

 UI Extension Forestry Information Series

## Silvicultural Decisions II - Mechanized vs. Conventional Logging

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On a recent field tour of *working forests* (private timberlands managed for profit) we observed a high-tech mechanized logging operation involving a *feller-buncher* and *tree-length processor*. A feller-buncher is a machine on tracks (similar to a bulldozer) that is driven to the tree and cuts with a hydraulic cutting head on a backhoe-like arm. The cutting head grasps the tree at the base and severs the tree, then the hydraulic arm lifts the entire tree and places it in a bunch, butt-first towards the landing. The pre-bunched trees are then skidded full-length with a conventional rubber-tired skidder to the landing, where the processor machine delimits, measures, and bucks the tree into logs, which are then directed into several piles separated by species, log size, or other criteria.

Our audience, which included woodland owners, schoolteachers, and forestry professionals, questioned the environmental impact, safety, and economics of this mechanized system compared to a more conventional logging system with people felling trees with hand-held chain saws, tree-length skidding after hand-limbing, and hand-bucking into log lengths at the landing.

**Environmental Impact.** The feller-buncher is a large machine weighing about 50,000 pounds. It can cause considerable soil disturbance when it turns while holding a large tree. This weight is distributed, however, over a large surface area of track, so the weight per square inch of soil surface is less than that of a horse's hoof or some other logging equipment with wheels. Because most timber in our region is in natural stands with a clumpy distribution of trees, conventional felling with chain saws is difficult to do without breaking tops and scarring trunks of residual trees. Even the best of sawers are limited in the direction they can fell

a tree; consequently, additional damage occurs when hand-felled trees are skidded around and through residual trees. The feller-buncher can cut and place trees butt-first in a bunch on open ground for easy skidding access with little or no residual tree damage. Less soil area is impacted because the skidder uses the same travel lanes as the feller buncher. The mineral soil exposed by the turning of the feller-buncher can increase erosion on steeper slopes, but on more stable ground it creates micro-site diversity and a place for new seedling establishment. Finally, the mechanized operation can complete a harvest rapidly while the soil is dry. In conventional, more time consuming operations, work usually stops only when soils become so wet that damage is severe. The feller-buncher also reduces fire hazards because it concentrates all slash at the landing. However, the conventional operation may have an environmental advantage by distributing slash across the site, for better nutrient recycling.

**Safety.** Logging is a very hazardous occupation, even with a highly skilled crew. The feller-buncher machine is enclosed and shielded. With its capacity to replace five to eight people with chain saws and gently extract trees from a clump of residual trees and place them on the ground, the feller-buncher greatly reduces safety hazards in the felling operation and later hazards from damaged trees and hanging, broken tops locally called *widow makers*. Skidding is also somewhat safer because the trees are pre-bunched in the open, reducing the likelihood of trees or tops falling on the skidder operator, who would have to navigate through residual trees with conventional hand-felling. Machine processing at the landing eliminates many personal hazards common to bucking logs into lengths by hand.

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**Economics.** Economic concerns involve the displacement of logging jobs and the cost-efficiency of the operations. A high-tech mechanized operation reduces the number of people required to do the job. In this situation, a five-person crew did the work of a twelve to fifteen person conventional crew. Some segments of the economy - equipment manufacturing for example - benefit from increased job opportunities; however, the number of logging jobs decreases while skill requirements increase. The mechanized operation we viewed involved an investment exceeding a million dollars, is only feasible on larger acreage, high-volume timber sales, and is limited by slope and other site conditions. This investment can be offset and, in efficient operations, surpassed by savings in labor, insurance, work-

ers compensation for injuries, and the ability to rapidly harvest and deliver logs to mills when prices are high. Additional profits are possible when the processor operator at the landing is skilled at bucking logs for optimum volume, and log quality and value are improved through reduced tree damage in the felling, skidding, and bucking operations of a high-tech, mechanized logging system.

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