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the common practice. Because of the steep slopes, main skidding roads or trails are generally built paralleling the stream course and are roughly leveled off for a width of 4 to 6 feet. Logs are pulled from the stump into the road, where they are fastened together by grabs and skidded to the landing. The dragging of the logs creates a channel which concentrates runoff from the road surface into a stream that develops considerable erosive force. A large proportion of the resulting erosion is preventable and occurs because no thought is given to its control.

The amount of soil moved is greater than ordinarily realized. Accumulations of sediment are seldom observed because the eroded material is generally deposited directly in the stream channels which the skid roads follow and frequently cross. A study of the effects of logging is being made at the Coweeta Experimental Forest as a part of a comprehensive investigation of water resource management. Here in the high rainfall belt of western North Carolina, skid roads have been found to be an important source of sediment for streams draining forested watersheds. In a 3-month period, June through August, 1942, 250 cubic feet of sediment were trapped from a portion of a skid road 450 feet in length, 5 feet in width, and with an average grade of 30 percent. This rate of loss is 4,370 cubic feet per acre of road surface for the 3-month period, or 2,860 cubic feet per mile of skid road. To indicate how this loss compares with cultivated land, some data from an adjacent watershed may be revealing. Five and one-half acres of this adjoining watershed were cleared in 1940, and were planted to corn in 1941 and 1942. The average slope of this field is 35 percent. In the 20-month period, September, 1941, to May, 1943, the measured soil loss from this area was 437 cubic feet, or about 80 cubic feet per acre. As gullying occurs on this field, much higher losses are expected. However, the important point is that skid roads themselves are potential or active gullies, and may contribute more sediment to a stream draining a forested watershed than would result from occasional patches of steep land in cultivated crops.

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Careless Skidding Reduces Benefits of Forest Cover for Watershed Protection

Logging chances in the Southern Appalachian Mountains are characterized by steep irregular topography and scattered stands of valuable timber. Direct ground skidding of logs by teams is

If the possible consequences of this erosion are realized in advance, then simple common sense methods will be sufficient and effective in reducing it. Measures which reduce erosion will also make for easier and cheaper skidding. A badly

washed road is both dangerous and slow.

Location of the road is of major importance, because it is more difficult to control erosion on very steep sections. In most of the southern Appalachian logging chances, previous cuttings have been made at least in the coves. The common practice is to use the old roads as much as possible. These roads are usually very poorly located for they were built without modern earth moving equipment, and relatively flat stretches alternate with very steep pitches. Use of these roads results in higher direct skidding costs as well as causing large erosion losses. Most of the preventable erosion takes place during the period of logging.

To minimize soil losses, water should be turned out of the trails wherever necessary to prevent its accumulation. Water breaks should be maintained and kept open. At the close of each day they should be cleaned out so that they will be serviceable. A few strokes with a mattock are usually all that is required. Some large operators have found that this simple maintenance reduces logging costs, and find it profitable to assign a man full-time responsibility for this job. Corduroy built up by laying poles across the trail is a very effective means of preventing washing, and is frequently done for easier skidding.

A contributing factor to soil losses from skid roads in this region is that logging is carried on at a slow rate. Small timber sales drag out for two or more years. When one operator is finished, another soon comes in to take out a different product such as ties, extract wood, or dogwood. This, of course, is a good argument for better location and maintenance of roads. It also points out a fallacy in the conventional method of waiting until a sale is closed before undertaking erosion control. However, any steps that can be taken to encourage operators to complete their sales promptly instead of working on them haphazardly will shorten the period of active erosion. Operations should also be integrated so that all products to be taken are removed at one time whenever this is feasible.

It is better to insure against erosion by care during the logging operations than to wait until logging is complete and then try to "close" the deeply cut roads. By then most of the preventable erosion has occurred. Correction is expensive because the surface soil horizons are washed away, and mulching and sloping are often necessary to encourage a new growth of vegetation.

If erosion is held to a minimum during the operating period, natural revegetation will occur rapidly, and usually no further measures will be required.

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