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Fire Regime Condition Class (FRCC) Interagency Handbook Reference Conditions

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PNVG Code: MMPH

Potential Natural Vegetation Group: Mixed Mesophytic Northeast

Geographic Area: The mixed-mesophytic forest region (Küchler 1964) is located in two of Bailey's ecoregion sections (McNab and Avers 1994). It includes the southern portion of the Southern Unglaciaded Allegheny Plateau Section (southeastern Ohio, western West Virginia, northeastern Kentucky). It also covers the Northern Cumberland Plateau Section (eastern Kentucky and east-central Tennessee; also a very small portion in northeast Alabama and northwest Georgia).

Description: These Plateaus are mature and dissected, most of the landscape consisting of high hills and narrow valleys. Elevations range from 650 to 1,300 ft. in the Allegheny Plateau and from 1,270 to 2,000 ft. in the Cumberland Plateau (McNab and Avers 1994). The dissected topography creates strong gradients in microclimate and soil moisture and fertility at the local (watershed) scale (Hutchins et al. 1976, Iverson et al. 1997, Morris and Boerner 1998). In the absence of frequent or catastrophic disturbance, these environmental gradients determine forest composition (Hutchins et al. 1976, Muller 1982, Iverson et al. 1997, Dyer 2001). We recognize two major and distinct forest types within this PNVG: mixed-oak and mixed-mesophytic. Though Küchler (1964) mapped and described this region as mixed-mesophytic, witness tree data (from early land surveys) and studies of old-growth forests suggest that mixed-oak forests were more abundant than mixed-mesophytic forests in many areas prior to European settlement (Beatley 1959, McCarthy et al. 1987, Abrams et al. 1995, Dyer 2001, McCarthy et al. 2001, Rentch et al. 2003).

Mixed-oak forest. Structure ranged from closed-canopy to more open and park-like forests, with dominant canopy species including white oak (*Quercus alba*), black oak (*Q. velutina*), hickories (*Carya glabra*, *C. tomentosa*), chestnut oak (*Q. prinus*), scarlet oak (*Q. coccinea*), and formerly American chestnut (*Castanea dentata*). Mixed-oak forests were dominant on xeric ridgetops/upper slopes and dry-mesic slopes, but also occupied mesic slopes in some areas (Muller 1982, McCarthy et al. 1987, Abrams et al. 1995, Dyer 2001, McCarthy et al. 2001). Historically, frequent surface fires presumably maintained this type and prevented succession to mixed-mesophytic forest, particularly on dry-mesic and mesic landscape positions (Delcourt and Delcourt 1998, Wade et al. 2000, Shumway et al. 2001). Today, after more than 75 years of effective fire suppression, shade-tolerant and/or fire-sensitive species (e.g., *Acer rubrum*, *A. saccharum*, *Fagus grandifolia*, *Liriodendron tulipifera*, *Nyssa sylvatica*) have become abundant.

Mixed-mesophytic forest. A diverse closed-canopy forest with dominant species including beech (*Fagus grandifolia*) yellow-poplar (*Liriodendron tulipifera*), American basswood (*Tilia americana* var. *heterophylla*), sugar maple (*Acer saccharum*), yellow buckeye (*Aesculus flava*), red oak (*Quercus rubra*), white oak (*Q. alba*) and formerly American chestnut (*Castanea dentata*) (Braun 1950, Muller 1982). This forest type developed primarily on mesic, sheltered landscape positions (e.g., lower slopes, coves, ravines) but also occurred on some dry-mesic slopes, where presumably fire was infrequent (Wade et al. 2000).

Fire regime description: The *mixed-oak* forest type is fire regime class I, frequent surface fires; presettlement return intervals ranging from 5-20 years (Frost 1998, Wade et al. 2000, Shumway et al. 2001, Guyette et al. 2003). The *mixed-mesophytic* forest type is fire regime class III, surface fires with return intervals 30 – 100+ years (Wade et al. 2000).

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: Post-replacement mesic	1	Regenerating stands on sheltered, mesic landscape positions (age = 0-9 years).
B: Post-replacement xeric	1	Regenerating stands on xeric and dry-mesic landscape positions (age = 0-9 years).
C: mid- seral	8	Closed canopy forests that develop on mesic landscape positions and have dominant trees 10-79 years of age. Dominant species include <i>Fagus grandifolia</i> , <i>Acer saccharum</i> , <i>Liriodendron tulipifera</i> ; also common are <i>Tilia americana</i> var. <i>heterophylla</i> , <i>Aesculus flava</i> , <i>Quercus alba</i> , and <i>Quercus rubra</i> .
D: late- seral open	50	Open-structured mixed-oak forests that develop on xeric and dry-mesic landscape positions. Dominant trees are 10+ years of age. Dominant species include <i>Quercus alba</i> , <i>Quercus velutina</i> , <i>Carya</i> spp. Fire-maintained.
E: late- seral closed	40	Closed-canopy mixed-mesophytic forests that develop on mesic landscape positions and have dominant trees that are 80+ years of age. Dominant species include <i>Fagus grandifolia</i> , <i>Acer saccharum</i> , <i>Liriodendron tulipifera</i> ; also <i>Tilia americana</i> va. <i>heterophylla</i> , <i>Aesculus flava</i> , <i>Quercus alba</i> , and <i>Quercus rubra</i> .
Total	100	

*Formal codes for classes A-E are: AESP, BMSC, CMSO, DLSO, and ELSC, respectively.

Fire Frequency and Severity

Fire Severity	Fire Frequency (yrs)	Probability	Percent, All Fires	Description
Replacement Fire	250 years	0.004	5%	>75 % top-kill of canopy
Non-Replacement Fire (Surface fire)	15 years	0.075	87%	Surface fires in the oak-dominated portions of the landscape.
Non-Replacement Fire (Mosaic fire)	150 years	0.007	8%	25-75% topkill of canopy
All Fire Frequency*	12 years	.086	100	

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

References

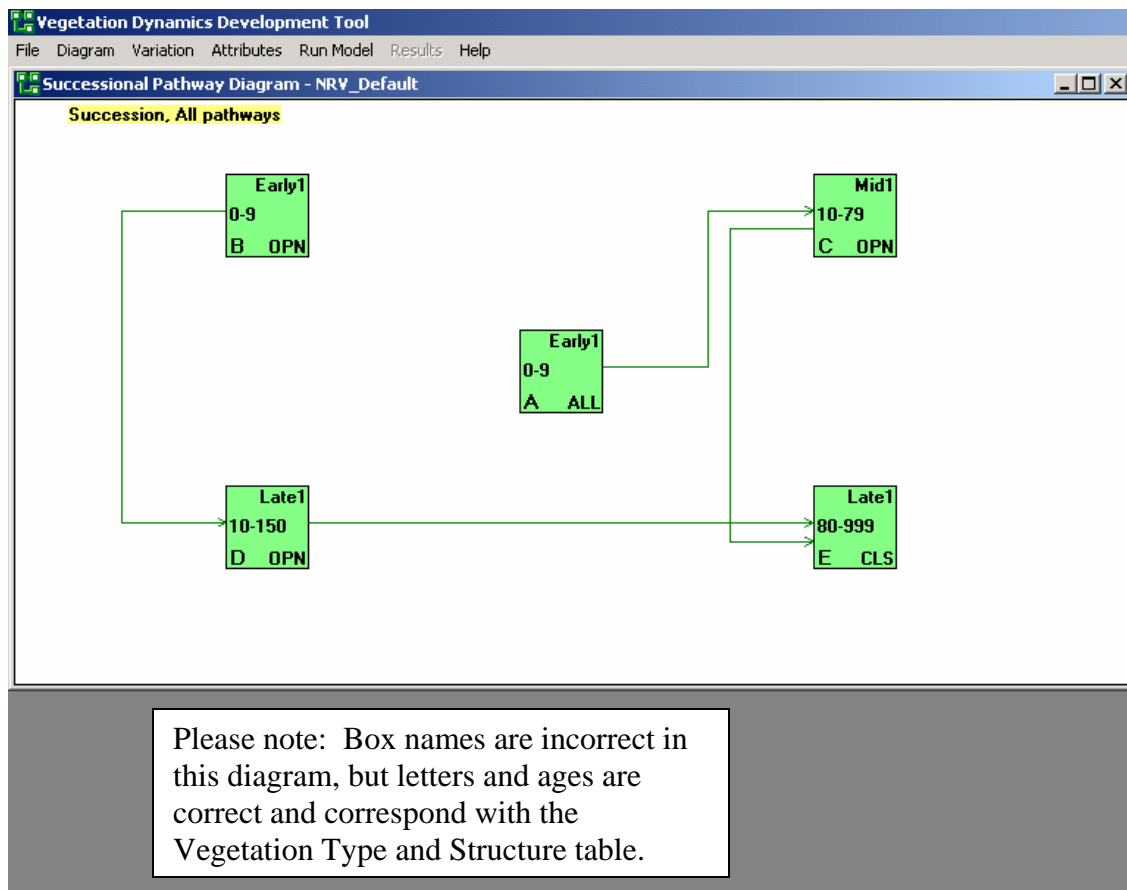
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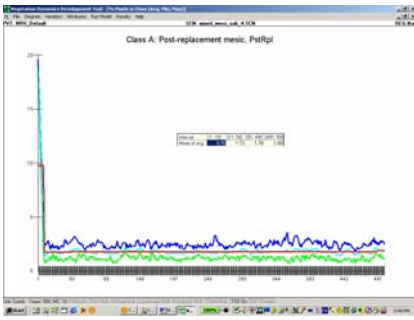
VDDT File Documentation

Include screen captures (print-screens) from any of the VDDT graphs that were used to develop reference conditions.

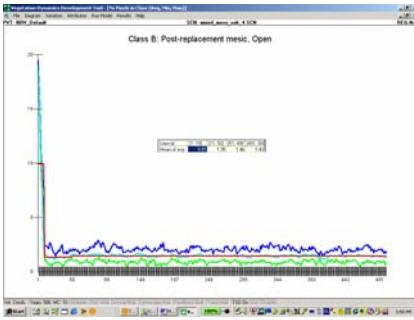
VDDT Diagram: Arrows show succession only.



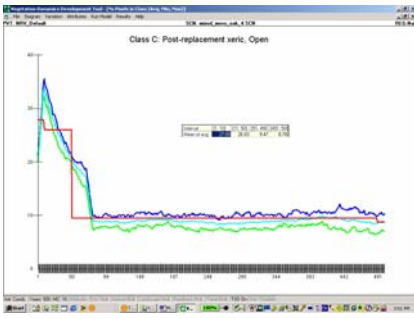
Please note: Box names are incorrect in these screen captures but the graphs and tables are correct. The correct box names are listed to the right of each graph



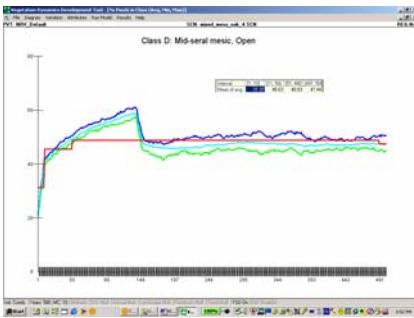
A. Post-replacement mesic



B. Post-replacement xeric



C. Mid-seral



D. Late-seral open (mixed-oak)



E. Late seral open (mixed-mesophytic)