

The Use of Boron Rods as a Boron Source for Dual Treated Timber .

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Introduction

- Creosote-borate dual treatment commonly used to extend timber life.
- AWWPA commodity specification C: Borate pretreatment = .17 pcf B_2O_3
- Borate pressure or dip treatment before creosote.
- Some facilities cannot afford to install equipment for borate treatment.
- Boron diffuses readily at high moisture content (30% or greater).
- Examine pretreatment using borate rods in green timber.

Methods



- Nine 3"x3/4" rods placed in 5" deep bore holes in 10"x10"x10' green timber before creosote.
- 13" apart.
- Number of rods based on volume of timber and amount of boron needed to achieve 0.17 pcf B_2O_3 .
- Bore hole plugged and timber treated with creosote.
- Timbers shipped and place in HEF (Saucier, MS).

Methods

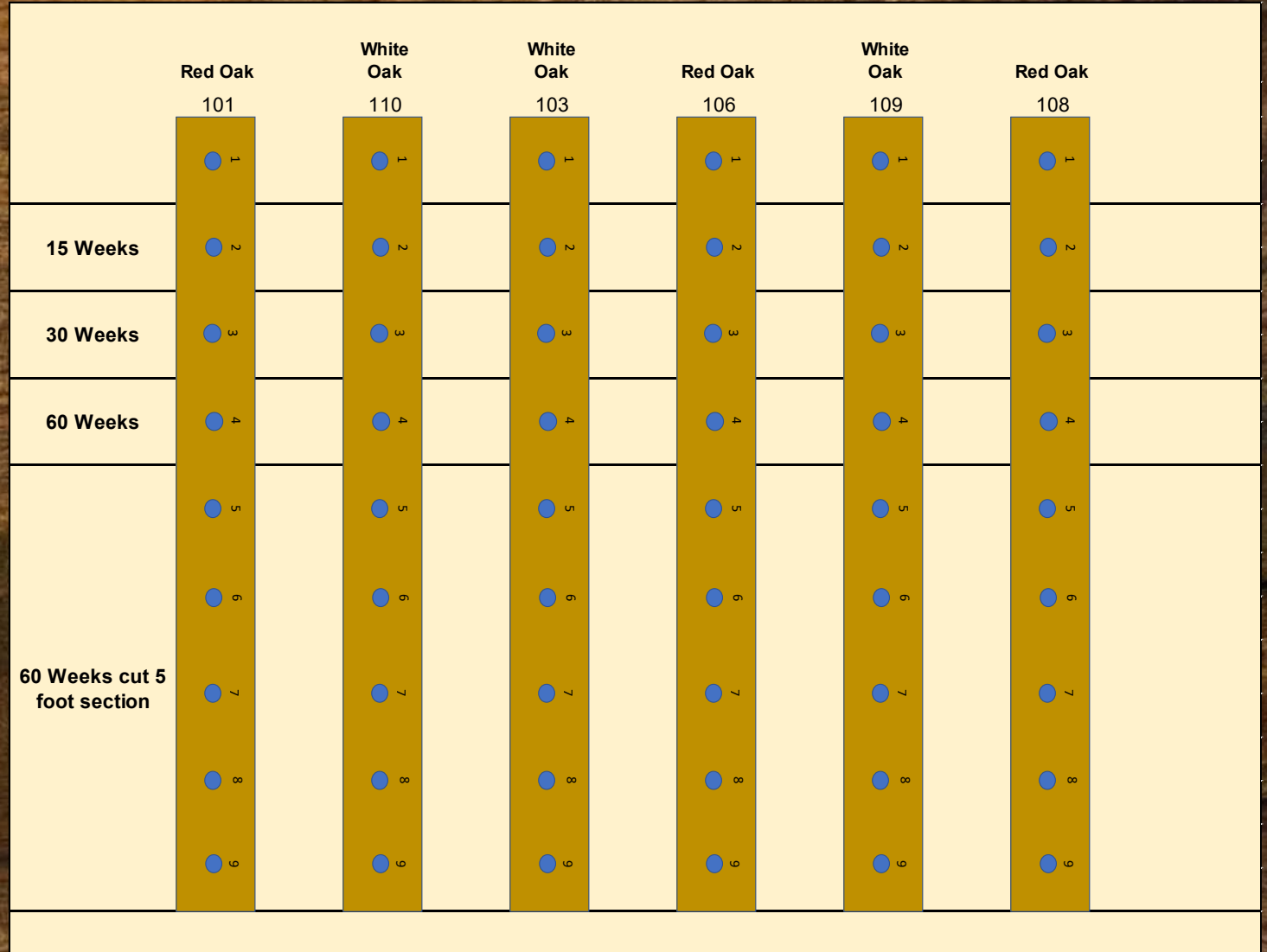


- Checked rod holes at 4 and 6 weeks.
- Rod dissolved; some holes filled with water, rod not present (probed with wire).
- Sampled for moisture content – did not get an initial MC at boring and rod installation.

Methods: Sampling



- 3 red oak, 3 white oak
- Sampled at 15 and 30 wks
- Future sampling at 60 wks
- Increment borer
- Whole sections at 60 wks



Methods: Sampling Pattern

- Longitudinal
 - 2, 4, 6" - positions: 1,2; 5,6; 9,10.
- Tangential
 - 1.5, 3" – positions: 3,4; 7,8.
- All distances from edge of rod hole.
- Sampled from outside to inside in order shown.
- Moisture content.
- Curcumin/Salicylic acid indicator.
- Boron Analysis = Azomethianine
 - Inner
 - Outer



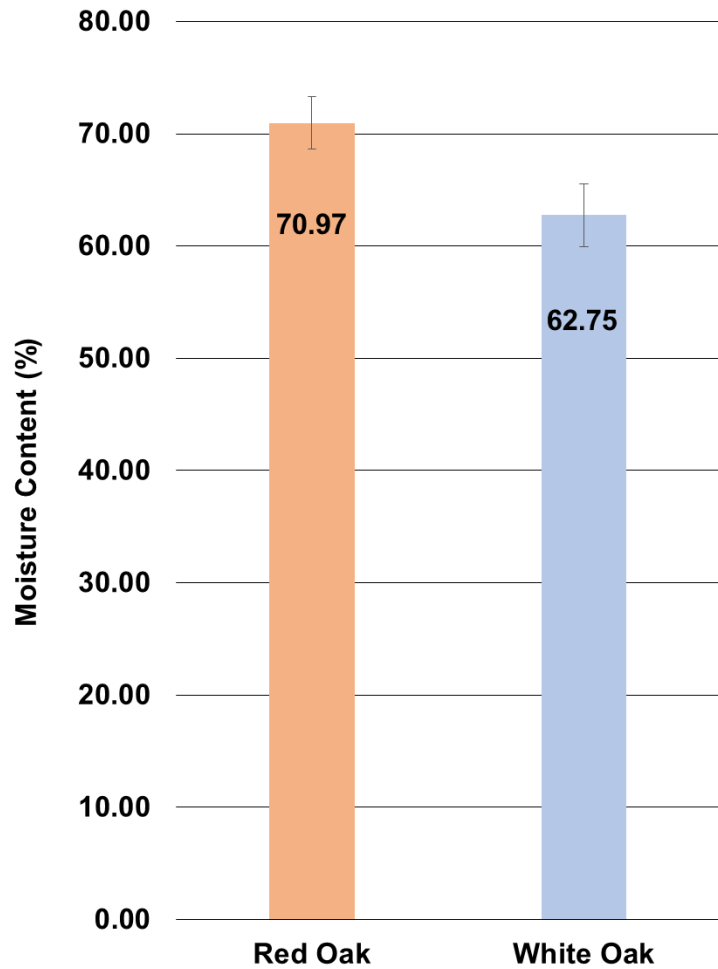
Methods: Sampling



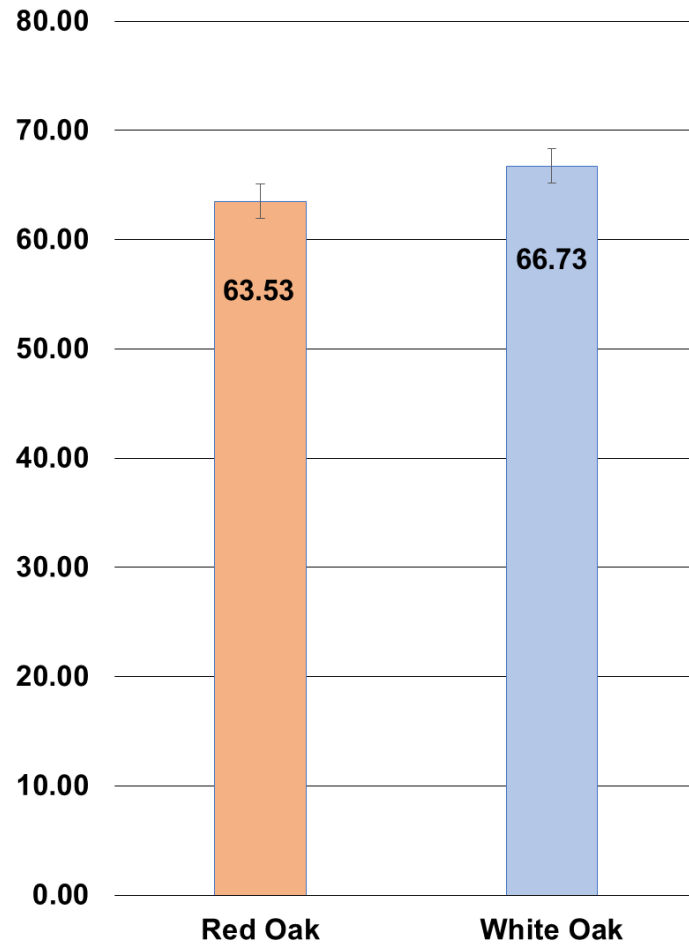
- Increment borer.
- 6" core sample.
- Stored in straw on ice.
- Dry at 60° C.

Results: Moisture Content

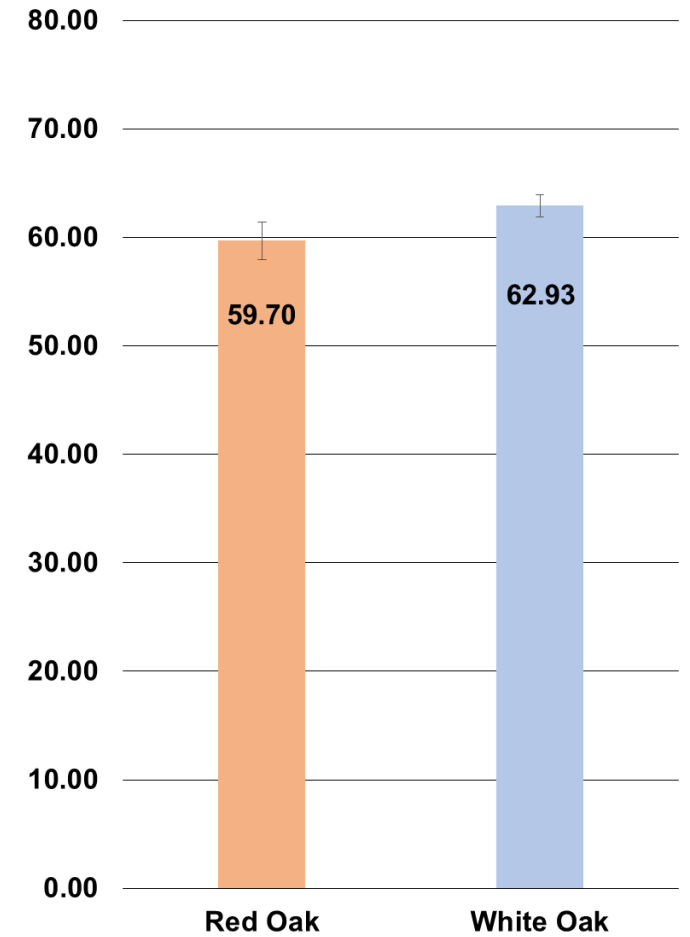
6 Weeks; n = 10



15 Weeks; n = 30

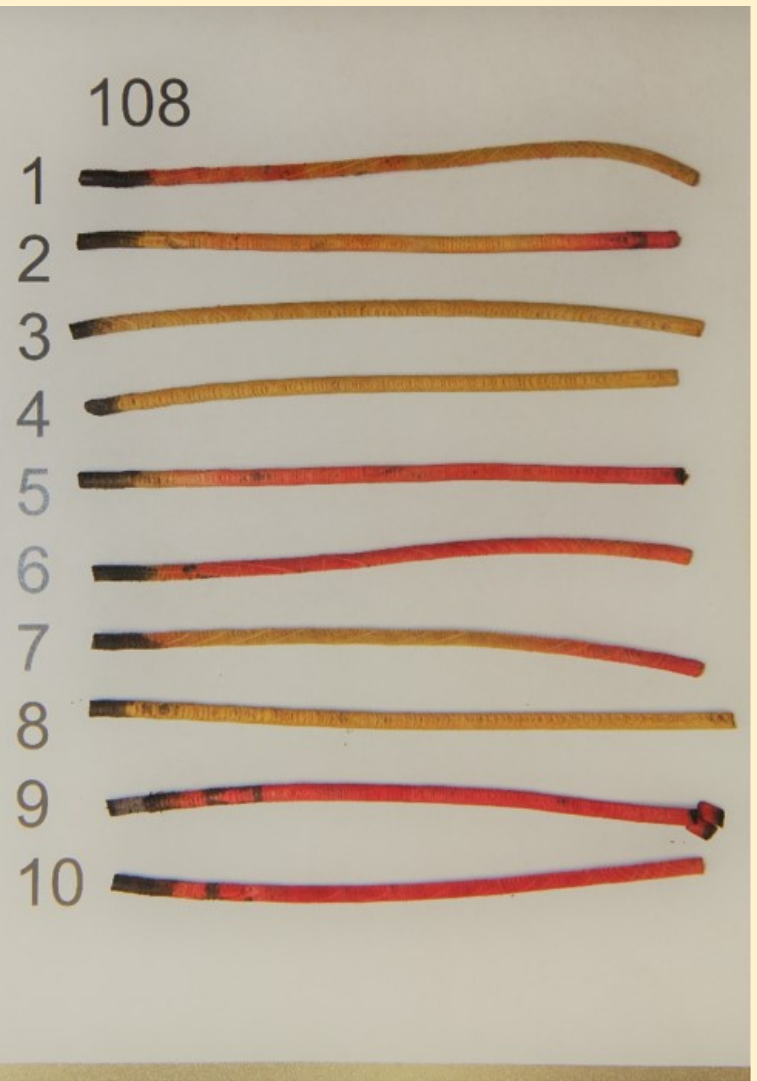


30 Weeks; n = 30



Results: Boron Indicator; Red Oak

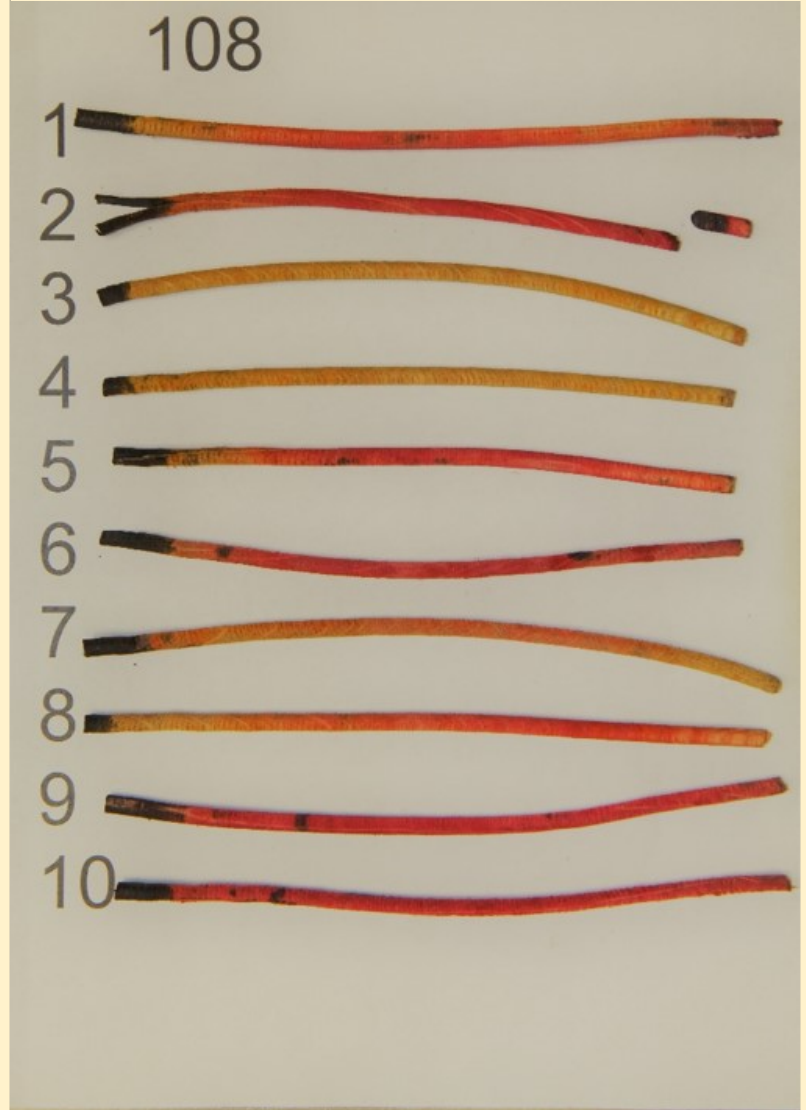
• Red Oak 15 Weeks



- Left = outer
- Right = inner
- 1,2 = 6" longitudinal
- 3,4 = 3" tangential
- 5,6 = 4" longitudinal
- 7,8 = 1.5" tangential
- 9,10 = 2" longitudinal



• Red Oak 30 Weeks



Results: Boron Indicator; White Oak

• White Oak 15 Weeks



- Left = outer
- Right = inner
- 1,2 = 6" longitudinal
- 3,4 = 3" tangential
- 5,6 = 4" longitudinal
- 7,8 = 1.5" tangential
- 9,10 = 2" longitudinal



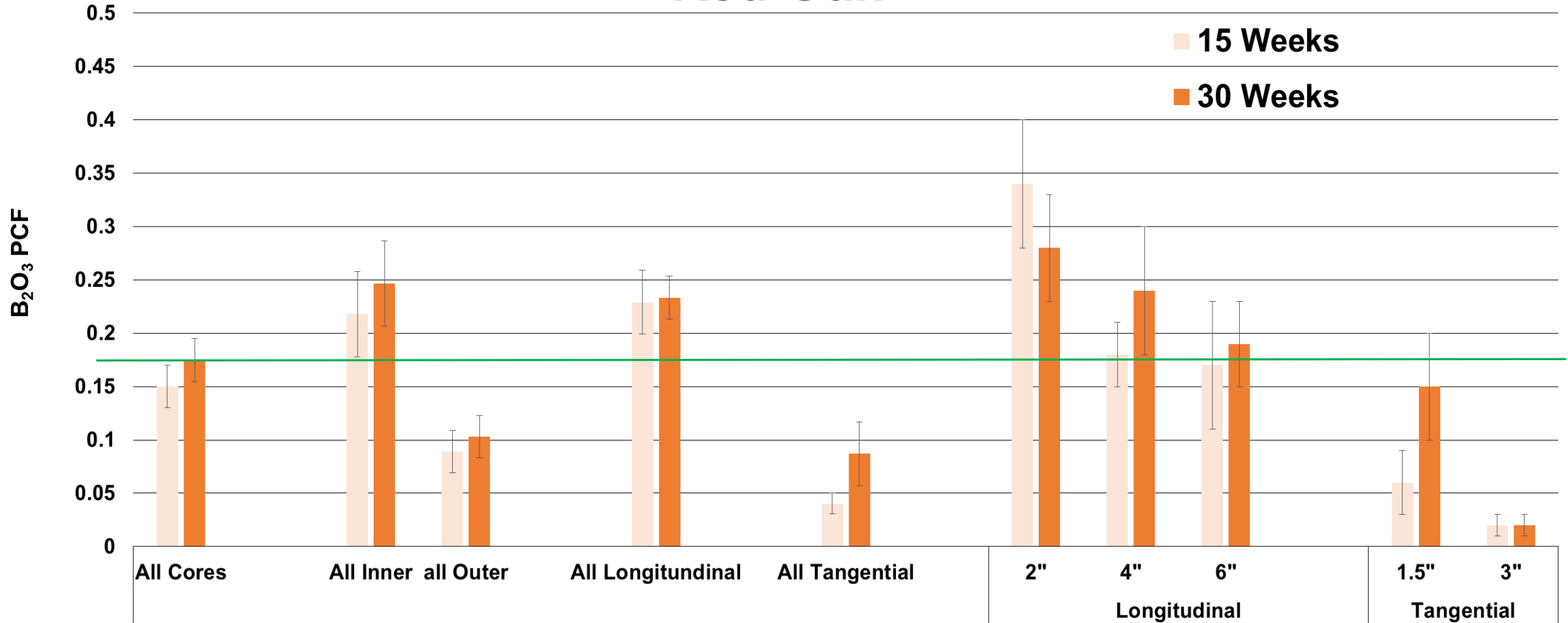
• White Oak 30 Weeks



Results: Boron Analysis

The green line = 0.17 pcf B₂O₃

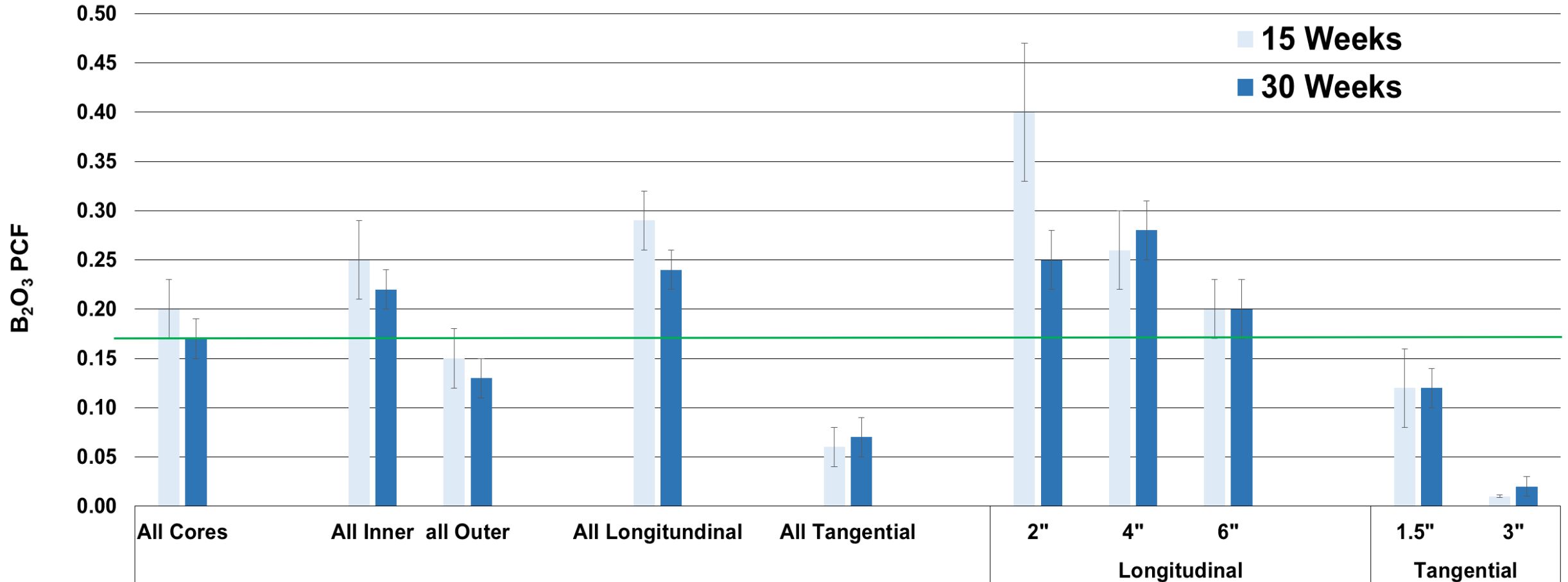
Red Oak



Results: Boron Analysis

The green line = 0.17 pcf B₂O₃

White Oak



Preliminary Conclusions

- Moisture content high and remains high = continued boron diffusion.
- Rod dissolved rapidly – 4 weeks, possibly faster.
- Boron diffusing readily in longitudinal direction.
- Boron not diffusing rapidly in tangential direction, but it is moving.
- Some boron levels are at or close to AWPA 0.17 pcf, but not in the outer and tangential locations away from where rod was placed.
- It's one small sample point in a large timber.
- Next sampling at past 1 year point; Cores and destructive sampling of entire timber.

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Questions?

