Natural Disturbance Program Quicknote #33

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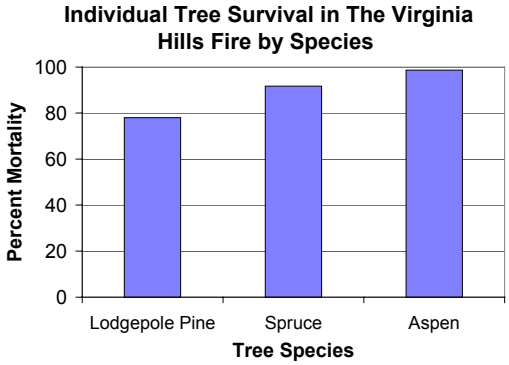
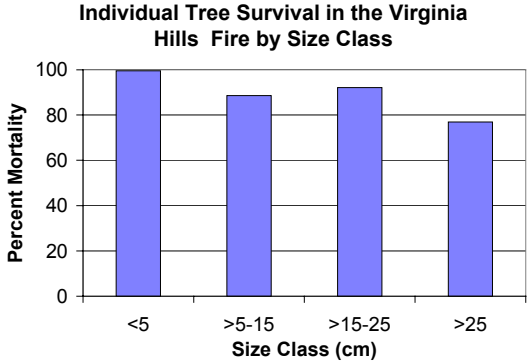
*By: David Andison and Kris McCleary*

# What Tends to Survive as Individuals?

In the Virginia Hills fire, softwoods and large trees had the best chance of surviving. Of those individual trees *not* in island or matrix remnants, the Virginia Hills fire of 2000 in Alberta killed a higher proportion of aspen stems relative to spruce and pine, and a higher proportion of small stems relative to large ones. (Note: An "individual" is defined here as a living stem located within areas of less than 6% survival).

For example, almost 99% of individual aspen stems – those not within island or matrix remnants (see Quicknotes 18, 22) - were killed by the Virginia Hills fire. In contrast, 92% of individual spruce stems were killed, and only 79% of individual lodgepole pine stems were killed. Similarly, virtually all stems smaller than 5cm DBH were killed by the fire compared to only about 78% of stems larger than 25cm DBH.




The survival patterns noted here raise some interesting questions since they seem to conflict with other residual pattern findings. For example, Quicknotes 24,30, and 31 suggest that tree species has only a marginal influence on the size, boundaries, or residual levels of fires.

The difference could simply be a function of the unique nature of the Virginia Hills fire. The patterns of a single fire cannot possibly represent the full range of natural conditions. However, the apparent inconsistency does compel us to at least consider the possibility that individual survival patterns may differ from island remnant survival patterns. For example, perhaps areas of higher burn intensity (in non-island areas) are more selective. This is not an unreasonable hypothesis. Islands, as defined here, have survival levels that range between 6-100%, and thus represent lower fire intensity conditions relative to non-island areas. All other things being equal, the chances of survival for species or stems easily killed by fire (such as aspen) are greater where fire intensity is lower.

Another possibility is that the apparent inconsistency is the result of a shift in the scale of observation. Residual survival results relate to the entire fire area, and not a stem-by-stem inventory of survival within individual remnants. So, it is still possible that the *location of residuals* may not be related to tree size or species patterns, but the *survival of the individuals* within those residuals is. In other words, fire is perhaps more selective at fine scales than at coarser scales.

In the end, while it is not possible to extrapolate these findings towards a more general statement of individual tree survival, it does generate some new, valuable, and very specific hypotheses about the survival mechanisms of all residual elements. The results also help foster a better appreciation of how complex fire patterns, and their associated processes, can be.

**For more information on this or other ND Quicknotes, please contact: Dr. David Andison, Bandaloop Landscape Ecosystem Services, Tel.: (604) 939 – 0830, Email: andison@bandaloop.ca, or visit www.fmf.ab.ca**