Topic & title of project or incident: ***Use of LANDFIRE data in the Cowychee Mountain Community Wildfire Protection Plan, Yakima, Washington — Making Risk Assessments User-Friendly***
Date of project or incident: July 2010

Background: In July of 2010, wildfire engulfed over 6,000 acres of shrub-steppe habitat on Cowiche Mountain, a largely undeveloped ridgeline lying just west of Yakima, Washington. This area is surrounded by a mix of irrigated agriculture and exburban residential development. Even though the Cowiche Mill Fire was stopped at the wildland urban interface (WUI) without loss of life or causing significant property damage, and direct human impacts were minimized by fire suppression, the broader impacts of living with wildland fire at the shrub-steppe/human interface remain. The unique benefit derived by the Cowiche Mill Fire was a level of collaboration that, up to that point, had not existed. Organizations (local and county fire officials, landowners, and public) had been managing wildland fire independently and from different perspectives. As a result of their experiences during the Cowiche Mill Fire, a committee of these groups was convened by the Cowiche Canyon Conservancy, a local land trust with a 2,000 acre preserve that burned in the blaze, to work on a Community Wildfire Protection Plan (CWPP) which assesses wildfire risk to the community in this shrub-steppe habitat interface zone. Yakima County recently completed a county-wide CWPP, but it largely addressed risk in the forested zones and was not considered useful for the broader landscape. With a small fund from the Fire Learning Network program, The Cowychee Mountain Community Wildfire Protection Plan was launched to bring a finer resolution to risks specific to the shrub-steppe habitat.

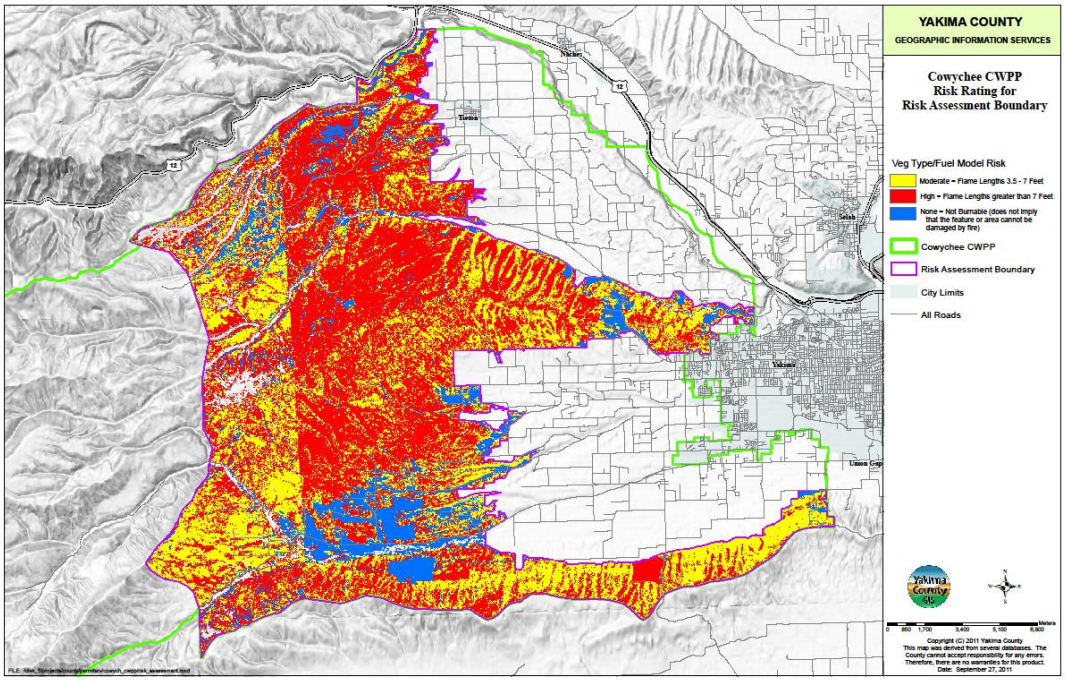

Figure 1. Risk Rating Map for Yakima County. Map shows combined fuel models, fire behavior and expectation of emergency response.

Description of analysis: The committee agreed at the onset of the project that LANDFIRE products would serve as the ideal "off-the-shelf" data sets as the starting point for their analysis. Using the vegetation and fire behavior fuel models (FBFM), data were clipped to the 88,789 acre assessment area. The FBFM/fuel types were processed through the BEHAVE fire model. Parameters of interest for the fire behavior modeling step were selected by working with the fire district team members to learn what factors affected their suppression activities. Flame length (Table 1) was the key factor for firefighters in determining whether they would engage in suppression or not ("stand and fight or cut and run"). Rate of spread was the key factor for evaluating response and evacuation time. Taken together, these factors represented overall risk. By taking the area's FBFMs and running them through the BEHAVE program (assuming summertime temperatures and low fuel moisture), both flame length and rate of spread graphs were produced for each of the fuel types under different slopes and wind speeds. With the graphs done for each fuel type, the next step was to turn graphs into a map (Figure 1). A simple "if-then" formula turned the graphs for each fuel type into a "low, medium and high" risk map based on slope and FBFM types. The resulting map (Figure 1) met the core teams' intuitive expectations given past experience.

Results/Summary: The risk assessment method developed for the Cowychee Mountain CWPP was a great study in resisting the impulse to create an overly complex technological modeling solution to the assignment. The assumptions about risk were easy to describe (under what conditions people can be "rescued"), corroborated by practitioner experience (local fire districts and federal fire staff). LANDFIRE data products enabled the technical team too quickly and cost effectively get products out for review and method refinement. Compatibility of the fuel model data with the fire behavior program play a crucial role in getting the analysis and result completed in a manner that satisfied the need for clarity, simplicity and credibility.

Management Implications: When considering the basic data products to use as base data for the assessments, LANDFIRE should be considered based on the direct application of the data in models such as, BEHAVE. No intermediate crosswalks were needed; and given the short time frame and marginal resources available, the familiarity, ease of use, and general utility of the LANDFIRE data products facilitated a sound analysis. Community expectations need to be tempered by how suppression activities are organized for firefighter and public safety in and around the wildland fire environment as addressed in Table 1. The risk map (Figure 1) shows the final results for different fuel types across the landscape of interest, providing managers with information they can use to implement action plans.

Recommendations: A). LANDFIRE vegetation data for this area needs further refinement at the scale of the project area; 83% of the land area was represented by only two fuel models. The technical committee used local experience to add several more models to the data set. CWPP teams provide a good mechanism to ground truth data sets as a by-product of community work on wildland and WUI fire projects.
B). Including the insights of the diverse group added a valued pragmatism to the risk assessment task. These practitioners should be sought out to assist in future iterations of data development, packaging and rollout.
C). The vegetation data for this area appears to be based solely on modeling. It is recommended additional local review is sought to update data sets.

TABLE 1. ***The relationship between fire behavior and risk—"will I be saved?"***

Fire Behavior	Sustained Flame Length	Suppression Action
Low	0-1'	Direct[1] attack; handcrews and engines can work effectively at the fire's edge
Moderate	1-3'	Direct and/or parallel[2] attack; handcrews and engines can work effectively at or near the fire's edge
Active	3-7'	Parallel or indirect[3] attack; heavy equipment and aircraft can be effective in the support of handcrews and engines
Very Active	7-15'	Indirect attack with large burnout[4] and backfire[5] operations; heavy equipment and aircraft are marginally or no longer effective at the fire's edge. The fire is moving too quickly and/or is too intense for ground forces to keep pace. Control lines are typically established at least one ridgeline away from the fires edge.
Extreme	15'+	Indirect attack with large burnout and backfire operations; heavy equipment and aircraft are ineffective along the fire's edge. The fire is moving too quickly and/or is too intense for ground forces to keep pace. Control lines are typically established more than one ridgeline away. Burning out or backfiring of entire drainages (sub-watersheds) conducted.

[1] Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel. "One foot in the black" or "Putting the wet stuff on the red stuff."
[2] Fire containment method where crews construct fireline at some distance from the edge of the fire (e.g., 100 yards) and then burn out the fuel in the buffer as the fireline is completed.
[3] A method of suppression in which the control line is located some considerable distance away from the fire's active edge. Generally done in the case of a fast-spreading or high-intensity fire and to utilize natural or constructed firebreaks fuel breaks and favorable breaks in the topography. The intervening fuel is usually backfired; but occasionally the main fire is allowed to burn to the line, depending on conditions.
[4] Setting fire inside a control line to consume fuel between the edge of the fire and the control line.
[5] A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire and/or change the direction or force of the fire's convection column.