

Fire Regime Condition Class (FRCC) Interagency Handbook Reference Conditions

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Potential Natural Vegetation Group: Appalachian Dry-Mesic Oak Forest

Geographic Area: Ranges throughout the central and southern Appalachians, from approximately central Pennsylvania south to northern Georgia and northeast Alabama.

Description: This system consists of predominately dry-mesic to dry forests occurring on open and exposed topography at lower to mid elevations in the Southern Blue Ridge, Southern Ridge and Valley, and Central Appalachians. This is the upland forest that characterizes much of the Appalachian highlands of the southeastern United States. It occupies a region of considerable size and environmental diversity with respect to landform, climate, soils, and geology. Various species of oak (*Quercus* spp.) are consistently present as major components of the tree stratum. Historically American chestnut (*Castanea dentata*) was a dominant or co-dominant in many of these communities until its virtual elimination by the chestnut blight fungus [*Endothia* (*Cryphonectria*) *parasitica*] during the early 1900's. Contiguous forests of tens to hundreds of thousands of acres once occurred.

Elevations of these forests range from less than 800 feet to over 4000 feet. Occurs on open slopes, ridgetops, lower elevation peaks, and higher parts of broad valley bottoms. Bedrock may be of any type. Soils are usually deep residual soils, but are often rocky. Some shallow soils, colluvium, and other soils may be present locally within the group, but shallow soils tend to produce environments that are more extreme and have a larger component of various pine species. Soils can range from acidic to circumneutral or basic, and the vegetation varies accordingly.

Typically, the vegetation seen today consists of forests dominated by oaks, especially white oak (*Quercus alba*) and red oak (*Quercus rubra*), and on drier sites chestnut oak (*Quercus montana*), black oak (*Quercus velutina*), and scarlet oak (*Quercus coccinea*). Along with oaks are varying amounts of hickory (*Carya* spp.), red maple (*Acer rubrum*), and other species such as white pine (*Pinus strobus*) and white ash (*Fraxinus americana*). American chestnut (*Castanea dentata*) was once dominant or codominant in many of these forests. Currently subcanopies and shrub layers are usually well-developed. Some areas (usually on drier sites) now have dense evergreen Ericaceous shrub layers of mountain laurel (*Kalmia latifolia*), fetterbush (*Pieris floribunda*), or on more mesic sites rhododendron (*Rhododendron* spp.). Others areas have more open shrub layers, sometimes consisting of blueberries (*Vaccinium* spp.) or huckleberries (*Gaylussacia* spp.). Herbs, forbs, and ferns are usually sparse to moderate in density.

Though often contiguous, patches are virtually always convoluted and interfingered with other systems, especially Mesophytic Cove Forests and Dry-Xeric Oak-Pine Forests. At the highest elevations it may grade into Northern Hardwood Forests. Small patches of other communities, such as rock outcrops and mountain wetlands, are sometimes embedded within this group.

Non-fire Dynamics: This system is naturally dominated by stable, uneven-aged forests, with canopy dynamics dominated by gap-phase regeneration. Most oaks are long-lived with typical age of mortality ranging from 200 to 400 years. Scarlet and black oaks are shorter lived with typical ages being approximately 50 to 100 years while white oaks can live as long as 600 years. Extreme wind or ice storms occasionally create larger canopy openings. Virtually all examples have been strongly affected by introduction of the chestnut blight, which killed all of the American chestnut trees, eliminating it as a canopy dominant. The introduction, and now widespread establishment, of gypsy moth (*Lymantria dispar*) that favors oaks as food has also affected these forests by causing widespread mortality of overstory trees depending on topographic position and precipitation amounts around defoliation events. Past logging, and now

lack of fire, has affected most occurrences by changing canopies to an even-aged, or more even-aged, structure with an understory of shade tolerant but fire intolerant species such as white pine, red maple, and striped maple (*Acer pennsylvanica*). Hickories are thought to have benefited greatly from the removal of American chestnut from the overstory, and their persistence and continued recruitment in contemporary oak-hickory forests may reflect fire exclusion in recent decades.

Fire Regime Description: Fire Regime Group I. Fire occurred fairly frequently in pre-European settlement times. In a recent study on fire history of a red oak stand in West Virginia it was found that fire intervals ranged from 7 to 32 years from 1846 to 2002 with a median of approximately 16 years, and prior to the fire control era ranged from 7 to 15 years (Schuler and McClain, 2003). Schuler and McClain stated these observations did not deviate significantly from previous research in the oak forests of Ohio, Maryland, and Missouri. Fires were usually low-intensity surface fires, with an occasional more intense fire that replaced patches of the overstory. The dominant species (oak and historically chestnut) are fairly fire-tolerant, making most fires non-catastrophic. If fires occurred during the spring “green-up” under very dry to drought conditions then patches of the overstory could be killed by basal injury depending on aspect and fire behavior. Fire is important for favoring oak dominance over more mesophytic tree species such as tulip poplar. Fire also can be expected to have a moderate to strong effect on vegetation structure, producing a more open canopy and less dense understory and shrub layer than currently seen. Fire frequency and/or intensity is important for determining the boundary between this group and both the more mesic and the drier systems and works in conjunction with aspect and exposure.

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: post replacement	8	Treefall gaps and small to medium patches 0-19 years in age with saplings and small trees up to 20 cm (8 in) dbh. Potential canopy species (oaks) are typically mixed with subcanopy tree and shrub species and herbs. Most oaks are coppice grown from previously established and fire killed individuals with some as seedlings from animal-buried acorns.
B: mid-seral closed	13	Old treefall gaps with closed canopy 20-64 years in age. Trees ranging from 20-60 cm (8-24 in) dbh. Shade tolerant species in the understory.
C: mid-seral open	20	Woodland with an open midstory and canopy closure <60%. Age of 20-69 years. Shrub/herbaceous cover patchy.
D: late- seral open	47	Forest with an open midstory and canopy closure 61-80%. Age is 70+ years. Shrub/herbaceous cover patchy.
E: late- seral closed	12	Closed canopy forest with cover >80%. Trees 65+ years in age. Midstory and understory closed with dense cover and stocking of shrubs and saplings.
Total	100	

Fire Frequency and Severity

Fire Severity	Fire Frequency (yrs)	Probability	Percent, All Fires	Description
Replacement Fire	500	0.002	3	Almost no replacement fire except in spring/early summer during periods of drought or on exposed slopes with south aspect. Replacement is still only tree by tree or small patches <10 acres. Mortality is from bole heating, not crown fire.
Non-Replacement Fire	14	.072	97	Low-intensity surface fires, flame lengths ranging from a few inches to 3 ft, consuming only litter, grass and forbs.
All Fire Frequency*	14	0.074	100	

*All Fire Probability = sum of replacement fire and non-replacement fire probabilities. All Fire Frequency = inverse of all fire probability (previous calculation).

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VDDT File Documentation

Assumptions: 1) Patch-size scale is single-tree canopy gaps.
2) Native American fire was considered and determined to a factor.









