

# CU IN THE WOODS

## HOMEMADE DEVICES TO DETERMINE BASAL AREA

*By Stephen Pohlman*

When a forester is helping you make decisions on your property, the measurement of basal area is very important. Basal area is simply the cross-sectional square footage of standing timber. By knowing this measurement, a forester can determine how to work with the stand to best meet your objectives.

Most foresters use a wedge prism to determine basal area (BA) for a timber stand. The wedge prism is basically a wedge of glass that is metered as a 'factor' due to the amount of refraction caused by the wedge's angle. A basal area factor (BAF) of 10 is the most commonly used. Though you can purchase wedge prisms through forestry equipment suppliers, at times a wedge prism might not be available in the field. So what else can you use?

Homemade basal area devices typically range from a pencil, a penny, a washer, a slim piece of wood, or your thumb. The only prerequisite for the device you select is that it must have a measurable width in inches. Next, multiply the width measurement by 33. Your answer will be how far from your eye you need to hold the item in front of you. To maintain an accurate distance, a measured string can be attached.

### **The formula to determine basal area device distance:**

Width of the item in inches x 33 = Distance item is held from your eye in inches

### **Homemade basal area device example using a penny:**

A penny measures approximately .75"

.75" x 33 = 24.75"

So, 24.75" is how far we need to hold the penny from our eye for this exercise.

The biggest difference one should remember when comparing the use of a wedge prism to their homemade basal area device is that when using a wedge prism, the prism is the plot center. When you use your homemade device, your eye is the plot center.

### **The exercise:**

1. Choose a random spot in your timber stand. This is known as a 'plot.'
2. Your eye will be the center of the plot. With one eye closed, aim your device at 4.5' up the first tree (4.5' = diameter at breast height, aka DBH).
3. If the width of the device (i.e. the penny) is smaller than the width of the tree (meaning the tree is bigger), count it as 'in'.
4. If the width of the device is larger than the width of the tree, it is considered 'out'.
5. If the width of the device is the same width as the tree, it is considered to be 'borderline'. In my field experience, if you count every other borderline tree in your tally, you will be as accurate as possible.
6. After the first tree is determined to be 'in/out/borderline', while standing in the same place, rotate 360 degrees until every tree has been checked until you come full circle back to the first tree. It is helpful to always pick a tree that easily stands out to you and always rotate in the same direction.
7. Once the first plot is complete, randomly pick another in the same timber stand, making sure that plots do not overlap. Repeat the above by tallying only the 'in' and every other 'borderline' trees.
8. Lastly, add all of your tallied trees together. This will include all of the 'in' trees and your every other borderline trees as well. Next, divide that number by the total number of plots you took.

Then multiply that number by 10 (our Basal Area Factor). The answer is your stand's basal area.

**The formula to calculate basal area:**

(total # of tallied trees / total # of plots) x 10 = Basal Area for your timber stand

**'In/Out/Borderline' decision illustration:**

Please note that the penny is exactly 24.75" from the eye as mentioned above when measuring and determining distance to be held in front of you.

Great timber stands typically have one thing in common, people that care about the land and a management plan. Hopefully you will find this to be a great field exercise to help you engage with your land and your forester. One thing to keep in mind, homemade devices are not as accurate as professional devices, however they are close and can provide you with a great way to monitor your timber stand over the years.



'In' Tree



'Out' Tree

Photo Credits: Stephen Pohlman,  
Clemson Extension



'Borderline' Tree

This article was featured in *CU IN THE WOODS* Fall 2020 Edition, you can view the full newsletter at: [https://www.clemson.edu/extension/forestry/newsletter/newsletter\\_files/2020-fall-forestry-newsletter](https://www.clemson.edu/extension/forestry/newsletter/newsletter_files/2020-fall-forestry-newsletter)



**COOPERATIVE EXTENSION**  
College of Agriculture, Forestry and Life Sciences

Clemson University Cooperative Extension Service offers its programs to people of all ages, regardless of race, color, gender, religion, national origin, disability, political beliefs, sexual orientation, gender identity, marital or family status and is an equal opportunity employer.