Increasing Values with Red alder

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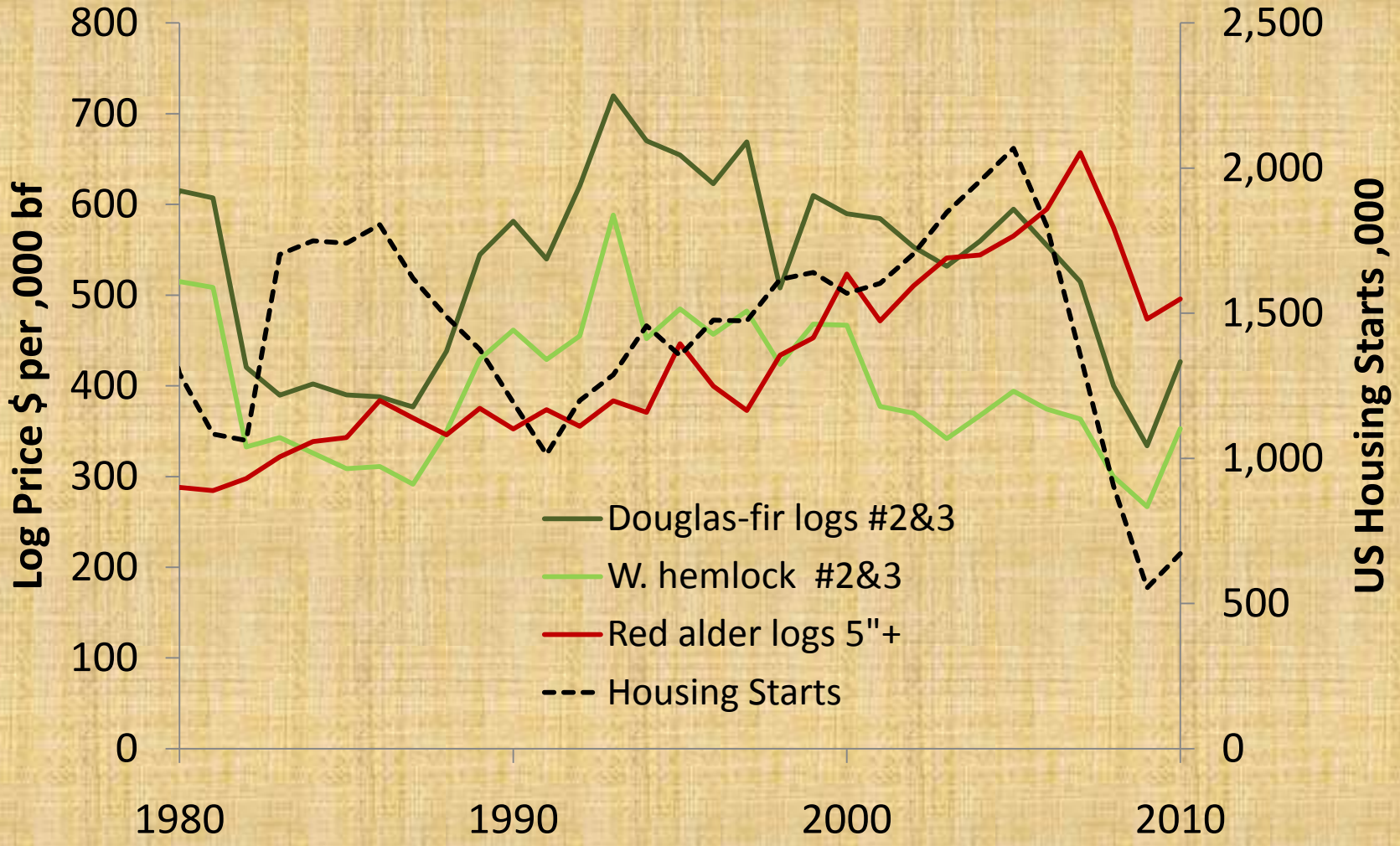
Motivations for Growing Red alder:
NW OR LOG PRICES & U.S. HOUSING STARTS



Sources: Glenn Ahrens summary from Housing - NAHB, Logs - ODF NW Oregon

Prerequisites to Maximizing Alder Value

1. Manage only on most productive sites – Predicted 50-year SI > 27m/89ft. (Harrington 1986)
2. Manage for high quality saw logs on a short rotation (30-35 years)
3. Optimize regeneration, density management
4. Capitalize on smaller operational units (5-10 acre scale)
5. Retain natural red alder where compatible with your objectives

Step 1: Select Your Best Sites

Red alder grows almost anywhere: Well-drained gravelly flood plains to poorly drained clay soils, BUT productivity is only optimal on the ideal sites. Proper site selection is prerequisite to success.

Key Physical Site Characteristics[1]:

- Topography:
  - Low elevation < 1000' (Summarizes length of growing season and temperature)
  - Slopes <20% (allows for ground-based harvesting)
  - Aspect: Key = sheltered from sun, wind
    - North or NE best, South worst, West aspects risk wind exposure
    - Effects of aspect greatly reduced when slopes <10%
- Soils:
  - Well drained, good rooting depth (>30 inches)
  - Loam, silt loam, clay loam (high water holding capacity)

Site Selection Steps

<u>Productivity assessment</u>

- ARCGIS-based DNR model
  - Initial Screening tool
- Field verify all sites using these steps:
  1. Use GTR PNW-192 (Harrington)
  2. Identify understory plant association
  3. Measure red alder site trees (when available)
  4. Map frost pockets, root disease
  5. Delineate any other areas unsuitable for alder

ARCGIS-based Site Selection

Selecting harvest units for red alder management

Site Selection Watch Outs

Frost Pocket Screening

1. Cold air settling: Any depressions on flat (<5%) topography
2. Macro cold-air drainage: Draws connecting areas of high to low elevation that drain large masses of cold air (valley bottoms)
3. Cold-air damming: Lower portions of units where cold air backs-up from vegetative barriers such as riparian areas, or topographical obstructions such as ridges or road fills

Frost Damage Illustration

Freeze damage prior to lifting in nursery, noticed in the field!

Frost kill in field (year 1)

Step 2: Site Preparation

GOALS OF SITE PREPARATION:

1) **Create plantable spots (every 8-9 feet)**
   a) Include an 18-24” cylinder free of obstruction around each plantable spot
2) **Control competing vegetation (<20% 1st growing season)**
   a) Chemically site prep twice before planting on tough sites if Atrazine cannot be used?
   b) Minimize green-up to maximize herbaceous weed control

Step 3: Seedling Selection

Target Seedling Characteristics

1. **1-year bare-root seedlings: P+½ (Webster) or 1+0 (Weyerhaeuser, IFA)**
2. **Sturdy (H/D < 120), well-branched seedling; buds all along the main stem**
3. **Seedling height: 24-48+ inches**
4. **Caliper (> 8mm, min. 6mm) Caliper is key!**
5. **Dense fine roots, healthy root systems with *Frankia* nodules**
6. **Minimal large diameter woody roots**
7. **Free of botrytis, frost damage**
8. **Do not top-mow seedlings**

Planting Execution

- **Timing:**
  - Plant mid-March to mid-April (after risk of damaging frost)
- **Planting Spot Characteristics (define in contract):**
  - Plant in mineral soil avoiding close proximity to stumps or slash piles (risks damage from reflective heat or mechanical abrasion)
    - Do not plant where obstructions intersect an imaginary 1-2 foot cylinder around seedling
  - Avoid excess scalping (minimizes reflective heat around stem)
  - Depth: settled groundline at root collar to 1 inch above
- **Stocking Levels:**
  - Target 540 tpa (9'x9') to 680 (8' x 8') – evenly spaced
  - Increase density on sites where vegetation cannot be controlled <20% during 1st season or if seedling quality is low

Results of Poor Planting

Mechanical abrasion caused by slash pile edges

Shallow plant wind-rocked out of planting hole in year 2

Finalizing Establishment: 1ST YEAR MONITORING

Trigger Necessary Actions:

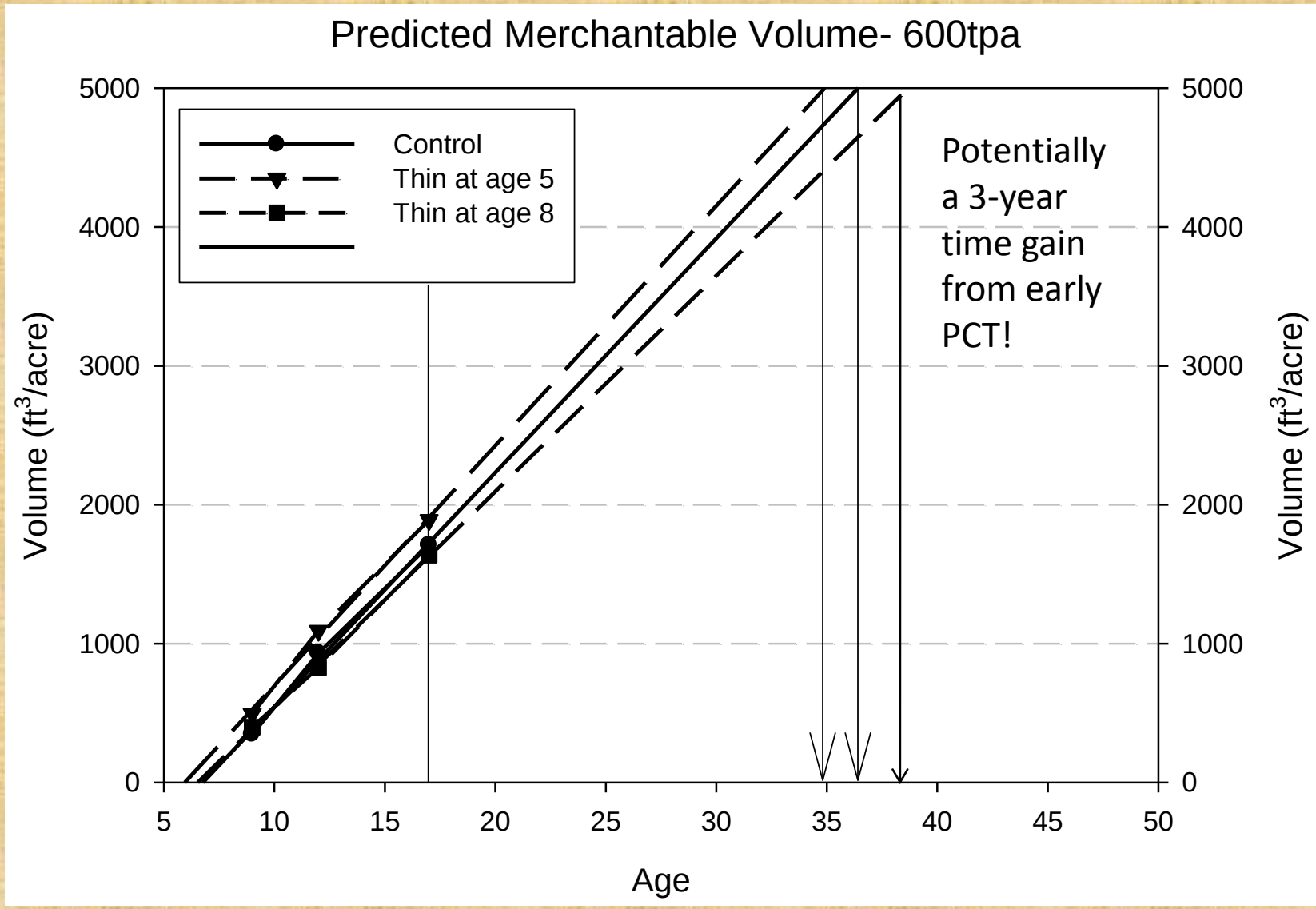
1. Measure total vegetation cover mid-July
   a. Herbicide release if total cover >50% and overtopping
2. Live stocking in late summer
   a. Interplant next spring if <440 live TPA or specific areas with trees greater than 13 feet apart.
   b. Identify, prevent causes of mortality- sun scald, frost, botrytis and drought stress most common agents
3. Map frost pocket mortality
   a. Re-plant frost pockets with conifer

Optimize Density Management Precommercial Thinning (PCT)

PCT Timing: Year 5 to 9 when the following stand conditions are met:

- HLC = 8-12 feet (lower if pruning live branches)
- Live crown ratio of CROP TREES: Target 60%
- Diameter growth trend of CROP TREES: Avoid decreases
- Tree height: 25-35 feet
- Season: Anytime leaves are off so PCT crew can visually assess defect, spacing.

PCT Timing Critical!



Hardwood Silviculture year 17 data projected to final harvest age:

- PCT to 230 tpa age 5 vs. age 8 vs. control

Current Density Management Regimes

With Commercial Thinning

- Plant 540-680 TPA
- PCT age 5-9 to 230-300 tpa at 60% LCR
- Thin to 150-180 tpa at age 15-19 at 50-60% LCR
- Harvest at age 30-35 years
  - 17-20 mbf/ac on best sites
  - 11-12 inch average diameter

Without Commercial Thinning

- Plant 540 TPA
- PCT age 5-9 to 230-250 tpa at 60% LCR
- Harvest at age 25-35 years
  - 13-20 mbf/ac
  - Lower diameters, higher % pulp, smaller sawlogs

The Future of Alder Management

- Growth Models
  - RAP ORGANON growth model now available

  http://www.cof.orst.edu/cof/fr/research/organon/downld.htm
- Yield & Value validation:
  - Commercial thinnings just beginning (Weyerhaeuser last year, WA DNR in the next few years)
  - Age 30+ measurements for many plantations to occur by 2025 will allow growth models to be adjusted for actual yields
- Further advancements in alder management depend on participation and support in cooperative alder research such as the Hardwood Silviculture Cooperative (HSC)

Questions?

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