Fire Regime Condition Class (FRCC) Interagency Handbook
Reference Conditions

Modeler: Ron Masters **Date:** 12-10-04 **PNVG Code:** PRAR6

Potential Natural Vegetation Group: Blackland Prairie (Kuchler Type 76 and 88-Fayette Prairie and also San Antonio Prairie which was not mapped by Kuchler)

Geographic Area: North central Texas from the Red River to near the southern Gulf coast bordered by the Coastal Prairie (Kuchler: bluestem-sacahuista), to the east bordering and mingling with Oak-Hickory forest (savanna), in central portions bounded by eastern and western Cross Timbers, to the west bordered by the mesquite-buffalograss and bluestem-grama vegetation types (Kuchler 1964).

Description: Considered by some to be the southern extension of tallgrass prairie. However, this vegetation type is rich in species and high in variation of soil types and species composition and communities. Seven discrete communities have been described in this type (Riskind and Collins 1975). Species composition varies both geographically and locally according to precipitation, soil type and microsite characteristics. Precipitation generally decreases north to south and from east to west, with the northeast portion having the highest annual precipitation (40+ inches) and the western central prairies less than 28 inches per year. These prairies are interspersed with bottomland and upland forests. Tall-, mid- and some shortgrass species occur in the various associations contributing to diverse structural mosaic locally and across the type. The dominant grass constituent across all site variants is little bluestem (*Schizachyrium scoparium*). In the eastern portions of this type Indiangrass (*Sorghastrum nutans*), eastern gamagrass (*Tripsacum dactyloides*) and switchgrass (*Panicum virgatum*) are important species. Secondary species vary in importance regionally depending on topography and soil moisture relations. Big bluestem (*Andropogon gerardii*) is an important secondary species particularly on lower microsites in the east but also important across the northern and western divisions of this type. Other important lowland species include Indiangrass and to a lesser extent Florida paspalum (*Paspalum floridanum*) and various sedges (*Carex* spp.). On higher and drier microsites, sideoats grama (*Bouteloua curtipendula*), hairy grama (*B. hirsuta*) and Texas grama (*B. ridgidseta*) are important secondary species. In the northern tier of prairies that make up this type, important species include sideoats grama, and Texas wintergrass or tussockgrass (*Nassella leucotricha*) and longspike tridens (*Tridens strictus*) on wet sites. In the northeast Silveus' dropseed (*Sporobolus silveanus*) may become a dominant in the higher rainfall area (Lynch 1962, Johnson 1963, Smeins 1973, Collins et al. 1975, Smeins and Diamond 1983, Diamond and Smeins 1985, Smeins1994).

Other important species may include tall dropseed (*S. asper*), Texas cupgrass (*Eriochloa sericea*), various panicums (*Panicum* spp., *Dicanthelium* spp.). Buffalograss (*Buchloe dactyloides*) and three awns (*Aristida* spp.) also may be important, particularly following heavy grazing and may dominate some sites. Three awns dominate drier sites with shallow soils (Lynch 1962). Forbs are variable and are often specificially associated with various communities. In the bluestem dominated communities *Conyza canadensis*, *Hedyotis, Plantago, Sisyrinchium* and various asters are prevelant (Lynch 1962). Other associates may include the genera *Oxalis*, *Polygala*, *Galactia, Strophastyles*, *Monarda* and *Cassia*. Woody plants that are important include *Quercus, Carya, Ulmus, Fraxinus, Symphoricarpos*, *Rhus* spp. and *Juniperus virginiana* which rapidly increases in the absence of fire. To the south and west mesquite (*Prosopis glandulosa*) and prickly pear cactus (*Opuntia* spp.) becomes more prevalent (Lynch 1962, Johnson 1963, Smeins 1973, Collins et al. 1975, Smeins and Diamond 1983, Diamond and Smeins 1985, Smeins 1994).

Bison (*Bison bison*) were historically an important source of disturbance that increased heterogeneity of patches on the landscape. Wild horses were established early on and large herds were noted by early explorers in the southern part of this type (Stewart 2002). Pronghorn antelope historically occurred in the western half of this type where mid- and shortgrass elements predominated (Nelson 1925). Although historical accounts of large groups (1,000's) of bison do occur, they evidently were not of the magnitude of herds in central and northern parts of the continent. The diversity of embedded edaphic communities within the general Blackland Prairie type is important and interacted with fire to determine wildlife species distributions. A problem with much of the literature on fire in prairies, and therefore a caution, is that it does not include interaction with herbivory (Engle and Bidwell 2001).

Fire Regime Description: Fire regime group II, with frequent replacement fires, both lightning and anthropogenic in origin (Moore 1972; Stewart 1951, 2002; Jurney et al. 2004). Wright and Bailey (1982) proposed a 5-10 year natural fire regime for tallgrass prairies in general. However frequent, anthropogenic fire was important for perpetuation of this type and (Sauer 1950; Stewart 1951, 2002). Further, frequency approaching annual burning is cited in numerous historical references (Moore 1972; Denevan 1992; Stewart 1963, 2002; Sampson et al. 2004). Historic fires have been documented during all seasons (Moore 1972, Stewart 2002, Jurney et al. 2004) dependant on the availability of dry fine fuels sufficient to carry a fire and likely edaphic and microsite contraints. Historic accounts from the 1800's depict some landscape scale burns where an entire landscape was described as burning (Jackson 1965). However it must be noted that these accounts occurred following aggressive market hunting and depletion of bison herds and were not characteristic of reference conditions. Bison grazing affected fire patterns and thus the landscape patterns in tallgrass prairie (Risser 1990). Bison and other grazing/browsing wildlife species preferentially seek out the new growth of recently burned areas affecting patch composition (e.g., Coppedge and Shaw 1998, Jackson 1965, Risser 1990, Steuter 1986, Fuhlendorf and Engle 2004). The large burn accounts are in contrast to the patch burn model where small burns are preferentially grazed by bison. Using the fire/bison interaction model first proposed by Steuter (1986) recent modifications propose that anywhere from 1/6 to 1/3 of a 20,000 acre (8,094 hectares) landscape likely burned (Fuhlendorf and Engle 2004). This caused earlier green-up and increased nutrient content of native grasses. Typically following green-up, fire is followed by intensive bison grazing pressure to the point that structural classes shifted over the landscape in response to an interaction between bison grazing pressure and fire (Steuter 1986; Fuhlendorf and Engle 2001, 2004). Heavily grazed and trampled areas would not burn in the next year to three years creating a one-way closed path. Following this type disturbance the patches are dominated with forbs and will not burn in the succeeding dormant and growing season because of lack of fuel. Whereas previous years unburned post-grazing re-growth would be the next patch to burn. Bison grazing drove the fire regime or at the least strongly influenced fire return intervals. Fire occurrence in turn influenced bison grazing distribution. This model depicts a landscape composed of a continuously shifting mosaic of patches with a short time period of duration. The small patch burn scenario is important to perpetuate suitable lek sites and brood rearing habitat for lesser, greater and Attwater's prairie chickens (respectively *Tympanicus pallidicinctus, T. cupido pinnnatus, T. c. attwateri,*) in the number accounted for presettlement (Sparks and Masters 1996). All three of these species historically occurred as somewhat discrete populations in parts of the blackland prairie (Silvy and Hagen 2004, Silvy et al 2004). Frequent fire is particularly important to control woody dynamics in this broadly dissected landscape mosaic of bottomland and upland forests (Denevan 1992; Stewart 1951, 2002) and varying edaphic conditions.

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: post replacement	24	Post fire community that is short duration (weeks to months-depending on time of burning) before transitioning into one of the other community stages.
B: mid-seral closed	34	Mixed forb and grass community either somewhat recovered from native animal grazing, or continuing post burn development. A diversity of microsites with differing edaphic conditions strongly influences vegetation height and structure depending on location in the region and prevailing climatic conditions.
C: mid- seral open	15	Generally forb dominated and with sparse grass clumps, derived from heavy bison grazing and trampling pressure, wallowing and horning. Likely small patches embedded in a larger mosaic of varying site conditions and communities.
D: late- seral closed	27	Tallgrass, mid-grass or shortgrass dominated depending on site and precipitation, tillering and overall plant vigor reduced by mulching effect from accumulation of ungrazed, unburned plant litter, over extended periods woody encroachment may occur. The characteristic structure depends on species composition and their stature.
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	4.4	0.2249	96	Surface fire potentially during most months but higher in prevalence in late dormant to early growing season and late growing to dormant season fire
Non-Replacement Fire	44.6	0.0224	4	Mid-growing season fires that burn a given patch incompletely or as a result of patchy bison grazing pressure
All Fire Frequency*	4.0	0.2473	100	

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

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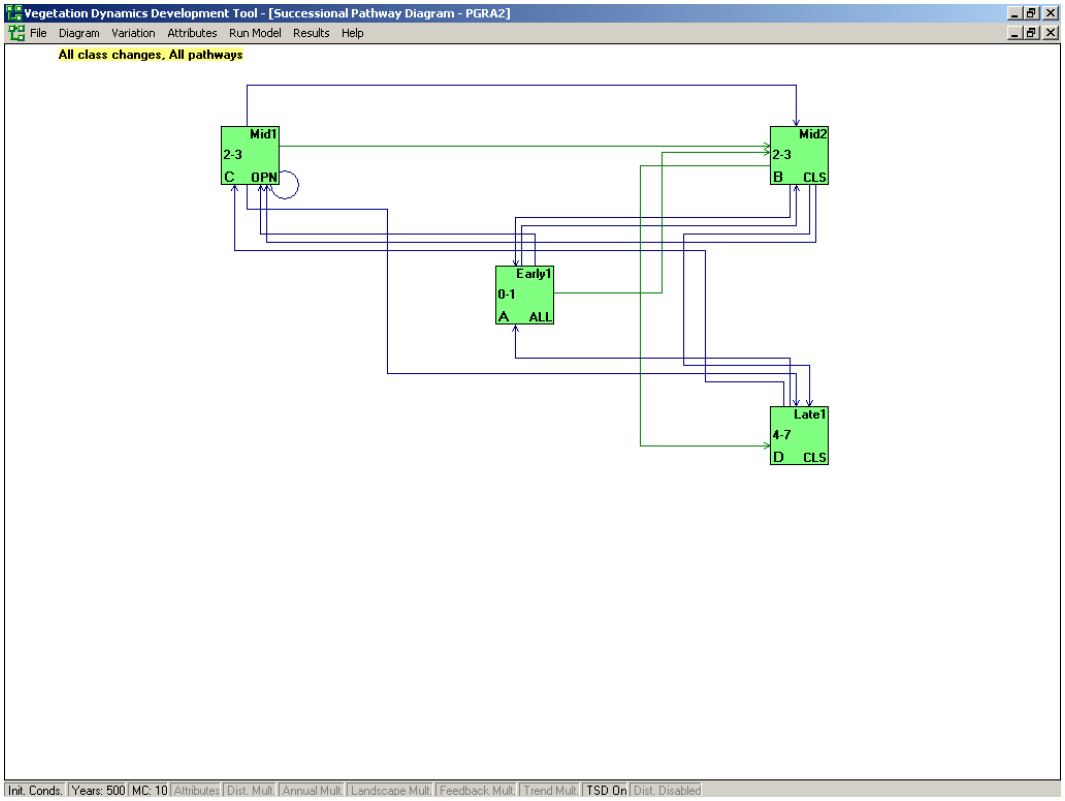
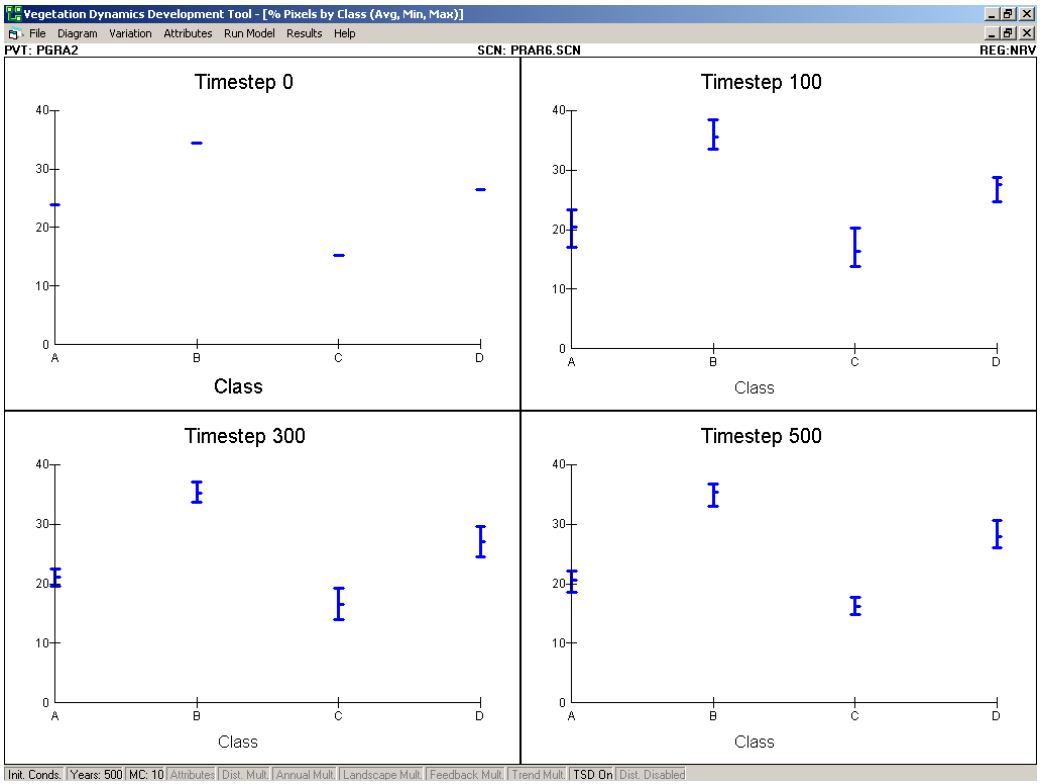
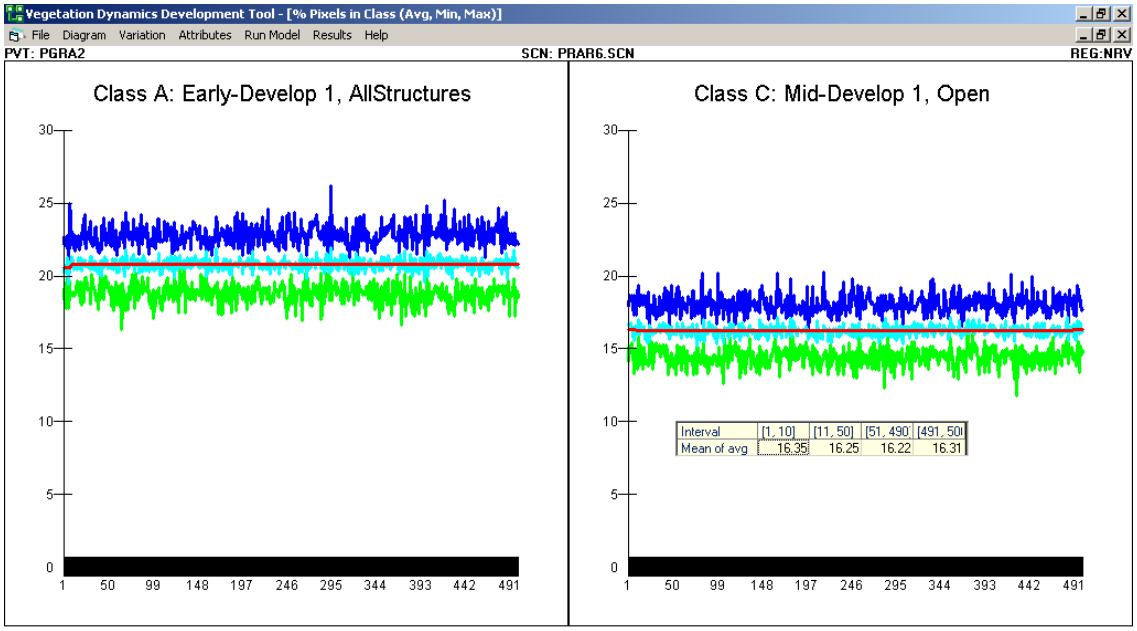
VDDT File Documentation

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



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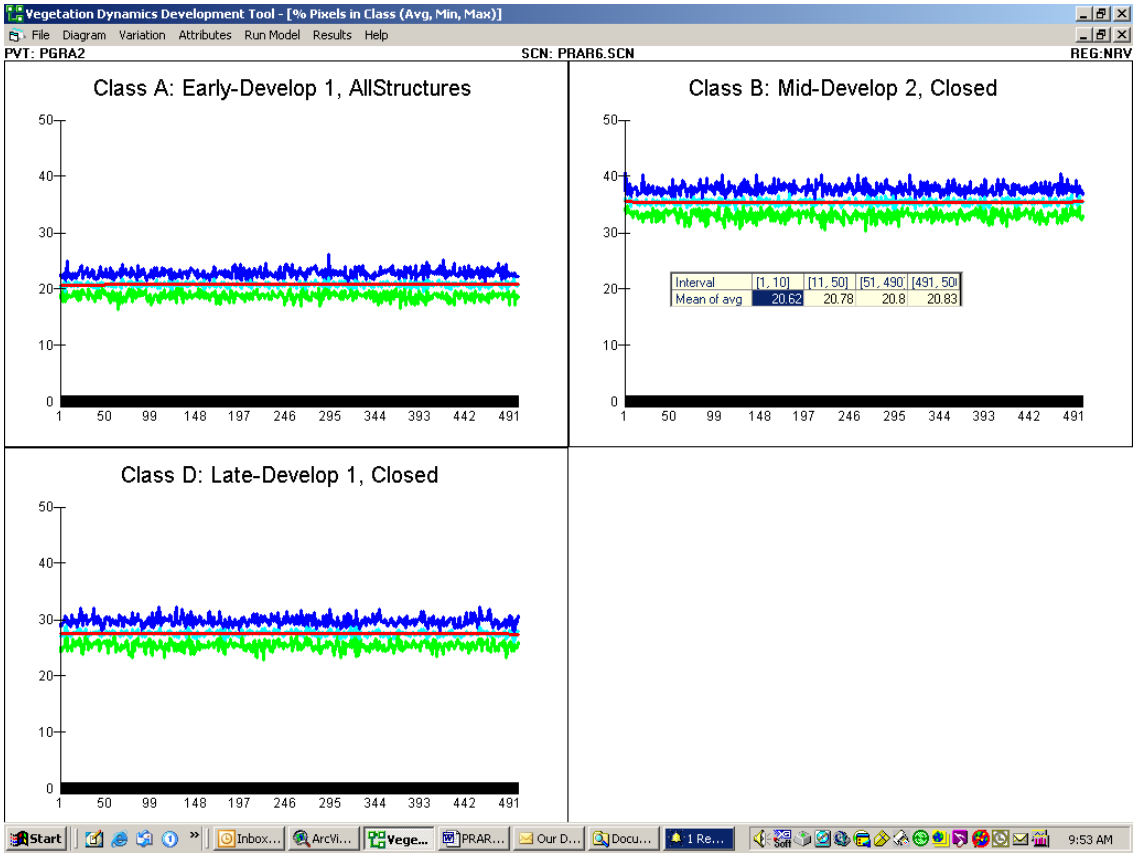
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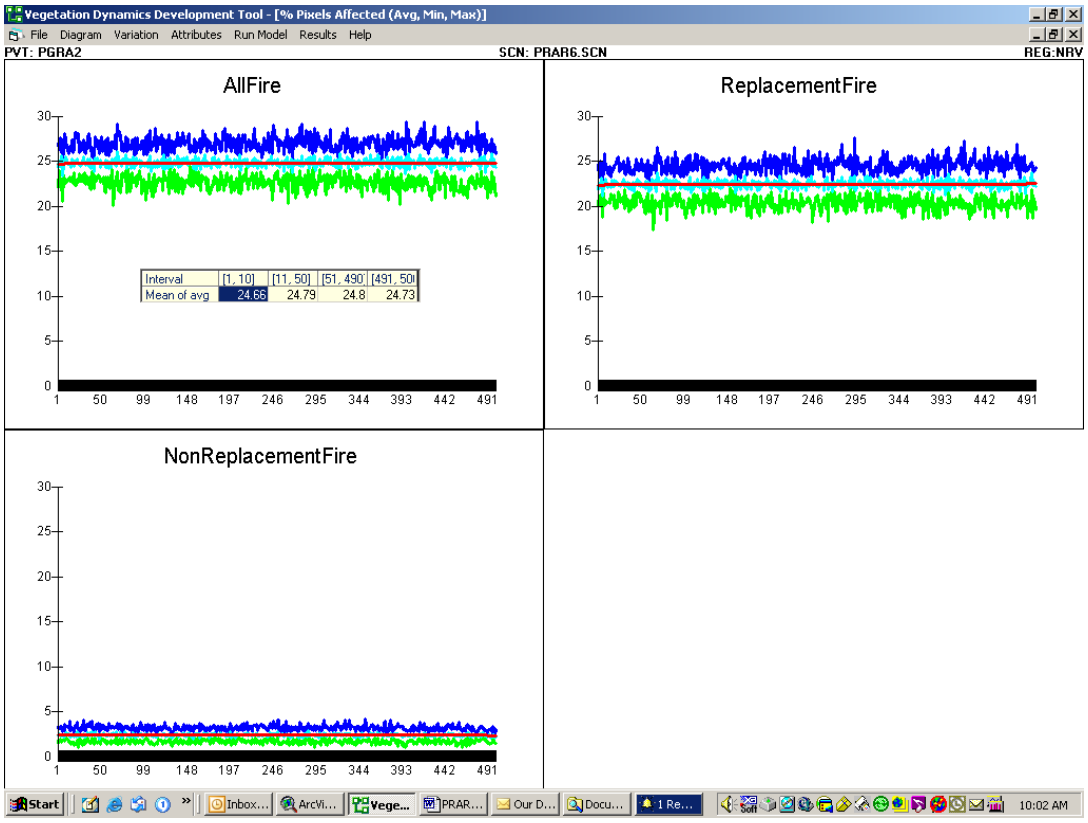
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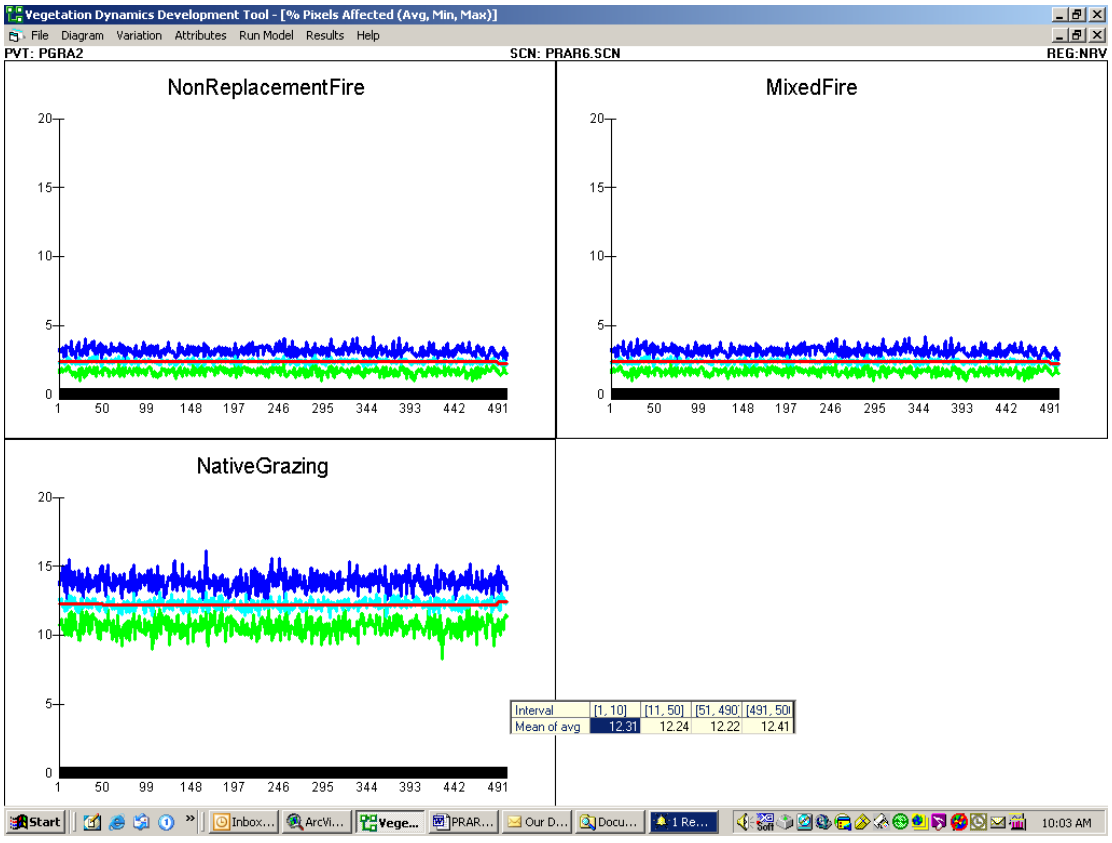
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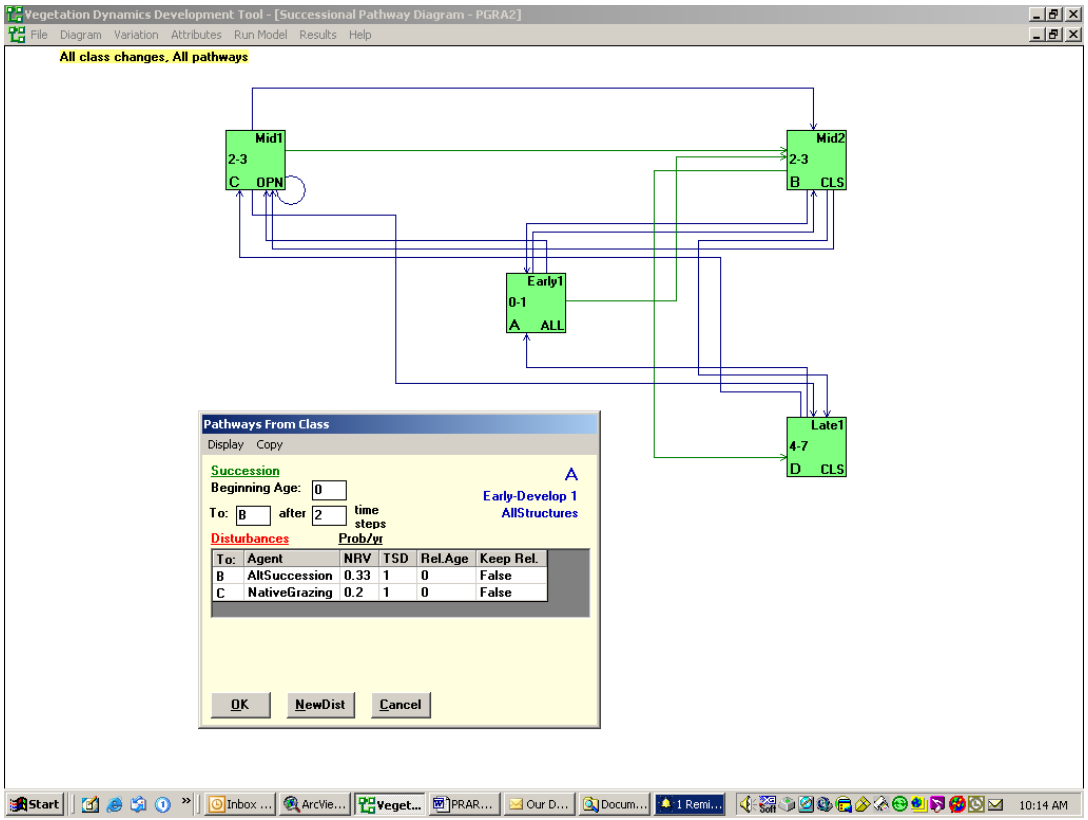
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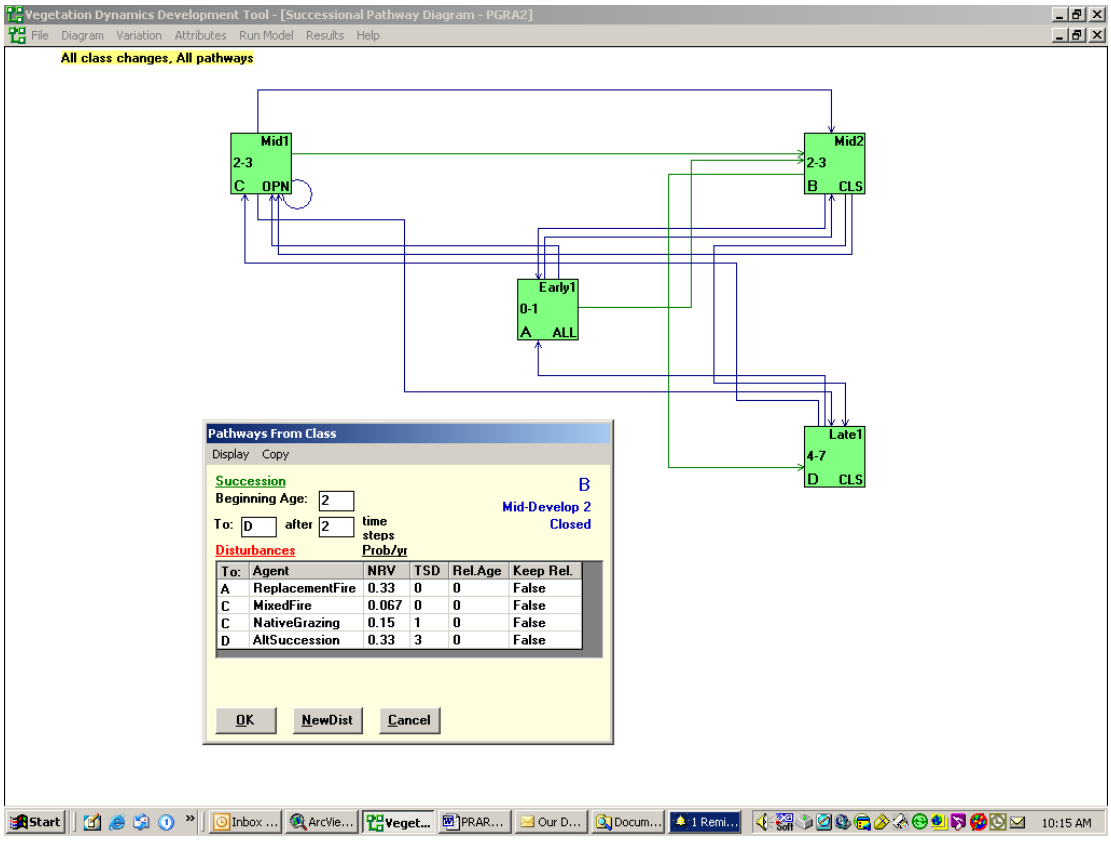
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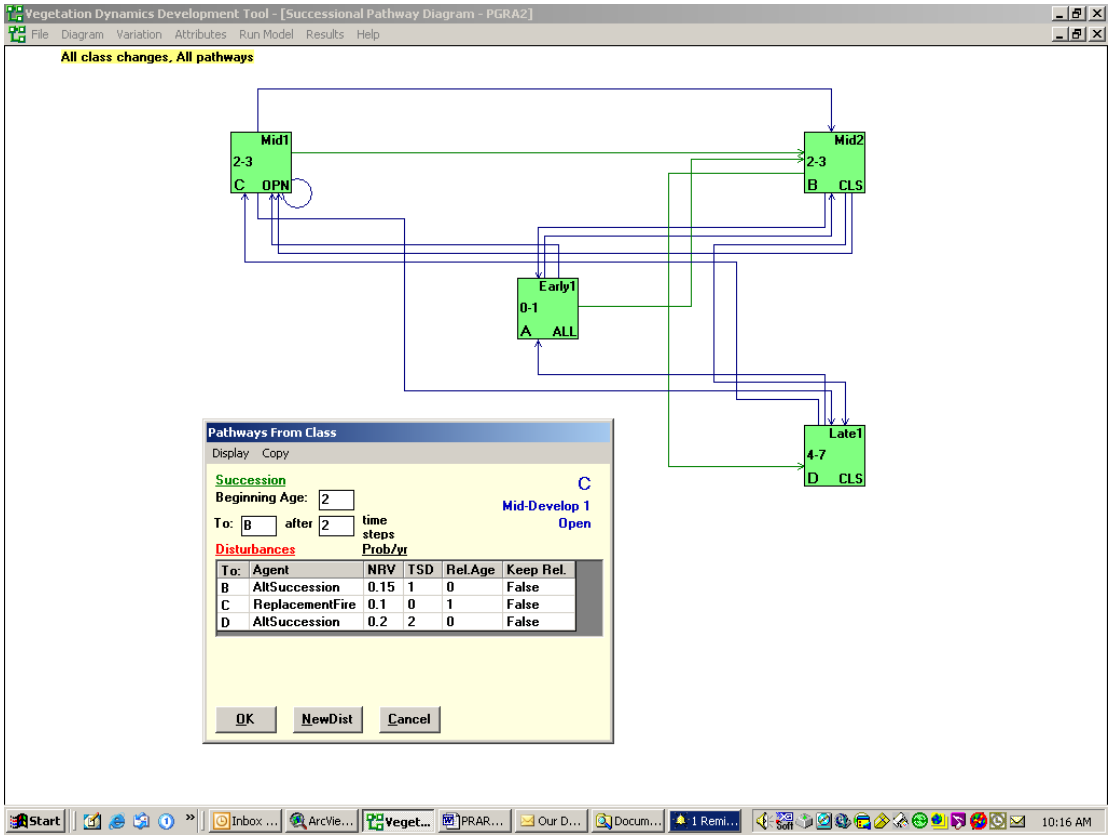
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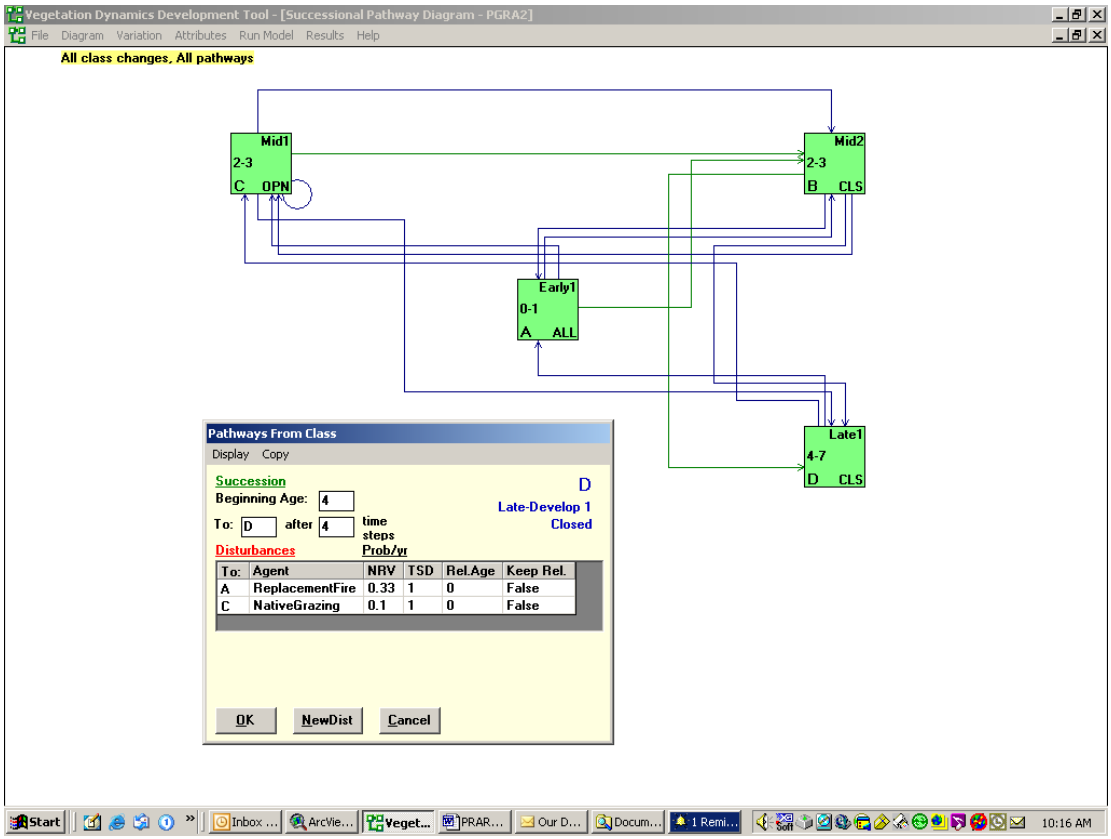
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Blackland prairie adapted from Kuchler 1964. Also includes Fort Worth Prairie, Grand Prairie and Fayette Prairie (Kuchler considered separate from the Blackland Prairie) (after Diamond and Smeins 1985, Smeins and Diamond 1983). San Antonio Prairie, which is not depicted, is a narrow area located north of Fayette Prairie and south of the main body of the Blackland Prairie.