

FOR 2542 – Forest Measurements and Inventory
Basal Area
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Basal area per tree is the cross-sectional area of a tree at breast height. It can be calculated from Diameter at breast height (DBH) by the following formula:

$$BA = \frac{\pi}{4 * 144} \cdot dbh^2$$

$$BA = 0.005454154 \cdot dbh^2 \text{ (ft}^2\text{/ac, } dbh \text{ in inches, in English units)}$$

$$BA = 0.00007854 \cdot dbh^2 \text{ (m}^2\text{/ha, } dbh \text{ in cm in metric units)}$$

where:

BA is basal area.

DBH is the diameter at breast height.

π is the constant 3.1415.

Basal area per acre is the sum of all the basal area per tree values in the acre. **Basal area per acre or hectare** is a standard measure of the size-density relationship in a stand.

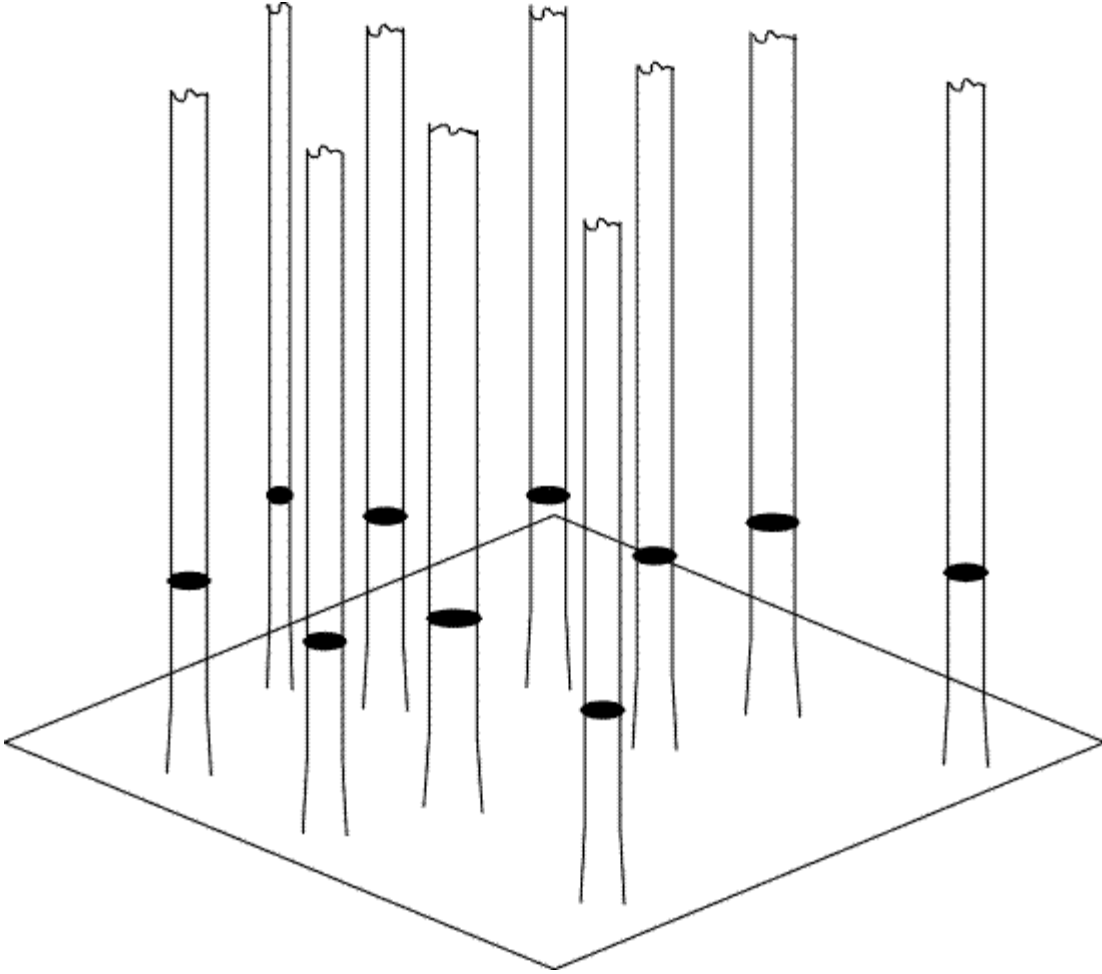
$$BA / ac = \sum_{i=1}^n BA_i \cdot w_i$$

where:

BA/ac is the Basal area per acre,

BA_i is the Basal area per tree for the *i*th tree

w_i is the sample expansion factor weight.



An illustration of the basal area per acre. The basal area per tree is the cross-sectional area of each tree at breast height (the black ellipses). Basal area per acre would be the sum of these cross-sectional areas for all trees in an acre.

References

Husch, B., T. W. Beers and J. A. Kershaw. 2003. *Forest Mensuration*. Fourth Edition. John Wiley & Son, Hoboken, New Jersey. 443 p.