NORTHERN HARDWOOD NOTES

Applying The Shelterwood System

The 2-cut shelterwood silvicultural system is the most reliable method we have for regenerating even-aged hardwoods. Unlike other systems it can be used for all hardwood species, both small- and large-seeded, but will probably be used most often for the small-seeded ones such as yellow birch, paper birch, and hemlock.

In the Lake States the basic requirement for getting reproduction with any even-age method, including shelterwood, is that hardwood regeneration MUST be established BEFORE the overstory is removed. When we cut second growth stands and end up with raspberries, poor stocking, or both, it is usually because this requirement was not met. For hardwood regeneration to be established, seedlings should be 2 to 4 feet high; by then their root systems have penetrated mineral soil.

The kind of shelterwood cut to use in the Lake States depends on the species. Light-seeded ones usually require scarification or fire.

A shelterwood cutting of a sugar maple stand on the Argonne Experimental Forest. This picture was taken three growing seasons after the initial cut. Note the abundance of reproduction in the understory.

How to Select a Shelterwood Type

Use Type 1 shelterwood if: Seedlings, usually sugar maple and where ash, are already present but not established.

Use Type 2 shelterwood if: You want to regenerate a mix of small- or light-seeded species along with maple and ash.

Type 1 shelterwood	Type 2 sheltetwood
1. Cut *from* below to 60 percent *crown cover.*	1. Cut from below to 70 or 80 percent *crown cover;* discriminate against undesirable species.
2. Log in winter.	2. Log in any season, except summer (to avoid sapstreak).
3. Do not scarify site (regeneration will be present).	3. Scarify or burn to remove existing vegetation and prepare a seedbed.
4. Remove overstory completely after regeneration is 2 to 4 feet high, usually within 3 to 8 years. Log in deep snow and/or use forwarder without ground skidding.	*4.* Same as Type 1.

Both types of shelterwoods meet the three requirements for establishing even-aged regeneration in the Lake States by providing:

1. A proper overstory to hold down herbaceous and shrub competition and prevent surface soil drying. (The cover should be uniform even if it means leaving less desirable species or smaller trees.)
2. A proper seedbed of humus and mineral soil shallowly mixed, or 60 percent of the area scarified, or litter removed by fire. (Such seedbeds retain moisture and increase surface soil temperatures for germination of light-seeded species.)
3. A seed source of at least four trees of a preferred species well distributed in each acre, or supplemental seeding. (Shelterwood cuts are ideal for planting.)

Note that marking for both types of shelterwoods should be based on percent *crown cover,* NOT basal area, because basal area is not a good indicator of crown cover from species-to-species or in stands with various diameters. Crown area tables can be used or the percent can be estimated with a little experience.

Summer logging should be avoided because of the possible risk of sapstreak disease resulting from root injury. Certain stem diseases, e.g., Nectria and Eutypella cankers, may be increased by shelterwood cutting if cankered trees have been left in the shelterwood overstory. Be sure to cut cankered trees before or during the first shelterwood cut to remove sources of infection.

Other alternatives are to use the Type 2 method to obtain a diversity of species or limit the Type 1 method to meandering strips not more than 1 chain wide rather than cutting in blocks.

Reference

Godman, R. M.; Tubbs, C. H. Establishing even-age northern hardwood regeneration by the shelterwood method-a preliminary guide. Res. Pap. NC-99. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station; 1973. 9 p.

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