

14300

Southern Coastal Plain Blackland Prairie and Woodland

BpS Model/Description Version: Aug. 2020

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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 chinks). 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	<i>Schizachyrium scoparium</i>	Little bluestem
SONU2	<i>Sorghastrum nutans</i>	Indiangrass
JUVI	<i>Juniperus virginiana</i>	Eastern redcedar
QUST	<i>Quercus stellata</i>	Post oak
ANGE	<i>Andropogon gerardii</i>	Big bluestem
QUMA3	<i>Quercus marilandica</i>	Blackjack oak
TRDA3	<i>Tripsacum dactyloides</i>	Eastern gamagrass
SPCO16	<i>Sporobolus compositus</i>	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 leaf form 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.

None

Indicator Species

Description

Maximum Tree Size Class

Sapling < 5" DBH

Indicator Species

Description

Maximum Tree Size Class

Pole 5-9"DBH

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
JUVI	<i>Juniperus virginiana</i>	Eastern redcedar	Low-Mid
RHGL	<i>Rhus glabra</i>	Smooth sumac	Low-Mid
RHCO	<i>Rhus copallinum</i>	Winged sumac	Lower
SCSC	<i>Schizachyrium scoparium</i>	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
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
JUVI	<i>Juniperus virginiana</i>	Eastern redcedar	Low-Mid
RHGL	<i>Rhus glabra</i>	Smooth sumac	Low-Mid
RHCO	<i>Rhus copallinum</i>	Flameleaf sumac	Lower
SCSC	<i>Schizachyrium scoparium</i>	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.