14300

Southern Coastal Plain Blackland Prairie and Woodland

BpS Model/Description Version: Aug. 2020

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|  |  |  |  |
| --- | --- | --- | --- |
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Vegetation Type

Herbaceous

Map Zones

46

Model Splits or Lumps

This biophysical setting (BpS) is lumped with: 1433

Geographic Range

Black Belt or Blackland Prairie occurs mainly in the gulf coastal plain of Tennessee, Mississippi, and Alabama in a broad arc approximately 450km long by 40-50km wide (Subsection 231Ba of Keys et al. 1995; Ecoregion 65a of Griffith et al. 2001). The system also includes the Jackson Prairie region of Mississippi; the Chunnenugee Hills, Red Hills and Lime Hills of Alabama in Washington, Wilcox, Monroe and Clark counties; and prairie remnants in the Fort Valley Plateau of Bleckley and Houston counties, Georgia (FRCC model, NatureServe 2005).

The Jackson Prairie system is found in a relatively small natural region of Mississippi (Jackson Hills Subsection 231Bj (Keys et al. 1995); Jackson Prairie Ecoregion 65r (EPA 2004)).

Biophysical Site Description

Blackland prairie and woodland occurs on eponymous rich, black, circumneutral topsoils formed over clayey, heavy, usually calcareous subsoils with carbonatic or montmorillonitic mineralogy. The system occurs in association with formations of the Tertiary Jackson (Yazoo Clay), Claiborne (Cook Mountain) and Fleming groups; and the Cretaceous Selma group (Selma, Mooreville or Demopolis chalks). The matrix around the blackland prairies is pine-oak forests growing in acidic, sandier soils with less clay (recent STATSGO soils maps).

Floristic similarity among sites across this geographic range generally appears to be 50% or greater, although a number of different alliances within this type have been recognized according to dominant, co-dominant, and diagnostic species. Extant prairies occur in single patches as well as mosaics less than one acre to over several hundred acres in response to soil depth, slope and fire. Mosaics may include virtually treeless patches associated with other patches of widely scattered trees, open deciduous woodlands and evergreen thickets (red cedar "balds").

This BpS represents a mosaic of eastern red-cedar (*Juniperus virginiana*) woodland, post oak (*Quercus stellata*) – blackjack oak (*Quercus marilandica*) woodland, and little bluestem (*Schizachyrium scoparium*) – yellow Indian grass (*Sorghastrum nutans*) herbaceous alliances, as classified by NatureServe (2006). It is a rare and imperiled vegetation type consisting of scattered remnants. Most of the original cover has been destroyed or altered by conversion to agriculture and the exclusion of fire.

Vegetation Description

Blackland prairie and woodland is a mosaic of southeastern dry-mesic tallgrass vegetation, deciduous Quercus-dominated woodlands and red-cedar (*Juniperus virginiana*) thickets or "balds." The presence of *Juniperus virginiana*-dominated zones may represent invasion by this species in the absence of sufficiently frequent or intense fire (DeSelm and Murdock 1993). Pines are generally absent, being inhibited by the higher surface soil pH (NatureServe 2006).

The oak woodlands include post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), and chinquapin oak (*Q. muhlenbergii*). Other woody components include, black oak (*Q. velutina*), southern red oak (*Q. falcata*), Durand oak (*Q. sinuata* var. *sinuata*), American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*), white ash (*F. americana*), smooth sumac (*Rhus glabra*), winged sumac (*Rhus copallina*), mockernut hickory (*Carya alba*), sweet pignut hickory (*C. glabra*), sugarberry (*Celtis laevigata*), eastern redbud (*Cercis canadensis* var. *canadensis*), Engelmann's hawthorn (*Crataegus engelmannii*), common persimmon (*Diospyros virginiana*), possumhaw (*Ilex deciduas*), chickasaw plum (*Prunus angustifolia*), Gray Carolina buckthorn (*Frangula caroliniana*), buckthorn bully (*Sideroxylon lycioides*), and winged elm (*Ulmus alata*) (NatureServe 2006).

The prairies are united by the relative abundance of little bluestem (*Schizachyrium scoparium*) and yellow Indian grass (*Sorghastrum nutans*), with other herbs including big bluestem (*Andropogon gerardii*), eastern gamma grass (*Tripsacum dactyloides*), composite dropseed (*Sporobolus compositus*), sideoats grama (*Bouteloua curtipendula*), white prairie clover (*Dalea candida*), purple prairie clover (*Dalea purpurea*), pale purple coneflower (*Echinacea pallida*), blazing-star (*Liatris* spp.), and rosin-weed (*Silphium*).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| SCSC | *Schizachyrium scoparium* | Little bluestem |
| SONU2 | *Sorghastrum nutans* | Indiangrass |
| JUVI | *Juniperus virginiana* | Eastern redcedar |
| QUST | *Quercus stellata* | Post oak |
| ANGE | *Andropogon gerardii* | Big bluestem |
| QUMA3 | *Quercus marilandica* | Blackjack oak |
| TRDA3 | *Tripsacum dactyloides* | Eastern gamagrass |
| SPCO16 | *Sporobolus compositus* | Composite dropseed |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

For the last 500-1,000yrs, fires were probably annual in most of the system, many if not most set by aboriginals. Fires were probably used to clear prairies for agricultural planting, to eliminate woody growth, and to aid in hunting. The modern landscape shows a tendency toward erosion, creating shallow-soil areas known as "cedar balds" where soil erosion, presumably from historic agriculture or over-grazing, has reduced topsoil. These areas often show exposures of underlying chalk. Such areas may have resulted (albeit at much lower frequencies) from aboriginal agriculture or overgrazing by native herbivores.

Much of the natural vegetation of the region has been converted to pasture and agricultural uses, but even old-field vegetation reflects the distinctive composition of the flora and ecological dynamics. In most cases individual prairie openings are small and isolated from one another, but were formerly more extensive prior to European settlement, forming a mosaic of grasslands and woodlands under frequent fire regimes (NatureServe 2006).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 50 | 5 |  |  |
| Moderate (Mixed) | 3 | 92 |  |  |
| Low (Surface) | 95 | 3 |  |  |
| All Fires | 3 | 100 |  |  |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Disturbance occurred at a scale often larger than the size of patches, although a significant portion probably originated in the present system. These prairie-woodland mosaics occurred in a pyric matrix, so fire probably swept in frequently from outside. Patches on the order of 40-50 square miles may have burned following a well-planned ignition, assuming nocturnal humidity recovery completely extinguished the fire. Smaller patches would have burned within natural barriers, different ignition parameters, and less extreme weather.

Of the approximately 100,000ac of Blackland Prairies mapped during the general land surveys of the early- and mid-1800s in Mississippi, probably <500ac of prairie vegetation exists today, even if one considers grazed areas and vacant agricultural lands with a semblance of prairie species (R. Wieland pers. comm.). Almost all of the lands were converted to agriculture. Some of the lands are now reverting back to prairie after being abandoned. More recently, lands are being converted to fescue pasture; other abandoned lands have become cedar glades. The number of acres in good condition is probably <100 (NatureServe 2006).

Adjacency or Identification Concerns

Vegetation differences from mosaic pine-oak forests are dramatic, and can be discerned at a glance by the trained eye even in heavily disturbed sites by looking for key dominant woody plant species. Soils maps show higher clay content and lower sand percentages than for surrounding areas (recent STATSCO soils maps).

Issues or Problems

This model is inclusive, with related systems such as Jackson Prairie and Georgia outliers added to the typical Black Belt type. This makes description of the system less definitive and possibly confusing. The characterization of the type as a woodland - prairie mosaic rather than a simple prairie (as was done in the original PNVG) is truer to what probably occurred pre-historically, but makes the system more difficult to model and describe.

Native Uncharacteristic Conditions

Comments

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | E | E | E | E | E | E | E | E | E | E |
| Shrub | 0.5-1.0 | E | E | E | E | E | E | E | E | E | E |
| Shrub | 1.0-3.0 | E | E | E | E | E | E | E | E | E | E |
| Shrub | >3.0 | E | E | E | E | E | E | E | E | E | E |
| Tree | 0-5 | A | A | B | B | B | B | C | C | C | C |
| Tree | 5-10 | A | A | B | B | B | B | C | C | C | C |
| Tree | 10-25 | E | E | E | D | D | D | D | D | D | D |
| Tree | 25-50 | E | E | E | D | D | D | D | D | D | D |
| Tree | >50 | E | E | E | D | D | D | D | D | D | D |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

**Description**

Class A 60 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |
| SONU2 | Sorghastrum nutans | Indiangrass | Lower |
| ANGE | Andropogon gerardii | Big bluestem | Lower |
| TRDA3 | Tripsacum dactyloides | Eastern gamagrass | Lower |

Description

Large patches of prairie grasslands are the dominant ecotype. Mosaics of prairie, thicket and woodland are dominated by prairies in uplands, in a complex, dendritic landscape, with heterogeneous age classes in woodlands and interconnected grassland patches. Red-cedar at the edges of bald thickets are scorched or killed by fire. With no fire this class disappears.

*Maximum Tree Size Class*  
None

Class B 19 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |
| JUVI | Juniperus virginiana | Eastern redcedar | Middle |
| QUST | Quercus stellata | Post oak | Mid-Upper |
| SONU2 | Sorghastrum nutans | Indiangrass | Lower |

Description

Fire has been excluded for multiple years. Large patches of prairie are uncommon to rare. Mosaics tend toward dominance by deciduous woodlands, with some prairie patches interconnected and some isolated within woodlands. Grasses remain growing under the tree cover in this transitional class. Forests are rare. With no fire this class disappears.

*Maximum Tree Size Class*  
Sapling < 5” DBH

Class C 3 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUST | Quercus stellata | Post oak | Upper |
| JUVI | Juniperus virginiana | Eastern redcedar | Middle |
| QUMA3 | Quercus marilandica | Blackjack oak | Middle |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |

Description

This is a rare class where ire has been excluded for multiple decades. Woodlands are the dominant cover type, with prairie patches generally isolated or small. The woodland canopy cover is taller, with trees tending toward maturity. Some patches of forest are present. Species within forests tend toward a mix of fire tolerant and intolerant. With no fire this class disappears in several decades. This class might have persisted in somewhat isolated situations with occasional fire.

*Maximum Tree Size Class*  
Pole 5-9"DBH

Class D 14 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| JUVI | Juniperus virginiana | Eastern redcedar | Low-Mid |
| RHGL | Rhus glabra | Smooth sumac | Low-Mid |
| RHCO | Rhus copallinum | Winged sumac | Lower |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |

Description

Fire has been excluded for a very extended period. Forests are dominant, with patches of woodland and rare prairie remnants surviving only in edaphically controlled conditions in only rare locations. Forests are mixed, with fire-intolerant species achieving dominance in many areas. With no fire this class would dominate the landscape. This class could occur in a forest patch isolated by wetlands.

*Maximum Tree Size Class*  
Medium 9-21" DBH

Class E 4 Late Development 2 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| JUVI | Juniperus virginiana | Eastern redcedar | Low-Mid |
| RHGL | Rhus glabra | Smooth sumac | Low-Mid |
| RHCO | Rhus copallinum | Flameleaf sumac | Lower |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |

Description

Erosion has removed most or all topsoil from subsoils or Cretaceous chalk. Eastern redcedar occurs in patches of varying size, from individuals through small groups to large thickets. The canopy is variable, with patches of trees interspersed with bare ground or sparse herb cover. Outcroppings of chalk occur. Fire may remove some or all redcedar in a patch, but the class depends on lack of soil, so the presumption is that it will reseed and replace itself. This class may have resulted from aboriginal agriculture or via overgrazing by native grazers.

*Maximum Tree Size Class*  
Medium 9-21"DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Early1:OPN | 4 |
| Late2:ALL | 0 | Early1:OPN | 499 |
| Mid1:OPN | 5 | Mid1:OPN | 24 |
| Mid1:CLS | 25 | Mid1:CLS | 49 |
| Late1:CLS | 50 | Late1:CLS | 999 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |
| Alternative Succession | Early1:OPN | Mid1:OPN | 1 | 1 | Yes | 4 |
| Optional 1 | Early1:OPN | Late2:ALL | 0.0001 | 10000 | Yes | 0 |
| Mixed Fire | Early1:OPN | Early1:OPN | 0.5714 | 2 | Yes | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 19 |
| Optional 1 | Mid1:OPN | Late2:ALL | 0.0001 | 10000 | Yes | 0 |
| Replacement Fire | Mid1:OPN | Early1:OPN | 0.1 | 10 | Yes | 0 |
| Alternative Succession | Mid1:CLS | Late1:CLS | 1 | 1 | Yes | 24 |
| Replacement Fire | Mid1:CLS | Early1:OPN | 0.05 | 20 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.1 | 10 | Yes | 0 |
| Surface Fire | Mid1:CLS | Mid1:CLS | 0.1 | 10 | No | 0 |
| Mixed Fire | Late1:CLS | Mid1:CLS | 0.01 | 100 | Yes | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.05 | 20 | No | 0 |

Optional Disturbances

Optional 1: Aboriginal agric. and grazing

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STATSCO maps courtesy of Jim Menakis, LANDFIRE workshop cadre.