

LANDFIRE Biophysical Setting Model

Biophysical Setting: 4415080

Ozark Prairie and Woodland

☒ This BPS is lumped with: 1423

☐ This BPS is split into multiple models: BpS 1423 is systematically lumped with BpS 1508 because 1508 may be too fine for mapping, would be difficult to distinguish and lacked expert input.

General Information

Contributors (also see the Comments field)

Date

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Reviewer

Modeler 2 Blane Heuman bheuman@tnc.org

Reviewer

Modeler 3

Reviewer

Vegetation Type

Upland
Grassland/Herbaceous

Dominant Species

SCSC
ANGE

Map Zone

44

Model Zone

☐ Alaska
☐ California
☐
☐ Great Basin
☐ Great Lakes
☐ Hawaii
☐ Northeast
☐ Northern Plains
☐ N-Cent. Rockies
☐
☐ Pacific Northwest
☒ South Central
☐ Southeast
☐ S. Appalachians
☐ Southwest

General Model Sources

☒ Literature
☒ Local Data
☒ Expert Estimate

SONU2
PAVI2
LIATR
LECA8
SYER
QUERC

Geographic Range

This system is found primarily within the Flint Hills of Kansas and the Osage Plains of OK, ranging into the Ozarks. Found in ECOMAP subsections 251Ea and 251Eb, with scattered outliers to the west and south including the system of prairies and in the undissected portions of the Springfield Plateau region of AR, OK and MO.

Biophysical Site Description

The alternating shale plains separated by limestone scarps that in a broad sense decrease in elevation in a stairstep pattern, from northwest to southeast. The flatter plains were formerly nearly continuous tallgrass prairie, while the scarped limestone areas were more dissected with bedrock outcrops and a mixture of prairie and savanna (Nigh and Schroeder 2002). Because of the presence of the rocky substrate close to the surface and the rolling topography, this area is relatively unsuitable for agriculture. Most occurrences are on gently to moderately rolling terraces developed predominately in sandstones and shales of Pennsylvanian age. Soils are moderately fertile to sterile and well-drained. In addition this region receives an annual precipitation total of 2-6in less than the surrounding regions due to a rainshadow produced by a combination of prevailing western winds and orographic effects.

Vegetation Description

Grasses form the matrix of the prairie with big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), prairie cordgrass (*Spartina pectinata*) and switchgrass (*Panicum virgatum*) dominating many Ozark Prairie and woodlands. A rich forb diversity is commonly present and includes *Helianthus* spp. (sunflower genus), panic grasses (*Dichanthelium* spp.), black-eyed susan (*Rudbeckia subtomentosa*), compass plant (*Silphium laciniatum*), blazing star (*Liatris* spp.), heath aster (*Symphotrichum ericoides*), bush clover (*Lespedeza capitata*), goldenrods (*Solidago* spp.) and violet (*Viola pedatifida*) also occur. Wetter areas

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

support a rich diversity of rushes and sedges including *Carex opaca*, *Carex oklahomensis*, *Carex buxauumii*, *Carex scoparia*, *Carex conjuncta*, *Carex davisii*, *Carex arkansasa* and *Eleocharis tenuis*. Areas of deeper soil, especially lower slopes along draws, slopes and terraces, support indigo (*Baptisia alba* var. *macrophylla*), narrow-leaved blazing star (*Liatris pycnostachya*) and ironweed (*Vernonia missurica*).

Oak grubs characterize that portion of this vegetation sequence that experienced recurring fires in advanced oak regeneration, which stimulates the resprouting response evidenced by the 'grubs' or multi-stemmed stump sprouts of shingle oak (*Quercus imbricaria*), black oak (*Q. velutina*), blackjack oak (*Q. marilandica*) and others.

Disturbance Description

Fire and grazing constitute the major dynamic processes for this region. Fires were frequent, primarily autumnal and of human origin. The grazing disturbance is considered in this model by reducing the average fire return interval probability in the grassland box. However, as oak-hickory regeneration becomes established, these species become largely fire resistant with age. Surface fires within woodland and forest types occurred every 12-15yrs, reducing duff layers and allowing recruitment of oak-hickory stems.

Adjacency or Identification Concerns

It is distinguished from Central Tallgrass Prairie (CES205.683) by having more species with southwestern geographic affinities and the presence of a thin soil layer over sandstones and shales substrates, although some areas of deeper soils are found within the region, especially on lower slopes, draws and terraces.

Native Uncharacteristic Conditions

Prairies are grown up in woody vegetation due to fire suppression and/or previous overgrazing. Some prairies today are forb-poor.

Scale Description

This type occurs as small patch in MZ44 and large patch in the neighboring zones (MZ43 and MZ42).

Issues/Problems

Although many of the native common plant species still occur, grazing does impact this region. Poor grazing practices can lead to soil erosion and invasion by cool-season grasses such as tall fescue (*Festuca arundinaria*) and smooth brome (*Bromus inermis*).

Comments

This model was written for MZ44. It differs from the MZ32 model primarily due to the prairies periphery to oak woodlands and forests in MZ44. This proximity increasing the perch sites and the source seed. MZ44 suggested reviewer: Tim Nigh MDC.

Vegetation Classes

****Fire Regime Groups are:** I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Class A 96 %

Early Development 1 All Structures

Upper Layer Lifeform

- ☒ Herbaceous
☐ Shrub
☐ Tree

Fuel Model
3

Description

0-999yrs. Grassland class. Dominated by little bluestem, big bluestem, Indiangrass, prairie cordgrass and switchgrass. Numerous forbs such as Helianthus spp. (sunflower genus), prairie clovers (Petalostemum spp.) and coneflowers (Echinacea pallida and Ratibida pinnata), amongst many others, were present. Fuel complexes consisted of short- or tall-grass prairie forbs and shrubs with little or no tree regeneration. Replacement fire every 1-2yrs maintains the class. Lack of disturbance (prob. = 0.01) moves class to B.

Indicator Species and Canopy Position

SCSC
Upper
ANGE
Upper
SONU2
Upper
PAVI2
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	100 %
Height	Herb 0m	Herb >1.1m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Shrub and tree species are relatively infrequent and, if present, constitute <10% cover in the area.

Class B 3 %

Mid Development 1 Closed

Upper Layer Lifeform

- ☐ Herbaceous
☒ Shrub
☐ Tree

Fuel Model
3

Description

10-999yrs. This class represents a shrubby prairie. Grass and forb species remain the same as in class A. Shrub species include climbing rose (Rosa setigera), prairie rose (Rosa caroliniana), leadplant (Amorpha canescens), Prairie willow (Salix humilis), smooth sumac (Rhus glabra), winged sumac (Rhus copalina), rough dogwood (Cornus drummondii), persimmon (Diospyros virginiana) and oak saplings (Quercus spp.) The fuel model in this class starts at a 3; however with increased leaf litter, the fuel model moves to a 2. Mixed fires (every three years) and surface fires (every 20yrs) maintain the class. Replacement fires every 40yrs move the class to A. The lack of disturbance (prob. = 0.01) moves class to C.

Indicator Species and Canopy Position

SCSC
Lower
ROSE2
Middle
SAHU2
Upper
RHUS
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	80 %
Height	Shrub 1.1m	Shrub 3.0m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Class C 1 %

Mid Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☒ Tree

Fuel Model
9

Description

20-999yrs. This tree class is dominated by white ash (Fraxinus americana), persimmon, shingle oak (Quercus

Indicator Species and Canopy Position

QUVE
Upper
QUMA3
Upper
DIVI5
Upper
FRAM2
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	80 %
Height	Tree 5.1m	Tree 25m
Tree Size Class	Very Large >33"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

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imbricaria), slippery elm (*Ulmus rubra*), blackjack oak (*Quercus marilandica*) and black oak (*Quercus velutina*). Class B succeeds to C without fire. Trees in this class will be at least three meters tall and will range to 20m tall. The oak trees especially will increase in DBH in the open instead of increasing in height. Surface fire (every 25yrs) maintains the class. Rare mixed fires (every 700yrs) and weather/stress events (every 500yrs) move the class to B. Replacement fires every 40yrs move the class to A.

Class D	0 %	<u>Indicator Species and Canopy Position</u>	<u>Structure Data (for upper layer lifeform)</u>												
[Not Used]	[Not Used]		<table border="1"> <thead> <tr> <th></th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Cover</td> <td>%</td> <td>%</td> </tr> <tr> <td>Height</td> <td></td> <td></td> </tr> <tr> <td>Tree Size Class</td> <td colspan="2"></td> </tr> </tbody> </table>		Min	Max	Cover	%	%	Height			Tree Size Class		
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Height															
Tree Size Class															
<u>Upper Layer Lifeform</u>															
☐ Herbaceous ☐ Shrub ☐ Tree		<u>Fuel Model</u>	☐ Upper layer lifeform differs from dominant lifeform.												

Description

Class E	0 %	<u>Indicator Species and Canopy Position</u>	<u>Structure Data (for upper layer lifeform)</u>												
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☐ Herbaceous ☐ Shrub ☐ Tree		<u>Fuel Model</u>	☐ Upper layer lifeform differs from dominant lifeform.												

Description

Disturbances						
<u>Fire Regime Group**:</u>	II	<u>Fire Intervals</u>				
		<i>Avg FI</i>	<i>Min FI</i>	<i>Max FI</i>	<i>Probability</i>	<i>Percent of All Fires</i>
		Replacement	1.7		0.58824	98
		Mixed	80		0.0125	2
		Surface	500		0.002	0
		All Fires	2		0.60274	
<u>Historical Fire Size (acres)</u>		<u>Fire Intervals (FI):</u> Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class.				
Avg 0						
Min 0						
Max 0						
<u>Sources of Fire Regime Data</u>						
☐ Literature ☐ Local Data ☐ Expert Estimate						
<u>Additional Disturbances Modeled</u>						
☐ Insects/Disease ☐ Native Grazing ☐ Other (optional 1) ☒ Wind/Weather/Stress ☐ Competition ☐ Other (optional 2)						

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References

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

Nigh, Timothy A. and Walter A. Schroeder 2002. Atlas of Missouri Ecoregions. Missouri Department of Conservation. The Conservation Commission--The State of Missouri. Pages 71-74.

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