

## Wildfire Residual Levels: Foothills vs. Saskatchewan

It has been hypothesized that residual levels within wildfires are significantly related to 1) wildfire size and, 2) the landscape in question. We already have evidence to suggest that the first assumption does not hold for foothills landscapes (see Quicknote #18). As to the second question, although our wildfire database includes fires from three different natural sub-regions within Alberta, no statistically significant difference in overall residual levels was found. One possible reason for this finding is that the variability within landscapes was just too high relative to variation between landscapes from our sample. In other words, perhaps the landscapes are not just different enough. Fortunately, we are able to extend the scope of this question by comparing survival patterns from foothills wildfires with matching wildfire data collected from Saskatchewan.

For context, Alberta foothills landscapes differ significantly from those in Saskatchewan in terms of topography, climate, vegetation, soils, and historical fire frequency. At their closest point, they are hundreds of kilometres apart. The only significant things they have in common are that both are within the boreal forest biome, and both are heavily influenced by wildfires.

Applying the same spatial language to each dataset, the total residual levels of Saskatchewan wildfire events (see Quicknote #7, 10 and 16) are no different than those of wildfire events in west-central Alberta. The average total area in residuals for Alberta foothills wildfires is 37.7%, compared to 35.8% for Saskatchewan. And even without the benefit of statistical testing, it is obvious that the frequency distributions of the two residual levels are similar (see adjacent Figure).

So why would overall residual levels of wildfires be similar between two entirely different parts of boreal Canada? At first blush, it would seem to suggest that topography, vegetation, soils, and even wildfire frequency have no influence on residual levels. In other words, once a fire starts, the residual levels of that fire are almost entirely a function of local burning conditions (*i.e.*, fire weather). If this is true, it suggests that there may actually be some universal patterns of wildfires.

However, another possibility is that the various factors influencing mortality levels within a wildfire have cancelled each other out. For example, a greater prevalence of summer drought in Saskatchewan may result in a higher average fire danger level than in the foothills, which translates into more intense (*i.e.*, hotter) fires. However, those fires may be no more severe (*i.e.*, may result in the same amount of mortality) because Saskatchewan has a far greater proportion of less flammable hardwood and mixedwood forests relative to the conifer dominated Alberta foothills.

In the end, although the mechanism may be unclear, the similarities in residual patterns between the two areas are undeniable. It begs the question of whether this pattern holds across other parts of boreal Canada, or for that matter any other forested landscapes influenced by wildfires. It also raises the question of whether wildfires in these two areas share other pattern characteristics.

*Many thanks to Mistik Management, the Saskatchewan Forest Centre, and Saskatchewan Environment for the use of their data for this Quicknote.*

