REGENERATION STUDIES FOLLOWING PRESCRIBED BURNING

IN WESTERN LARCH FORESTS OF MONTANA

by

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The Northern Region and the Intermountain Forest and Range Experiment. Station have cooperated for the past four years with studies of the use of fire in silviculture. These experiments are centered at Miller Creek, Flathead National Forest and at Newman Ridge, Lolo National. Forest. At Miller Creek, 60 ten-acre blocks were logged (the volume was composed of about one-third each of larch, Douglas-fir, and spruce) and at Newman Ridge 16 blocks from 18 to 58 acres were logged (the volume was about one-third each of larch and Douglas-fir, 13 percent lodgepole pine, 6 percent ponderosa pine, and 16 percent all other species. At both locations the units were equally distributed on north, east, south, and west-facing slopes. Broadcast burning was accomplished from May through October.

The following cooperators are involved:

Steering committee: A. P. Brackebusch, Coordinator: S. S. Evans

Region 1 Liaison Officer: and C. E. Hardy, INT Liaison Officer

Fire Management Research: W. R. Beaufait, NFFL, Missoula

Timber Management Research, R.D. Pfister and R. C. Shearer, FSL, Missoula

Wildlife Habitat Research: L. J. Lyon, FSL, Missoula

Wildlife Ecology Research: C. H. Halvorson, FSL, Missoula (Bureau of Sport Fisheries and Wildlife)

Watershed Management Research (Water Quality and Yield): N. V. DeByle, FSL, Logan, Utah

Air Quality Research: D. F. Adams and R. Coppe, Washington State University

Progress reports from this cooperative study are available from the steering committee.

Timber management research has the following objectives in this study:

> To determine the effects of prescribed burning logging slash at different times with respect to site preparation for regeneration of western larch, Douglas-fir, and Engelmann Spruce at Miller Creek and western larch, Douglas-fir, Engelmann Spruce, grand fir, ponderosa pine, and lodgepole pine at Newman Ridge. This includes the study of: (1) seed losses, germination, root development, and seedling survival, (2) planting stock survival and early development, (3) the length of time these sites remain receptive to natural or artificial regeneration, and seed-seedling ratios. In addition we are studying the seed dissemination pattern of western larch and major associated species on the Newman Ridge clearcuts. Specific objectives are to study (1) cone and seed production of major species, (2) timing of seedfall, and (3) the relation of seed dissemination to major topographic and environmental variables.

These studies were surperimposed on selected blocks burned in the prescribed fire cooperative study. Seed of the various species is sown only on blocks where these species previously grew. These plots were established on seedbeds with 0.0 and greater than 0.5-inch of unburned duff remaining at both locations and on scarified seedbed only at Newman Ridge. Seeding will be repeated yearly until each seedbed is judged ineffective for further study. The pattern of germination and causes of seedling mortality are determined for each seeding by making weekly or bimonthly counts starting in early May. Seedling development is followed. Natural regeneration is also being evaluated.

Supplementary information useful in interpreting results were obtained within the upper four inches of soil including (1) soil moisture before and after burnlng, (2) soil. temperature during burning, and (3) root kill attributed to effects of the fire.

Thus far western larch planting success has been variable on these study areas, whereas survival of spruce and Douglas-fir more consistent:

	Survival of Species Planted (percent)				
Year and Location of Planting	WL	DF	ES	GF	PP
1968 - Miller Creek	53	74	80	--	--
1969 - Miller Creek	1	80	83	--	--
1970 - Miller Creek		(Not Evaluated Yet)			
1970 - Newman Ridge*	74	92	88	98	90

*Measurement made August 1, 1970.

The survival of western larch planting stock seems strongly related to its needle and root development prior to planting. In 1969, the larch stock had full needle development and shoots and roots were elongating before the seedlings were planted. In 1968, the needles were about 1/4 to 1/2 elongated before the trees were planted, roots were developing, but no shoot growth had begun. In 1970, the buds had burst but only slight needle and root development was evident. Thus far, survival of western larch is best following planting in 1970.