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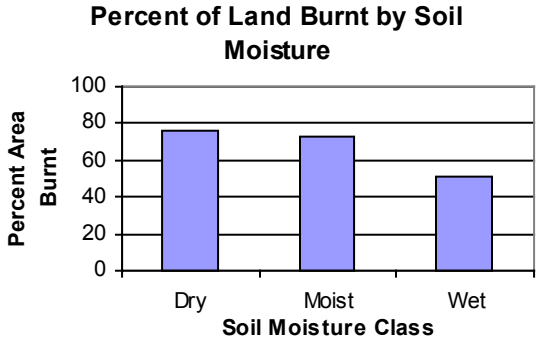
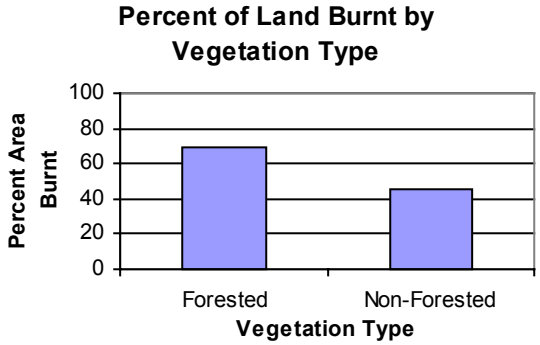
Natural Disturbance Program Quicknote #31

March 2005 *By: David W. Andison*

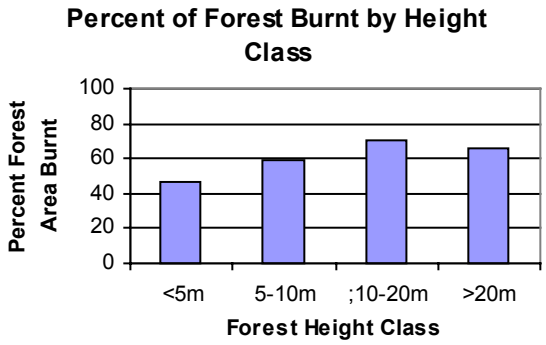
Does Fuel-Type Have *Anything* to Do With Fire Patterns?

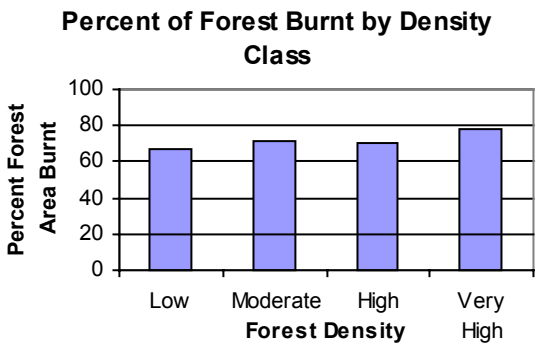
Yes. If we compare what burned to what did not burn within a buffered area of historical fires in west-central Alberta, the stand-level attributes that fires most respond to are soil moisture and the presence of trees. For example, on average, about 76% of the area defined as having "dry" soils burned, compared to only 51% of those areas defined as having "wet" soils. Similarly, 70% of forested areas burned within historical fires, compared to only 45% of non-forested areas within the same fires.





Fire patterns also respond to both the height and density of pre-fire stands, although to a lesser degree than either soil moisture or the presence of trees. For example, 46% of the area of forest less than 5m tall burned, compared to 68% of the forested area with trees taller than 20m. Surprisingly, the proportions of areas that burned in different age-classes and tree cover-classes were not significantly different.





The conclusion that wet sites are less likely to burn seems to conflict with the observation that aspen stands are just as likely to burn as conifer-dominated stands. One possible explanation for this discrepancy is that the *relative* fuel-moisture level of hardwood stands is not a constant throughout the burning season. Another possible explanation is that wet sites are highly related to areas that have no trees, representing a fundamentally different spatial arrangement of fuels.

It is also interesting to note that fire patterns, on average, respond more to the size and density of trees than to species or age. Once again, one could argue either that 1) hardwoods function as different fuel-types depending on the time of year, or 2) the spatial arrangement of fuel (vertically and horizontally) is more important, on average, than the *types* of fuels.

In the end, the influence of fuel-type on the burn patterns of individual fires varies widely, likely in response to both the time of year and fire weather conditions. It is important to realize that in these data represent the *averaged* effects over the full range of burning conditions and timing.

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