Fire Regime Condition Class (FRCC) Interagency Handbook
Reference Conditions

Modeler: KellyAnn Gorman, Randy Swaty **Date:** 29 November 2007 **PNVG Code:** CBPF

Potential Natural Vegetation Group: Conifer Bog, embedded in fire-prone system

Geographic Area: Northern parts of Michigan, Minnesota, and Wisconsin; also occurs in New York and New England in small bogs.

Description: Dense to open, low to medium-tall forests of needle-leaf evergreen and deciduous trees on peatland soils occurring as discontinuous pockets or stringers within fire-prone upland vegetation communities such as pine communities. The canopy may be sparse and/or stunted, especially in acid (pH < 5.5) peatlands. Low hummocks and water-filled depressions may be present. Forested rich peatlands (pH > 5.5) occur in closed wet depressions, especially in small watersheds or catchment areas, and drains and toe slopes adjacent to streams; acid peatlands occur in large, flat, poorly drained landscapes, especially peatlands on glacial lake plains, often forming adjacent to fen water tracks or forming in stagnant areas between heads of peatland streams and drains. Soils are very poorly drained, saturated throughout the growing season in normal years, and may be deep organic peat (acid and rich peatlands) or less than 12" of organic peat over sand (mineral soil bog).

The canopy is dominated by any combination of:

- black spruce (*Picea mariana*)
- larch or tamarack (*Larix laricina*)
- white cedar (*Thuja occidentalis*)
- jack pine (*Pinus banskiana*)

White pine (*Pinus strobus*) often occurs on drier hummocks, particularly in mineral soil bogs.

Broadleaf tree species may be present in the understory, especially:

- red maple (*Acer rubrum*)
- birch (*Betula* spp.)
- quaking aspen (*Populus tremuloides*)

The understory is dominated by ericaceous shrubs and fine-leaved graminoids, especially:

- small cranberry, blueberries (*Vaccinium* spp.)
- wild lily-of-the-valley (*Maianthemum canadense*)
- willow (*Salix* spp.)
- bog birch (*Betula pumila*)
- bog laurel (*Kalmia polifolia*)
- sedges (*Carex* spp.)

The surface layer is dominated by:

- mosses, primarily *Sphagnum*
- brown mosses dominate pools
- *Pleurozium schreberii* may also be abundant

Additional indicators for rich peatland:

- speckled alder (*Alnus incana*)
- twinflower (*Linnaea borealis*)
- tufted loosestrife (*Lysimachia thrysiflora*)

Additional indicators for acid peatland:

- bog rosemary (*Andromeda glaucophylla*)
- Indian pipe (*Monotropa uniflora*)
- tussock cottongrass (*Eriophorum vaginatum*)
- leatherleaf (*Chamaedaphne calyculata*)

Additional indicators for mineral soil bogs:

- snowberry (*Symphoricarpos* spp.)
- Labrador tea (*Ledum groenlandicum*)
- raspberry (*Rubus* spp.)
- wintergreen (*Gaultheria procumbens*)
- alder (*Alnus* spp.)
- currant (*Ribes* spp.)

Mineral soil bogs may have a significant herb layer characterized by:

- bunchberry (*Cornus canadensis*)
- bracken fern (*Pteridium aquilinum*)
- goldthread (*Coptis* ?)
- sedge (*Carex* spp.)
- starflower (*Tridentalis borealis*)

Fire Regime Description: Fire Regime Group IV. Conifer bogs generally occur as pockets in lowland areas surrounded by upland vegetation, and the fire regime is generally driven by the return interval of the upland vegetation. Fires may occur following drought cycles and may be severe, but sites are typically very wet and fires are infrequent. Windthrow as a result of shallow rooting, including singe-tree and small and large patches, and changes in hydrology, such as flooding or draining as a result of the construction or destruction of beaver dams, are the important disturbances in this system. Although severe fire can occur in spruce bogs, it is not common, with a rotation ranging from 220 to over 1,000 years with a mean of 540 years. Severe, catastrophic fires may convert the community to an open bog, rich swamp, or poor fen. Low- to moderate-severity fires, which are still stand-replacing, kill black spruce and are more common at 90- to 220-year intervals, with a mean interval of 120 years. Catastrophic windthrow may have occurred on a 400- to over 1,000-year rotation, with a median of 550 years. Light windthrow (small patches) occurred on a rotation of 40 to 380 years, with a median of 85 years.

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: post replacement	20	Early post-replacement forest dominated by tamarack and shrub species such as leatherleaf, small cranberry, and blueberry; jack pine may be present; 0-15 yrs old
B: mid-seral closed	5	Young forests generally dominated by tamarack with black spruce; cedar and possibly balsam fir becoming a significant component; > 75% canopy closure; 15-55 yrs old
C: mid- seral open	35	Young forests generally dominated by tamarack, with lesser amounts of black spruce and possibly jack pine; cedar only a minor component; shrub layer dominated by ericaceous species; 15-55 yrs old
D: late- seral open	30	Mature forest now dominated by black spruce with lesser amounts of tamarack; cedar is a minor component; significant shrub layer of ericaceous species; 55+ yrs old
E: late- seral closed	10	Mature forest dominated by black spruce with cedar and balsam fir but little tamarack; > 75% canopy closure; 55+ yrs old
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	120	.0083	100	Whether a shrub layer is present or not, trees have crown ratios nearing 1.0 so low-, moderate-, and high-severity fires all spread

				through the canopy.
Non-Replacement Fire	None	0	0	Because most species have thin bark and rarely reproduce vegetatively, non-replacement fires are effectively non-existent.
All Fire Frequency*	120	.0083	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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PERSONAL COMMUNICATION (if applicable):

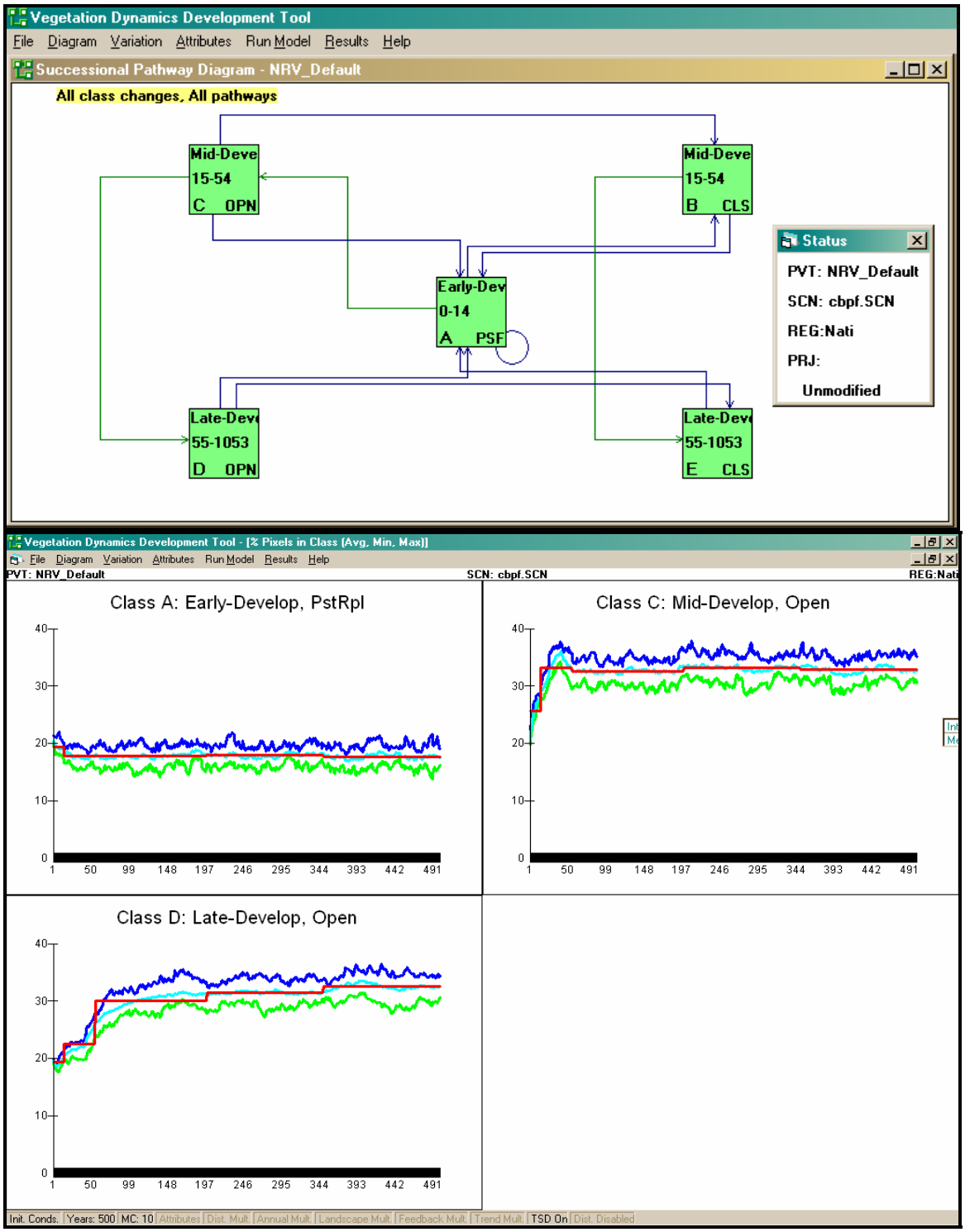
Peer Review by Dave Cleland and Greg Nowacki, UFSF Northeast Region 9 Forest Ecologists, at Milwaukee, WI: 21 July, 2004.

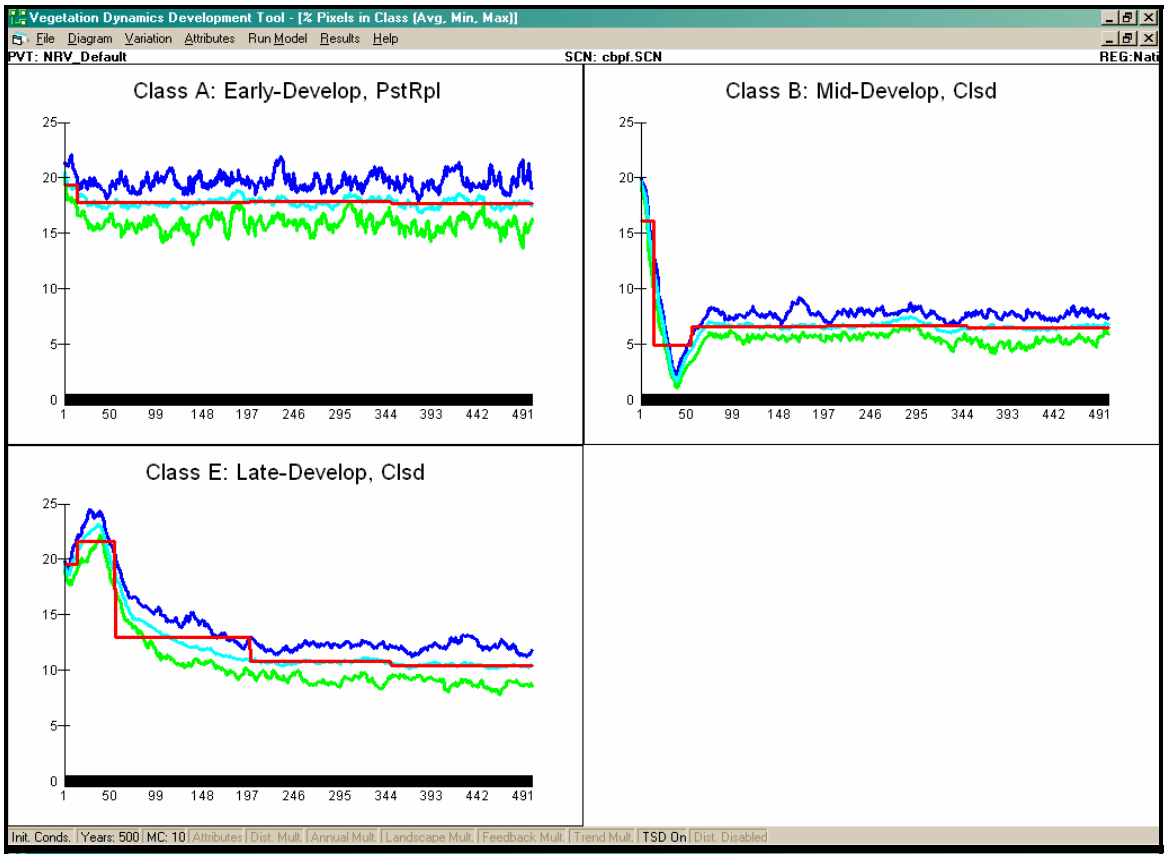
VDDT File Documentation

Assumptions:

- Open/closed canopy closure breakpoint is 75%.

- Native American fire was considered but not determined to be a significant factor.
- The disturbance called Optional 1 is a placeholder representing changes in hydrology; it did not receive a probability because it happens infrequently on the scale of individual bogs and because it would be an open pathway, sending stands out of the model rather than resetting succession to A.

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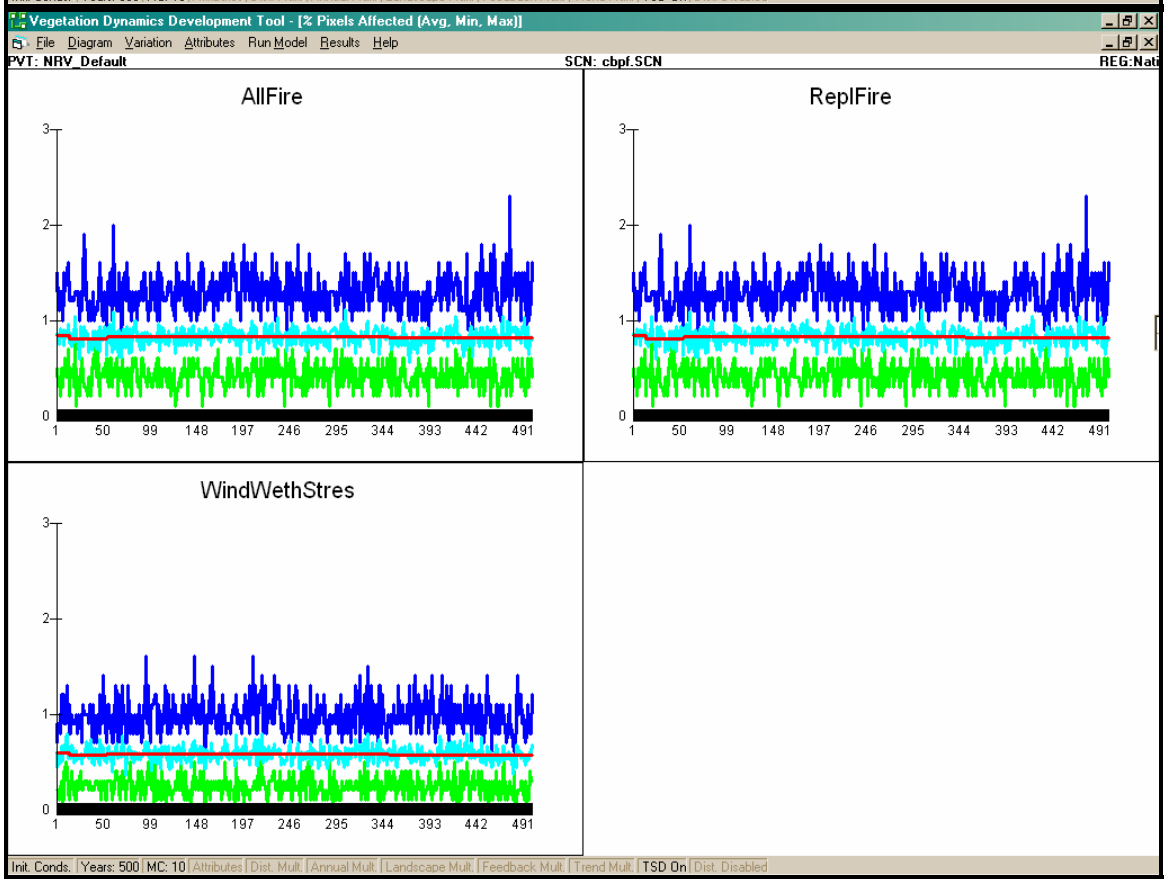
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