A COMPARISON OF ORGANIC LAYER CONSUMPTION BETWEEN FIRES OF CANADA AND ALASKA

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ABSTRACT

Boreal forests contain a significant portion of the world's terrestrial carbon in their surface organics and soil horizons. Fire, the main disturbance in these forests, plays an important role in regulating the flow of carbon in these landscapes. To better understand the effects of fire on boreal forests, we are examining the relationships between soil drainage, burn severity, and carbon storage. The prescribed burns of the International Crown Fire Modelling Experiment (ICFME), Northwest Territories, Canada, provided a unique opportunity to test these relationships and compare the results to both wildland and prescribed fires in central Alaska. At ICFME we examined plots, both pre- and post-burn, located along dry and moist transects. Depth of organic material (to mineral soil), soil carbon and nitrogen, and soil respiration were measured. These data were then compared with data from two fires in Alaska: FrostFire, a 1999 prescribed burn north of Fairbanks, and the Delta Junction fires, where a wildfire occurred in the summer of 1999.

The Canadian plots had thinner organic layers than either of the Alaskan sites. This difference may be related to the fact that the Canadian site appeared to be better drained than either of the locations in Alaska. We also found that fire consumed less of the organic horizon in Canada (average approximately 12%) when compared to the Alaskan Frostfire site (average approximately 43%) and Delta Junction site (average approximately 21% for feather mosses and 60% for lichen). Low fire consumption in Canada is likely related to higher moisture content of the organics at the time of the fire, which resulted in a lower-intensity burn. Carbon and nitrogen values, before and after the burns, also varied among the three sites, as did bulk density. These data provide preliminary information relating burn intensity, soil drainage, and net carbon storage.

Citation: Manies, K.L., J.W. Harden, and K.P. Wickland. 2004. A comparison of organic layer consumption between fires of Canada and Alaska. Page 224 *in* R.T. Engstrom, K.E.M. Galley, and W.J. de Groot (eds.). Proceedings of the 22nd Tall Timbers Fire Ecology Conference: Fire in Temperate, Boreal, and Montane Ecosystems. Tall Timbers Research Station, Tallahassee, FL.