



Logging Costs and Production Rates for the Group-Selection Cutting Method

PHILIP M. McDONALD

ABSTRACT: Young-growth, mixed-conifer stands were logged by a group-selection method designed to create openings 30, 60, and 90 feet in diameter. Total costs for felling, limbing, bucking, and skidding on these openings ranged from \$7.04 to \$7.99 per thousand board feet. Cost differences between openings were not statistically significant. Logging costs for group selection compared favorably with those previously reported for seed-tree and selection harvest cuts--\$8.20 and \$8.39, respectively.

In recent years loggers and timber owners have asked for information on logging costs associated with different cutting methods. Especially needed is cost information on second-growth, mixed-conifer stands. Atkinson and Hall¹ reported cost information on the tree selection and seed-tree methods.

In 1963 logging costs and production rates for the group selection method were obtained in a study at the Challenge Experimental Forest, Yuba County, California. The cutting was made in cooperation with the Soper-Wheeler Company, Strawberry Valley, Calif.

The major aim of this study was to evaluate regeneration in group-selection openings. Small groups of trees in seven sub-compartments were removed to form openings of three diameter sizes: 30, 60, and 90 feet. Each size was replicated 16 times. The arrangement of openings in each sub-compartment was dictated by the decision to remove 10 percent of the basal area. This was the amount of basal area which could be removed and still maintain a realistic application of the group selection method.²

Each sub-compartment averaged 9 acres, and all were similar in topography, slope, and amount of brush. Although stand

¹Atkinson, William A., and Hall, Dale O. Comparative seed-tree and selection harvesting costs in young-growth, mixed-conifer stands. U.S. Forest Serv. Res. Note PSW-N19, 3 pp., Pacific SW. Forest & Range Expt. Sta., Berkeley, Calif. 1963.

²Baker, Frederick S. Theory and practice of silviculture, p. 277. New York: McGraw-Hill Book Co., Inc. 1934.

conditions were similar, the differences in plot sizes resulted in differences in the diameter distributions of cut trees. The removal of a single large tree often created a 30-foot opening; a large tree and several small ones, a 60-foot opening; and several large and small trees, a 90-foot opening. Ratios of numbers of trees over 18 inches diameter at breast height to trees under 18 inches, was:

<u>Diameter of opening</u> (feet)	<u>Ratio</u>
30	1 to 0.33
60	1 to 0.67
90	1 to 0.29

Felling and skidding operations in each opening were timed by a stop watch. Time to fell, limb, and buck the trees, and an allowance for distance between openings, were the basis for "felling costs." The minimum log was 10 feet long and 10 inches in diameter inside bark at the small end. Average time per turn (one complete trip from landing to woods and return) determined skidding production.

Two men worked as a felling team. One would fell, the other buck; the faller occasionally would buck to equalize the work load. The buckler had a smaller, faster saw, which was better suited for limbing and bucking. Saw maintenance time was allocated to each opening on the basis of relative volume.

The team was paid at a gyppo (contract) rate of \$3.00 per thousand and feet board measure, net log scale (Scribner rule). Employee benefits and payroll expenses representative of the area increased this cost to \$3.71 per M bd. ft.

Logs were ground-skidded an average of 630 feet. Nearly all main skid roads had been established in an earlier logging operation, thus increasing production an estimated 12 percent. The two skidding tractors were each rated at 113-drawbar horsepower.

A skidding crew consisted of a cat-skinner and a choker-setter. Basic wage rates plus additional payroll expenses, as for fallers, were \$3.70 and \$3.50 per hour, respectively. The tractor-use rate was \$7.50 per hour.

The 60-foot openings had the greatest proportion of smaller trees and the lowest average log volume. The proportion of large trees was high in the 30-foot openings, but was highest in the 90-foot cuttings. But in yarding, the 30-foot openings had a greater number of "light" turns, than the 90-foot openings.

All production rates for the three group-selection sizes were compared statistically. No significant differences were found.

Total costs for felling, limbing, bucking and yarding ranged from \$7.04 to \$7.99 per thousand board feet (table 1). These charges

compare favorably with those previously reported for seed-tree and selection harvest cuts--\$8.20 and \$8.39, respectively.³ Therefore, the silviculturist is not prevented by economic considerations from adding the cutting of small openings by group selection to the practice of his art.

Table 1. Logging and production costs for the group-selection cutting method Challenge Experimental Forest, 1963

Production item	Size of opening		
	30 ft.	60 ft.	90 ft.
Area:			
Average volume ¹ per acre logged.....Bd. ft.	38,769	28,163	21,551
Average log volume.....Bd. ft.	340	274	318
Felling production:			
Volume per man-day.....Bd. ft.	14,224	12,440	15,920
Volume per man-hour.....Bd. ft.	1,778	1,555	1,990
Man-hours per M bd.ft.....Hours	0.56	0.64	0.50
Skidding production ² :			
Volume per tractor-day....Bd. ft.	33,864	27,464	35,304
Volume per tractor-hour...Bd. ft.	4,233	3,433	4,413
Volume per man-hour.....Bd. ft.	2,116	1,716	2,206
Tractor-hours per M bd.ft.Hours	0.24	0.29	0.23
Man-hours per M bd.ft.....Hours	0.47	0.58	0.45
Production costs per M bd.ft.:			
Felling.....Dollars	3.71	3.71	3.71
Skidding.....Dollars			
Labor cost	1.70	2.10	1.63
Tractor cost	<u>1.77</u>	<u>2.18</u>	<u>1.70</u>
Total skidding cost.....Dollars	3.47	4.28	3.33
Total cost, felling and skidding.....Dollars	7.18	7.99	7.04

¹All volumes are net log scale, board feet (Scribner rule).

²Skidding production decreased 12 percent to allow for pre-constructed skidroads.

The logger or timber owner should consider many factors before he concludes that a particular cutting method is best for his particular location and conditions. An important factor is the logging cost. Logging costs for the group-selection cutting method at Challenge were not prohibitive. Other considerations, such as type and

³Atkinson, W.A. and Hall, D.O. id. cit.

amount of regeneration and ease of management, should govern the choice of cutting method.

A future paper will report cost and production rates for the clear-cut method. It will also compare and describe the clear-cut, selection, seed-tree, and group selection cutting methods in young-growth, mixed-conifer stands.

The Author. . .

PHILIP M. McDONALD is studying silvicultural problems of young-growth Sierra forests at the Challenge Experimental Forest, Yuba County, California. A native of Seattle, Washington, he holds bachelor's (Washington State University, 1960) and master's (Duke University, 1961) degrees in forestry. His Forest Service experience includes work in soils, watershed management, and forest genetics research at the Intermountain Station in Idaho and Utah; and snow management research at the Pacific Southwest Station.