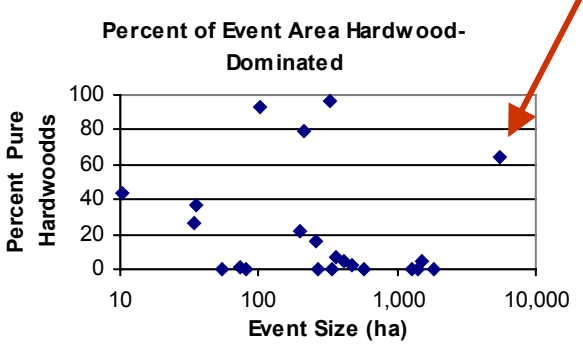
foothills MODEL FOREST
research growing into practice.

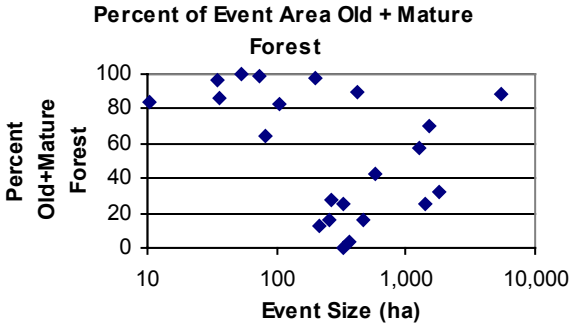
Natural Disturbance Program Quicknote #30

January 2005 *By: David W. Andison*

Can Fuel-Type be Used to Predict Event Size?

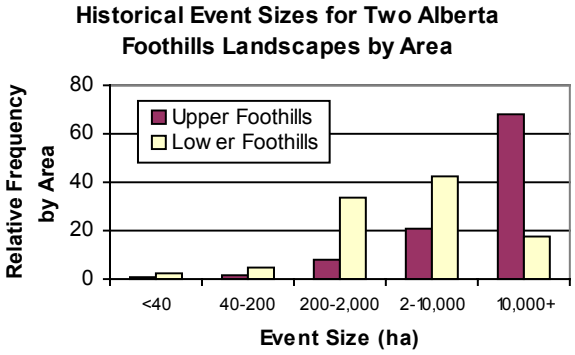
Not alone. In west-central Alberta, fire event size is unrelated to soil moisture, the proportion of non-forested areas, or pre-disturbance species composition, density, age, or height. One might expect to find, for example, that smaller fires tend to occur in areas dominated by younger forest or hardwood leading stands. In fact, neither hypothesis is true (see figures below). For instance, the largest historical fire event in the dataset (5,500 ha) occurred in an area dominated by aspen stands within the Lower Foothills landscape.

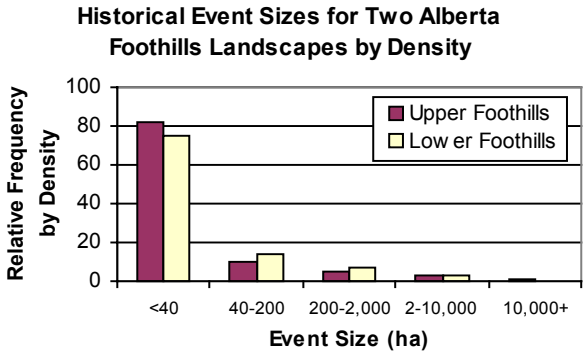




One should not necessarily conclude from this that fuel-type has no influence on fire size. Rather, the findings suggest that fuel-type *alone* is not a reliable predictor of fire size. Recall from Quicknote #2 that fire size varies by landscape, which corresponds to fundamental differences in climate, ignition sources, topography, and vegetation (*i.e.*, fuel type). Thus, logically, *all* of these factors influence fire size.

So, perhaps a better question is*: In what way* does fuel-type influence fire size? By way of an answer, consider that fires larger than 10,000 ha on the mixedwood-dominated Lower Foothills landscape account for about 17% of the historical fire area, compared to 68% by area for the Upper Foothills (see below). While this represents a significant difference in area, it translates into only marginally higher numbers of large fires. In fact, if just a handful of fires were at least 20,000 ha instead of 1,000 ha in the Lower Foothills landscape, the frequency distributions of the two landscapes would be fairly similar.





These small differences are the product of a combination of factors, but it is not difficult to imagine that fuel-type is prominent among them. For example, had the 5,500 ha fire event noted above occurred in the softwood-dominated Upper Foothills landscape under the same burning conditions, it is reasonable to assume that it would have been larger – perhaps much larger. Thus, although fire size cannot be predicted by fuel-type information alone, it is almost certainly a factor contributing to fire size thresholds. More specifically, perhaps fuel-type is more important for defining the *shape* of fire event size distributions (such as those shown above), while fire weather factors help regulate the exact size, or *position*, of each fire event within those distributions.

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