



The Nature Conservancy
Protecting nature. Preserving life.



BpS Review in the Northern Rockies
What is it? Why does it matter? How does it work?

Jim Smith
LANDFIRE Project Lead

Presented to
The Northern Rockies Fire Science Network
May 3, 2016



LANDFIRE's mission is to provide agency leaders and managers with a common "all-lands" data set of vegetation and wildland fire/fuels information for strategic fire and resource management planning and analysis.

Who We Are

The Nature Conservancy  **LANDFIRE Team**



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- partner on LANDFIRE
- education, outreach, bps models
- small part of the overall LF team

Today's Agenda



A bit about the models

How models are used



Help us improve!

Ariane Babcock

Introduction to LANDFIRE

LANDFIRE

Landscape Fire and Resource Management Planning Tools Project

Think.....

- **Comprehensive**
- **Consistent**
- **Compatible**
- **Current**



LANDFIRE is an innovative program designed to create and update vegetation, fire and fuel data for the entire United States. Leading partners are Department of the Interior, US Forest Service and The Nature Conservancy, along with collaborators in the natural resources world who contribute knowledge, data and technical expertise. LANDFIRE supports resource management activities across the country, with spatial data, vegetation models, and powerful user tools.

LANDFIRE Products

Spatial Data Sets

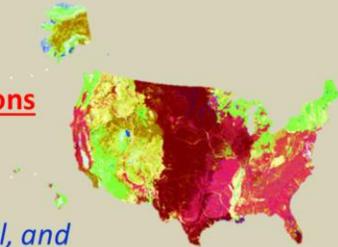
- Historic vegetation type (Ecological System)
- Current Vegetation
 - Type (ES), height class, cover %
- Fire Regime information (Historic)
- Plot/Event Data Bases (LFRDB)
- Fire Behavior
- Disturbances
- Topographic



Biophysical Settings Models and Descriptions

Tools and Support

Native Application Scale: National, Regional, and Large Landscape



LANDFIRE uses peer-reviewed scientific methods, and delivers datasets of vegetation, fire, and fuels information for all land ownership types. Products include more than 20 geo-spatial layers and relational databases that support a wide range of analysis and modeling applications – whether fire-focused or not. And you can combine datasets to assess conditions on your own landscape.

Illustration ...comprehensive/compatible

- Biophysical Settings (BpS) spatial data



- BpS Models and Descriptions-linked by BpS Code

BpS Models and Descriptions

Two-part bundle

LANDFIRE Biophysical Setting Model

Biophysical Setting: 2810110 Rocky Mountain Aspen Forest and Woodland

This BPS is being split.
 This BPS is split into multiple models.

General Information

Contributor	Date
Modeler 1 Kelly Pohl kpoth@fws.org	4/23/2005
Modeler 2	
Modeler 3	

Vegetation Type

Max Zones	Model Zones
Forestal 28 0	<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"/> Northern <input type="checkbox"/> Appalachians
	<input type="checkbox"/> Northern Plains <input checked="" type="checkbox"/> Southwest

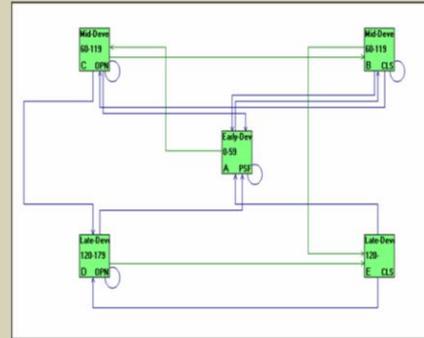
Dominant Species*

General Model Sources	
POTRS <input checked="" type="checkbox"/> Literature	0 0
SVOR <input checked="" type="checkbox"/> Local Data	0 0
AKLV <input checked="" type="checkbox"/> Expert Estimate	0 0

Geographic Range
Western Colorado, Utah, northern New Mexico, northern Arizona, central Nevada.

Biophysical Site Description
This type occurs on flat to moderately steep terrain (<50%) on all aspects. Elevation typically ranges from 2775m-3555m (9090' to 11660') in magnitude 28. Stable aspen typically occurs above grass, sagebrush, or P1. Soils are generally deep, moist, cool, and moist. As a species, aspen is adapted to a much broader range of environments than most plants found associated with it.

Text description informed by ecological model



State-and-transition ecological model

As we progress through the presentation today I will talk about BPS models and BPS descriptions. These are separate but linked items.

BpS Descriptions: the Basics

General		Classes	Height/Cover	Summary	Disturbances	Relevant Literature																											
Biophysical Setting ID	Biophysical Setting Name	Land Cover Class	Name	Email																													
5013110	North-Central Interior Dry Oak Forest and Woodland	Forested	Modeler 1 Greg Nowacki	gnowacki@fs.fed.us																													
Geographic Range		Biophysical Site Description		Modeler 2																													
Province 222. For Michigan 222J. For Wisconsin 222K, L and R.		This system occurs most commonly on interlobates where outwash, ice-contact, and end moraine landforms are situated between former glacial lobes. Other landforms suitable for development of the dry oak forest are sandy lake plain and dunes. Common to all these landforms is		Modeler 3																													
Disturbance Description		Vegetation Description		Date	3/16/2007																												
The North-Central Interior Dry Oak Forest and Woodland is predominantly Fire Regime 1, characterized by low-to-moderate severity surface fires. Historically, indigenous fires accounted for over 95% of the ignitions over these landscapes. Vegetation types varied		Oaks dominated the presettlement vegetation, especially white oak (<i>Quercus alba</i>), black oak (<i>Quercus velutina</i>), northern pin oak (<i>Quercus ellipsoidalis</i>), and bur oak (<i>Quercus macrocarpa</i>). This system is distinguished from North-Central Interior		<table border="1"> <thead> <tr> <th>Model Dominant Species</th> <th></th> </tr> </thead> <tbody> <tr><td>QUAL</td><td><i>Quercus alba</i></td></tr> <tr><td>QUVE</td><td><i>Quercus velutina</i></td></tr> <tr><td>QUEL</td><td><i>Quercus ellipsoidalis</i></td></tr> <tr><td>QUCO2</td><td><i>Quercus coccinea</i></td></tr> <tr><td>CAGL8</td><td><i>Carya glabra</i></td></tr> <tr><td>PRSE2</td><td><i>Prunus serotina</i></td></tr> <tr><td>SAAL5</td><td><i>Sassafras albidum</i></td></tr> <tr><td>QUMA2</td><td><i>Quercus macrocarpa</i></td></tr> </tbody> </table>			Model Dominant Species		QUAL	<i>Quercus alba</i>	QUVE	<i>Quercus velutina</i>	QUEL	<i>Quercus ellipsoidalis</i>	QUCO2	<i>Quercus coccinea</i>	CAGL8	<i>Carya glabra</i>	PRSE2	<i>Prunus serotina</i>	SAAL5	<i>Sassafras albidum</i>	QUMA2	<i>Quercus macrocarpa</i>									
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Adjacency/Identification Concerns		Uncharacteristic Native Conditions		<table border="1"> <thead> <tr> <th>Model Zone</th> <th>Mapzones</th> <th></th> </tr> </thead> <tbody> <tr><td><input type="checkbox"/> Alaska</td><td>1st MZ</td><td>50</td></tr> <tr><td><input type="checkbox"/> California</td><td>2nd MZ</td><td></td></tr> <tr><td><input type="checkbox"/> Great Basin</td><td>3rd MZ</td><td></td></tr> <tr><td><input checked="" type="checkbox"/> Great Lakes</td><td>4th MZ</td><td></td></tr> <tr><td><input type="checkbox"/> Northeast</td><td>5th MZ</td><td></td></tr> <tr><td><input type="checkbox"/> Northern Plains</td><td>6th MZ</td><td></td></tr> <tr><td><input type="checkbox"/> Northern Rockies</td><td>6th MZ</td><td></td></tr> <tr><td><input type="checkbox"/> Pacific Northwest</td><td>7th MZ</td><td></td></tr> </tbody> </table>			Model Zone	Mapzones		<input type="checkbox"/> Alaska	1st MZ	50	<input type="checkbox"/> California	2nd MZ		<input type="checkbox"/> Great Basin	3rd MZ		<input checked="" type="checkbox"/> Great Lakes	4th MZ		<input type="checkbox"/> Northeast	5th MZ		<input type="checkbox"/> Northern Plains	6th MZ		<input type="checkbox"/> Northern Rockies	6th MZ		<input type="checkbox"/> Pacific Northwest	7th MZ	
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This type intergrades and can be easily confused with North-Central Interior Dry-Mesic Oak Forest and Woodland (1310). Fire suppression within the last century has allowed this system to be converted to that system on the loamer soils within the historic range		Though present historically, red maple has been typified as the "native invasive" in oak forests. Its abundance in these systems measured in both stem density and basal area has grown considerably due to fire suppression and the marked increase in fire return		<input type="checkbox"/> This BpS is lumped with: <input type="checkbox"/> This BpS is split into multiple models (explain differences)																													

Originally captured in an Access tool: "Model Tracker Database"

The description has multiple sections - I'll give you a quick tour of some of them today. In the "General" section or tab we find the basic information about a BPS- where it occurs, what the natural disturbance regimes were, a vegetation description and information on where the BPS would have occurred based on soils, surficial geology, climate, etc. This information was typed in by experts, Dr. Greg Nowacki in this case, often backed up by literature. These descriptions were originally developed in an Access database. That database and PDF documents of the descriptions are available on the Vegetation Tab of LANDFIRE.gov.

Description: Succession Classes

Class A

	Class Indicator Species	Indicator Spp.	Canopy Position
Landscape %	ANGE Andropogon gerardi	Upper	
Cover Type	SCHZ4 Schizachyrium	Upper	
Struct. Stage	SCHZ4 Sorghastrum nutans	Upper	

Description: PRAIRIE. This class ranges from 0-4 years and succeeds to class B. Class A is grassland prairie maintained by frequently recurring fire. Replacement fire was modeled with the probability of occurring every 10 years. Native Americans used these lands for hunting, and agriculture/native plant gathering. If fire is absent for a few years, tree seedlings and sprouts would recruit into trees and form savannas. Heavy grazing, though unlikely to have large-scale impact, would have kept certain patches from progressing to a woody shrub vegetation stage and would have maintained Class A. Native grazing was modeled with the probability of occurring every 100 years.

Class B

	Class Indicator Species	Indicator Spp.	Canopy Position
Landscape %	QUAL Quercus alba	Upper	
Cover Type	QUVE Quercus velutina	Upper	
Struct. Stage	ANGE Andropogon gerardi	Lower	
	SCHZ4 Schizachyrium	Lower	

Description: SAVANNA. This class ranges from 5-14 years and succeeds to class C. Savannas conditions occurred where fire was fairly frequent allowing some trees to develop (5-15 yrs). Any area that does not burn frequently would convert to woodland conditions (class C). Replacement fire, modeled at the probability of occurring every 40 years, would send class B to class A. Surface fire, modeled at the probability of occurring every 33 years, would maintain the system in this class. Native grazing, modeled at the probability of occurring every 100 years, would also maintain the system in this class.

Fire Fuel Behavior Model

Structural Data (for upper layer lifeform):

Min Canopy Closure	0 %
Max Canopy Closure	100 %
Min Height	Herb 0m
Max Height	Herb >1.1m
Max tree size class	None

Upper Layer Lifeform (select one)

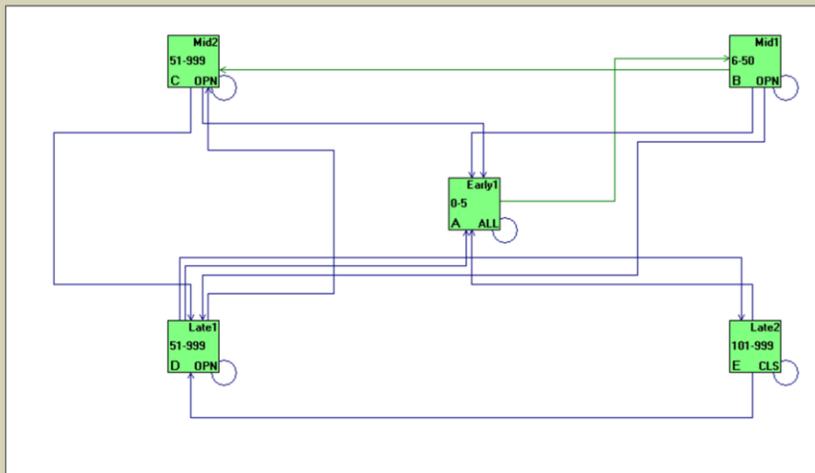
Tree Herb Shrub Fern

Upper Layer Lifeform is not Dominant

If checked, please specify the dominant lifeform, and its minimum and maximum canopy cover and height:

While the general information is interesting to me, the real value added in my mind is on the succession classes tab. For each LANDFIRE model and description we developed 5 or fewer succession classes or seral stages. We described them in terms of species, disturbance, canopy characteristics and percent of the landscape that would have been occupied by the succession classes under natural disturbance regimes. I've circled a couple of items here. While these succession classes shifted around the landscape historically due to disturbance so we did not develop a historic s-class map, but we do map these today. The canopy characteristic are important for that. Also, I wanted to point out that the percentages come from the modeling we'll discuss next.

State and Transition Models



Boxes = Succession classes. Lines = disturbances or succession

To get an estimate of how much of each succession class would have been on the landscape we used state and transition models developed in Vegetation Dynamics Development Tool by ESSA technologies. While the modeling platform has evolved- we now use ST-Sim, the concepts are the same. Each box represents a succession class, the green lines that come out of the sides of the boxes succession and the blue lines coming out of the tops and bottoms disturbance. You'll also see the age ranges (such as 0-5), a box label (such as "A") and a broad structure label (such as "Open").

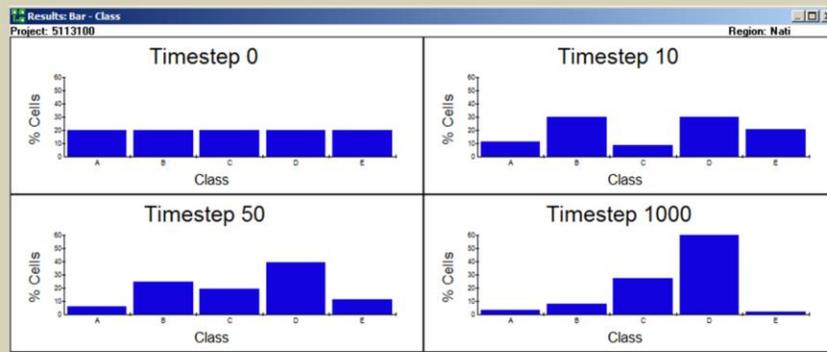
Historic Succession Class Percents

Inputs for VDDT/ST-Sim modeling included

- basic parameters for each Succession Class (structure, start and end age)
- types and annual probability of disturbances
- what happens when there is not a disturbance

Models were run

- 10 times for 1,000 cells, 1,000 years



The experts looked to literature, personal experience and other data to come up with information to parameterize the models. The succession classes typically represent some sort of break in development of the BpS such as when shrubs start to fill in if there is no fire, when a dominant tree starts to bear cones or when the broad structural characteristics stabilize. The model is probabilistic so we entered an annual probability of a disturbance affecting a cell in a particular succession class and what happens to that cell. When a cell is not affected by a disturbance it succeeds to the next succession class. The models were run 10 times for a thousand years, which is long enough for them to stabilize.

Find the BpS models/descriptions here....

<http://www.landfire.gov/NationalProductDescriptions24.php>

Biophysical Settings Description and Quantitative Models

LANDFIRE calls historic (pre-European settlement) ecosystems "Biophysical Settings," or BpS. To better understand how BpS functioned across the United States, LANDFIRE worked with hundreds of experts to develop descriptions and models. The results are combined into "sets" or bundles that are available to anyone for free online.

The What and the How of BpS Models

LANDFIRE used an expert-based development process to create state-and-transition models that describe pre-settlement ecosystem structure and function for every [Ecological System](#) present in the current LANDFIRE [BpS](#). Each ecosystem, which LANDFIRE calls a **Biophysical Setting** (BpS), has a description document and a quantitative state-and-transition model including succession/growth and disturbance that can be viewed and manipulated in either the Vegetation Dynamics Development Tool (VDDT) or ST-Sim. LANDFIRE BpS quantitative models were first developed in an early version of VDDT, but now can be examined and modified in the latest incarnation of VDDT called ST-Sim. ST-Sim represents a significant advance in state-and-transition modeling and its use is strongly encouraged.

Download BpS Models

Succession → Disturbance

Early Succession Beaver Meadow 0-50 yrs

Mid Succession Sedge Wet Meadow 51-999 yrs

Mid Late Succession Northern Shrub Thicket 10-150 yrs

Late Succession Swamp Forest 100-999 yrs

Credit: Jessica Price, Forest Scenarios Project, <http://faculty.nelson.uic.edu/~jbernage/scenarios/>

After review and QA/QC we delivered the bundles to the LANDFIRE mappers who ingested them into their mapping processes. In many ways it was an insane time of life for people in the LANDFIRE project.

Find the models here....

1. **Compiled databases** in the Lower 48 States and Hawaii OR Alaska extents using links in the table

Compiled BpS Databases	
Description Databases (Access)	Model Database (ST-Sim)
Lower 48 States and Hawaii Descriptions	Master ST-Sim Model Database
Alaska Descriptions	

2. **BpS model information** within individual map zones (click on the map below), including:
 - BpS description as a PDF
 - Reference condition summary table as a .csv file
 - Metadata
 - [Vegetation Dynamics Development Tool \(VDDT\)](#) model database
3. **Spatial data** - [learn more](#)



After review and QA/QC we delivered the bundles to the LANDFIRE mappers who ingested them into their mapping processes. In many ways it was an insane time of life for people in the LANDFIRE project.

BpS Models/Descriptions Uses--Internal

Source of fundamental ecological information for BpS mapping

Fire Regime Attributes: Historic fire return intervals, fire severity distributions, fire regime groups, etc.

One component of the Fire Behavior Fuel Model ruleset

Pre-European Settlement Succession Class % for departure calculations

In addition to the mapping I mentioned earlier, planners in multiple agencies are using them as “starter models.” They will take the basic LANDFIRE models, add in current management such as logging or fire suppression then develop optimization models to figure out land management strategies to get them to their desired future conditions. Also, I’ll note that programs such as FSC certification refer to LANDFIRE as a place to get historic ecological information.

LANDFIRE Uses -- External



Map created by The Nature Conservancy LANDFIRE Team

LANDFIRE Web-Hosted Applications Map (WHAM!)

The LANDFIRE Web-Hosted Applications Map (WHAM!) is an online, interactive map that calls up many of the applications, their locations, and the partners we work with. It's easy as point-and-click! Hover over a "balloon," click on it, and learn how LANDFIRE products helped land managers meet their planning objectives.

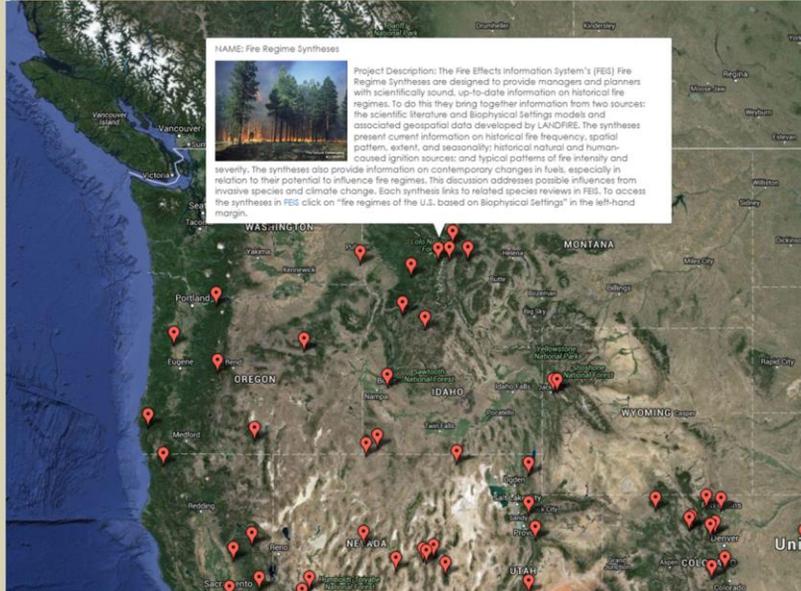
SOURCE

The Nature Conservancy's LANDFIRE team helps real people apply LANDFIRE products to solve real world problems. If you know of an application that should be added to the map, let us know! Visit us at: The LANDFIRE Program Site and TNC LANDFIRE or email us at: landfire@tnc.org

<http://maps.tnc.org/landfire>

In addition to the mapping I mentioned earlier, planners in multiple agencies are using them as “starter models.” They will take the basic LANDFIRE models, add in current management such as logging or fire suppression then develop optimization models to figure out land management strategies to get them to their desired future conditions. Also, I’ll note that programs such as FSC certification refer to LANDFIRE as a place to get historic ecological information.

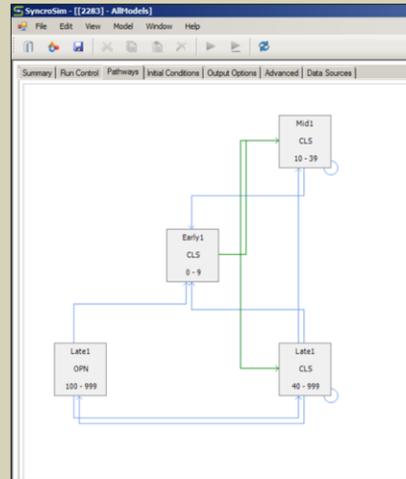
WHAM!-Northern Rockies Applications



In addition to the mapping I mentioned earlier, planners in multiple agencies are using them as “starter models.” They will take the basic LANDFIRE models, add in current management such as logging or fire suppression then develop optimization models to figure out land management strategies to get them to their desired future conditions. Also, I’ll note that programs such as FSC certification refer to LANDFIRE as a place to get historic ecological information.

Why Review the BpS?

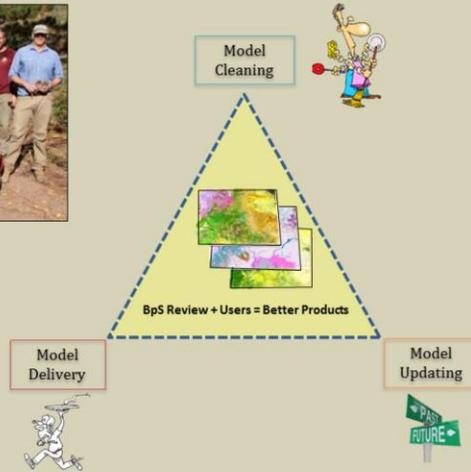
- Reduce duplication
- Fix “blunders” e.g. typos, inconsistencies, etc.
- Integrate new science and new experts. *Ten years is a long time!*
- Potential for creating a more useful delivery system
- Updated modeling software



There has been no comprehensive review of the LANDFIRE National model set since their original delivery from 2005 through 2009, only sporadic, ad hoc, inconsistent review based upon immediate opportunity. Since then, errors and inconsistencies have been discovered, and missing information identified. There is reason to believe that supporting science may have improved. Thus, the time is right to review and potentially revise LANDFIRE National BpS models. Leading the review process is The Nature Conservancy's (TNC) LANDFIRE team.

Our Philosophy

BpS Review + Users = Better Products



We are certain we can improve the BpS descriptions and bundles with your help, though not everyone agrees. Some feel that we will only make them different...We also know that there will be conflicting views. We will do our best to reconcile differences. We will try to make this process as painless and interesting as possible.

BpS Review Process

- We have “cleaned” the BpS list by identifying and noting duplicates
- The documents are posted on the dedicated BpS Review website
- Contributors may review the Word document/description, the model, or both
- Most review is conducted in contributors’ locations, e.g. office desk, laptop, etc., though the LANDFIRE team will hold WebEx training sessions and are available to help onsite in some cases

BpS review website: <http://www.landfirereview.org/>



The BpS review involves three steps: model cleaning, model updating, and model delivery. If you know how vegetation systems function, or have ideas how we can better deliver the information, we want your expertise and input. Start at the BpS review website where you'll find information on how to join the effort

The screenshot shows the website interface for the LANDFIRE Biophysical Settings Review Site. At the top, the URL 'www.landfirereview.org' is displayed. The header includes the logos for 'The Nature Conservancy' and 'LANDFIRE Biophysical Settings Review Site'. A navigation menu contains links for 'Home', 'About', 'Review', 'Resources', and 'Contacts'. The main content area is titled 'The BpS Review' and contains the following text: 'LANDFIRE BpSs are described and modeled. Everything you need to review a BpS is contained within the BpS description document, including all the information from the simulation model. Use the instructions provided here to get started, and [contact us](#) anytime with questions.' Below this is a section for 'Review Instructions' with four numbered steps: 1. Watch a short video overview about reviewing a BpS Description. 2. Get your BpS description(s). Please be patient, as loading the spreadsheet may take some time. If you can't find the document you are looking for please send an e-mail to landfire@nrc.org. 3. Review and edit the description in your word processing program. This step includes sub-points: 'Add your name, email, and phone number at the top of the page.', 'Use track changes for your edits and comments.', and 'Review and edit the simulation model (optional)'. 4. Submit your review document via email to landfire@nrc.org. A section titled 'What happens next?' follows, stating: 'Thanks for your review! The LANDFIRE team will review your comments as soon as possible and contact you with any questions. All comments and suggestions will be documented and made available to the public, but the LANDFIRE team will make the final decision on how review comments are incorporated into the revised BpS model set. Look for revised descriptions and models available online in 2016.' On the right side, there is an 'Additional Resources' section with links to 'How to decipher the BpS Code', 'Map Zone Boundaries', 'Succession Class Mapping Guidelines—CONUS and HI', 'Succession Class Mapping Guidelines—AK', and 'NatureServe Explorer'. Social media icons for Twitter, Facebook, and YouTube are also present.

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BpS Description Document Download

We have 700+ BpS documents stored in the online BpS vault. Unless you are very eager and want to review them all, we suggest you use [this spreadsheet](#) to find the BpS(s) of interest to you.

You can search and select by these fields:

1. BpS Name
2. Geography (Region or Map Zone)
3. Vegetation Type (e.g. tree, shrub, or grassland)
4. Fire Regime Group

Once you find the BpS(s) of interest, click on the BpS Code(s) and download it to your computer.

	A	B	D	E	J	K
1	MapZone	Code	BpS Code	BpS Name	Region	Map Zone
1340		21 11590	2111590	Rocky Mountain Montane Riparian Systems	Northwest	
1341		22 11590	2211590	Rocky Mountain Montane Riparian Systems	Northwest	
1342		25 11590	2511590	Rocky Mountain Montane Riparian Systems	Southwest	
1343		27 11590	2711590	Rocky Mountain Montane Riparian Systems	South Central	
1344		33 11590	3311590	Rocky Mountain Montane Riparian Systems	South Central	
1345		28 11590	2811590	Rocky Mountain Montane Riparian Systems	Southwest	
1346		29 11590	2911590	Rocky Mountain Montane Riparian Systems	Northwest	
1347		10 11590	1011590	Rocky Mountain Montane Riparian Systems	Northwest	
1348		19 11590	1911590	Rocky Mountain Montane Riparian Systems	Northwest	
1349		10 11670	1011670	Rocky Mountain Poor-Site Lodgepole Pine Forest	Northwest	
1350		19 11670	1911670	Rocky Mountain Poor-Site Lodgepole Pine Forest	Northwest	

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Review Guidance for LANDFIRE Biophysical Settings Models and Descriptions
 Please note that we pledge to review and consider every comment we receive. We cannot, however, guarantee that all comments will be incorporated into the revised model or description. Major revisions will need to be corroborated with data, peer-reviewed literature and/or additional opinions.

1. Please use your valuable time to review and suggest modifications to the content of the descriptions or the parameters in the model, not on editorial or style issues or other non-technical concerns. All

Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
 Model Date: 10/18/05 Report Date: 8/21/14

Modelers		Reviewers	
Dick Edwards	reedwards@fs.fed.us	Chuck Kosteka	kosteka@webaccess.net

Succession Pathways

From Class	Begin at (yr)	Succeeds to	After (years)
Early1.ALL	0	Mid1.CLS	99
Late1.CLS	130	Late1.CLS	999
Late1.OPN	80	Late1.CLS	129

Mid1.CLS	40	Late1.CLS	129
Mid1.OPN	40	Late1.OPN	79

Disturbance Pathways

Disturbance Type	Disturbance occurs in	Moves vegetation to	Disturbance Probability	Return Interval (yrs)	Reset Age to New Class Start Age After Disturbance?	Years Since Last Disturbance
Competition/Mant	Early1.ALL	Early1.ALL	0.0020	500	No	
ReplacementFire	Early1.ALL	Early1.ALL	0.0050	200	No	
Disturbance	Early1.ALL	Mid1.OPN	0.0200	50	Yes	
ReplacementFire	Late1.CLS	Early1.ALL	0.0050	200	Yes	
Insect/Disease	Late1.CLS	Late1.OPN	0.0020	500	Yes	
Wind/Weather/Storm	Late1.CLS	Mid1.OPN	0.0050	200	Yes	

The BpS review involves three steps: model cleaning, model updating, and model delivery. If you know how vegetation systems function, or have ideas how we can better deliver the information, we want your expertise and input. Start at the BpS review website where you'll find information on how to join the effort

Take-Home Messages

- WHAT: LANDFIRE BpS has three parts - spatial data, text description, and quantitative state-and-transition models - all explicitly linked.
- WHY: LANDFIRE BpS models/descriptions are important to the LANDFIRE Program and to external natural resource communities.
- HOW: LANDFIRE BpS models/descriptions are being reviewed....and **PLEASE** participate.

<http://www.landfirereview.org/>

The BpS review involves three steps: model cleaning, model updating, and model delivery. If you know how vegetation systems function, or have ideas how we can better deliver the information, we want your expertise and input. Start at the BpS review website where you'll find information on how to join the effort

Online Connections



LANDFIRE Program Home <http://www.landfire.gov>



Conservation Gateway: <http://nature.ly/landfire>



Twitter: [@nature LANDFIRE](https://twitter.com/nature_LANDFIRE)



YouTube: [LANDFIREvideo](https://www.youtube.com/LANDFIREvideo)



Bulletins/Post cards via e-mail

– Opt in: <http://eepurl.com/baJ BH>



Email: LANDFIRE@tnc.org

BpS model review website: <http://www.landfirereview.org/>

Questions? Comments?



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