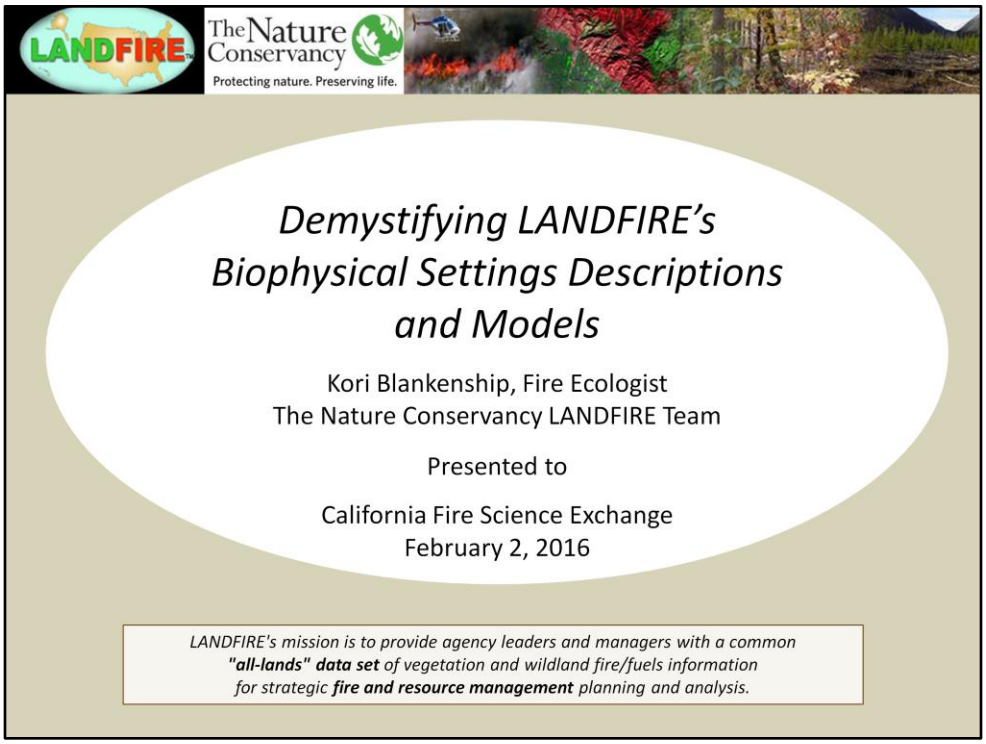


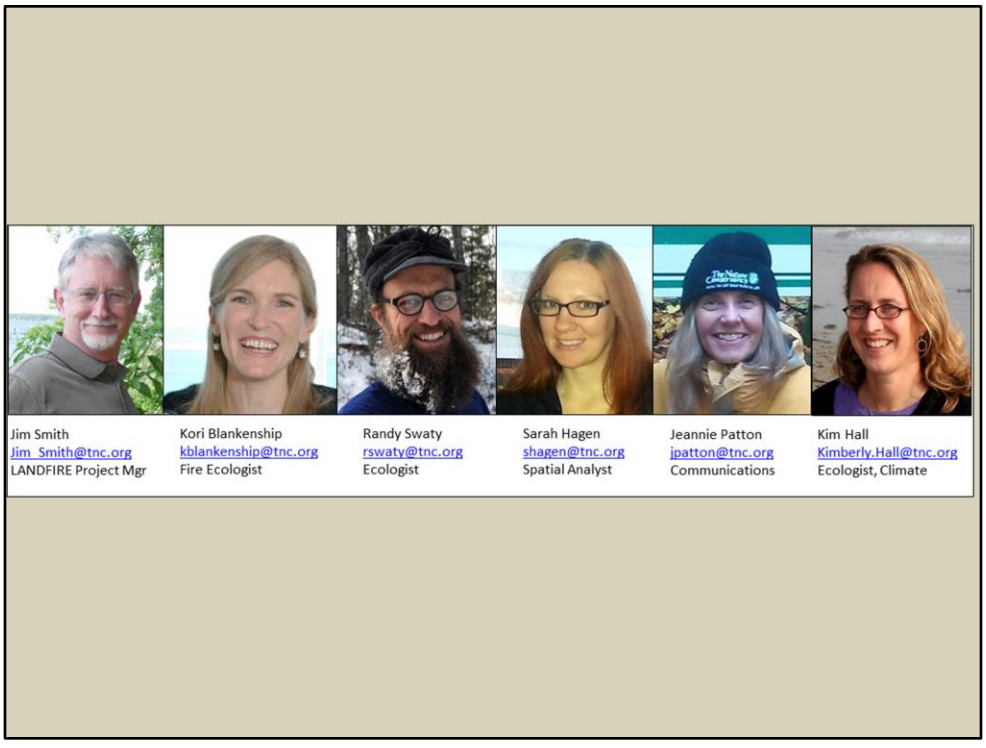
Welcome to the LANDFIRE and California Fire Science Exchange webinar. I'm Jeannie Patton, Communications Lead for The Nature Conservancy's LANDFIRE Program. This is one of a series of webinars offered in partnership with the Fire Science Exchange Network that look at LANDFIRE's Biophysical settings review project. Today's is the fourth in our California series; other regional presentations are scheduled through the spring.

The webinars are recorded and posted on the LF YouTube channel about a week after we host them live. We publicize the webinars via the LANDFIRE Bulletin, so if you do not subscribe yet, please do. The link to subscribe is on the last slide of this presentation.

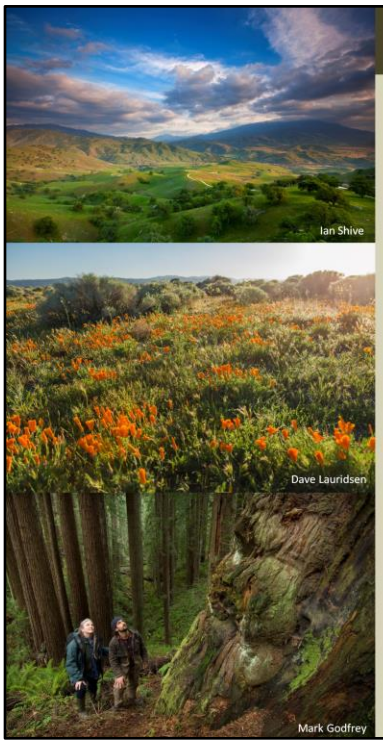
Today's presenter is Kori Blankenship, Fire Ecologist with The Nature Conservancy's LANDFIRE team.

Kori joined TNC in 2005 when she was hired to facilitate the creation of thousands of vegetation dynamic models for ecosystems across the US. She earned undergraduate and graduate degrees in Geography from Western Washington University's Huxley College of the Environment; graduate research investigated seasonal changes in fire behavior and effects in the dry forests of north central Washington State. Kori worked as a GIS specialist at the Missoula Fire Sciences Lab and as a wildland firefighter in Washington and Colorado for the NPS and USFS. Her current focus is on taking the

results of the first five years of the LANDFIRE project and applying the processes and products toward addressing conservation challenges on large landscapes and ecosystems. Kori lives in Bend, OR. She is one of the leaders of the BpS Review and Update project.



Introduce the TNC-LANDFIRE team



Today's Agenda

BpS Models 101

Using the BpS Models

Improving the BpS Models

Announce agenda

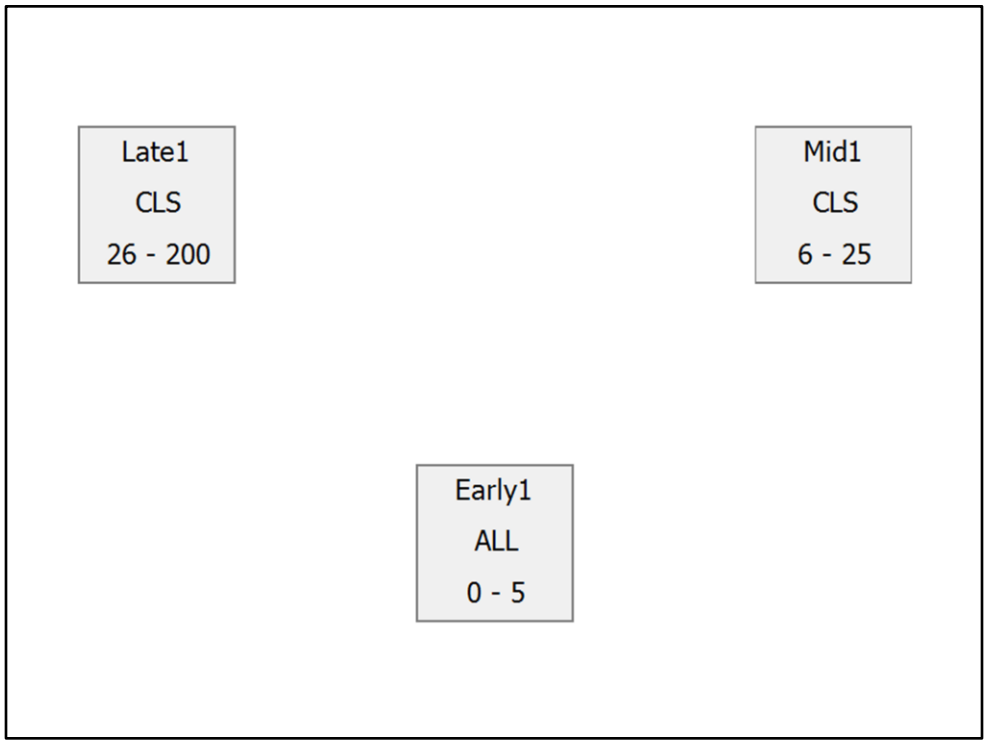
Take Home Message

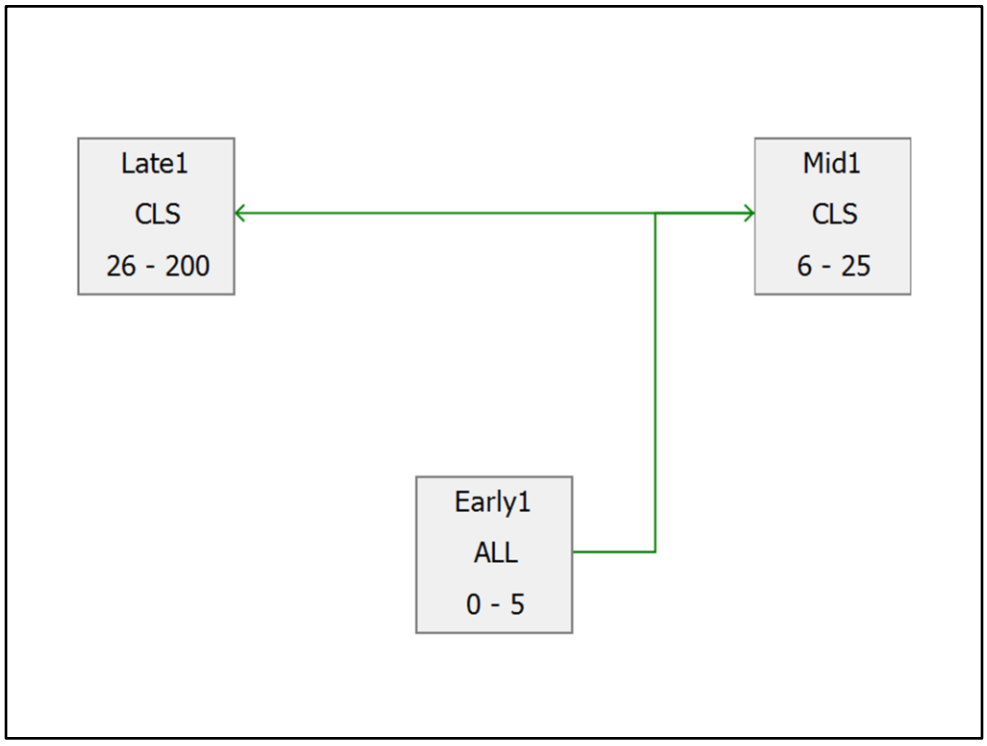
BpS models are important because they:

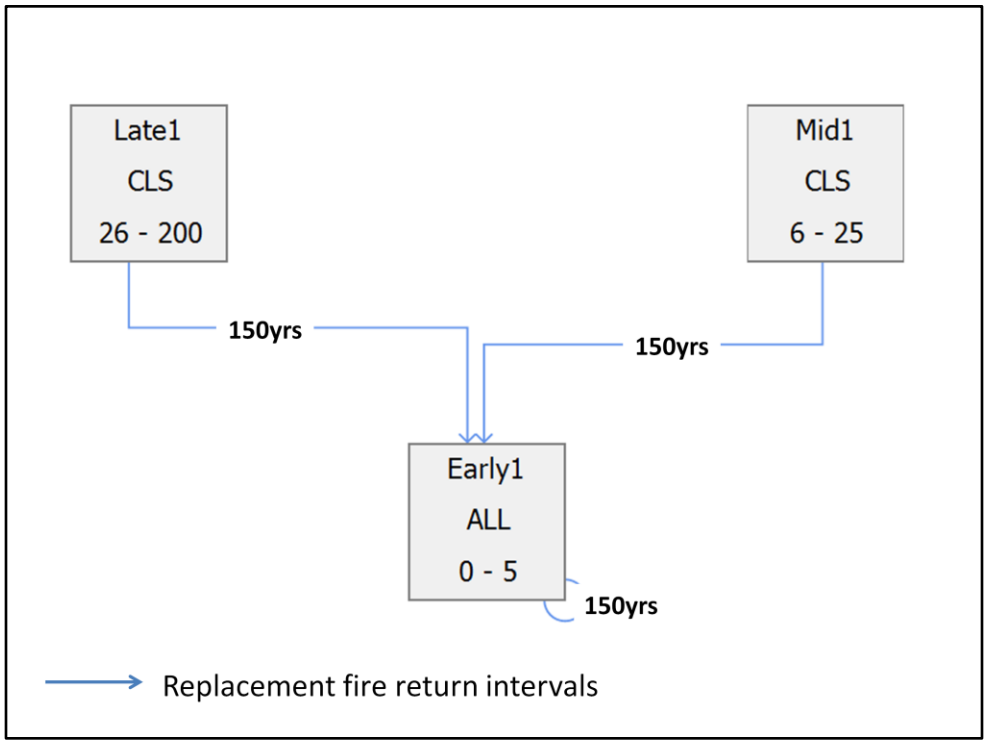
- Help us to understand complex ecological processes and relationships
- Provide a framework for exploring alternative approaches to accomplish landscape goals

-focus on disturbance and succession dynamics
-help us understand complex ecological processes and relationships
-connected to spatial data
-cover about 500 veg types around the country
-LF models can compliment local models; Hugh's ~5 forest models and others

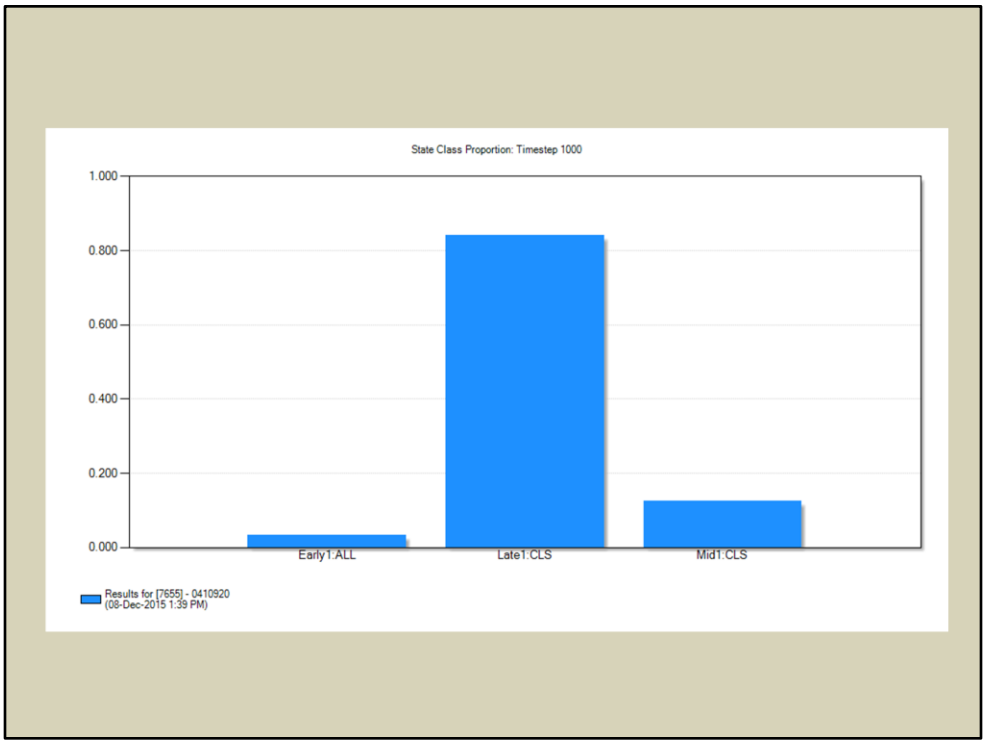
First example of modeling and description


Late1
CLS
26 - 200
Mid1
CLS
6 - 25
Early1
ALL
0 - 5


Late1
CLS
26 - 200
Mid1
CLS
6 - 25
Early1
ALL
0 - 5

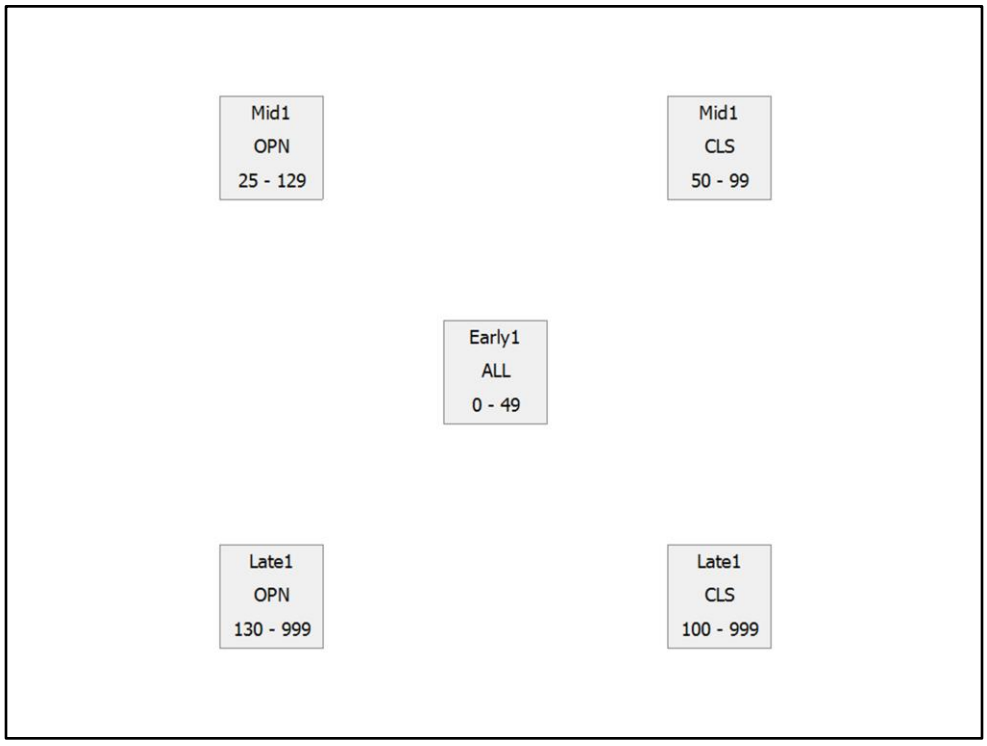


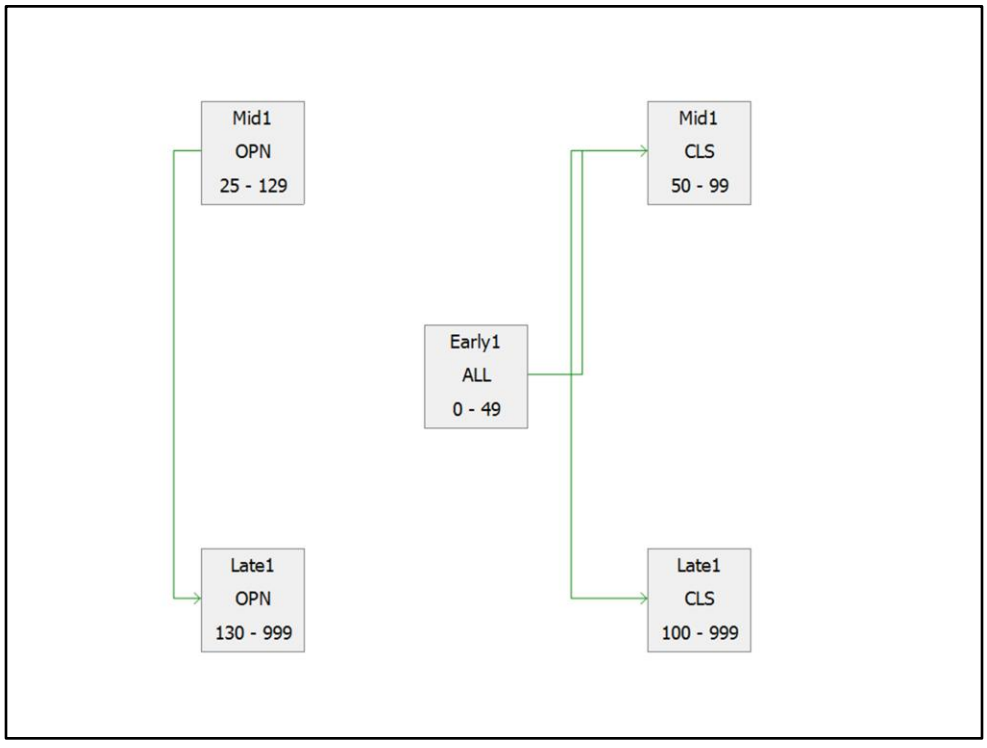
Replacement fire



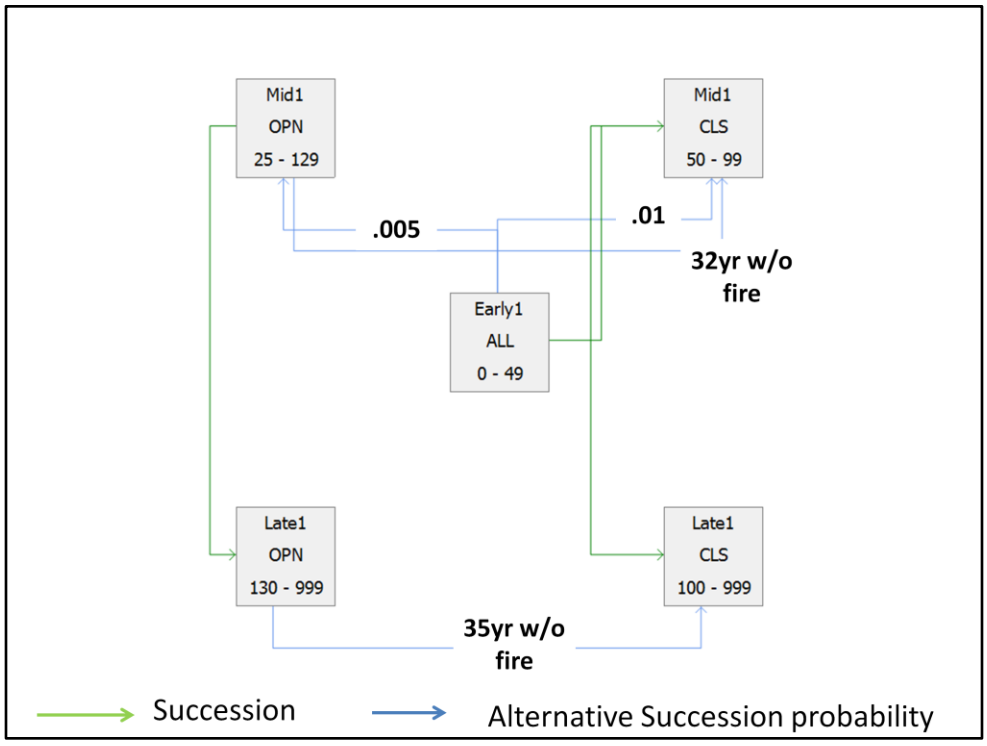
Reference conditions

Image: Plumas-Eureka SP mixed conifer forest.jpg, found on Bing images, free to share and use

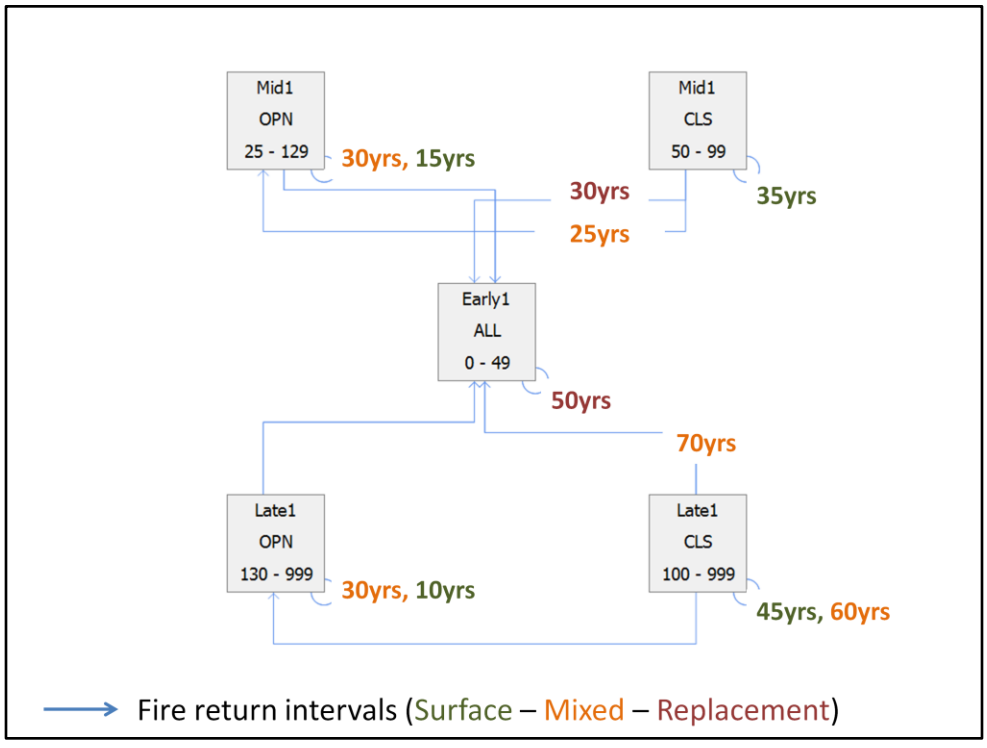

Mid1
OPN
25 - 129
Mid1
CLS
50 - 99
Early1
ALL
0 - 49
Late1
OPN
130 - 999
Late1
CLS
100 - 999


Mid1
OPN
25 - 129
Mid1
CLS
50 - 99
Early1
ALL
0 - 49
Late1
OPN
130 - 999
Late1
CLS
100 - 999

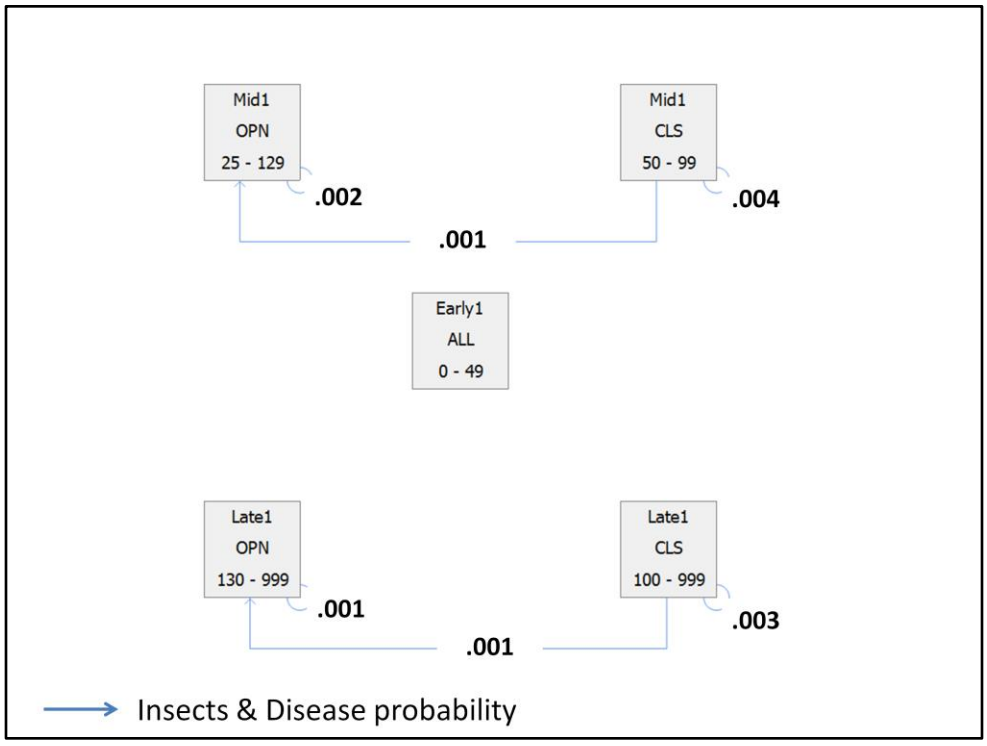
Succession



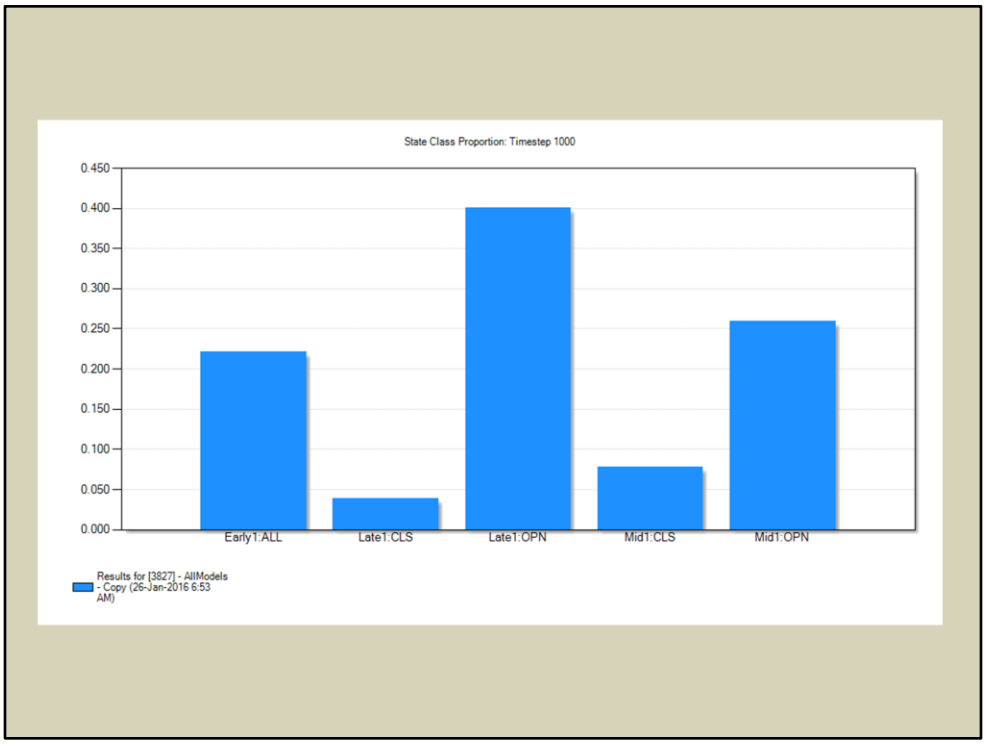
Succession and alt succession



For simplicity, only included FRI for the most frequent fire transitions



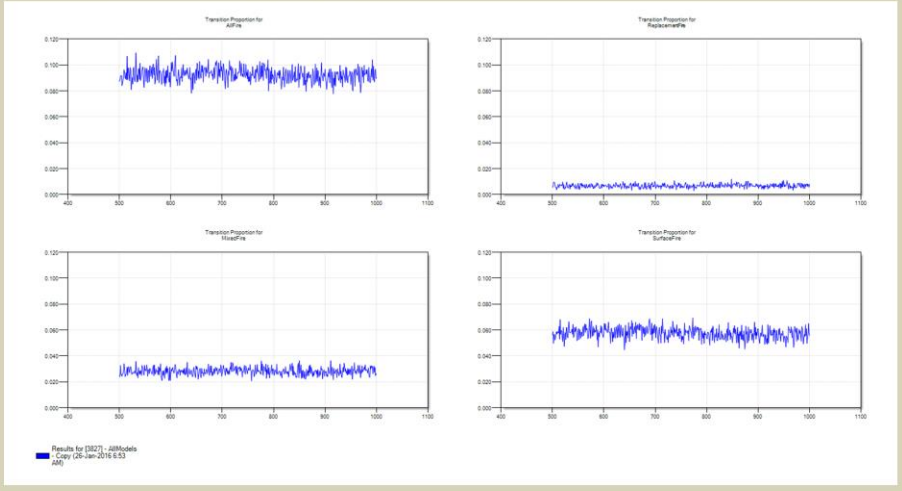
-Insects and disease
-More frequent in closed classes


State Class Proportion: Timestep 1000
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
Early1:ALL
Late1:CLS
Late1:OPN
Mid1:CLS
Mid1:OPN
Results for [3827] - AllModels - Copy (26-Jan-2016 6:53 AM)

Bps # 0610270

AllFire FRI = 11yrs

Replacement FRI = 150yrs



Mixed FRI = 35yrs

Surface FRI = 17yrs

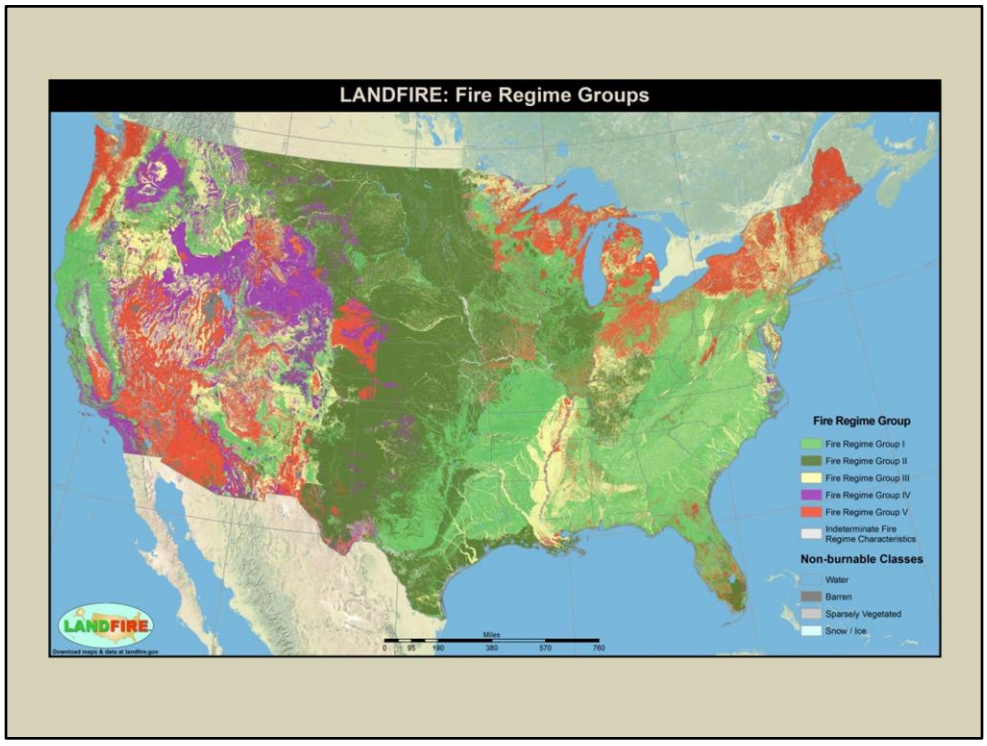
Bps # 0610270

Creating the BpS Models

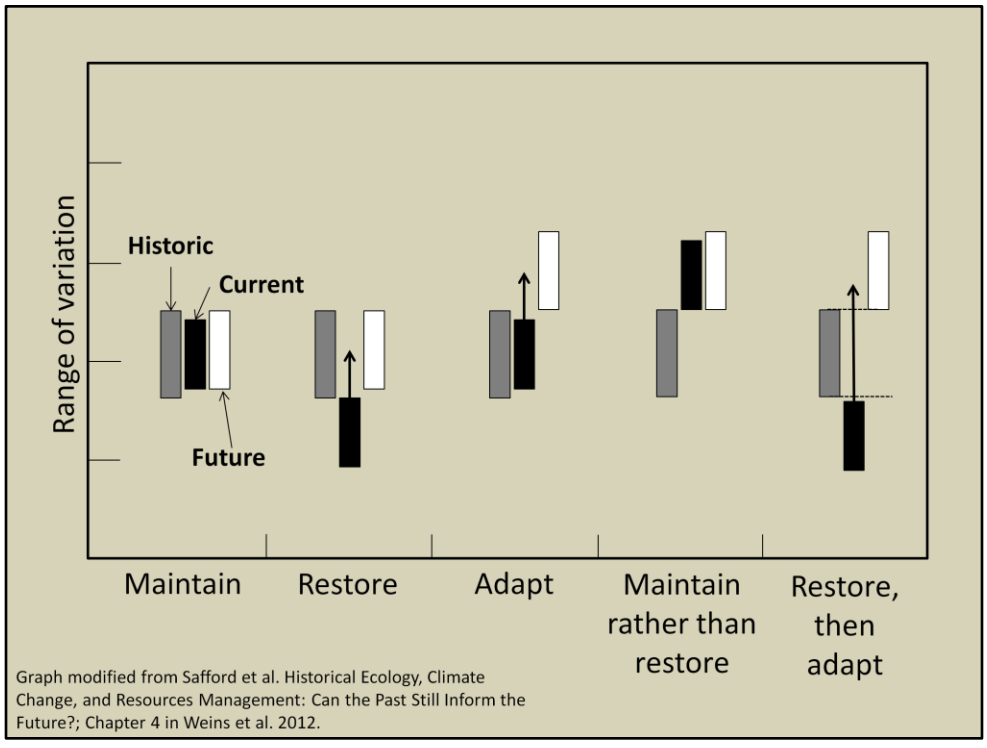
-collaborative process facilitated by TNC-LF
-represent collective ecological knowledge of hundreds of people around the country
->700 contributors to the models, >40 expert workshops plus individual meetings

Strengths	Limitations
Cover ~500 BpS	Don't include management or climate change
Connected to spatial data	Modeling constraints
Relatively easy to use, supported by LANDFIRE	Non-spatial
Good documentation	Difficult to validate, limited information
Suitable for large landscapes	Refine for local use

Documentation – state assumptions in the description, numbers in model are explained in the description



-LANDFIRE use of model info
-fire frequency and severity, FRG, succession class, VCC

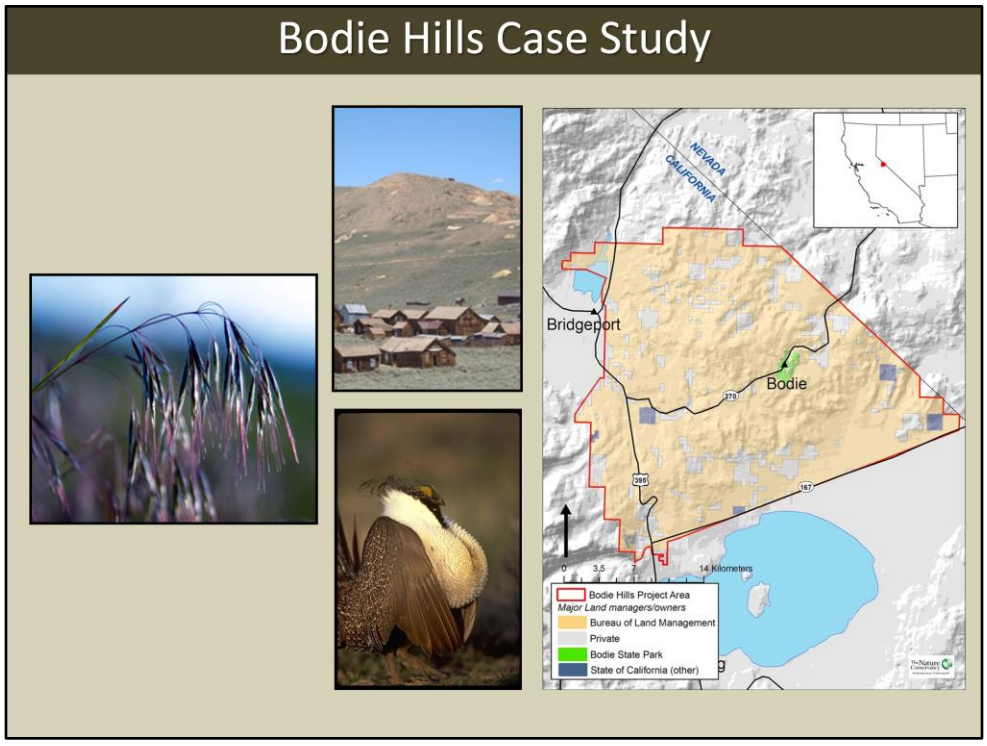


Graph modified from Safford et al. Historical Ecology, Climate Change, and Resources Management: Can the Past Still Inform the Future?; Chapter 4 in Weins et al. 2012.

Bodie Hills Case Study

- This work was undertaken by some of our Nature Conservancy Colleagues in Nevada – Louis Provencher, Greg Low and Susan Abele.
- They used VCC and BpS models as a primary component of a conservation action plan that was designed to improve ecological conditions, reduce fire risk and maintain livelihoods.
- But, importantly they had to have a plan with community buy-in. The VCC metric and the ecological models that underlie it were an important part of creating that buy-in.

Photos: Bodie Hills CAP Report, 2009

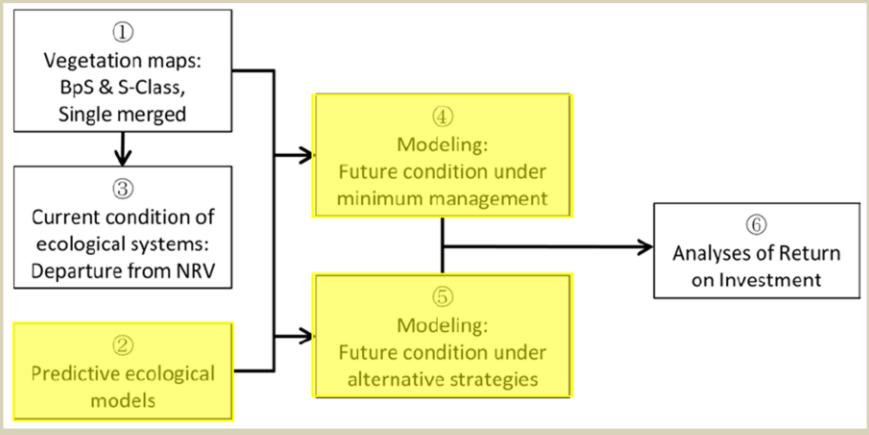


•This is the Bodie Hills study area. It is located on the east slope of the Sierra Nevada on the border between CA and NV.
•The landscape is about 192,000 acres, it is largely unfragmented and it includes historic Bodie State park.
•BLM is the primary land manager, 30% of the area is in private ownership.

•There are very few invasive species in the landscape. Cheatgrass is the primary invader and is found mostly along roads and at lower elevations.
•The landscape has a large, well documented, genetically distinct Greater Sage-Grouse population.

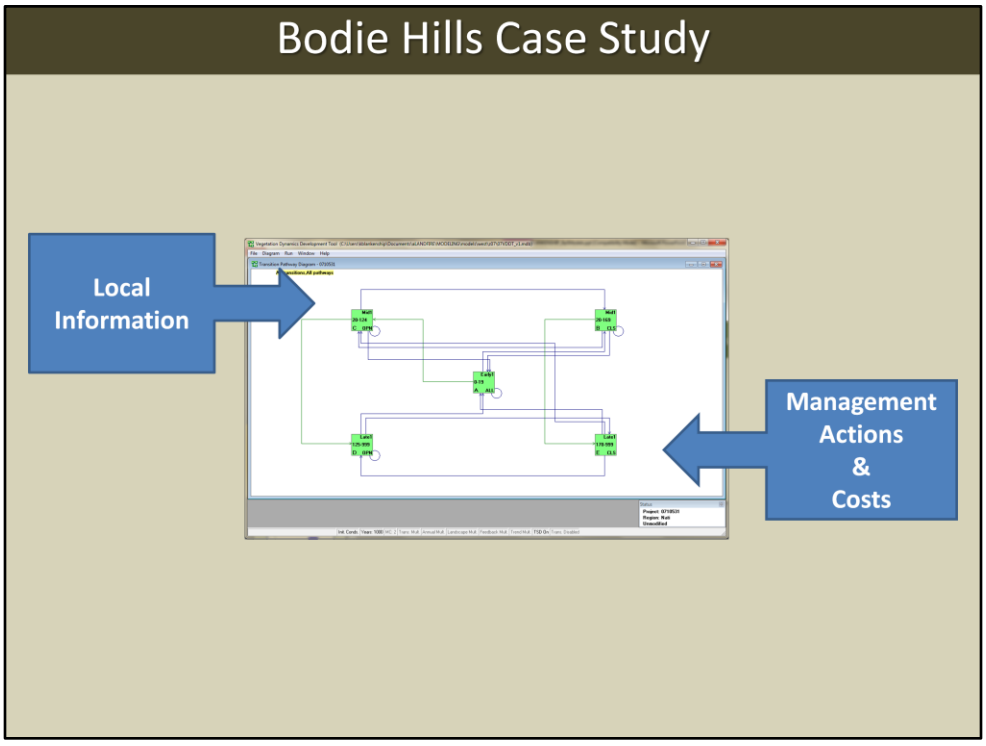
Photos: Bodie state park (provided by L. Provencher), cheatgrass (NPS Photo by Jim Pisarowicz; http://www.nps.gov/wica/naturescience/grasses-cheatgrass.htm), sage grouse (usfws http://www.fws.gov/mountain-prairie/species/birds/sagegrouse/)

Bodie Hills Case Study



- For this planning process The Nature Conservancy used a technique developed by Louis Provencher, Greg Low and Susan Abele called Landscape Conservation Forecasting.
- This technique is designed as a process that involves stakeholders in modeling ecological conditions under current and potential, collaboratively developed future management scenarios.
- Notice the predictive ecological models are key to this process.
- The final step is to recommend a set of actions based on a return on investment calculation that predicts where you will get the biggest bang for your buck in terms of your management investment and your predicted vegetation conditions.

Bodie Hills Case Study



- They started with LF BpS models and adapted them with local knowledge and data to represent the Bodie Hills area.
- They added in management actions and costs.
- Then, the ran various management scenarios to test how the ecosystem would respond over a 20 year time frame.

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

Low Departure

Moderate Departure

High Departure

•The models were run to simulate various scenarios including 20 years without management and 20 years of ecological management.
•This table shows the expected change in ecological condition after 20 years under these scenarios compared to the current condition.
•The models in combination with the VCC metric become a basis for evaluating management strategies and a key factor in determining where and how to invest resources in restoration.

(N/A refers to systems that were not assessed because they were not a high priority or were dealt with elsewhere. For example, the Mountain Shrub ecosystem is very small (~50 acres) and intertwined w/ Montane Sagebrush Steppe so it is managed as part of the Sagebrush Steppe system.)

Bodie Hills Case Study

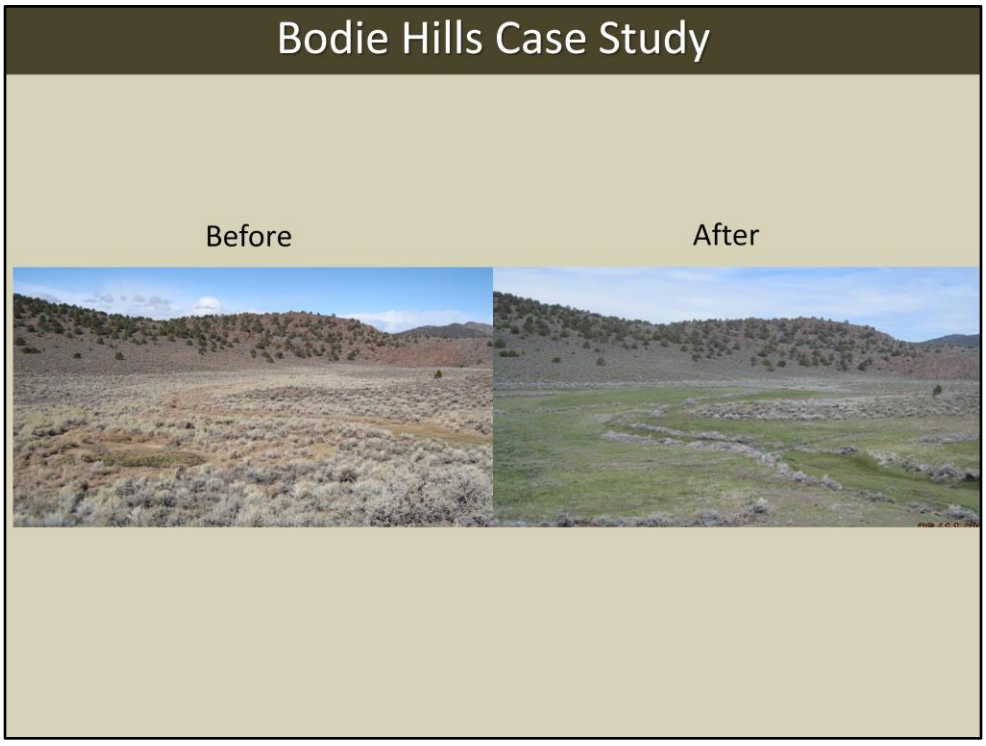
Project	Bodie Hills				
Conservation Target	Montane Sagebrush Steppe				
Objective	Improve ecological condition of ~120,000 acres of Bodie Hills montane sagebrush steppe from 72% departure (FRCC 3) from NRV to ~55% departure (FRCC 2), prevent increase in highest-risk classes to 20% or less… over 20 years, 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
	Excluding 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)

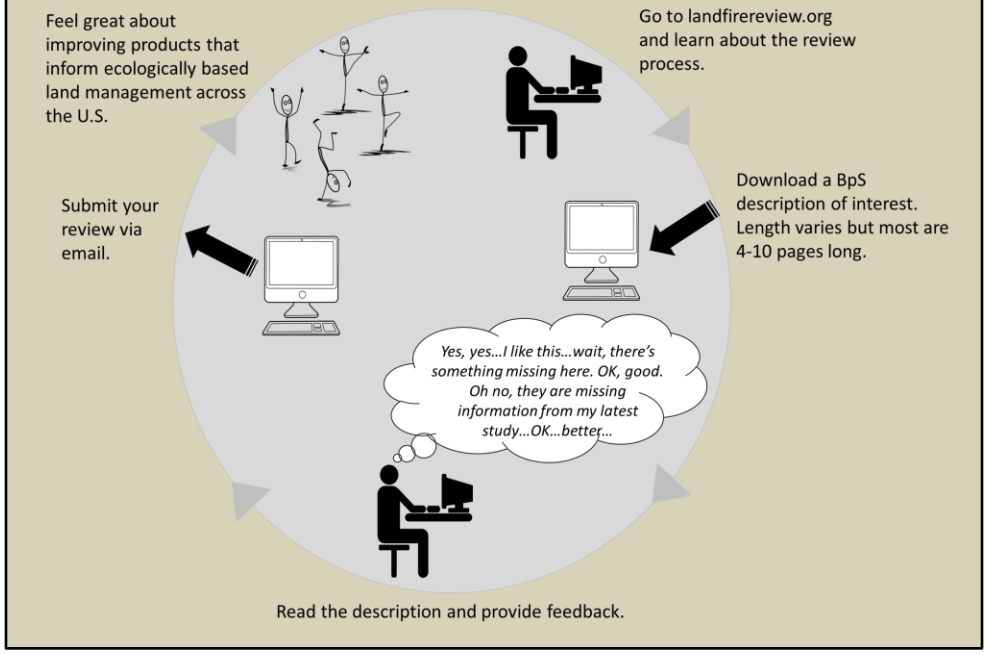
- Using the models and the information they contain, the Bodie Hills group was able to come up with specific management actions for each ecosystem of interest that help achieve the objectives for each individual ecosystem.
- This slide shows the actions and costs for managing Montane Sagebrush Steppe in order to improve its condition and to reduce fire risk to the historical Bodie State Park.
- Some of the actions include different types of prescribed fire. Also notice, that there is a cost associated with each action which is tracked in the STM model.



•Within months of project completion, USFWS provide $100,000 of stimulus funding to restore wet meadows adjacent to sagebrush used by greater sage-grouse on private lands. The project was funded specifically because of the stakeholder plan that was developed.
•Picture shows wet meadow restoration project completed 1.5 years ago
•The BLM can't move forward with management actions until the environmental assessment is reviewed.
•Ecological models were at the core of the process that was used to develop an acceptable plan.
•Models themselves are not the answer. Models provide a structured framework that facilitates working together (even by people who have been adversarial in the past); the approach utilizes the best available science, allows participants to quickly game out scenarios to test everyone's ideas, allows for easy sensitivity testing; for these reasons, models were a key component in the success of the Bodie Hills plan (and in other areas, e.g. Cherokee National Forest).

Picture: wet meadow restoration, L. Provencher

landfirereview.org

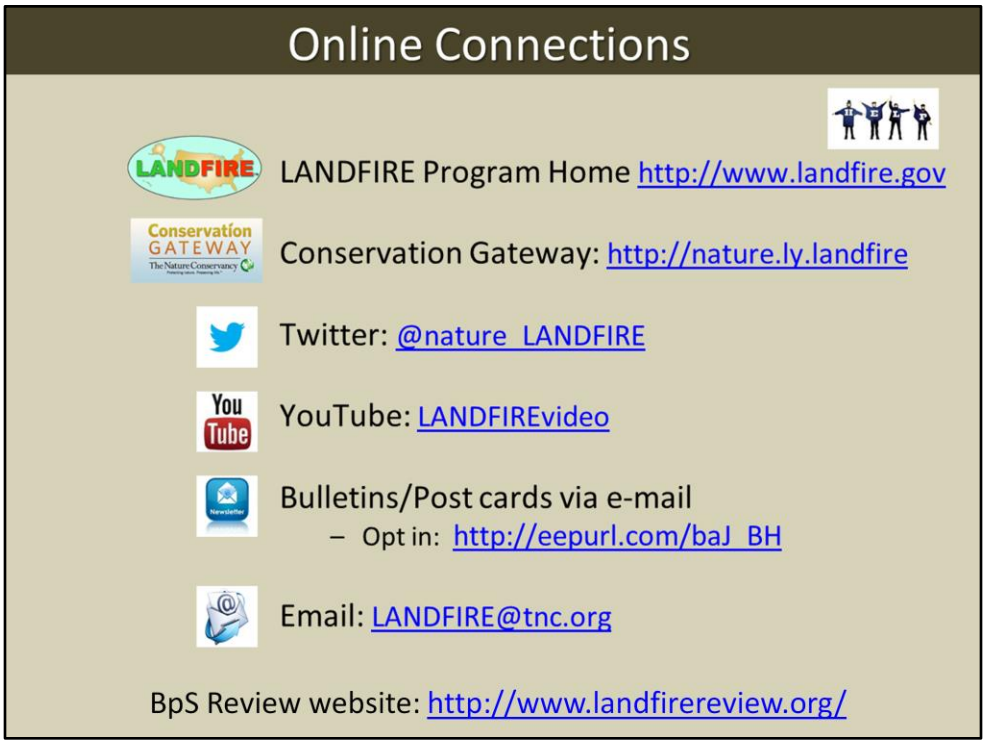


Take Home Message

BpS models are important because they:

- Help us to understand complex ecological processes and relationships
- Provide a framework for exploring alternative approaches to accomplish landscape goals

-focus on disturbance and succession dynamics
-help us understand complex ecological processes and relationships
-connected to spatial data
-cover about 500 veg types around the country
-LF models can compliment local models; Hugh's ~5 forest models and others



Ways to reach LANDFIRE