



Timber Talks



Department of Fisheries and Forestry

Prepared by V. H. Phelps, Forest Research Laboratory, 506 W. Burnside Road, Victoria, B.C.

Is Slash Burning Good Silviculture?

No. 64

Hazard from fire within a forested area can be reduced by controlled burning of slash and debris that accumulates during a logging operation. Reliable information is available for accomplishing this effectively and safely with experienced supervisors. Less is known as to the potential of fire for a sound silvicultural practice, particularly its effect on the characteristics of the soil and its influence on coniferous seedling growth. Cutover cedar-hemlock stands at Mabel Lake and Reiter Creek, near Vernon, B. C., where logging slash had been burned, were examined to compare physical and chemical characteristics of burned and unburned soils and the growth of coniferous seedlings.

Degraded acid-brown wooded soils were characteristic of both locations and physiographic features were similar. At three similar sites near Mabel Lake, where the depth of litter varied, logging slash was burned on randomly selected small plots for 0, 20 or 40 minutes in 1965; on areas burned in 1962, 1963 and 1965 at Reiter Creek, conditions of unburned, lightly and heavily burned were selected for study. Soil samples and undisturbed soil cores were collected from each area for analyses. Newly germinated Douglas-fir seedlings were planted in each soil core, grown under controlled conditions of temperature and humidity for eight months, and then for 12 months in a greenhouse.

Some soil properties were directly and immediately changed due to burning and others changed indirectly and gradually. Immediate changes included, a marked increase in the pH of the surface litter and the Ae horizon of the mineral soil, an increased level of water extractable phosphorous, nitrogen and soluble salts, a loss of total nitrogen, phosphorous and potassium and a reduction in the C/N ratio of the humus layer. Weathering and leaching modified these effects and the pH of the surface soil tended to gradually revert toward the value before burning. Field moisture percentages were higher on burned soils than on unburned soils during the active growing season and lower during the dormant season. Changes in relative percentages of sand, silt and clay sized separates, hydraulic conductivity and bulk density due to burning were not detected.

Seedlings were most vigorous on unburned soils and poorest on the most intensely burned. Chlorosis of seedlings on burned soils was very prevalent, disappearing after about 20 months, but seedling growth remained inferior. Greater variation in the size and weight of seedlings was encountered when they were grown on burned rather than on unburned soils.

Seedling growth was evaluated on their development in the growth chamber and greenhouse. Less favorable environmental conditions that might be anticipated under normal field conditions would most likely have resulted in considerable mortality. Further investigation under field conditions and for an extended period would provide a more complete evaluation of the effects of slash burning on soil and seedling growth.