

DRAFT

Fire Regime Condition Class (FRCC) Interagency Handbook Reference Conditions

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Date: 3/1/05

PNVG Code: POHS

Potential Natural Vegetation Group: Piedmont Oak-Hickory-Shortleaf Pine

Geographic Area: Atlantic Slope Piedmont Forests – Pennsylvania to Georgia, from the eastern toe of the Appalachians to the western margin of the Atlantic Coastal Plain.

Description: The vast Piedmont region ranges regionally from about 300 to 1200 feet elevation, and contains a complexity of major and minor vegetation types. These include, from highest and driest to moist (excluding bottomland and riparian forests): Piedmont monadnock forests, dry piedmont rolling uplands, and partially fire-sheltered Piedmont Mixed Mesic Hardwood Forest. This model focuses on these three major variants. Some of the more specialized types included in the above major ecosystems are Shortleaf Pine Savanna and Woodland, Piedmont Post Oak Savanna, Piedmont Prairie, diabase Glades and Serpentine Barrens.

Monadnocks are erosion-resistant metamorphic and igneous rock types that have been left standing above the piedmont peneplain. They range from around 200 to 1000 feet high and show distinct vegetation differences according to aspect. The south-facing slopes were typically dominated by chestnut oak (*Quercus montana*) and shortleaf pine (*Pinus echinata*) with a grassy understory of species such as the poverty grasses *Danthonia sericea* and *D. spicata* and forbs such *Liatris* and *Pityopsis*. The herb layer was maintained by a combination of dry soils and fire on an interval of around 4-6 years. Scarlet oak (*Quercus coccinea*) and black gum (*Nyssa sylvatica*) were common associates.

Fire maintained shortleaf pine dominated the upper south slopes and ridgetops of the gently rolling piedmont peneplain itself. Lower, mid and upper slopes of south and west aspect supported a fire-maintained mixture of shortleaf pine, oaks and hickories. The more fire-adapted oaks and hickories included white oak (*Quercus alba*), post oak (*Quercus stellata*) and mockernut hickory (*Carya tomentosa*). Red oak (*Quercus rubra*) was a common dominant on cooler, moister and slightly fire sheltered north slopes.

Mixed Mesic Hardwood Forest (Schafale and Weakley 1990) was found on lower slopes and the margins of bottomland flats. Being land too steep to farm, these mesic forests comprise the most abundant remnant natural forest type on the Piedmont. Virtually all other uplands were cleared and in agriculture by the Civil War. On the steepest, most fire sheltered lower north slopes, pure stands of beech (*Fagus grandifolia*), the most fire-sensitive major tree species of the region, can be found. It is often co-dominant with pignut hickory (*Carya glabra*), another fire-refugial species. Other tree species included tulip poplar (*Liriodendron tulipifera*) and white oak.

Shortleaf pine increases in importance to the south and east, historically forming open woodlands and grassy savannas in the piedmont/coastal plain region transitional to the longleaf pine dominated sandhills. Natural mixed pine stands composed of shortleaf pine, longleaf pine and loblolly pine, with scattered oaks and hickories were also described historically from this transition region (Ashe 1884, 1915, Sargent 1884). Virginia pine (*Pinus virginiana*), the common old-field pine of the Piedmont today, is a fire sensitive species once limited to tornado tracks where open habitats were created without fire, and as scattered trees in mixed pine-hardwood stands in an intermediate position on the fire frequency and fire effects gradients. To the north as far as New England and to the south as far as northwest Georgia, pitch pine (*Pinus rigida*) occupies a similar position to shortleaf pine in relation to fire. White pine is uncommon on the Piedmont but may be found there as far south as North Carolina. It typically forms small stands of only a few hectares in a very specific zone on the upper

north slopes of low hills. These are fire-refugial situations but light surface fire, at about 20-25 year intervals may be necessary to prepare the seedbed for regeneration under old trees.

Other common piedmont tree species include scarlet oak, black oak, *Carya cordiformis*, and a little table-mountain pine. Midstory species in natural systems may include saplings of the overstory trees as well blackgum, dogwood, sourwood, sassafras, mountain laurel, eastern red cedar, along with sprouts of American chestnut and chinquapin and, in more mesic inclinations, serviceberry, basswood, eastern hemlock, American holly, rhododendron. On mesic, mid to lower north slopes may be found rhododendron (*Rhododendron maximum*), mountain-laurel (*Kalmia latifolia*), blueberries (*Vaccinium* spp.).

Uncharacteristic succession. Most piedmont forests today are closed canopy forests with dense multi-storied woody vegetation. Examples with intact fire-maintained grassy understories are now rare. With exception of the above mentioned Mixed Mesic Hardwood forests on slopes, most current stands originated as old fields of cutover woodlots.

Fire Regime Description: Fire regime group I, with frequent light surface fires in fine grass, pine needles and hardwood litter. Presettlement Mean Fire Return Interval (MFI) was mostly 4-6 years in the more fire-exposed parts of the landscape (Frost 1998). Natural fire regimes were primarily surface fires having a seasonally bimodal distribution related to ignition by lightning or by Native Americans. Over the whole Piedmont, both ignition sources seemed to have been about equally important but the relative amount of fire due to each of the two primary ignition sources varied from place to place depending upon Native American use and fire compartment size. Lightning ignitions occurred any time from March to October but appear to have been most frequent and extensive in the spring fire season ranging from mid March to mid April. In the fall there was post-harvest burning in November during the time when Native Americans moved to winter hunting camps (Byrd 1728). Native American importance as an ignition source increased inland from the coastal plain to the mountains and early explorers described zones of small, open prairies on the upper Piedmont at the toe of the Appalachians maintained by annual fall burning (See model EPWM, Eastern Prairie-Woodland Mosaic for a description and more historical information on this now vanished presettlement type.)

Model Assumptions: No piedmont types fit the western seral models based on stand replacement. The dominant model was tree-by-tree replacement with mortality of long-lived individual canopy trees or small clusters resulting from old age, wind throw, disease and fire. Occasional small patches were downed by tornadoes or hurricanes, with hurricane effects decreasing as distance from the coast increased. Fire frequencies used for this model do not include the prairie/woodland areas maintained by annual burning by Native Americans (see the separate model EPWM Eastern Prairie/Woodland Mosaic).

For model purposes, the following definitions were used for closed versus open classes: "open" in these fire-maintained forests refers more to the understory than the canopy. Class D can have 95% tree cover and still be considered open if frequent fire under the fire-resistant canopy trees maintains the understory free of most shrub, sapling and subcanopy tree cover. This open understory results in sufficient light reaching the forest floor to maintain a species-rich grass-forb layer. This fire dependent herb layer contains most of the plant species diversity and is the habitat for a number of rare plant species such as smooth coneflower (*Echinacea laevigata*), federal endangered; Michaux's sumac (*Rhus michauxii*), federal endangered; Georgia aster (*Aster georgianus*), state endangered in NC; (*Helianthus schweinitzii*), federal endangered and many others. Structural cover definitions: <10% cover = prairie, 11-50% savanna if a fire-maintained grassy layer present, 50-75% woodland, 75-100% forest (and forest can be "open").

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: post replacement	7	Pine and oak reproduction to 15' tall. Community of forbs and perennial grasses. More common on dry sites dominated by pines susceptible to fire & pine beetles. Forms as small openings with scattered live trees surviving recent disturbance. 0-25% tree canopy cover
B: mid-seral closed	8	Closed canopy with high stem density, oaks and other hardwoods on mid and lower slopes with shortleaf, pitch or Virginia pine on dry south slopes and ridges. Reduced herbaceous understory resulting from shade. > 75% canopy cover
C: mid-seral open	20	Mid-development. Woodland and forest with open, well developed herbaceous understory. Post oak, white oak and chestnut oak with shortleaf, pitch or Virginia pine (occasionally table-mountain pine on xeric sites) canopy cover 25-90% cover:
D: late-seral open	41	Late-development, canopy species ass in class C, 50-250 years old. Well developed, fire-maintained ground cover of perennial grasses and forbs. Shrubs much more sparse than in modern fire-suppressed forests. 25-95% canopy cover
E: late-seral closed	24	Late-seral, 50-300+ years, closed canopy dominated by oaks and hickories or beech, depending upon slope and aspect. Represented primarily by Mixed Mesophytic Hardwood Forest on steeper mid and lower slopes. Scattered subcanopy trees such as dogwood, sourwood and sassafras and relatively sparse herb layer. Canopy gaps usually only constitute 1- 5%. > 75% canopy cover
Total	100	

Fire Frequency and Severity

Fire Severity	Fire Frequency (yrs)	Probability	Percent, All Fires	Description
Replacement Fire	100	.01	7	Small hotspots during rare fires occurring under unusually severe burning conditions.
Non-Replacement Fire	7	.14	93	Primarily surface fire in all classes. Some mosaic fire.
All Fire Frequency*	7	.15	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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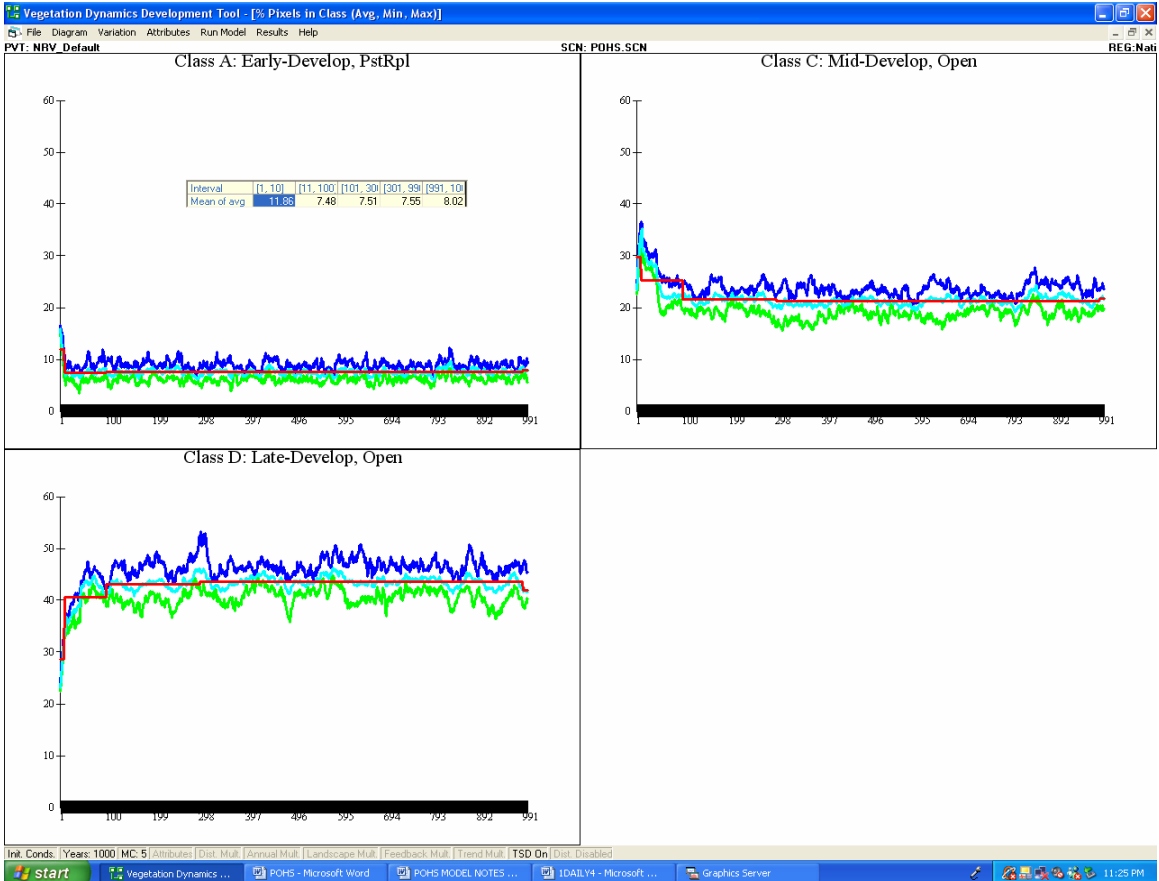
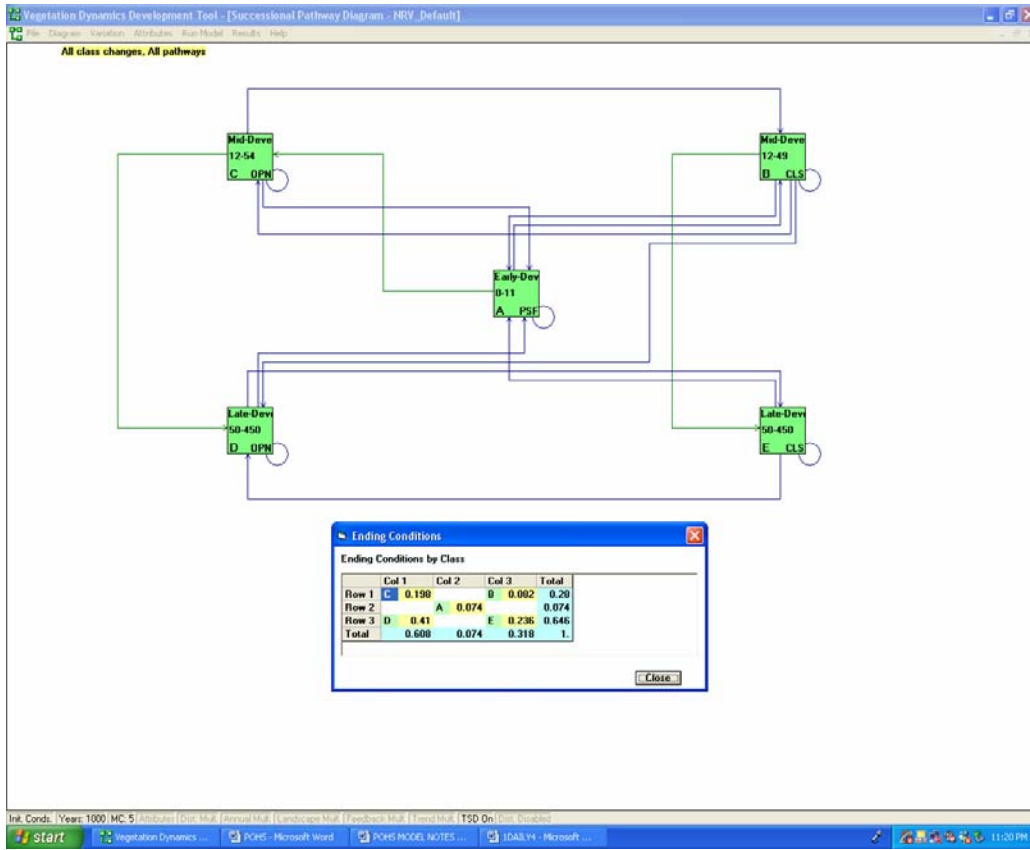
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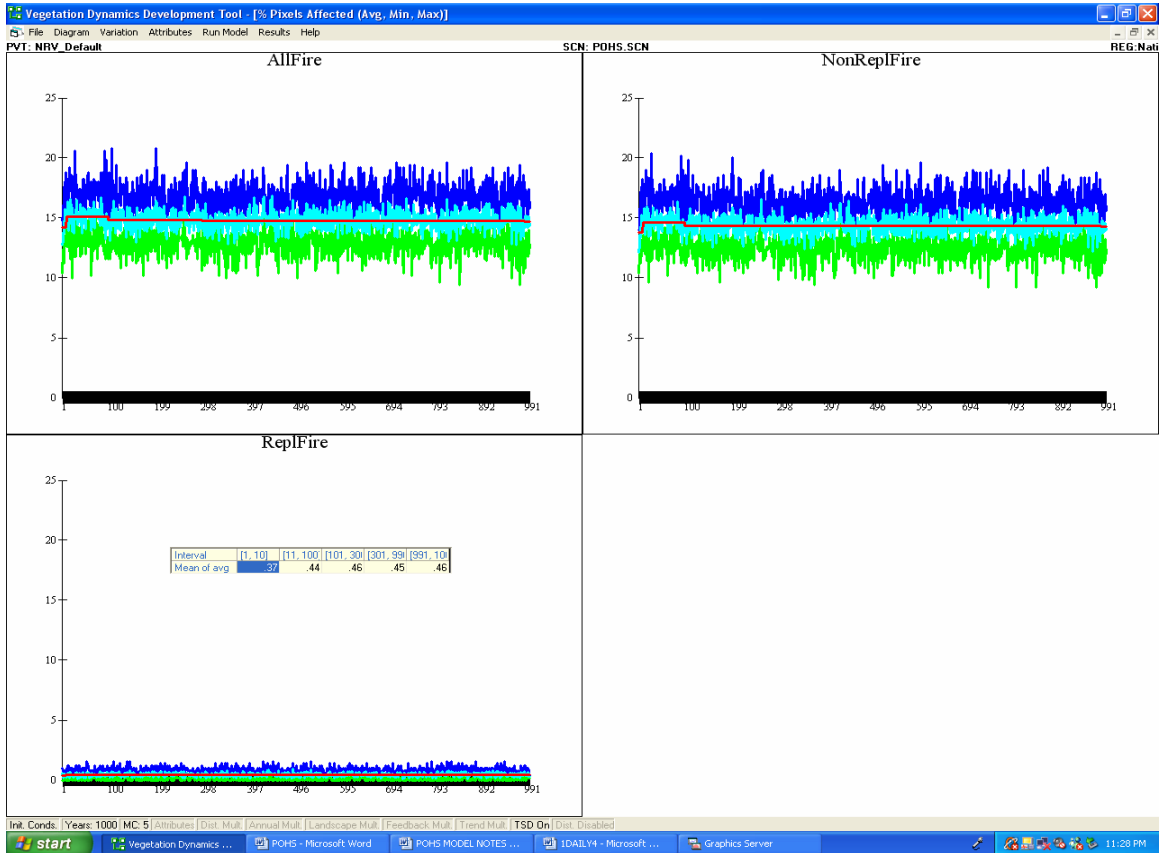
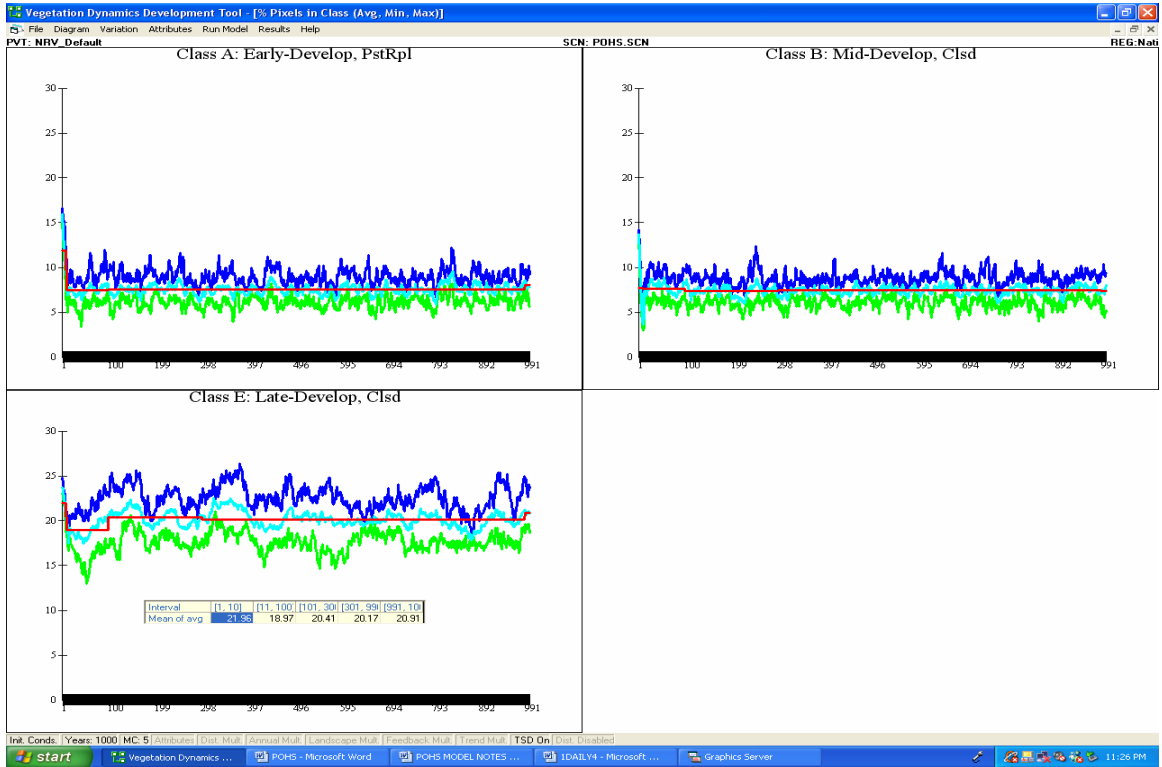
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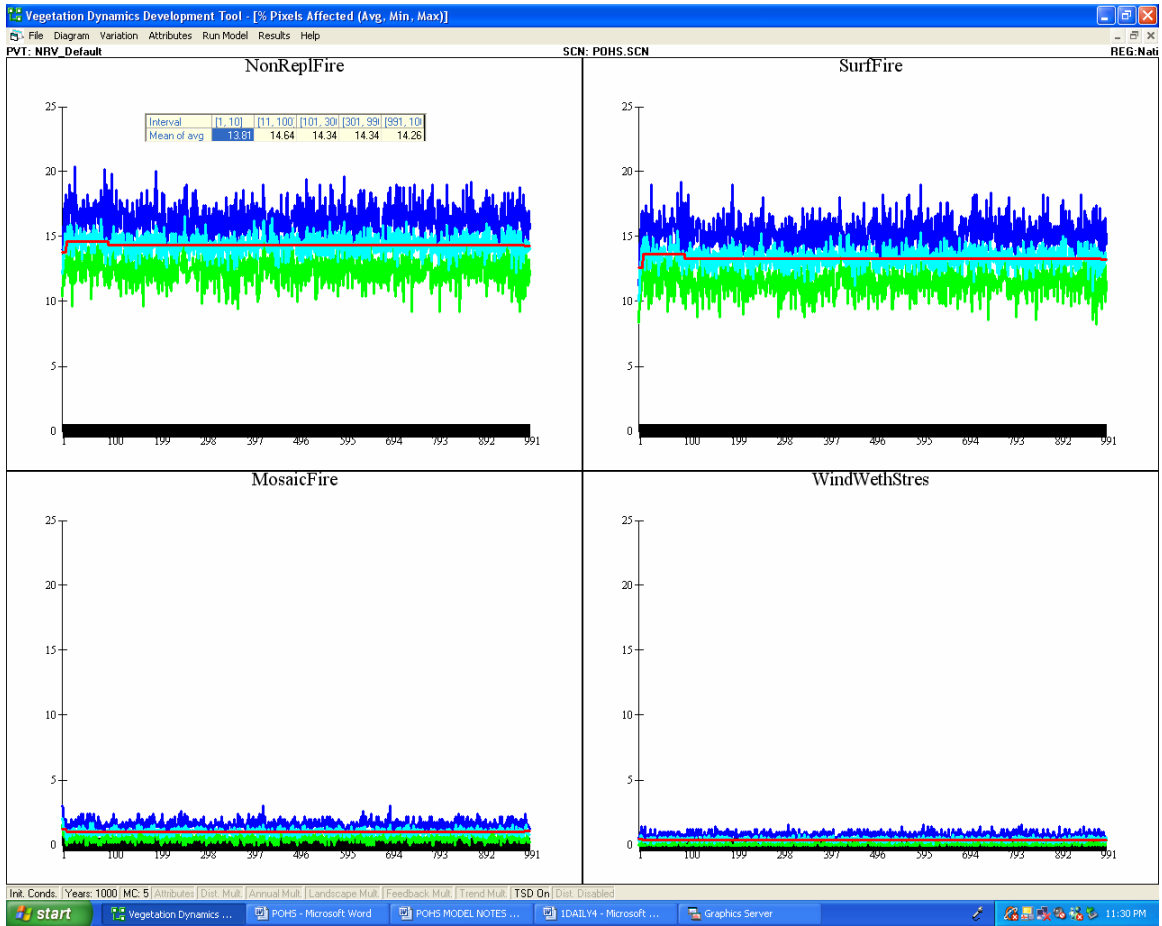
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VDDT File Documentation

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







Second prescribed burn in piedmont shortleaf pine savanna, Mineral Springs Barrens TNC preserve, Union County, NC