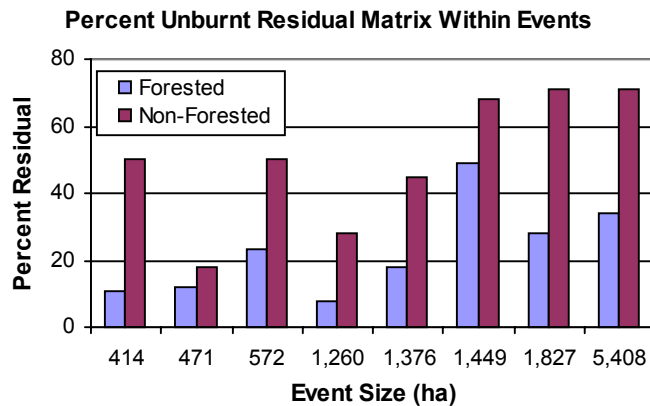# Does "Fuel-Type" Influence Fire Event Patterns?

Sometimes. For example, the distinction between forested (ie, any area with trees) and naturally non-forested areas (ie, scrub, bog, brush, and grass) is a critical one. Forested "matrix residuals" (or non-island residuals - see Quicknote #22) account for about 25% of the total forested area of a disturbance event, while non-forested matrix residuals account for about 50% of the total non-forested area within an event. In other words, the probability of a forested area burning within a fire event in west-central Alberta is about twice that of a non-forested area. Furthermore, although highly variable from one fire to another (see adjacent figure) all events had higher relative levels of residuals in non-forested areas.

Percent Unburnt Residual Matrix Within Events

However, a much weaker relationship is found between the probability of burning and dominant tree species. Hardwood-leading areas demonstrate only a slightly lower probability of burning than either spruce or pine-leading areas, based on matrix residual levels. Nor is this relationship consistent between events (see figure below).

Overall, there is little doubt that the presence of non-forested (but vegetated) areas influences fire event patterns. However, beyond that, the role of vegetation, or fuel-type, as an influence on the average fire pattern diminishes sharply.

This is seemingly in contrast to a considerable body of evidence that suggests that species composition is a critical factor influencing fire behaviour. In fact, this may very well be true, but in *relative* terms, the influence of species composition likely fluctuates. Fire event

Percent Unburnt Residual Matrix Within Events

patterns are simply expressions of the relative influence of the full range of fire behaviour phenomena over time and space. It is not difficult to imagine that fires burning during very extreme fire weather conditions will respond to changes in tree species very differently than one burning under moderate fire weather conditions. So in fact, fire weather influences may often restrict the influence of species composition within a fire, while at other times, species composition may be a more dominant influence. The wide variation found in residual matrix patterns between fires in our data supports the idea that external phenomena are important factors in determining fire patterns. Even the relationship between the probabilities of forested and non-forested areas burning is highly variable between events.

In the end, these findings say more about the scale at which patterns exists than the degree to which they do. The fact that there is too much variation between fires to detect strong residual pattern "signals" suggests that understanding, and ultimately capturing, the variation in residual patterns *between* fires is at least as important as capturing residual patterns *within* fires. This also demonstrates the peril of representing within-event residual patterns by single fires, averages, or a single convention.