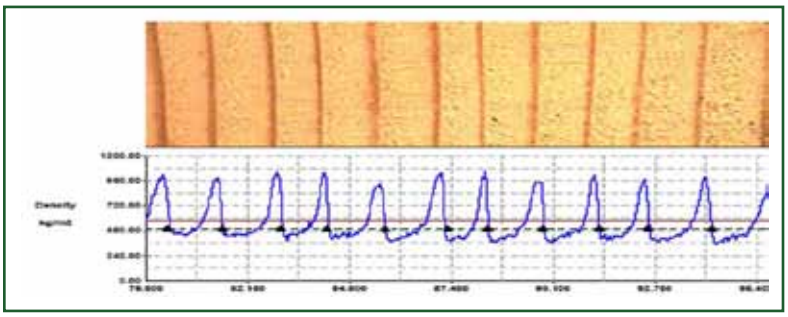
RESEARCH in Progress

Coalition for Advanced Wood Structures
a university, industry, government partnership

Sustainable Building Materials from At-Risk Intermountain Species

The shift from traditional forest management to ecosystem restoration practices is expected to generate a sustainable flow of small-diameter logs that could be used to produce structural and nonstructural building products. Conversion of these raw materials to the most appropriate end uses is vital to restoration management and the local industries it supports.



X-ray densitometry scanning used to determine the density of earlywood and latewood in individual growth rings.

Background

Ecosystem management operations in many areas of the Intermountain West are hampered by high log transportation costs to distant mills. In addition to high extraction costs, the variable nature of trees limits their value to producers of high-performance structural lumber and roundwood products. Reducing uncertainty in the quality of the raw material made available from restoration operations should make this material more attractive to high-performance structural products manufacturers. Up to now, the evaluation of standing trees for quality has been based on growth characteristics such as knots, sweep, and form, but these criteria do not address other wood properties of interest to high-performance structural building materials manufacturers.

Objective

This research characterizes the physical and mechanical properties and attributes of lumber from small-diameter Douglas-fir to improve its utilization for housing and other structures. Specifically, we will continue developing tools that can be used to remotely and rapidly assess potential stiffness and strength characteristics of lumber produced from forest restoration material.

Approach

This research builds on our prior research on suppressed stands of Douglas-fir that suggests that certain forest site characteristics could be used to predict potential for wood quality. This study will focus on several specific aspects:

- Assessing variation in tree ring morphology as it relates to stiffness in standing trees, logs, and boards
- Investigating environmental influences on the morphology of standing trees
- Assessing the potential for remote measurement of morphological differences in standing trees
- Developing the means to predict clear wood properties from tree ring morphology

Expected Outcomes

- Improved understanding of morphological characteristics pertinent to stiffness of Douglas-fir in the Intermountain West
- Further development of predictive models for stiffness in standing trees

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High-stiffness 2×4 lumber from small-diameter trees may be suitable for structural applications such as roof trusses. Ecosystem restoration activities could provide suitable lumber.

Timeline

Data collection for this study will begin in winter 2009–2010 and is expected to be completed by fall 2011. Published reports should be available by early 2012.

Cooperators

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