13760

Southern Ridge and Valley/Cumberland Dry Calcareous Forest

BpS Model/Description Version: Aug. 2020

Update: 4/19/2018

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| --- | --- | --- | --- |
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Vegetation Type

Forest and Woodland

Map Zones

48, 53, 57, 61

Geographic Range

This system includes dry to dry mesic calcareous forests of the Southern Ridge and Valley region of Alabama and Georgia, extending north into Tennessee, Kentucky, Virginia and adjacent West Virginia. It includes calcareous forests on lower escarpments of the Cumberland Plateau and other related areas.

Biophysical Site Description

Examples of this forest and woodland system occur usually on dry sites, on a variety of topographic and landscape positions including slopes (particularly south- and west-facing ones), ridges, and knobs, depending on where the base-rich rock is present or crops out, and where the soils are influenced by calcareous/circumneutral geology. Elevation is generally between 200- 500m.

Vegetation Description

Oaks dominate the overstory of most natural stands, if they have not been preferentially removed. Tree species include white oak, post oak, chinquapin oak, Shumard oak, black oak, and hickory species with eastern redcedar, possibly mixed with shortleaf pine. Midstory species in natural systems are primarily oak , but can include sugar maple, American beech, dogwood, hickories, ashes, elms, hackberry/sugarberry, Eastern redcedar, hop-hornbeam, redbud, black locust, black cherry, sassafras, and possibly sprouts of American chestnut. Eastern redcedar coverage will be limited or reduced in examples with more frequent fire, but it may dominate a midstory layer in conditions of infrequent fire. The shrub layer is typically characterized by non-ericads (but possibly with deerberry [*Vaccinium stamineum*]), *Viburnum* species, *Crataegus* species, and *Philadelphus* species. Ground cover typically includes little bluestem (*Schizachyrium scoparium*), Yellow Indian grass (*Sorghastrum nutans*), calciphilic sedges (*Carex* spp.) and a variety of herbaceous plants. More mesic inclusions may have serviceberry, basswood, or American holly in the tree layers and *Viburnum*, dogwood, sawbrier (*Smilax glauca*), greenbrier (*Smilax rotundifolia*), wild grape (*Vitis* spp.), and others in the shrub layer. Without periodic fire, advanced oak regeneration is usually absent except on xeric sites. With even shorter fire return intervals (or more intense growing-season burns) successional shifts of oak forest and woodlands to savannas or to woodlands are possible.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| QUST | *Quercus stellata* | Post oak |
| QUAL | *Quercus alba* | White oak |
| QUSH | *Quercus shumardii* | Shumard's oak |
| JUVI | *Juniperus virginiana* | Eastern redcedar |
| VIBUR | *Viburnum* | Viburnum |
| SCSC | *Schizachyrium scoparium* | Little bluestem |

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

Disturbance Description

Fire regime group I, with frequent surface fires. Pre-settlement fire return intervals are believed to have ranged from 3-14yrs. Natural fire regimes were primarily surface fires during the dormant season with occasional growing season mosaic fires (most likely occurring infrequently once or twice every 20-25yrs).

Windthrow and ice damage can be important agents in opening the canopy.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 189 | 4 |  |  |
| Moderate (Mixed) | 111 | 6 |  |  |
| Low (Surface) | 8 | 90 |  |  |
| All Fires | 7 | 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 type, generally occupying distinct physiographic settings (ridges, upper slopes, lower south and west-facing slopes) on the order of 100s of hectares, rather than extending over large continuous areas.

Adjacency or Identification Concerns

In the absence of fire, mesophytic species (e.g. yellow poplar, sugar/red maples and others) could replace oaks over time. Widespread oak decline could dramatically change dominance regimes. Nonnative invasive plant species (most notably Ailanthus, Asiatic bittersweet, Japanese honeysuckle, and kudzu) along with insects (most notably gypsy moth) can also exacerbate community shifts.

Issues or Problems

The Fire Regime Condition Class type was originally described for Cumberlands and Southern Appalachians, but the concept incudes the most exposed mid-elevation ridges and lower slopes of the Cumberland Plateau escarpment, where base-rich rocks and resultant soils are present.

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 | 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 | A | A | A | A | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | A | A | A | A | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | A | A | A | A | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | A | A | A | A | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | UN | UN | C | C | C | B | B | B | UN | UN |
| Tree | 10-25 | UN | UN | D | D | D | E | E | E | UN | UN |
| Tree | 25-50 | UN | UN | D | D | D | E | E | E | UN | UN |
| Tree | >50 | UN | UN | D | D | D | E | E | E | 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 8 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUAL | Quercus alba | White oak | Upper |
| QUST | Quercus stellata | Post oak | Upper |
| JUVI | Juniperus virginiana | Eastern redcedar | Middle |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |

Description

Oak and Eastern red-cedar reproduction to 15ft tall and ~15yrs old. Community of forbs and perennial grasses. More persistent on dry sites. Openings tend to be small and have scattered live trees. <25% tree canopy cover.

Upper Layer Lifeform is not the dominant lifeform. Some examples are more open, but trees are typically the dominant life form.

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

Class B 5 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| JUVI | Juniperus virginiana | Eastern redcedar | Mid-Upper |
| ACSA3 | Acer saccharum | Sugar maple | Upper |
| QUAL | Quercus alba | White oak | Mid-Upper |
| LITU | Liriodendron tulipifera | Tuliptree | Upper |

Description

Mid-development with closed canopy, oak with Eastern red-cedar with little or no herbaceous understory. Some woody understory development. Greater than 50% canopy cover (crown closure estimate). In the continued absence of fire, stands may become heavily dominated by E. red-cedar with mesophytic species (e.g. yellow poplar, sugar, red maple, black gum) likely to replace oaks.

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

Class C 22 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUST | Quercus stellata | Post oak | Upper |
| QUAL | Quercus alba | White oak | Upper |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |
| DASP2 | Danthonia spicata | Poverty oatgrass | Lower |

Description

Mid-development open canopy. Woodland with herbaceous and/or low shrub understory. Oak (white, post) with limited eastern redcedar <50% canopy cover. *Schizachyrium scoparium* most typical grass.

Upper Layer Lifeform is not the dominant lifeform. Ground layer (herbs and sometimes dwarf shrubs) could exceed tree cover, but this is not typical.

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

Class D 50 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUST | Quercus stellata | Post oak | Upper |
| QUAL | Quercus alba | White oak | Upper |
| SCSC | Schizachyrium scoparium | Little bluestem | Lower |
| DASP2 | Danthonia spicata | Poverty oatgrass | Lower |

Description

Late-development open canopy pine-oak to oak-pine in composition. Late-seral oak woodland (White, Post) with limited Eastern red-cedar <50% canopy cover. *Schizachyrium scoparium* most typical grass.

Upper Layer Lifeform is not the dominant lifeform. Ground layer (herbs and sometimes dwarf shrubs) could exceed tree cover, but this is not typical.

*Maximum Tree Size Class*  
Large 21-33"DBH

Class E 15 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUAL | Quercus alba | White oak | Upper |
| ACSA3 | Acer saccharum | Sugar maple | Upper |
| JUVI | Juniperus virginiana | Eastern redcedar | Mid-Upper |
| VIBUR | Viburnum | Viburnum | Lower |

Description

Late-seral closed canopy, oak dominated overstory community, possibly with "mesic" species (e.g. Sugar maple) with little herbaceous cover. May have a dense woody shrub understory layer. Canopy gaps occupying 1- 2%, larger openings represent 1- 2% of landscape respectively > 50% canopy cover (crown closure estimate).

*Maximum Tree Size Class*  
Large 21-33"DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:OPN | 14 |
| Mid1:OPN | 15 | Late1:OPN | 59 |
| Mid1:CLS | 15 | Late1:CLS | 59 |
| Late1:OPN | 60 | Late1:OPN | 999 |
| Late1:CLS | 60 | 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 | 13 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Surface Fire | Early1:ALL | Early1:ALL | 0.15 | 7 | No | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 20 |
| Wind or Weather or Stress | Mid1:OPN | Mid1:OPN | 0.004 | 250 | No | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.005 | 200 | No | 0 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.15 | 7 | No | 0 |
| Wind or Weather or Stress | Mid1:CLS | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.03 | 33 | Yes | 0 |
| Surface Fire | Mid1:CLS | Mid1:CLS | 0.06 | 17 | No | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 20 |
| Wind or Weather or Stress | Late1:OPN | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Wind or Weather or Stress | Late1:OPN | Late1:OPN | 0.005 | 200 | No | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.15 | 7 | No | 0 |
| Insects or Disease | Late1:CLS | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Wind or Weather or Stress | Late1:CLS | Late1:OPN | 0.01 | 100 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.01 | 100 | Yes | 0 |
| Surface Fire | Late1:CLS | Late1:CLS | 0.04 | 25 | No | 0 |

References

Abrams, M.D., D.A. Orwig and M.J. Dockry. 1997. Dendroecology and successional status of two contrasting old-growth oak forests in the Blue Ridge Mountains, USA. Can J. For. Res. 27:994-1002.

Harrod, J.C., M.E. Harmon and P.S. White. 2000. Post-fire succession and 20th century reduction in fire frequency on xeric southern Appalachian sites. J. Veg. Science 11:465-472.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 08 June 2007.