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Research Note

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TREE BIOMASS ESTIMATES FOR MINNESOTA'S ASPEN-BIRCH FOREST SURVEY UNIT

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ABSTRACT.—Live tree biomass estimates are presented for five counties of northeastern Minnesota. Tree biomass is given in green tons for forest types and species groups.

KEY WORDS: Volume, tops and limbs, cull, growing-stock, boles.

An increasing demand for wood fiber, advances in wood technology, and other changes in the Nation's forest resources have spurred interest in complete tree utilization. Such developments require a measure of total tree volume that includes more than just merchantable volume. Estimating tree biomass is the first step in estimating the total wood volume on commercial forest land.

Tree biomass, including the bark, is made up of five components:

1. **Growing-stock boles.**—the above-ground volume in growing-stock trees from a 1-foot stump to a variable 4-inch top diameter outside the bark (t.d.o.b.).
2. **Growing-stock tops and limbs.**—the above-ground volume in growing-stock trees from a 1-foot stump, excluding the growing-stock bole.
3. **Cull tree boles.**—the above-ground volume in cull trees from a 1-foot stump to a 4-inch t.d.o.b.
4. **Cull tree tops and limbs.**—the above-ground volume of cull trees from a 1-foot stump, excluding the cull bole.

5. **1- to 5-inch d.b.h. trees.**—the total above-ground volume of all trees 1 to 5 inches in diameter at breast height.

In Minnesota, estimates of tree biomass on commercial forest land outside the National Forests were obtained during the fourth Minnesota Forest Inventory (dated 1977). The recently completed Superior National Forest Inventory (dated 1979) has provided tree biomass estimates for that forest. Information from the two surveys has been combined to estimate the tree biomass on commercial forest land in the Aspen-Birch Forest Survey Unit (Carlton, Cook, Koochiching, Lake, and St. Louis Counties).

METHOD

Tree biomass was estimated with the following method: First, net cubic foot volumes were converted to green tons by using weight conversion factors for each species (Markwardt 1930). The weight of the bole bark was then computed using bark correction factors for individual species, the gross volume of the bole, and an average bark weight of 37 pounds per cubic foot. Tops and limbs for growing-stock and cull trees were estimated as 45 percent of the gross bole volume (Young *et al.* 1976). Finally, the biomass for trees less than 5 inches d.b.h. was computed from a regression equation fit to Young's tree weight table (Young *et al.* 1976). This regression equation uses d.b.h. to estimate total above-ground biomass as 80 percent of the above- and below-ground biomass.