LANDFIRE 2008 Refresh

Vegetation Transition Error Briefing Paper

April 2011

Error Discovery

LANDFIRE vegetation transitions are being mapped for the CONUS, Alaska, and Hawaii using circa 01 (LF_1.0.5) vegetation data in combination with mapped disturbances in order to predict vegetation conditions circa 08 (LF_1.1.0) for the LANDFIRE Refresh 2008 update. Mapped disturbance information comes from the Monitoring Trends in Burn Severity project, Vegetation Change Tracker analysis, and the field-contributed disturbance information contained in the Events database. These data sets are integrated within the Remote Sensing Landscape Change process to create a consolidated list of disturbance type, severity, and time since disturbance. Mapped disturbances are then intersected with the circa 01 Existing Vegetation Type (EVT) , Existing Vegetation Height(EVH), and Existing Vegetation Cover(EVC) to create the necessary inputs for the next step in the Refresh process, predicting vegetation transitions due to disturbance or growth/succession.

LANDFIRE used existing science based processes in the methodology for delineating vegetation transitions. One of these processes is the Fire and Fuels Extension - Forest Vegetation Simulator (FFE-FVS). When the disturbance occurred in forested systems, the predicted vegetation transition was generated using FFE-FVS. In this process, FFE-FVS simulations were run using plot data from the LANDFIRE Reference Data Base (LFRDB) which replicated each circa 01 combination of disturbance type, severity, time since disturbance, EVT, EVH and EVC. The outcome of the simulation was then linked to the same condition on the map and circa 08 vegetation was generated.

After investigating user-provided input for a landscape in Northern Idaho, we discovered that the vegetation transition linkage had an error which required remapping of LANDFIRE 2008 Refresh - EVT, EVH, and EVC (LF_1.1.0), as well as the suite of fire behavior and fire effects layers generated from the vegetation layers. We used the existing terminology from FFE-FVS related to successional simulations. Specifically, the error occurred when forest transitions associated with the "Mechanical Remove" disturbance were mapped to areas that actually experienced a "Mechanical Add" disturbance. The converse also happened, in which forest transitions associated with the "Mechanical Add" disturbance were mapped to areas that had actually experienced a "Mechanical Remove" disturbance.

These two disturbances result in very different post-disturbance conditions. "Mechanical Remove" (or Mech A as it was referred to in the FFE/FVS simulations) can be implemented at three severities, high severity (clearcut/prescribed burn the slash), moderate severity (thin the stand to 35% of the original density/pile and burn the slash), and low severity (thin from below leaving 20% of the 0-6" material/pile and burn the slash). "Mechanical Add" (or Mech B as it was referred to in the FFE/FVS simulations) is also implemented high severity (remove 90% of the 0-8" material/masticate the slash), moderate

severity (remove 75% of the 0-6" material/masticates the slash), and low severity (remove 55% of the 0-6" material/lop and scatter the slash).

To illustrate the differences between the two treatments, below is a summary of the FFE-FVS output for selected EVT's, and the resulting change in canopy cover after a High Severity Mechanical Add and High Severity Mechanical Remove one year after treatment.

Existing Vegetation Type	Avg % reduction in canopy cover for 1 year TSD	
	Mechanical Remove	Mechanical Add
Rocky Mountain Lodgepole Pine Forest	54	21
Mediterranean California Dry-Mesic Mixed Conifer Forest and Woodland	50	10
North Pacific Mountain Hemlock Forest	42	10
East Cascades Oak-Ponderosa Pine Forest and Woodland	69	15

The LANDFIRE Vegetation Transition Team analyzed the data across all areas where circa 08 vegetation and fuels products have been completed and posted. Below is a summary of the acreage mapped to the two types of disturbances in discussion that were remapped with correct transitions.

	GeoArea			
Disturbance	**PNW** (8 of 8 map zones)	**PSW** (5 of 5 map zones)	**SW** (8 of 9 map zones)	**NC** (7 of 9 map zones)
Mechanical Add disturbance occurred but Mechanical Remove transition was used	**1,069,616ac (0.53% of total acres or 4.5% of disturbed acres)**	**427,339ac (0.40% of total acres or 4.4% of disturbed acres)**	**386,351ac (0.15% of total acres or 2.8% of disturbed acres)**	**136,391ac (.04% of total acres or 2.3% of disturbed acres)**
Mechanical Remove disturbance occurred but Mechanical Add transition was used	**4,153,061ac (2.1% of total acres or 17.3% of disturbed acres**	**1,100,260ac (1.0% of total acres or 11.4 % of disturbed acres)**	**303,820ac (0 .11% of total acres of 2.2% of disturbed acres)**	**640,709ac (0.21% of total acres or 11% of disturbed acres)**

Resolution

Since the transitions were already derived and the error was only a transposition of two disturbance codes used for Mechanical Add vs. Mechanical Remove, the LANDFIRE Vegetation Transition Team elevated this error to management and the decision was made to make the appropriate corrections to the Vegetation Transition database for each affected Mapzone, and the circa 08 EVT, EVH, and EVC spatial layers were regenerated as well as the Fire Behavior and Fire Effects (FCCS only) data layers.

Implications for LANDFIRE Stakeholders

Transposing of the two distinct types of mechanical treatments had implications for National level programs, such as FPA and WFDSS, however this error and resolution were communicated to those programs and actions were taken to incorporate the revised data sets. For users who may have downloaded data from the LANDFIRE data distribution site prior to this change, those users should download the revised data layers.

If users continue to use the earlier layers please be aware that things such as; surface fuel model assignments, "Mechanical Add" treatments generally reduce fire behavior slightly, whereas "Mechanical Remove" treatments create a much more distinct reduction in the fire behavior characteristics. This distinct reduction, of course, relates directly to the type and amount of crown fire that the site will display in the fire behavior models. The canopies in the "Mechanical Remove" are also reduced at a higher level, significantly reducing the amount and type of crown fire the site will support.

One of the benefits of having the treatments denoted in the LANDFIRE data is to show their impacts on real time fire spread and intensity through modeling programs. For the same reason stated above, the fire behavior projections from these programs will erroneously predict the fire behavior reduction in the treatment areas on fire growth for fire incidents and may lead to errors in analysis or operational decisions.