



# CENTRAL HARDWOOD NOTES

## Logging Damage

The best commercial logging will damage at least some residual trees during all forms of partial cutting, no matter how carefully done. Yet recommendations at the end of this Note show there is much that you can do to limit damage by proper road and trail layout, proper training and supervision of crews, appropriate equipment, and diligence.

### Disturbance from Skidding

Felling mature and other large-diameter trees will snap off, bend over, or break branches from smaller or younger residuals. Skidding will knock bark off the lower bole of some trees no matter what their size, and push over many small ones.

Skidding wounds degrade the butt log and reduce its value. Trees with major injuries—broken branches larger than 3 inches diameter or wounds exposing more than one-third of the bole circumference—will also likely develop internal discoloration and decay. In addition, skidding scrapes off the litter layer, exposes shallow roots and the mineral soil, and rips out advance regeneration in the trails. Indiscriminant skidding can disturb a high proportion of the stand. This could lead to a decline in the residual stand, increased potential for surface erosion, and the unnecessary destruction of some understory vegetation.

When a skidder mires in saturated soil, it leaves deep ruts and severs the roots of trailside trees. This increases the chances of windthrow. It also diminishes tree vigor by restricting moisture and nutrient uptake, and reducing the energy storage capacity of the root system. And deep ruts often make a trail unsuitable for future use.

### Damage During Uneven-age Management

Due to their abundance in uneven-age stands, more saplings and poles will be injured than sawtimber. In some cases, the losses may upset the residual structure within the lower diameter (age) classes. Many trees remain standing, but have major injuries to the crown or main stem. They may comprise one-fifth of the residual basal area in partially cut uneven-age stands.

Every re-entry at subsequent cutting cycles will wound additional trees, and reinjure some previously damaged ones. Some trees will have multiple wounds. Reinjury adds grading defects and increases discoloration and chance of rot. As a result, stands under uneven-age management will likely have a base level of defect despite efforts to upgrade stand quality through marking. While some trees with old wounds can be removed at each cutting cycle, to harvest most of the damaged trees would usually force a reassessment of the management objectives.

## Thinning of Even-age Stands

In most thinning, residual crop trees are in the upper crown positions. The shorter and smaller ones are cut, so felling primarily destroys or damages intermediate and overtopped trees. Their loss is not important. Most of the important damage comes from skidding. By contrast, cuttings that remove the largest trees from even-age stands will more likely damage your future crop trees, as happens with uneven-age management.

Overall, the combined losses of small trees in felling and skidding during conventional thinning may drop the residual relative density by as much as 10 percent below the target level. In addition, up to 20 percent of the remaining trees in thinned stands may be damaged by skidding. The greater the thinning intensity, the more extensive the damage. In the worst case, there may not be enough undamaged dominant and co-dominant trees to fully occupy the site at the end of the rotation.

Improvement in logging machinery design and capability have changed harvesting operations, even for intermediate stand treatments. In some thinnings, the entire tree is skidded, rather than just the main stem. Mechanized felling and bunching, and grapple skidding are also used for thinning. When done properly, whole-tree skidding and mechanized logging need not cause more damage than conventional tree-length operations. Small, highly mobile cable yarding equipment has proven efficient for thinning operations on steep slopes. A well-planned cable yarding operation might even leave fewer injuries, especially along the corridors.

## Recommendations for Reducing Logging Damage

Most skidding damage results from turning loads onto a skidding trail, or when loads do not “track” in the center of a trail along curves. While you can remove some previously damaged trees along trailsides in subsequent logging, cutting all of them would widen the corridors excessively. Felling injuries cannot be avoided in a well-spaced residual stand, whether even- or uneven-aged.

The best way to limit damage during logging is through preventive measures as follows:

1. Share your concern about limiting logging damage with the logging contractor and review ways to promote careful work among tree fellers and machine operators.
2. Consider marking “leave” trees instead of “cut” trees if it will help the logger avoid them.
3. Use directional felling to divert falling trees away from high-quality residuals, and align the boles for efficient skidding with minimum turning.
4. Cut out forks and remove large branches from the felled trees so they track well and fit the skidding corridors.

5. Insist on a well-planned access system that does not cover more than 10 to 15 percent of the area, and monitor for compliance.
6. Do not allow skidding when the soil is too wet.
7. Use well-organized and fairly straight skidding trails that bypass poorly drained spots and accommodate machine operations. Minimize turning; avoid sharp turns and keep loads in the center of the trail.
8. Use the smallest size machinery possible without making the operations inefficient, and make sure the trail is wide enough and straight enough to accommodate the equipment.
9. Log when the soil is well drained or frozen. Avoid springtime operations when the bark is easily skinned off the tree trunks.
10. Plan ahead for mechanized logging. Specialized equipment requires different kinds of skid trails.
11. In mechanized tree- or long-length operations, place the wood piles left by the feller-buncher inside major skidding corridors (not among the residual trees). This avoids damaging trailside trees as loads are turned.
12. In cable yarding, make sure corridors are wide enough, properly spaced, and oriented. Make sure the crew is experienced and the equipment is properly used.

Take an active rather than passive approach to harvesting operations to insure compatibility between logging and the silvicultural goals. To succeed, you must continually think about and take direct steps to keep the damages within tolerable levels for your management objectives.

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