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Lower Mississippi River Dune Woodland and Forest

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Forest and Woodland

Map Zones

45

Geographic Range

This system represents the vegetation of sand dunes and related eolian features of the lower Mississippi River Alluvial Valley in Missouri and Arkansas. These dunes are west of Crowley's Ridge and near the Black and White rivers, above the normal flood level of the Mississippi River.

Biophysical Site Description

Examples in Missouri occur amidst a series of low-lying, anastomosing channels. Heineke (1987) states that this large area of eolian sand dunes occurs "mainly in a long band to the west of Crowley's Ridge," and occupies approximately 1000 square kilometers (400 square miles) in discrete fields of up to 78 square kilometers (30 square miles) each. The dunes consist of a layer of sand or sandy loam over an impervious sublayer (Heineke 1987). Depressions in the dune fields (e.g., Lower Mississippi River Dune Pond (CES203.189)) are one of the principal habitats for the rare shrub pondberry (*Lindera melissifolia*). Called "sand ponds" in Arkansas, these depressions have silty bottoms and perched water tables.

Vegetation Description

The uppermost portions of the dunes support a xeric community of very open post oak (*Quercus stellata*) woodlands with little bluestem (*Schizachyrium scoparium*) and abundant lichen cover (presumably *Cladonia* spp), along with prickly pear (*Opuntia* spp). Less edaphically extreme slopes support more closed-canopied forests in which *Q. stellata* is still important, along with southern red oak (*Q. falcata*) and possibly other species. In many instances, distinctive wetlands imbedded within this system are also present (Lower Mississippi River Dune Pond (CES203.189)).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
QUST	<i>Quercus stellata</i>	Post oak
QUVE	<i>Quercus velutina</i>	Black oak
QUMA3	<i>Quercus marilandica</i>	Blackjack oak
QUFA	<i>Quercus falcata</i>	Southern red oak
QUAL	<i>Quercus alba</i>	White oak

QUMI	<i>Quercus michauxii</i>	Swamp chestnut oak
QUPH	<i>Quercus phellos</i>	Willow oak
QULY	<i>Quercus lyrata</i>	Overcup oak

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

Disturbance Description

Fire and drought are the primary disturbance processes in this type. The fire regime is group 1, with high frequency, low intensity surface fires. Replacement fires are infrequent, every 200-300yrs. Mixed fire is very infrequent in open canopy conditions, but occurs more frequently in closed canopy (every 80yrs in closed states). Seasonality helps define surface, mixed fire and stand replacement fire types. Mixed fires are rare and occur on lower slopes that have a more closed canopy structure. Stand-replacement fires are rare and would occur under extreme drought conditions during the growing season. Late growing season fires under normal moisture conditions were for the most part surface fires. Anthropogenic fire contributes significantly to all fire occurrences. The absence of fire is also significant in movement to classes with closed canopy conditions. Within stand competition and maintenance is most common in closed condition classes. Drought and moist cycles play a strong role interacting with fire frequency, severity and vegetative structure.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	340	1		
Moderate (Mixed)	451	1		
Low (Surface)	5	98	2	5
All Fires	5	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 is a large patch (400 x 30 miles) system. Fires range in size from <100ac to regional scale / entire system fires during regional drought events.

Adjacency or Identification Concerns

Landscape has been converted to agricultural use. System is primarily identified by soil series due to conversion. Topography has been altered by laser leveling and other agricultural preparation processes.

Issues or Problems

Native Uncharacteristic Conditions

Comments

None

Succession Classes	
1	1
2	2
3	3
4	4
5	5
6	6
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Mapping Rules

[illegible]

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	5	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUERC	Quercus	Oak	Upper
LIST2	Liquidambar styraciflua	Sweetgum	Upper
ARIST	Aristida	Threeawn	Lower
ANDRO2	Andropogon	Bluestem	Lower

Description

Oak reproduction to 10ft tall. Community of forbs and perennial grasses. More persistent on dry sites. Openings tend to be small and have scattered live trees.

Maximum Tree Size Class

None

Class B	7	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUERC	Quercus	Oak	Upper

CARYA	Carya	Hickory	Upper
SAAL5	Sassafras albidum	Sassafras	Upper

Description

Mid-seral with closed canopy oak pole-sized trees with little or no herbaceous understory. Some woody understory development. High canopy cover (crown closure estimate). More likely to occur on lower dune slopes and ponds due to water availability.

Maximum Tree Size Class

Pole 5-9" DBH

Class C	13	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUERC	Quercus	Oak	Upper
SAAL5	Sassafras albidum	Sassafras	Upper
ARIST	Aristida	Threeawn	Lower
ANDRO2	Andropogon	Bluestem	All

Description

Mid-development, open canopy. Woodland/savanna with herbaceous understory. Oak-pine predominate overstory <80% canopy cover. More likely to occur on upper slopes and dune tops. Trees are in the sapling stage.

Maximum Tree Size Class

Pole 5-9" DBH

Class D	65	Late Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUERC	Quercus	Oak	None
SAAL5	Sassafras albidum	Sassafras	None
ARIST	Aristida	Threeawn	None
ANDRO2	Andropogon	Bluestem	None

Description

Late-seral woodland/savanna oak overstory with perennial grasses and limited shrub community with low tree canopy cover.

Maximum Tree Size Class

Medium 9-21"DBH

Class E	10	Late Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUERC	Quercus	Oak	Upper
CARYA	Carya	Hickory	Upper
SAAL5	Sassafras albidum	Sassafras	Upper
ARIST	Aristida	Threeawn	None

Description

Late-seral, closed canopy, oak dominated overstory. Some herbaceous cover and “rank” woody shrub understory layer. Canopy gaps with non-oak regeneration and higher canopy cover. Disturbance is infrequent in these closed canopy forests.

Maximum Tree Size Class

Medium 9-21"DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	10
Mid1:OPN	11	Late1:OPN	40
Mid1:CLS	11	Late1:CLS	40
Late1:OPN	41	Late1:OPN	999
Late1:CLS	41	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:ALL	Mid1:CLS	1	1	Yes	8
Replacement Fire	Early1:ALL	Early1:ALL	0.007	143	Yes	0
Surface Fire	Early1:ALL	Early1:ALL	0.25	4	No	0
Alternative Succession	Mid1:OPN	Mid1:CLS	1	1	Yes	12
Replacement Fire	Mid1:OPN	Early1:ALL	0.007	143	Yes	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.25	4	No	0
Wind or Weather or Stress	Mid1:CLS	Early1:ALL	0.005	200	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.01	100	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.013	77	Yes	0
Surface Fire	Mid1:CLS	Mid1:CLS	0.05	20	No	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	16

Wind or Weather or Stress	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Surface Fire	Late1:OPN	Late1:OPN	0.25	4	No	0
Wind or Weather or Stress	Late1:CLS	Late1:OPN	0.005	200	Yes	0
Insects or Disease	Late1:CLS	Late1:OPN	0.005	200	Yes	0
Insects or Disease	Late1:CLS	Early1:ALL	0.007	143	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.01	100	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.013	77	Yes	0
Surface Fire	Late1:CLS	Late1:CLS	0.07	14	No	0

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