****DRAFT****

Fire Regime Condition Class (FRCC) Interagency Handbook Reference Conditions

Modeler: Roger D. Fryar **Date:** 06/02/2004 **PNVG Code:** (100) Oak-Hickory

Potential Natural Vegetation Group: Western Dry-Xeric Oak (OKHK2)

Geographic Area: Interior Highlands and Cumberlands

Description: Potential natural vegetation group common to the Interior Highlands and Cumberlands. Typically occupying dry to xeric sites at elevations between 500 and 2500 feet on ridge tops, western, southern, southwestern and, on lower elevations, dryer northern aspects. Overstory oaks dominate with up to 60% oak specific. Tree species include black oak, post oak, blackjack oak, white oak, northern red oak, hickories with mixes of eastern white pine (Cumberlands) and shortleaf pine. Midstory species can include blackgum, red maple, American beech, dogwood, hickories, ashes, elms, eastern white pine, sourwood, black locust, black cherry, sassafras, serviceberry, eastern red cedar, along with sprouts of chinquapin. The lower canopy can include dogwood, blueberries (*Vaccinium* spp.), sawbrier (*Smilax glauca*), greenbrier (*S. rotundifolia*), (*Gaylussacia spp*), wild grape (*Vitis* spp.), and others. Ground cover may include, bluestem grass, sedges (*Carex* spp.) and a variety of herbaceous plants.

Without periodic fire, advanced oak regeneration is usually absent except on xeric sites. In the absence of fire, western mixed mesophytic species (e.g. blackgum, maples and others) are likely to replace oaks. Widespread oak decline, epidemic levels of native insect infestations (red oak borers and two-line chestnut borers), outside the range of natural variability can pose serious plant community stability problems. Non-native invasive plant species (e.g. kudzu) and non-native insects (most notably gypsy moth) can exacerbate community sustainability. Oak and hickory are considered "keystone" species within the ecosystem and are of major importance in maintaining biodiversity. Not only do the large number of oak and hickory species by themselves contribute to community richness but they are known to provide food and support for a substantial number of wildlife species (Spetich 2004).

Succession: Succession to mesophytic species can occur in the absence of periodic fire. Other pathways of succession can move closed oak forests to open, oak woodland. With even shorter fire return intervals (or more intense growing-season burns) success ional shifts of oak forest and woodlands to savannas or to woodlands with more of a pine component are possible.

Fire Regime Description: Fire regime group I, with frequent surface fires.

Mean Fire Return Interval (MFI) <35 years *www.srs.fs.fed.us/sustain* ; Pre-settlement fire return interval estimates ranging from 1-13 years with MFI of 3.7 years (Spetich 2004); Other fire return interval estimates ranging from of 2-7 years for open woodlands (Spetich 2004); MFI of 11.2 years for the Native American period (Spetich 2004): Fire return intervals ranging from 1-9 years with MFI of 4.4 years for the time period 1804 to 1906 (Spetich 2004) A likely range for fire return interval is between 2-15 years. Normal, natural fire regimes were most likely surface fires during the dormant season with occasional growing season mosaic fires (most likely occurring infrequently at 10 to 25-year intervals coincident with Hales solar cycles and/or droughts associated with El Nino Southern Oscillation (ENSO) cycles).

Model Assumptions: Mid and late-seral dry-xeric open stands are relatively stable communities and maintained with frequent fire. A seven-year FRI used in model. Mid and late-seral closed stands are less ecologically stable and more susceptible to disturbance agents including insects, disease and mosaic (mixed severity) fires.

For model purposes, the following definitions were used for closed versus open classes:

<10% prairie
11-25% savanna
26-60% woodland (open)
61%+ forest (closed)

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: post replacement	10	Pine and oak reproduction to 15' tall. 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
B: mid-seral closed	10	Mid-seral with closed canopy oak and shortleaf pole-sized trees with little or no herbaceous understory. Some woody understory development. > 50% canopy cover (crown closure estimate)
C: mid-seral open	20	Mid-development, open canopy. Woodland/savanna with herbaceous understory. Oak-pine predominate overstory < 50% canopy cover
D: late-seral open	50	Late-development, open canopy oak-pine to pine-oak in composition. Late-seral woodland/savanna pine and oak overstory with perennial grasses and limited shrub community. < 50% canopy cover
E: late- seral closed	10	Late-seral, closed canopy, oak dominated overstory community. Some herbaceous cover and "rank" woody shrub understory layer. Canopy gaps with non-oak regeneration. > 50% canopy cover (crown closure estimate)
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	105	.0095	7	
Non-Replacement Fire	8.4	.1191	93	Primarily surface fire in all classes. Some mosaic fire.
All Fire Frequency*	7.8	.1286	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

U.S. Department of Agriculture, Forest Service, Southern Forest Research Station, Southern Forest Resource Assessment, [Online]. Available: http://*www.srs.fs.fed.us/sustain*

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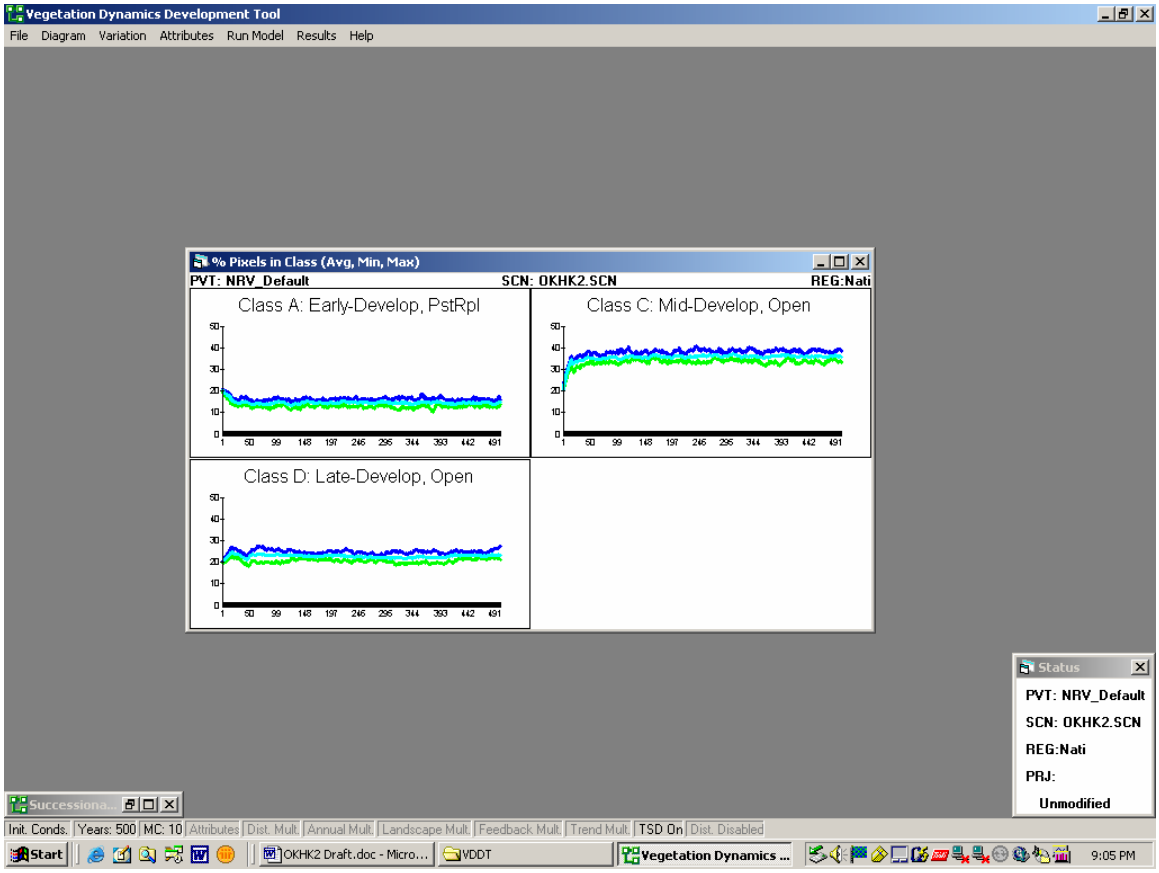
Brown, James K.; Smith, Jane Kapler, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 257 p.

Schmidt, Kirsten M, Menakis, James P., Hardy, Colin C., Hann, Wendel J., Bunnell, David L. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Gen. Tech. Rep. RMRS-GTR-87. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 41 p. + CD.

U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, December). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/.

VDDT File Documentation

Include screen captures (print-screens) from any of the VDDT graphs that were used to develop reference conditions.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File Diagram Variation Attributes Run Model Results Help
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SCN: OKHK2.SCN
REG:Nati
Class A: Early-Develop, PstRpl
Class C: Mid-Develop, Open
Class D: Late-Develop, Open
Status
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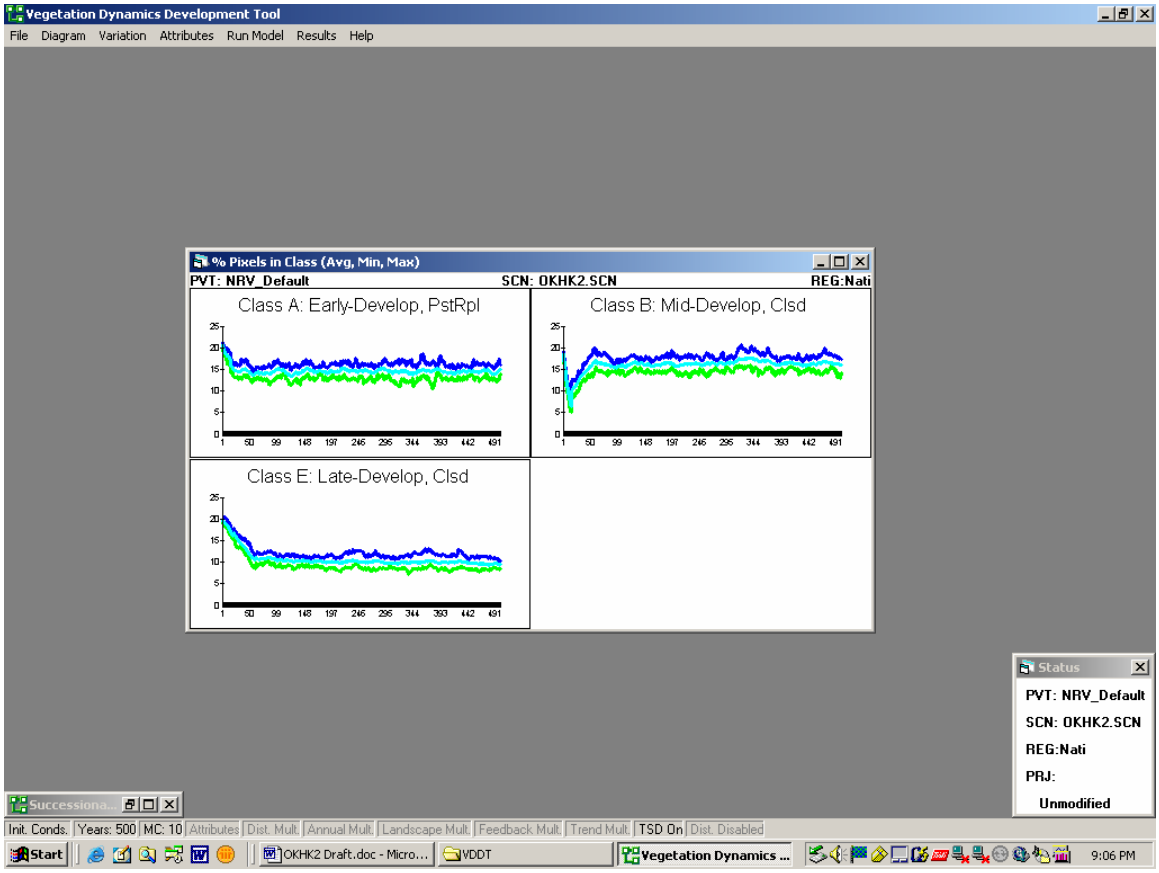
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Class A: Early-Develop, PstRpl
Class B: Mid-Develop, Clsd
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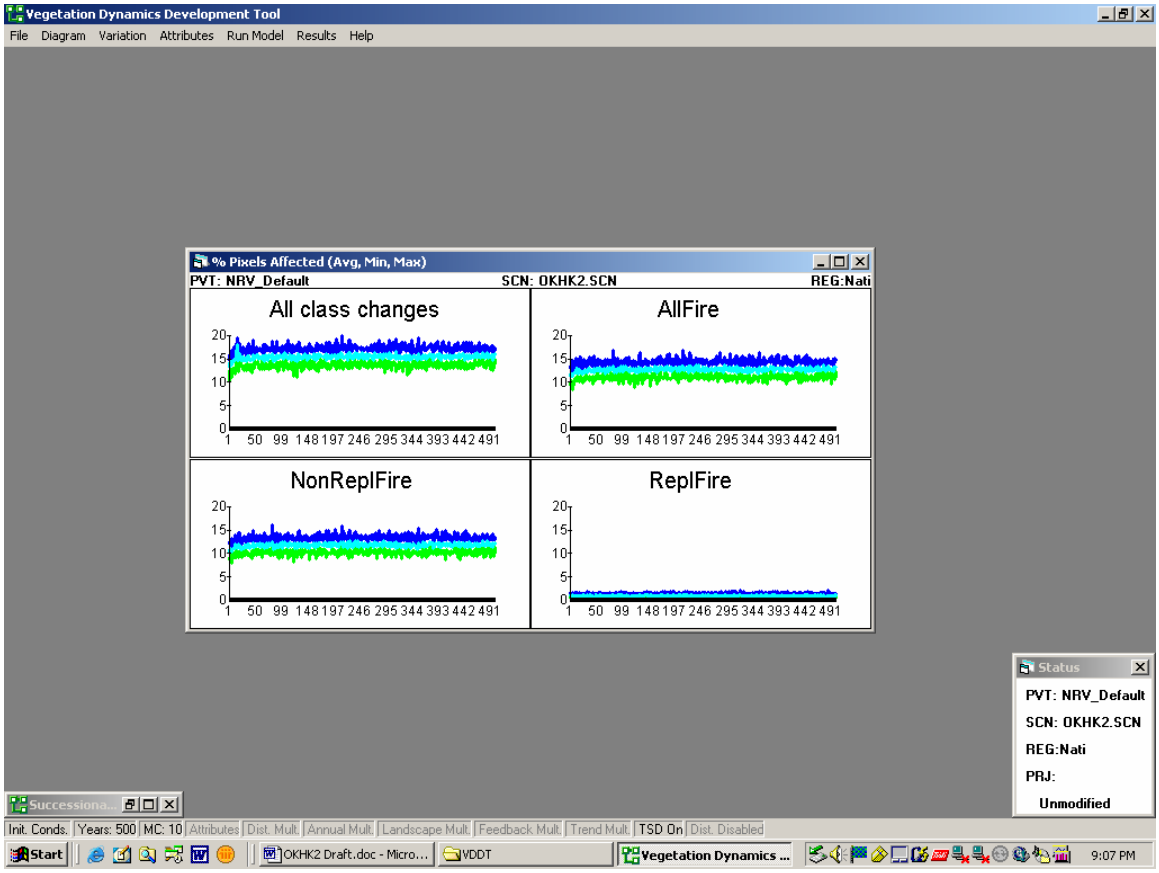
Vegetation Dynamics Development Tool
File Diagram Variation Attributes Run Model Results Help
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REG:Nati
All class changes
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NonReplFire
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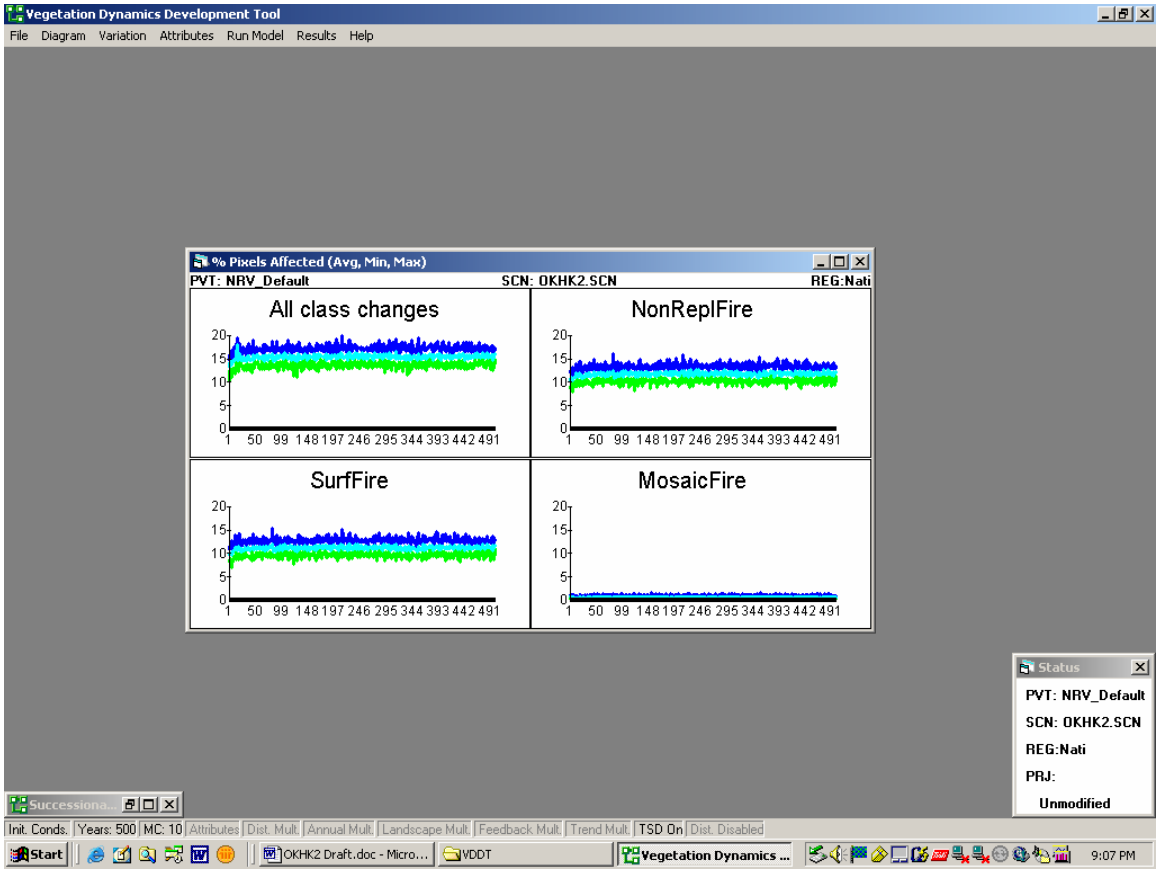
Vegetation Dynamics Development Tool
File Diagram Variation Attributes Run Model Results Help
% Pixels Affected (Avg, Min, Max)
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All class changes
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SurfFire
MosaicFire
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