The Nature Conservancy

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LANDFIRE

LANDFIRE Biophysical Settings Models

The Nature Conservancy's LANDFIRE Team
Kori, Jim, Jeannie, Randy & Sarah

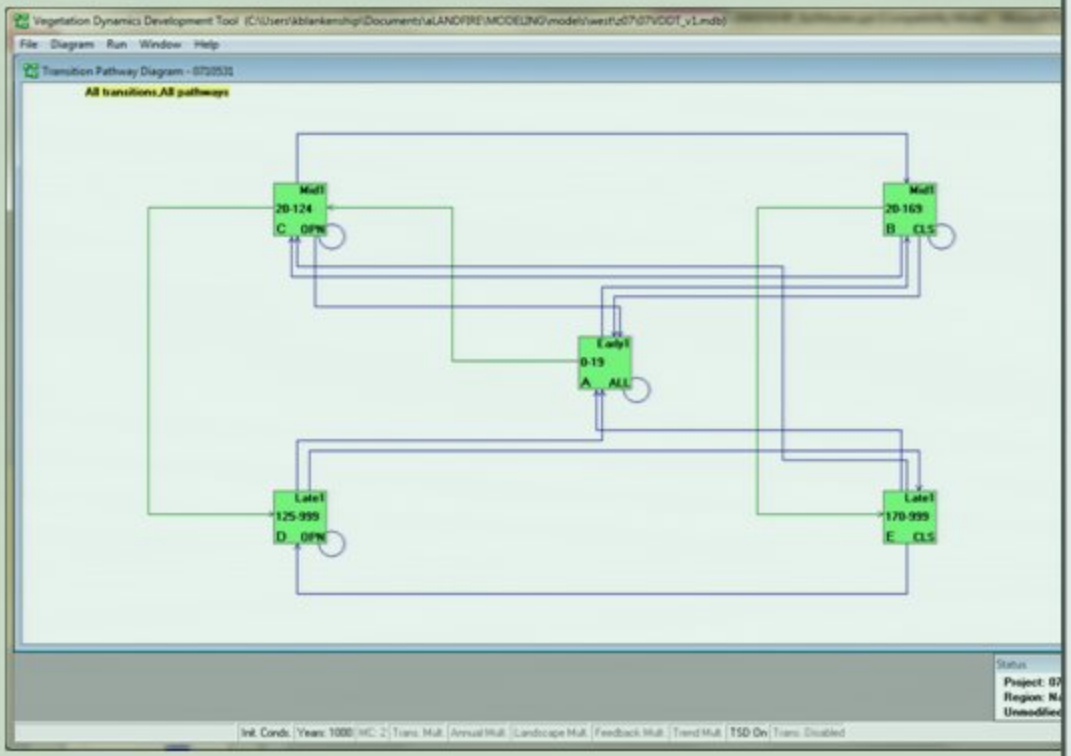
Photo credits, Erika Nortemann and Mark Godfrey

Overview

- What is a Biophysical Settings Model?
- How are the models used in LANDFIRE?
- How has the model set changed over time?
- How have others applied the models?

What is a Biophysical Settings Model?

BpS Model



LANDFIRE Biophysical Setting Model

Biophysical Setting: 0710531 **Northern Rocky Mountain Ponderosa Pine Woodland and Savanna - Mesic**

☐ *This BPS is lumped with:*
☑ *This BPS is split into multiple models: Suggest splitting into a mesic and xeric. This model is mesic and more commonly found in MZ09. Represented by shorter mfri than xeric in areas with >17in precip.*

General Information

Contributors (also see the Comments field) **Date** 10/4/2005

Modeler 1 Mike Simpson msimpson@fs.fed.us **Reviewer** Bruce Hostetler bhostetler@fs.fed.us
Modeler 2 James Dickinson jddickinson@fs.fed.us **Reviewer**
Modeler 3 Dave Owens deowens@fs.fed.us **Reviewer**

Vegetation Type
Forest and Woodland

Map Zone
7

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

Dominant Species* **General Model Sources**

PIPO	POSA	☑ Literature
FEID	AMAL	☑ Local Data
CEVE	SYAL	☑ Expert Estimate
PUTR2	CAGE	

Geographic Range
Dry ponderosa pine forests extend from south-central and eastern Oregon to eastern Washington. They are an important forest type along the eastern flank of the Cascade Range extending eastward in the Blue and Wallowa Mountains of Oregon. In eastern Washington they occur in extensive tracks in the Okanogon highlands and near Spokane.

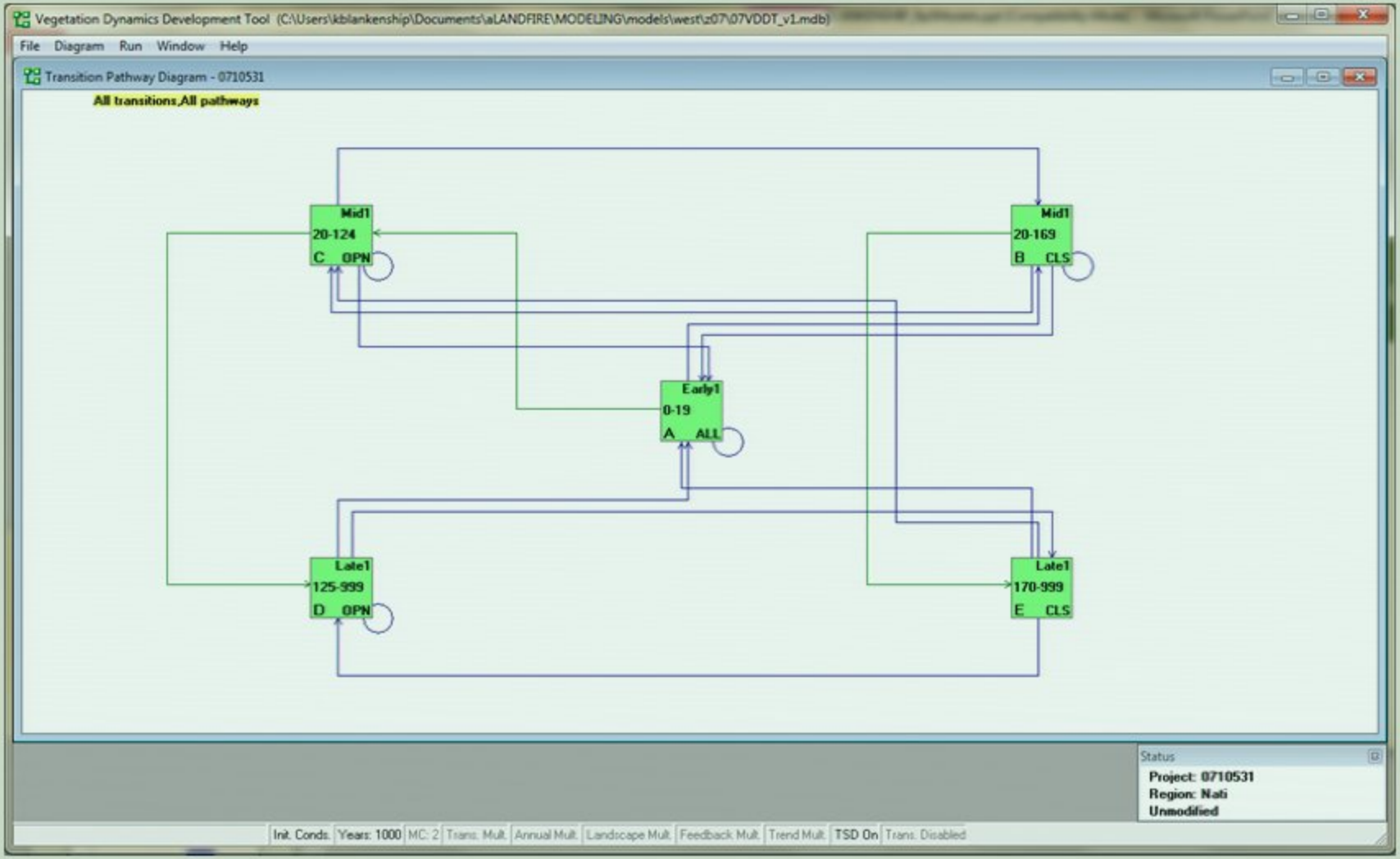
Biophysical Site Description
The Dry Ponderosa Pine mesic sub-type occurs between 600m (Washington) to 2000m (Oregon) elevation respectively. Precipitation varies between 40-60 cm/yr with the majority occuring as snowfall during the winter. Soil types include a range of parent materials having coarse and fine textures. In central Oregon, these forests commonly occur on sites characterized by shallow deposits of Mazama pumice and ash. Western juniper vegetation types are the only forest types occuring on sites drier than the Dry Ponderosa Pine forests.

Vegetation Description
The Dry Ponderosa Forest mesic sub-type consist of nearly pure, self-replacing stands. Older stands typically include multiple size and age cohorts shaped by frequent surface and mixed fire severities. Even-age stands were an important component but less common under pre-European settlement conditions. Other species in these stands including aspen, lodgepole, and western juniper were generally restricted to unique moisture, edaphic, or topo-edaphic conditions. Understory composition consisted of relatively few species and was dominated by Festuca idahoensis. Purshia tridentata may be locally present, especially in the western and northern extents of the range. Other grass species including Stipa comata, Agropyron spicatum, and Poa spp., and shrub species including Ceanothus velutinus and Arctostaphylos patula were important understory species within the dry ponderosa forest subtype.

*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 severity.

Northern Rocky Mtn. Ponderosa Pine

Northern Rocky Mtn. Ponderosa Pine



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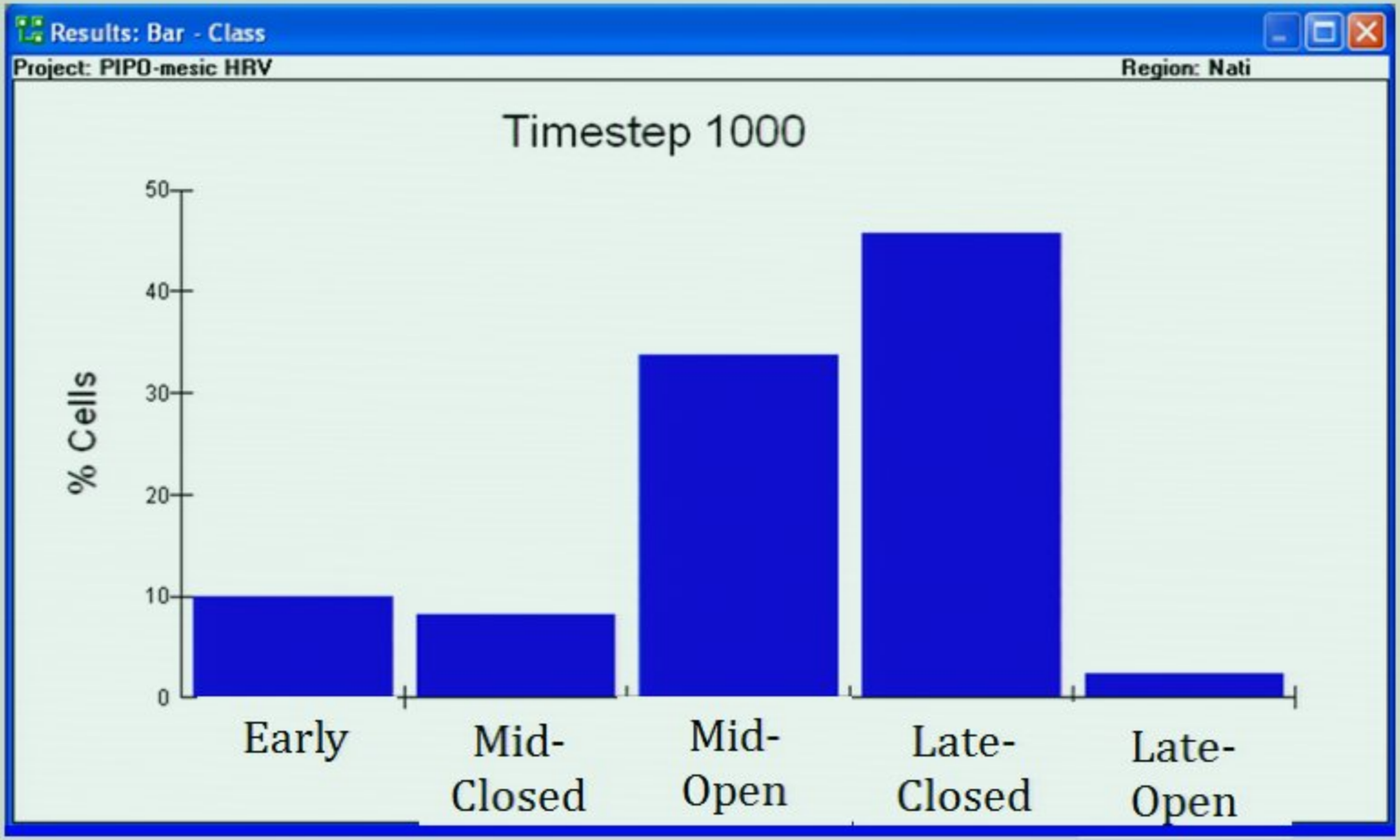

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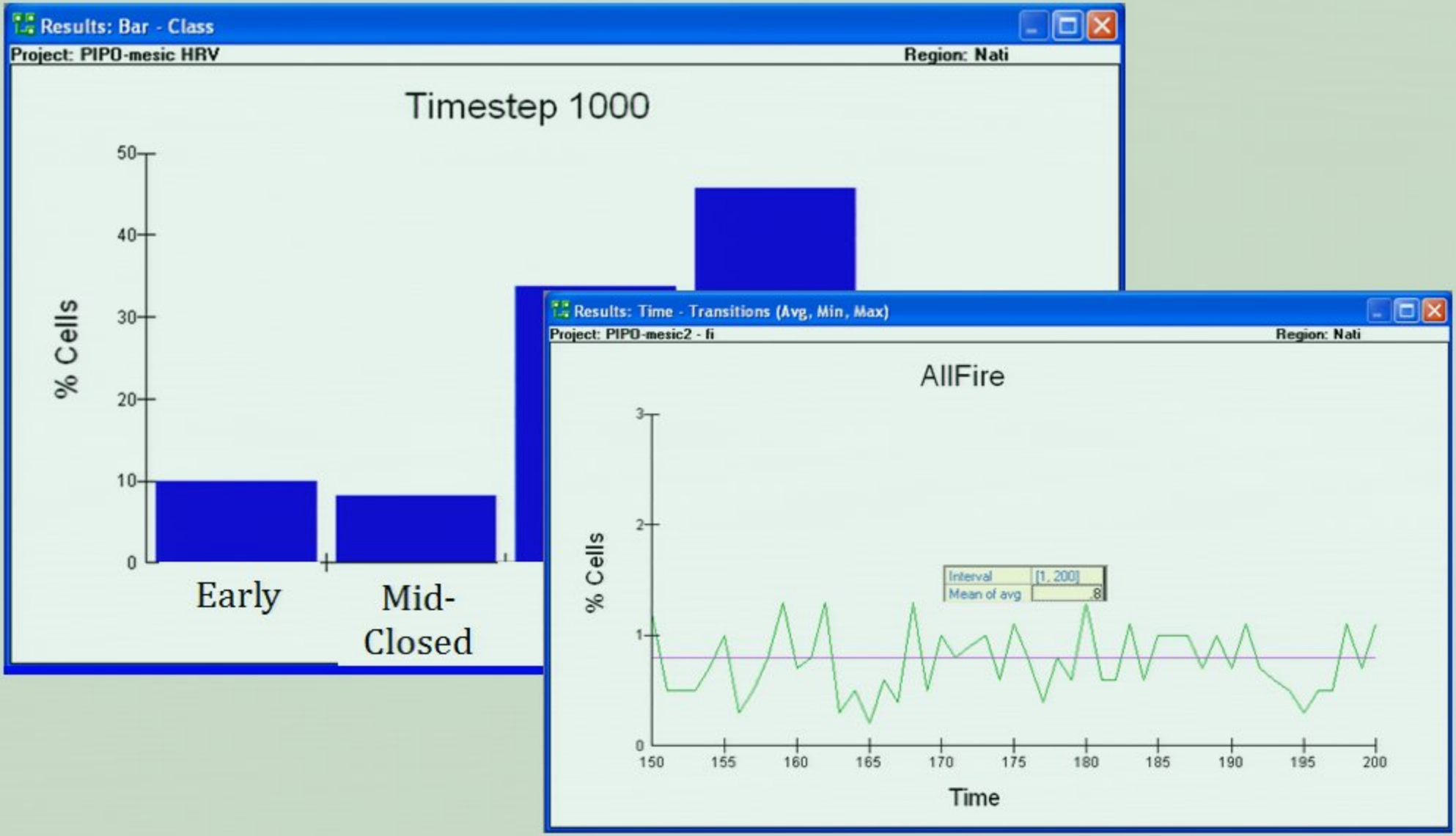

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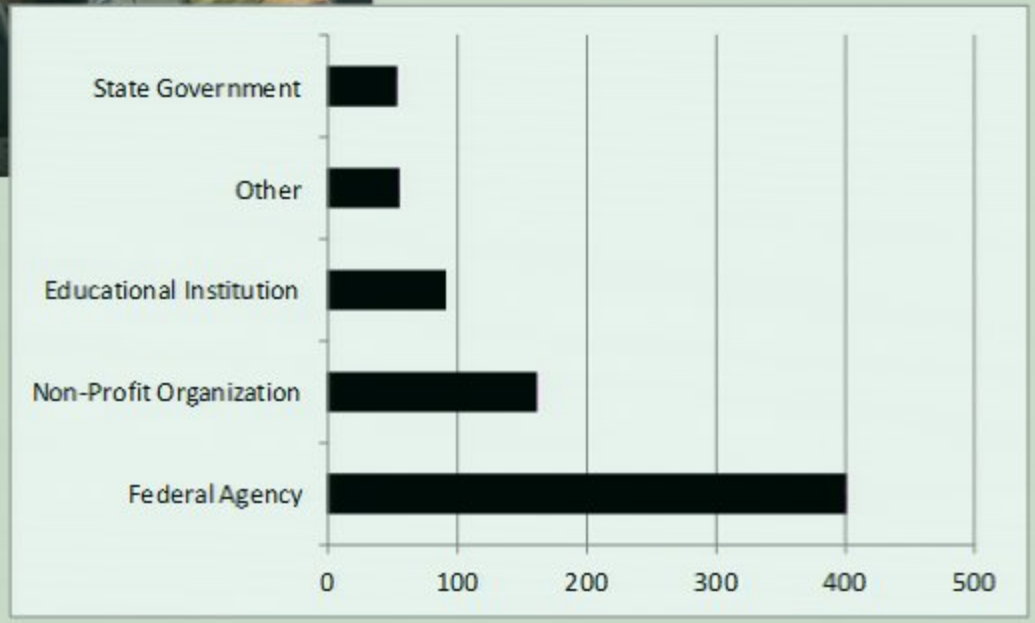
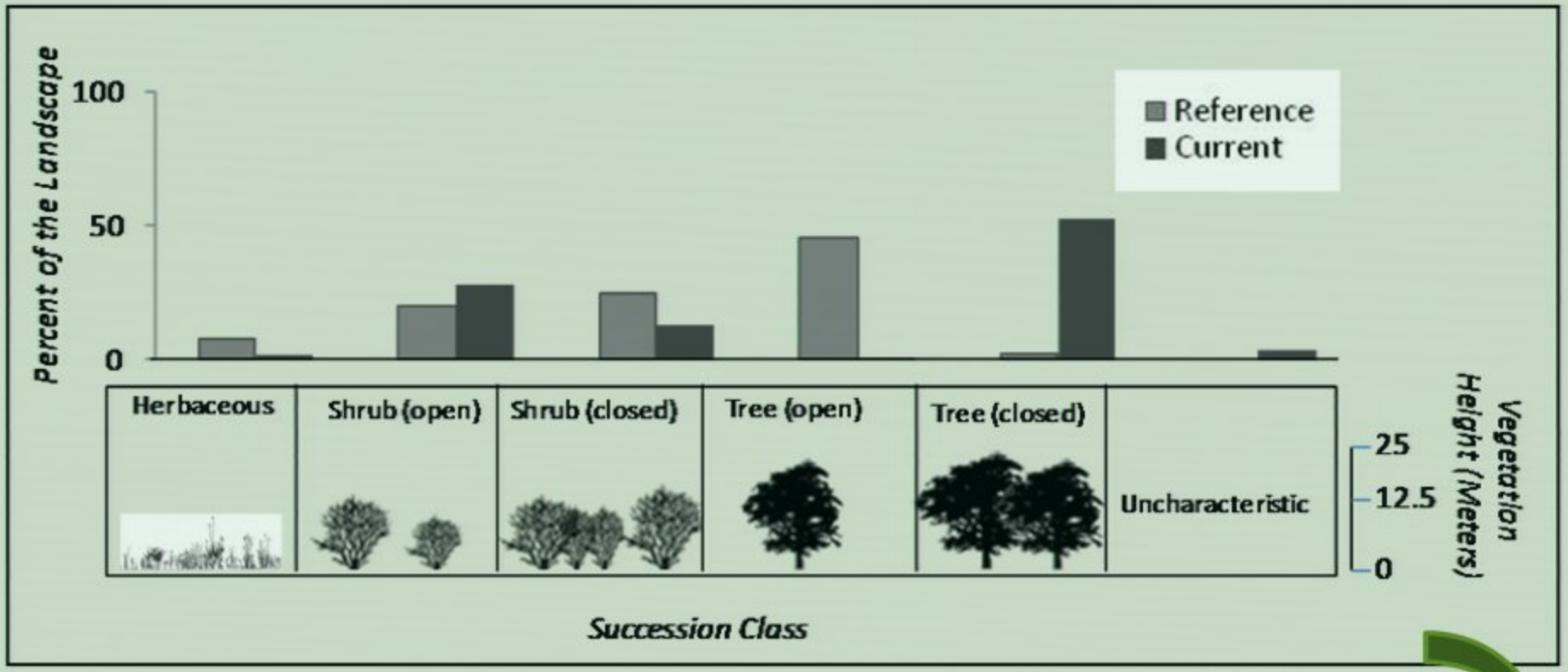
Model Development

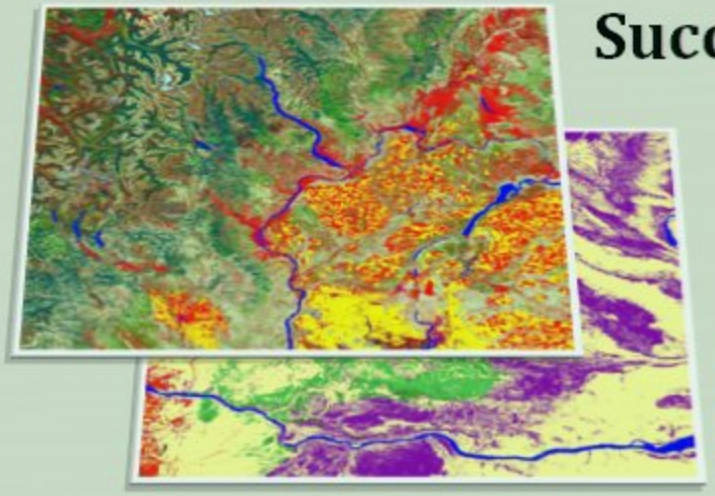


How are the models used in LANDFIRE?

Reference Conditions



Spatial Products



Succession Class

Fire Regime Group Products

- Fire Regime Group
- Fire Frequency
- Fire Severity

Existing Vegetation Type

Biophysical Settings

Fire Behavior Fuel Models

How has the model set changed over time?

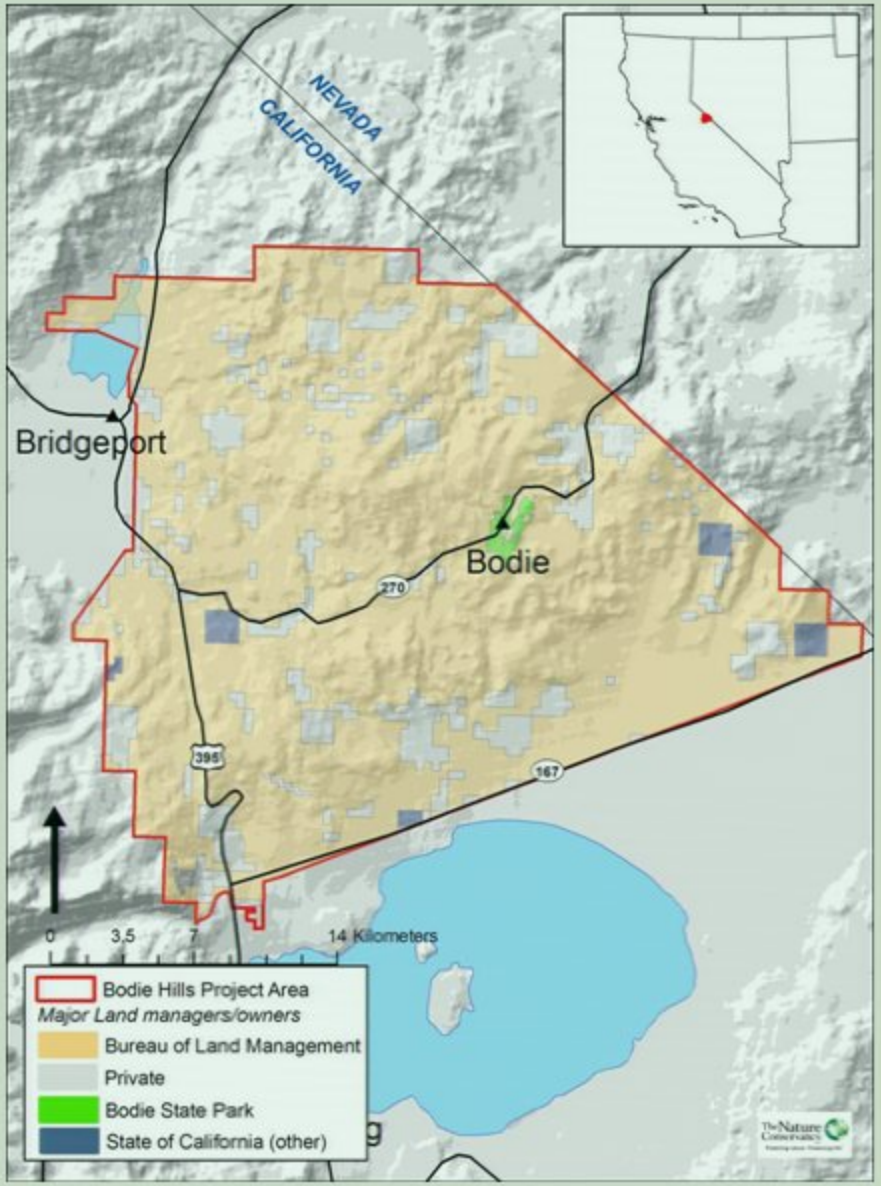
	National	2001 & 2008	2010
Model Set	Original	Grouped	~Original
Number of Models	2,164	356	~2,164
Pros	Regional variation maintained	Fewer models, similar to types that are managed	Same as National
Cons	More variation than needed for some applications	Loss of regional variation	Same as National

How have others applied the models?

Bodie Hills Case Study

Bodie Hills Case Study

192,000 acres



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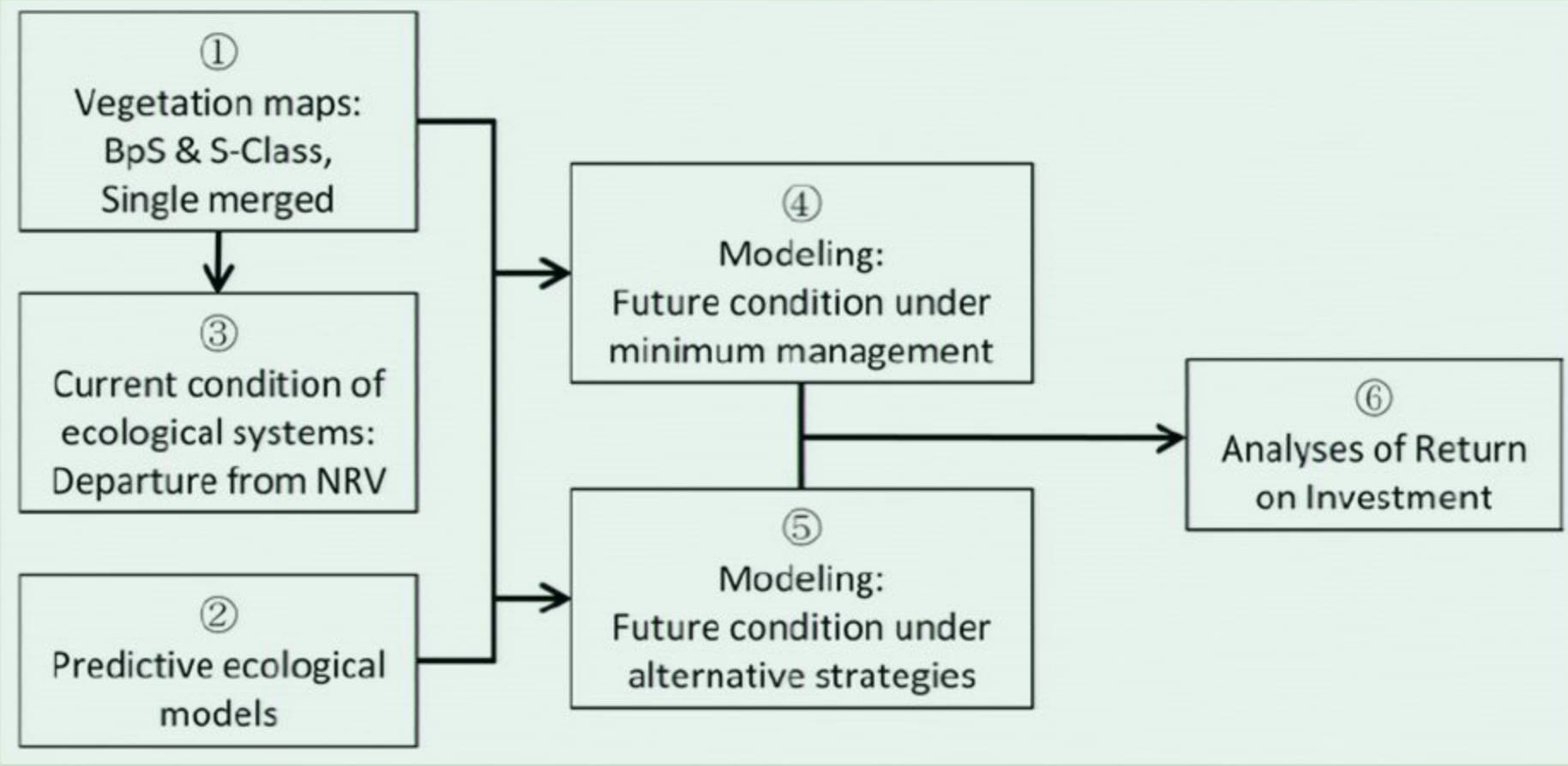

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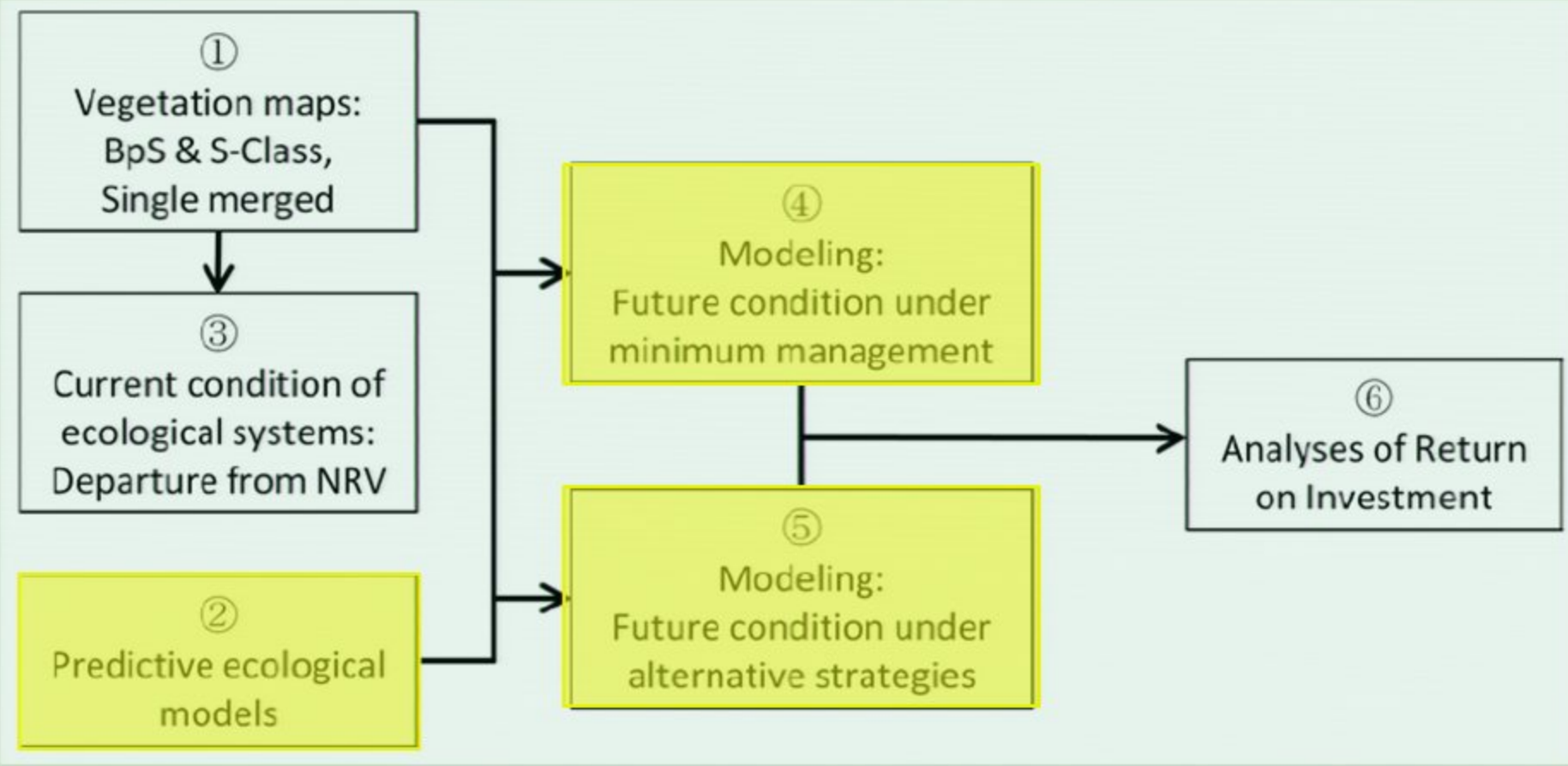
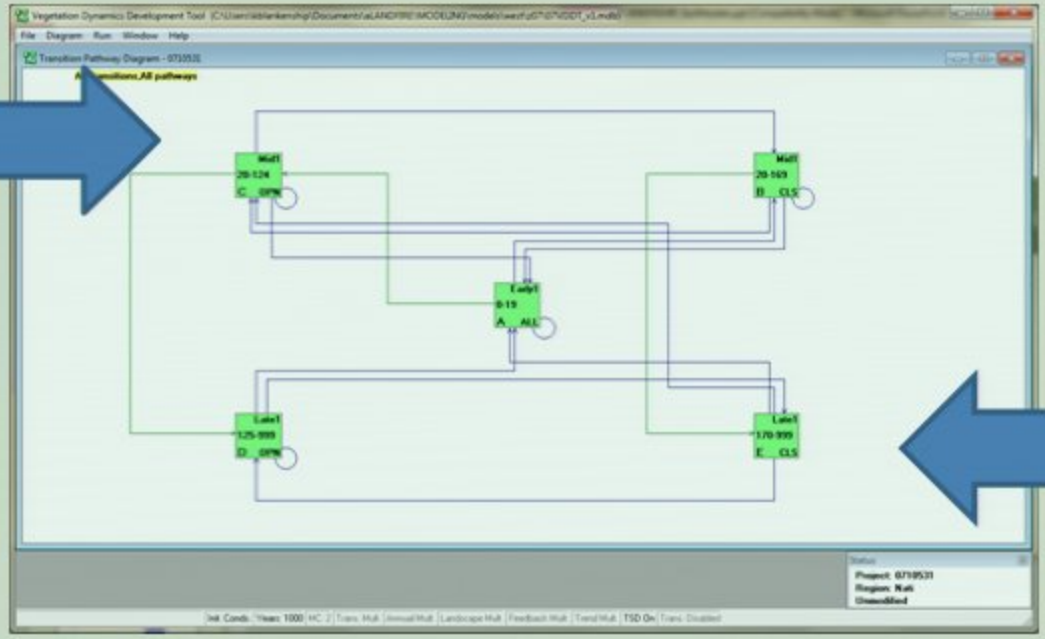


Bodie Hills Case Study

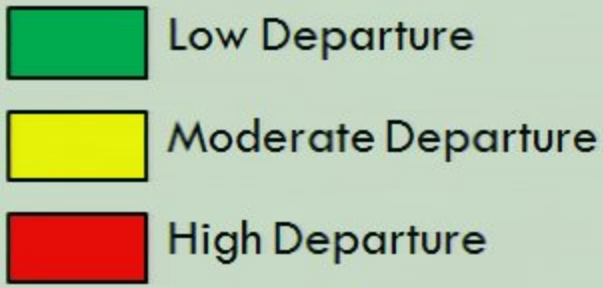
Local Information



Management Actions & Costs

Bodie Hills Case Study

Ecological System	Current	20 Years No Mgmt	20 Years Ecological Mgmt
Alpine	5	5	n/a
Aspen	41	49	33
Basin Wildrye – Big Sagebrush	73	79	45
Juniper Savanna	35	29	n/a
Low Sagebrush	41	37	37
Montane Sagebrush Steppe	72	69	57
Montane-Subalpine Riparian	21	33	27
Mountain Mahogany Woodland	22	15	n/a
Mountain Shrub	39	49	n/a
Pinyon-Juniper Woodland	29	30	n/a
Tobaccobrush	9	15	n/a
Wet Meadow	33	38	19
Wyoming Big Sagebrush (loamy)	74	70	58
Wyoming Big Sagebrush (sandy)	99	99	97



Bodie Hills Case Study

Project	**Bodie Hills**				
Conservation Target	**Montane Sagebrush Steppe**				
Objective	Improve ecological condition of ~120,000 acres of Bodie Hills montane sagebrush steppe from 72% departure (FRCC 3) from NRV to ~55% departure (FRCC 2), prevent increase in highest-risk classes to 20% or less… over 20 years, and establish fuel break around Bodie State Park providing ecological benefits by increasing Classes A & B				
Acres Treated/Year					975
Total Ecosystem Acres					119,836
Strategy	Treat ~1000 acres/yr of montane sagebrush steppe -- with prescribed fire, mowing/burning/ drilling/seeding, lopping & canopy thinning.				
Actions			***Acres/Year***	***Cost/Acre***	***Cost/Year***
	Lop Class D & DPL & Encroached Class; fire risk		50	$ 300	$ 15,000
	Conduct early spring burns of Shrub/Annual/Perennial Grass Class (ShAP) to Class A		500	$ 40	$ 20,000
	DPL restoration & 300 ft. fuel break around 7 miles of State Park (280 acres over 3 years @$207/acre)	$ 112,000	-	$ 400	$ -
	Regular prescribed fire in Classes C & D		400	$ 50	$ 20,000
	ing of Class C as needed for WUI objectives		25	$ 400	$ 10,000
	cal & plant surveys	$ 9,800	900	$ 35	$ 31,500
	one time costs	**$ 121,800**			**$ 96,500**
Number of Years					20
Notes	Arch & plant survey @$55 (may not be needed for lop DPL and early grazing) DPL restoration assumes reduced cost-per-acre (ave. between $207 - $600) for large-scale contract				

Early spring burns

Rx fire in Open classes

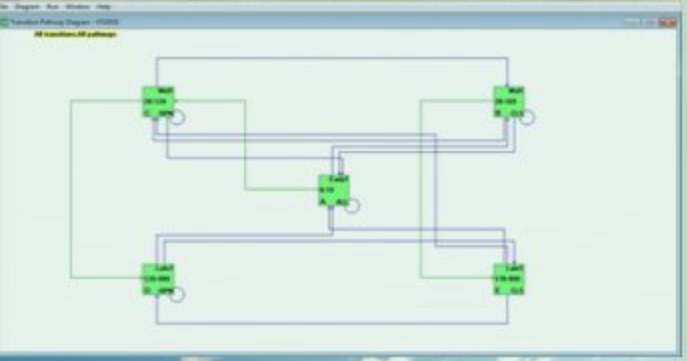
WUI-ROI (ecologically-based and wildfire protection management)

Bodie Hills Case Study

Before

After

Take Home Messages



- LANDFIRE's models describe and quantify pre-settlement ecosystems.
- Models are useful planning tool.
- Get help using models from LANDFIRE.

For More Information

www.landfire.gov

- Models
- Model Search Spreadsheet

www.conservationgateway.org/topic/landfire

- Reviewing and Modifying Models
- Model Adaptation Manual
- Application Stories