

13530

Southern Appalachian Low-Elevation Pine Forest

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Vegetation Type

Forest and Woodland

Map Zones

47

Geographic Range

This system consists of shortleaf pine- and Virginia pine-dominated forests in the lower elevation south including the Cumberland Plateau, extending into the Interior Low Plateau of Kentucky and Tennessee.

Biophysical Site Description

Occurs on ridge tops, upper and mid slopes, and the lower ranges. Bedrock may be a variety of types, but the system may be limited to acidic substrates. Fire is undoubtedly a very important influence. Examples can occur on a variety of topographic and landscape positions, including ridgetops, upper and midslopes, as well as lower elevations (generally below 700m [2300ft]) in the southern Appalachians such as mountain valleys.

Vegetation Description

Vegetation consists of closed to open forests or woodlands dominated by *Pinus echinata* or *Pinus virginiana*. *Pinus rigida* may sometimes be present. Hardwoods are sometimes abundant, especially dry-site oaks such as *Quercus falcata*, *Quercus prinus*, and *Quercus coccinea*, but also *Carya glabra*, *Acer rubrum*, and others. The hardwood component may be partly the result of fire suppression. The shrub layer may be well-developed, with *Vaccinium pallidum*, *Gaylussacia baccata*, or other acid-tolerant species most characteristic. Herbs are usually sparse but may include *Pityopsis graminifolia* and *Tephrosia virginiana*. Herbs probably were more abundant and shrubs less dense when fires occurred more frequently, and the communities of this system may have been grassy under more natural conditions, with *Schizachyrium scoparium* being a typical component, possibly with *Danthonia* spp.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PIEC2	<i>Pinus echinata</i>	Shortleaf pine
SCSC	<i>Schizachyrium scoparium</i>	Little bluestem

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

Disturbance Description

The fire regime for this biophysical setting is characterized by frequent surface fires. Area fire frequency is 3-4yr mean fire return interval (range 1-12yrs). (Masters et al. 1995) Replacement

and mixed severity fires are infrequent, every 100-1000yrs. Stand-replacement fires occurred mostly under extreme drought conditions during the growing season. Lightning fire may have played a role in maintaining this system. Other disturbance factors include ice storms, wind events, insect infestations, and species competition for resources. Native ungulate grazing may have played a small role in replacement where buffalo and elk concentrated, but fire generally maintained systems. Drought and moist cycles play a strong role interacting with both fire and native grazing.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	101	2		
Moderate (Mixed)	1201			
Low (Surface)	2	98		
All Fires	2	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

Probably naturally a large-patch system, covering 1000s of acres. Most remnants in relatively natural condition are probably small patches. Natural size distribution not well-known, but probably a large-patch system with patches or complexes covering hundreds to thousands of acres. The current distribution of patch size is also not well-known. Size of defined occurrences may be strongly affected by standards for condition and separation distances.

Adjacency or Identification Concerns

This system (CES202.332) at its western extent in central Tennessee would be distinguished from equivalent Ozarkian systems (e.g. Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland (CES202.313)) by the presence of *Pinus virginiana* and *Quercus prinus*, which do not cross the Mississippi River.

Similar Ecological Systems:

- Allegheny-Cumberland Dry Oak Forest and Woodland (CES202.359)
- Central and Southern Appalachian Montane Oak Forest (CES202.596)
- Ozark-Ouachita Shortleaf Pine-Bluestem Woodland (CES202.325)
- Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland (CES202.313)
- Southern Appalachian Montane Pine Forest and Woodland (CES202.331)
- Southern Piedmont Dry Oak-(Pine) Forest (CES202.339)

Issues or Problems

Native Uncharacteristic Conditions

Historically, the red-cockaded woodpecker would have been present in these open pine stands, but it has been extirpated from this part of its historic range. Large herbivores (elk, bison) would also have been present and would have helped to maintain this system.

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	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	UN	UN	UN	UN	UN	UN	UN
Tree	5-10	A	A	A	C	C	C	C	B	B	B
Tree	10-25	A	A	A	D	D	D	D	E	E	E
Tree	25-50	UN	UN	UN	D	D	D	D	E	E	E
Tree	>50	UN	UN	UN	D	D	D	D	E	E	E

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 16 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEC2	<i>Pinus echinata</i>	Shortleaf pine	Upper
DANTH	<i>Danthonia</i>	Oatgrass	Lower
PIVI2	<i>Pinus virginiana</i>	Virginia pine	Low-Mid

Description

This is a savanna type. Scattered large shortleaf pines and hardwoods are present, but grasses and forbs are dominant. Virginia pine may also be present. Pine and oak reproduction to 15ft tall. Herbaceous community dominated by bluestems and forbs. More persistent on shallow soils. Openings may be small to extensive and have scattered live trees.

Maximum Tree Size Class

Medium 9-21"DBH

Class B 3 Mid Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
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PIEC2	Pinus echinata	Shortleaf pine	Upper
PIVI2	Pinus virginiana	Virginia pine	Low-Mid

Description

This type is a dense thicket. Mid-seral closed with closed canopy (>70%; on mountainous sites >60%) shortleaf and Virginia pine (*P. virginiana*) and pole-sized oak with little or no herbaceous understory.

Maximum Tree Size Class

Pole 5-9" DBH

Class C	36	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEC2	Pinus echinata	Shortleaf pine	Upper
ANDRO2	Andropogon	Bluestem	Lower
SCSC	Schizachyrium scoparium	Little bluestem	Lower
DANTH	Danthonia	Oatgrass	Lower

Description

This is a woodland/savanna type. Mid-seral open woodland/savanna pine and oak overstory with bluestem grasses and forbs. Shrub layer may be prevalent on some sites and dominated by various oak sprouts and a few shrub species. Shrub prevalence highly dependent on time since burned. Cover <70%; on mountainous sites cover <60%.

Maximum Tree Size Class

Medium 9-21"DBH

Class D	43	Late Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEC2	Pinus echinata	Shortleaf pine	Upper
ANDRO2	Andropogon	Bluestem	Lower
DANTH	Danthonia	Oatgrass	Lower
SCHIZ4	Schizachyrium	Little bluestem	Lower

Description

Late-seral woodland/savanna pine and oak overstory with bluestem grasses, Danthonia, and forbs. Shrub layer may be prevalent on some sites and dominated by various oak sprouts and a few shrub species. Prevalence highly dependent on time since burned. Shrub layer may be absent on other sites, particularly on shallow soils. Cover <70%; on mountainous sites cover <60%.

Maximum Tree Size Class

Large 21-33"DBH

Class E**2****Late Development 1 - Closed**Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEC2	Pinus echinata	Shortleaf pine	Upper

Description

Late-seral, closed canopy (>70%; on mountainous sites >60%) pine-oak dominated overstory community. No herbaceous cover and few shrubs.

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	6
Replacement Fire	Early1:ALL	Early1:ALL	0.01	100	Yes	0
Surface Fire	Early1:ALL	Early1:ALL	0.5	2	No	0
Alternative Succession	Mid1:OPN	Mid1:CLS	1	1	Yes	15
Replacement Fire	Mid1:OPN	Early1:ALL	0.01	100	Yes	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.5	2	No	0
Wind or Weather or Stress	Mid1:CLS	Early1:ALL	0.005	200	Yes	0
Competition or Maintenance	Mid1:CLS	Mid1:CLS	0.01	100	No	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.01	100	Yes	0
Insects or Disease	Mid1:CLS	Early1:ALL	0.01	100	Yes	0

Mixed Fire	Mid1:CLS	Mid1:OPN	0.02	50	Yes	0
Surface Fire	Mid1:CLS	Mid1:CLS	0.1	10	No	0
Alternative Succession	Late1:OPN	Late1:CLS	1	1	Yes	10
Wind or Weather or Stress	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Competition or Maintenance	Late1:OPN	Late1:OPN	0.01	100	No	0
Replacement Fire	Late1:OPN	Early1:ALL	0.01	100	Yes	0
Surface Fire	Late1:OPN	Late1:OPN	0.5	2	No	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
Insects or Disease	Late1:CLS	Late1:OPN	0.01	100	Yes	0
Competition or Maintenance	Late1:CLS	Late1:CLS	0.01	100	No	0
Replacement Fire	Late1:CLS	Early1:ALL	0.01	100	Yes	0
Surface Fire	Late1:CLS	Late1:CLS	0.1	10	No	0

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