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A Discussion of the Effects of Slash Burning

on the

Regeneration of Douglas Fir

Since one third of our total land area is classed as productive forest land, the problem of keeping that area productive becomes of great importance. This problem is largely one of regeneration. It is quite practicable to create conditions to assist the regeneration of Douglas fir and there is no good reason why all logged and burned areas on the Lower Coast should not restock naturally. The adverse factors that prevent normal restocking on cut-over lands could largely be avoided at their source by including regeneration provisions at the time a cutting is planned. Pre-organization of cutting is the key to our regeneration problems. Man's ingenuity has upset the natural succession so it must now be turned to devising methods of management that will forestall denudation of forest land and help a new forest to succeed its predecessor.

The technique of management is relatively simple. Cutting should be so organized that each block of logged land can be seeded from adjacent stands, or groups, of timber, except in certain instances where artificial seeding or planting may be the surest and cheapest procedure. An important phase is slash burning, but caution must be used to ensure a burn of moderate intensity thereby creating conditions favourable to establishment of a protective herbaceous cover in as short a time as possible. It is particularly necessary to avoid destructive burning on areas of critical exposure, on areas that have already reseeded, and on areas where restocking has started. And last but not least, fire must be kept from all areas once burned. Moderate burns generally create favourable seed-bed conditions; on the other hand, severe burns frequently so denude an area that coniferous seedlings are unable to survive for more than a few weeks and restocking does not start for eight or ten years. In the meantime, seed cast over the area is wasted. Again, where there is no burning, the seed must germinate promptly after logging in order to survive the competition created by the dense cover of vegetation and matted remains of herbaceous plants that follow.

The regeneration of plant life is influenced by a complicated group of climatic, edaphic, and biologic factors, from

which it is generally most difficult to isolate one or two and point to them as being the most important. Particularly is this true of Douglas fir, and out of the data collected through research, together with impressions gathered as a result of experience, there has arisen a variation of opinion among foresters as to the effect of slash burning on regeneration. It is scarcely understandable why conflicts should prevail, but one should never lose sight of the fact that we are dealing with an intricate set of relationships which vary, sometimes over a wide range, from time to time and place to place. This thought is well expressed by Eneroth\* when he says "It is quite evident that the burning of clearings and all our other regenerating measures, influence the new growth quite differently in different soils; in areas of different geological, and particularly hydrological, conditions; and under varied degrees of cultivation, etc. This may be the main reason for the wide differences in foresters' opinions on practically every point on this complicated question: The effect of burning the clearings. Local experiences change with the variation of the soil in the plantations; we have not always taken the trouble to separate the heterogeneous sections when we discussed burning of clearings." True there has been a tendency to evaluate results without first separating the variables involved in the problem. How then can one have a proper appreciation of cause and effect if even the dominant variables are not given consideration?

There is much hypothesis and supposition regarding many of the ecological phases of regeneration of Douglas fir on cut-over land because the present state of our knowledge of the controlling factors and their effects is one of progressive development, but we can point out that the dominant factors as regards management technique are:

1. Marginal timber, or groups of trees which are a source of seed.
2. Occurrence of seed crops.
3. Quantity of debris.
4. Intensity of burn. *To depend on Soil.*

Let it be emphasized that these are merely the dominant factors and they are found more or less influenced by numerous additional factors, such as direction and turbulence of the prevailing wind, which, under certain conditions, may assume dominance, but in general the four enumerated are the most important.

Study and experience has led us to draw up these schedules as a starting point in the problem of slash disposal on cut-over areas.

Burning is recommended where a combination of the following conditions are found:

1. Heavy slash. Quite apart from the hazard involved, excessive slash will cover so much of the land surface that the young stand will be poorly stocked and of poor quality due to mechanical interference of the debris.

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\* E. Eneroth. Contribution to the Knowledge we have of the Effect on the Soil from Burning of Clearings. U.S. Forest Service, Translation 61, from the Journal of the Swedish Forestry Society, 1928.

2. Heavy duff. Where there is a heavy layer of duff, conditions are not favourable to germination, so if this is removed by burning without the soil structure being injured, the seed-bed is materially improved.
3. Seed supply. There must be a source of seed in the form of a stand of marginal timber or groups of seed trees, all within seeding distance of the area.
4. No seed crop. When the seed crop is virtually a failure and there is no advance reproduction of any account, the slash should be burned promptly, care being exercised not to have a severe burn. This treatment will prepare the ground for the seed crop it is hoped Nature will provide the following season.

Burning is not recommended where there is a combination of these conditions:

1. Light slash.
2. Satisfactory seed bed. If the duff is thin or the humus has become mixed in with the upper surface of the mineral soil, seed bed conditions are favourable.
3. No seed supply. Quite often the situation arises where the source of the seed reaching the area immediately after logging is subsequently removed, and if the first seed is destroyed there is no hope of natural regeneration within a reasonable length of time.
4. Seed crop. Where there has been a good seed crop immediately preceding winter logging, or immediately following spring and summer logging, a burn will destroy the seed.

Continuing the matter of recommendations, it is of interest to add that Mr. L.A. Isaac, of the Pacific Northwest Forest Experiment Station at Portland, Oregon, leading U.S. Forest Service authority on Douglas fir silviculture, in a recent letter states: "If I, personally, were managing a timber operation and wanted to secure natural regeneration, I would clean up and burn promptly the areas of highest fire hazard and all areas that were cut during the year following a complete crop failure. During years when seed was produced I would attempt to leave areas of low fire hazard unburned. In addition to this I would make a supreme effort to break up my area by leaving patches of green timber to aid in fire protection and to furnish a seed supply. The patches that I would select to leave would be areas of young growth or a mixture of young and old growth patches that at present have a low commercial value, and patches that could be conveniently taken out at some later date."

In conclusion it is emphasized that, while the above schedules may act as a guide, there is no universal or all-inclusive rule which can be laid down with regard to slash burning. Any decision must be made right on the ground after careful analysis of the conditions prevalent. Each area has individual conditions of subsequent source of seed, seed crop, established reproduction, and the possibility of fire control.

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