# WOOD QUALITY FOR LONGLEAF PINES: A SPACING, THINNING AND PRUNING STUDY ON THE KISATCHIE NATIONAL FOREST

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**Abstract**—Twenty 70-year-old longleaf pine (*Pinus palustris* Mill.) trees were harvested from a spacing, thinning, and pruning study on the Kisatchie National Forest, LA. Tree property mapping was used to show the property variation within and between three of the trees. The construction of such maps is both time consuming and cost prohibitive using traditional test methods. However, we were able to construct tree property maps using NIRVANA (Near InfraRed Visual and Automated Numerical Analysis), a spectroscopic system developed for automated property determination for increment cores. This allows wood quality to be determined throughout the tree, and presented in the form of a readily interpretable map. Thus, the effects of spacing, thinning and pruning at different ages were observed within, as well as, between trees. The effect of high levels of extractives in the heartwood on the property determinations remains to be completely resolved.

## MATERIALS AND METHODS

Trees were harvested and 2-inch disks cut approximately every 2 feet along the bole. The disks were then further sectioned into 0.5-inch wood slices, from bark to bark and through the pith in the north-south direction. The slices were scanned using NIRVANA as previously described elsewhere (So and others 2006) with specific gravity values predicted along each slice. The model used for predicting specific gravity was based on data collected from a previous longleaf study (So and others 2006). Following early results, several slices then underwent extraction with acetone followed by further scanning for comparative purposes.

## RESULTS AND DISCUSSION

Tree property maps generally show a large variation in properties within a tree (So and others 2002). The results presented were for three trees with varying spacing and thinning regimes. It was shown for the fast-grown tree that there was a high level of extractives in the heartwood nearer the base of the tree. This resulted in very high specific gravity values in this region. Generally, specific gravity decreased with height. The trees with smaller d.b.h., and correspondingly slower growth, showed few regions of very low specific gravity as one would expect. The sensitivity of this technique, and particularly the presence of extractives, plays a major role in determining the resultant pattern. After scanning, some of the samples underwent extraction and were then scanned again. The specific gravity values on the extractive-free wood were much lower in the heartwood than previously observed, indicating both extractives removal and the presence of juvenile wood. Maps can be easily generated for other properties such as stiffness and strength. The data from NIRVANA can be meshed with the collection of growth and yield data.

## CONCLUSIONS

NIRVANA can be used for property mapping of trees in a timely manner. Thus, it is possible to show the effects of silvicultural treatments throughout a tree, thereby allowing treatment comparisons. It is anticipated that the property variation within trees can be explained by their treatment and growing history.

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## LITERATURE CITED

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