Enhanced Conservation Action Planning

Introduction to VDDT

Vegetation Dynamics Development Tool

Maps

Models

Metric

"All Models Are Wrong But Some Are Useful"

George E.P. Box

Cherokee National Forest Landscape Restoration Initiative

LANDFIRE developed reference condition models for every ecological system in the United States

USGS FireLab USDA Forest Service The Nature Conservancy

LANDFIRE Biophysical Setting Model

Biophysical Setting 5713520 **Southern Appalachian Montane Pine Forest and Woodland**

☐ *This BPS is lumped with:*
☐ *This BPS is split into multiple models:*

General Information

Contributors (also see the Comments field) **Date** 8/15/2007

Modeler 1 Steve Cary
Modeler 2 Margit Bucher mbucher@tnc.org
Modeler 3 Sam Lindblom slindblom@tnc.org
Reviewer Wanda Sanhilo wsanjule@tnc.org
Reviewer Charles Lafon clafon@geog.tamu.edu
Reviewer

Vegetation Type
Forest and Woodland

Map Zone
57

Model Zone
☐ Alaska ☐ N-Cent.Rockies
☐ California ☐ Pacific Northwest
☐ Great Basin ☐ South Central
☐ Great Lakes ☐ Southeast
☐ Northeast ☑ S. Appalachians
☐ Northern Plains ☐ Southwest

Dominant Species* PIPU5 GAYLU PIRI VACCI QUPR2 QUIL QUCO2

General Model Sources
☑ Literature
☑ Local Data
☑ Expert Estimate

Geographic Range
Blue Ridge Mountains of TN, NC, and VA (including extreme northeast GA and northwest SC). Mountains of the Ridge and Valley in VA and WV. Western extent is along the KY-VA border on Pine Mtn.

There may also be isolated examples occurring on ridges or monadnocks like Pine Mountain (MZ54 GA), Kings Mountain (MZ59 NC), Pilot Mountain and Hanging Rock in NC.

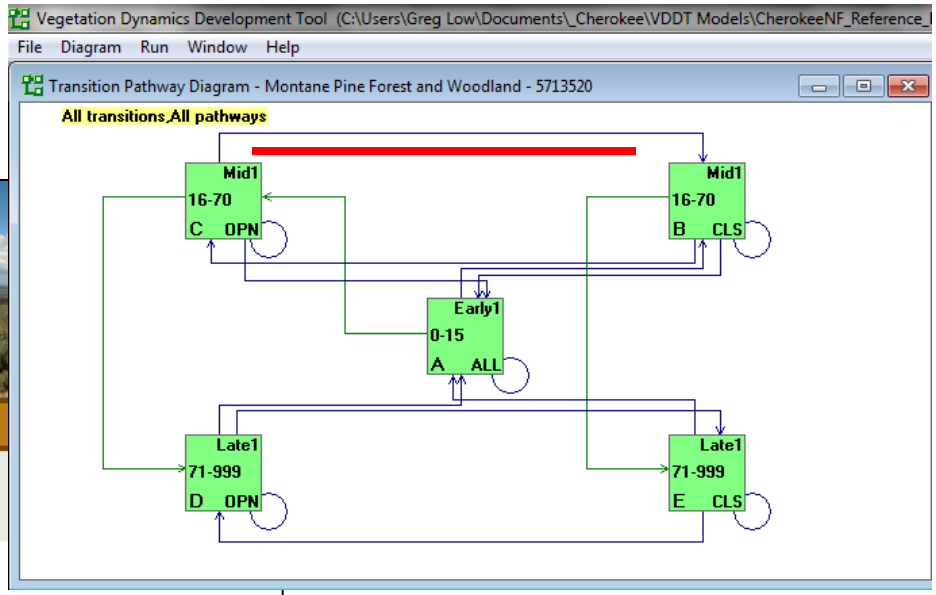
Biophysical Site Description
Occurs on xeric to dry sites at moderate to upper elevations between 1000-4000ft. Typically described as "ridgetop communities" this community occupies the driest and most fire-prone of sites. Sites are typically located on convex, south to west facets of steep spur ridges, narrow rocky crests, and cliff tops. They occur at elevations from below 300m (1,000 ft) to more than 1,200m (4,000 ft) on various substrates, but most commonly on acidic, sedimentary and metasedimentary substrates, e.g., sandstone, quartzite, and shale. A few stands occur on Piedmont monadnocks and foothills. Soils are very infertile, shallow, and droughty. Thick, poorly decomposed duff layers, along with dead wood and inflammable shrubs, contribute to a strongly fire-prone habitat.

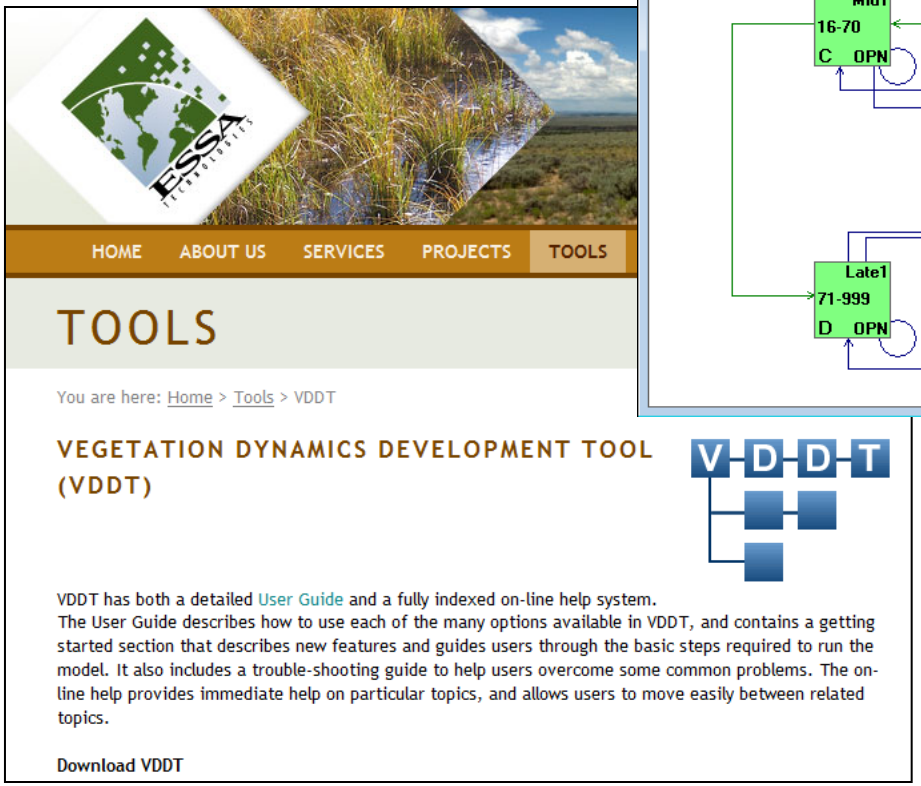
Vegetation Description
Overstory pine species dominate with up to 70% species specific (e.g. Pinus pungens or Pinus rigida, sometimes with Pinus virginiana or rarely Pinus echinata codominant (NatureServe 2007)). Chestnut oak (Q. prinus) and Scarlet oak (Quercus coccinea) and other pines may also be in overstories. Midstories, when present, may include mountain laurel (Kalmia latifolia), blackgum (Nyssa sylvatica), red maple

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100 year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement sev

Cherokee National Forest Landscape Restoration Initiative

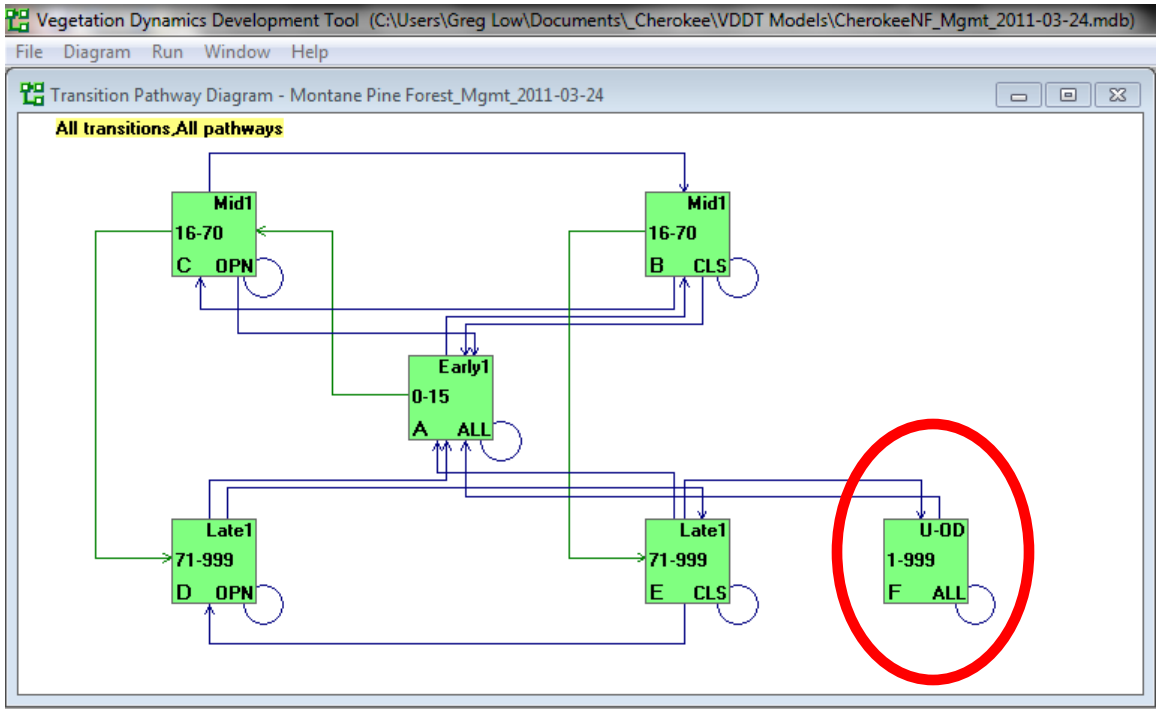
LANDFIRE also **developed** computer models for each system in VDDT software





Cherokee National Forest Landscape Restoration Initiative

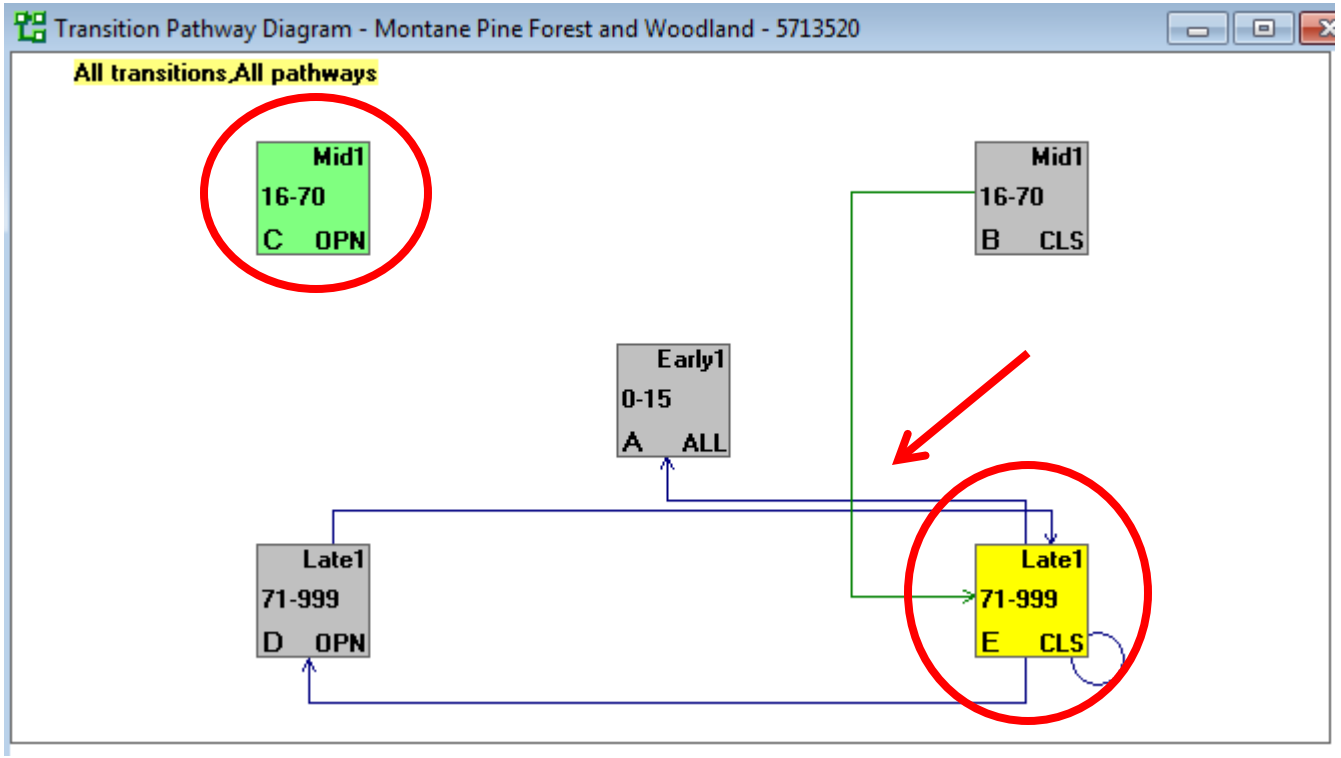
These models have been reviewed and modified for the Cherokee National Forest to reflect local conditions



Added Uncharacteristic Class: Oak-dominated

Cherokee National Forest Landscape Restoration Initiative

Key Inputs into Models:
Age Classes
Succession & Disturbance Pathways



Cherokee National Forest Landscape Restoration Initiative

Key Inputs into Models:
Rates & Effects of Disturbances

Class Properties for Class E: Late1 CLS

Deterministic transitions

Timing		To Class		
Start Age	End Age	Box	Cover	Stage
71	999	E	Late1	CLS

E
Late1 - Late-Develop
CLS - Closed

Display Pathways
- (•) From Class
- ( ) To Class

Probabilistic transitions

Transition Type	Min Age	Max Age	Min TSD	Max TSD	Prob	Propn	Prob x Propn	To Class Box	To Class Cover	To Class Stage	Rel. Age
Insect/Disease	71	999	0	9999	0.0130	1.00	0.0130	D	Late1	OPN	0
MixedFire	71	999	0	9999	0.0130	1.00	0.0130	D	Late1	OPN	0
Optional1	71	999	0	9999	0.0040	1.00	0.0040	D	Late1	OPN	0
ReplacementFire	71	999	0	9999	0.0020	1.00	0.0020	A	Early1	ALL	0
SurfaceFire	71	999	0	9999	0.0400	1.00	0.0400	E	Late1	CLS	0
Wind/Weather/St	71	999	0	9999	0.0010	1.00	0.0010	A	Early1	ALL	0

New | Copy | Delete

Class E **5%**

Late Development 1 Closed

Upper Layer Lifeform

- [ ] Herbaceous
- [ ] Shrub
- [x] Tree

Fuel Model 9

Indicator Species* and Canopy Position

PIRI	Upper
PIPU5	Upper
QUCO2	Mid-Upper
QUPR2	Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	71 %	100 %
Height	Tree 10.1m	Tree 25m
Tree Size Class	Large 21-33"DBH	

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

(Class age 71yrs+). Late-seral, closed canopy, pine-oak dominated overstory. Little herbaceous cover and dense shrub layer.

This class is a closed-canopy pine-oak forest that results after prolonged periods of fire suppression or microtopography that protects the forest from fires (approximately 50yrs+). A shift in dominance from pines to oaks would be expected in the absence of fire for long durations and would be hastened by ice storms and pine beetles. This class ranges from 71yrs to a mature persistent closed canopy forest. Class E could move to Class D (late open stage) with a mixed fire (75yr probability), or potentially to class D with an ice event (250yr probability).

Replacement fires transition this class to A (500year probability).

Cherokee National Forest Landscape Restoration Initiative

Key Inputs into Models:
Initial Conditions -- from Simon Data

General | Initial Conditions | Options | Output

Total Area Represented: 21837

Proportion of Cells:

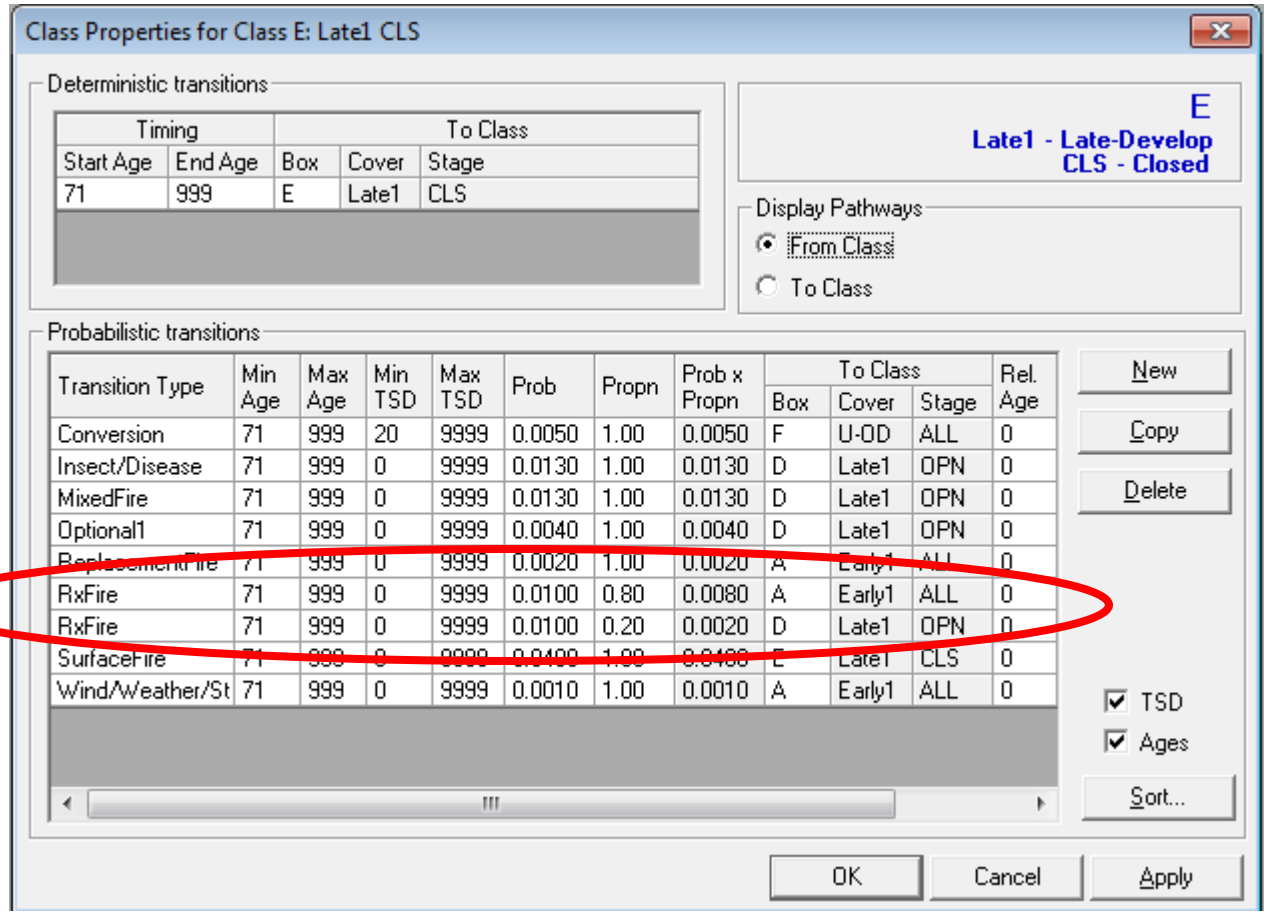
	Class		Propn
A	Early1	ALL	0.0602
B	Mid1	CLS	0.1335
C	Mid1	OPN	0.0085
D	Late1	OPN	0.0297
E	Late1	CLS	0.5654
F	U-OD	ALL	0.2028

Reset | Normalize | End Values | Load... | Save As... | TSD | Ages | Sort...

New Age | Delete Age | Total: 1.0001

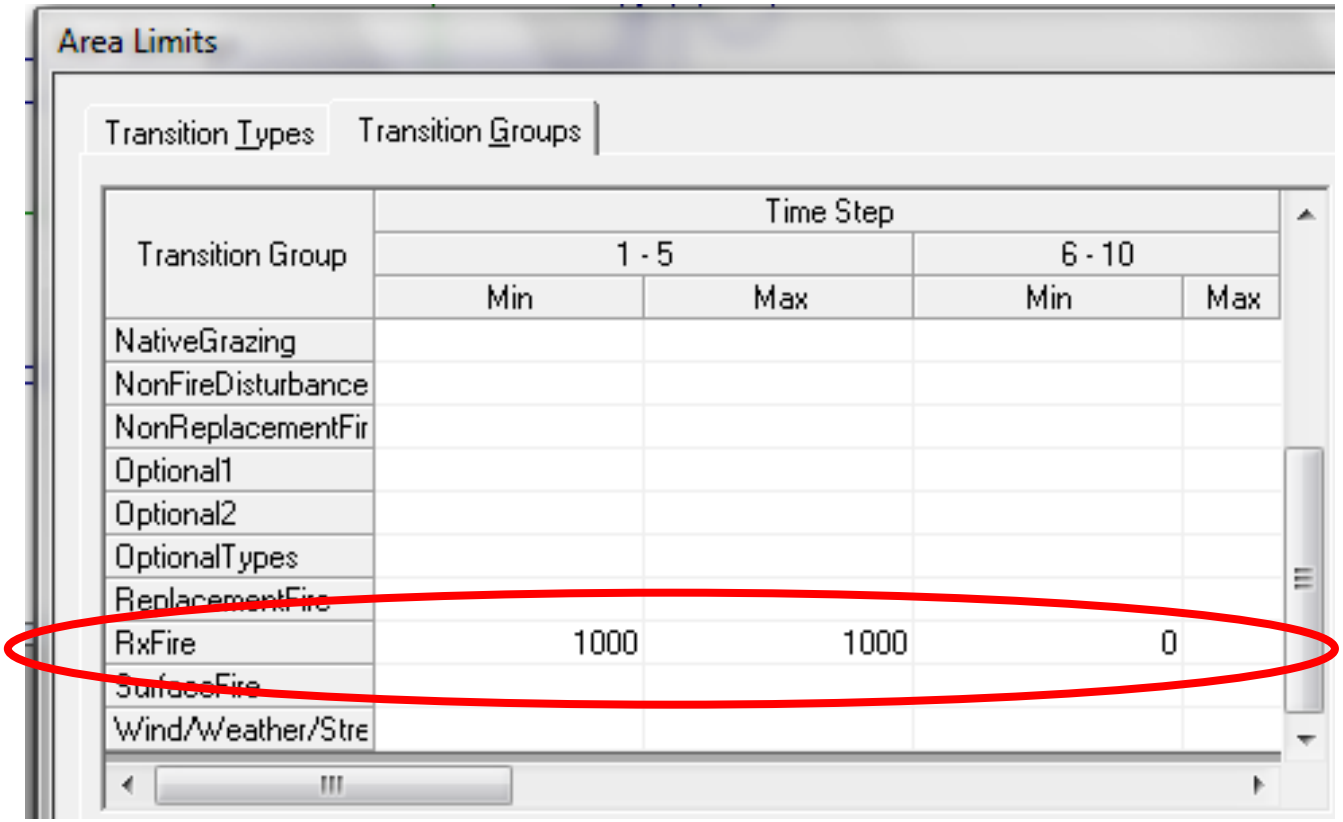
Cherokee National Forest Landscape Restoration Initiative

Key Inputs into Models:
Potential Management Actions & Effects



Cherokee National Forest Landscape Restoration Initiative

Key Inputs into Models:
Acres of Management Action/Year

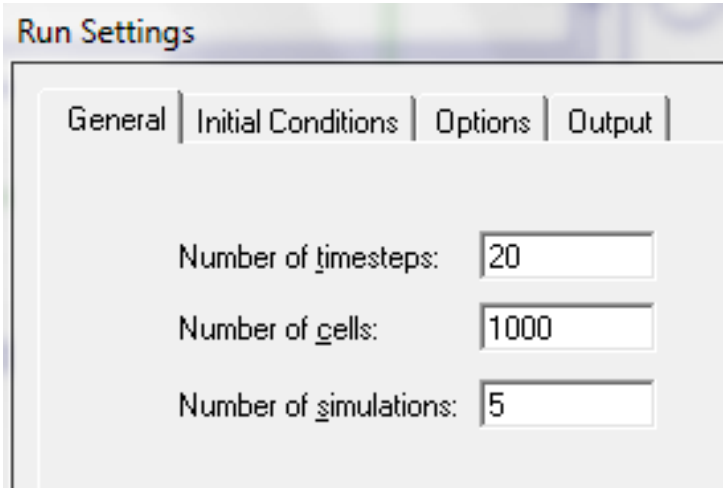


Key Inputs into Models: Multipliers to Reflect Fire Suppression

Transition Probability Multipliers

Transition Type	Probability Multiplier
AltSuccession	1
Conversion	1
MixedFire	0.6
ReplacementFire	0.8
SurfaceFire	0.4
Wind/Weather/Stress	1

Model Runs:
Number of Years & Number Simulations



Cherokee National Forest Landscape Restoration Initiative

Model Run Outputs:
Final Conditions Table

Final Conditions

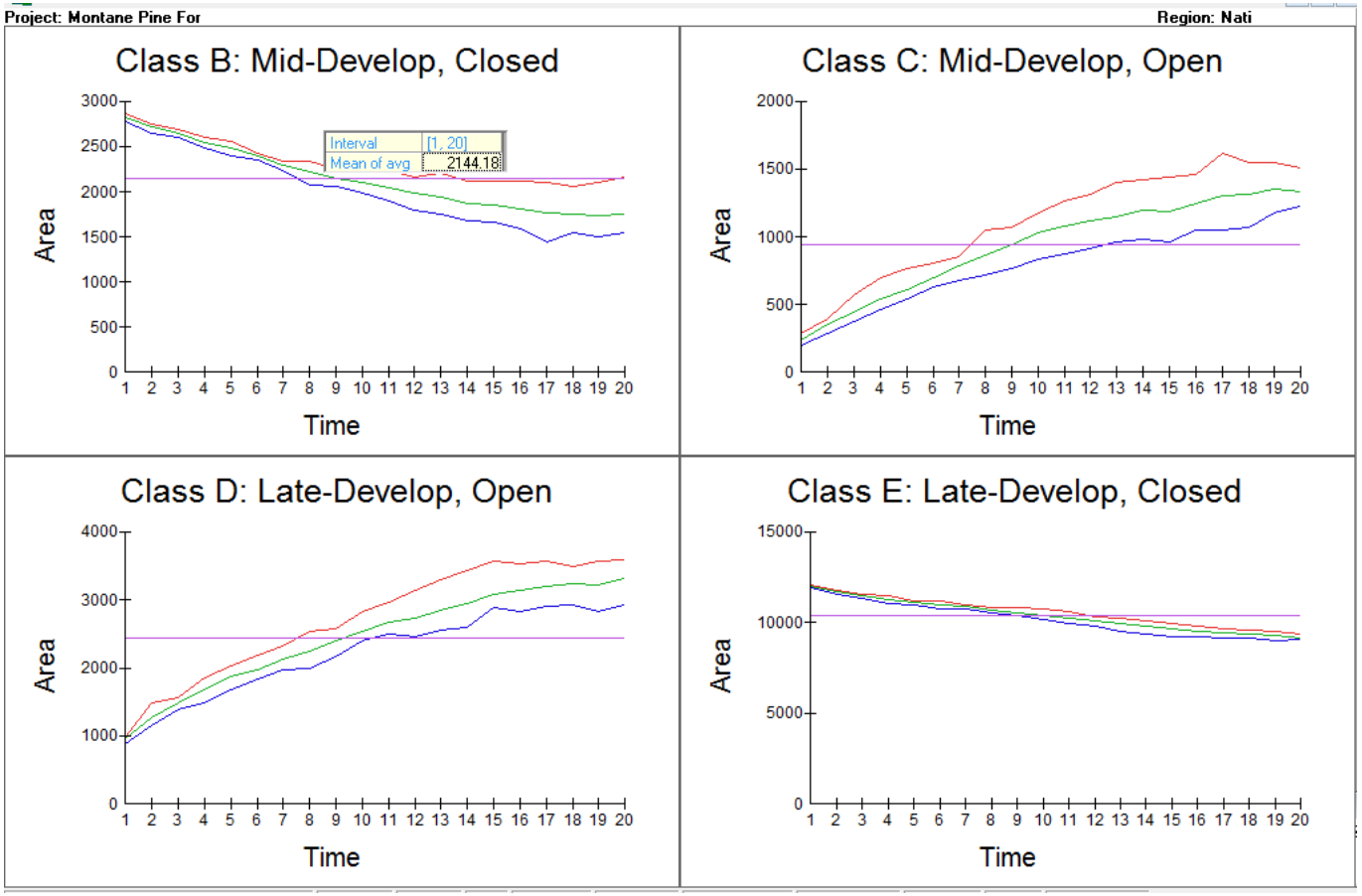
Proportion of cells

Class			Propn
Box	Cover	Stage	
A	Early1	ALL	0.0616
B	Mid1	CLS	0.0802
C	Mid1	OPN	0.061
D	Late1	OPN	0.1518
E	Late1	CLS	0.4206
F	U-OD	ALL	0.2248

Close

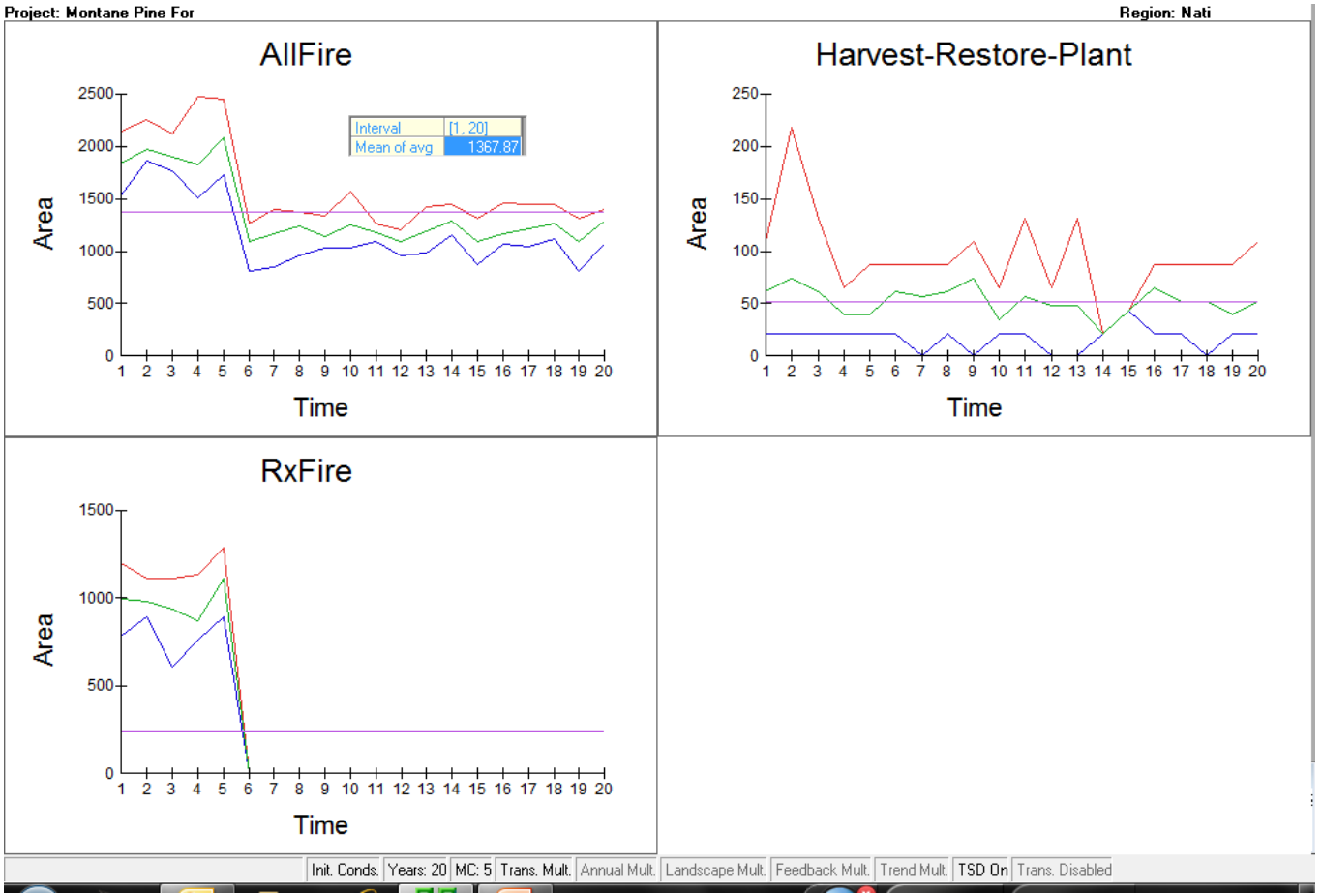
Cherokee National Forest Landscape Restoration Initiative

Model Run Outputs: Graphs – S-classes



Cherokee National Forest Landscape Restoration Initiative

Model Run Outputs:
Graphs – Management & Disturbances



Cherokee National Forest Landscape Restoration Initiative

Questions?