14290

West Gulf Coastal Plain Southern Calcareous Prairie

BpS Model/Description Version: Aug. 2020

Update: 5/30/2018

|  |  |  |  |
| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Philip E. Hyatt | phyatt@fs.fed.us |  |  |
|  |  |  |  |
|  |  |  |  |

Vegetation Type

Herbaceous

Map Zones

37, 45

Geographic Range

Lousiana: central Lousiana such as Fleming Glade southeast of Alexandria and the Keiffer and Tancock Prairie areas near Winnfield. Texas: small prairie areas scattered in map zone (MZ) 37.

Biophysical Site Description

This prairie system occurs as small polygons within pine-dominated portions of the West Gulf Coastal Plain. The presence of fairly unique soils conditions exist with calcareous clays. This soil prevents the establishment of forested conditions by a combination of low available water during drought and wildfire under pre-European settlement conditions. Typically, this occurs in uplands, but occasionally the soils driving the system cross small stream bottoms or riparian areas bisecting the prairies. Historically the system is found within the range of longleaf pine. However examples occur in Texas west to the eastern edge of the Post Oak Savannah region of east Texas. Plant communities occur over relatively deep soils with circumneutral surface soil pH. These conditions form an unusual local landscape embedded in a forest system with acidic soils. Most prairie openings form distinct polygons of <1ac to 50-100ac or rarely more. A review of survey records from the early 1800s revealed some of these prairies in Louisiana have been nearly or completely lost to woody invasion (Dave Moore, USFS, pers. comm.). An example includes the Tancock Prairie system which was mapped as over 1,000ac in early survey records. The Tancock Prairie remnants now form only 5-10ac polygons and roadside remnants. A similar prairie to the east of Tancock cannot be relocated as prairie, but covered about 1,400ac in the early 1800s.

Vegetation Description

Blackland prairie flora typically consists of 3-6ft tall grasses and a diverse mix of forbs which flower at various times throughout the growing season. The flora is dominated by little bluestem (*Schizachyrium scoparium*) and Indian grass (*Sorghastum nutans*). Important associate grasses include dropseed (*Sporobolus clandestinus*), eastern gamma grass (*Tripsacum dactyloides*), bushy bluestem (*Andropogon glomeratus*), and three-awn grasses (*Aristida* spp.). Common forbs present are goldenrods (*Solidago* spp.), asters (*Aster* spp.), sunflowers (*Helianthus* spp.), evening primrose (*Oenothera biennis*), coneflowers (*Echinacea* spp.), prairie clovers (*Dalea* spp.), milkweeds (*Asclepias* spp.), compass plant (*Silphium laciniatum*), blazing stars (*Liatris* spp.), and many others (MacRoberts 1997, Foti 1989, Zollner and Simon 1998).

Post oak (*Quercus stellata*) and chinquapin oaks (*Q. muehlenbergii*) grew on ridges with thin soil over marl and chalk. Post oaks were also found either dense or in savanna-like stands over fragipans where the soil was poorly drained. Bois-d’arc (*Maclura pomifera*) was found on dry calcareous ridges with dense thickets of sumac, persimmon (*Diospyros virginiana*) and greenbriar (*Smilax* spp.) (Hutchinson 1985).

Degraded blackland prairies show increased abundance of eastern red cedar (*Juniperus virginiana*) and other woody species such as persimmon, white ash (*Fraxinus americana*), winged elm (*Ulmus alata*), Carolina buckthorn (*Rhamnus caroliniana*), deciduous holly (*Ilex decidua*), flowering dogwood (*Cornus florida*) and rusty blackhaw (*Viburnum rufidulum*) due to intensive grazing and long-term fire suppression (Roberts 1979, Foti 1989, Zollner and Simon 1997).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| SCSC | *Schizachyrium scoparium* | Little bluestem |
| SONU2 | *Sorghastrum nutans* | Indiangrass |
| JUVI | *Juniperus virginiana* | Eastern redcedar |

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

Disturbance Description

Disturbance by both natural fire, Native American generated fire and perhaps native grazers (bison) likely helped maintain these areas prior to European settlement.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 5 | 86 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) | 28 | 14 |  |  |
| All Fires | 4 | 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

This biophysical setting (BpS) appears in three forms on the landscape. Early surveyors mapped some sites as large polygons up to a couple thousand acres in size. Fire suppression in recent years caused significant decreases in size by more than 50% from 1935 to 1995 in central Louisiana's Keiffer Prairies (based on aerial photography). As a result, today we see 1-100+ acre polygons of prairies in this BpS, mostly scattered within the historic ovals. Some of the best examples occur in Keiffer Prairies in Winn Parish, Louisiana, where ~55 prairies remain.

Adjacency or Identification Concerns

The West Gulf Coastal Plain Southern Calcareous Prairies form a very distinctive habitat within the surrounding uplands. The edges where eastern red cedar (*Juniperus virginianus*) or hardwoods have invaded are less well defined; but the presence of eastern red cedar often very accurately defines the historic range of these prairies.

Issues or Problems

In the last 200yrs, impacts have changed. Especially in the last 50yrs or so, fire suppression has allowed hardwoods to invade these prairies. In addition, attempts to plow and cultivate these areas or to plant them to pine trees have been attempted, usually with miserable results from the perspective of the humans attempting to change the system to farm or forest. In the past 10yrs the reintroduction of fire by prescription and the mechanical control of woody vegetation encroachment have begun to counterbalance the effects of fire suppression and other attempts to "tame" the prairies. As for the reference condition, fire occurred more frequently than under current conditions.

Imported from MZ37 on 8/28/07 by Brendan C. Ward

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 | B | B | B | B |
| Herb | 0.5-1.0 | A | A | A | A | A | A | B | B | B | B |
| Herb | >1.0 | A | A | A | A | A | A | B | B | B | B |
| Shrub | 0-0.5 | C | C | C | C | C | C | C | C | C | C |
| Shrub | 0.5-1.0 | C | C | C | C | C | C | C | C | C | C |
| Shrub | 1.0-3.0 | C | C | C | C | C | C | C | C | C | C |
| Shrub | >3.0 | C | C | C | C | C | C | C | C | C | C |
| Tree | 0-5 | C | C | C | C | C | C | C | C | C | C |
| Tree | 5-10 | C | C | C | C | C | C | C | C | C | C |
| Tree | 10-25 | C | C | C | C | C | C | C | C | C | C |
| Tree | 25-50 | C | C | C | C | C | C | C | C | C | C |
| Tree | >50 | C | C | C | C | C | C | C | C | C | C |

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 23 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SCSC | Schizachyrium scoparium | Little bluestem | Upper |
| SONU2 | Sorghastrum nutans | Indiangrass | Upper |

Description

Short grass and bare ground within 12 months of recent stand replacement (grass) fire. Blackland prairie flora will begin to return within one year. Grasses will be dominated by little bluestem (*Schizachyrium scoparium*) and Indian grass (*Sorghastum nutans*).

*Maximum Tree Size Class*  
Seedling <4.5ft

Class B 59 Mid Development 1 - Open

DBH

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SCSC | Schizachyrium scoparium | Little bluestem | Upper |
| SONU2 | Sorghastrum nutans | Indiangrass | Upper |

Description

A diverse plant community will return including little bluegrass and Indiangrass. Important associate grasses include dropseed (*Sporobolus clandestinus*), eastern gamagrass (*Tripsacum dactyloides*), bushy bluestem (*Andropogon glomeratus*) and three-awn grasses (*Aristida* spp.). Common forbs present are coneflowers (*Echinacea* spp.), prairie clovers (*Dalea* spp.), milkweeds (*Asclepias* spp.), compass plant (*Silphium laciniatum*), blazing stars (*Liatris* spp.), and many others.

*Maximum Tree Size Class*  
Sapling >4.5ft; <5" DBH

Class C 18 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| JUVI | Juniperus virginiana | Eastern redcedar | Upper |
| LIST2 | Liquidambar styraciflua | Sweetgum | Upper |

Description

Includes two types of woody habitat within the prairie system. In prairie edges, eastern redcedar (*Juniperus virginiana*) often invades the prairie edge in the absence of fire. Random lack of fire allows cedar to increase in size to the point that it begins to reduce the probability of ground fires by reducing ground fuels though competition for resources. Alternatively, in areas with topographic position where fire is less likely to enter, hardwood shrubs may invade the prairie edges creating an area of dense shrub inclusions in some areas of the prairie.

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

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:OPN | 1 |
| Mid1:OPN | 2 | Mid1:OPN | 999 |
| Late1:OPN | 11 | Late1:OPN | 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** |
| Native Grazing | Early1:OPN | Early1:OPN | 0.1 | 10 | Yes | 0 |
| Replacement Fire | Early1:OPN | Early1:OPN | 0.25 | 4 | Yes | 0 |
| Alternative Succession | Mid1:OPN | Late1:OPN | 0.01 | 100 | Yes | 0 |
| Native Grazing | Mid1:OPN | Mid1:OPN | 0.1 | 10 | No | 0 |
| Replacement Fire | Mid1:OPN | Early1:OPN | 0.25 | 4 | Yes | 0 |
| Wind or Weather or Stress | Late1:OPN | Mid1:OPN | 0.0025 | 400 | Yes | 0 |
| Replacement Fire | Late1:OPN | Early1:OPN | 0.03 | 33 | Yes | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.2 | 5 | No | 0 |

References

Foti, T. 1989. Blackland Prairies of Southwestern Arkansas. Pages 23-28 in: Proceedings: Arkansas Academy of Science, volume 43.

FotiI, T. 1987. Site Report: Blackland Prairie Sites in Arkansas. Unpublished Report Submitted to the Arkansas Natural Heritage Commission. 2 pp. + tables and maps.

MacRoberts, B. and M. MacRoberts. 1997. Historical Notes on Louisiana Prairies: Changes in Prairie Flora in Half a Century. Phytologia, volume 82(2): 65-72.

Hutchinson, M. 1985. A report of an Inventory to Locate Potential Natural Areas in Southwestern Arkansas. Natural Land Institute, Unpublished Report. 19 pp.

MacRoberts, B. and M. MacRoberts. 1997. Historical Notes on Louisiana Prairies: Changes in Prairie Flora in Half a Century. Phytologia, volume 82(2): 65-72.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

NatureServe. 2006. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 18 July 2006.

Turner, R.L., J.E. Van Kley, L.S. Smith, and R.E. Evans. 1999. Ecological classification

system for the national forests and adjacent areas of the West Gulf Coastal Plain. The

Nature Conservancy, Nacogdoches, TX, USA.

Zollner, D. and S. Simon. 1998. Grandview Prairie Wildlife Management Area and Conservation Education Center Ecological Assessment and Baseline Community Monitoring Plan and Budget. Project proposal. The Nature Conservancy – Arkansas Field Office, Little Rock, AR. 4 pp.

Personal Communication

Moore, Dave, Forest Ecologist, Mark Twain NF, 573.341.7457, dmoore@fs.fed.us.