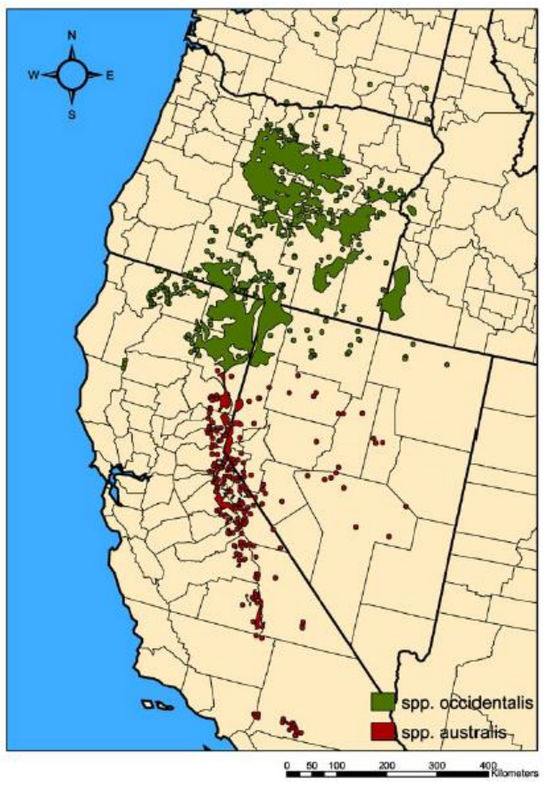
UTILIZATION OF WESTERN JUNIPER RESIDUES FOR STRANDBOARD MANUFACTURING

Oregon State University

INTRODUCTION

Western juniper (*Juniperus occidentalis*) acreage in the Great Basin of the western United States has increased dramatically in the past century. Western juniper is native to five states: Oregon, California, Washington, Idaho and Nevada. In Oregon alone, western juniper woodlands have expanded from approximately 607,000 hectares (1.5 million acres) in 1930 to about 2.6 million hectares (6.5 million acres) today.



Native range of western juniper (Miller et al. 2005) (developed by Steve Petersen, Department of Rangeland Ecology and Management, Oregon State University, Corvallis, Oregon)

GOAL

Restoration of the woodlands is complicated and costly without a relevant market for the juniper logs. Based on the conical shape of the logs and many knots there is a small market focused on lumber production. One way to use juniper logs or residues from lumber production is the manufacturing of strandboard.

Western juniper in central Oregon

MATERIALS

Low-quality logs, slabs, and trim ends were used for manufacturing the strands. Southern Yellow Pine strands from an OSB facility were used for control panels.
OD Density juniper sapwood: 385 kg/m^3
OD Density juniper heartwood: 425 kg/m^3
Panel size: 12 × 600 × 600 mm
OD Density: 560 kg/m^3
Resin type: phenol formaldehyde

Laboratory manufactured strands

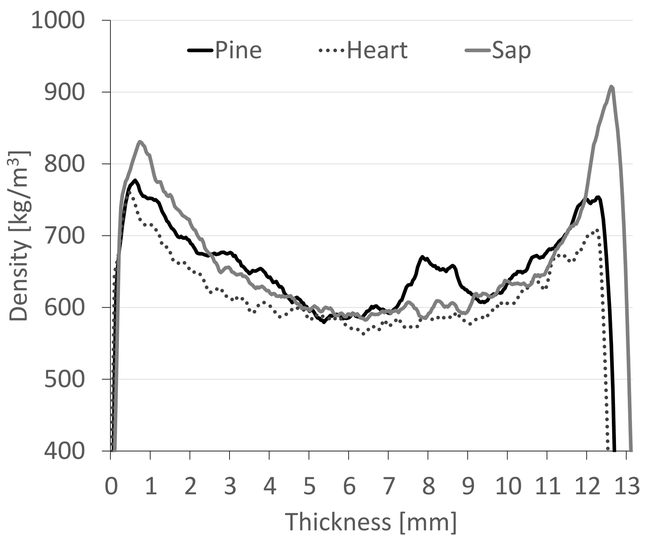
-Heartwood only
-Sapwood only
-Slabs from lumber production without bark
-Slabs from lumber production with bark

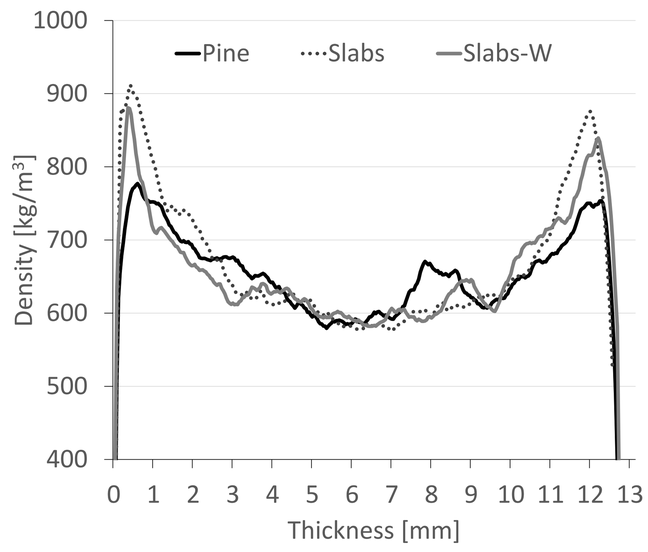
METHODS

Density profile- measured on three specimens from each group
Bending properties- Modulus of Elasticity (MOE) and Modulus of Rupture (MOR) were measured on nine specimens
Internal bond- measured on nine specimens

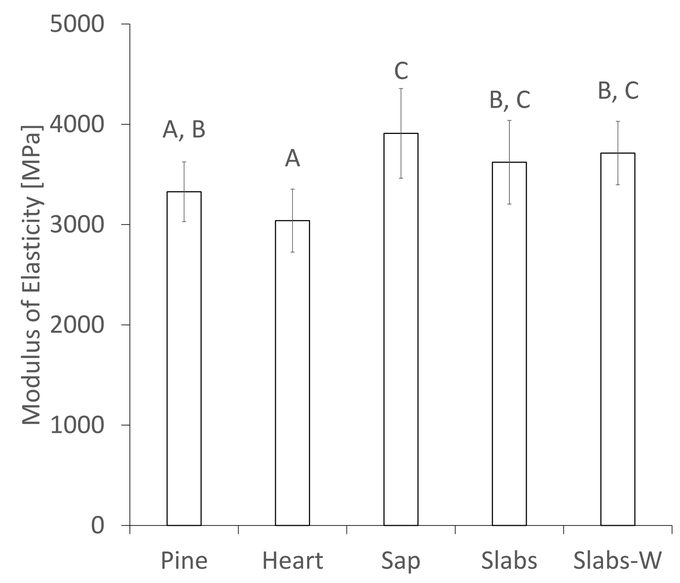
RESULTS

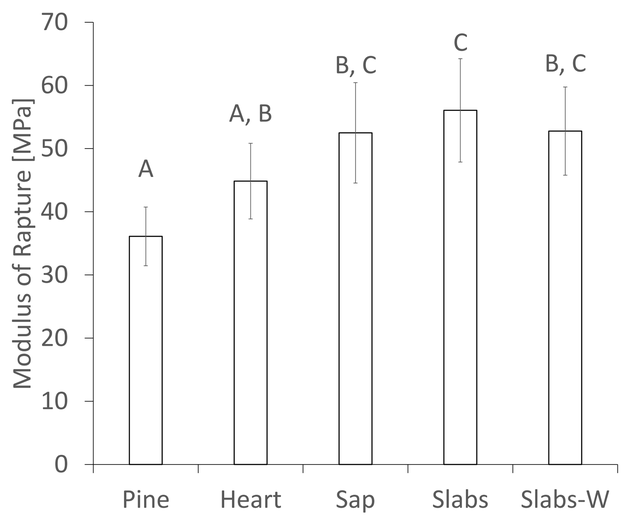
Density profile



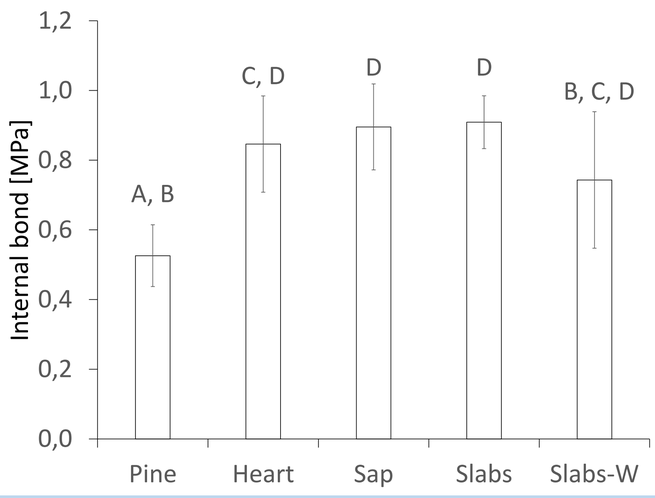


Bending properties





Internal bond



	Internal Bond [MPa]		
Pine	0.53	(0.09)	A, B
Heart	0.85	(0.14)	C, D
Sap	0.90	(0.12)	D
Slabs	0.91	(0.08)	D
Slabs-W	0.74	(0.20)	B, C, D

Means with the same letter in column do not differ statistically by the Tukey´s test (α = 0.05). Numbers in parentheses represent standard deviation

CONCLUSIONS

Higher surface density for panels made from sapwood strands and strands made from slabs with and without bark was caused by the densification of the sapwood strands in these layers; there is a higher compaction ratio for the low-density juniper sapwood.

Modulus of Elasticity showed comparable results for juniper panels in comparison to the control Southern Yellow Pine panels. Due to the high densification of the surface layers on the panels made from sapwood strands and strands made from slabs with and without bark, which were also mostly sapwood, a statistically significant increase was observed in the Modulus of Rupture.

The average values of the internal bonds were higher for juniper panels with a significant increase of about 65% for heartwood, sapwood and slabs without bark. Juniper panels made with 10% bark (Slabs-W) reached the same internal bond as control panels.

ACKNOWLEDGEMENT

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Miller, R.F., Bates, J.D., Svejcar, T.J., Pierson, F.B., and Eddleman L.E. (2005). Biology, ecology, and management of western juniper (Juniperus occidentalis). Oregon State University Agricultural Experiment Station Technical Bulletin 152, 82 pp.

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