13810

Lower Mississippi River Dune Woodland and Forest

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
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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 approximately1000 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 | *Quercus stellata* | Post oak |
| QUVE | *Quercus velutina* | Black oak |
| QUMA3 | *Quercus marilandica* | Blackjack oak |
| QUFA | *Quercus falcata* | Southern red oak |
| QUAL | *Quercus alba* | White oak |
| QUMI | *Quercus michauxii* | Swamp chestnut oak |
| QUPH | *Quercus phellos* | Willow oak |
| QULY | *Quercus lyrata* | 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

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

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

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

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

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

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

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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