



Enhanced Conservation Action Planning

Introduction to VDDT

Vegetation Dynamics Development Tool

Cherokee National Forest Landscape Restoration Initiative



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



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 Contents field) **Date** 8/15/2007

Modeler 1 Steve Croy		Reviewer	Wanda Sathole	wrsathole@tnc.org
Modeler 2 Margi Bucher	mbucher@tnc.org	Reviewer	Charles Labin	clabin@geog.tamu.edu
Modeler 3 Sam Lindblom	slindblom@tnc.org	Reviewer		

Vegetation Type	Min Zone	Model Zone	
Pine and Woodland	57	<input type="checkbox"/> Alaska	<input type="checkbox"/> N-Cent Rockies
		<input type="checkbox"/> California	<input type="checkbox"/> Pacific Northwest
		<input type="checkbox"/> Great Basin	<input type="checkbox"/> South Central
		<input type="checkbox"/> Great Lakes	<input type="checkbox"/> Southeast
		<input type="checkbox"/> Northeast	<input checked="" type="checkbox"/> S. Appalachians
		<input type="checkbox"/> Northern Plains	<input type="checkbox"/> Southwest

Dominant Species* **General Model Sources**

P1P5 GAYLU	<input checked="" type="checkbox"/> Literature
P1R1 VACCI	<input checked="" type="checkbox"/> Local Data
QUPE2 QUIL	<input checked="" type="checkbox"/> Expert Estimate
QUCCI	

Geographic Range

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

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 "ridgtop communities" this community occupies the driest and most fire-prone of sites. Sites are typically located on crests, 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 metamorphic 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

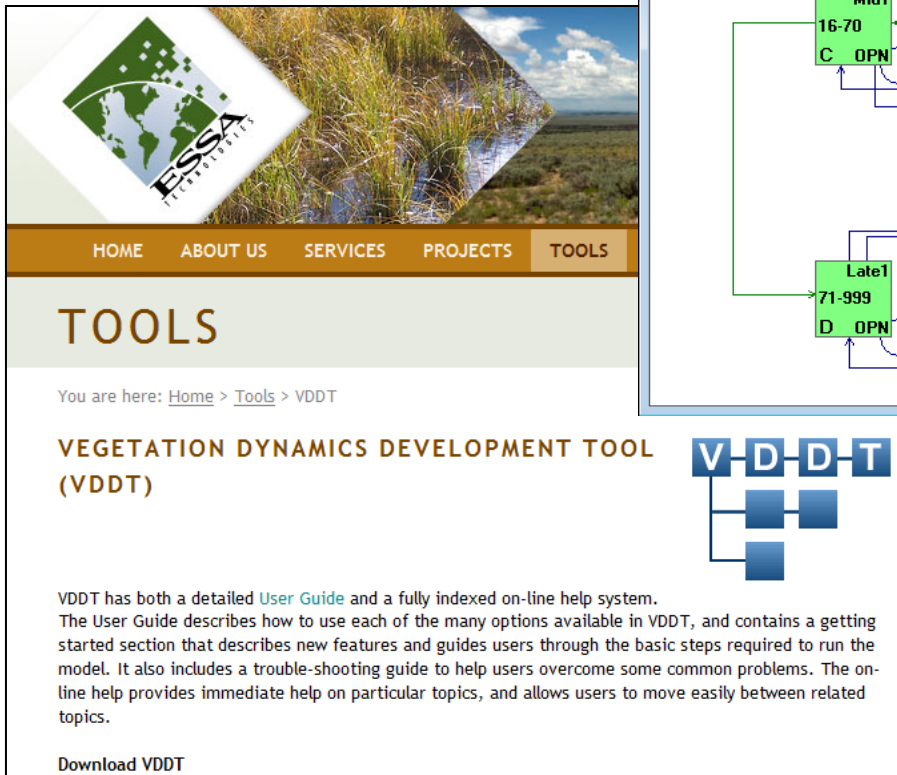
Overstory pine species dominate with up to 70% species specific (e.g. *Pinus pungens* or *Pinus rigida*, sometimes with *Pinus virginiana* or rarely *Pinus schineta* codominant (NatureServe 2007)). Chestnut oak (*Q. prinus*) and Scarlet oak (*Quercus coccinea*) and other pines may also be in overstories. Madroveria, 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: 0-25 year frequency, surface severity; II: 0-25 year frequency, replacement severity; III: 25-100-year frequency, mixed severity; IV: 25-100+ year frequency, replacement severity; V: 200+ year frequency, replacement sev

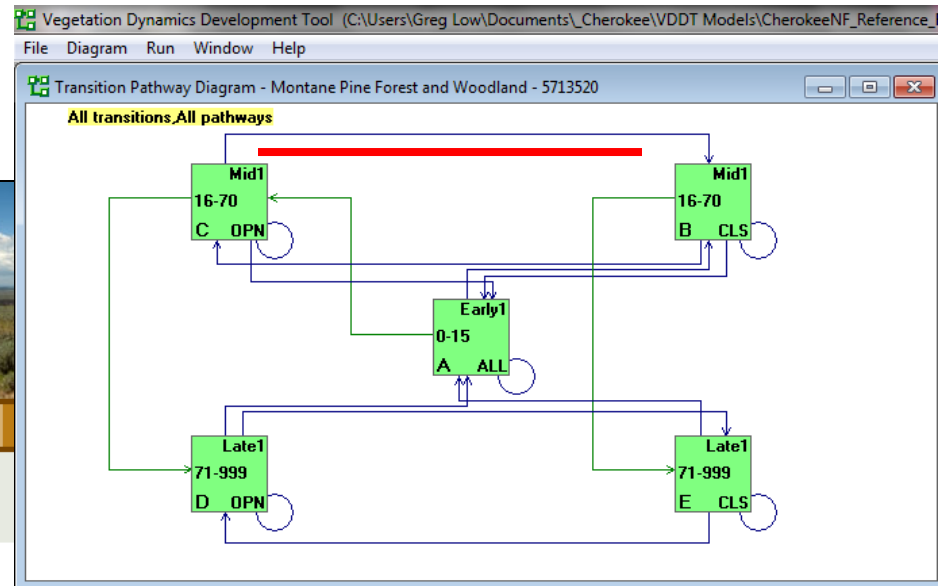
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LANDFIRE also developed computer models for each system in VDDT software

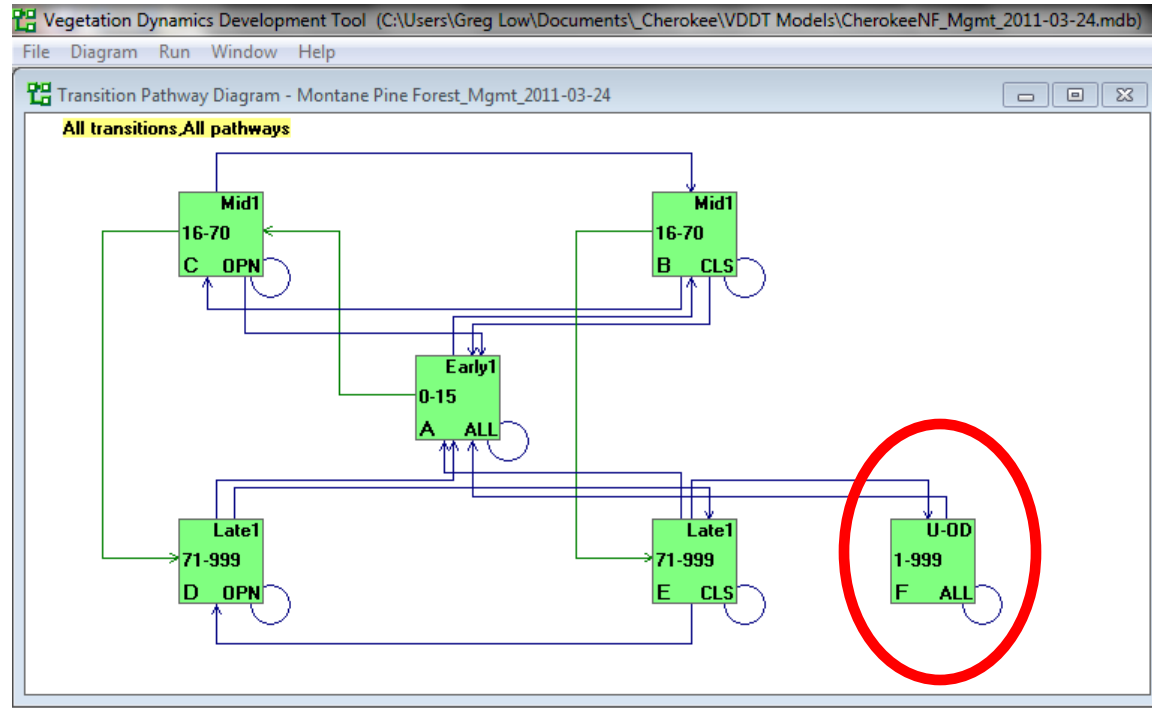


The screenshot shows the VDDT website interface. At the top is the ESSA logo and a navigation menu with 'HOME', 'ABOUT US', 'SERVICES', 'PROJECTS', and 'TOOLS'. The 'TOOLS' section is highlighted. Below the menu, the text reads 'TOOLS' and 'You are here: Home > Tools > VDDT'. The main heading is 'VEGETATION DYNAMICS DEVELOPMENT TOOL (VDDT)'. To the right of this heading is a logo for 'VDDT' consisting of the letters V, D, D, T in blue boxes. Below the heading, there is a paragraph of text: 'VDDT has both a detailed User Guide and a fully indexed on-line help system. The User Guide describes how to use each of the many options available in VDDT, and contains a getting started section that describes new features and guides users through the basic steps required to run the model. It also includes a trouble-shooting guide to help users overcome some common problems. The on-line help provides immediate help on particular topics, and allows users to move easily between related topics.' At the bottom left, there is a 'Download VDDT' link.



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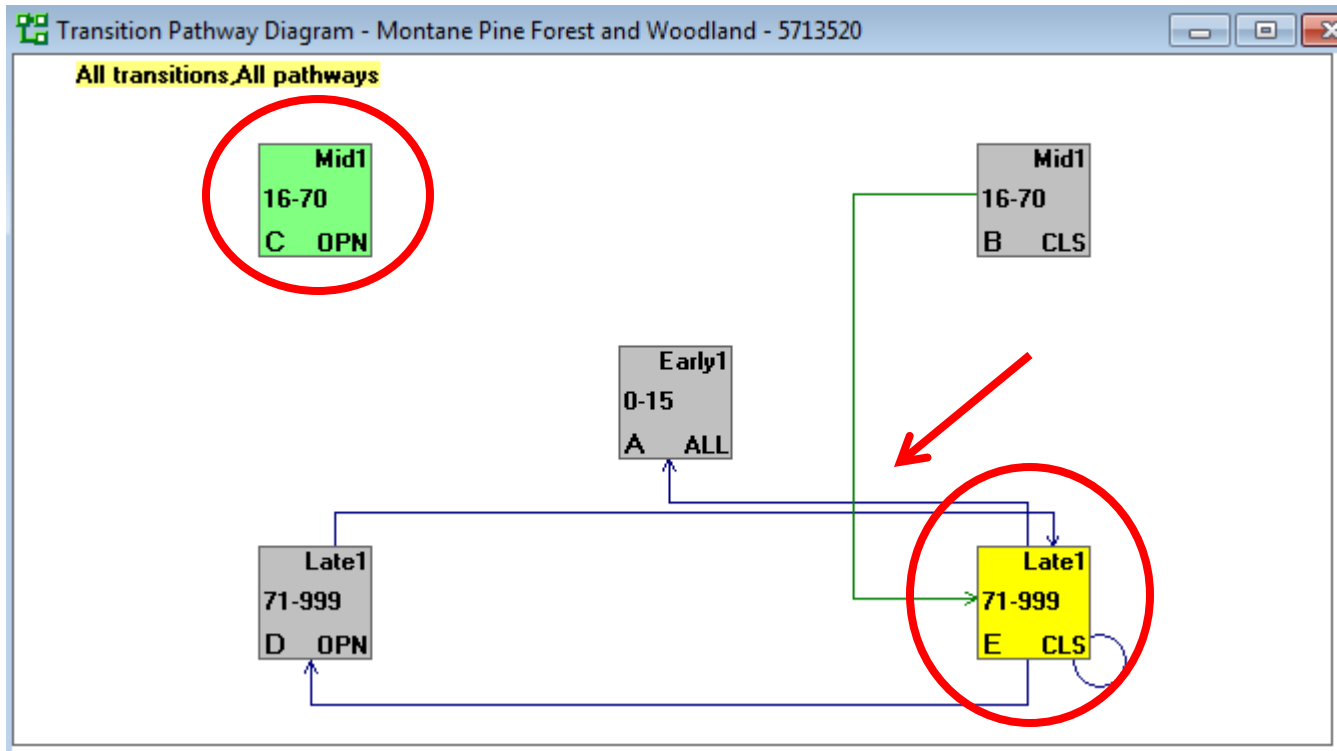
These models have been reviewed and modified for the Cherokee National Forest to reflect local conditions



Added Uncharacteristic Class: Oak-dominated

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Key Inputs into Models: Age Classes Succession & Disturbance Pathways



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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

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			Rel. Age
								Box	Cover	Stage	
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
 Tree

Fuel Model 9

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).

Indicator Species* and Canopy Position

PIR1 Upper
PIPU5 Upper
QUCO2 Mid-Upper
QUPR2 Mid-Upper

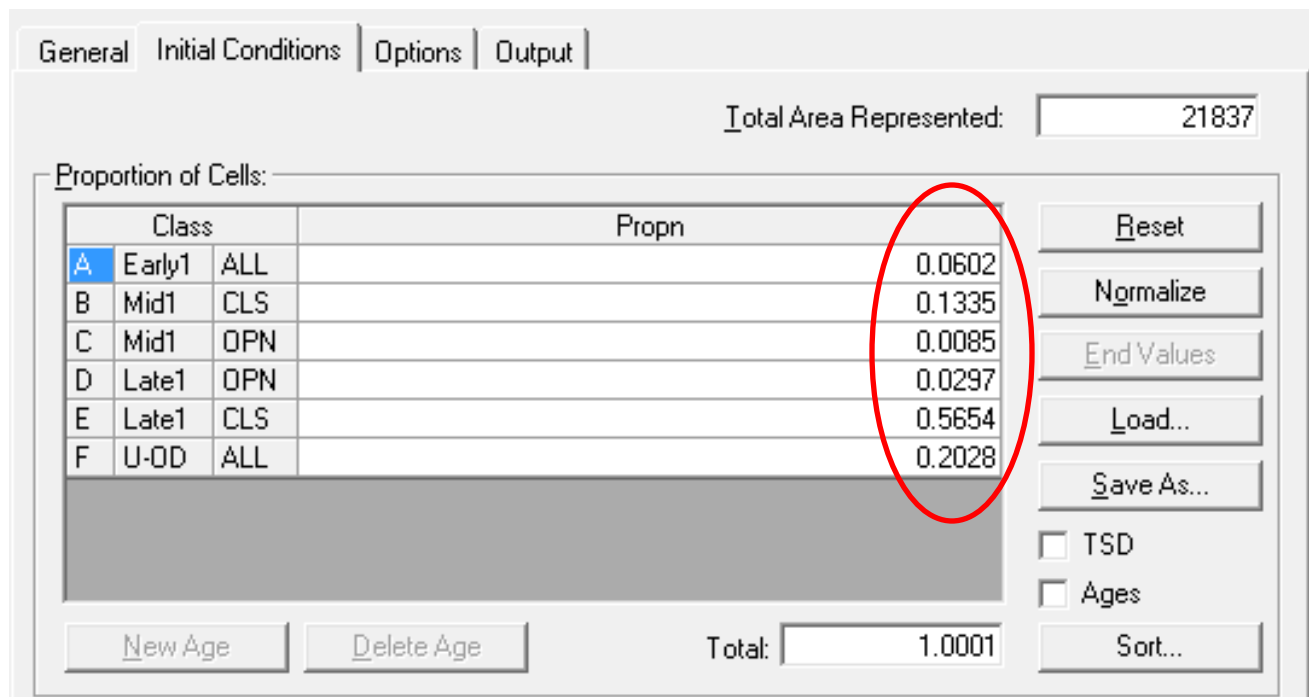
Structure Data (for upper layer lifeform)

	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.

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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

Buttons: Reset, Normalize, End Values, Load..., Save As...

Options: TSD, Ages

Buttons: New Age, Delete Age

Total: 1.0001

Sort...

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Key Inputs into Models: Potential Management Actions & Effects

Class Properties for Class E: Late1 CLS

Deterministic transitions

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

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			Rel. Age
								Box	Cover	Stage	
Conversion	71	999	20	9999	0.0050	1.00	0.0050	F	U-OD	ALL	0
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
RxFire	71	999	0	9999	0.0100	0.80	0.0080	A	Early1	ALL	0
RxFire	71	999	0	9999	0.0100	0.20	0.0020	D	Late1	OPN	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

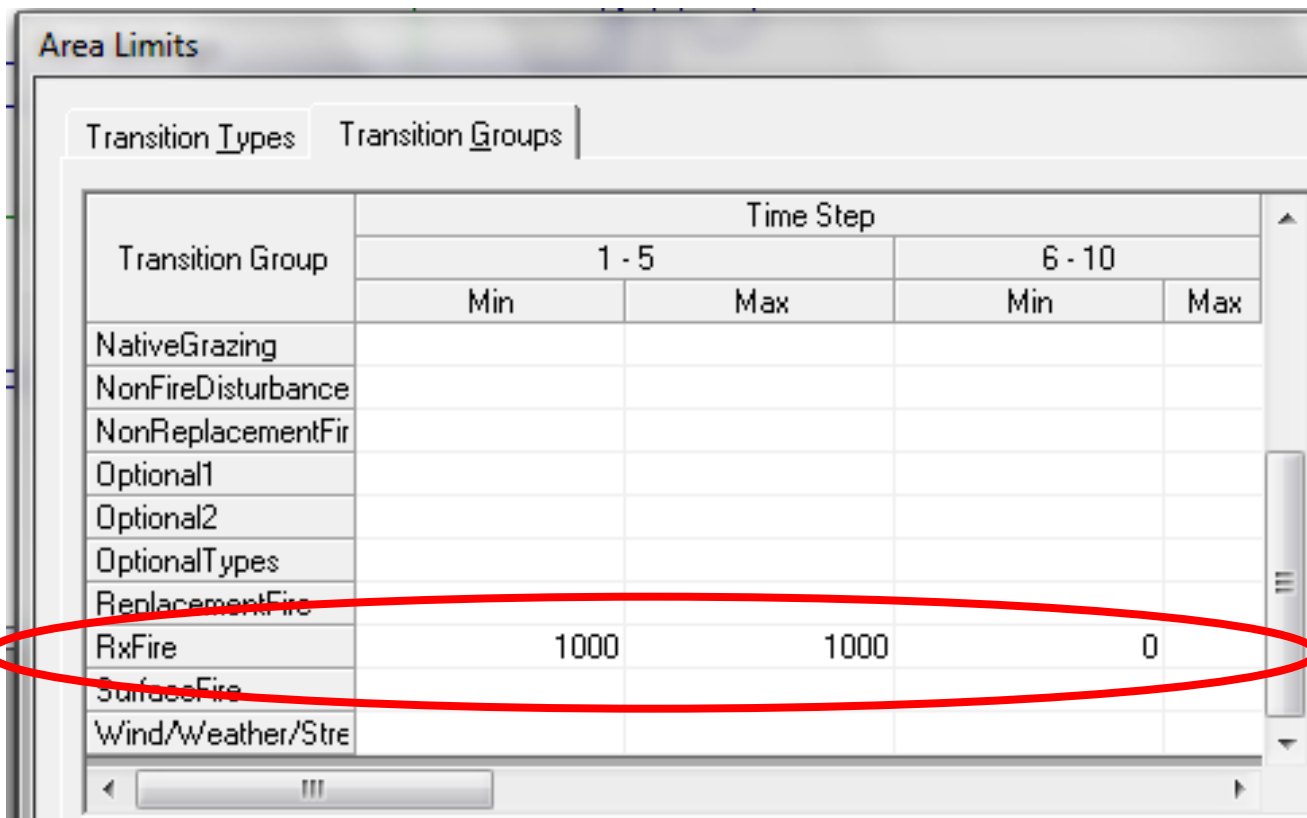
TSD
 Ages

Sort...

OK Cancel Apply

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Key Inputs into Models:
Acres of Management Action/Year



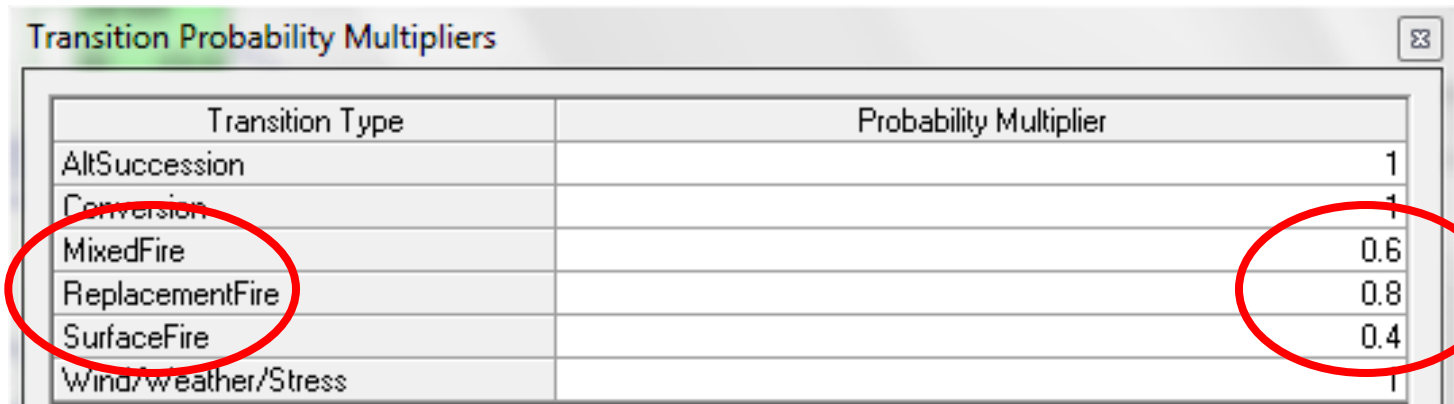
The screenshot shows a software interface titled "Area Limits" with two tabs: "Transition Types" and "Transition Groups". The "Transition Groups" tab is active, displaying a table with the following structure:

Transition Group	Time Step			
	1 - 5		6 - 10	
	Min	Max	Min	Max
NativeGrazing				
NonFireDisturbance				
NonReplacementFir				
Optional1				
Optional2				
OptionalTypes				
ReplacementFire				
RxFire	1000	1000	0	
SurfaceFire				
Wind/Weather/Stre				

The "RxFire" row is circled in red, indicating its values: 1000 for the 1-5 time step and 0 for the 6-10 time step.

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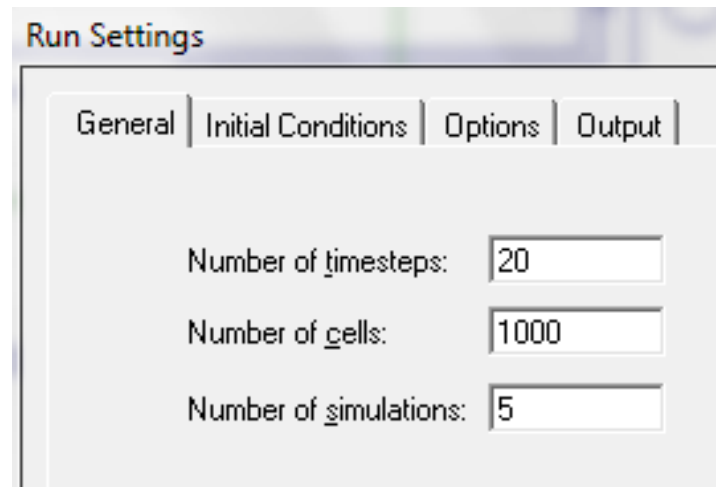
Key Inputs into Models: Multipliers to Reflect Fire Suppression



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

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Model Runs: Number of Years & Number Simulations



Run Settings

General | Initial Conditions | Options | Output

Number of timesteps:

Number of cells:

Number of simulations:

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Model Run Outputs: Final Conditions Table

Final Conditions

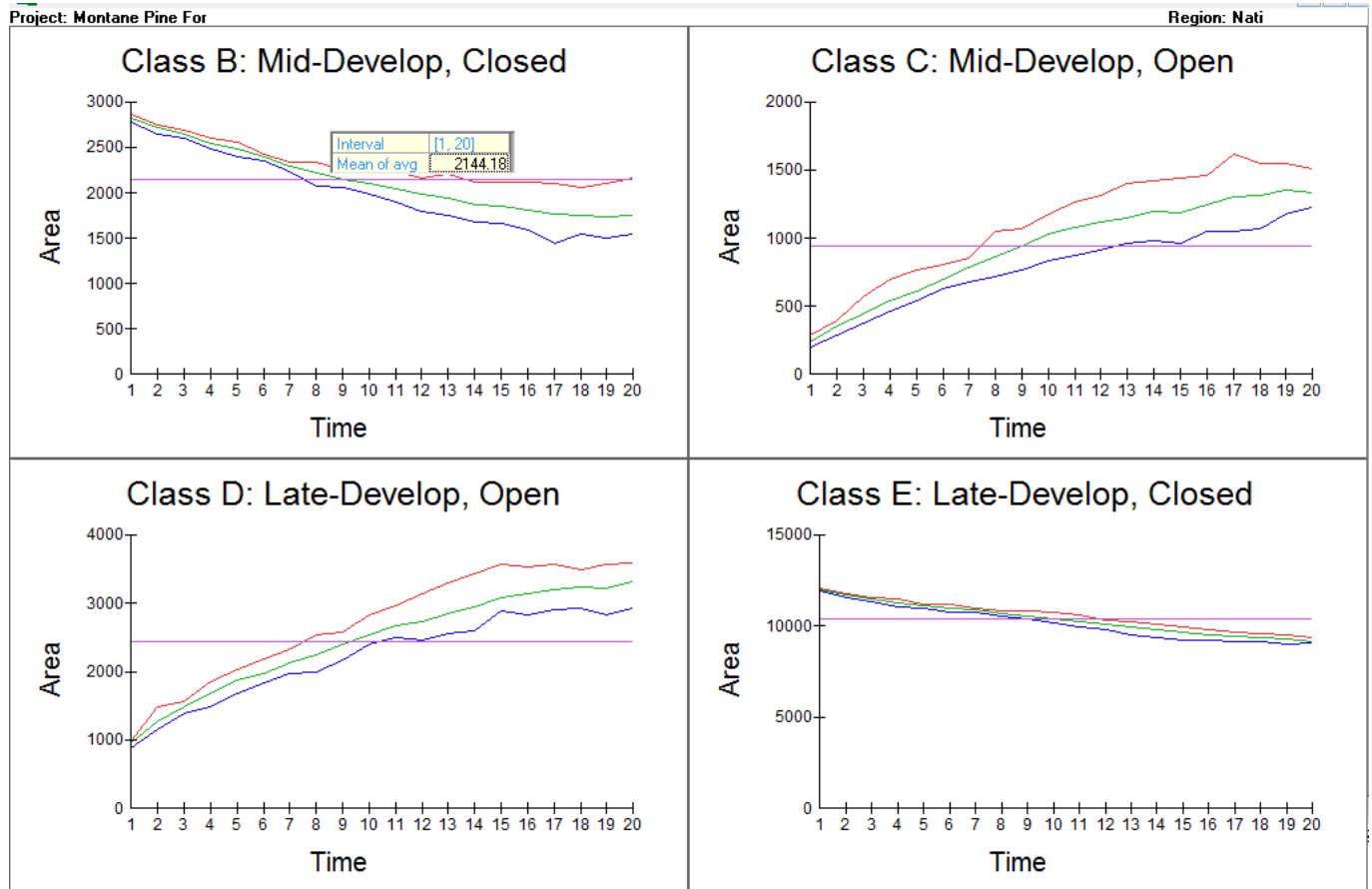
Proportion of cells

Box	Class		Propn
	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

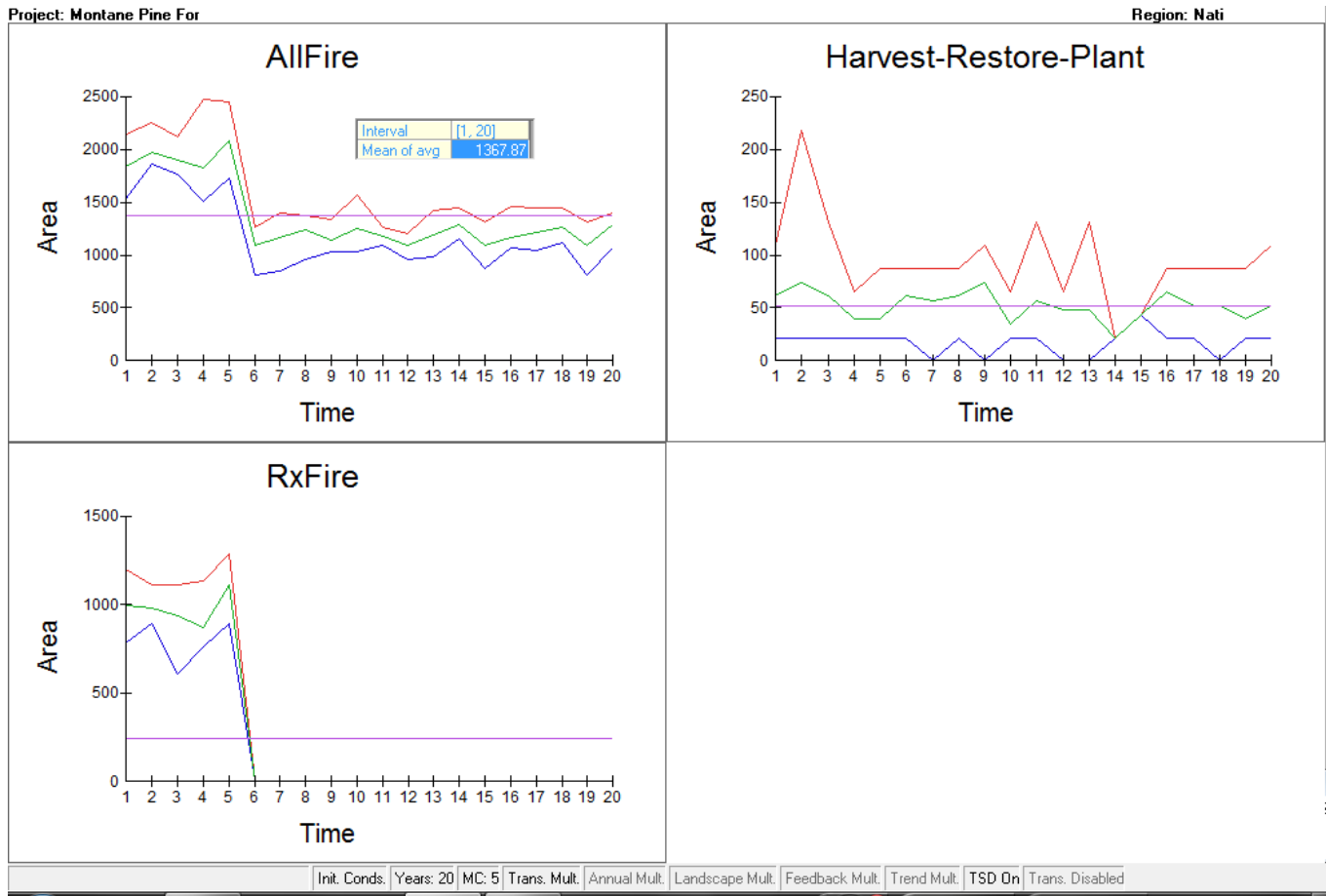
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Model Run Outputs: Graphs - S-classes



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Model Run Outputs: Graphs - Management & Disturbances



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Questions?