Fire Regime Condition Class (FRCC) Interagency Handbook
Reference Conditions

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Potential Natural Vegetation Group: NorthernTallgrass prairie

Geographic Area: ND and southern MN east to PA

Description: **This model was modified directly from the PRAR5 (Bluestem Prairie, mixed and tallgrass prairie) model developed by Ron Masters as follows:**

1) The duration of the post-burn state was reduced to one year and the mid-seral state was eliminated. This shortens the rate of succession on these more productive sites.
2) The amount of grazing disturbance (bison) was reduced.
3) Because of the faster rate of grass growth and the lesser impact of bison, states A (post-burn) and B (grazing induced forbs) were given replacement fire probabilities of 10% (In the PRAR5 models these states almost never burn).

For a more complete description refer to the PRAP5 model.

Fire Regime Description (From PRAR5 model verbatim): Fire regime group II, with frequent surface fires, both lightning and anthropogenic in origin (Higgins 1986). Natural fire was possible during the dormant season through spring and during the late-growing season (Bragg 1982, Higgins 1986, Engle and Bidwell 2001) and dependant on the availability of dry fine fuels sufficient to carry a fire. Historic accounts from the 1800's often depict very large landscape scale burns where an entire landscape was described as burning (Irving 1935, 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 essential to perpetuate suitable lek sites and brood rearing habitat for prairie chickens (*Tympanicus cupido*) in the number accounted for presettlement (Sparks and Masters 1996).

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: post replacement	25	One-year post fire state
B: mid- seral open	15	Forb dominated site with sparse bunchgrass clumps, derived from heavy bison grazing and trampling pressure, wallowing and horning
D: late- seral closed	60	Tallgrass dominated, tillering and overall plant vigor reduced by mulching effect from accumulation of ungrazed, unburned plant litter, over extended periods woody encroachment may occur.
Total	100	

*Formal codes for classes A-E are: AESP, BMSC, CMSO, DLSO, and ELSC, respectively.

Fire Frequency and Severity

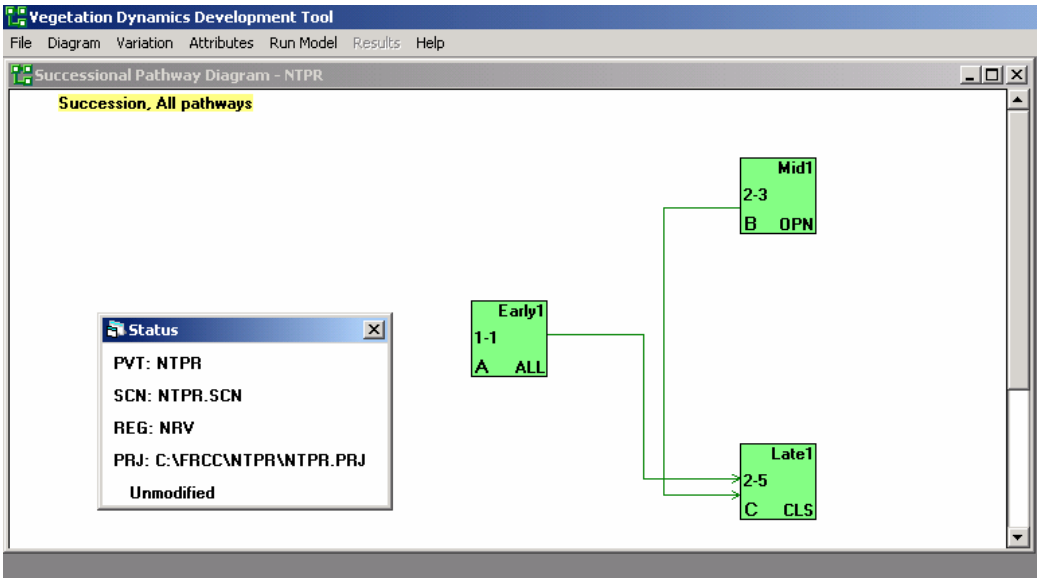
Fire Severity	Fire Frequency (yrs)	Probability	Percent, All Fires	Description
Replacement Fire	3.6	.28	100	Surface fire during dormant to early growing season and late growing to dormant season fire
Non-Replacement Fire	NA	0	0	
All Fire Frequency*	3.6	.28	100	

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

References

See references from the PRAR5 model. Only some will apply.

VDDT file documentation: Model NTPR located in C:/FCCC/NTPR: Load VDDT text files into C:/FRCC for project file to work. The diagram shows succession only.



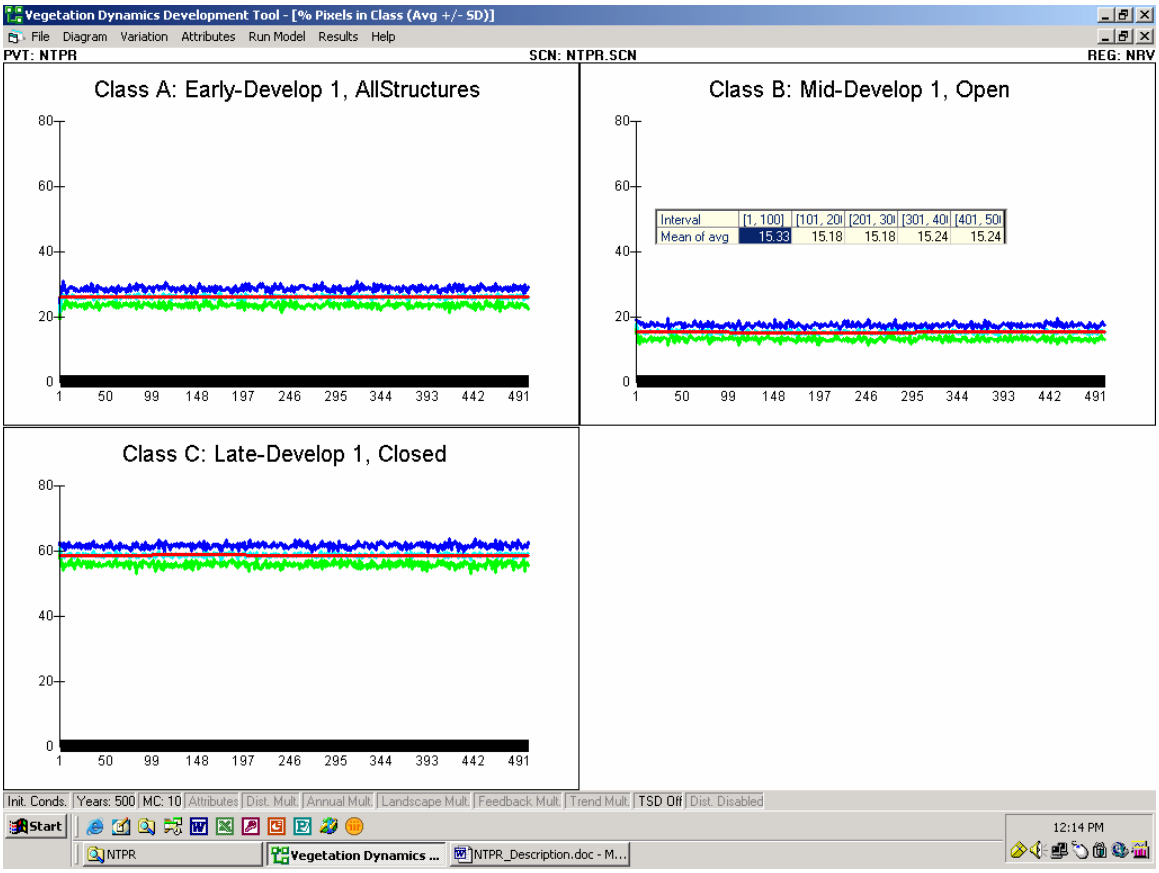
Disturbance probabilities by class: VDDT model NTPR

Class	To	Agent	Prob	TSD	Freq/ FRI	Rel Age
A	B	NativeGrazing	.15	0	7	0
A	A	Replacement fire	.1	0	10	-1
B	A	Replacement fire	.1	0	10	0
C	A	Replacement fire	.4	0	2.5	0
C	B	NativeGrazing	.05	0	20	0

Class A – Post burn: A succeeds to mature stands (Class C). Relatively more susceptible to grazing impacts and less susceptible to fire.

Class B – forb dominant: Forb dominated site created by intensive grazing. Recovers to Class C after 2 years.

Class C – Late-successional prairie Mature grasses highly susceptible to fire.


Vegetation Dynamics Development Tool - [% Pixels in Class (Avg +/- SD)]
File Diagram Variation Attributes Run Model Results Help
PVT: NTPR
SCN: NTPR.SCN
REG: NRV
Class A: Early-Develop 1, AllStructures
Class B: Mid-Develop 1, Open
Interval [1, 100] [101, 20 [201, 30 [301, 40 [401, 50
Mean of avg 15.33 15.18 15.18 15.24 15.24
Class C: Late-Develop 1, Closed
0 20 40 60 80
1 50 99 148 197 246 295 344 393 442 491
Init. Conds. Years: 500 MC: 10 Attributes Dist. Mult. Annual Mult. Landscape Mult. Feedback Mult. Trend Mult. TSD Off Dist. Disabled
Start
NTPR
Vegetation Dynamics ...
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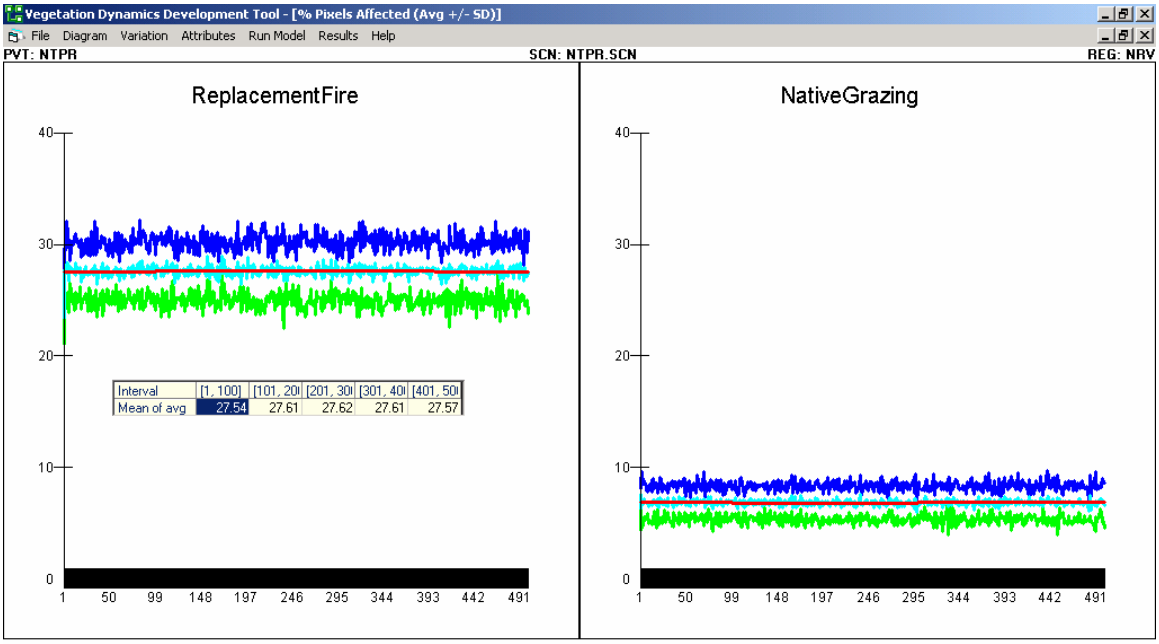
Vegetation Dynamics Development Tool - [% Pixels Affected (Avg +/- SD)]
File Diagram Variation Attributes Run Model Results Help
PVT: NTPR
SCN: NTPR.SCN
REG: NRV
ReplacementFire
NativeGrazing
40
30
20
10
0
1 50 99 148 197 246 295 344 393 442 491
Interval [1, 100] [101, 200] [201, 300] [301, 400] [401, 500]
Mean of avg 27.54 27.61 27.62 27.61 27.57