

Determining Site Productivity

Alternatives to Current Methods

James D. Arney, Ph.D.

Forest Biometrics Research Institute

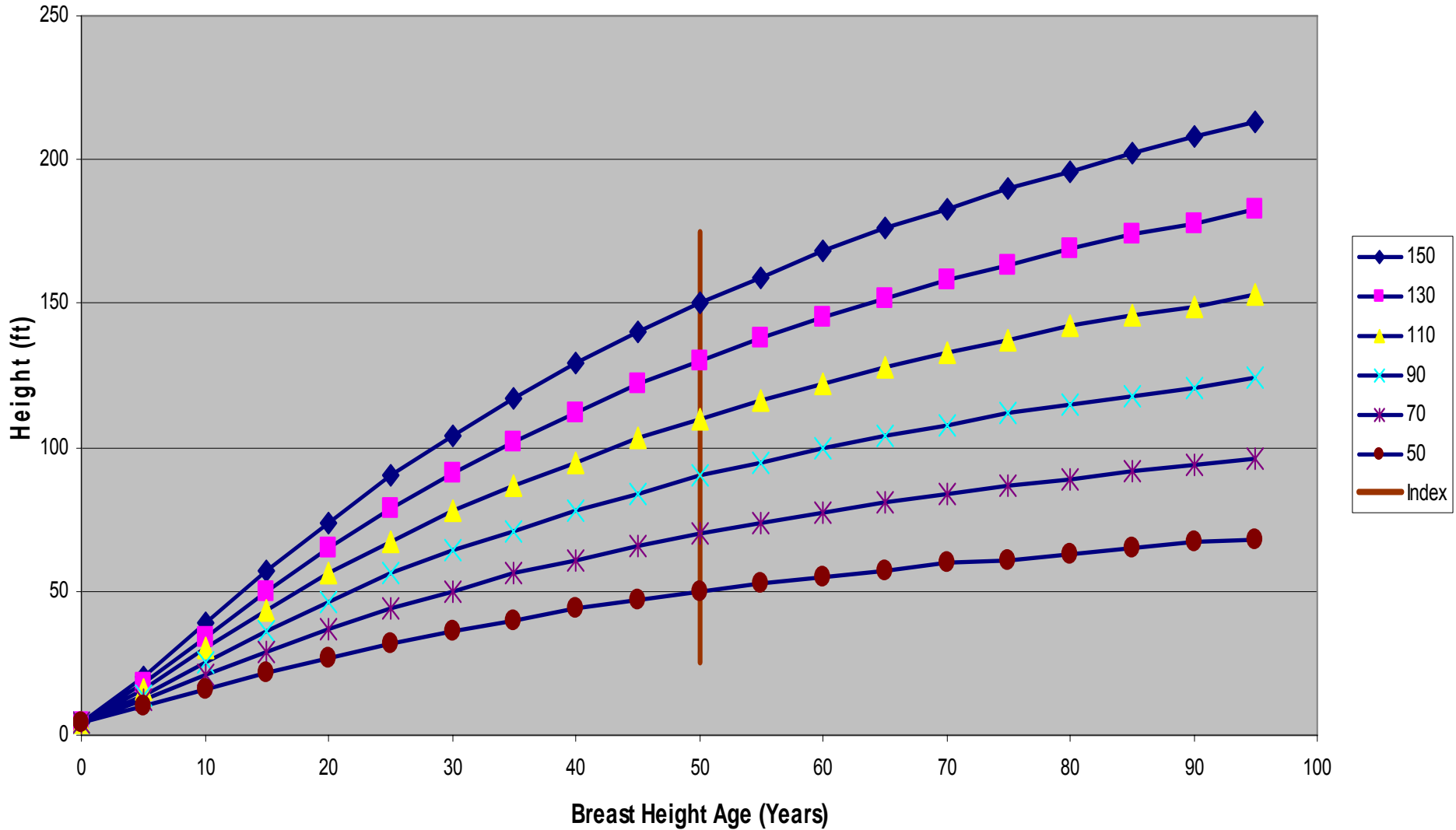
Corvallis, Oregon

April 25, 2007

Traditional Site Classification

- ▶ Height Growth / Age Indexed at Fixed Age
- ▶ Macro-Site Capacity Defined by Ht / Age
- ▶ Assumed to be Independent of Silviculture
- ▶ Traditional Methods:
 - Historically Height at 100 years (Total Age)
 - West Coast – Height at 50 years (Breast Height)
 - Southeast – Height at 25 years (Total Age)

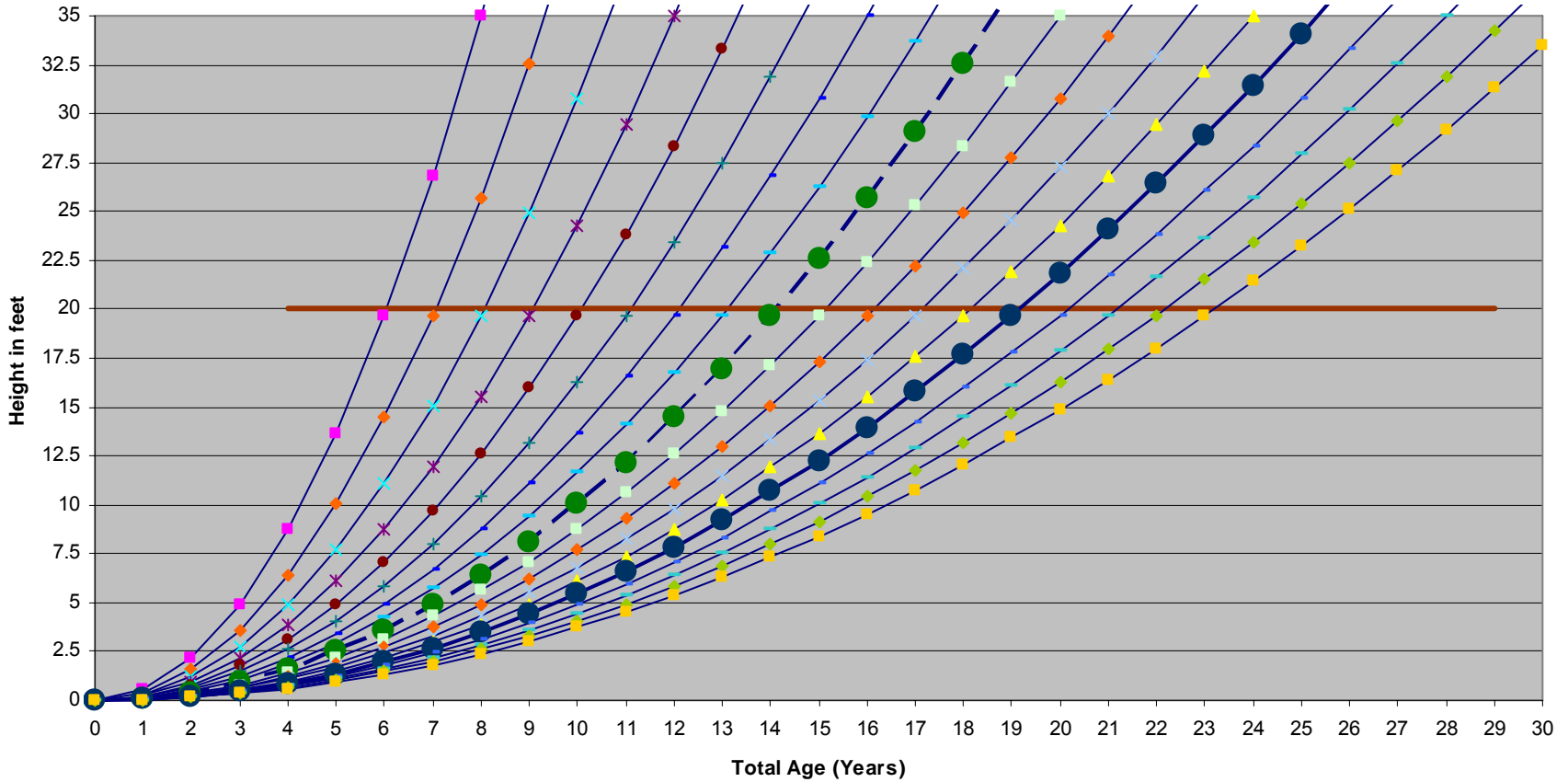
Standard West Coast Site Index Curves Douglas-fir (King, 1966)



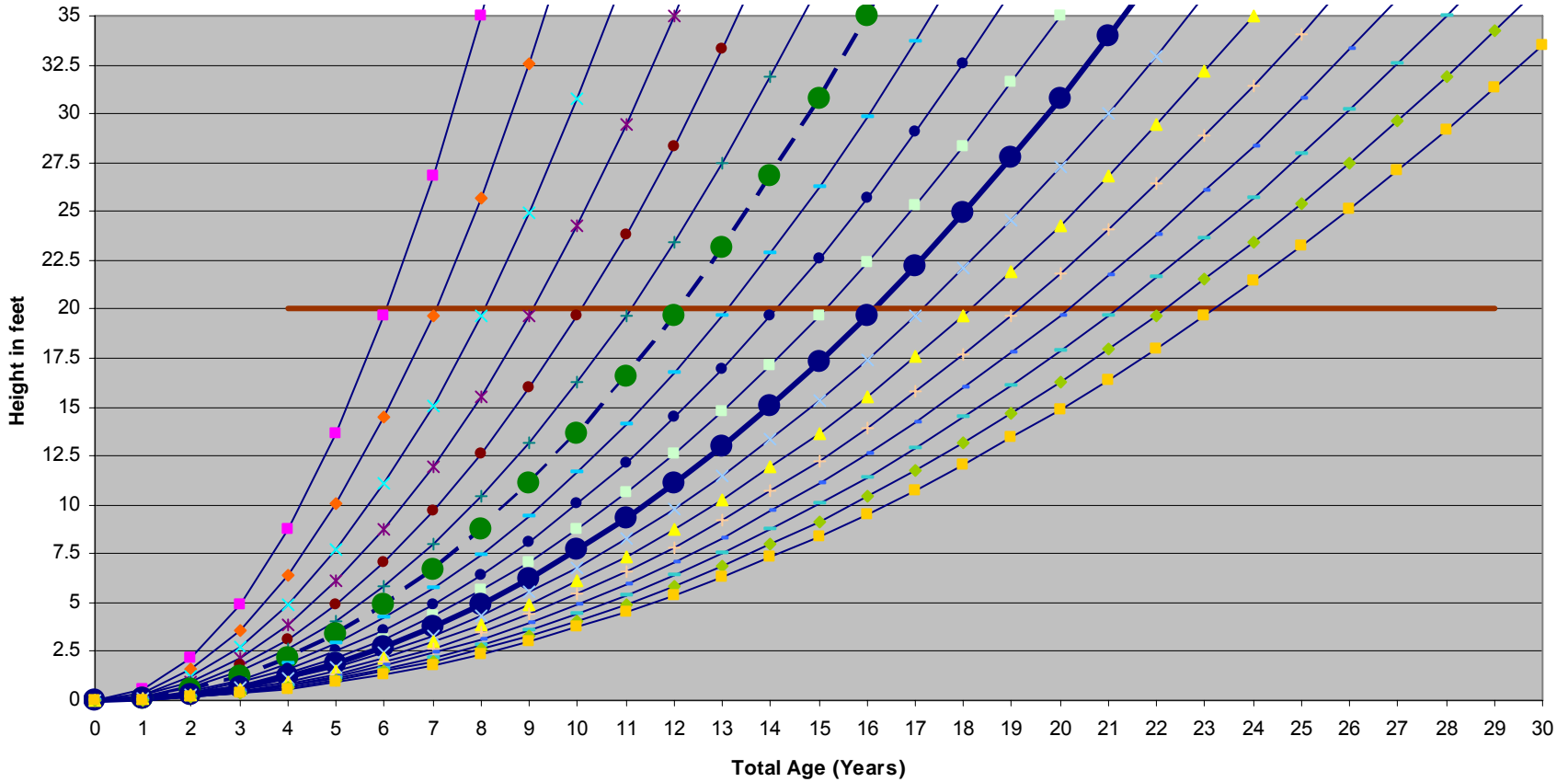
Shortcomings of Traditional Methods

- ▶ Early Growth highly sensitive to Silviculture
 - Height Growth delayed by Competition
 - Effective Site Preparation enhances Growth
 - Vigorous Planting Stock enhances Growth
 - Effective Brush Control enhances Growth
 - Effective Browsing Control enhances Growth
- ▶ Early Silviculture confounds BH Site Method
- ▶ **Plantation** Ht/Age rates exceed **Site Curves**

Managed vs Natural Stand - Total Yrs to 20-ft Ref Height Douglas-fir Site 80ft @50yrsBH



Managed vs Natural Stand - Total Yrs to 20-ft Ref Height Douglas-fir Site 100ft @50yrsBH



Alternative Site Classification

- ▶ Separate the Impact and Influence of Silvicultural Treatments and Genetic Gain
- ▶ Establish and Apply a Robust Method of Site Classification from Direct Tree Measurement
- ▶ Develop an Ownership-wide Classification of Native Site Productivity Capacity
- ▶ Establish a Permanent Classification based on Soils, Climate and Topographic Variables

10m Site Classification Method

- ▶ Use Boris Zeide's (1978) Two-Point Principal
 - Measure Two Heights on the Same Tree
 - Record the Number of Years between Msmts
 - Site Index based on Two Upper-Stem Msmts
- ▶ Move the Base Age from BH to 10-meter Ht
- ▶ Site Capacity equals #Years from 10 to 20 meters
- ▶ Site Shape equals #Years from 20 to 30 meters
- ▶ Site Index = Height Growth in Meters / Decade
- ▶ Site Index = $100 / (\text{\#Years from 10m to 20m Ht})$
- ▶ 10m Site Method may be Applied Anywhere

Conventional Coastal Douglas-fir Site Curves Height Growth Intercepts (10, 20, 30 meters)

