LANDFIRE Biophysical Setting Model

Biophysical Setting **5713520** **Southern Appalachian Montane Pine Forest and Woodland**

☐ *This BPS is lumped with:*
☐ *This BPS is split into multiple models:*

General Information

Contributors (also see the Comments field) **Date** 8/15/2007

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Vegetation Type
Forest and Woodland

Map Zone
57

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

Dominant Species*
PIPU5 GAYLU
PIRI VACCI
QUPR2 QUIL
QUCO2

General Model Sources
☑ Literature
☑ Local Data
☑ Expert Estimate

Geographic Range

Blue Ridge Mountains of TN, NC, and VA (including extreme northeast GA and northwest SC). Mountains of the Ridge and Valley in VA and WV. Western extent is along the KY-VA border on Pine Mtn.

There may also be isolated examples occurring on ridges or monadnocks like Pine Mountain (MZ54 GA), Kings Mountain (MZ59 NC), Pilot Mountain and Hanging Rock in NC.

Biophysical Site Description

Occurs on xeric to dry sites at moderate to upper elevations between 1000-4000ft. Typically described as "ridgetop communities" this community occupies the driest and most fire-prone of sites. Sites are typically located on convex, south to west facets of steep spur ridges, narrow rocky crests, and cliff tops. They occur at elevations from below 300m (1,000 ft) to more than 1,200m (4,000 ft) on various substrates, but most commonly on acidic, sedimentary and metasedimentary substrates, e.g ., sandstone, quartzite, and shale. A few stands occur on Piedmont monadnocks and foothills. Soils are very infertile, shallow, and droughty. Thick, poorly decomposed duff layers, along with dead wood and inflammable shrubs, contribute to a strongly fire-prone habitat.

Vegetation Description

Overstory pine species dominate with up to 70% species specific (e.g. Pinus pungens or Pinus rigida, sometimes with Pinus virginiana or rarely Pinus echinata codominant (NatureServe 2007)) . Chestnut oak (Q. prinus) and Scarlet oak (Quercus coccinea) and other pines may also be in overstories. Midstories, when present, may include mountain laurel (Kalmia latifolia), blackgum (Nyssa sylvatica), red maple

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(Acer rubrum), sourwood (Oxydendrum arboretum), black locust (Robinia pseudoacacia) and sprouts of American chestnut (Castanea dentate). Understories can include hobblebush (Viburnum lantanoides), blueberries (Vaccinium spp.), huckleberries (Gaylussacia spp.), Galax urceolata, sedges and other herbaceous species.

Short-statured table-mountain pine (Pinus pungens) and pitch pine (Pinus rigida) are usually the dominants forming an open overstory, often with co-dominant chestnut oak (Quercus prinus). Less important tree associates include scarlet oak (Quercus coccinea), Virginia pine (Pinus virginiana) and sassafras (Sassafras albidum). Except in the Piedmont stands, bear oak (Quercus ilicifolia) is characteristically abundant in the shrub layer, along with various ericaceous species. Colonial shrubs usually pre-empt available microhabitats for most herbaceous species, but bracken fern (Pteridium aquilinum var. latiusculum) and turkey-beard (Xerophyllum asphodeloides) are often competitive enough to achieve significant cover.

The globally rare variable sedge (Carex polymorpha), the state-rare northern pine snake (Pituophis melanoleucus melanoleucus), several rare moths and all bear oak feeders are locally associated with these woodlands. More common and conspicuous animals often found in these dry, rocky, semi-open habitats include the northern fence lizard (Sceloporus undulatus hyacinthinus) and the five-lined skink (Eumeces fasciatus).

Disturbance Description

Periodic fire is an important ecological process that provides opportunities for regeneration of both pines and less competitive herbaceous species, while setting back successional encroachment of potential overstory species (especially chestnut oak, black gum, red maple, and white). On cliffs and other very rocky sites, the vegetation is self-perpetuating due to extreme edaphic conditions. Fire reduction and the native insect pest, southern pine beetle (Dendroctonus frontalis) are the most serious threats to communities of this group, although historically, pine beetle-induced mortality followed by stand-replacing fire was a principal mechanism for pine regeneration.

NatureServe (2007) notes that if the pines are lost, the distinction between this system and Southern Appalachian Oak Forest (CES202.886 -- BpS1315) or Central Appalachian Pine-Oak Rocky Woodland (CES202.600 -- BpS1377) becomes blurred.

Fire Regime Group I with relatively common surface fires (2-9yrs) and rarer mixed (160yrs ?) and replacement (100yrs ?) fires. Non-fire disturbances that resulted in stand alteration (rarely replacement) included mortality from insects (biotic) and wind-weather related events (abiotic) e.g., windstorm and ice.

In the absence of frequent fire, encroachment by oak (and other tree/shrub species) occurs leading to dense and overcrowded stands with little, if any, pine regeneration. In these encroached stands the older remaining stressed pines are more likely predisposed to insects.

Adjacency or Identification Concerns

This system is similar to and should be compared with BpS 1377 -- Central Appalachian Pine-Oak Rocky Woodland (CES202.600). Distinctions between these systems and BpS 1353 -- Southern Appalachian Low-Elevation Pine Forest (CES202.332) and 1354 -- North-Central Appalachian Pine Barrens (CES202.590) should also be reviewed.

A subset of northern and central Appalachian Pine-Oak / Heath communities that occurs on exposed, high-elevation summits of sedimentary ridges are sometimes referred to as montane or Appalachian "pine

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barrens." Although these communities are fire-influenced, the vegetation retains a dwarfed, shrub land (less than six meters [20ft] tall) physiognomy even during long absences of fire due to extremely shallow, xeric soils and constant exposure to severe winds and ice. Only one occurrence of such a "pine barren" is documented in Virginia, covering about 60 ha (150 ac) on Warm Springs Mountain (Bath County), at elevations between 1100-1200m (3600-4000ft). Larger examples occur in nearby West Virginia at elevations from 1200-1375m (4000-4500ft) on the summit of North Fork Mountain (Pendleton County). The singular Virginia occurrence is characterized by dense, nearly impenetrable thickets of Catawba rhododendron (Rhododendron catawbiense), bear oak (Quercus ilicifolia), mountain-laurel (Kalmia latifolia), black huckleberry (Gaylussacia baccata), and late lowbush blueberry (Vaccinium angustifolium), with scattered emergent (but still shrub-sized) pitch pines (Pinus rigida). The average height of the barrens vegetation varies from knee-high in years following intense burns to about five meters (16ft). Compositionally and environmentally, the Central Appalachian "pine barrens" can be considered part of the Pine – Oak / Heath Woodlands ecological group, but more study is needed to determine whether the Virginia stand represents a distinct community type.

NatureServe (2007) makes the following comments regarding adjacent ecological systems: This system is almost always bordered and intermixed with Southern Appalachian Oak Forest (CES202.886 -- BpS 1315) or (in the northern half of its range) by Central Appalachian Pine-Oak Rocky Woodland (CES202.600 -- BpS 1377).

The distinctions are made more difficult by the suppression of fire and subsequent invasion of less fire-tolerant species such as Acer rubrum and Nyssa sylvatica. Generally speaking, communities with a heavy component of pine (at least 25 or 50% of canopy) are categorized as Southern Appalachian Montane Pine Forest and Woodland (CES202.331-- BpS 1352), whereas communities with a much smaller component of pines are considered Southern Appalachian Oak Forest (CES202.886 -- BpS 1315) or Central Appalachian Pine-Oak Rocky Woodland (CES202.600 -- BpS 1377)). Central Appalachian Pine-Oak Rocky Woodland (CES202.600) is distinguished by a mixed or deciduous canopy and absence of Pinus pungens. At the highest elevations that this system is seen, it may intergrade with Southern Appalachian Grass and Shrub Bald (CES202.294 -- BpS 1414).

Stands with Pinus echinata present are generally accommodated by Southern Appalachian Low-Elevation Pine Forest (CES202.332 -- BpS 1353). The relationship between these two systems may need further clarification. Southern Appalachian Low-Elevation Pine Forest (CES202.332) is distinguished by occurrence as small patches on the most extreme topography, as well as by the species of pines dominating. However, Pinus echinata may codominate in Southern Appalachian Low-Elevation Pine Forest (CES202.332) at times.

Sites that would support Southern Appalachian Montane Pine Forest and Woodland (CES202.331-- BpS 1352) under a natural fire regime, but which have lost the pines by logging, southern pine beetle or senescence in the absence of fire, should probably be regarded as degraded examples of this system.

Native Uncharacteristic Conditions

Now present and increasingly abundant red maple (Acer rubrum),white pine (Pinus strobes), blackgum (Nyssa sylvatica), oaks (Quercus spp), and mountain laurel (Kalmia latifolia) has been typified as the "native invasive" in pine forests and woodlands. Their abundance in these systems measured in both stem density and basal area has grown considerably due to fire suppression and the marked increase in fire return interval. The increasing abundance of oak, white pine, red maple, and black gum in this type can be attributed to fire suppression. In the absence of frequent fire, encroachment by oak (and other tree/shrub

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species) occurs leading to dense and overcrowded stands with little, if any, pine regeneration. In these encroached stands the older remaining stressed pines are more likely predisposed to insects.

In many stands, mountain laurel seems to be a greater problem than any of the tree species (Lafon, pers. comm.).

Sites that would support Southern Appalachian Montane Pine Forest and Woodland (CES202.331-- BpS 1352) under a natural fire regime, but which have lost the pines by logging, southern pine beetle or senescence in the absence of fire, should probably be regarded as degraded examples of this system (NatureServe 2007).

Scale Description

These pine-dominated forests and woodlands occurred as large patches within a matrix of oak-dominated forests and woodlands.

NatureServe (2007) notes that contiguous bodies of this system probably once covered dozens to 100ac+. Patches often occur in complexes with other systems.

Issues/Problems

Comments

This model was based on R8TMPP -- Table Mountain/Pitch Pine, by Roger Fryar (9/2005), adapted on 8/15/2007 by Steve Croy, Margit Bucher, Sam Lindblom, Megan Sutton, and Gary Curcio, with assistance from Colleen Ryan.

Potential reviewers: Charles Lafon, Melissa VanGundy, Henri Grissino-Meyer, Chuck (CE) Williams(Clarion College?, PA), Wanda SanJule (VA TNC), Tom Waldrop (Clemson), Rick Meyers

Charles Lafon felt the following points made in the report are particularly important, because sometimes they are overlooked:
(1) It is noted that although the stands often are referred to as "ridgetop communities," they actually cover larger areas, i.e., the south- and west-facing facets of spurs.
(2) The importance of patchiness in burning. Patchiness (along with temporal variability in fire return interval) likely was important for the survival of pine seedlings.
(3) The role of canopy-thinning disturbances other than fire (e.g., southern pine beetle, ice storms).

In addition, he made the following comment:
Concerning 2-9yr fire return interval. I think this interval is largely based on our fire history studies. I would clarify that this is the typical interval at which fires were recorded anywhere in our study sites (i.e., scarring at least one tree). Some of the fires may have burned only a portion of the study areas. Filtering out the potentially small-extent fires reveals slightly longer return intervals – on the order of 5-15yrs for the more widespread fires.

Vegetation Classes

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Class A 12 %

Early Development 1 All Structure

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model

Indicator Species* and Canopy Position

PIRI	Mid-Upper
PIPU5	Mid-Upper
QUCO2	Mid-Upper
QUPR2	Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	100 %
Height	Tree 0m	Tree 5m
Tree Size Class	Sapling >4.5ft; <5"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

(Class age 0-15yrs). In this class, very dense regeneration of seedlings/saplings and coppice (scattered oak grubs, pine regeneration, and low shrubs) 5 to 15ft in height. No understory in the truest sense of the word. Scattered among the seedlings/saplings and coppice are developing clumps of warm-season grasses such as little bluestem, big bluestem, and Indian grass along with Ericaceous shrubs including Vaccinium, Gayluccia, Kalmia, and Pieris. Other commonly encountered plants are dry site sedges, bear oak, sweet fern, and composites. Fire is likely the dominant disturbance event, with surface fires occurring more frequently than stand-replacing fires. This class may persist on the landscape up to 15yrs.

With time and periodic surface fire, class A succeeds to class C. We estimate that fires may occur in this class every five years, but that stand replacement fires would only occur every 20yrs, maintaining this system in A. This accommodates periodic surface fires that are patchy and don't replace the whole stand. Parts of the landscape with a more frequent fire regime could be maintained as a grassland system and would be captured in a different model.

Class A alternatively succeeds to class B in the absence of fire for a period of 14yrs.

Class B 3 %

Mid Development 1 Closed

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model

Indicator Species* and Canopy Position

PIRI	Mid-Upper
PIPU5	Mid-Upper
QUCO2	Mid-Upper
QUPR2	Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	71 %	100 %
Height	Tree 5.1m	Tree 10m
Tree Size Class	Medium 9-21"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

(Class age 16-70yrs). This stage is a mid-seral closed stage dominated by dense oak and pine saplings in approximately equal amounts in oak and pine overstory with shade tolerant shrubs coming in under the tree saplings.

Class A succeeds to class B with the absence of fire for a period of 14yrs. The understory becoming sparse but including the same species as class A.

With time and no mixed severity fires, class B will succeed to class E (late closed stage). Very low intensity surface fires (five year probability) maintain this class. A mixed severity fire (50yr probability) would open up this mid-closed stage and transition it to class C. Replacement fires (75yr probability) transition this class back to A.

Invasions of pest/pathogens, likely pine beetles, may maintain this class in B (50yrs). Rare Catastrophic wind/weather events (500yrs) transition this class back to A, but more likely ice events (option1 - 250yrs)

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may open this stand and transition it to C.

Class C **25 %**

Mid Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 9

Indicator Species* and Canopy Position

PIRI	Mid-Upper
PIPU5	Mid-Upper
QUCO2	Mid-Upper
QUPR2	Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	21 %	70 %
Height	Tree 5.1m	Tree 10m
Tree Size Class	Medium 9-21"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

(Class age 16-70yrs). Mid-seral, open canopy. Pines in this class are equal to or more dominant than oaks. Woodland with herbaceous/grass and mixed low shrub understory. In the absence of frequent fire, woody understory increases in height and cover, including mountain laurel and other ericaceous species. Oak species found interspersed among the pines are multi-stemmed, a result of coppice from fire events.

Frequent surface fires and mixed-severity fires maintain this class. Frequent surface fires are modeled to have occurred with a five year probability with mixed severity fires at a 75yr probability. With time and fire the class would succeed to class D. Without fire for 20yrs the vegetation would close in and would transition to class B. Replacement fires (150yr probability) transition this class to A.

Invasions of pest/pathogens, likely pine beetles, may maintain this class in C (100yr probability), while rare catastrophic wind/weather events (1000yrs) transition this class back to A.

Class D **55 %**

Late Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 2

Indicator Species* and Canopy Position

PIRI	Upper
PIPU5	Upper
QUCO2	Mid-Upper
QUPR2	Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	21 %	70 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Large 21-33"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

(Class age 71yrs+). Late-development, open canopy pine to pine-oak. This class has the visual impression of a woodland, with scattered low-fire suppressed shrubs and interspersed grasses and herbs. Greater than 40% cover of herbaceous and graminoid species present in the groundcover

The vegetation of this class is similar to class C except that this class has more mature trees (over 70yrs in age). This class would be maintained by frequent surface fires with a five year probability and mixed fires with a 100yr probability. A replacement fire with a 200yr probability would send the class back to A. Lack of fire for 20yrs transitions this type to E.

Invasions of pest/pathogens, likely pine beetles, may maintain this class in D (75yr probability) while rare catastrophic wind/weather events (1000yrs) transition this class back to A.

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Class E **5%**

Late Development 1 Closed

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☑ Tree

Fuel Model 9

Indicator Species* and Canopy Position

PIRI	Upper
PIPU5	Upper
QUCO2	Mid-Upper
QUPR2	Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	71 %	100 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Large 21-33"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

(Class age 71yrs+). Late-seral, closed canopy, pine-oak dominated overstory. Little herbaceous cover and dense shrub layer.

This class is a closed-canopy pine-oak forest that results after prolonged periods of fire suppression or microtopography that protects the forest from fires (approximately 50yrs+). A shift in dominance from pines to oaks would be expected in the absence of fire for long durations and would be hastened by ice storms and pine beetles. This class ranges from 71yrs to a mature persistent closed canopy forest. Class E could move to Class D (late open stage) with a mixed fire (75yr probability), or potentially to class D with an ice event (250yr probability).

Replacement fires transition this class to A (500year probability).

Invasions of pest/pathogens, likely pine beetles, may transition this class to D (75yr probability) while rare catastrophic wind/weather events (1000yrs) transition this class back to A.

Disturbances

Fire Regime Group:** I

Historical Fire Size (acres)

Avg 1000
Min 100
Max 10000

Sources of Fire Regime Data

☑ Literature
☑ Local Data
☑ Expert Estimate

Fire Intervals

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	88.43			0.01131	5
Mixed	100.9			0.00991	5
Surface	5.422			0.18443	90
All Fires	5			0.20565	

Fire Intervals (FI):

Fire interval is expressed in years for each fire severity class and for all types of fir combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inver 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.

Additional Disturbances Modeled

☑ Insects/Disease ☐ Native Grazing ☑ Other (optional 1) Ice storm
☑ Wind/Weather/Stress ☐ Competition ☐ Other (optional 2)

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LANDFIRE Biophysical Setting Model

Biophysical Setting 5713530 Southern Appalachian Low-Elevation Pine Forest

☐ *This BPS is lumped with:*
☐ *This BPS is split into multiple models:*

General Information

Contributors (also see the Comments field) **Date** 7/26/2007

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Vegetation Type
Forest and Woodland

Map Zone
57

Model Zone

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

Dominant Species*

PIVI2	QUCO2
PIEC2	CAGL8
QUFA	VAPA4
QUPR2	GABA

General Model Sources
☑ Literature
☐ Local Data
☑ Expert Estimate

Geographic Range
This system is found primarily in the Appalachian regions of KY and the Southern Blue Ridge in northern GA, western NC, southeastern TN, the Cumberlands of AL, parts of the Interior Low Plateau (e.g., the Knobs Region of KY), and southwestern VA (NatureServe 2007).

Biophysical Site Description
Occurs on a variety of topographic and landscape positions, including ridgetops, upper and midslopes, in mountain valleys and lower ranges. Bedrock may be a variety of types, but system is limited to acidic substrates (NatureServe 2007). This system consists of shortleaf pine- and Virginia pine-dominated forests in the lower elevation southern Appalachians and adjacent Piedmont and Cumberland Plateau, extending into the Interior Low Plateau of Kentucky and Tennessee. Fire is important in maintaining Shortleaf pine dominated types. The natural habitat of Virginia pine is xeric fire refuges such as exposed rock outcrops with patchy and light fuels. It is thus somewhat comparable to Table Mountain pine, but at lower elevations. Under natural conditions, it would occupy minor land area as a type but would have scattered individuals surviving in mixture with shortleaf pine.

This system is common to the Southern Appalachians but less so in the adjacent Piedmont, typically occupying xeric to dry sites at elevations generally below 700m on ridge tops, western, south and southwestern aspects. Occasionally Virginia pine is also found dry-mesic sites as a pioneering vegetation.

Vegetation Description
Vegetation consists of closed to open forest dominated by shortleaf pine (Pinus echinata) or Virginia pine (Pinus virginiana). Pitch pine (Pinus rigida) may sometimes be present. Hardwoods may be abundant at

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times, especially dry-site oaks such as Quercus falcata, Quercus prinus and Quercus coccinea. Other overstory components vary with moisture regimes but could include several other pine species, red and white oaks, other hardwoods and/or eastern red cedar. Many stands are strongly even-aged and density-dependent based on age.

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 sp (NatureServe 2007).

Virginia pine is an aggressive invader following disturbance and might be considered uncharacteristic vegetation on some sites. The frequency of its occurrence in the Southern Appalachian forested landscapes today is undoubtedly greater than in pre-settlement times. Its niche appears best fitted to xeric sites on thin soils (e.g. "necklace" stands adjacent to bluff lines in the Cumberlands and Appalachians). Virginia pine is increasingly at risk of mortality to disturbance agents as it matures. Older trees are particularly susceptible to pine beetle attacks due to slow radial growth and relatively high growing densities on often poor sites. Older trees are also more prone to windthrow. Few stands reach 100yrs of age with most stands "breaking up" at 50 to 75yrs of age.

Disturbance Description

Fire is an important influence and may be the only factor determining the occurrence of this system which would be a hardwood forest without fire. Fires were probably frequent and of low-intensity, or a mix of low- and high-intensity. Fire is important in determining the dominance of the two pines and the presence of the hardwood components and the overall vegetation structure.

Shortleaf pine (P. echinata) when mature is resistant to fire, while Virginia pine (P. virginiana) is less adapted to fire with thinner bark and higher mortality rates (particularly in young stands), and P. virginiana seedlings are easily killed by fire and will not resprout. It can however, survive repeated low intensity fires. The natural occurrence of P. virginiana on infertile, thin soils allows the community to persist in a specialized edaphic niche. It is a prolific seeder and is able to pioneer on these and other disturbed sites. P. virginiana often develops 'red heart' rot, caused by Fomes pini, at ages beyond about 60yrs. Virginia pine is very shallow rooted and susceptible to windthrow. Heavy snow and ice can create significant stand openings. Initial openings give rise to further windthrow and even larger openings as trees fall into gaps.

Under present conditions, the Southern pine beetle is an important factor in this system. Beetle outbreaks can kill pines without creating conditions for pines to regenerate.

In the absence of fire to maintain the ecosystem, natural Virginia pine stands could succeed to varying vegetation cover: (a) xeric oaks such as scarlet oak, chestnut oak, blackjack oak, and post oak; (b) mountain laurel, sourwood, red maple, and huckleberry; and (c) eastern white pine overstory.

Effects of logging and past clearing as well as fire suppression make understanding of this system's natural character and dynamics difficult. Some pine-dominated areas appear to be successional stands established in former hardwood forests after logging or cultivation, and would not be expected to have the same dynamics or ecosystem characteristics as natural pine forests maintained by fire. In natural pine forests,

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logging may allow pines to regenerate or may change the composition to weedy hardwoods. It might alter canopy composition as well as structure (NatureServe 2007).

Adjacency or Identification Concerns

Examples with significant hardwood component may be classified as Southern Piedmont Dry Oak-(Pine) Forest (CES202.339 -- BpS1368). NatureServe (2007) also notes that this system probably usually bordered and intermixed with Southern Appalachian Oak Forest (CES202.886-- BpS1315) and Southern and Central Appalachian Cove Forest (CES202.373 -- BpS1318) may be present in more mesic areas. It may also intergrade into Southern Appalachian Montane Pine Forest and Woodland (CES202.331 -- BpS1352) at high elevations.

The relationship between this system and Southern Appalachian Montane Pine Forest and Woodland (CES202.331 -- BpS1352) may need further clarification. Southern Appalachian Low-Elevation Pine Forest (CES202.332) is distinguished by its occurrence as large patches on lower terrain (generally below 700m [2300ft]) and less extreme topography. The vegetation of the two systems may overlap but pitch pine and Table Mountain pine are more typical of the former, while shortleaf pine and Virginia pine are more typical of the latter (NatureServe 2007).

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 -- BpS1367)) by the presence of Pinus virginiana and Quercus prinus, which do not cross the Mississippi River (NatureServe 2007).

Native Uncharacteristic Conditions

Absence of fire without pine reproduction may lead to succession to hardwood forest types.

Effects of logging and past clearing as well as fire suppression make understanding of this system's natural character and dynamics difficult. Some pine-dominated areas appear to be successional stands established in former hardwood forests after logging or cultivation, and would not be expected to have the same dynamics or ecosystem characteristics as natural pine forests maintained by fire. In natural pine forests, logging may allow pines to regenerate or may change the composition to weedy hardwoods. It might alter canopy composition as well as structure (NatureServe 2007).

Scale Description

Spatial scale and pattern are generally characterized as large patch. Most remnants in relatively natural condition are probably small patches. In its most natural setting, topography generally limits the patch size of the ecological community.

Issues/Problems

Adjusted class landscape percents so that class E had one percent by adjusting class D from 34% to 33% (Landsum can't handle 0 percent classes) - MHW MiFSL 3/19/08.

Comments

NOTE: 2/26/09: As a result of final QC for LANDFIRE National by Jennifer Long the user-defined min and max fire return intervals for mixed severity fire was deleted because they were not consistent with the modeled fire return interval for this fire severity type.

This BpS is really a combination of Rapid Assessment model descriptions for R8PIVlap - Appalachian Virginia Pine and R8PIECap - Appalachian Shortleaf Pine. The RA modeler for each was Roger D. Fryar

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and each was reviewed by Ron Stephens rstephens@fs.fed.us.

Vegetation Classes

Class A 32 %

Early Development 1 All Structure

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 7

Indicator Species* and Canopy Position

PIVI2	Upper
PIEC2	Upper
VACCI	Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	90 %
Height	Tree 0m	Tree 5m
Tree Size Class	Sapling >4.5ft; <5"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class age 0-10yrs. Dense seedling and sapling stands with variable herbaceous or woody understory vegetation. Stands originating from Virginia pine forests may have dense pine seedlings with very little understory. Shortleaf-originating stands may include hickory, yellow poplar, dogwood, blueberry, blackberry, huckleberry, grasses and forbs.

Class B 2 %

Mid Development 1 Closed

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 8

Indicator Species* and Canopy Position

PIVI2	Upper
VACCI	Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	100 %
Height	Tree 5.1m	Tree 10m
Tree Size Class	Pole 5-9" DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class age 11-30yrs. Poletimber and small sawtimber stands dominated by Virginia pines with minor components of shortleaf pine and other woody and herbaceous vegetation. Stands are often dense.

Class C 32 %

Mid Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 8

Indicator Species* and Canopy Position

PIEC2	Upper
PIVI2	Upper
QUERC	Low-Mid
CARYA	Low-Mid

Structure Data (for upper layer lifeform)

	Min	Max
Cover	31 %	50 %
Height	Tree 5.1m	Tree 25m
Tree Size Class	Pole 5-9" DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class age 11-30yrs. Canopy trees are dominated by shortleaf pine, relatively open with grassy understory. Oak and hickory may also be present in canopy or midstory. Virginia pine may be present in pockets protected from fire.

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Class D 33 %

Late Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 8

Indicator Species* and Canopy Position

PIEC2	Upper
QUERC	Mid-Upper
CARYA	Mid-Upper
COFL2	Middle

Structure Data (for upper layer lifeform)

	Min	Max
Cover	31 %	70 %
Height	Tree 25.1m	Tree 50m
Tree Size Class	Medium 9-21"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class age 31yrs+. Canopy is dominated by shortleaf pine. Some open parklike stands with grassy understories; overstory contains varying amounts of pine, oak and hickory. Variable midstory development possible with dogwood, oak and hickories.

Class E 1 %

Late Development 1 Closed

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☑ Tree

Fuel Model 8

Indicator Species* and Canopy Position

PIVI2	Upper
VACCI	Low-Mid

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	100 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class age 31yrs+. Small sawtimber stands dominated by Virginia pines with gaps occurring from tree mortality caused by native insects, wind, ice and snow.

Disturbances

Fire Regime Group: I

Historical Fire Size (acres)

Avg 100
Min 10
Max 1000

Sources of Fire Regime Data

- ☑ Literature
- ☐ Local Data
- ☑ Expert Estimate

Fire Intervals

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	25.28	25	125	0.03955	14
Mixed	144.9			0.00690	2
Surface	4.203	5	15	0.23795	84
All Fires	4			0.28441	

Fire Intervals (FI):

Fire interval is expressed in years for each fire severity class and for all types of fir combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inver 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.

Additional Disturbances Modeled

- ☑ Insects/Disease
- ☑ Wind/Weather/Stress
- ☐ Native Grazing
- ☐ Competition
- ☐ Other (optional 1)
- ☐ Other (optional 2)

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