DRAFT

Fire Regime Condition Class (FRCC) Interagency Handbook Reference Conditions

Modeler: David Brownlie, Caroline Noble **Date:** 7/13/04 **PNVG Code:** SFPM

Potential Natural Vegetation Group: South Florida Coastal Prairie-Mangrove Swamp

Geographic Area: South Florida (sub-tropical) coast primarily. Although very limited in spatial extent, black mangrove "shrub" communities persist by root sprouting further north in frost-prone reaches along the Gulf coast to TX. (Kuchler 105)

Description: Typically located on depositional (unstable) anaerobic sediments, low wave-energy, tidal flats of the marine-terrestrial interface. May also occur as a belt along tidal rivers, in lagoons behind barrier islands and beaches, and in a natural mosaic of coastal prairie (saltmarsh) and closed mangrove forest. Mangrove vegetation is easily displaced by freshwater aquatic vascular plants, suggesting that under pre-settlement conditions, fire and plant competition from inland areas restricted the mangrove-coastal prairie complex location to saline-brackish zones. Principal species dominating the coastal prairie component of the mosaic include: cordgrass (Spartina spartinae and S. bakeri); black needle-rush (Juncus roemerianus); saltgrass (Distichlis spicata); or sawgrass (Cladium jamaicense). Coastal prairies margins are often fringed by white mangrove (Laguncularia racemosa). Principal species dominating the often dense, closed mangrove forests are: red mangrove (*Rhizophora mangle*) growing in sub-tidal areas subjected to regular, prolonged tidal flooding; black mangrove (*Avicennia germinans*) in the inter-tidal zone; and still further inland, the shade intolerant white mangrove (*Laguncularia racemosa*) a possible indicator of recent disturbance, and buttonwood (*Conocarpus erectus*) an indicator of the freshwater ecotone. All of these essentially tropical species are frost intolerant and fire sensitive, but well adapted to anaerobic and saline (facultative halophytes) soil conditions.

Fire Regime Description: Group II < 35 Years (Frequent) Stand Replacement, for the coastal prairie portion of the landscape mosaic; with Group V, 100+ Years (Rare), Stand Replacement applying to the mangrove forest portion of the landscape. Fires in the coastal prairie portion (< 30%) of the matrix likely were frequent (every 2-10 years), and stand replacing. These fires periodically killed back mangrove fringes, but would quickly burn themselves out in the sparse, shaded mangrove litter before penetrating more than a few meters into adjoining closed-canopy mangrove forest, resulting in a non-replacement natural mosaic burn pattern across the entire landscape. Closed mangrove forest provides an effective natural barrier to fire spread except under the most extreme drought conditions. Tidal creeks, pools, and bare hyper-saline soil areas further limits fire compartment size where mangrove forest dominates. The frequent natural lightning ignitions in coastal prairies were augmented somewhat by anthropogenic fires. However, most First Nation archaeological sites are found inland from the mangrove-coastal prairie community. Intense (Category 4+) hurricanes occurring about every 30 years, and severe frost events (every 15-30 years) are the main controls over mangrove forest distribution and structure. Less intense (Category 1-3) hurricanes and frost or cold weather intrusions, occur about every 15 years and can "open" up portions of previously closed-canopy, dense mangrove forests making them more apt to sustain stand-replacing fire spread during droughts following such disturbances. Lightning does commonly kill small areas of mangrove (0.1-0.5 acres) creating small canopy gaps. In the absence of fire, mangrove forests tend to invade further inland into open marsh and prairie.

Vegetation Type and Structure

Class*	Percent of Landscape	Description

A: post replacement	15	0-7 Years—Bare tidal flats (seaward) or coastal herbaceous prairie (saline marsh) with only widely scattered (<25% canopy cover) mangrove or other woody stems.
B: mid-seral closed	15	16-35 Years, ≥ 75% canopy cover from mangrove species. Small areas of bare tidal sediments or salt tolerant grasses and other herbs may persist beneath the mangrove canopy, but generally resist fire spread except under extreme drought conditions. Category 4+ hurricanes (1/30 years) can eliminate the mangrove canopy and expose bare sediments (Class A). Category 1-3 hurricanes (1/15 years) can create sizeable openings within the mangrove forest (Class C). Lightning creates small (0.1-0.5 acre) canopy gaps. Fires penetrate ecotones at mangrove forest fringe adjoining prairies especially following frost or major hurricane damage.
C: mid- seral open	25	8- 15 years, < 50% canopy cover from mangrove species often a result of lower intensity (Category 1-3 1/15 years) storm damage. Salt tolerant grasses and other herbs may invade these canopy openings and foster stand replacing fire spread (Class A). Lightning can create additional small (0.1-0.5 acre) canopy gaps.
D: late- seral open	2	36 + years old, < 50% canopy cover from mangrove species often a result of lower intensity (Category 1-3, 1/15 years) storm damage or decades of cumulative lightning-caused small (0.1-0.5 acre) canopy gaps. Accumulation of coarse woody debris and mangrove "muck" is evident. Salt tolerant grasses and other herbs may invade these canopy openings and foster mosaic fires that maintain an open condition (Class D, 1/25 years), or stand replacing fires (Class A, 1/50 years). Category 4+ hurricanes (1/30 years) can eliminate the mangrove canopy and expose bare sediments (Class A). Fires penetrate ecotones at mangrove forest fringe adjoining prairies especially following frost or major hurricane damage.
E: late- seral closed	43	36+ Years, ≥ 75% canopy cover from mangrove species, little or no understory except in small (0.1-0.5 acre) lightning-caused canopy gaps. Accumulation of coarse woody debris and mangrove "muck" is evident, but generally fires only sustain spread under the extreme drought conditions. Category 4+ hurricanes (1/30 years) can eliminate the mangrove canopy and expose bare sediments (Class A). Category 1-3 hurricanes (1/15 years) can create sizeable openings within the mangrove forest (Class D). Fires only penetrate a few meters into the inland ecotone and mangrove forest fringe adjoining prairies.
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	21-34	0.0292-0.0469		Always yield Class A. Frequent (1/10-1/15 years) in coastal prairies (<30% of landscape), moderate frequency (1/25-1/50 years) in Open mangrove classes (Classes C/D), infrequent (1/250 years) severe fires burning through root zone under extreme drought, in Closed mangrove classes (B/E).
	27	0.0376	99	
Non-Replacement Fire	77-10,000+	0.0000-0.0130		Class D only. Mosaic fires triggers class maintenance (1/25 years).
	250	0.004		

All Fire Frequency*	21-34	0.0297-0.0470	1	26 year mean frequency with high variation due to complex severe hurricane-drought interactions.
	26	0.038	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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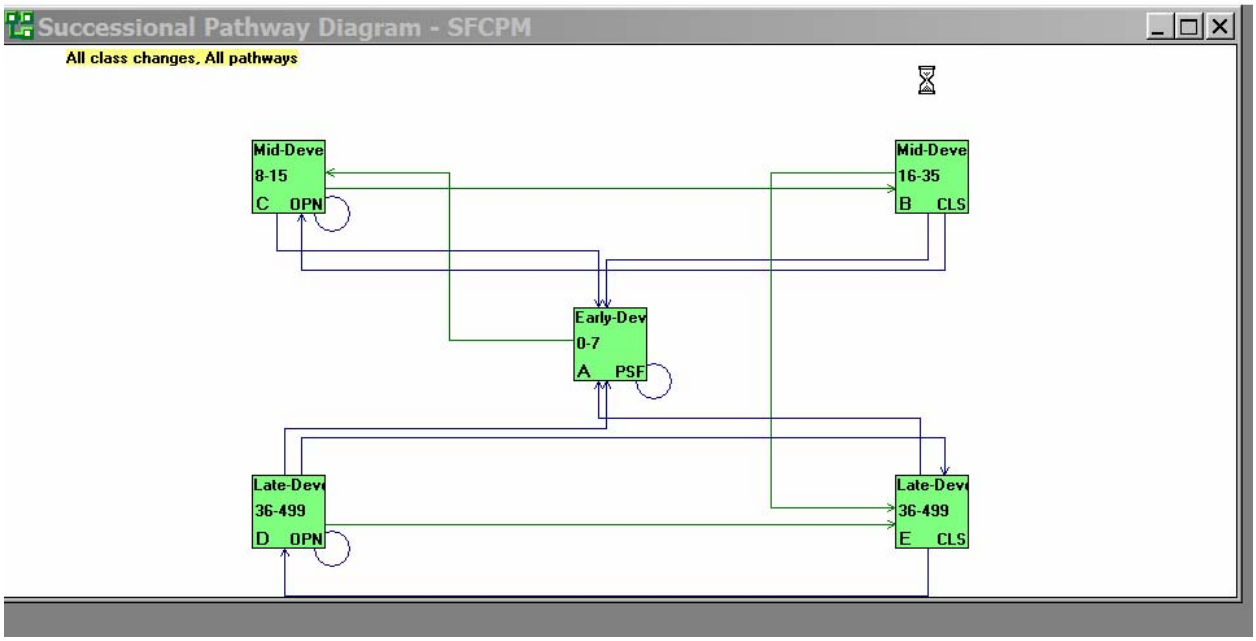
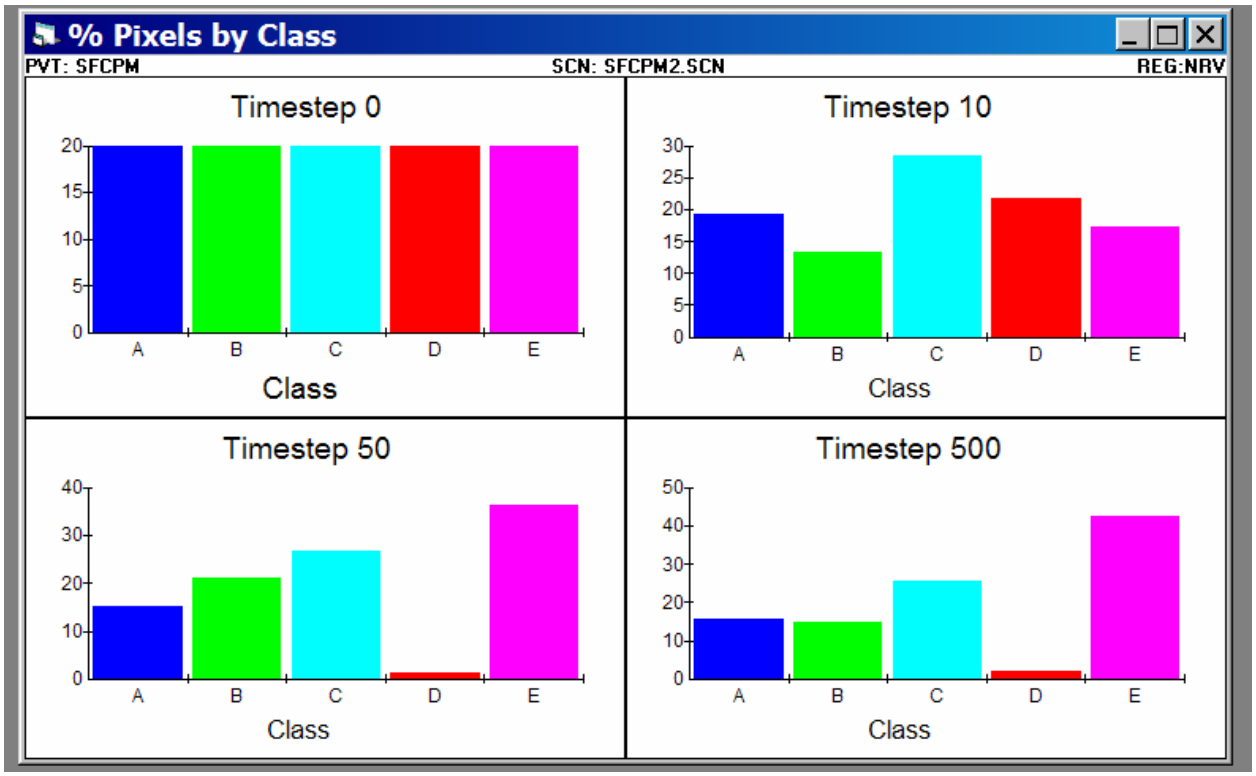
VDDT File Documentation

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

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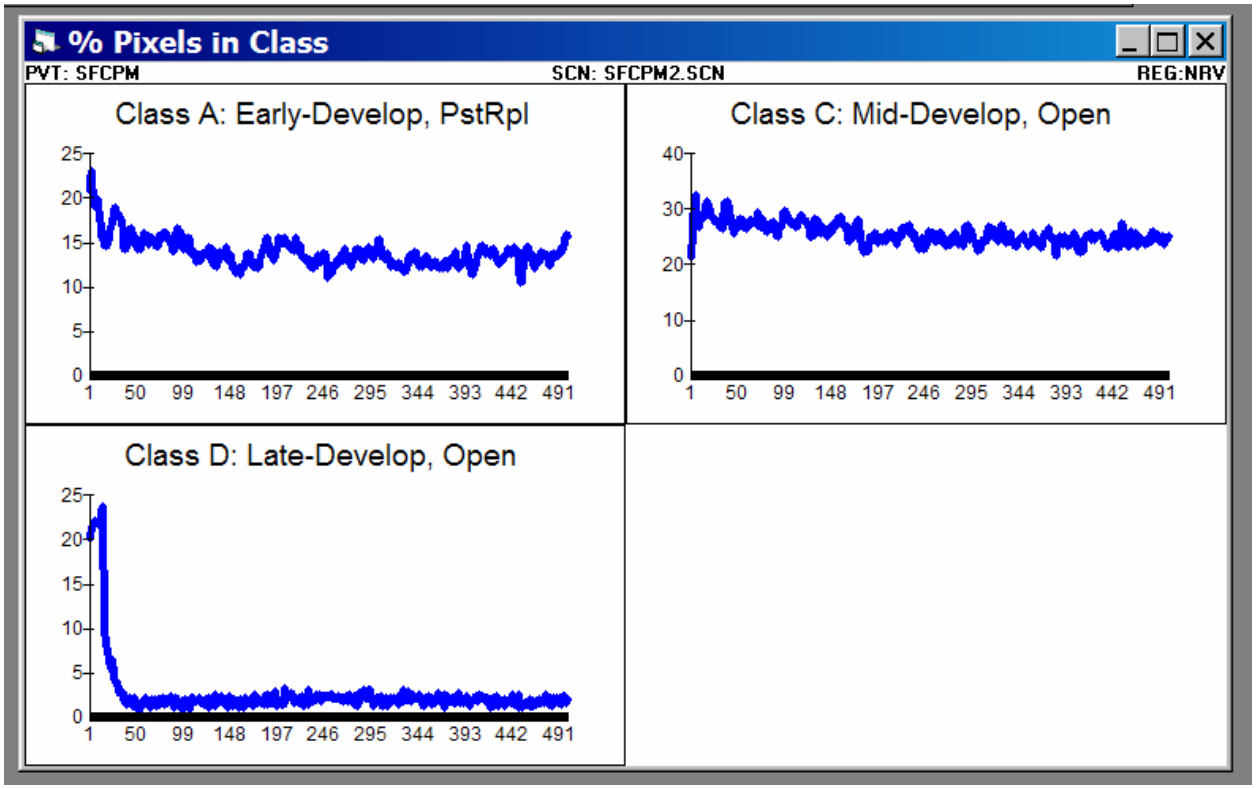
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Class C: Mid-Develop, Open
Class D: Late-Develop, Open
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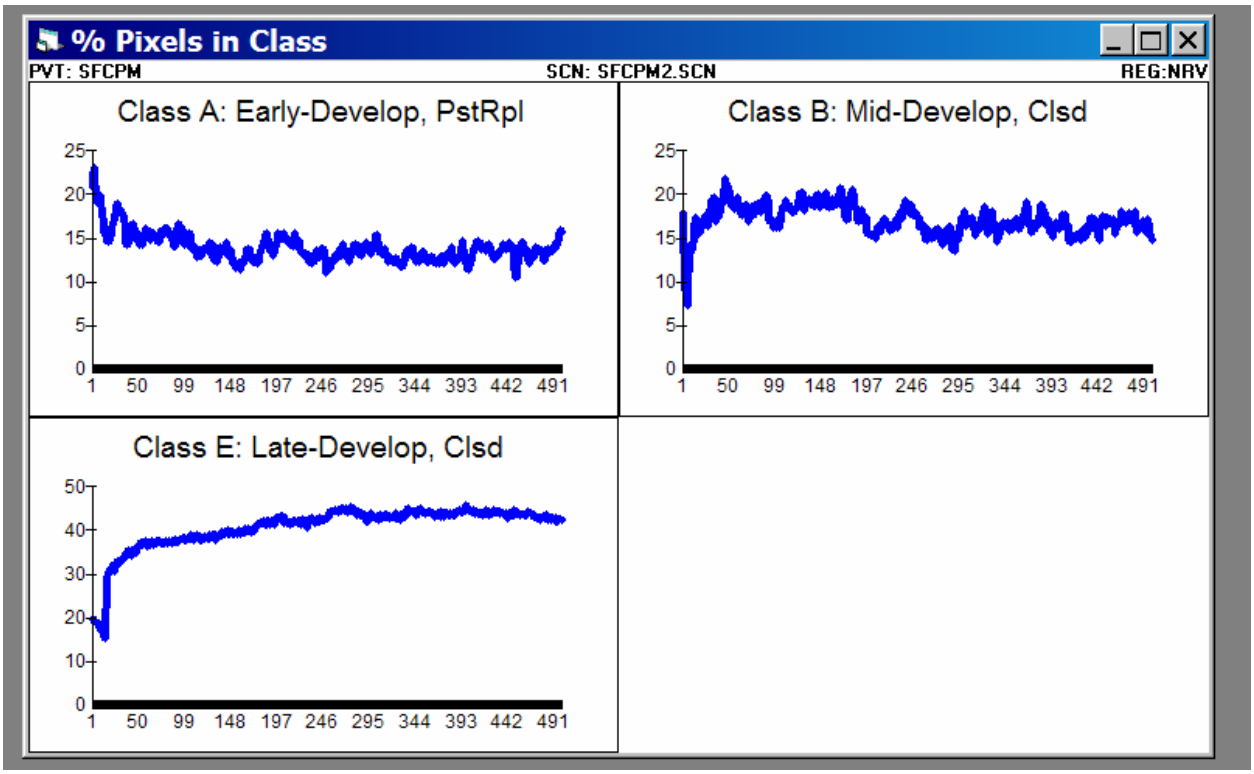
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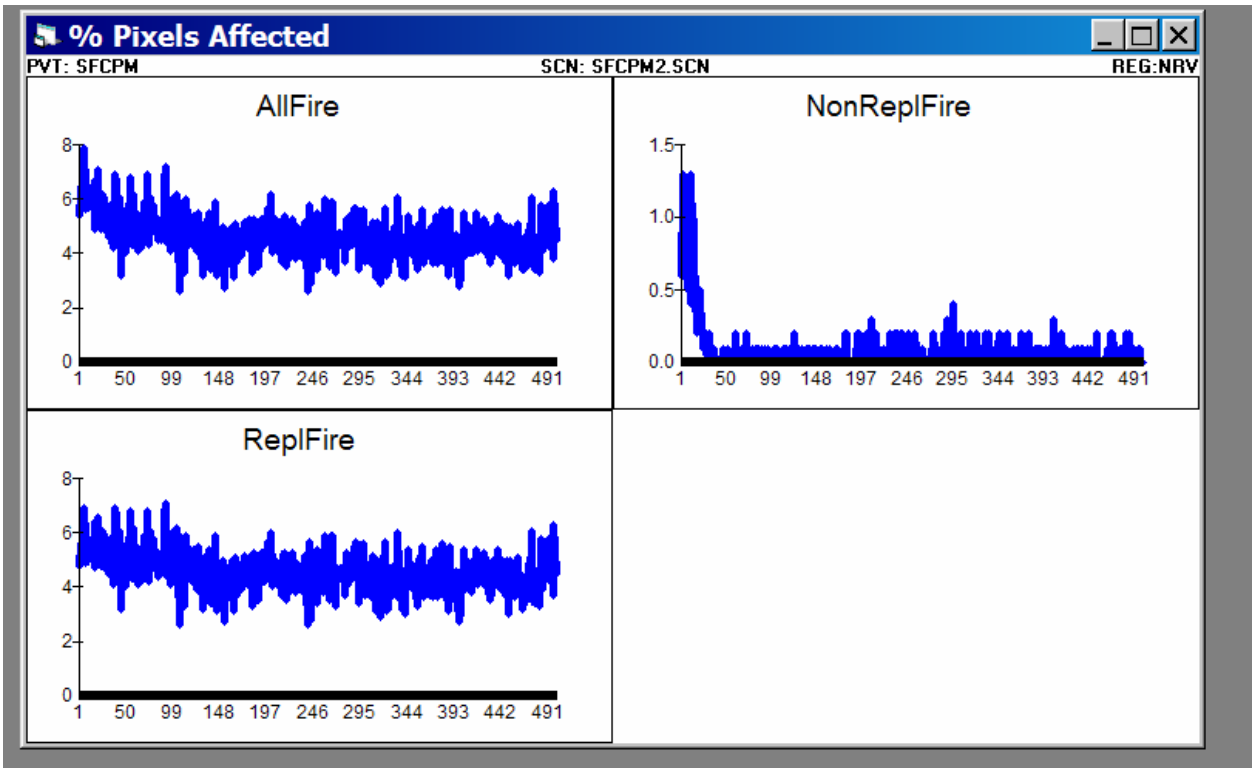
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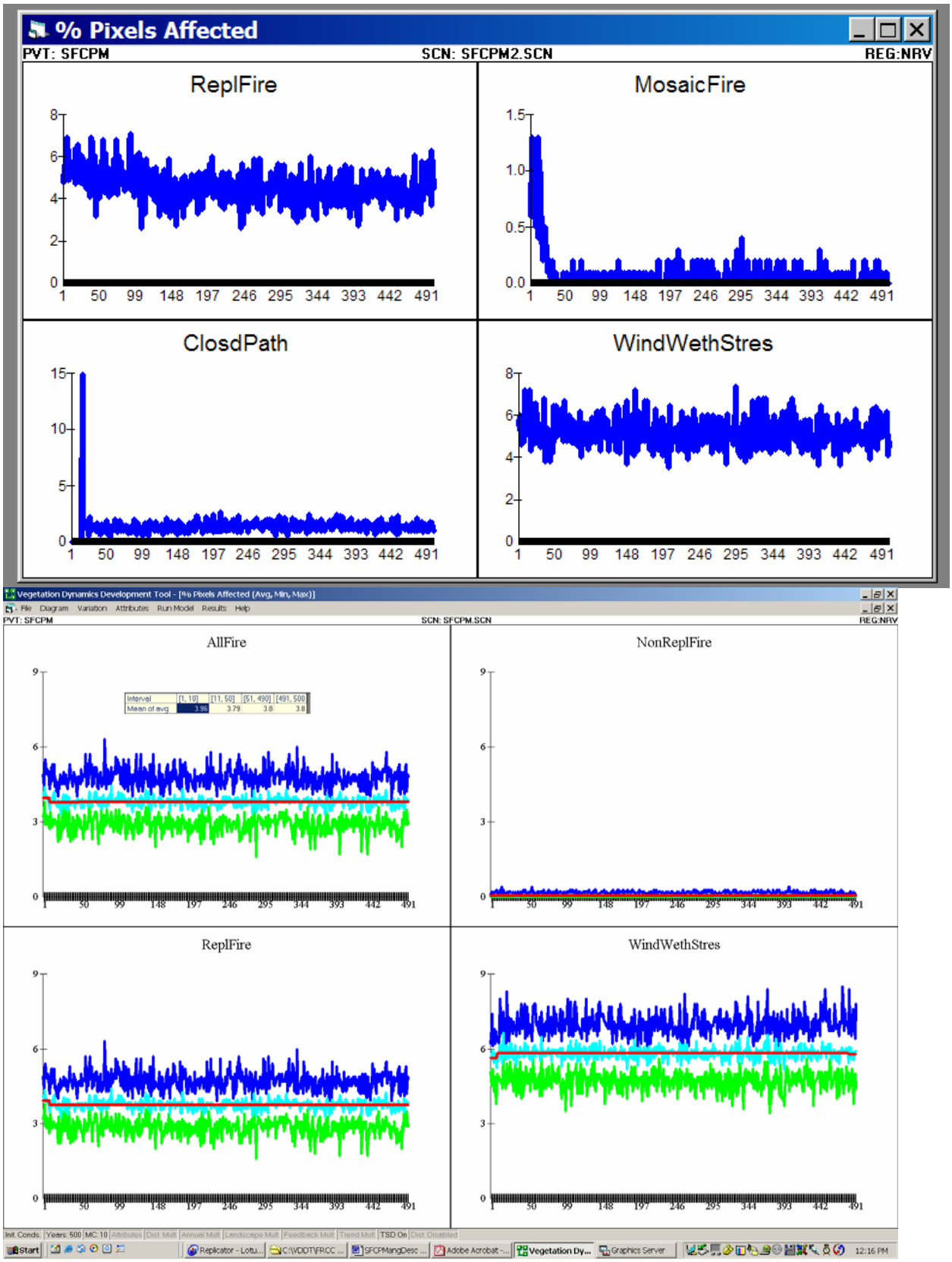
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File Diagram Variation Attributes Run Model Results Help
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AllFire
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WindWethStres
Init Conds
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Start
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