

INTRODUCTION

Landowners and government agencies often engage in small-scale harvesting of timber to fulfill land management objectives. In deciding what type of machinery to use for this harvesting, it is useful to consider issues of cost, scale, and labor force. We undertook a cost-benefit analysis of the use of skidders vs. bobcats in a steep forest of ponderosa pine (*Pinus ponderosa*). The study area was located adjacent to United States Forest Service Road 226 in Township 11 South, Range 10 West, and Section 05 on the Black Range Ranger District of the Eastern Gila National Forest southwest of Winston, New Mexico. The project area comprises approximately 200 acres. The economics and efficiency analysis was based on the first 20 acres in size, with ponderosa pine as the dominant tree species harvested. Approximately 66% of the forest could be characterized as having uneven age structure, with the remaining consisting of an even age structure. There was a high level of dwarf mistletoe (*Arceuthobium* spp.) parasitizing the ponderosa pine in all three stands and mortality was occurring as a result of dwarf mistletoe and dry sites. The tree density varied from very high to very low; therefore, risk of insect infestation was low based on stand average, but did increase in areas with higher tree density. There was an open grassy area in the southeastern portion of the study area adjacent to the study site consisting of scattered trees with ponderosa pine regenerating within and along the edges of the opening.

Tree sizes in the study area ranged from 2- to 30-in. diameter, with the quadratic mean diameter of all trees approximately 5 in., and approximately

12 in. for trees larger than 5 in. diameter at breast height (DBH). The basal area consisted of an average of 72 to 93 sq ft per acre.

ANALYSIS

A comparative analysis of the efficiency in both timing and economic terms was conducted by comparing a skid-steer loader (commonly referred to as a “bobcat”) and a Caterpillar 518C (commonly referred to as a “skidder”) as methods of removing timber. This analysis includes estimated time of removal per acre for each piece of equipment. Labor, fuel, repair, and fixed costs for each were also included in the study.

Table 1 presents the comparative analysis on a per-acre basis for a study plot located in the Gila National Forest. It is assumed that one additional person is needed in the labor force to attach the choker to the tree when the skidder is employed in the process of removing timber. The bobcat does not require the additional person to perform this task due to the method of loading and removing timber, as displayed at the study plot. Fuel, fixed costs, and repair costs were employed using the University of Nebraska tractor tests for the equipment under consideration. These Nebraska tractor tests, affiliated with the U.S. Department of Commerce, are the basis and guideline generally used for analyses like ours, commonly conducted in a whole farm analysis.

¹Respectively, Associate Professor, Graduate Assistant, Research Associate, and Research Associate, Department of Agricultural Economics and Agricultural Business, New Mexico State University.

Table 1. Comparative Analysis of Timber Removal

	Hours/Acre	People/Acre	Total Hours	Wage	Labor	Fuel Cost	Repair Cost	Fixed Cost	Total Cost
Bobcat	2.55	2	5.11	\$10	\$51.09	\$4.70	\$2.76	\$2.58	\$61.13
Skidder	2.04	3	6.13	\$10	\$61.31	\$30.66	\$4.23	\$2.74	\$98.94

As observed in Table 1, the skidder is less effective from an economic point of view than the bobcat. The assumption is that the skidder may accomplish the same set of tasks in only 80% of the time taken by the bobcat. Holding this assumption constant, the bobcat completes the same set of tasks for \$37.81 less per acre than the skidder.

According to this benefit-cost analysis, the skidder must complete the tasks in 50% of the time in order to show the same economic efficiency as the bobcat. Of course, there are other factors to consider when comparing these two avenues of tree removal. But if only a benefit-cost analysis is considered in the decision-making process, then for a smaller sized project such as we considered here, the bobcat would be the best choice. Assuming other forest management considerations are evaluated, the response could vary.

REFERENCES

- Hawkes J.M., and J.D. Libbin. 2010. *Cost and return estimates for farms and ranches*, Projected Crop. New Mexico State University, Las Cruces, NM. [Online]. Available from <http://aces.nmsu.edu/cropcosts/>.
- University of Nebraska Tractor Test Laboratory. 2009. *Tractor test report*. Lincoln: University of Nebraska.

Contents of publications may be freely reproduced for educational purposes. All other rights reserved. For permission to use publications for other purposes, contact pubs@nmsu.edu or the authors listed on the publication.

New Mexico State University is an equal opportunity/affirmative action employer and educator. NMSU and the U.S. Department of Agriculture cooperating.