



Natural Regeneration Following Four Treatments Of Slash On Clearcut Areas Of Lodgepole Pine - A Case History

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Logging slash from clear-cut lodgepole pine (*Pinus contorta* Dougl.) stands has been dealt with in several different ways. An excellent opportunity to compare natural tree establishment following various slash treatments was provided when the U. S. Forest Service applied 4 different treatments on lodgepole pine clearcuts in north-central Colorado. Three different treatments were made on contiguous blocks of the same sale. Two additional sale blocks described here were on similar sites in close proximity to, but not contiguous with, the others. Although the treatments were not replicated, the kind of tree establishment experienced on these sale areas should be indicative of what might happen under similar conditions.

The study areas are on south aspects at about 9,000 feet elevation with slopes varying from 5 to 15 percent. The gray-wooded soils are from 2 to 2½ feet in depth and are derived from granite parent material. Texture varies from sandy loam in the upper horizons to gravely loamy sand in the lower horizons, and pH ranges between 5 and 6.

The treatments were: (1) "broadcast burn", in which the slash was left where it fell during the logging operation and later burned, (2) "walk-down with dozer", in which a crawler tractor was run back-and-forth over the area after logging to press all residual trees and logging slash to the ground, (3) "dozer pile-and-burn", in which the residual trees and logging slash were pushed into windrows and later burned, and (4) "lop and scatter", in which the tops were trimmed and the slash scattered by hand during logging.

The results of sampling the reproduction by the stocked mil-acre quadrat method² and of measuring the slash depth at each sample point are shown in Table 1.

It is assumed by the "stocked-quadrat" method of sampling reproduction that the area is divided into squares or "quadrats", each of which could conceivably support a tree to maturity. One hundred percent stocking would mean that each quadrat on the area is occupied by at least one seedling. Each quadrat not occupied by reproduction would theoretically represent a portion of the site which is not being fully utilized by tree growth.

R. W. Cowlin used the following definitions of stocking when using the stocked-quadrat method for sampling Douglas-fir reproduction:

Good stocking	70 to 100% of quadrats stocked
Medium stocking	40 to 69% of quadrats stocked
Poor stocking	10 to 39% of quadrats stocked
Non-stocked	0 to 9% of quadrats stocked

These stocking level definitions were used as guides in this study.

From the standpoint of this classification, none of the treatments studied resulted in "good stocking"; however, all of the areas studied except those piled and burned fell into the "medium stocked" category. One pile and burn area was classified as "poorly stocked" and the other as "non-stocked".

As can be noted in Table 1, there seems to be a direct relationship between the presence of slash and the presence of seedlings. In serotinous cone areas serious deficiencies both in terms of seedling numbers and dis-

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²Cowlin, R. W., 1932. Sampling Douglas Fir Reproduction Stands by the Stocked-Quadrat Method. Journ. For. 30:437.

tribution can result from slash disposal operations which eliminate too much of the seed. On these south slopes slash also appeared to play a roll in providing shelter. This was particularly evident on the pile and burn areas where nearly all of the reproduction became established on the north and east sides of stumps or unburned slash.

Although the lop and scatter, broadcast burn, and walk-down areas might be considered to be adequately stocked taking into account only numbers of seedlings per acre, the distribution as indicated by the percent of mil-acre

stocking showed that some spots were decidedly understocked. A count of seedlings on stocked quadrats also indicated poor distribution. For example, on the walk-down area where only 45 percent of the mil-acre quadrats were stocked, the average number of seedlings per stocked quadrat was 5.7.

It appears from this small sample that natural lodgepole pine reproduction can best be obtained by leaving the logging slash uniformly distributed over the clearcut area.

Table 1 — Results of Sampling Logging Slash and Lodgepole Pine Reproduction Following Four Slash Treatments on Lodgepole Pine Clearcuts

Treatments:	Broadcast burn	Lop and scatter	Walk-down with dozer	Pile and burn (A) ³	Pile and burn (B) ³
% mil-acre Stocking	60	59	45	31	4
% sample pts. with slash	46	58	58	34	30
Av. number seedlings per acre	1860	2080	4290	810	20
Av. number seedlings per stocked mil-acre quadrat	3.1	4.3	5.7	2.8	1.0
Av. slash depth at pts. where slash was present (inches)	5.5	8.8	11.7	5.0	3.8
Number of growing seasons since slash treatment	3	8 ⁴	3	2	3

³Samples were taken on two "pile and burn" areas.

⁴Comparison of seedling numbers between the "lop and scatter" area and the other areas may not be valid, since the number of years since treatment is greater than on the other areas. However, nearly all of the reproduction sampled on the "lop and scatter" area appears to have established immediately following treatment.