether or not the full historical range of fire behavior and fire seasonality can be restored on the modern landscape, and the limited scope of modern fire application may impact full restoration to historical conditions.

Transition T1A
State 1 to 2

Lack of fire, or a fire return interval that exceeds 3 years on a consistent basis for a long period of time.

Transition T1B
State 1 to 3

Land use conversion

Transition T2A
State 2 to 1

Reintroduction of fire on a 1 to 3 year return interval.

Transition T2B
State 2 to 3

Land use conversion

Transition T3A
State 3 to 4

Restoration of vegetation community and application of managed fire.

Additional community tables

Inventory data references

Data collection and analysis of field data will be performed during the Verification Stage of

ESD development.

Other references

Ash, A., E. McDonald, E. Kane, and C. Pories. 1983. Natural and modified pocosins: Literature synthesis and management options. U.S. Fish and Wildlife Services, Dept. Biol., Tech. Rep. FWS/OBS-83/04. U.S. Fish and Wildlife Services, Washington, D.C.

Caldwell, P., M. Vepraskas, J.D. Gregory, R.W. Skaggs, and R.L. Huffman. 2011. Linking Plant Ecology and Long-Term Hydrology to Improve Wetland Restoration Success. Transactions of the ASABE. 54: 2129-2137. DOI: 10.13031/2013.40662

Cleland, D.T., J.A. Freeouf, J.E. Keys, G.J. Nowacki, C.A. Carpenter, W.H. McNab. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. General Technical Report WO-76D. U.S. Department of Agriculture, Forest Service. Washington, D.C.

Dimick, B. P., J. Stucky, W. Wall, M. Vepraskas, T. Wentworth, and C. Arellana. 2010. Plant-soil- hydrology relationships in three Carolina bays in Bladen County, North Carolina, USA. Castanaea 75(4): 407-420

Fenneman, N.M., and D.W. Johnson. 1946. Physical divisions of the United States. U.S. Geological Survey, Physiographic Committee. Scale 1:700,000.

Florida Chapter, Soil and Water Conservation Society. 1989. 26 Ecological Communities of Florida. 147 pp.

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

McNab, W.H.; D.T. Cleland, J.A Freeouf, J.E. Keys Jr., G.J. Nowacki, C.A. Carpenter, comps. 2007. Description of ecological subregions: sections of the conterminous United States [CD-ROM]. Gen. Tech. Report WO-76B. Washington, DC: U.S. Department of Agriculture, Forest Service. 80 pp.

Moritz, C. 2021. Evaluating mitigation sites in Carolina bay wetlands that were previously converted to agriculture. Institutional Repository at North Carolina State University, North Carolina State University, Raleigh, NC, 1–323.

Moritz C., M. Vepraskas, and M. Ricker. 2022. Hydrology and Vegetation Relationships in a Carolina Bay Wetland 15 Years after Restoration. Wetlands. 42. DOI: 10.1007/s13157-022-01530-0.

Nelson, J.B. 1986. The Natural Communities of South Carolina Initial Classification and Description, South Carolina Wildlife and Marine Resources Department, Division of

Wildlife and Freshwater Fisheries.

Peet, R.K., and D.J. Allard. 1993. Longleaf Pine Vegetation of the Southern Atlantic and Eastern Gulf Coast Regions: A Preliminary Classification. In Proceedings of the Tall Timbers Fire Ecology Conference, No. 18, The Longleaf Pine Ecosystem: ecology, restoration and management, edited by Sharon M. Hermann, Tall Timbers Research Station, Tallahassee, FL, 1993.

Ross, T.E. 2003. Pocosins and Carolina Bays Compared, The North Carolina Geographer, Volume 11: 22-32

Schafale, M.P., and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina Third Approximation. North Carolina Natural Heritage Program. 321 pp.

Sharitz R.R., and J.W. Gibbons. 1982. The ecology of southeastern shrub bogs (pocosins) and Carolina bays: a community profile. U.S. Fish and Wildlife Service, Division of Biological Services, Washington, D.C. FWS/OBS-82/04. 93 pp.

Soil Survey Staff. 2023. Web Soil Survey. USDA Natural Resources Conservation Service. http://websoilsurvey.sc.egov.usda.gov/ (accessed 16 February 2023).

U.S. Department of Agriculture, Natural Resources Conservation Service. 2017. Geomorphic Description System, Version 5.0. Schoeneberger, P.J., and D.A. (eds). USDA-NRCS, National Soil Survey Center, Lincoln, NE.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. Agriculture Handbook 296.

U.S. Environmental Protection Agency. 2013. Level III and IV ecoregions of the continental United States: Corvallis, Oregon, U.S. EPA, National Health and Environmental Effects Research Laboratory, map scale 1:3,000,000, https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states.

Contributors

Matthew D. Duvall

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	08/10/2025
Approved by	Charles Stemmans
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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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:

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17. **Perennial plant reproductive capability:**
