

What Do You See?



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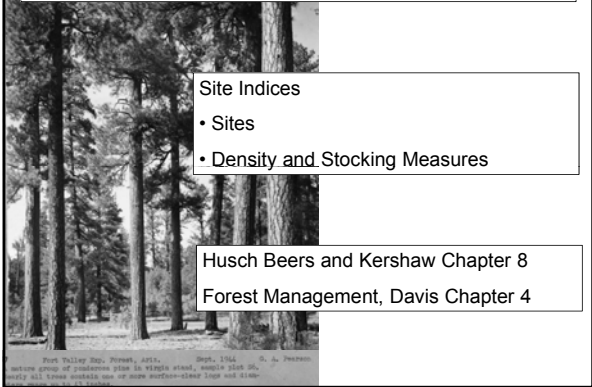
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FOR 274: Forest Measurements and Inventory



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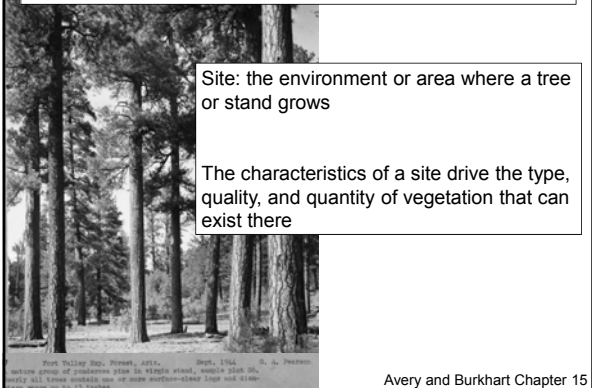
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Sites: What is a Site Anyway?



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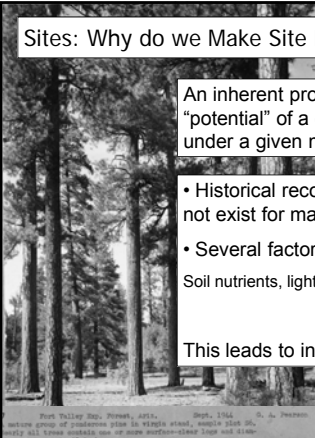
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Sites: Why do we Make Site Measurements?

An inherent property used to predict the "potential" of a given site to produce products under a given management prescription

- Historical records of productivity data do not exist for many forests
- Several factors affect productivity: Soil nutrients, light availability, topography, etc

This leads to indirect methods



Port Talley Sta. Forest, W.Va., Sept. 1964. A. A. Peterson  
uniform group of productive sites in single stand, similar site ID,  
early fall. Trees average 100 ft high, medium-sized logs and d.b.h.

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Sites: Tree Height as a Site Measurement

Relations between Tree Height and Age:

- Practical & Consistent
- Sensitive to site characteristics
- Relatively insensitive to thinning intensity
- Strongly related to volume

We define this measurement of a site as a Site Index



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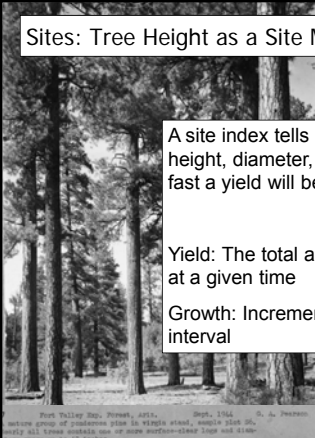
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Sites: Tree Height as a Site Measurement

A site index tells us how fast trees grow in height, diameter, and crown widths and how fast a yield will be obtained from the site

Yield: The total amount available for harvest at a given time

Growth: Incremental increase in a unit time interval



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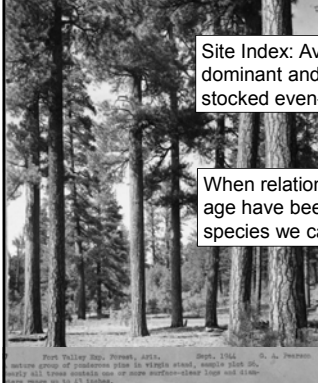
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Sites: Tree Height as a Site Measurement



Site Index: Average total height of dominant and codominant trees in well-stocked even-aged stands

When relations between tree height and age have been established for certain species we can produce predictive curves

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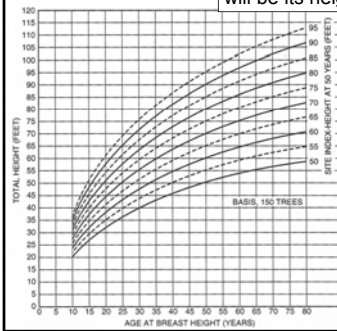
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Sites: Species-Specific Height Index Curves

Q: Tree is 20 years old and 45 feet, what will be its height at 70 years?



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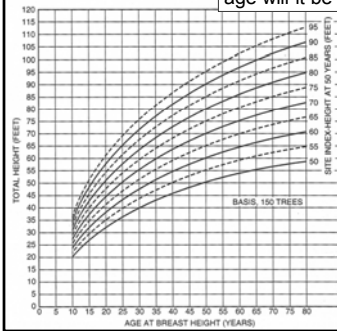
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Sites: Species-Specific Height Index Curves

Q: Tree is 30 years old and 50 feet, what age will it be when its height is 75 feet?



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Sites: Measuring Site Trees



Site Trees: Dominant or Codominant in even-aged stands with no evidence of damage, suppression, or deformity

Measurements:

- Max Tree Height – clino/hypsometer
- Tree Age - corer

Port Talley Sta., Forest, Ark., Sept. 1964. G. A. Johnson  
 mature group of loblolly pine in single stand, regular size class, nearly all trees available for stem section-length logs and diameter measurements at 1.37 m.

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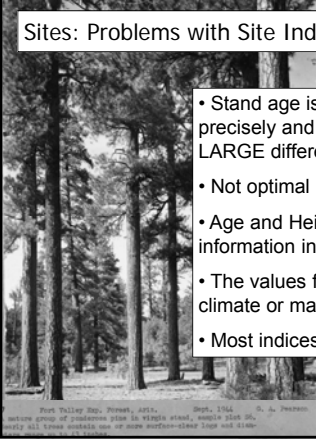
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Sites: Problems with Site Indices



- Stand age is difficult to measure precisely and small errors can lead to very LARGE differences
- Not optimal in non even-aged stands
- Age and Height may not provide enough information in some sites
- The values for a site can change due to climate or management activities
- Most indices are species specific

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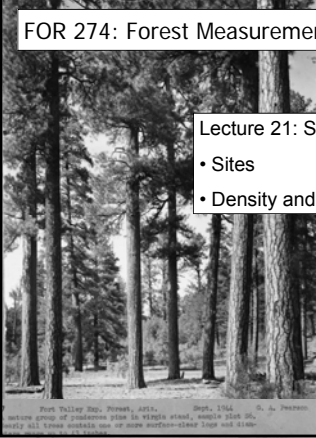
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FOR 274: Forest Measurements and Inventory



Lecture 21: Site Indices

- Sites
- Density and Stocking Measures

Port Talley Sta., Forest, Ark., Sept. 1964. G. A. Johnson  
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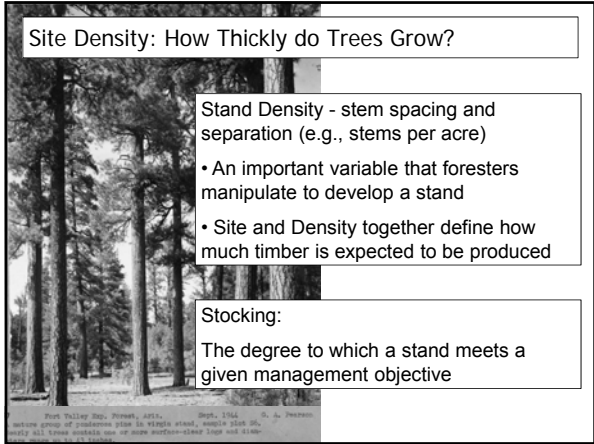
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**Site Density: How Thickly do Trees Grow?**

**Stand Density - stem spacing and separation (e.g., stems per acre)**

- An important variable that foresters manipulate to develop a stand
- Site and Density together define how much timber is expected to be produced

**Stocking:**  
The degree to which a stand meets a given management objective




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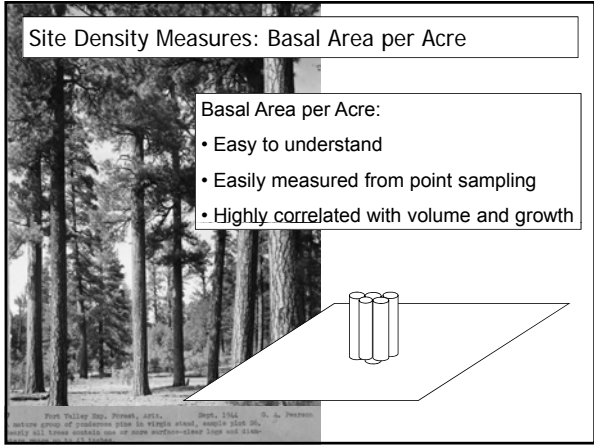
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**Site Density Measures: Basal Area per Acre**

**Basal Area per Acre:**

- Easy to understand
- Easily measured from point sampling
- Highly correlated with volume and growth




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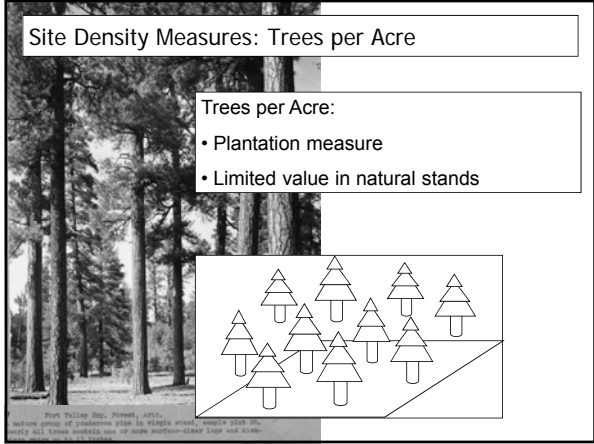
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**Site Density Measures: Trees per Acre**

**Trees per Acre:**

- Plantation measure
- Limited value in natural stands




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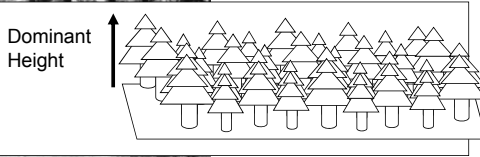
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Site Density Measures: Relative Spacing

Average Distance between trees is divided by height of the dominant canopy

$$RS = [\sqrt{(43,560/\text{trees per Acre})}] / \text{Height}$$




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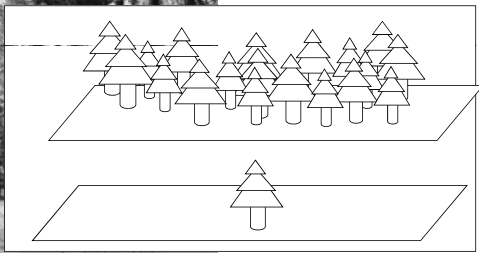
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Site Density Measures: Crown Competition Factor

Area available to the average tree in a stand as compared to the maximum area it would use if it were open grown




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Site Density Measures: The Stand Density Index

Stand Density Index (SDI):

- Developed by Reineke in 1933
- Uses diameter,  $D_q$ , of tree with the average BA (quadratic mean diameter) and number of trees per unit area (N)

Reineke Observed that for each species: Different fully stocked even-aged stands with the same  $D_q$  have ~ maximum N

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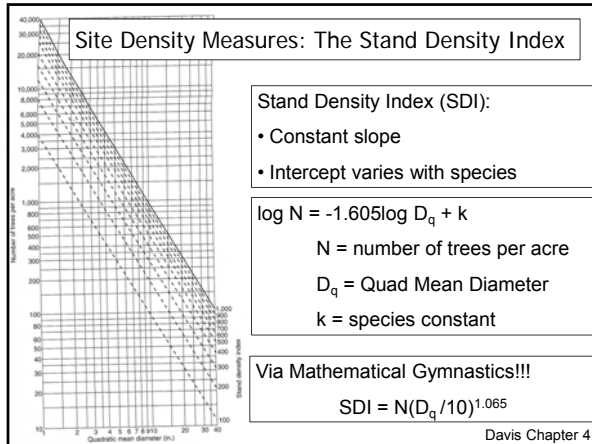
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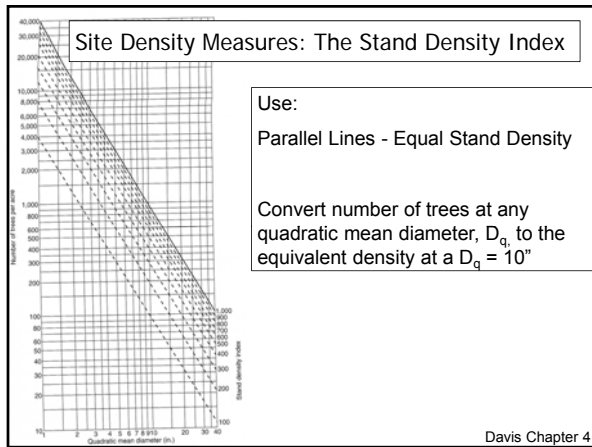
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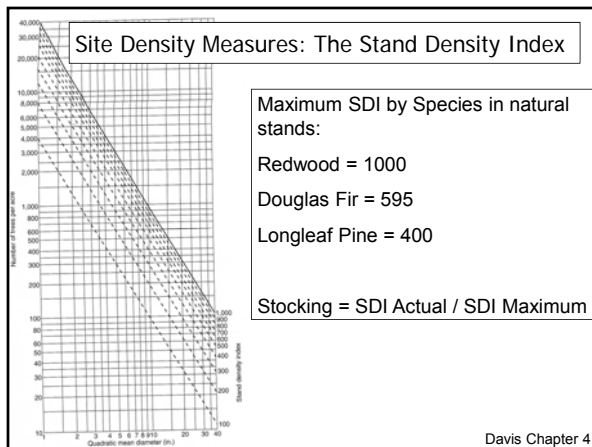
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