

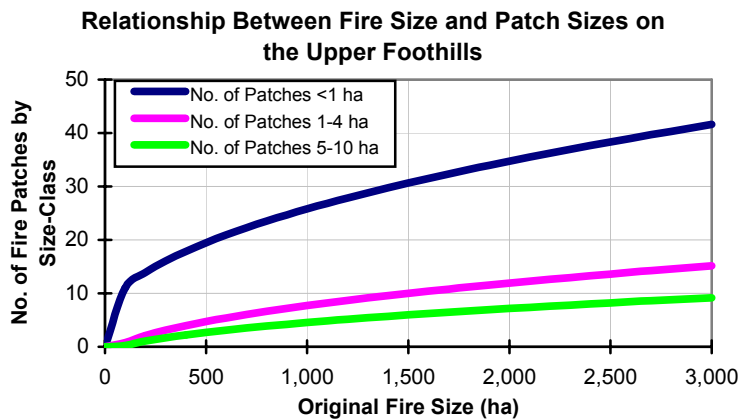
FMF Natural Disturbance Program Research

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Don't Forget the Wee Ones

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It is common knowledge that large fires dominate northern landscapes right across Canada. However, very small natural disturbance patches are still quite abundant. For example, according to our stand origin data, 62% of the youngest forest patches in the Upper Foothills landscape are less than 40 hectares in size (see Quicknote #7). However, we have reason to suspect that even these estimates grossly underestimate the actual number of very small natural disturbance patches. Consider, for example, that small disturbance patches would be extremely difficult to identify using aerial photographs taken several decades after the event. Nor are fire data records reliable since (until recently) they tend to ignore smaller fires, and map only gross fire boundaries. Even modern-day estimates of fire size distributions are biased due to more effective control of small and intermediate-sized fires.



Alternatively, it is possible to reconstruct a *likely* patch size distribution using historical fire data. Recall from Quicknote #4 that disturbance events are composed of a number of individual patches. By using data from 25 historical fires in the Alberta Foothills, it is possible to estimate the relationship between fire event size and patch sizes. For example, in the adjacent figure, a 1,000 hectare fire has (on average) 27 patches less than 1 hectare in size, 8 patches between 1-4 hectares, and 4 patches between 5-10 hectares. By applying these relationships to the frequency of large fire events (for which we have very good data), we can recreate a probable disturbance patch size distribution. Based on these analyses, we found that the *minimum* number of disturbance patches less than 40 hectares in size in the Upper Foothills was 90% (as opposed to 62% from the stand origin data), and a more likely scenario results in 94%.

Our findings are not particularly surprising, but raise several important issues. First, as we have concluded in other Quicknotes, northern forest landscapes are “naturally” more complex than we may be assuming. This analysis suggests that for every disturbance patch greater than 40 hectares in size (some of which are tens of thousands of hectares, mind you), there are between 10-15 patches *smaller* than 40 hectares. Second, although we are beginning to do a laudable job of creating larger, more complex cultural disturbances, we should consider means of representing very small disturbance patches as well. Finally, it is clear that even highly accurate stand-origin maps may not pick up very small patches of different-aged forest. Recall that our accuracy level for the FMF stand origin map was about 80%. It is reasonable to presume that one reason it was not higher is that some small patches of younger forest were mistaken for stand-level heterogeneity.