Impact of Biomass Removals on Forest Nutrient Status and Productivity

UI Experimental Forest Case Study

Intermountain Forest Tree Nutrition Coop

Leonard R Johnson and Terry Shaw

UI Experimental Forest Study

- 1982 Biomass Removal Experiment
- Whole tree removal in Clearcut and Shelterwood
- Remove all material 5 inches and larger
- Adjacent seed tree stand had bole only harvest
- Initial IFTNC case study on nutrient levels 23 years after harvest

Study of Costs and Operational Difficulties with Biomass Transport and Processing

Residue Chipping at Second Landing

Material 5 inches and larger and tops of merchantable material hauled to roadside for subsequent chipping

Cable Yarding Uphill with Live Skyline

Clearcut Landing Area

Yarding and Loading from Clearcut Unit

Stand Characteristics by Silvicultural Treatment Type

Stand Characteristic	Control	Shelterwood	Seed Tree	Clearcut
Rock Type	Granitic	Granitic	Granitic	Granitic
Veg. Series	Cedar	Cedar	Cedar	Cedar
Harvest Date	-	1982	1980/1982	1982
Harvest Type	-	Whole Tree	Bole Only	Whole tree
Site Prep		B Burn	B Burn	B Burn

Clearcut:

According to Harold:

September burn

Low moisture in duff layer

Burned to bare mineral soil in most of the area

Seed Tree:

According to Harold –

Bole only harvest in 1980
St Helens deposit in 1980
Burned in October 1980

Plant in Spring 1981
Remove Seed Trees 1982

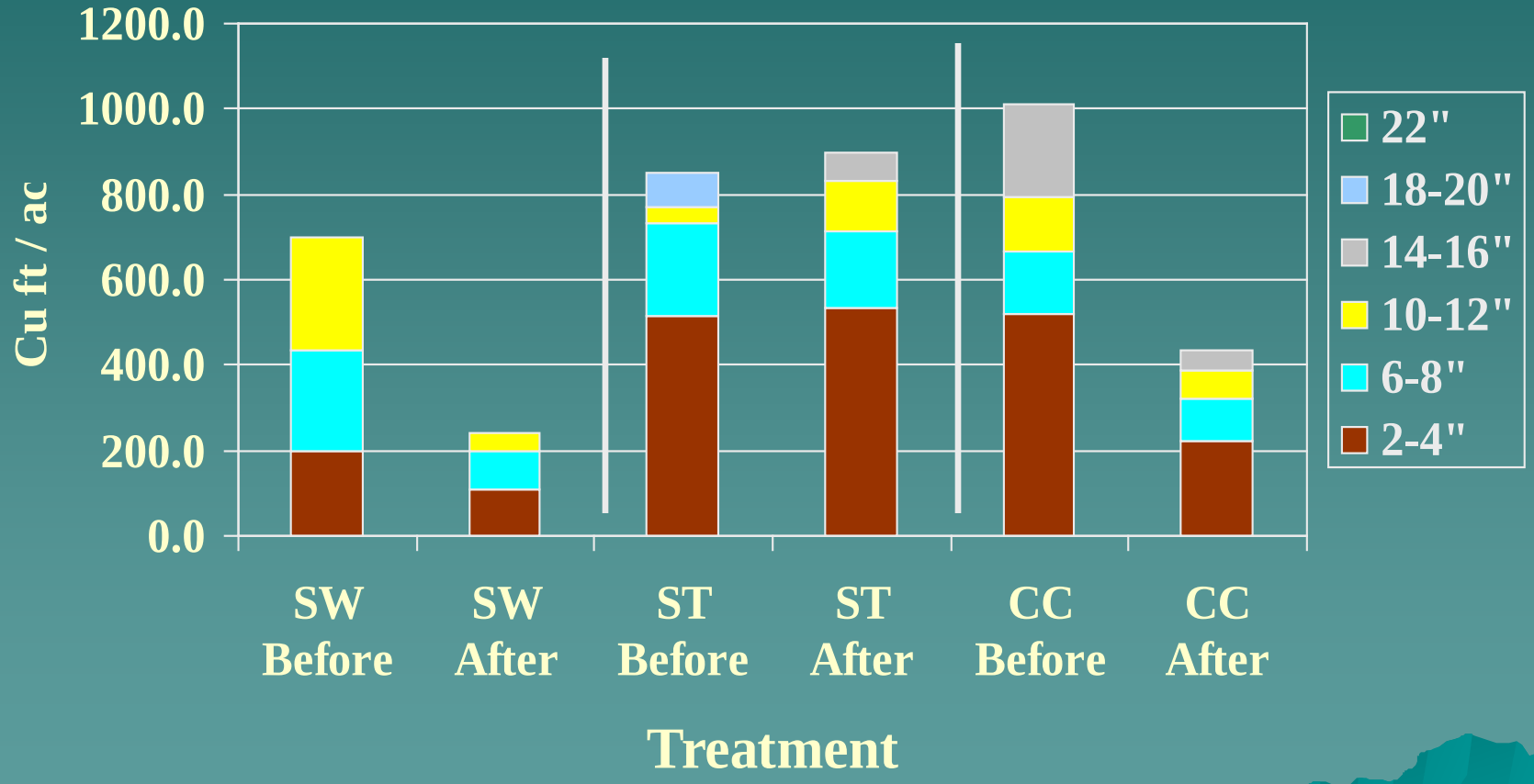
Interplant in 1982

Shelterwood:

No burning except fringe near clearcut

No planting or additional site preparation

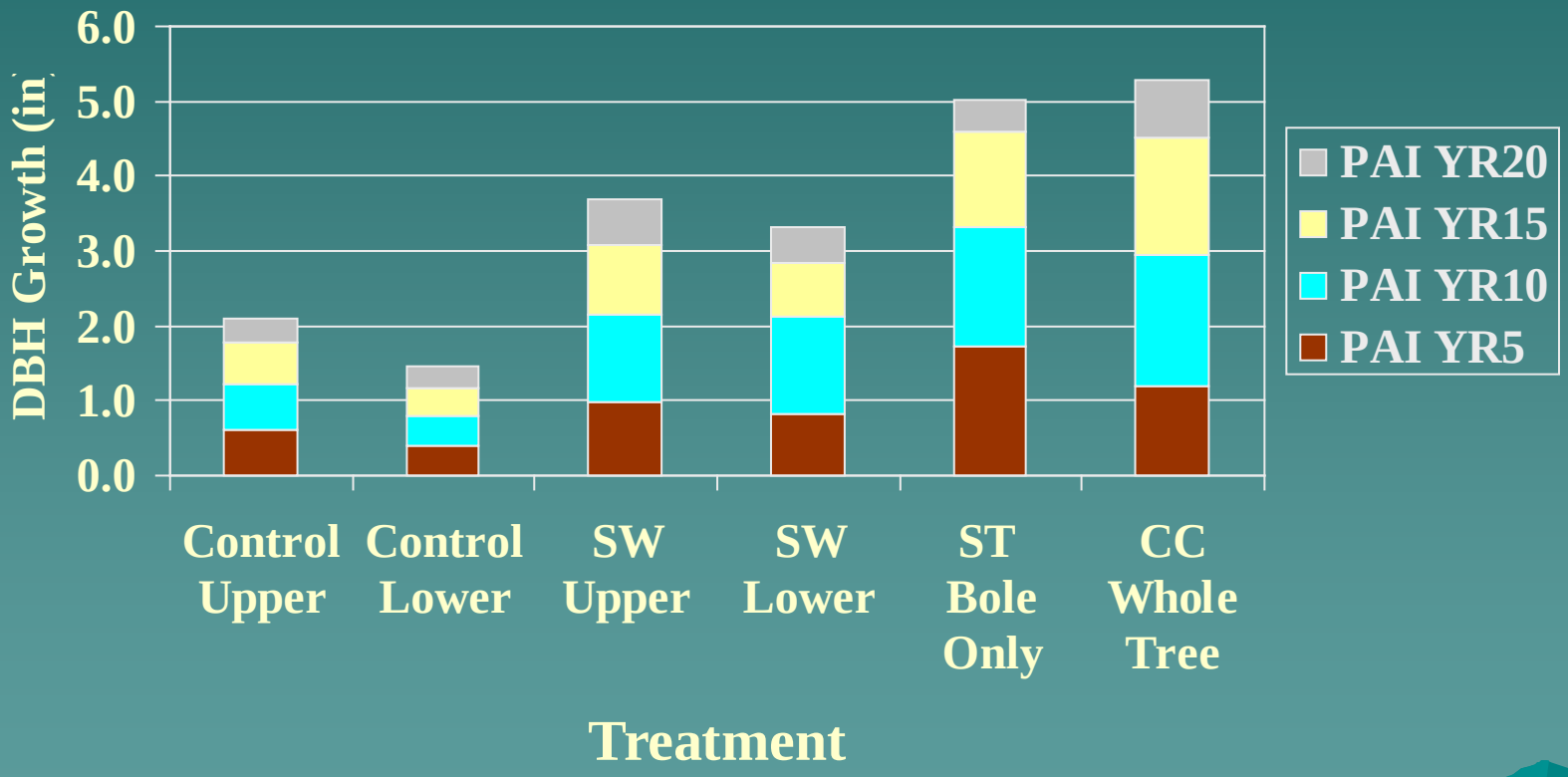
Down and Dead Inventory
Slash Recovery
Cu ft/ac by Diameter Class



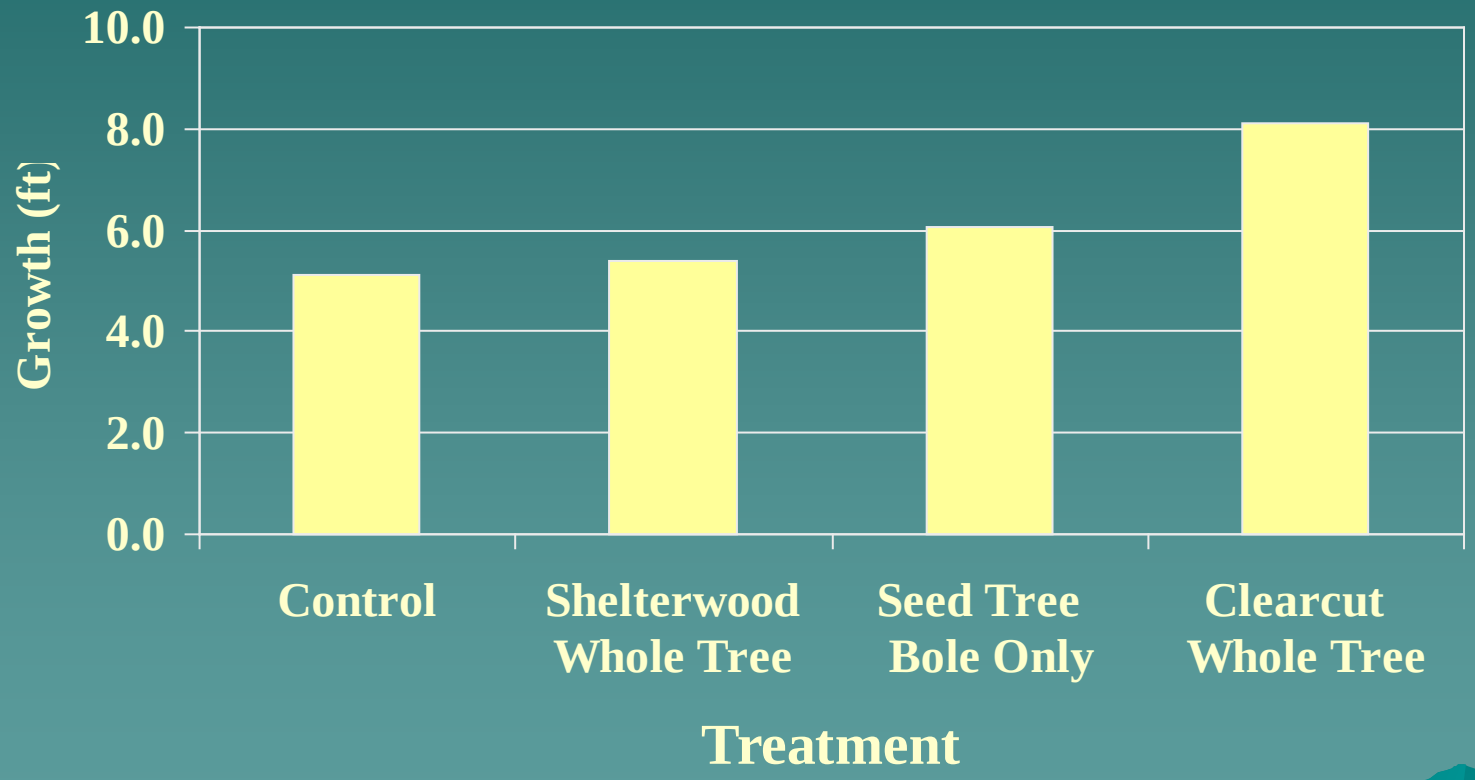
Stand Characteristics 2004 by Silvicultural Treatment Type

Stand Characteristic	Control	Shelterwood	Seed Tree	Clearcut
Trees per Acre	353/-	377/1400	223/600	197/450
BA per Acre	238	110	20	19
Mean DBH	12	8	4	4
Site Height	103	96	36	41
Cu ft/ac	7961	3360	285	251

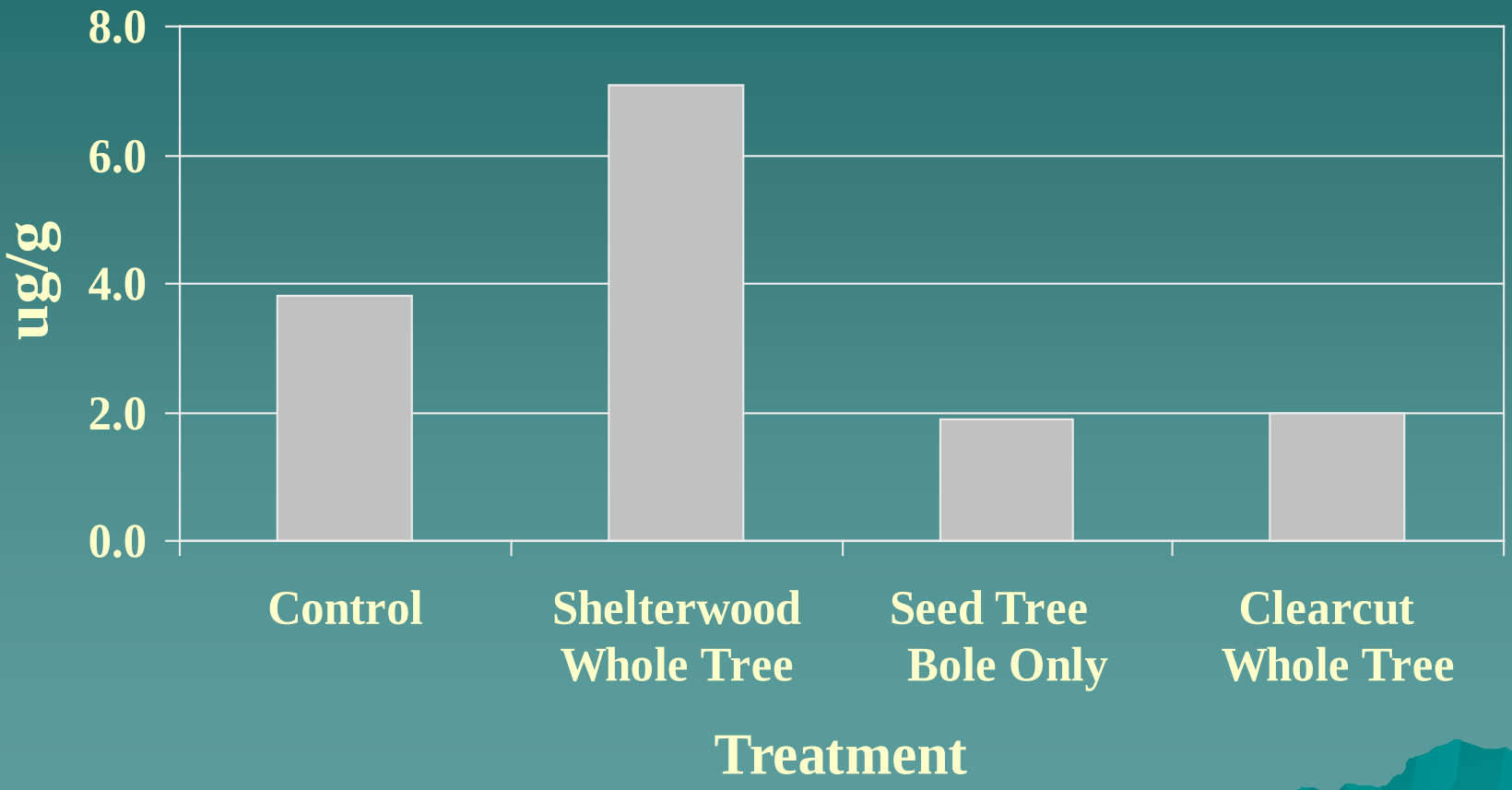
Douglas-fir DBH PAI by Stand Treatment and Crown Class



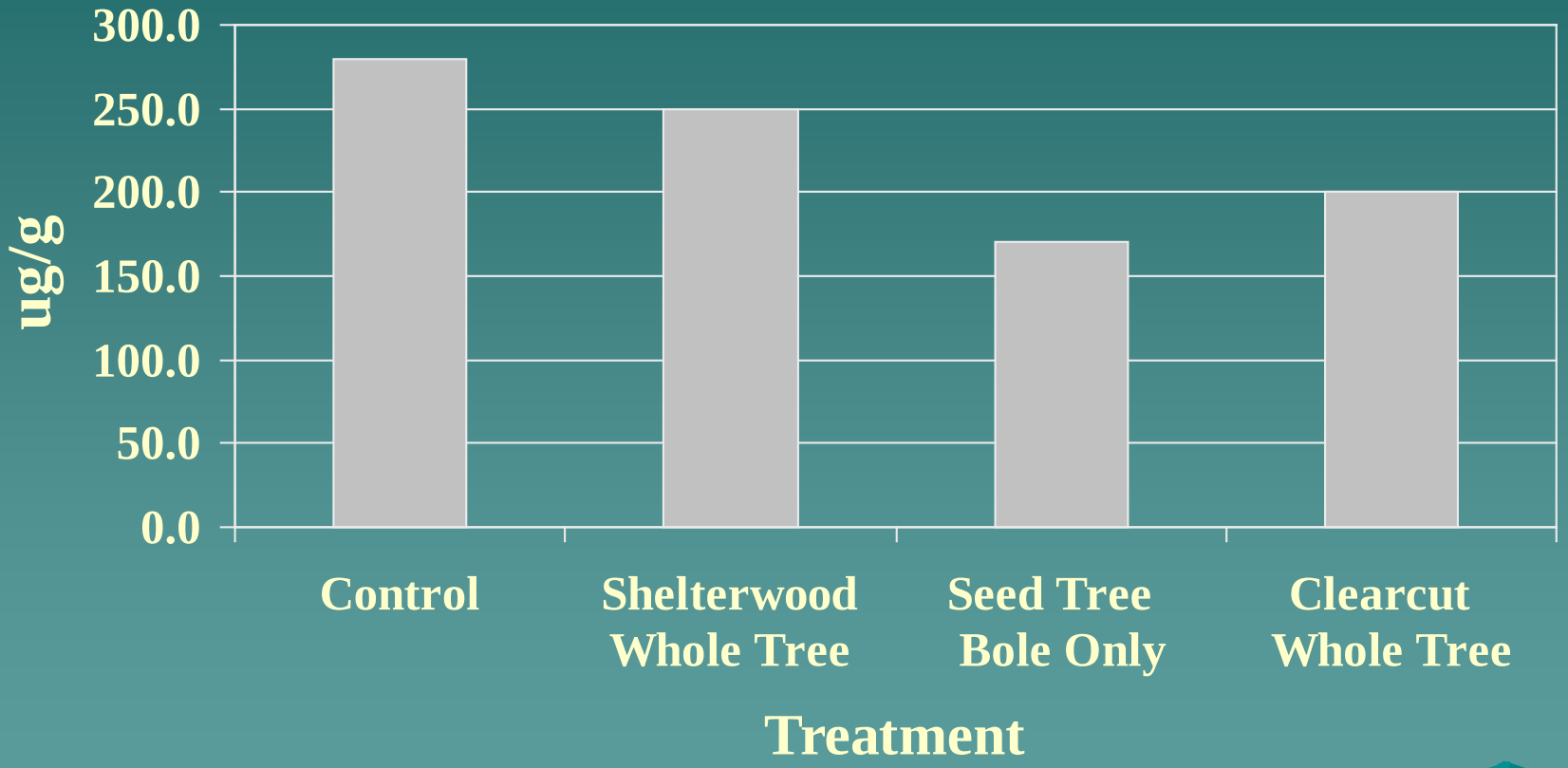
Five-Year Height Growth by Stand Treatment



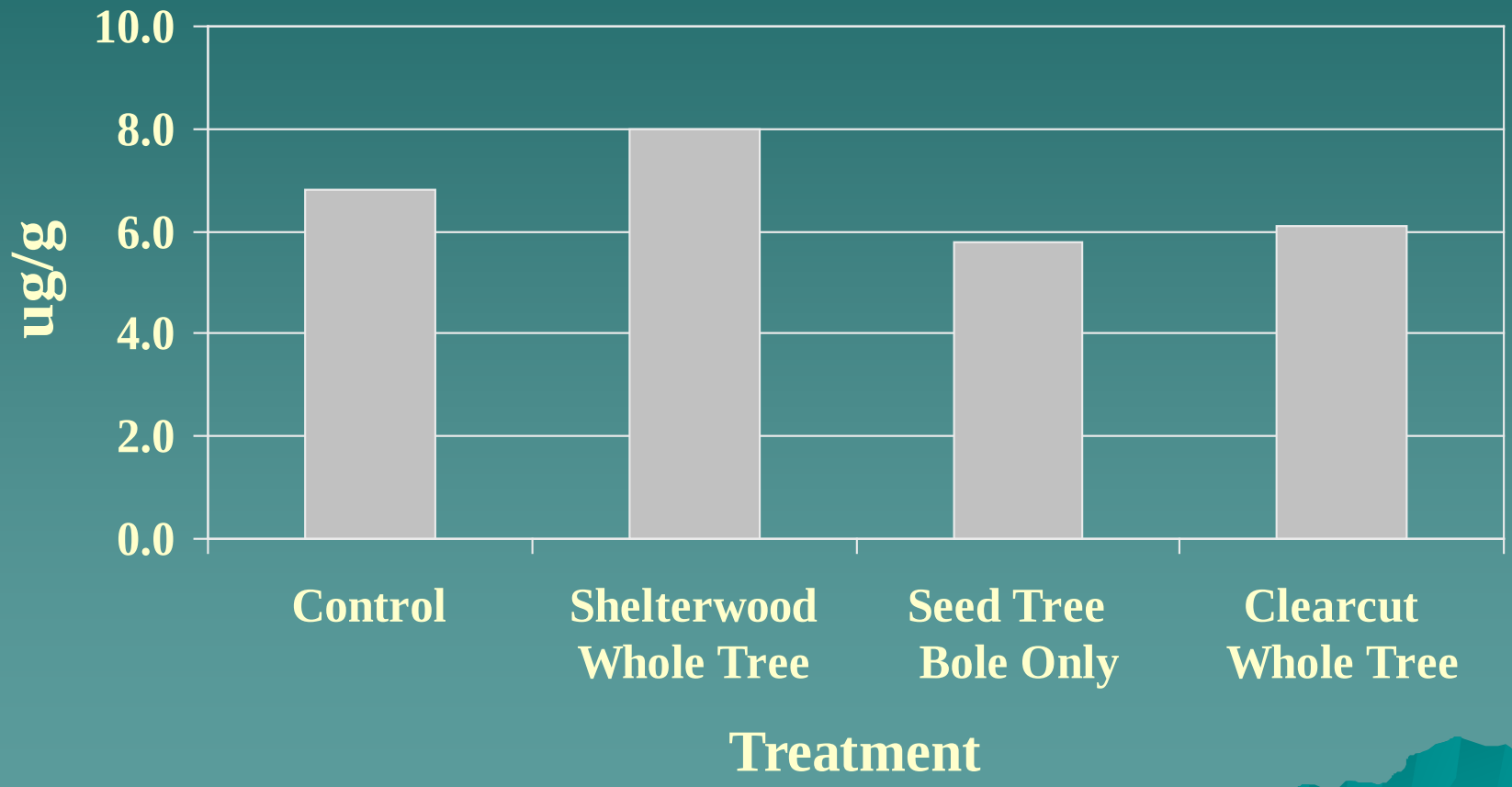
Surface Soil NH_4 Concentrations by Stand Treatment



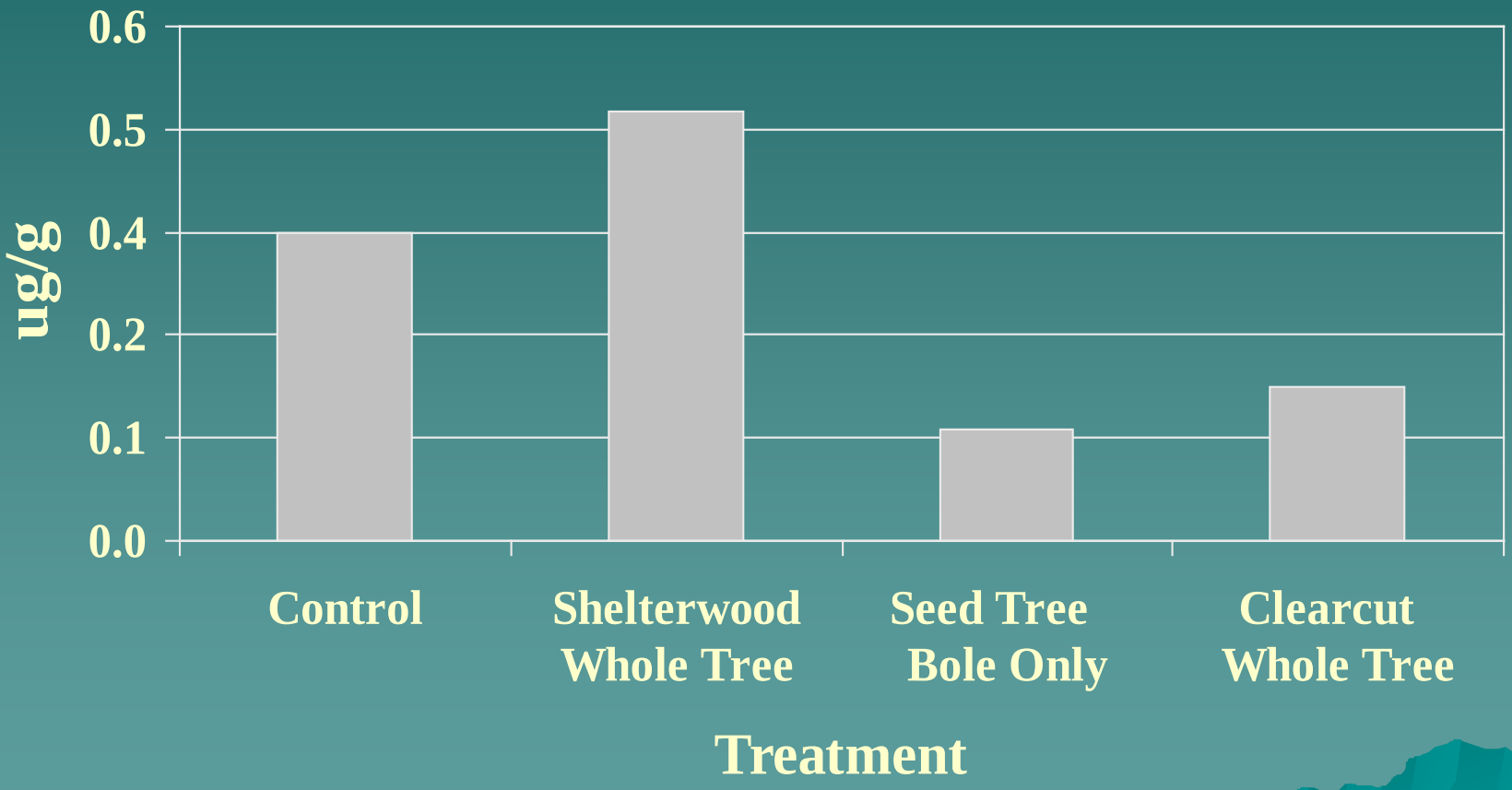
Surface Soil Available K Concentrations by Stand Treatment



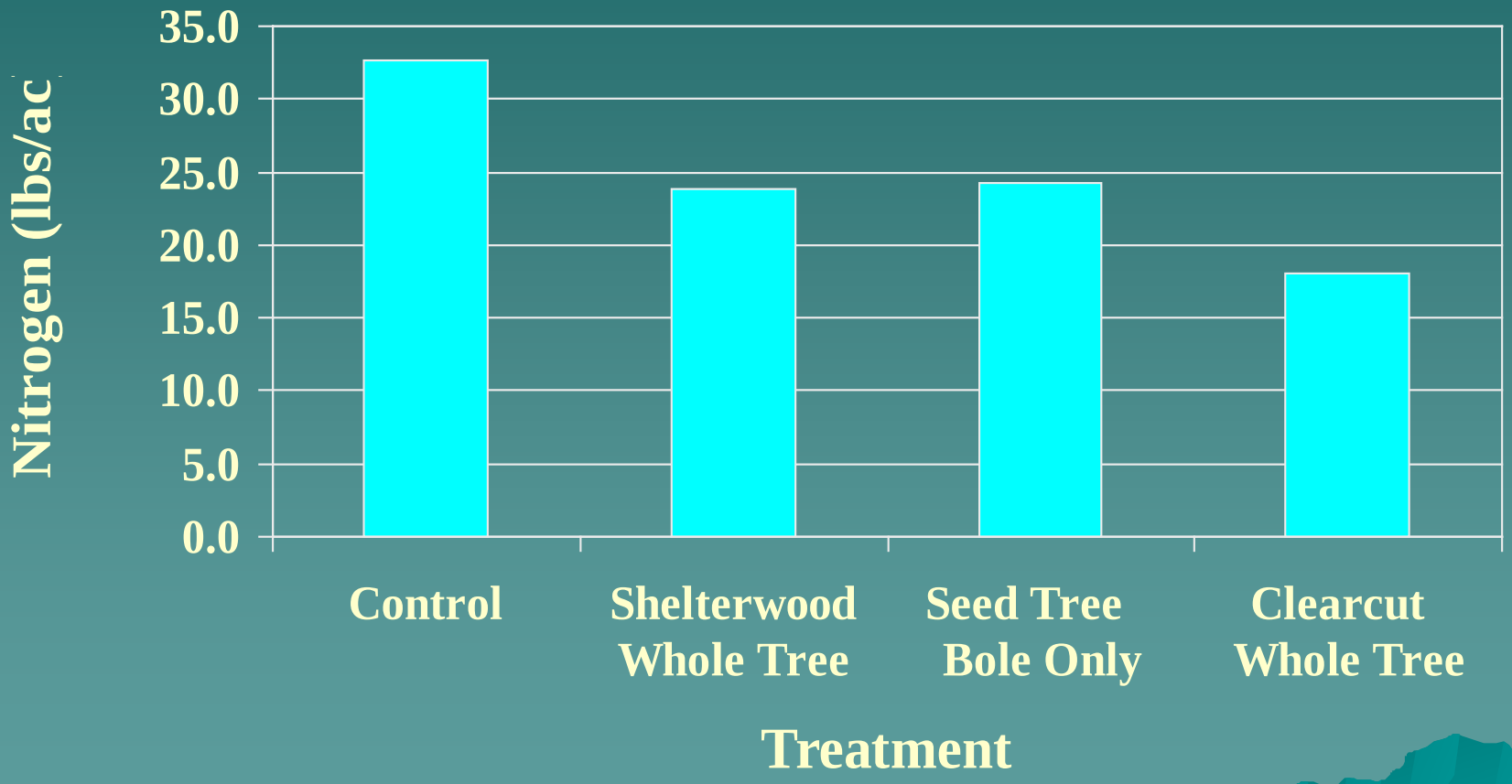
Surface Soil S Concentrations by Stand Treatment



Surface Soil B Concentrations by Stand Treatment

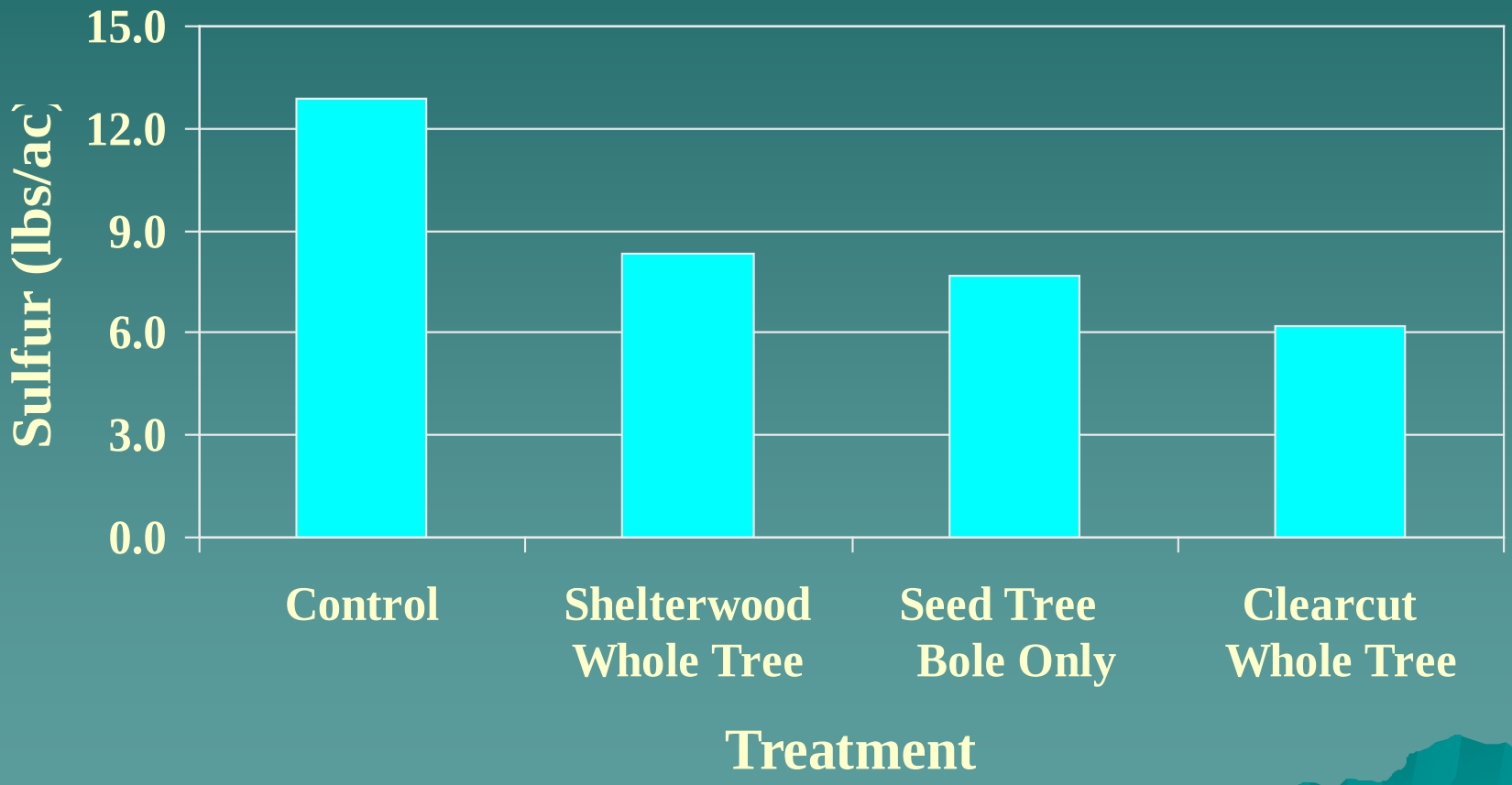


Forest Floor N Concentrations (lbs/ac) by Stand Treatment



Forest Floor K Concentrations (lbs/ac) by Stand Treatment

Forest Floor S Concentrations (lbs/ac) by Stand Treatment



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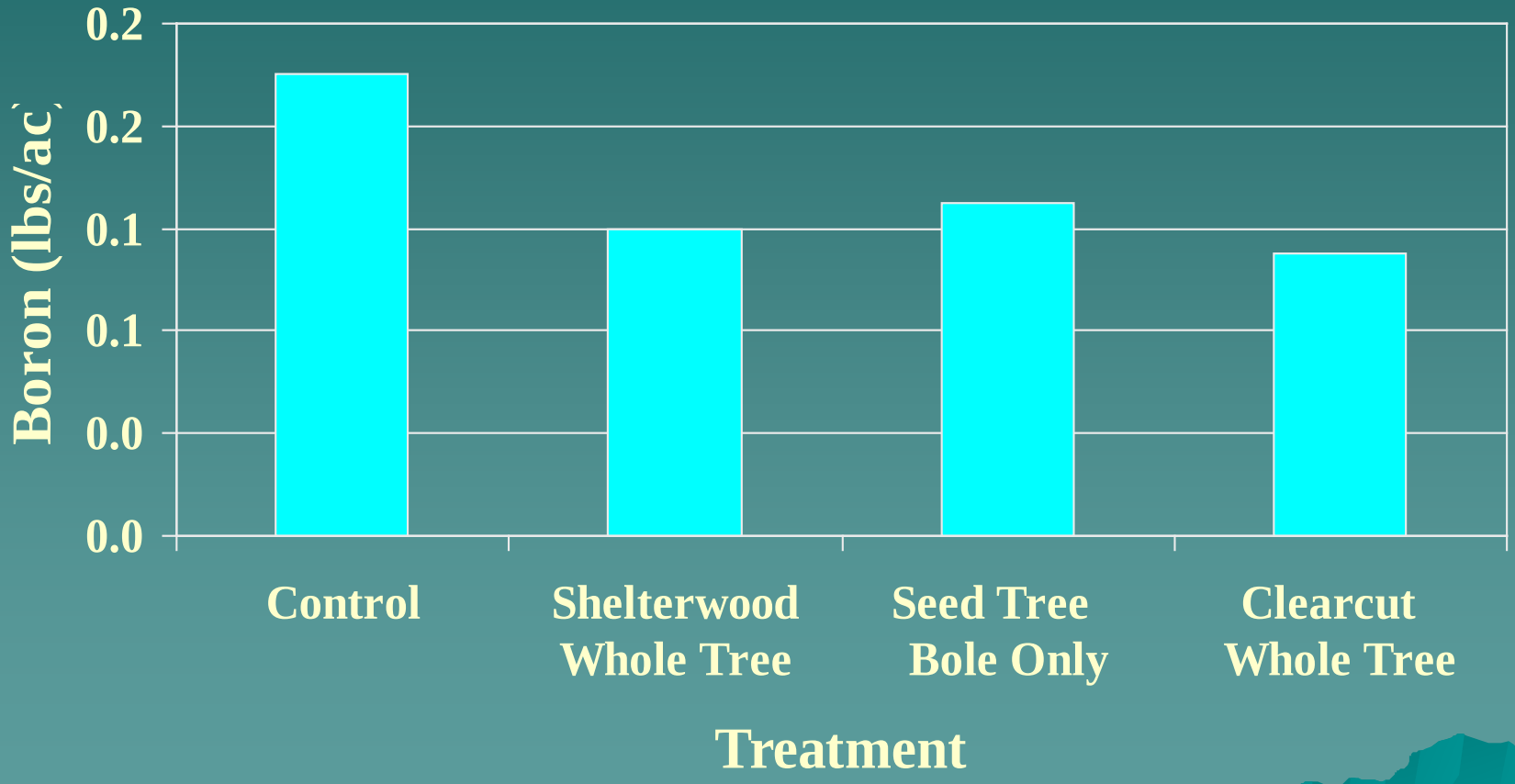
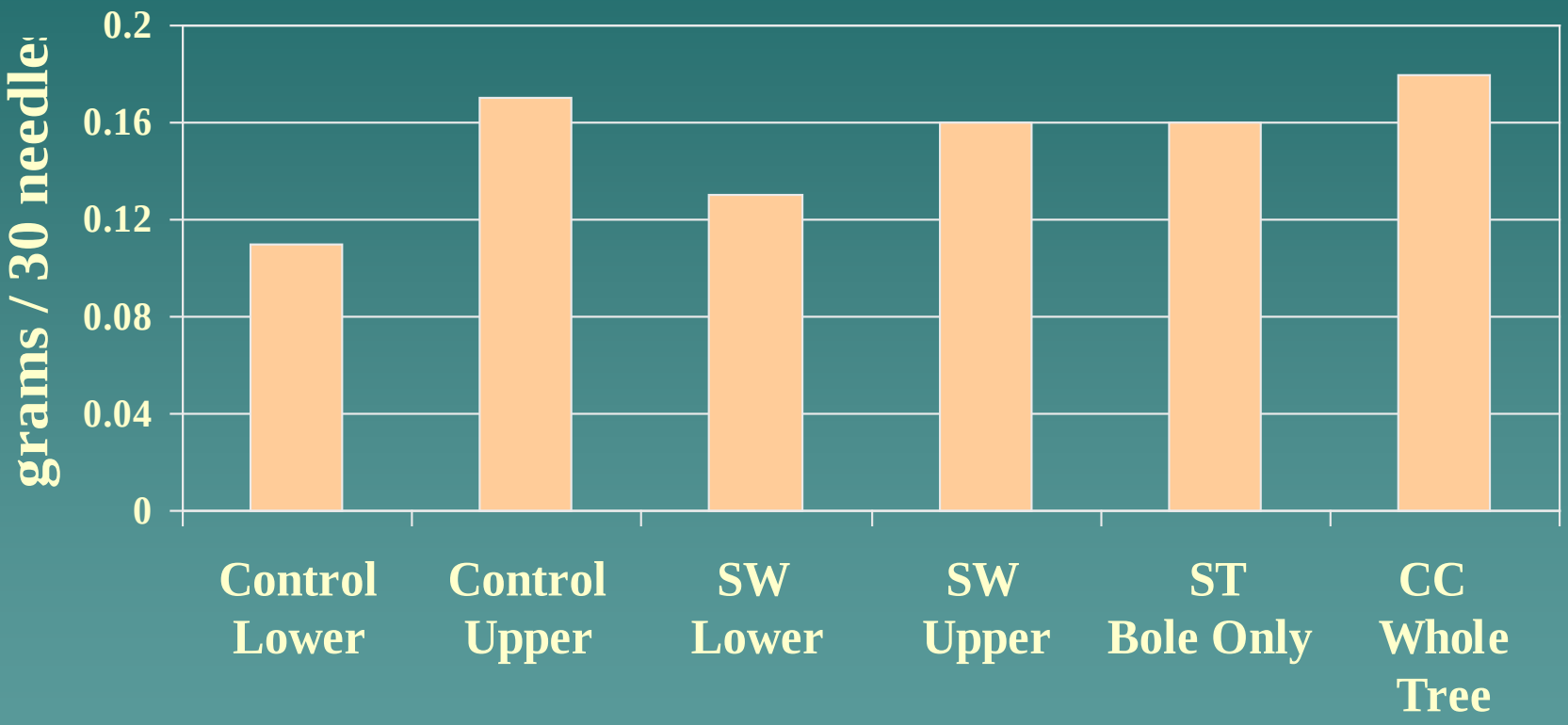
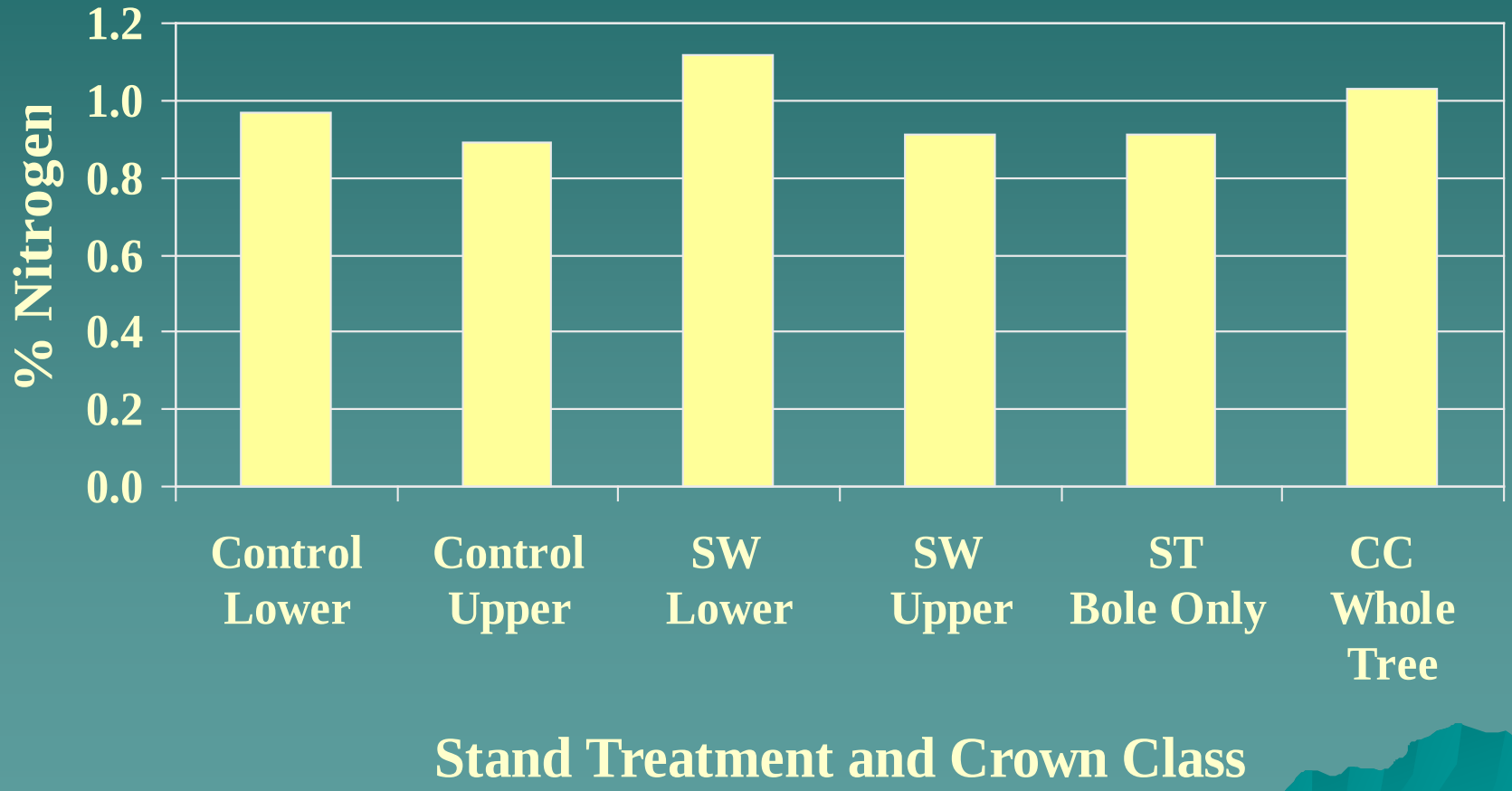


Douglas-fir Needle Weight
by Stand Treatment and Crown Class

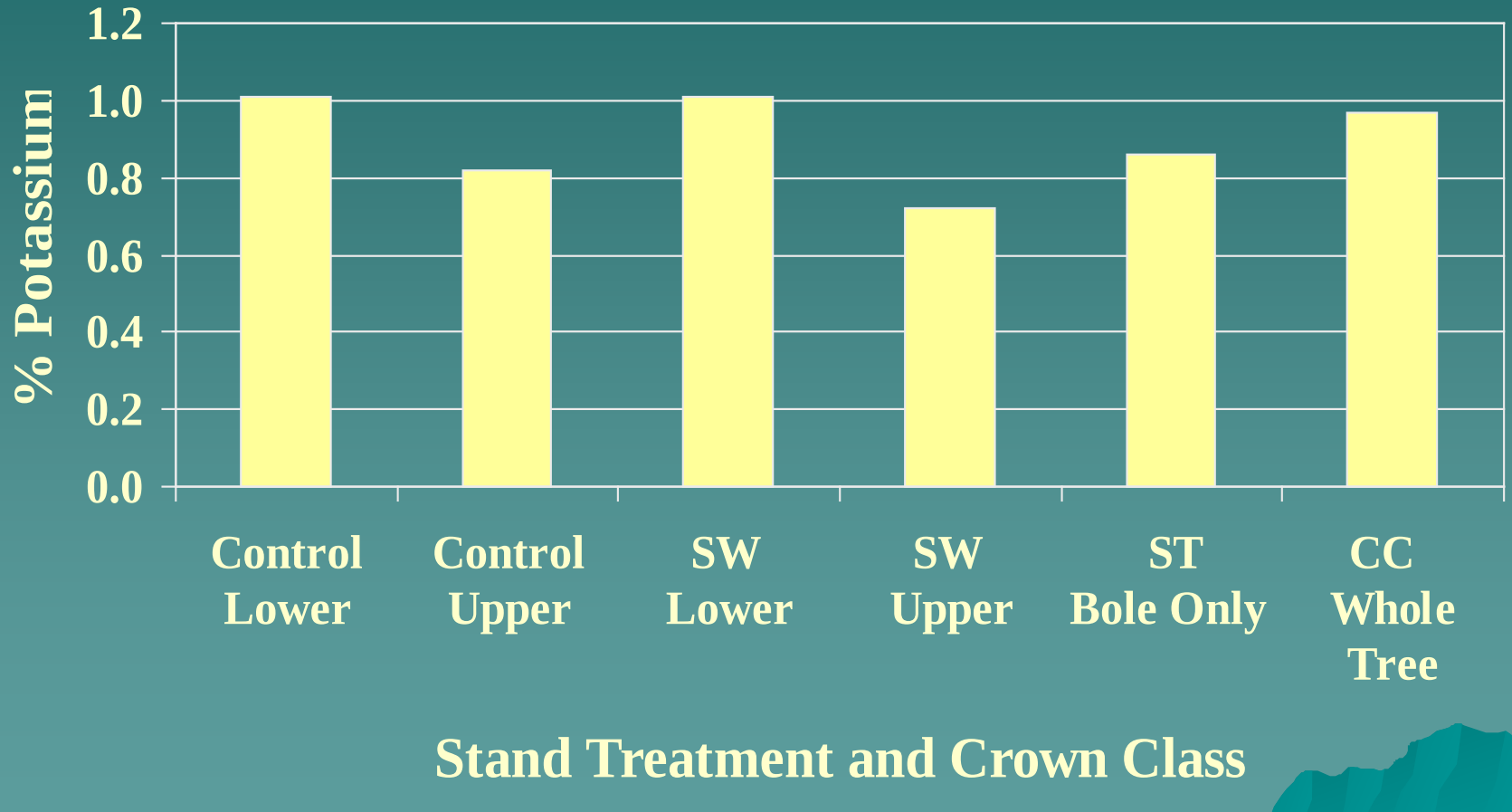


Douglas-fir Foliar N Concentrations
by Stand Treatment and Crown Class



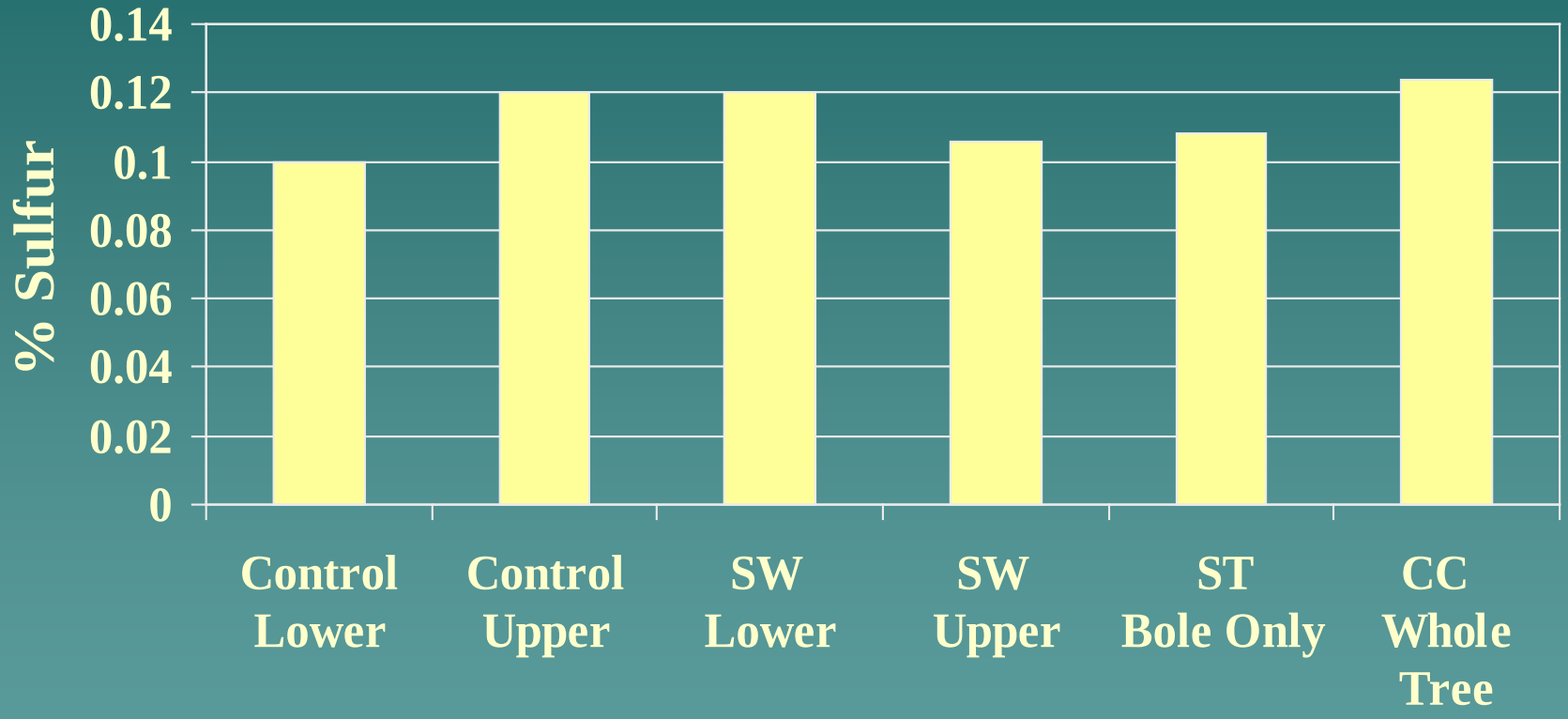
Douglas-fir Foliar K Concentrations

by Stand Treatment and Crown Class



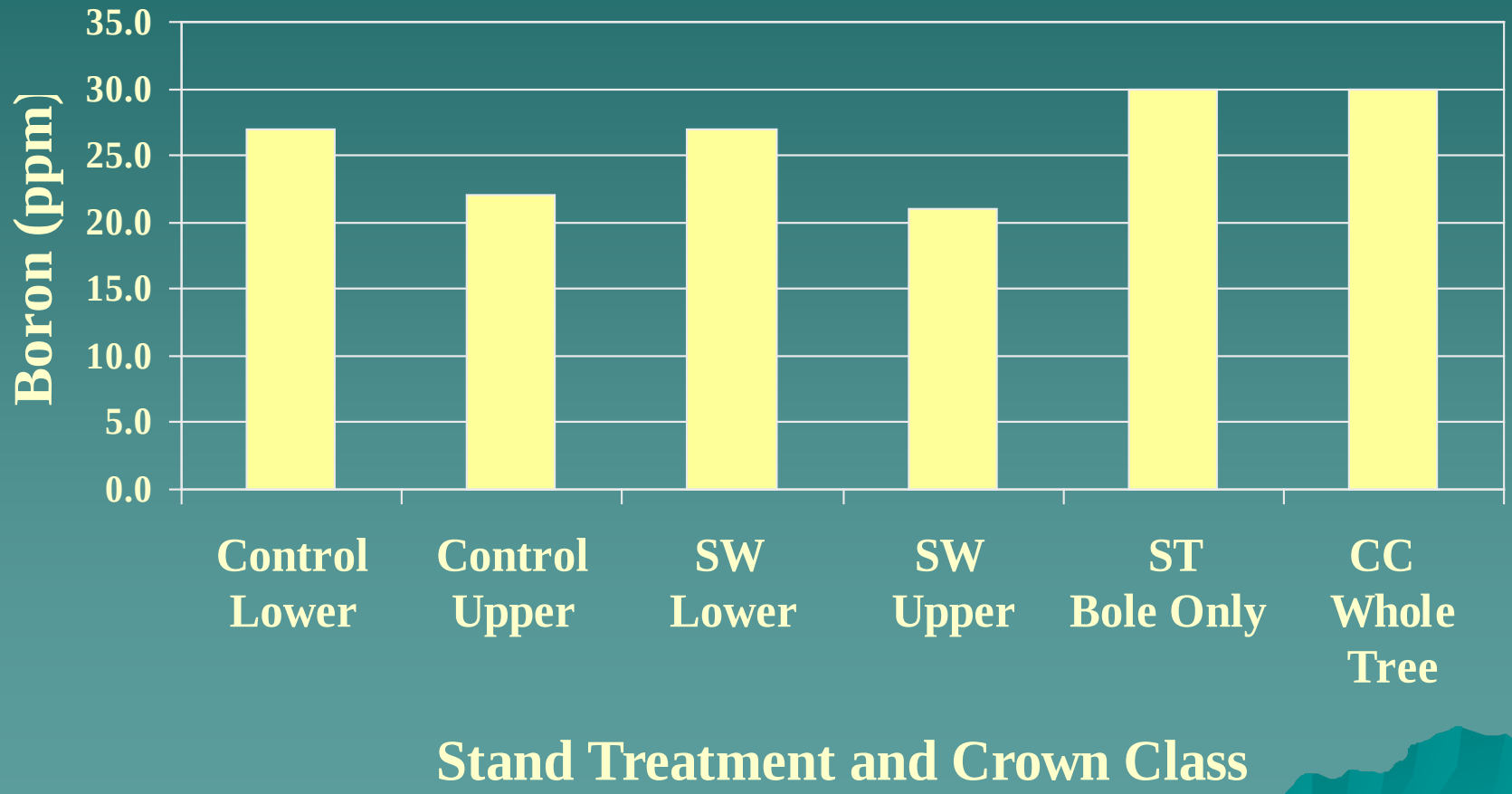
Douglas-fir Foliar S Concentrations

by Stand Treatment and Crown Class



Douglas-fir Foliar B Concentrations

by Stand Treatment and Crown Class



Is a Case Study, not a Replicated Experiment

4 inch and Smaller Material Left on Site

Broadcast Burning of Both Sites may Have Impacted Resulting Nutrient Characteristics

Some of the Patterns follow Expectations, Some Do Not