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ARE YOUR SEEDLINGS BEING BURIED?

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Certain sites are difficult to regenerate after clear cutting or wildfire. Heat and drought are well recognized as limiting factors on many such areas, but another factor affecting regeneration--gravitational movement of soil and debris on slopes--is seldom considered. Removal of vegetative cover can greatly accelerate soil sloughing on steep sites, and planted or natural seedlings may be covered or uprooted.

Although downslope movement of soil material and other debris such as rocks, litter, and slash is not as obvious as the gullies and alluvial deposits caused by surface runoff, it may be much more widespread. It occurs during all seasons but is most intense in the summer as dry gravel and in the fall as debris moved by frost heaving and heavy rains. In some areas deer have also accelerated this type of erosion by trampling warm south slopes during the spring.

The extent of the problem is not known. However, gravitational movement of soil and debris appears to occur most commonly on steep south slopes (fig. 1) where a dense

Figure 1.--A steep south slope typical of sites where soil and debris movement is a major factor retarding regeneration.

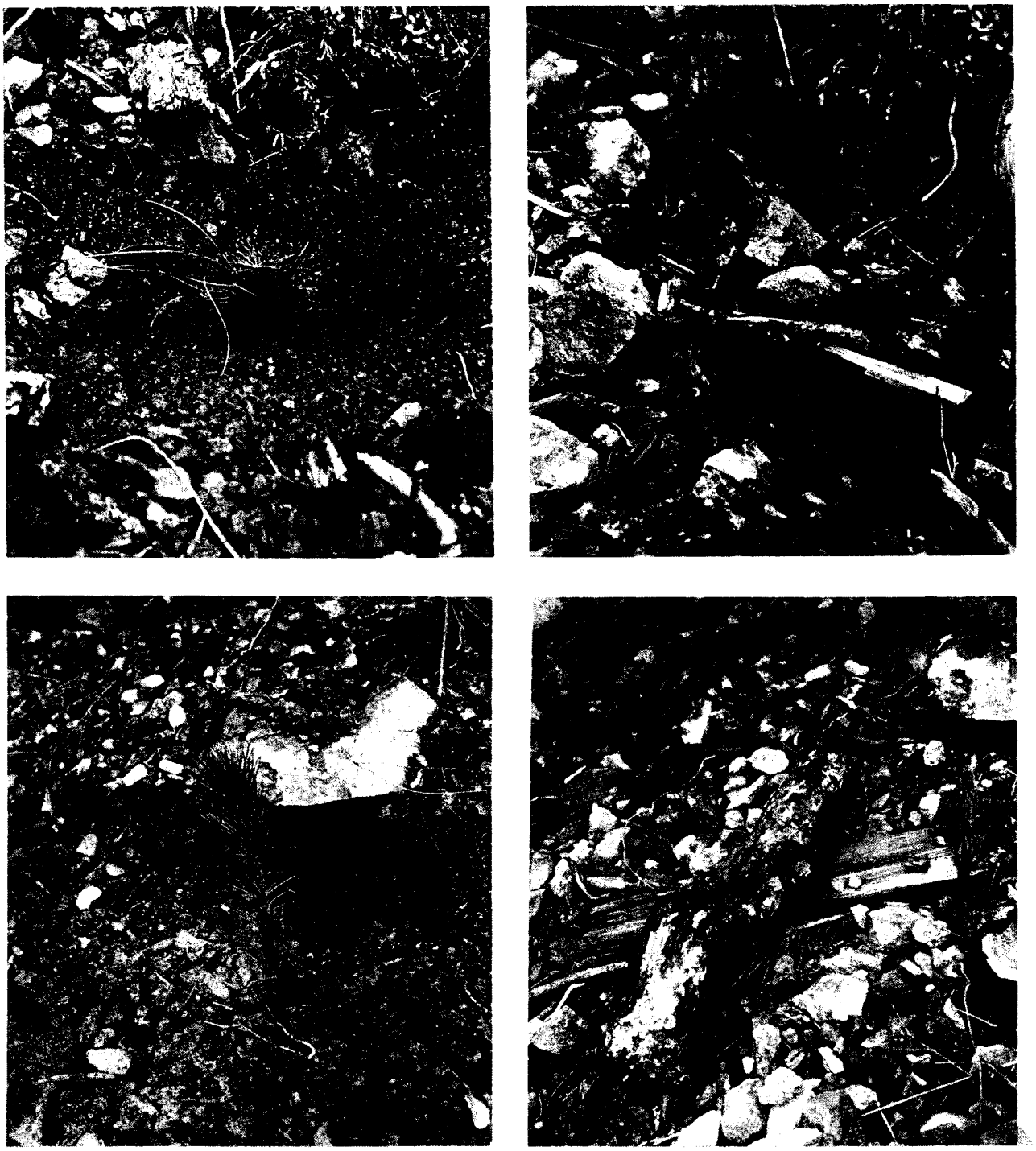

Figure 2.--Effect of soil and debris movement on planted trees. Upper left, ponderosa pine seedling as it appeared at the time of planting in November, and upper right, as it appeared 5 months later. Lower left, sugar pine seedling as it appeared at the time of planting in November, and lower right, as it appeared 5 months later.

vegetative cover may have held the soil in a position greater than its natural angle of repose. When the vegetative cover is removed and the soil surface is disturbed, movement begins. This sequence of events has been observed on the west side of the Cascade Range and in the Coast Ranges of Oregon.

A study of planted 2-0 and 3-0 Douglas-fir seedlings on a south-exposed, 50-percent slope showed 3-0 stock survived better, primarily because its larger size made it more capable of resisting sloughing.[1] As observed in that study, ". . . 23 percent of the 2-0 and 8 percent of the 3-0 trees were lost by the end of the first growing season because of surface movement--soil, rock particles, litter, and rotten wood either covered or uprooted them." A later planting of incense-cedar and ponderosa and sugar pines in the same vicinity suffered heavy damage from debris movement between November, when the trees were planted, and bud bursting time in May. Almost two-thirds of the trees were partially or completely covered (fig. 2).

Some measures can be taken to avoid excessive damage to planted trees from soil and debris movement. Planting spots should be chosen carefully to include the flattest microsites such as occur above stumps and uprooted trees. Trees should be planted near the outside edges of benches or scalped spots in areas subject to sloughing; trees planted on the inside of benches are especially vulnerable to covering. Trees could be planted beneath stumps, well-anchored rocks, or other objects which would help divert moving debris from the tree. Large stock appears to be superior to small stock in resisting debris.

Studies of slope, aspect, and soil are needed where gravitational movement is a major problem. Special methods of treatment are necessary to insure a new stand on areas where debris movement is a hazard to regeneration. Some possibilities include: (a) temporary cover to stabilize the soil, (b) preparatory measures such as furrowing, (c) fertilization to increase early growth of planted trees, and (d) leaving slash unburned on steep, unstable slopes.

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[1] Berntsen, Carl M. A test planting of 2-0 and 3-0 Douglas-fir trees on a steep south slope. U.S. Forest Serv. Pac. NW. Forest and Range Expt. Sta. Res. Note 165, 4 pp. 1958 (Processed.)