Fire Regime Condition Class (FRCC) Interagency Handbook
Reference Conditions

Modeler: Ron Masters **Date:** 12-27-04 **PNVG Code:** PRAR7

Potential Natural Vegetation Group: Bluestem-Sacahuista Prairie (Kuchler Type 77) also known as the Coastal Prairie.

Geographic Area: Along the Gulf Coast and inland varying distances from 50 to 150 miles (80-240 km) from south Texas to Louisiana and the mouth of the Mississippi River (see map). To the north this type is bordered by Oak-Hickory forest (Kuchler type 100) in much of Texas and in east Texas Oak-Hickory-Pine (Kuchler type 111) and in Louisiana to the north and east by Southern Floodplain Forest (Kuchler type 112) (Kuchler 1964). To the south and west it also joins with the desert grasslands. This type is dissected by numerous rivers and streams.

Description: This type has many of the same vegetation elements of tallgrass prairie but also has a number of additional species, including some tropical grasses. Nearly 1,000 plant species have been identified in this type. The forb community tends to be richer in the coastal prairie than in true tallgrass prairie. This type is considered a shrub-grassland complex rather than a prairie (Johnston 1963, Scifres and Mutz 1975, Drawe 1994). This type is highly variable in species composition because of the dissected nature of the terrain and topography caused by numerous rivers and creeks (Johnston 1963, Diamond and Smeins 1985, Drawe 1994). Dominated by little bluestem (*Schizachyrium scoparium*), sea coast bluestem (*S. c. var. littoralis*) several *Panicums* and sacahuista also know as Gulf cordgrass (*Spartina spartinae*). Sacahuista primarily dominates along floodplains of the numerous rivers and near the coast. Other important species include bushy bluestem (*Andropogon glomeratus*), other bluestems such as split-beard (*A. ternarius*), broomsedge bluestem (*A. virginicus*), silver bluestem (*Bothriochloa saccharoides*), various *Sporobolus*, and several tropical grasses of the genera *Heteropogon, Paspalum, Trachypogon* and the previously mentioned *Panicum*.

A topographic and moisture gradient exists as one progresses inland and out of floodplains. Species associations change with edaphic and moisture conditions. Secondary species vary in importance regionally depending on topography and soil moisture relations and include sideoats grama (*Bouteloua curtipendula*), buffalo grass (*Buchloe dactyloides*) and threeawns (*Aristida* spp.). Several grass-likes that are important include *Carex* spp., *Eleocharis* spp., *Scirpus* spp. Conspicuous forbs include the genera *Ratibida*, *Rudbeckia*, *Liatris*, and *Sagittaria*. Shrubs that are important include in honey mesquite (Prosopis glandulosa) and various acacias most notably huicache (*Acacia farnesiana)* in Texas, also *Rosa bracteata*, and various oaks (*Quercus* spp). Eastern baccharis (*Baccharis halimifolia*) and wax myrltle (*Myrica cerifera*) are more important to the east. All of these woody plants and others increase in the absence of fire.

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 southwestern most part of this type (Nelson 1925) where rainfall amounts dropped considerably. 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 and wetlands within the general 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). Extended inundation in areas referred to as lagunas adds a disturbance element within 25 km of the coast. These areas are subject to a different successional pattern than that following other types of disturbance (Scifres and Mutz 1975).

Fire Regime Description: Fire regime group II, with frequent replacement fires, both lightning and anthropogenic in origin (Stewart 1951, Lehmann 1965, Drawe 1980, Stewart 2002; Jurney et al 2004). Likely, this type has one of the most frequent fire regimes in North America. Annual burning was described in references to historic accounts (Stewart 1951, Chamrad and Dodd 1973, Stewart 2002:141-144) and in one instance reference was made to burning twice (summer and winter) in the same year (Lehmann 1965:133). These references do not indicate every acre was burned every year but likely some considerable area was burned every year with most of the type being burned at least biannually and some areas burned twice in a given year. Lehmann (1965) also notes accounts about the patches of unburned vegetation and relative green-up compared to burned areas. Fire was likely possible during most seasons and dependant on the availability of dry fine fuels sufficient to carry a fire. Historic accounts from the 1800's depict large burns, but the terrain is dissected by numerous rivers and creeks bordered by trees (Lehmann 1965, Drawe 1994). Therefore this landscape matrix strongly influenced the probable size of burn. Within this matrix bison herds had some influence although herds were of smaller size and more dispersed than herds of the central Great Plains. Bison grazing affects fire patterns and thus the landscape patterns in tallgrass prairie (Risser 1990) and assuredly this system as well. 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). Burn accounts are in agreement with 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) tallgrass landscape likely burned (Fuhlendorf and Engle 2004). Likely this figure is less for coastal prairie because of the dissected terrain. Buring causes earlier green-up and increased nutrient content of native grasses and is preferentially selected by grazing animals (Lehmann 1965, Oefinger and Scifres 1977). 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 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 and very frequent fire scenario is essential to perpetuate suitable lek sites and brood rearing habitat for Attwater's prairie chicken (*Tympanicus cupido attwateri*) in this system with long growing seasons, fertile soil and quick recovery time and with habitat requirements (Kessler 1978) similar to other prairie chicken species noted by Sparks and Masters (1996). This species historically occurred as somewhat discrete populations in parts of the blackland prairie and coastal prairie (Lehmann 1965, Chamrad and Dodd 1973, Silvy and Hagen 2004, Silvy et al 2004). Frequent fire is essential to control woody dynamics in this dissected landscape mosaic of rivers and creeks with stringers of bottomland and some upland forests (Denevan 1992; Lehmann 1965, Stewart 1951, 2002) and varying edaphic and moisture conditions (Scifres and Mutz 1975).

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: post replacement	26	Post fire community that is short duration (often weeks-depending on time of burning) before transitioning into one of the other community stages. Succession post inundation with water proceeds in a different manner through a sedge then bunchgrass stage.
B: mid-seral closed	39	Mixed forb and grass community either somewhat recovered from bison grazing, or inundation with water or continuing post burn development. Can be somewhat forb dominated with a woody component in areas.
C: mid- seral open	21	Forb dominated site with sparse bunchgrass clumps, derived from heavy bison grazing and trampling pressure, wallowing and horning, or inundation with water.
D: late- seral closed	14	Tallgrass dominated but with a persistent woody component, tillering and overall plant vigor reduced by mulching effect from accumulation of ungrazed, unburned plant litter, over short periods of fire exclusion woody encroachment will rapidly occur. The woody element will also increase following drought and over-utilization of herbaceous plants.
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	3.6	0.28	78	Surface fire during most any season. Some areas may have burned twice in a given year.
Non-Replacement Fire	12.5	0.08	22	Fires that incompletely burn a given patch because of either wet or unavailable fuels from flooding in poorly drained depressions or as a result of drought and over-grazing thus limiting fuels
All Fire Frequency*	2.8	0.36	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

Anderson, R. C. and L. E. Brown. 1986. Stability and instability in plant communities following fire. American Journal of Botany 73:364-368.

Axelrod, D. I. 1985. Rise of the grassland biome, central North America. Botanical Review 51:163-201.

Bailey, D.W., J.E. Gross, A.L. Emilio, L.R. Rittenhouse, M.B. Coughenour, D.M. Swift, and P.L. Sims. 1996. Mechanisms that result in large herbivore grazing distribution patterns. Journal of Range Management 49(5):386-400.

Biondini, M.E., A.A. Steuter, and R.G. Hamilton. 1999. Bison use of fire-managed remnant prairies. Journal of Range Management 52(5):454-461.

Box, T. W., and R. S. White. 1969. Fall and winter burning of south Texas brush ranges. Journal of Range Management 22:373-376.

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.

Chamrad, A. D. and J. D. Dodd. 1973. Fire in the range of Attwater's prairie chicken. Proceedings Tall Timbers Fire Ecology Conference 12:257-276.

Coppedge, B.R., and J.H. Shaw. 1997. Effects of horning and rubbing behavior by bison (*Bison bison*) on woody vegetation in a tallgrass prairie landscape. American Midland Naturalist 138(1):189-196.

Coppedge, B.R., and J.H. Shaw. 1998. Bison grazing patterns on seasonally burned tallgrass prairie. Journal of Range Management 51(3):258-264.

Coppedge, B.R., and J.H. Shaw. 1998. Diets of bison social groups on Tallgrass Prairie in Oklahoma. The Prairie Naturalist 30(1):29-36.

Coppedge, B.R., and J.H. Shaw. 2000. American bison *Bison bison* wallowing behavior and wallow formation on tallgrass prairie. Acta Theriologica 45(1):103-110.

Daubenmire, R. 1968. Ecology of fire in grasslands. Adv. Ecol. Research 5:209-266.

Denevan, W. M. 1992. The pristine myth: the landscape of the Americas in 1492. Annals of the Association of American Geographers 82:369-385.

Diamond, D. D., and F. E. Smeins. 1985. Composition, classification and species response patterns of remnant tallgrass prairies in Texas. The American Midland Naturalist 113(2):294-308.

Diamond, D. D., D. H. Risking and S. L. Orzell. 1987. A framework for plant community classification and conservation in Texas. The Texas Journal of Science 39:203-221.

Drawe, D. L. 1980. The role of fire in coastal prairie. Pages 101-113 *in* Proceedings of a Symposium: Prescribed Range Burning in the coastal prairie and eastern Rio Grande Plains of Texas.Texas Agricultural Extension Service, The Texas A & M University System, College Station, TX.

Drawe, D. L. 1994. Bluestem-sacahuista Prairie SRM 711. Pages 91-92 *in* T. N. Shiflet, ed. Rangeland cover types of the United States. Society for Range Management, Denver, CO. 152p.

Durham, A. J., and M. M. Kothmann. 1977. Forage availability and cattle diets on the Texas coastal prairie. Journal of Range Management 30:103-106.

Engle, D.M., and T.G. Bidwell. 2001. Viewpoint: The response of Central North American prairies to seasonal fire. Journal of Range Management 54:2-10.

Ford, M. F., and J. B. Grace. 1998. The interactive effects of vertebrate herbivory and fire on a coastal marsh in Louisiana, the Pearl River. Wetlands 18:1-8.

Ford, M. F., and J. B. Grace. 1998. Effects of herbivores on vertical soil accretion, shallow subsidence and soil elevation changes in coastal Louisiana. Journal of Ecology 86:974-982.

Fuhlendorf, S. D. and D. M. Engle. 2001. Restoring heterogeneity on rangelands: ecosystem management based on evolutionary grazing patterns. BioScience 51:625-632.

Fuhlendorf, S. D. and D. M. Engle. 2004. Application of the fire-grazing interaction to restore a shifting mosaic on tallgrass prairie. Journal of Applied Ecology 41:604-614.

Gough, L. and J. B. Grace. 1998. Effects of flooding, salinity, and herbivory on coastal plant communities, Louisiana, United States. Oecologia 117:527-535.

Gough, L. and J. B. Grace. 1999. Predicting effects of environmental change on plant species density: experimental evaluations in a coastal wetland. Ecology 80:882-890.

Grace, J. B. and B. H. Pugesek. 1997. A structural equation model of plant species richness and its application to a coastal wetland. American Nat. 149:436-460.

Grace, J. B. and G. R. Guntenspergen. 1999. The effects of landscape position on plant species density: evidence of past environmental effects in a coastal wetland. Ecoscience 6:381-391.

Grace, J. B. and H. Jutila. 1999. The relationship between species density and community biomass in grazed and ungrazed coastal meadows. Oikos 85:398-408.

Grace, J. B., L. Allain, and C. Allen. 2000. Factors associated with plant species richness in a coastal tallgrass prairie. Journal of Vegetation Science 11:443-452.

Grace, J. B., L. Allain, and C. Allen. 2000. Vegetation associations in a rare community type - coastal tallgrass prairie. Plant Ecology 147:105-115.

Hansmire, J. A., D. L. Drawe, D. B. Wester and C. M. Britton. 1988. Effect of winter burns on forbs and grasses of the Texas coastal prairie. The Southwest Naturalist 33:333-338.

Jackson, A. S. 1965. Wildfires in the Great Plains grasslands. Proc. Tall Timbers Fire Ecology Conference 4:241-259.

Johnston, M. C. 1963. Past and present grasslands of southern Texas and northeastern Mexico. Ecology 44:456-466.

Jutila, H. M., and J. B. Grace. 2002. Effects of disturbance on germination and seedling establishment in a coastal prairie grassland: a test of the competitive release hypothesis. Journal of Ecology 90:291-302.

Jurney, D., R. Evans, J. Ippolito, and V. Bergstrom. 2004. The role of wildland fire in portions of southeastern North America. Pages 95-116 *in* R. T. Engstrom and W. J. de Groot (eds). 22nd Tall Timbers Fire Ecology Conf. Proceedings. Kanaskas, Alberta.

Kessler, W. B. 1978. Attwater prairie chicken ecology in relation to agricultural practices. Ph.D. Thesis, Texas A&M University, College Station. 158p.

Komarek, E. V. 1965. Fire ecology, grasslands and man

Kucera, C. L. 1978. Grasslands and fire. Pages 90-111 in Proc. Conference Fire regimes and ecosystem properties. Gen. Tech. Rep. WO-26. USDA For. Ser., Washington, DC.

Kuchler, A. W. 1964. Potential natural vegetation of the conterminous United States. Special Publication 36. American Geographical Society, New York, New York.

Lehmann, V. W. 1965. Fire in the range of Attwater's prairie chicken. Proceedings Tall Timbers Fire Ecology Conference 4:127-143.

Lonard, R. I., F. W. Judd, and E. H. Smith. 2003. Recovery of vegetation following a wild fire on the margins of tidal flats, Padre Island National Seashore, Texas. Texas Journal of Science 55:347-364.

Lynch, B. D. 1962. Study of a grassland mosaic at Austin, Texas. Ecology 43:679-686.

McAtee, J. W., C. J. Scifres, and D. L, Drawe. 1979. Improvement of Gulf cordgrass range with burning or shredding. Journal of Range Management 32:372-375.

Moore, C. T. 1972. Man and fire in the central North American grassland 1535-1890: a documentary historical geography. Ph.D. Dissertation, University of California, Los Angles. 155p.

Nelson, E. W. 1925. Status of the pronghorn antelope, 1922-1924. U.S. Department of Agriculture Bulletin No. 1346. Washington, D.C. 64p.

Oefinger, R. D. and C. J. Scifres. 1977. Gulf cordgrass production, utilization and nutritional value following burning. Texas A&M University, Texas Agricultural Experiment Station Bulletin. College Station, TX. 19p.

Plumb, G.E., and J.L. Dodd. 1993. Foraging ecology of bison and cattle on a mixed prairie: implications for natural area management. Ecological Applications 3(4):631-643.

Risser, P. G. 1990. Landscape processes and the vegetation of the North American grassland. *in* S. L. Collins and L. L. Wallace, eds. Fire in North American tallgrass prairies. University of Oklahoma Press, Norman. 175p.

Sampson, F. B., F. L. Knopf and W. R. Ostlie. 2004. Great Plains ecosystems; past, present and future. Wildlife Society Bulletin 32:6-15.

Sauer, C. O. 1950. Grassland climax, fire and man. Journal of Range Management 3:16-21.

Schmidt, Kirsten M, Menakis, James P., Hardy, Colin C., Hann, Wendel J., Bunnell, David L. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Gen. Tech. Rep. RMRS-GTR-87. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 41 p. + CD.

Scifres, C. J., and K. W. Duncan. 1982. Brownseed paspalum response to season of burning. Journal of Range Management 35:251-253.

Scifres, C. J., and J. L. Mutz. 1975. Secondary succession following extended inundation of Texas Coastal Rangeland. Journal of Range Management 28:279-282.

Scifres, C. J., J. W. McAtee, and D. L. Drawe. 1980. Botanical, edaphic and water relationships of gulf cordgrass (*Spartina spartinae*) and associated communities. The Southwestern Naturalist 25:397-410.

Scifres, C. J., J. L. Munz, R. E. Whitson, and D. L. Drawe. 1982. Interrelationships of huisache canopy cover with range forage on the coastal prairie. Journal of Range Management 35:558-562.

Shaw, J.H., and M. Lee. 1997. Relative abundance of bison, elk, and pronghorn on the southern plains, 1806-1857. Plains Anthropologist 42(159, Memoir 29):163-172.

Silvy, N. J. and C. A. Hagen. 2004. Introduction: management of imperiled prairie grouse species and their habitat. Wildlife Society Bulletin 32:2-5.

Silvy, N. J., M. J. Peterson, and R. R. Lopez. 2004. The cause of the decline of pinnated grouse: the Texas example. Wildlife Society Bulletin 32:16-21.

Smeins, F. E., and D. D. Diamond. 1983. Remnant grasslands of the Fayette Prairie, Texas. The American Midland Naturalist 110:1-13.

Sparks, J. C. and R. E. Masters. 1996. Fire seasonality effects on vegetation in mixed-, tall- and southeastern pine-grassland communities: a review. Transactions of the 61st North American Wildlife and Natural Resources Conference 61:246-255.

Steuter, A. A. 1986. Fire behavior and standing crop characteristics on repeated seasonal burns-northern mixed prarie. Pages 54-59 *in* A. L. Koonce, ed., Prescribed burning in the Midwest: State-of-the-art, Proceedings of a symposium. University of Wisconsin, Stevens Point. 162 p.

Stewart, O. C. 1951. Burning and natural vegetation in the United States. Geographical Review 41:317-320.

Stewart, O. C. 1963. Barriers to understanding the influence of use of fire by aborigines. Proc. Tall Timbers Fire Ecology Conference 2:117-126.

Stewart, O. C. 2002. Forgotten fires, Native Americans and the transient wilderness. Edited by H. T. Lewis and M. K. Anderson. University of Oklahoma Press, Norman. 364p.

Tharpe, B. C. 1925. Structure of Texas vegetation east of the 98th meridian. University of Texas Bulletin 2606, University of Texas, Austin.

Vogl, R. J. 1974. Effects of fire on grasslands. Pages 139-194 in T. T. Kozlowski, and C. E. Ahlgren (eds.). Fire and ecosystems. Academic Press, New York.

U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, December). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/.

Vinton, M.A., and D.C. Hartnett. 1992. Effects of bison grazing on *Andropogon gerardii* and *Panicum virgatum* in burned and unburned tallgrass prairie. Oecologia 90:374-382.

Wright, H. A., and A. W. Bailey. 1982. Fire ecology: United States and southern Canada. John Wiley and Sons, New York. 501p.

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VDDT File Documentation

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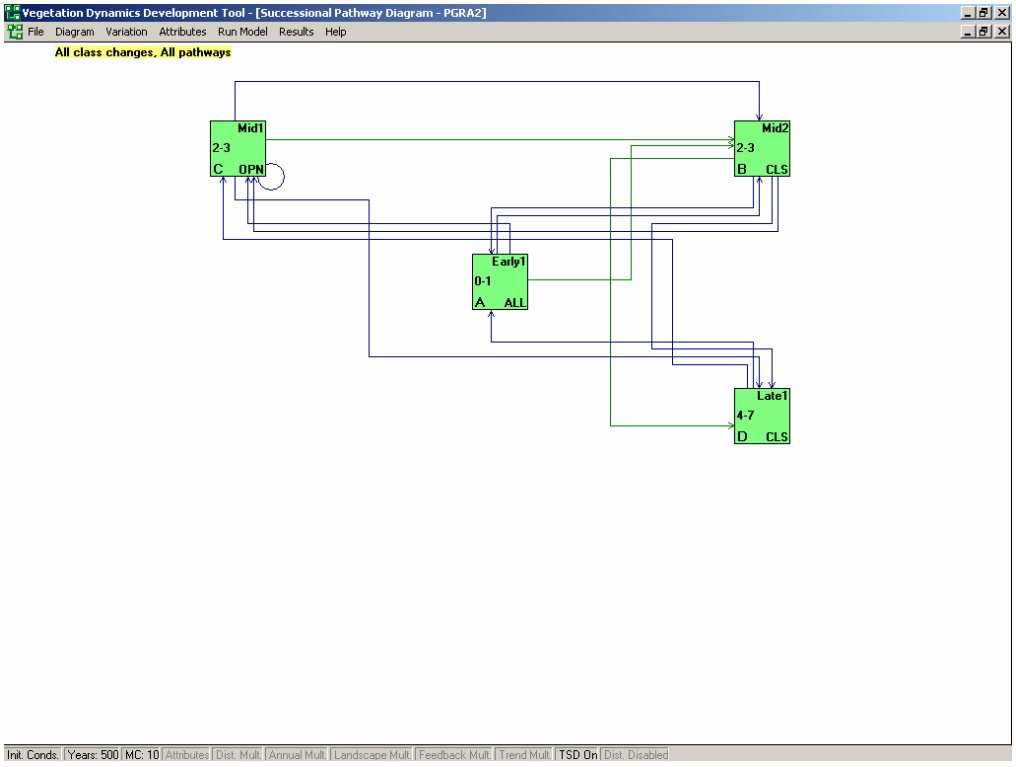

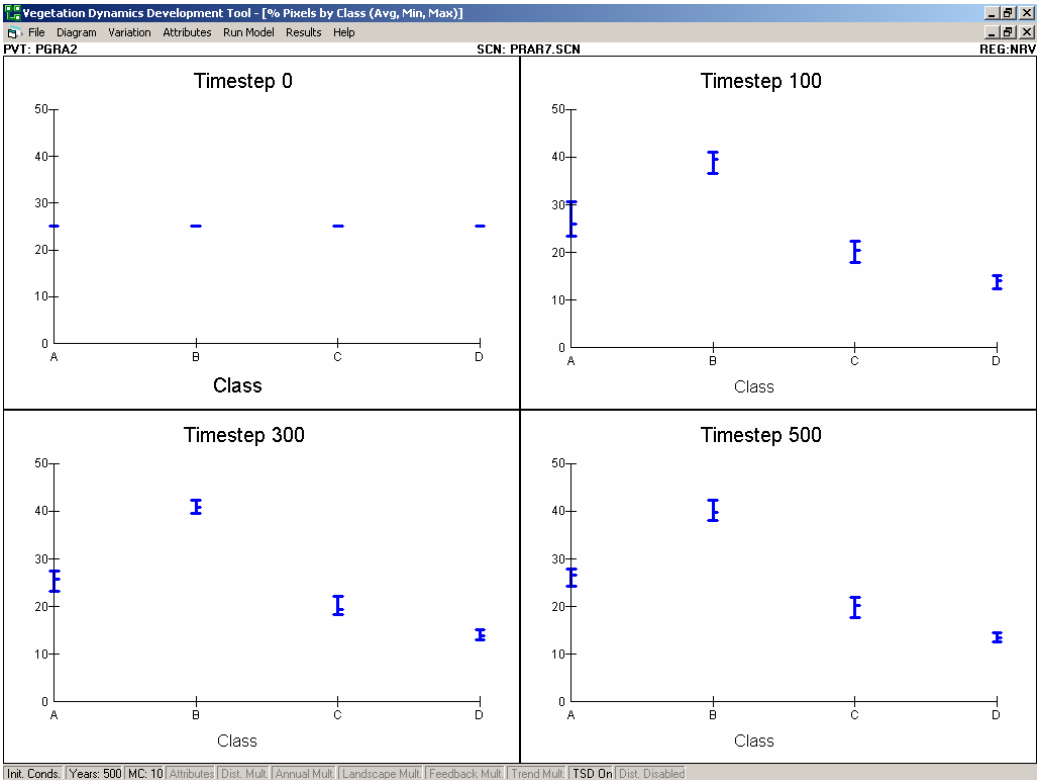

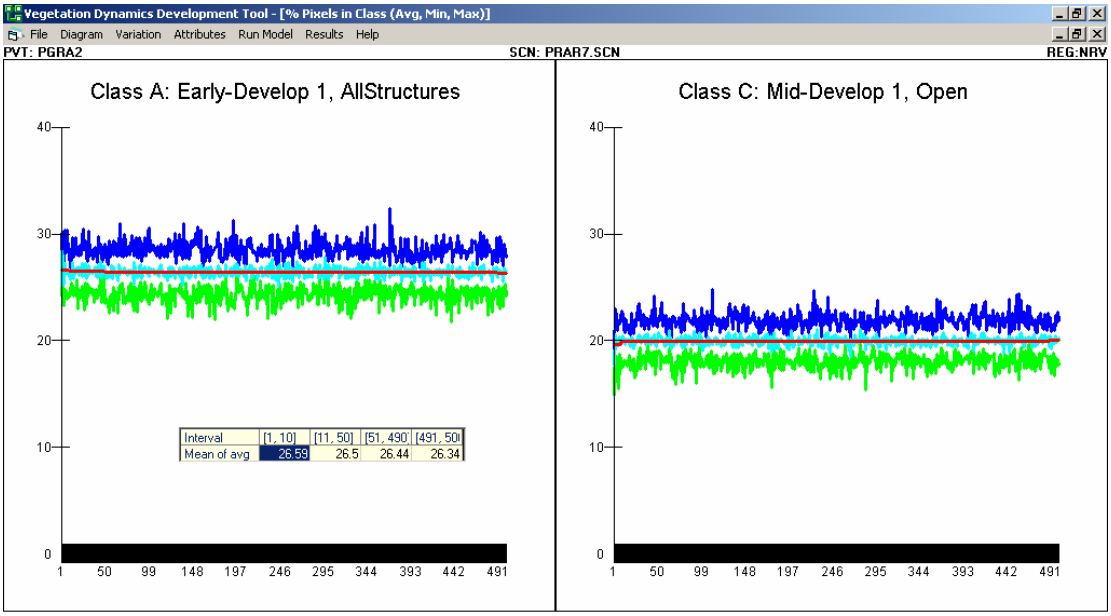
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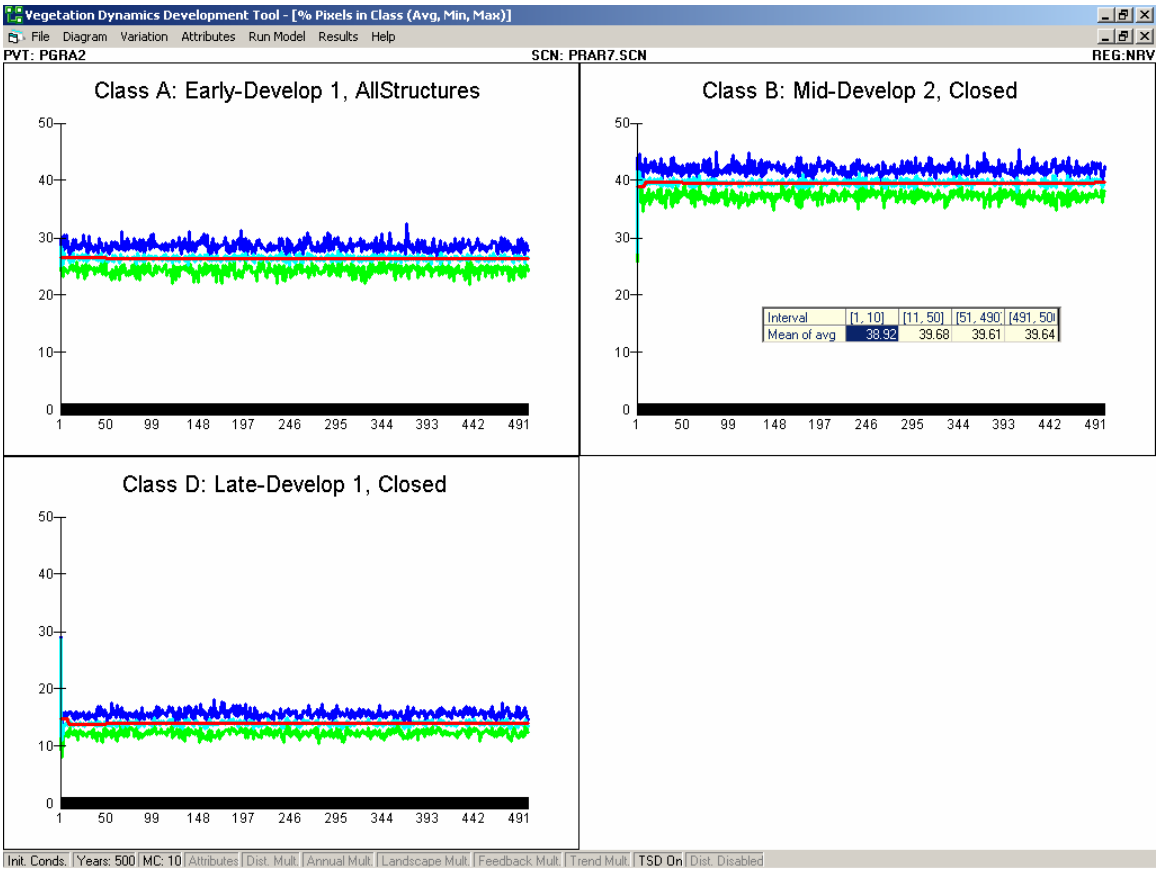
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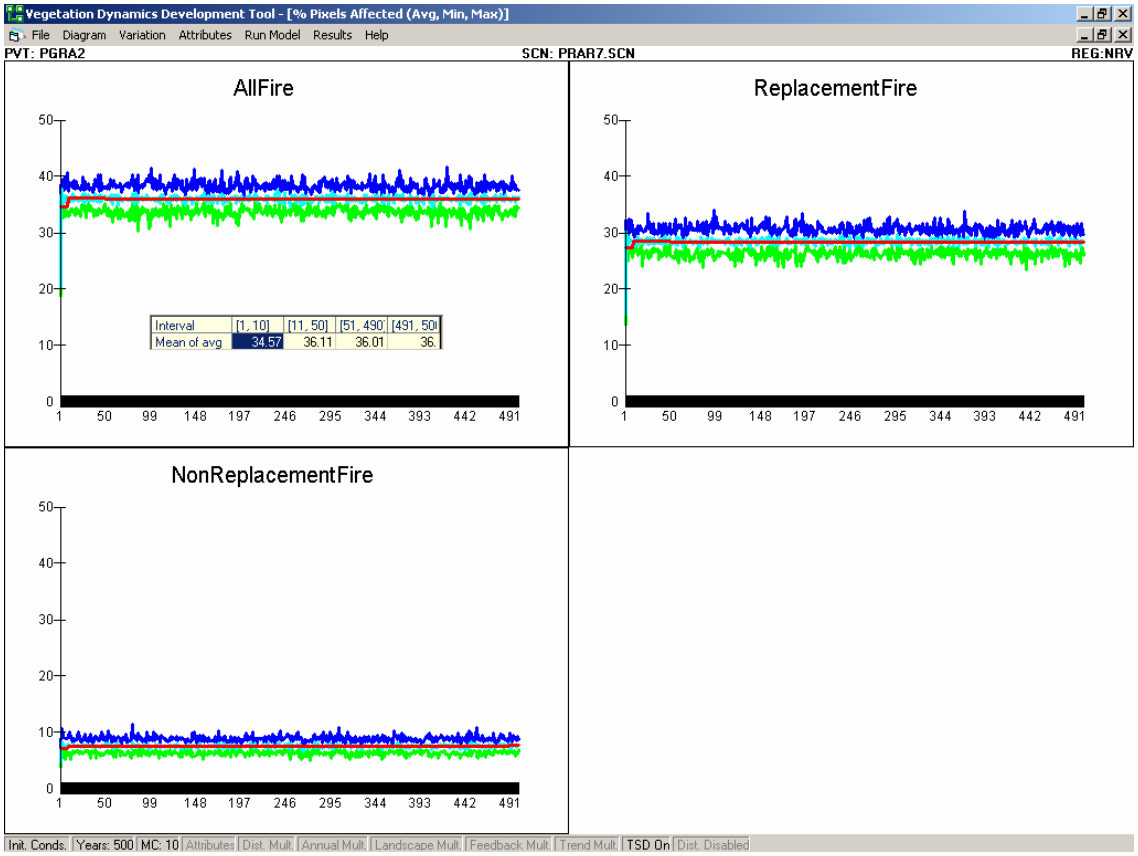
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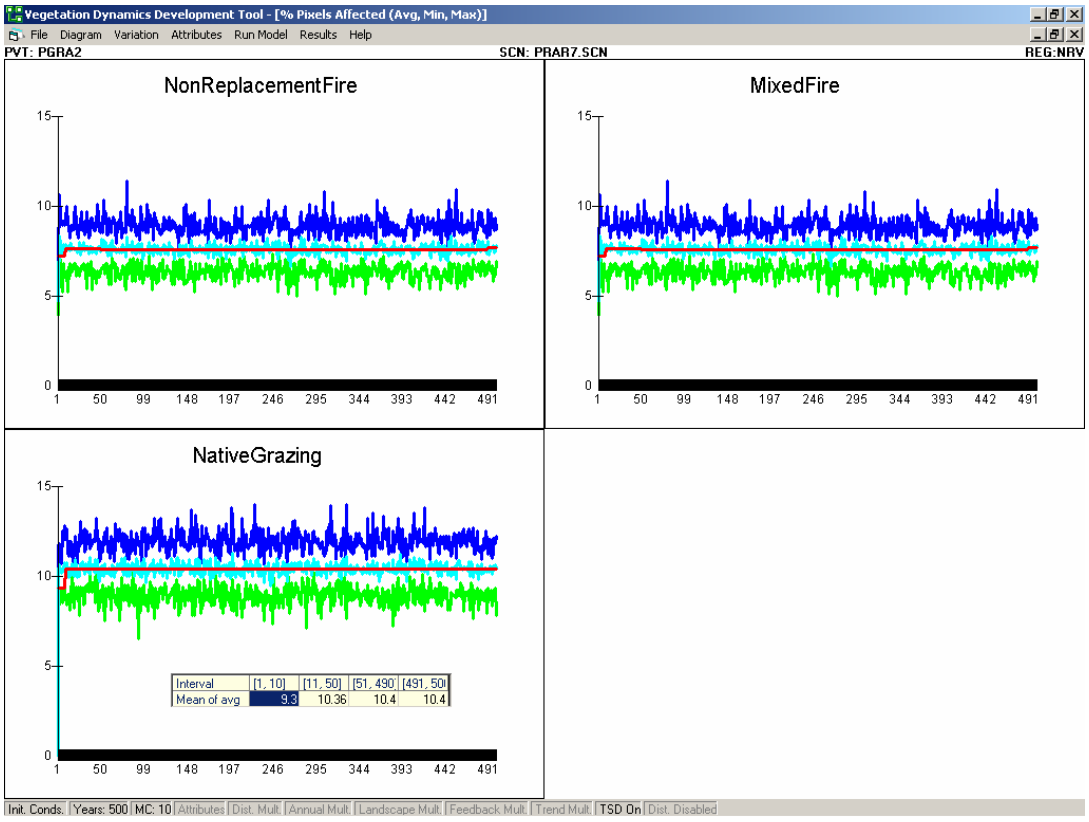
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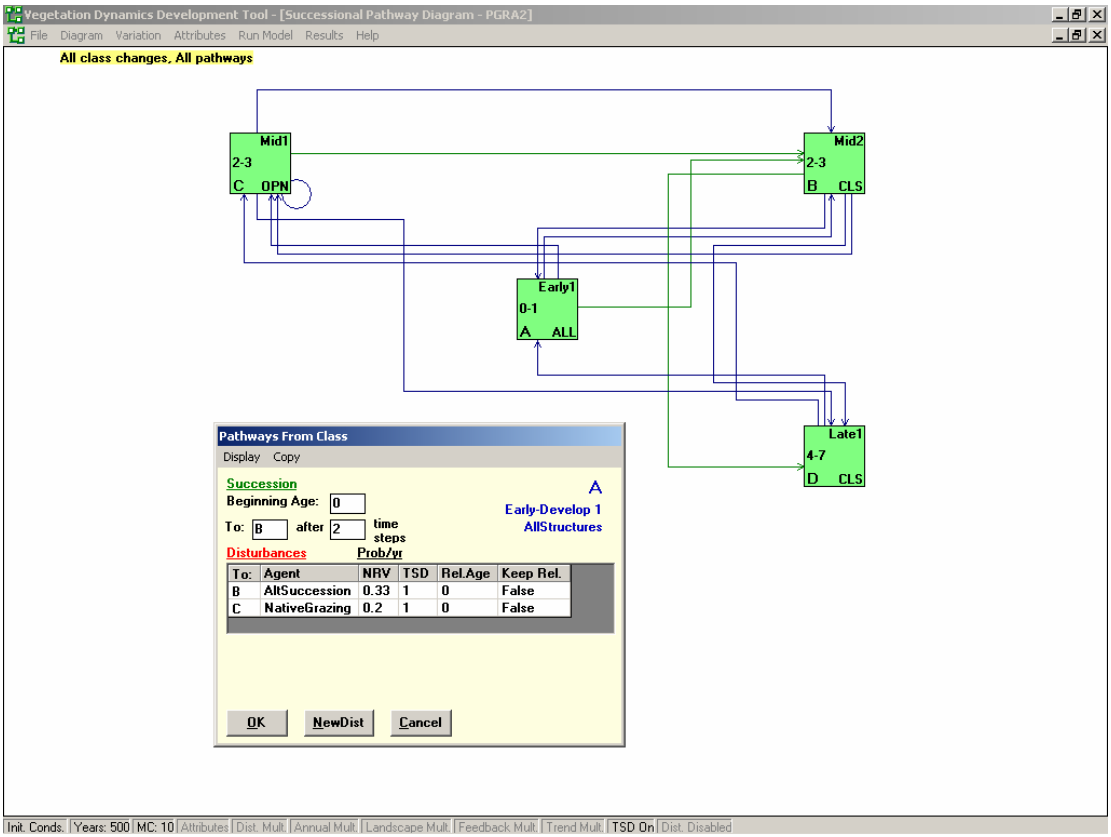
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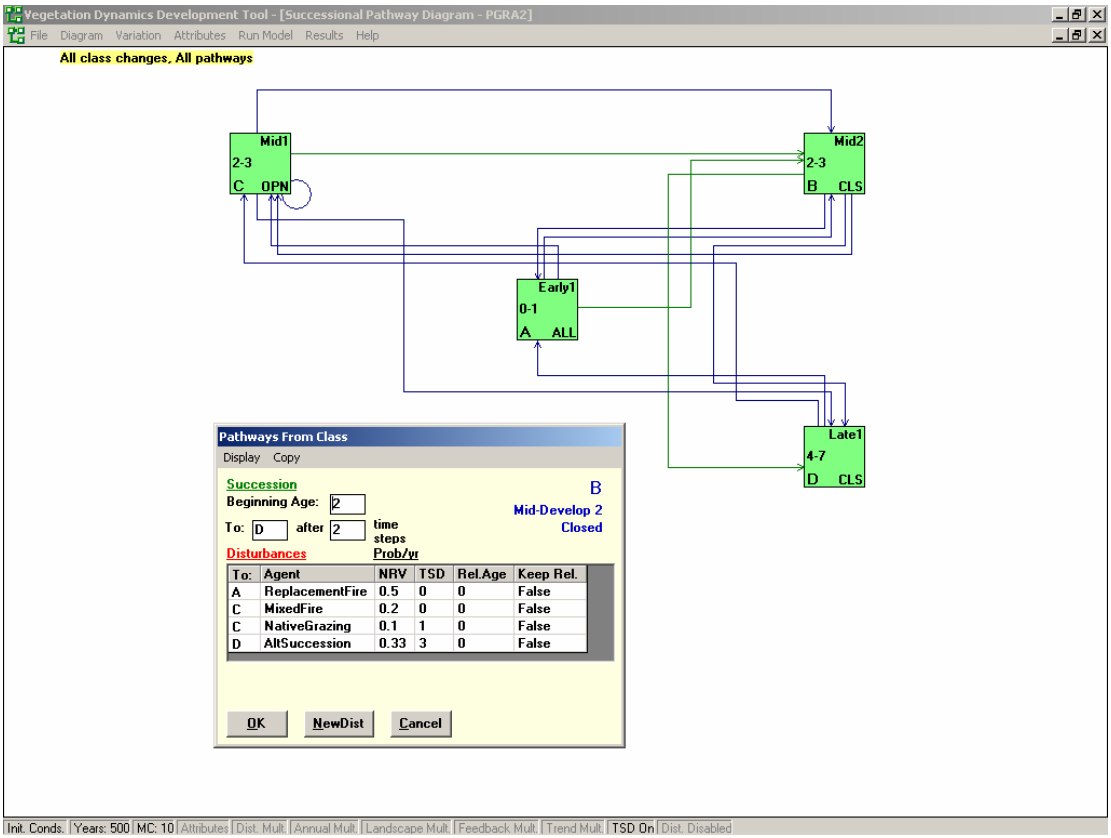
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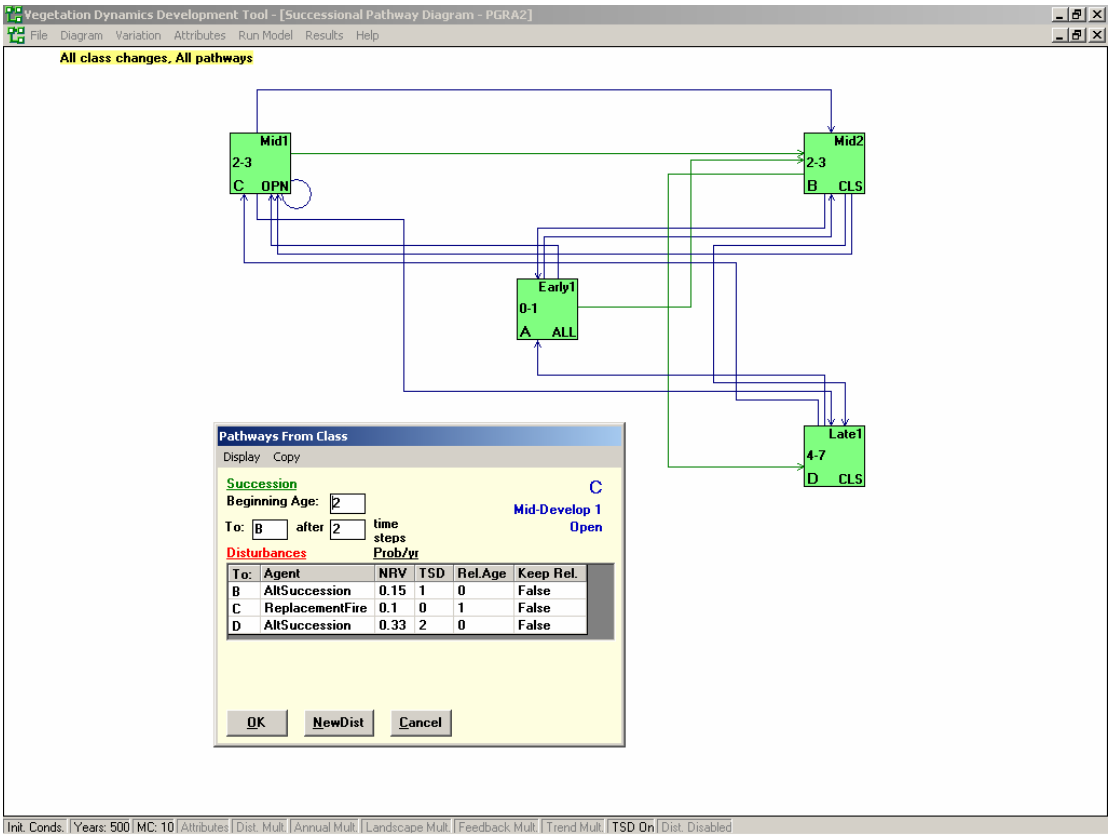
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Early1
0-1
A ALL
Late1
4-7
D CLS
Pathways From Class
Display Copy
Succession
Beginning Age: 2
To: B after 2 time steps
C
Mid-Develop 1
Open
Disturbances
Prob/yr
To: Agent NRV TSD Rel.Age Keep Rel.
B AltSuccession 0.15 1 0 False
C ReplacementFire 0.1 0 1 False
D AltSuccession 0.33 2 0 False
OK NewDist Cancel
Init. Conds. Years: 500 MC: 10 Attributes Dist. Mult. Annual Mult. Landscape Mult. Feedback Mult. Trend Mult. TSD On Dist. Disabled

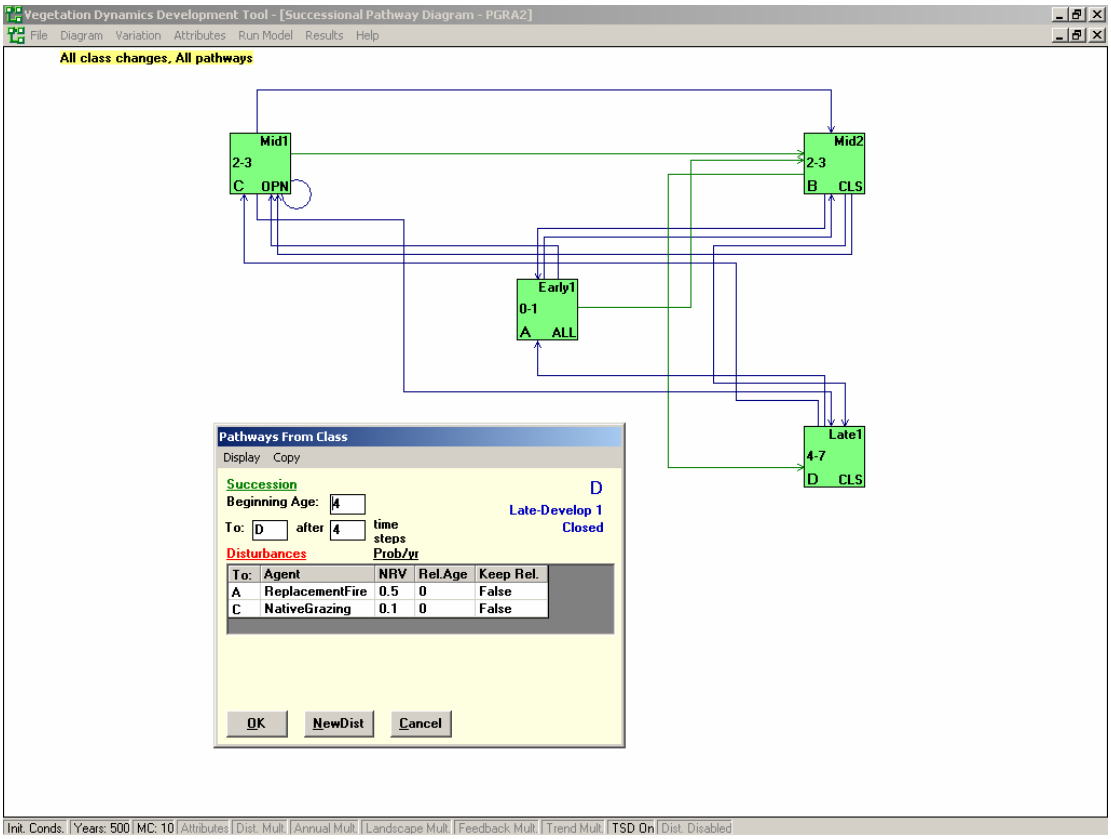
Vegetation Dynamics Development Tool - [Successional Pathway Diagram - PGRA2]
File Diagram Variation Attributes Run Model Results Help
All class changes, All pathways
Mid1
2-3
C OPN
Mid2
2-3
B CLS
Early1
0-1
A ALL
Late1
4-7
D CLS
Pathways From Class
Display Copy
Succession
Beginning Age: 4
To: D after 4 time steps
D
Late-Develop 1
Closed
Disturbances
Prob/yr
To: Agent NRV Rel.Age Keep Rel.
A ReplacementFire 0.5 0 False
C NativeGrazing 0.1 0 False
OK NewDist Cancel
Init. Conds. Years: 500 MC: 10 Attributes Dist. Mult. Annual Mult. Landscape Mult. Feedback Mult. Trend Mult. TSD On Dist. Disabled

Figure 1. Bluestem-sacahuista prairie adapted from Kuchler (1964). Also known as the Coastal Prairie.