Improving Your Future Forest's Wood Quality

James M. Robbins
Forester II
California Department of Forestry and Fire Protection (CAL FIRE)

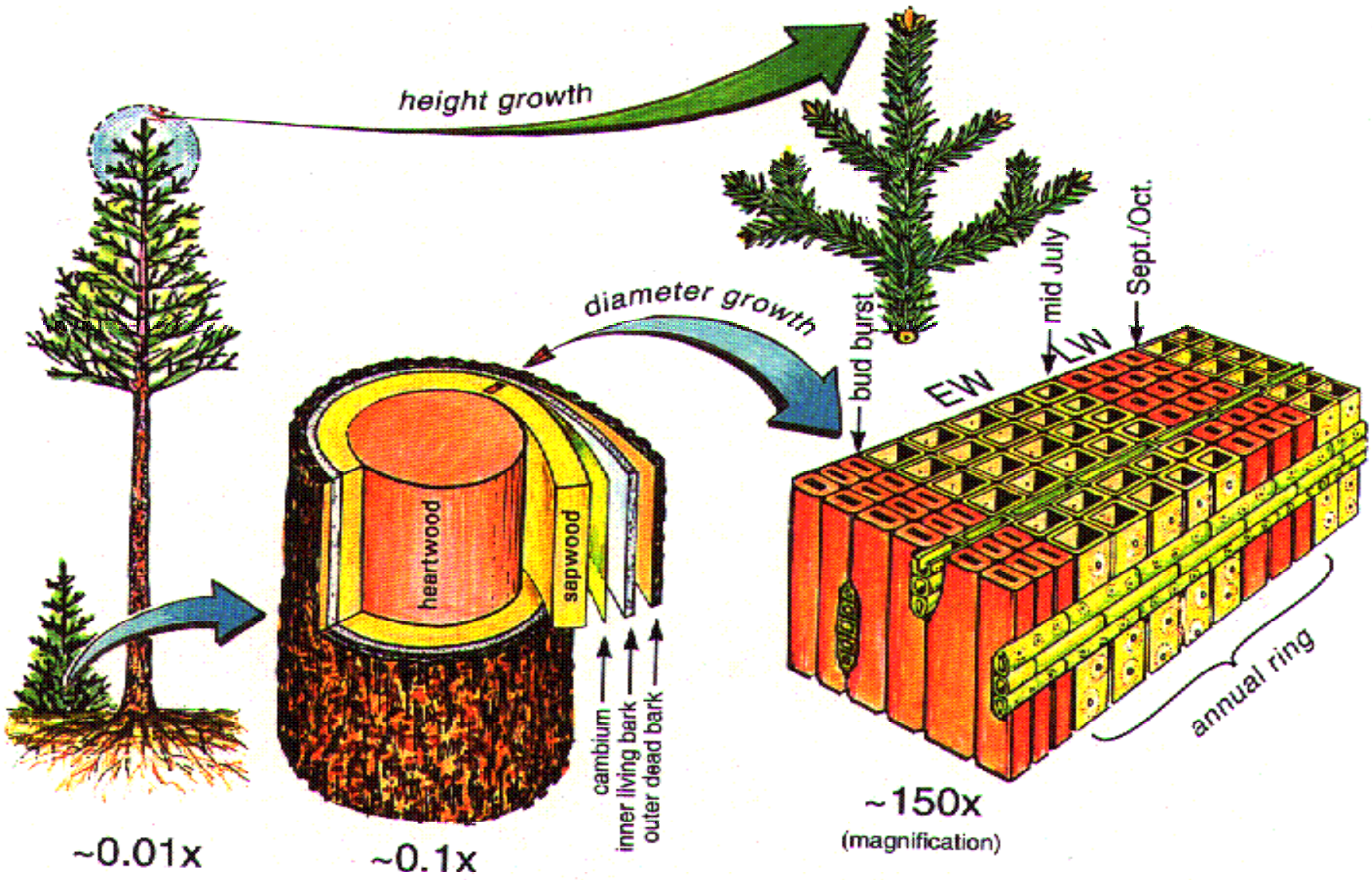
Forest Regulation and Future Forests

- Forest regulation has and will continue to limit the trees which are harvestable in the future due to:
  - Watercourse Protection
  - Wildlife Restrictions
  - Geologic Restrictions
  - Other Site Specific Issues
- Therefore, every harvestable acre should be managed for maximum value

How Do You Define Wood Quality?

- Traditionally, volume production or economic return has determined forest management with secondary consideration given to wood quality
- “Quality is the resultant of physical and chemical characteristics possessed by a tree or part of a tree that enable it to meet the property requirements for different end products (Mitchell, 1960).”
- Quality is often described by physical wood properties such as wood density, fiber length, and microfibril angle, all which impact wood’s end use properties.

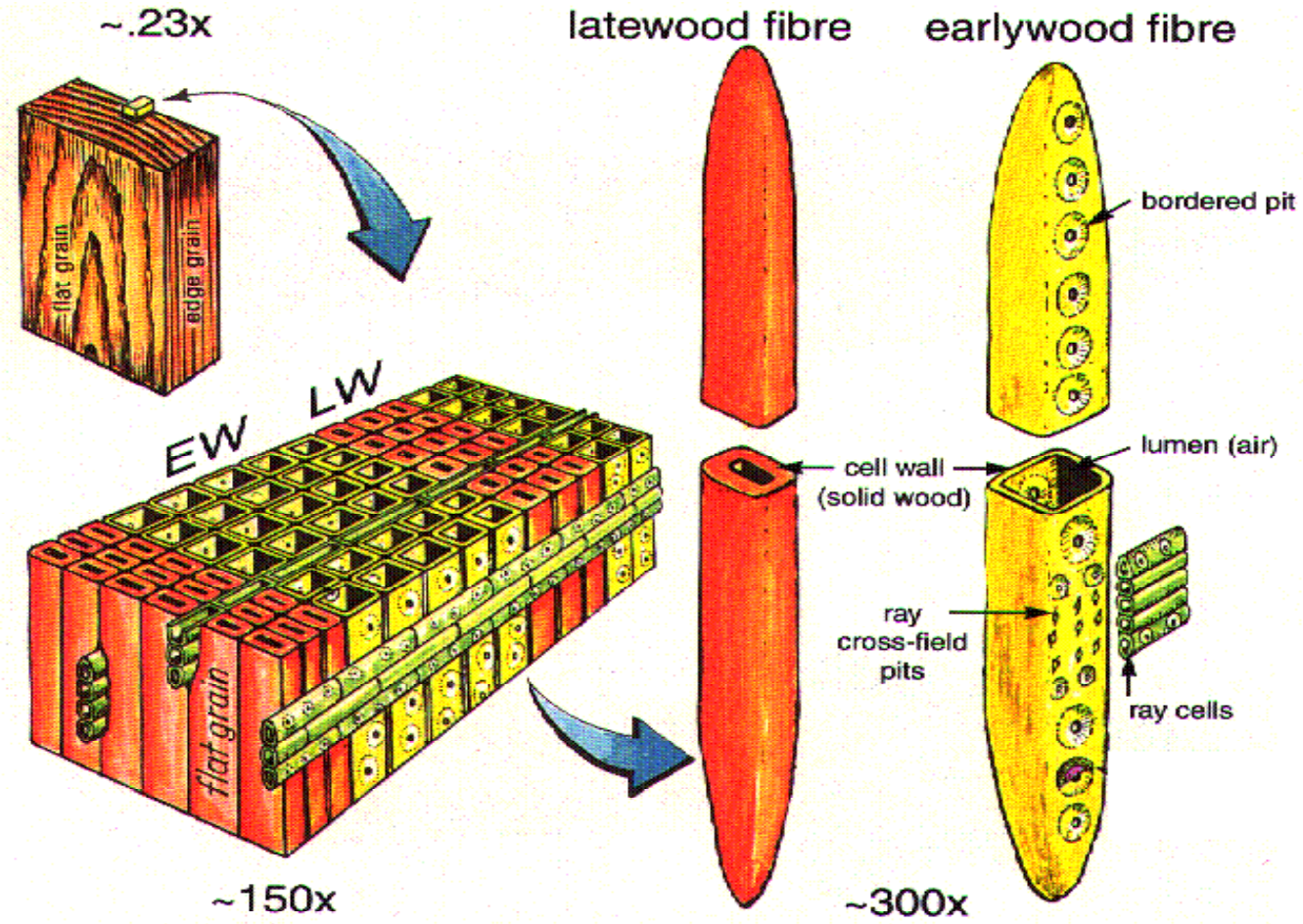
Wood Anatomy



(Jozsa and Middleton, 1994)

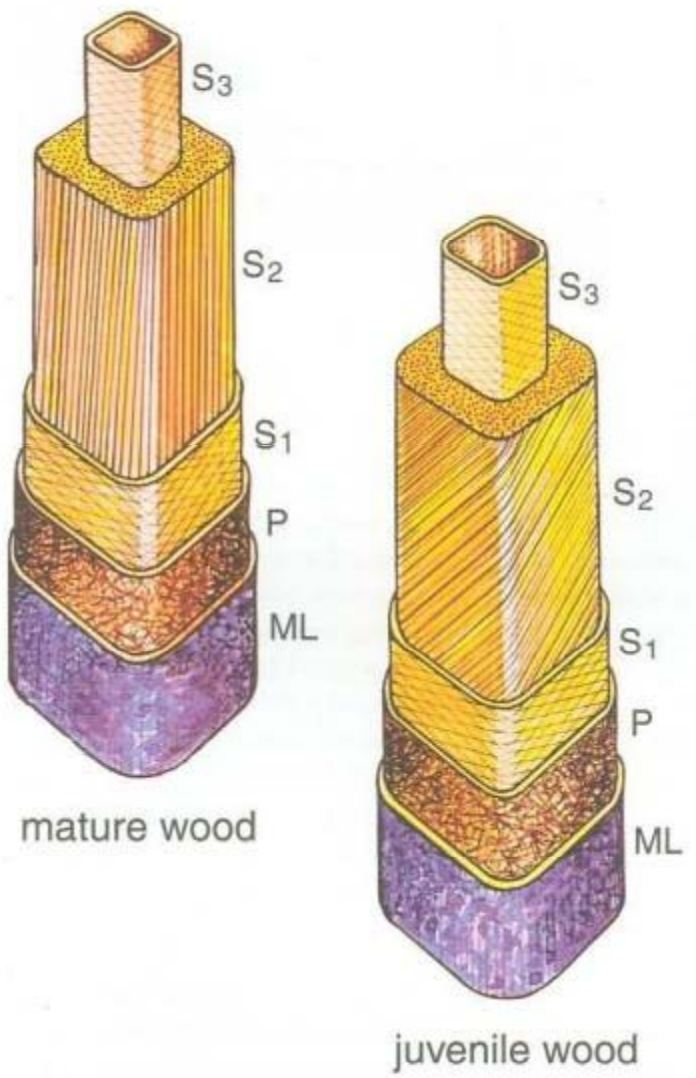
WOOD ANATOMY

Wood Density and Fiber Length



(Jozsa and Middleton, 1994)

Wood Anatomy
Microfibril Angle



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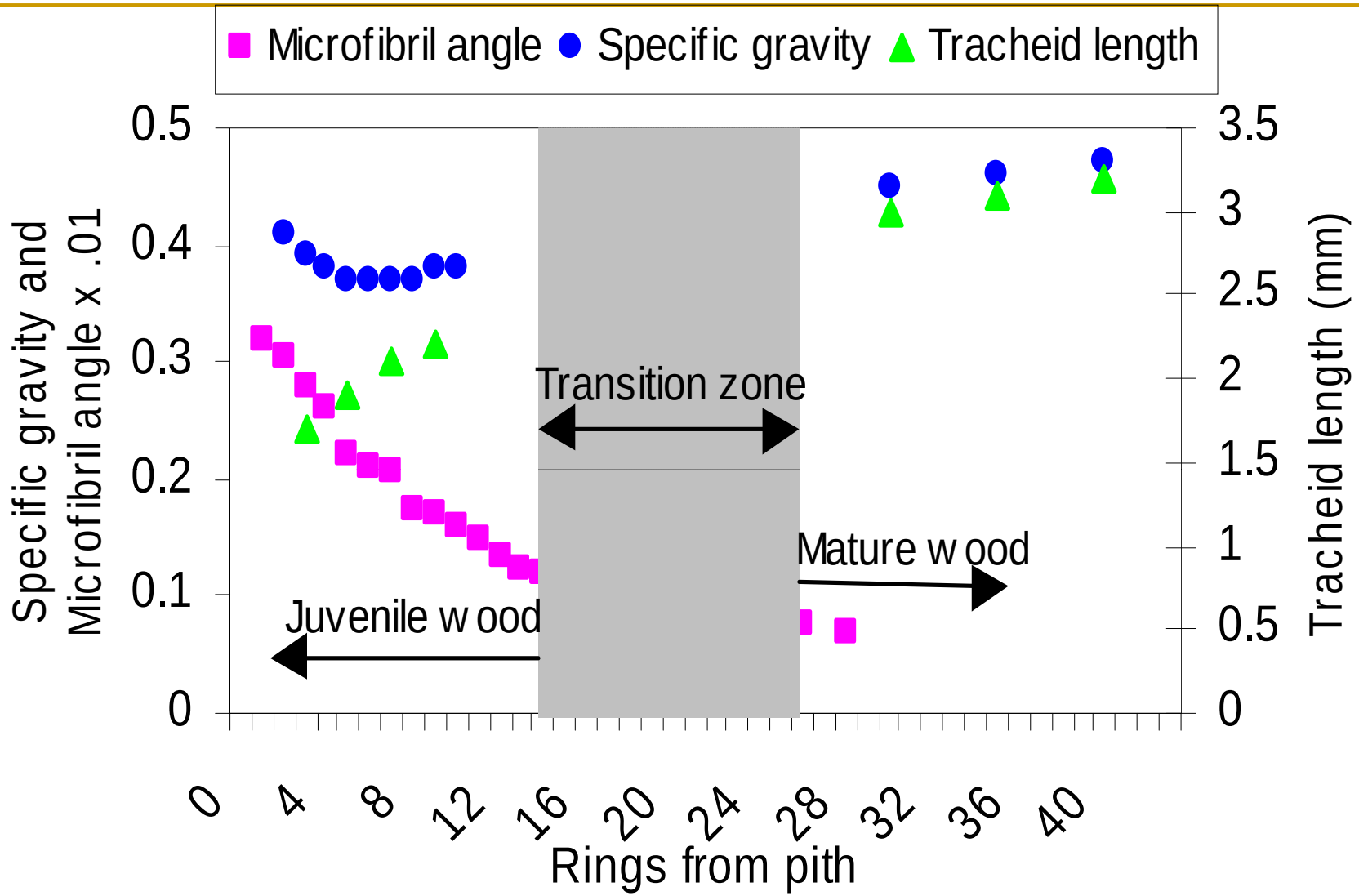
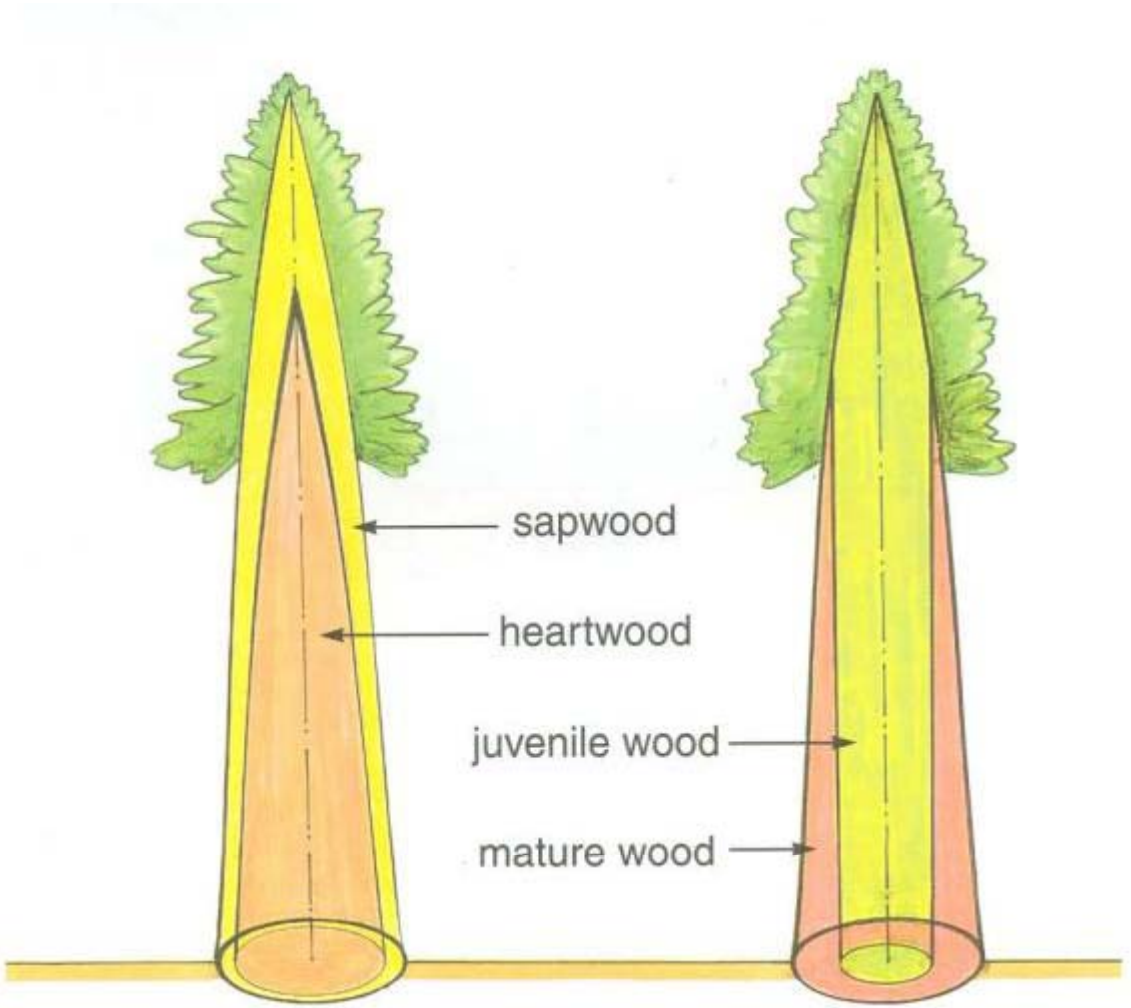


Figure 1 The juvenile wood transition illustrated by microfibril angle (Erickson and Arima, 1974), specific gravity (Megraw, 1986), and tracheid length (Megraw, 1986).

Heartwood/Sapwood Versus Wood Quality

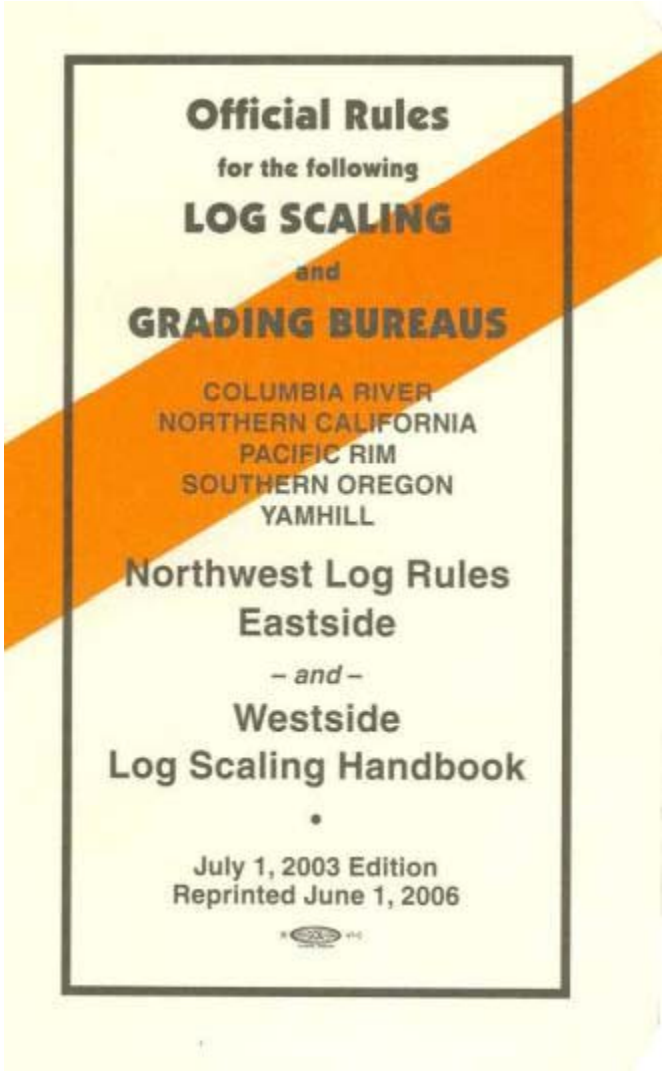


(Jozsa and Middleton, 1994)

Real World Wood Quality Measurement

- Log Value Dependent on Scaling and Grading Rules such as:
  - Log diameter and length
  - Number, location and size of knots
  - Taper
  - Rings per Inch
  - Other defects
- All of these variables can be manipulated through silvicultural treatments.

Real World Wood Quality Measurement

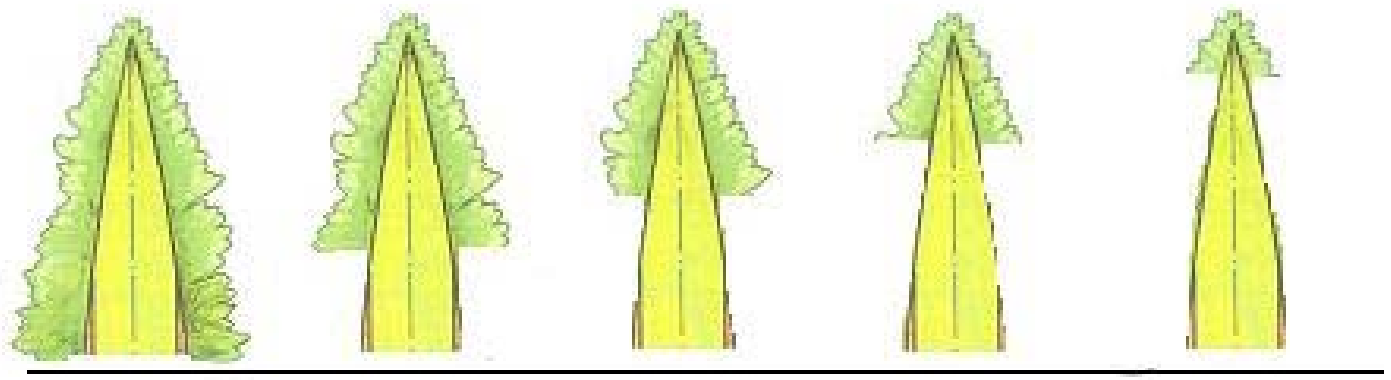


Green Diamond Pruning Study

- **Acknowledge Jim Rydelius, Dan Opalach, and Mark Diegan, Green Diamond Resource Company**
- **Research evaluation by Dr. Kevin O'Hara, University of California Berkeley**

Green Diamond Pruning Study

- Third-growth redwood was precommercially thinned and pruned on 7 sites
- Treatments included: control, 60%, 45%, 30%, and 15% live crown ratio (LCR).
- For example, at the 299 Cutoff site, 30% LCR trees averaged 5.5” DBH and 30’ tall, and were pruned to approximately 20 feet.



Green Diamond Pruning Study Positive Results

- Epicormic Sprout Development?
- Epicormic sprout number and size were not statistically different between control and treatments, except for the 15% LCR treatment
- Epicormic branch numbers declined between 2 and 6 years after pruning, which indicated that some sprouts had died.
- Growth in terms of height, taper, basal area, and volume are minimally, if at all, affected by pruning intensity.
- Redwoods vigorous growth at a young age, combined with early pruning, results in branch stub occlusion within a few years and a small knotty core.

Green Diamond Pruning Study

- Negative Results
  - Bear Damage was observed at four of the seven sites
  - Bear damage was severe in several plots
  - However, bear damage was not correlated with pruning treatment. All of the plots, except the control were precommercially thinned.
- Unknown economic return and unknown future market.


Control


15% LCR


30% LCR


45% LCR


Dead Sprout

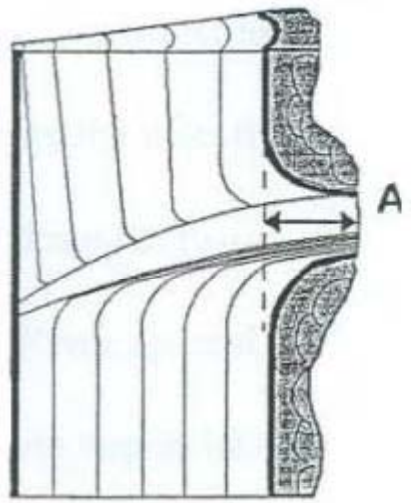

Knot Indicators

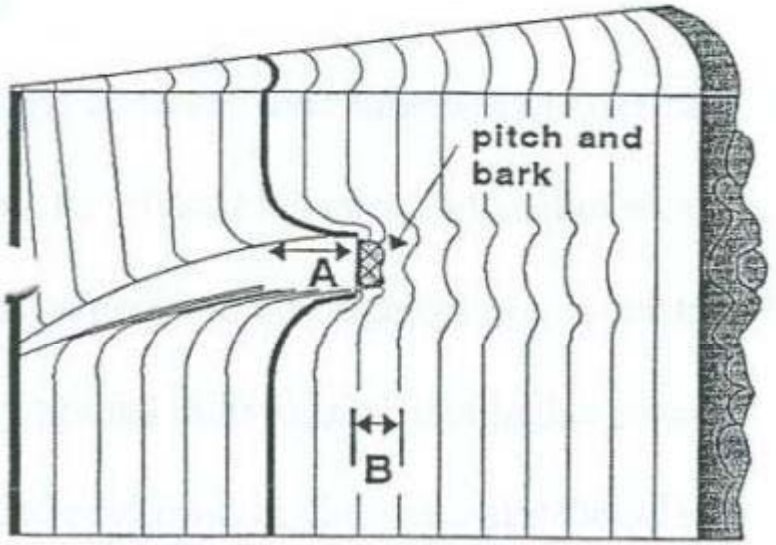
Clear Wood?

- Knot Occlusion in Young Coast Redwood, by David McCann, HSU Forestry capstone project
- Sampled 223 knots from destructive sample of 20 trees

Knot Occlusion

- A-branch occlusion
- B-bark/pitch occlusion





Results

- Knot occlusion was completed within 3 years
- Branch stub length should be minimized for fast occlusion
- Live branches occlude faster than dead ones
- Branch stub occlusion occurs quickly in young redwood trees because of small branches, thin bark, and fast growth rates.

Make it Happen With Cost-Share

- Take advantage of cost share programs to fund precommercial thinning and pruning.
- Choose precommercial thinning and pruning specifications with wood quality in mind.
- Prune and thin early to minimize the size of the knotty wood core.
- Document, Document, Document!

Uncertainty is Guaranteed, but Good Quality Trees are Always Valuable