USDA Natural Resources
Conservation Service

Ecological site PX137X00X010
Flood Plains And Seepage Swamps

Accessed: 05/11/2025

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): 137X–Carolina and Georgia Sand Hills

MLRA 137 covers approximately 8,665 square miles (22,450 square kilometers) in the states of South Carolina (44 percent), Georgia (34 percent), and North Carolina (21 percent).

The Sand Hills region occurs below the "fall line", which delineates the older crystalline rocks of the Southern Piedmont (MLRA 136) from the younger sediments of the Southern Coastal Plain (MLRA 133A). The term "fall line" came about because the rivers of the Piedmont cut downward through hard bedrock to meet the lower Coastal Plain sediments. The elevational change is evident in the waterfalls and rapids that occur along this transitional line.

This region is composed of mainly of unconsolidated sediments deposited during the Cretaceous period. Overlying these sediments is the late Miocene to early Pliocene Pinehurst Formation. The Pinehurst Formation is of windblown or eolian origin. Soils in this formation are the subject of this ecological site. Deposits of kaolin and high-silica sands are found across the area and are often mined.

Classification relationships

ATTENTION: This ecological site meets the requirements for PROVISIONAL. A provisional ecological site is established after ecological site concepts are developed and an initial state-and-transition model is drafted. A provisional ecological site typically will include literature reviews, land use history information, legacy data, and must include some soils data, ocular estimates for canopy and/or species composition by weight, and some line-point intercept information. A provisional ecological site provides the conceptual framework of soil-site correlation for the development of the ESD. For more information about this ecological site, please contact your local NRCS office.

Ecological site concept

The Flood plains and seepage swamps ecological site is rare in MLRA 137 and focuses on a reference plant community with an Atlantic white cedar-dominated overstory (*Chamaecyparis thyoides*). Although most Atlantic white cedar communities are associated with streamheads and seepage swamps, riverine communities do exist along some flood plains.
This ecological site is characterized by soils that are wet throughout the year. Typically these have a muck or peat surface over sandy material and are represented by the following components: Bibb, Johnston, Kinston, Osier, Pelham, and Pickney. Correlated map units are rarely or frequently flooded but do not have a ponding frequency. Vegetation dynamics are poorly understood, but infrequent fires are thought to be necessary for reference community maintenance. Atlantic white cedar is neither shade nor fire tolerant. The species colonizes rapidly and may regenerate from seed residue after fire. Therefore, Atlantic white cedar stands are often even-aged. Prolonged fire exclusion encourages hardwood or bay species establishment
Proposed field investigations are designed to test the association of our initial Flood plains and seepage swamps ES with soil series and specific soil properties.

Table 1. Dominant plant species

Tree	(1) *Chamaecyparis thyoides* (2) *Pinus serotina*
Shrub	Not specified
Herbaceous	Not specified

Legacy ID

F137XY010SC

Physiographic features

The area is one of transition between the Southern Piedmont and Southern Coastal Plain. The majority of the area is located in the Sea Island Section of the Coastal Plain Province of the Atlantic Plain. The western part of the area in Georgia is located in the East Gulf Coastal Plain Section of the same province and division. Portions of the northern half of the MLRA are in the Piedmont Upland Section of the Piedmont Province of the Appalachian Highlands. The area is highly dissected and hilly, with elevations ranging from 165 to 660 feet. Local relief is typically 10 to 20 feet, but can range up to 165 feet.

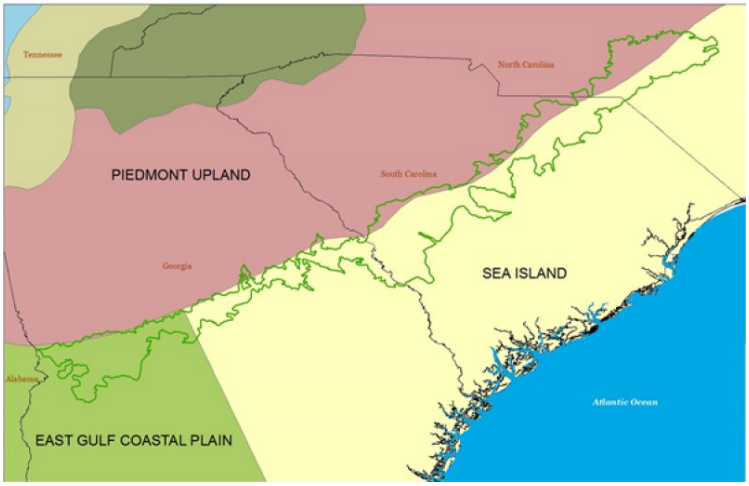


Figure 1. Physiographic sections of MLRA 137

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Drainageway
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to frequent
Ponding frequency	None
Elevation	120–660 ft
Slope	0–2%
Water table depth	6–9 in
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation in this area ranges from 41 to 53 inches (1,041 to 1,346 millimeters). Maxiumum precipitation occurs in midsummer, and the minimum occurs in autumn. High-intensity, convective thunderstorms account for summer rainfall. If snow occurs at all, it is in small amounts.

The average annual temperature ranges from 59 to 65 degrees F (15 to 18 degrees C).

Climate data is based on Normal PRISM data for the period 1981-2010.

Table 3. Representative climatic features

Frost-free period (average)	204 days
Freeze-free period (average)	232 days
Precipitation total (average)	50 in

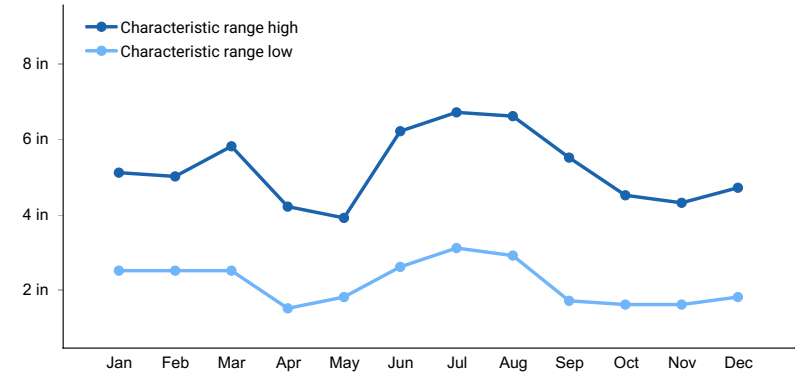


Figure 2. Monthly precipitation range

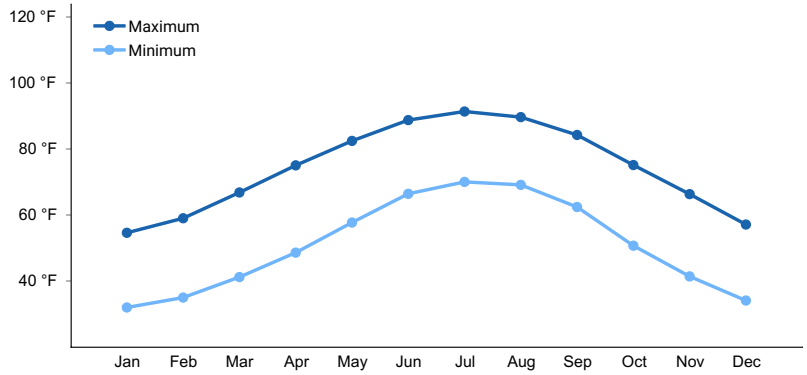


Figure 3. Monthly average minimum and maximum temperature

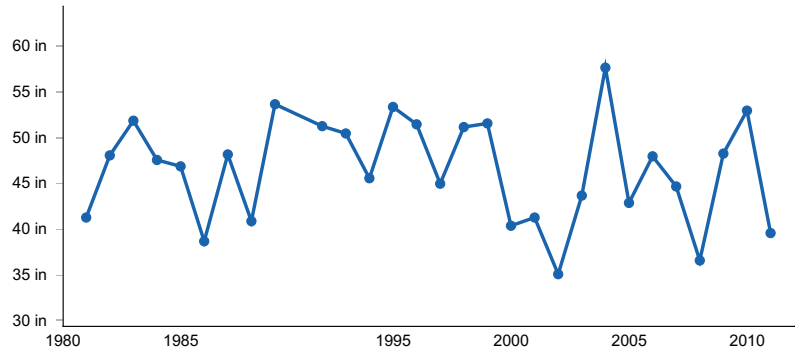


Figure 4. Annual precipitation pattern

Climate stations used

- (1) AIKEN 5SE [USC00380074], Aiken, SC
- (2) CAMDEN 3 W [USC00381310], Camden, SC
- (3) CHERAW [USC00381588], Cheraw, SC
- (4) SANDHILL RSCH ELGIN [USC00387666], Elgin, SC
- (5) BYRON EXP STN [USC00091448], Byron, GA

- (6) MACON MIDDLE GA RGNL AP [USW00003813], Macon, GA
- (7) AUGUSTA BUSH FLD AP [USW00003820], Augusta, GA
- (8) POPE AFB [USW00013714], Fort Bragg, NC
- (9) COLUMBIA [USW00013883], West Columbia, SC
- (10) JOHNSTON 4 SW [USC00384607], Johnston, SC
- (11) PELION 4 NW [USC00386775], Pelion, SC
- (12) HAMLET [USC00313784], Hamlet, NC
- (13) JACKSON SPRINGS 5 WNW [USC00314464], Jackson Springs, NC

Influencing water features

This ecological site occurs on flood plains and in drainageways in the Carolina and Georgia Sand Hills.

Soil features

This ecological site is characterized by soils that are wet throughout the year. Typically these have a muck or peat surface over sandy material and are represented by the following components: Bibb, Johnston, Kinston, Osier, Pelham, and Pickney. These soil series are members of the soil orders Entisols, Inceptisols, or Ultisols (Pelham series). They exhibit a seasonal high water table between 0 and 12 inches for some part of the year in most years and are all hydric soils. All correlated series are members of an aquic taxonomic great group. Correlated map units can be rarely or frequently flooded but do not have a ponding frequency.

Figure 6. Profile of the Pelham soil series.

Table 4. Representative soil features

Surface texture	(1) Mucky loam (2) Loamy sand (3) Fine sandy loam
Drainage class	Poorly drained to very poorly drained
Permeability class	Rapid to moderate
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3–12 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm

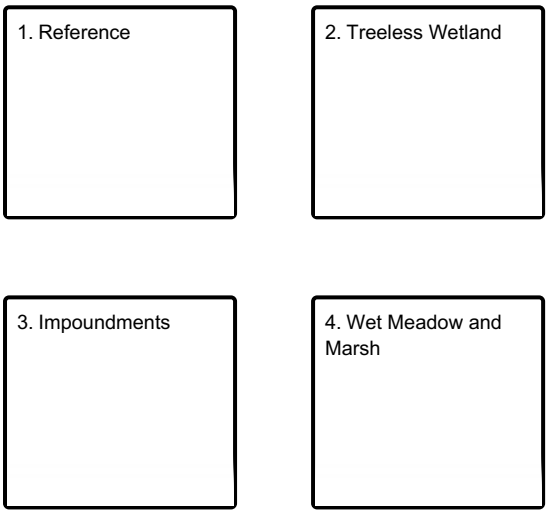
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	3.6–6
Subsurface fragment volume <=3" (Depth not specified)	0–13%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

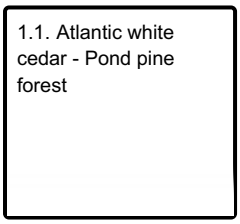
The Flood plains and seepage swamps site includes woody wetland vegetation occurring on seepage streamheads and along small streams. The native vegetation occurs as forests and woodlands with an evergreen shrub stratum and canopy dominated by Pond Pine (*Pinus serotina*), Atlantic White Cedar (*Chamaecyparis thyoides*), and/or hardwoods such as Sweet Bay (*Magnolia virginiana*), Swamp Black Gum (*Nyssa biflora*), and Tuliptree (*Liriodendron tulipifera*). The ecological dynamics of the site is influenced by the amount and duration of saturation or flooding and the frequency and intensity of wildland fire. Damming by beavers or by humans can lead to the establishment of linear ponds called Coastal Plain Semipermanent Impoundments. These ponds support aquatic vegetation, but when dams fail, the site is available for ruderal wetland graminoid plants. This successional vegetation is called Wet Meadow & Marsh in the state transition diagram. The Wet Meadow & Marsh can succeed to the reference state, as the vegetation continues to recover.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
Reference

The reference state includes forests and woodlands with an evergreen shrub stratum and canopy dominated by Pond Pine (*Pinus serotina*), Atlantic White Cedar (*Chamaecyparis thyoides*), and/or hardwoods such as Sweet Bay (*Magnolia virginiana*), Swamp Black Gum (*Nyssa biflora*), and Tuliptree (*Liriodendron tulipifera*). The ecological dynamics of the state are influenced by the amount and duration of saturation or flooding and the frequency and intensity of wildland fire. These areas are generally upstream from well developed floodplains, and are more influenced by seepage fed saturation, than by flooding for stream channel overflow. These seepage habitats

support many evergreen shrubs which can burn in medium to high intensity wildland fires. The leaves of these shrubs contain volatile oils which provide substantial fuel to fires which may approach this riparian habitat from adjacent uplands at medium intensity. The varied frequency and intensity of wildland fire contributes to a mosaic of different vegetation with in this ecological site.

Community 1.1
Atlantic white cedar - Pond pine forest

Forest overstory. Atlantic white cedar
Red maple
Tulip poplar
Pond pine

State 2
Treeless Wetland

State 2 occurs when frequent burns cause the site to become dominated by herbaceous plants, mostly wetland graminoids or Switch Cane (*Arundinaria gigantea* ssp. tecta). These treeless seepage wetlands are also found in patches slightly upslope from the Sandhill Streamhead Pocosin and Swamp, and are included as a separate ecological site description document. However, since there is a relationship between the Streamhead Canebrake and Sandhill Seep and the Sandhill Streamhead Pocosin and Swamp, it is included as a state in this state transition model. Streamhead Canebrake and Sandhill Seep which is not subject to wildland fire for a long period of time with succeed to Sandhill Streamhead Pocosin and Swamp. These are sensitive habitats, the disturbance caused by ORV use or hog rooting will lead to a transition to ruderal Wet Meadow and Marsh.

State 3
Impoundments

Coastal Plain Semi-permanent Impoundment represents areas along creeks or small rivers which may be dammed by beavers or by mill dams. Beavers were one of the first animals to be commercially exploited for the European market. After the beavers were depleted, they had a greatly reduced role in creating and maintaining impoundment ponds. As settlers came into areas, creeks and small rivers were dammed for milling. Today many of the mill ponds no longer exist, but beaver have been making a comeback in recent decades. Both mill ponds and beaver ponds can provide the same type of semi-permanently flooded habitat for aquatic vegetation. With dam failure the Coastal Plain Semi-permanent Impoundment transitions to Wet Meadow or Marsh.

State 4
Wet Meadow and Marsh

Wet Meadow & Marsh habitats are herbaceous wetlands which have been disturbed in some way. When dam failure causes an impounded area to no longer be flooded, then the site becomes available to plants which are quick to colonize the previously impounded area. Generally these are wetland graminoid plants which are typical of ruderal conditions, such as *Andropogon glomeratus* var. pumilus, *Juncus effusus*, or *Scirpus cyperinus*. The invasive exotic shrub, *Ligustrum sinense* can also become dominant on these newly available sites. When Blackwater Bottomland Hardwoods or Cypress- Gum Swamps are clearcut, these same opportunistic wetland graminoids or exotic shrubs can come to dominate the newly opened and disturbed site. These sites can (in turn) recover to ruderal forests, or can become dominated by the exotic Tallow tree, *Triadica sebifera*.

Additional community tables

Other references

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Contributors

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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	
Approved by	
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):**

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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):**

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:**