



Making and Using Measurement Tools—Basal Area

Forest Management Practices Fact Sheet Managing Water Series #12

Introduction

There are a variety of *measurement tools* that can help assess a woodland. The tools can be sophisticated pieces of equipment (such as prisms) that are purchased from vendors or they can be homemade devices. This fact sheet will describe how to make and use a homemade tool for estimating basal area.

Best Management Practices (BMPs) can prevent or minimize the impact of forestry activities on rivers, lakes, streams, groundwater, wetlands, and visual quality.

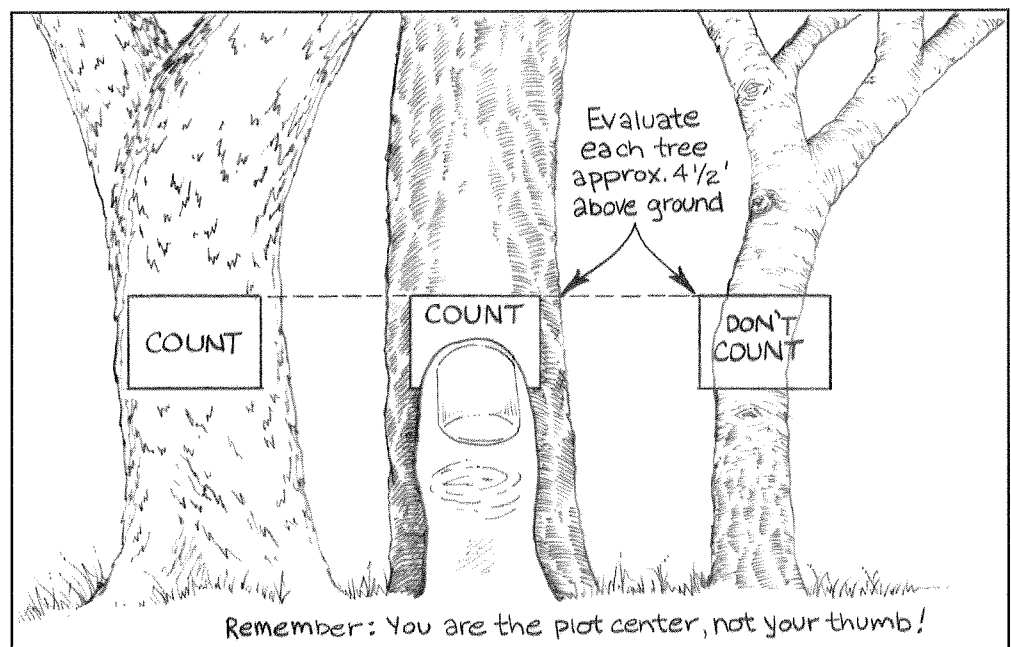
Basal area is the cross-sectional area of a tree 4.5 feet above ground. The basal area of all trees in a given land area describes the degree to which an area is occupied by trees and is generally expressed in square feet per acre (ft²/acre). Basal area is useful in determining whether enough trees remain to provide adequate shade within shade strips. (Shade strips are bands of vegetation along streams, lakes, and wetlands. They help moderate water temperatures.)

Application

Basal area of a land area can be estimated by holding an object such as a washer, penny, or thumb a fixed distance from your eye. Use the following formula to calculate the distance to hold the object from your eye:

$$\text{Distance from eye} = \text{width of object} \times 33$$

For example, a thumb with a width of 0.75 inches should be held 24.75 inches away from your eye ($0.75 \times 33 = 24.75$). You can maintain that distance while using the tool by stretching a string of the appropriate length between your eye and the object.



To estimate basal area, stand in the center of a randomly selected location or plot. Hold the object the appropriate length from one eye and close the other eye. Remember these key points:

- ▶ Aim the object at a spot on the tree's trunk 4.5 feet above the ground. Only consider live trees that are larger than 5 inches in diameter at that spot.
- ▶ Count only trees with trunks that look wider than the object. They are "in." Tree trunks that are narrower than the object are "out."
- ▶ Include every other tree with a trunk the same apparent size as the object.
- ▶ Standing at plot center, evaluate all trees in your viewing area by turning to the right until you return to the starting point.
- ▶ Repeat this procedure in several different locations. The more randomly selected plots taken, the more accurate the data. Plots should be far enough apart that they don't overlap.
- ▶ Determine the average number of "in" trees by dividing the total number of "in" trees by the total number of plots.
- ▶ Multiply the average number of trees considered "in" by 10 (the basal area expansion factor that corresponds to the formula above). This will yield an estimate of the basal area per acre.

$$\text{Basal area/acre} = \text{average number of trees counted} \times 10$$

As an example, assume that a total of 30 "in" trees were counted in 5 sample plots. The average number of "in" trees per plot is 6. The basal area/acre is 6×10 , or 60 square feet/acre.

Advantages

Homemade tools for estimating basal area are less expensive and easier to use than commercially available tools. They provide accurate enough estimates of basal area to make decisions regarding shade strips.

Disadvantages

Homemade tools are less accurate than commercially available ones.

Related Fact Sheets in This Series

Project Planning: Locating Roads, Landings, Skid Trails, and Crossings (FS-6970); *Managing Water on Roads, Skid Trails, and Landings* (FS-6971); and *Making and Using Measurement Tools—Slope* (FS-6982).

Cooperators

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