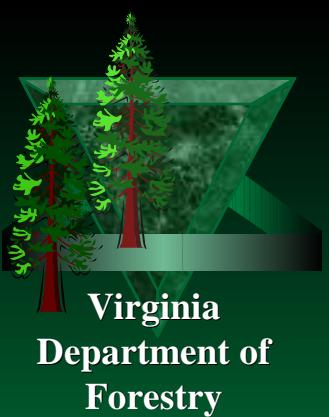




Improving Pine and Hardwood Growth

August 2, 2011
Charlottesville, VA





Realizing Potential Growth

*Consider a system
of silvicultural treatments,
not just one individual treatment.
The effects are often additive.*





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Pine

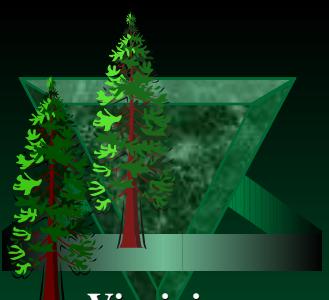
▼ Growth

- Current – 2-6 tons/ac/yr
- Potential – 10+ tons/ac/yr

▼ Tree Improvement

▼ Silviculture





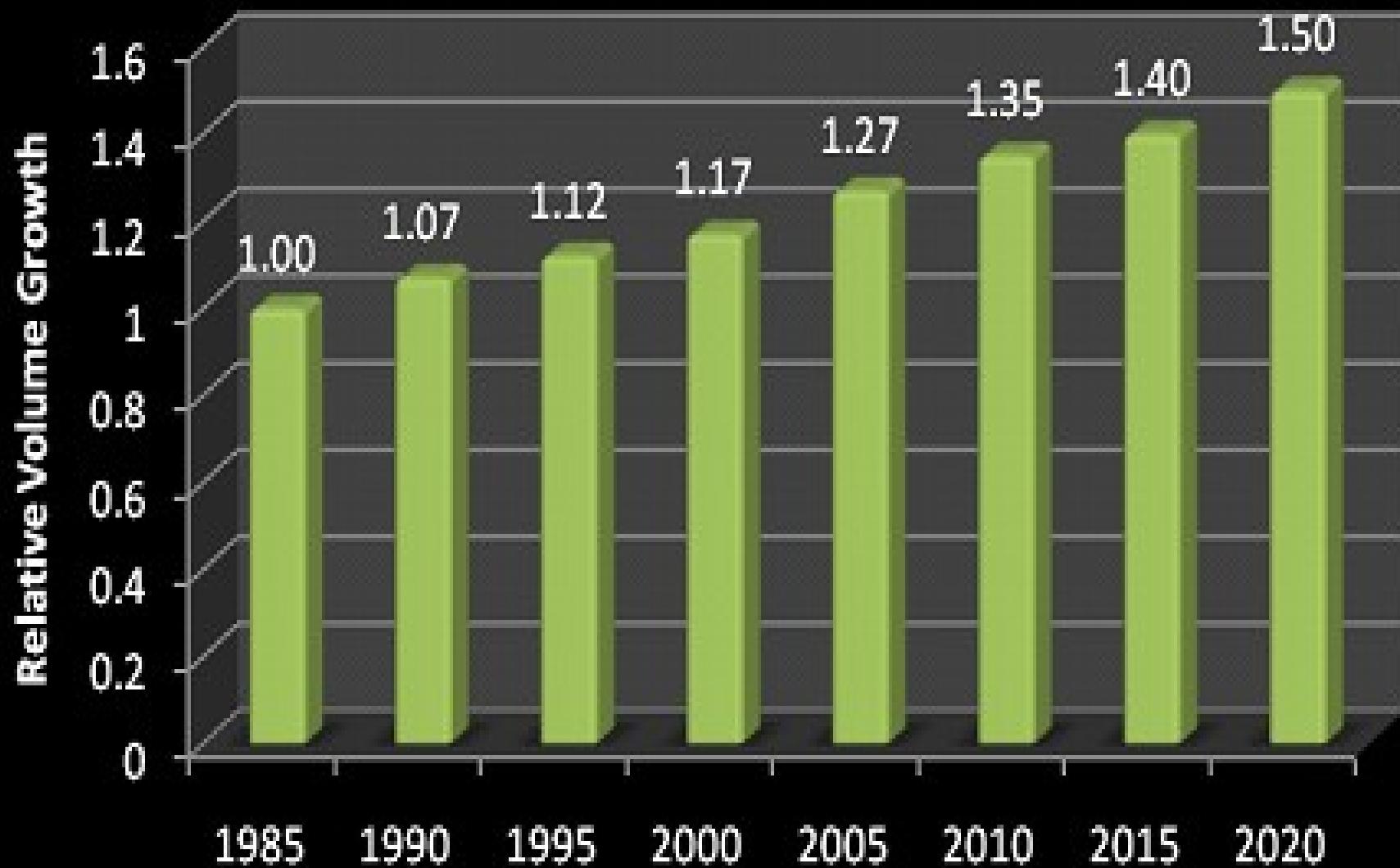
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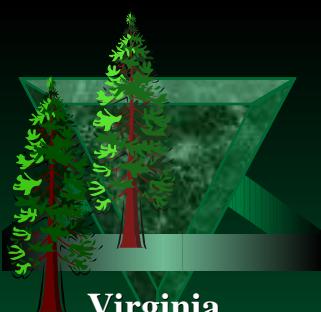
DOF Tree Improvement

- ▼ 1st Gen 1988-1997 15%
- ▼ 2nd Gen 1997-2009 25%
- ▼ 3rd Cycle 2010 – 30%
- ▼ 2nd Gen Prem 2010 – 35%
- ▼ 2nd Gen Elite 2010 – 45%



Genetic Improvement of Loblolly Pine





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Silviculture

- ▼ **Density Control**
- ▼ **Site Prep**
- ▼ **Herbaceous Weed Control**
- ▼ **Early Release**
- ▼ **Mid-Rotation Release**
- ▼ **Mid-Rotation Fertilization**





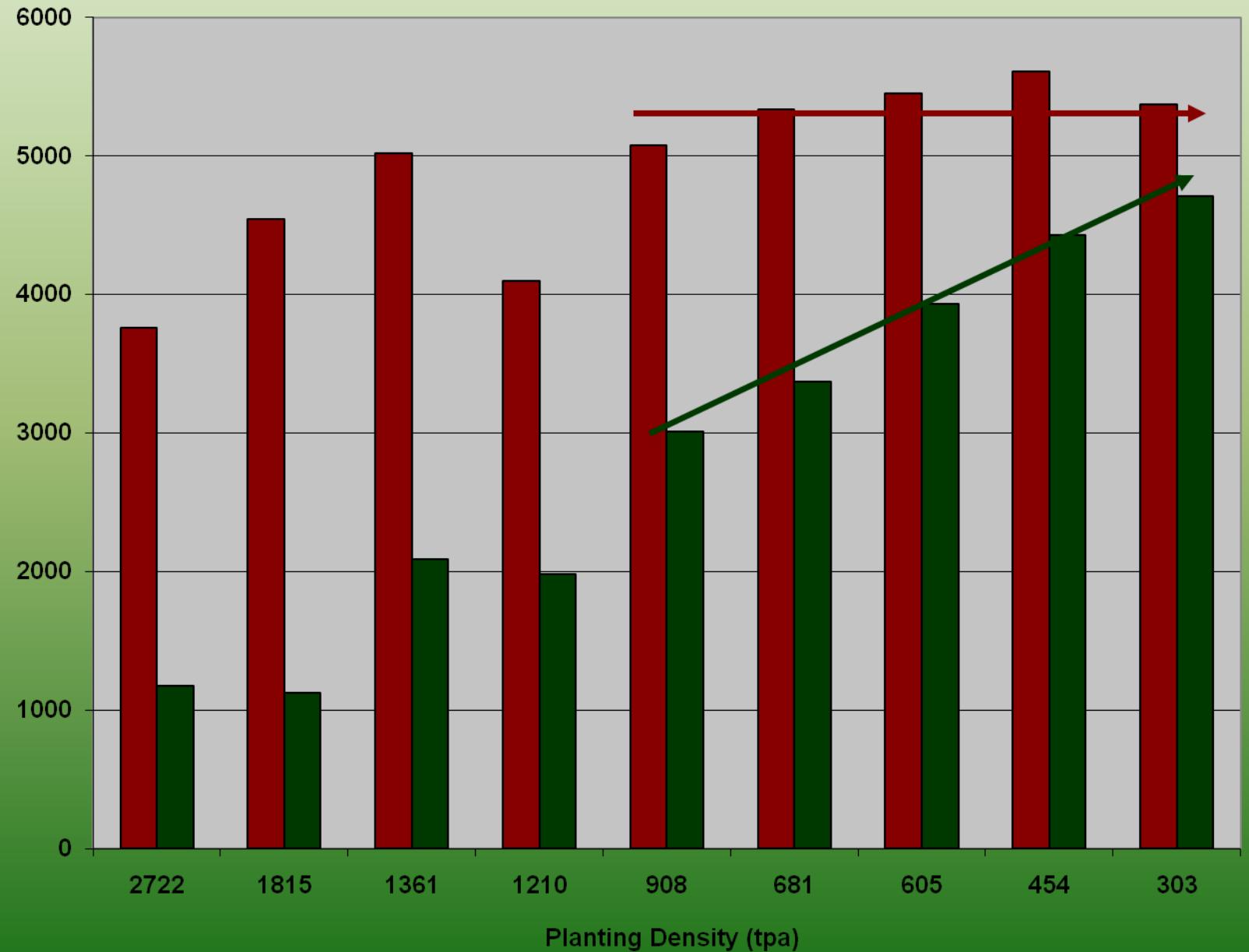
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Silviculture

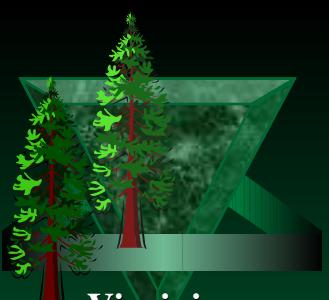
- ▼ **Density Control:** Appropriate planting density, pre-commercial thinning (if needed), or commercial thinning can have huge effects on the subsequent growth rate and development of the stand and individual trees.



Effect of Planting Density on Loblolly Pine Volume Production at Age 25





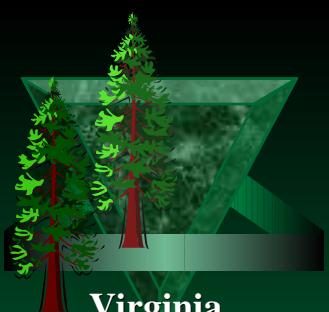


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Silviculture

- ▼ **Site Prep:** From our current site prep study, our volume growth response is around 70%. From an older site prep study near Appomattox, the longer-term response to woody competition control was 95%. We might take this as a better reflection of long-term response. To be conservative, estimate 75%.

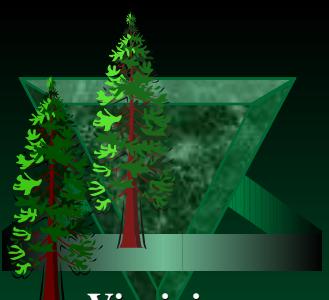




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Silviculture

- ▼ **Herbaceous Weed Control:** A test near Appomattox found the response to be between 5 and 10%. Estimate about 5%. (Note – this will be more valuable if it's part of a complete suite of treatments – for example, with woody control HWC added 27% in yield)





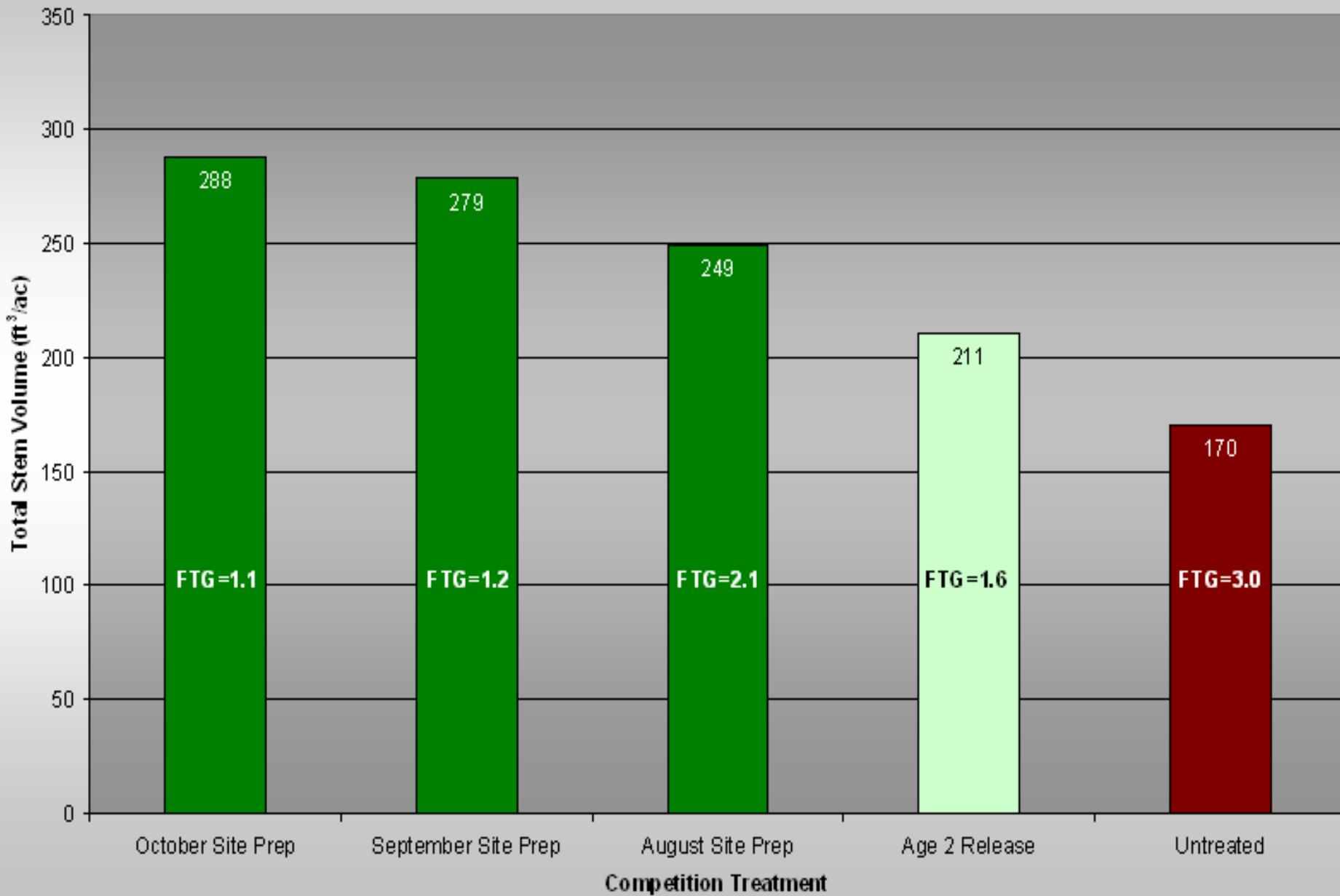
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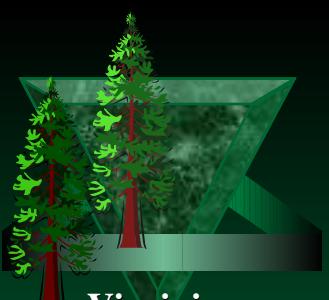
Silviculture

- ▼ **Early Release:** From Tom Dierauf's release plots, the average gain from release was somewhere around 52%. This is conservative.



Timing of Hardwood Control in Loblolly Pine - Age Five Results





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Silviculture

- ▼ **Mid-Rotation Release:** We haven't done this here much, but in the South studies have shown an average gain in volume around **20%**.





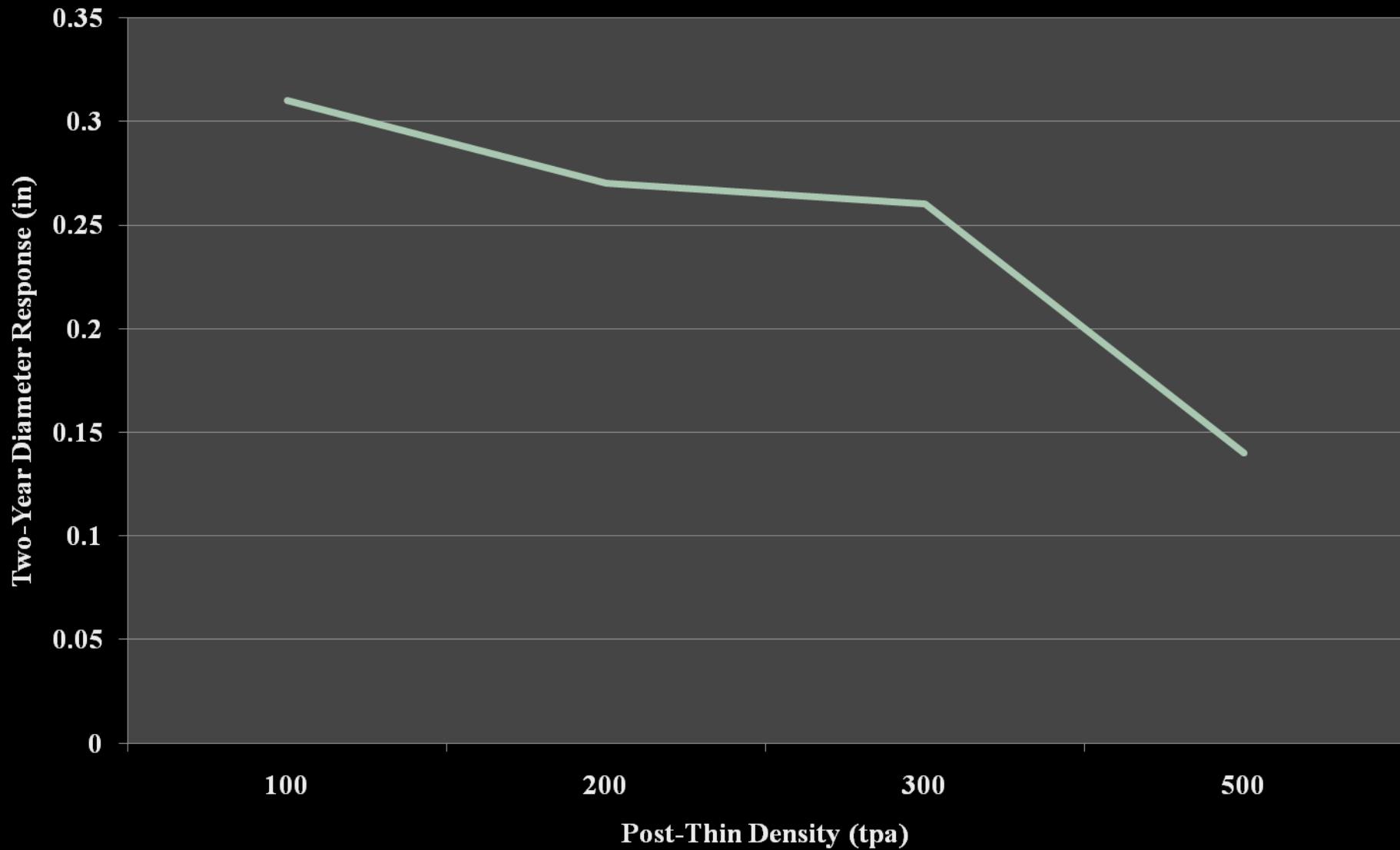
Silviculture

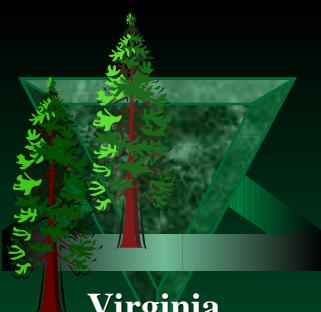
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- ▼ Mid-Rotation Fertilizer: 25%



Two-Year Diameter Response to Fertilizer in Thinned Plots





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Hardwood

▼ Growth

- Mixed oak: 1-2.5 tons/ac/yr
- Eucalyptus: 12-20 tons/ac/yr

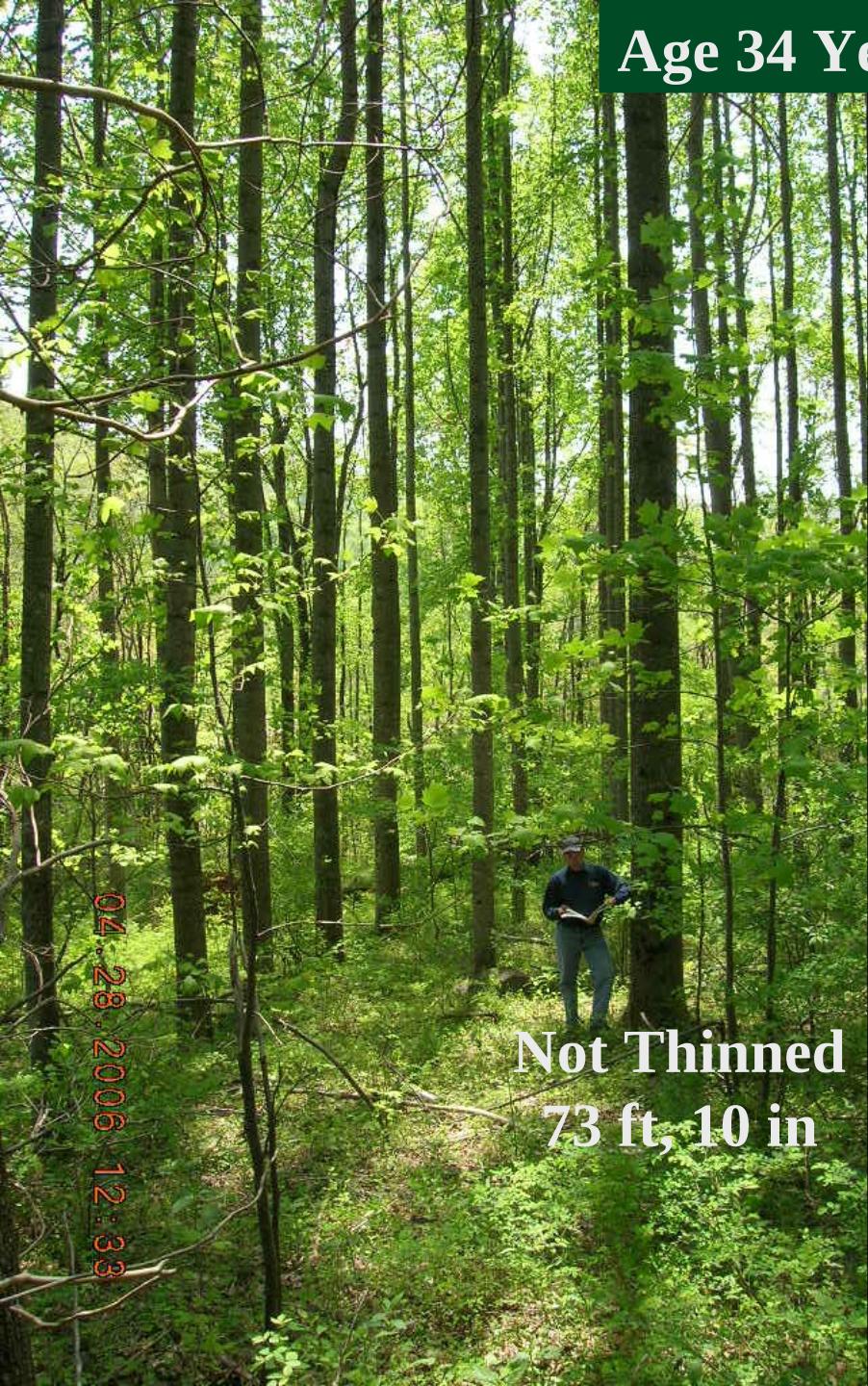
▼ Regeneration (Natural or Artificial)

▼ Crop Tree Release

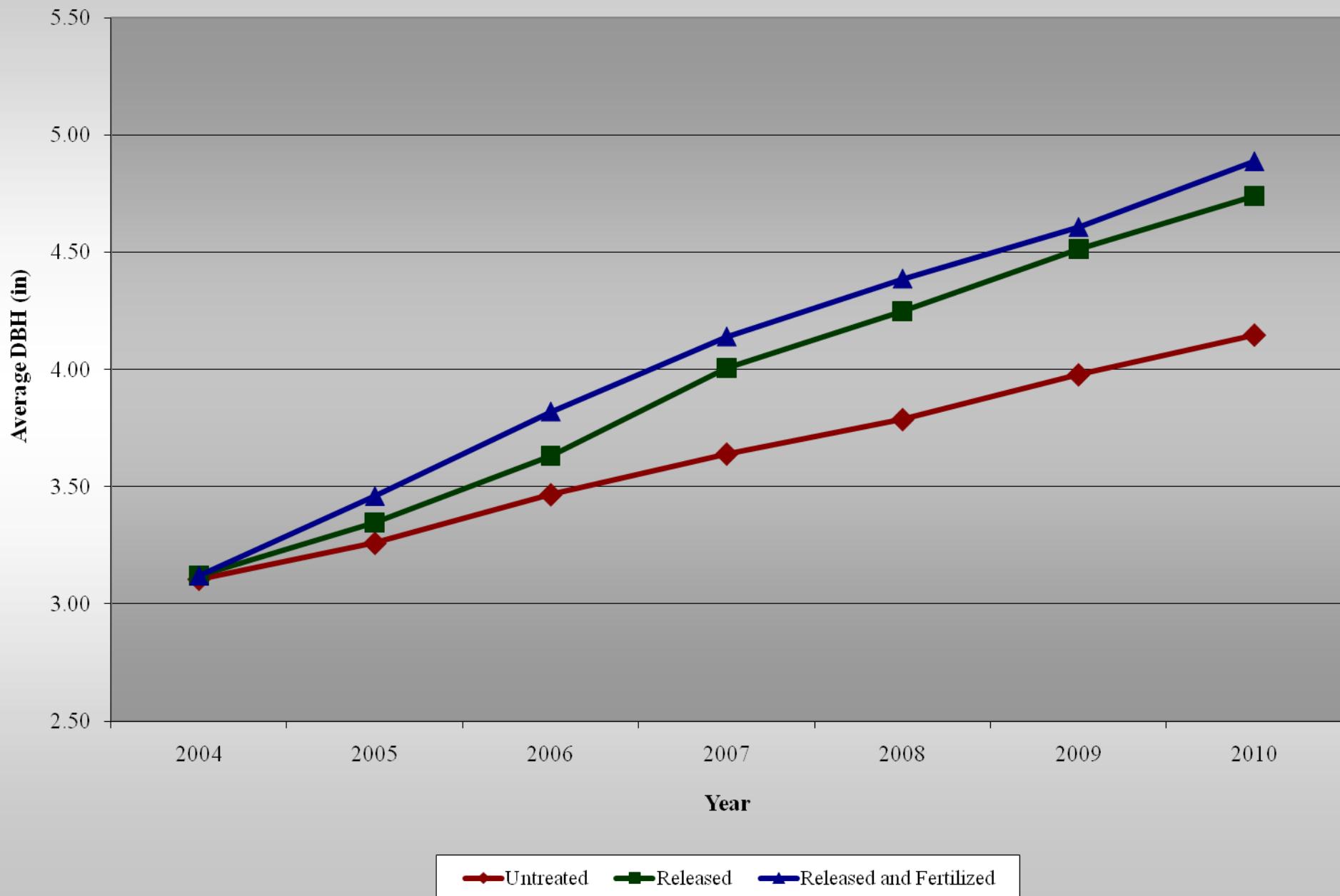
▼ TSI / Thinning



Age 34 Yellow Poplar



2005 White Oak Crop Tree Release Study







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Threats

- ▼ Invasive Tree Species
 - Ailanthus, etc.
- ▼ Non-native insects & pathogens
 - EAB, TCD, ALB, HWA

