FMF Natural Disturbance Program Research

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The "Even-Aged" Boreal Forest Myth

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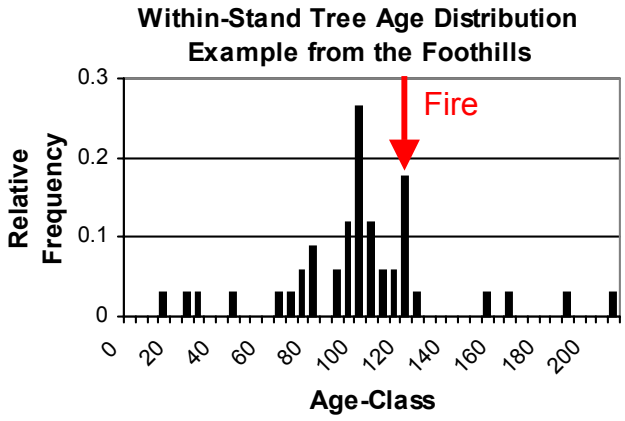
The terms "even-aged" and "stand-replacing" are used routinely in reference to the boreal forest. Given the size and severity of forest fires and the tree species involved, this is understandable. However, it is a mistake to think of boreal stands as models of homogeneity, and forest fires as the cause of such patterns. On the contrary, so-called stand-replacing fires create significant levels of variability, or "heterogeneity" on the ground. For instance, in the 125 year-old foothills stand in the example below, about 10% of the trees survived the last fire – either as individuals, or clustered into "islands". This suggests that fire severity overall may have been high, but was spatially variable.



Similarly, fires injure trees and consume foliage, fine fuel, and forest floor biomass to different degrees over space. This helps to create conditions conducive to gradual rates of invasion after a fire. For instance, although the last stand replacing fire was 125 years ago in the example, recruitment took place for 100 years afterwards (although the majority took place in the first 25 years).

To be clear, the example above does not represent all boreal stands. There are many cases where the age-class distribution of individual stands is much narrower. For instance, fires in pure pine stands on flat ground are more *likely* to consume and kill material uniformly. On the other hand, *some* mixed-species stands exhibit age-class distributions that are truly multi-aged. The point is that almost all boreal stands exhibit some degree of age dispersion, either from survival, extended invasion periods, or both.

Age complexity is thus a "natural" pattern of the boreal landscape - partly from survivors, but mostly from gradual rates of invasion. This has some important implications. First, age complexity implies structural complexity. Within a single stand, there are likely many different types of habitat opportunities. Second, as Quicknote #5 discussed, this complexity partially explains why inventory stand ages are not very precise. Determining the date of the last stand-replacing fire can be tricky under these circumstances. Third, expectations of, and comparisons to "natural" stand functions and structure should be re-evaluated. We may have many sound reasons for wanting to create uniformly-aged stands across the entire landscape, but emulating natural patterns is not among them. Lastly, it means that the study of natural range of variation cannot stop at the landscape level. Fire frequencies and sizes may be important components of describing fire regimes, but an understanding of fire pattern is incomplete without an appreciation of *within*-fire patterns.