****DRAFT****

Fire Regime Condition Class (FRCC) Interagency Handbook Reference Conditions

Modeler: Hom, Lilly, Patterson, Van Tuyl **Date:** 05/28/2004 **PNVG Code:** NEOP

Potential Natural Vegetation Group: Northeastern Oak – Pine Forest

Geographic Area: Northeastern United States, specifically, southeastern New Jersey, Long Island, and Cape Cod. (Long Island and Cape Cod should have separate model?)

Description: The northeastern oak–pine forests (Kuchler PNV 110) are found on coarse textured, well-drained soils of the coastal plain. They include woodlands and shrublands with an open tree canopy of pitch pine (*Pinus rigida*) and an understory of shrubby oaks (*Quercus ilicifolia*, *Quercus* prinoides, Quercus *marilandica*, *Quercus stellata*) and heath species (*Vaccinium* and *Gaylussacia* spp.; Jordan et. al 2003). Herbaceous and groundcover species may include golden heather (*Hudsonia ericoides*), bearberry (*Arctostaphylos uva-ursi*), mountain laurel (*Kalmia latifolia*), sweetfern (*Comptonia peregrina*), wintergreen (*Gaultheria procumbens*), bracken fern (*Pteridium aquilinum*), Pennsylvania sedge (*Carex pensylvanica*), and cow-wheat (*Melampyrum lineare*).

Some differences exist between the northeast oak–pine forests of the Pine Barrens in New Jersey and the barrens of Long Island and Cape Cod and are mostly related to succession. Pure pitch pine forests are common in the NJ Pine Barrens, including the dwarf pine plains (pygmy forests) and occur under an intense frequent fire regime. The landscape of Long Island and Cape Cod barrens is dominated much more, especially in the absence of a pitch pine seed source, by pure oak forests rather than pure pitch pine forests.

Fires, especially large wildfires, have been a major factor in the development of the present differences among forest stands on similar sites in the Pine Barrens. Abandoned uplands sites generally progress from a grass or shrubland (fire return interval of 2–3? years) → pitch pine/scrub oak woodland (5–25 years) → pure pitch pine forest with heath/oak scrublands (30–60 years) → pitch pine/tree-sized oak forest (60–100 years) → oak–hickory forest (100–200 years).

Fire Regime Description: Fire Regime Class I Pitch pine is a fire-adapted species. It has serotinous cones, which only open and release seeds after fire (serotiny may not be present in Long Island/Cape Cod pitch pine). Pitch pine also produces stump sprouts after fire and has thick, fire resistant bark. Likewise, it is quick to maturity and to produce seeds. Because of these characteristics, frequent, severe fires eventually eliminate all other tree species except for pitch pine, as well as scrub oak. Many pines are sprouts from root crowns and recover from last fire by trunk sprouts Fire kills oak stems more readily than pines, but most oaks sprout. Prescribed burning favors pine over the more susceptible oak, as well as the herbaceous component over shrubs.

Different fire frequencies and intensities interrupt succession, accounting for variations in forest composition. Periodic wildfires with 40-year intervals have produced oak-pine mixtures over extensive areas of uplands while more frequent fires have created mixtures of pitch pine and shrub oaks. The most frequent fires have created the pine plains.

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: post replacement	5	Grass and/or shrubland, can include *Carex* and *Panicum* spp., mixed oak or pine/oak seedling mixture, heaths or dwarf pine plains
B: mid-seral closed (open?)	25	Pitch pine dominant with scrub oak dominant in the understory (*Quercus ilicifolia*, *Quercus prinoides*, *Quercus stellata*)
C: mid-seral open	30	Pure pitch pine forest; heaths may or may not be present, depending on fire history
D: late-seral open	30	Pitch pine – oak codominant; canopy oak species include *Quercus velutina*, *Quercus coccinea*, *Quercus alba*, *Quercus stellata*
E: late-seral closed	10	Oak–hickory forest – *Carya* spp., *Quercus velutina*, *Quercus rubra*, *Quercus alba*; some heath and scrub oak present
Total	100	

Fire Frequency and Severity

Fire Severity	Fire Frequency (yrs)	Probability	Percent, All Fires	Description
Replacement Fire	50	0.02	17	Primarily in A (20-year replacement fire) and B (20-year replacement fire)
Non-Replacement Fire	10	0.1	83	Maintains B (30-year surface fire), C (5-year surface fire), D (5-year surface fire and 100-year mosaic fire, which returns D to B) and E (100-year mosaic fire maintaining E)
All Fire Frequency*	6.3	0.12	100	

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

Model assumptions

Class A represents a number of possibilities at this point – anything from pine plains to shrublands to mixtures of oak and pine or just mixed oak. Needs clarification.

In the absence of a pitch pine seed source, class B will automatically progress to class E.

Class D represents the climatic climax community with fire. Should no fire occur in class D for 200 years (3 cumulative fire cycles? –65 years for each cycle if adding all fire probabilities), it will climax at E, an oak–hickory forest.

References

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.

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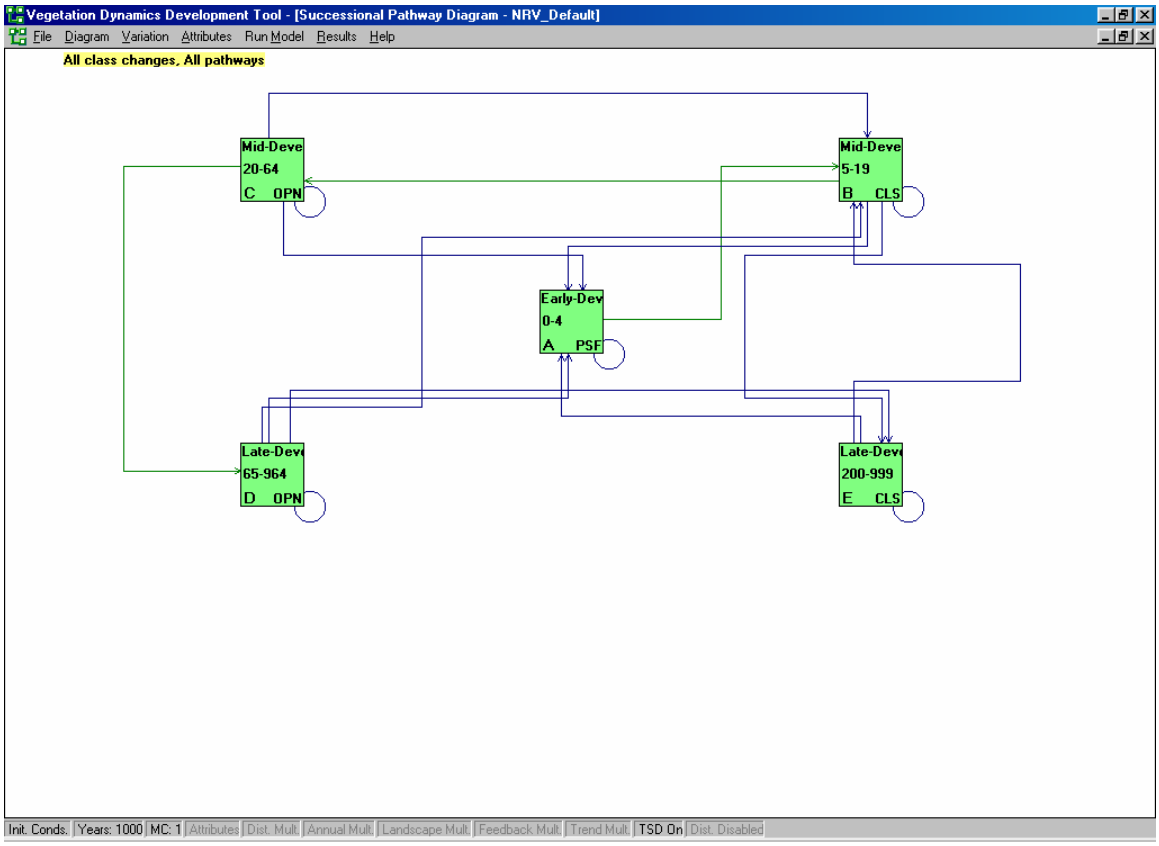
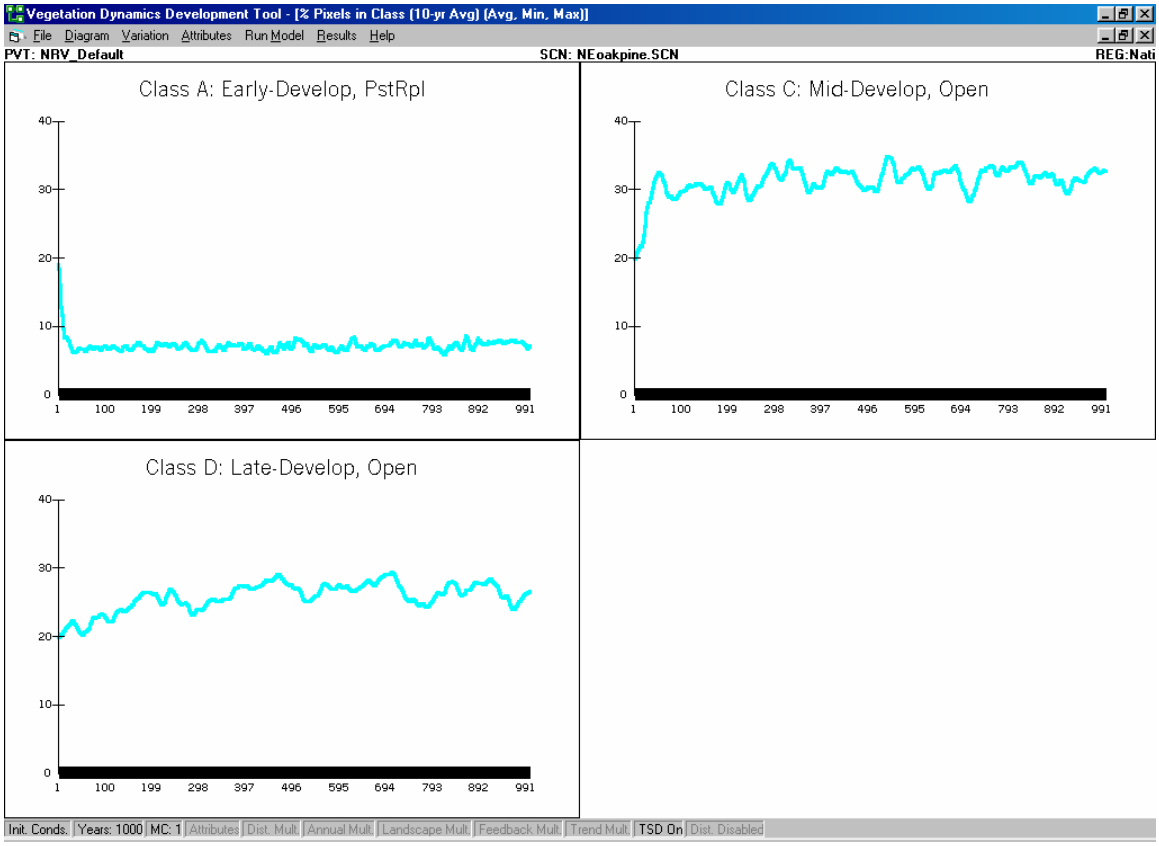
VDDT File Documentation




Vegetation Dynamics Development Tool - [% Pixels in Class (10-yr Avg) (Avg, Min, Max)]
File Diagram Variation Attributes Run Model Results Help
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SCN: NEoakpine.SCN
REG:Nati
Class A: Early-Develop, PstRpl
Class C: Mid-Develop, Open
Class D: Late-Develop, Open
0 10 20 30 40
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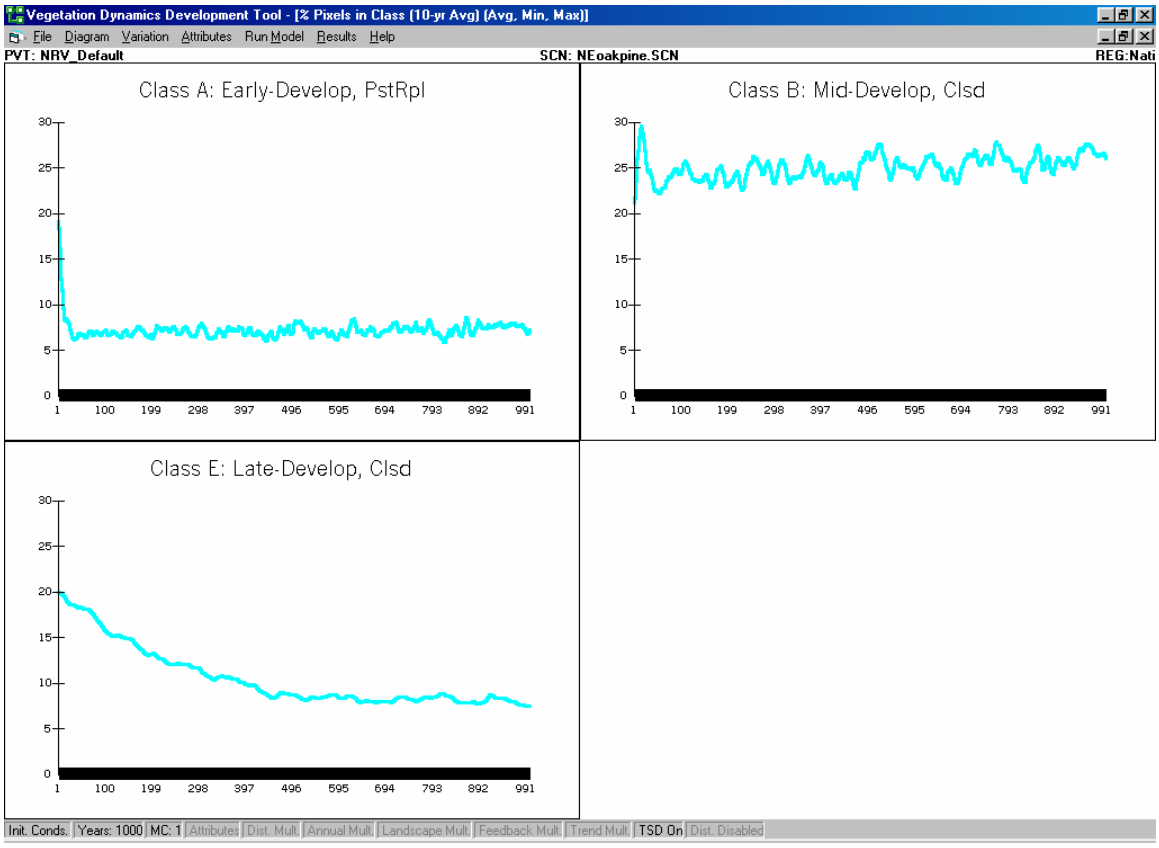
Vegetation Dynamics Development Tool - [% Pixels in Class (10-yr Avg) (Avg, Min, Max)]
File Diagram Variation Attributes Run Model Results Help
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SCN: NEoakpine.SCN
REG:Nati
Class A: Early-Develop, PstRpl
Class B: Mid-Develop, Clsd
Class E: Late-Develop, Clsd
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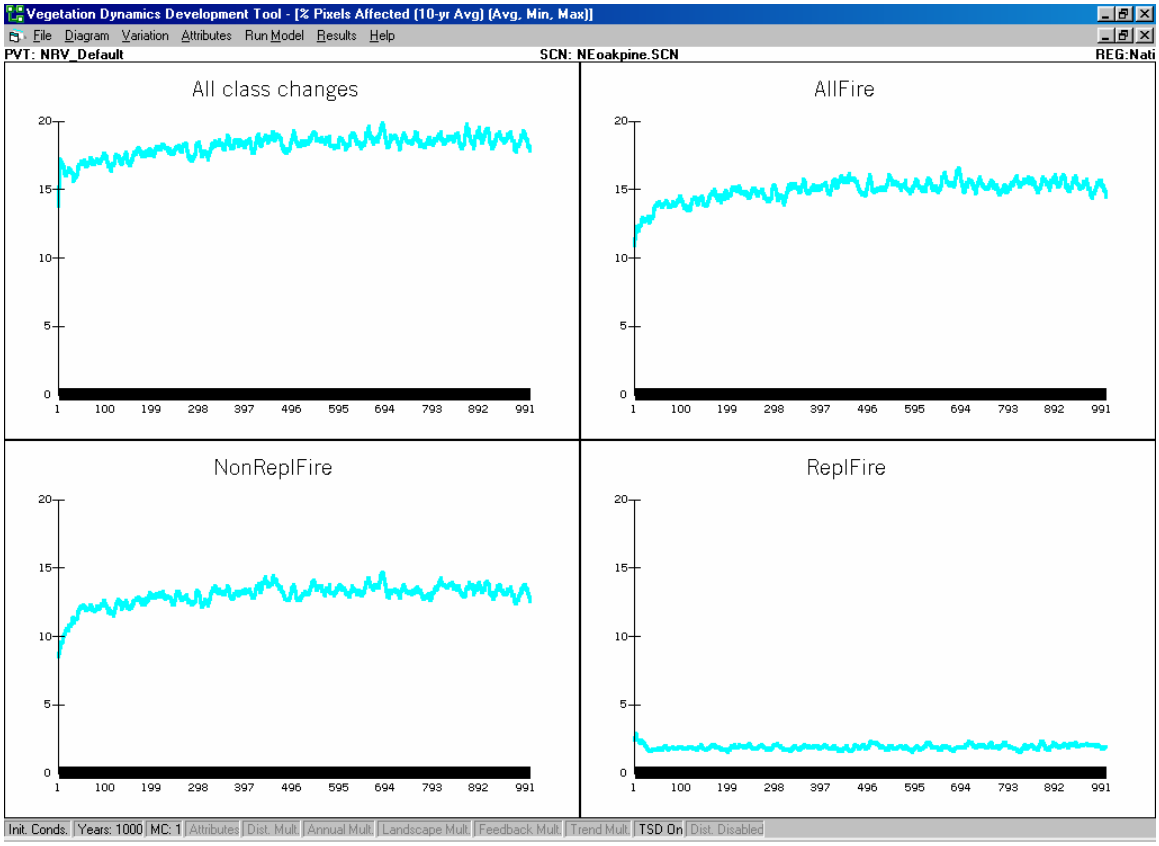
1 100 199 298 397 496 595 694 793 892 991
Init. Conds. Years: 1000 MC: 1 Attributes Dist. Mult. Annual Mult. Landscape Mult. Feedback Mult. Trend Mult. TSD On Dist. Disabled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File Diagram Variation Attributes Run Model Results Help
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SCN: NEoakpine.SCN
REG:Nati
All class changes
AllFire
NonReplFire
ReplFire
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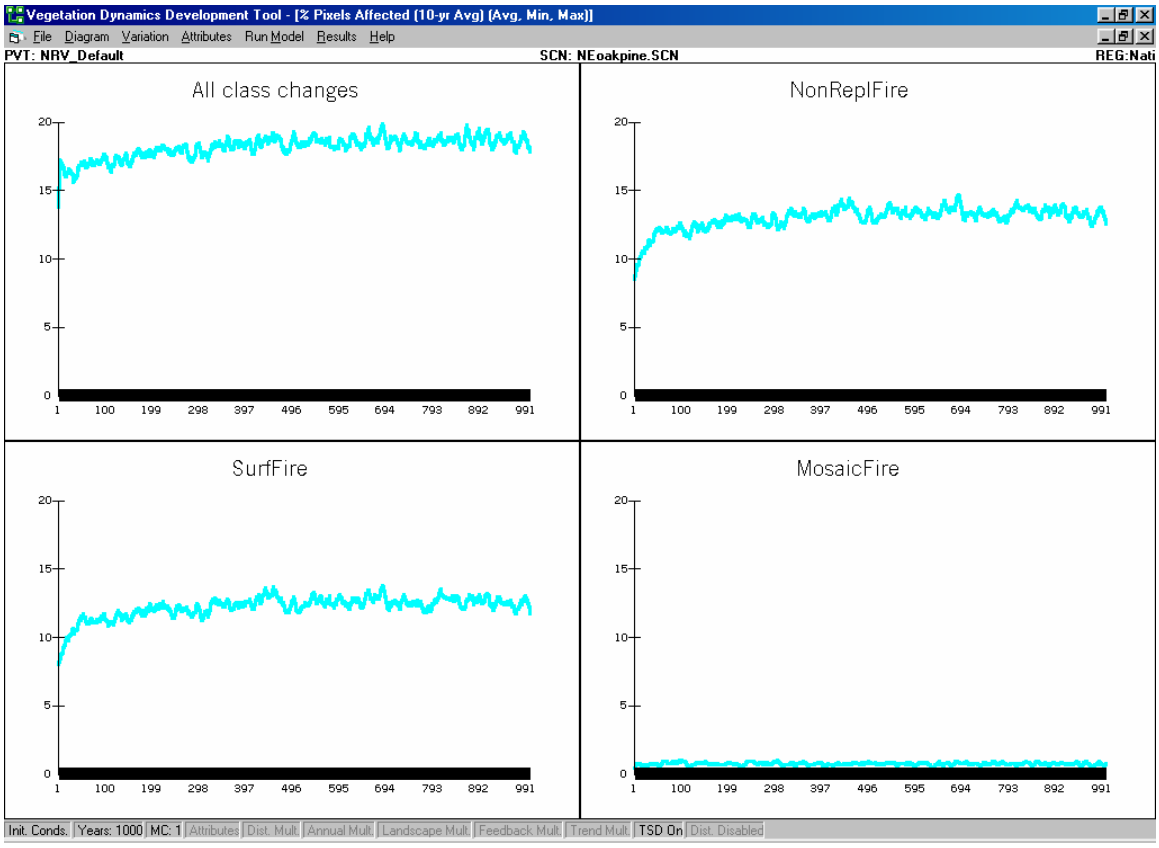
1 100 199 298 397 496 595 694 793 892 991
Init. Conds. Years: 1000 MC: 1 Attributes Dist. Mult. Annual Mult. Landscape Mult. Feedback Mult. Trend Mult. TSD On Dist. Disabled


Vegetation Dynamics Development Tool - [% Pixels Affected (10-yr Avg) (Avg, Min, Max)]
File Diagram Variation Attributes Run Model Results Help
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SCN: NEoakpine.SCN
REG:Nati
All class changes
NonReplFire
SurfFire
MosaicFire
0 5 10 15 20
1 100 199 298 397 496 595 694 793 892 991
Init. Conds. Years: 1000 MC: 1 Attributes Dist. Mult. Annual Mult. Landscape Mult. Feedback Mult. Trend Mult. TSD On Dist. Disabled