

GETTING MORE VALUE FROM THE TOLERANT HARDWOOD HARVEST THROUGH SORTING AND MERCHANDIZING

Steve D'Eon ^a, Peter Hamilton ^b

^a Knowledge Exchange Specialist, Canadian Wood Fibre Centre, Natural Resources Canada

Email: sdeon@nrca.gc.ca

^b Researcher, FPInnovations

Email: peter.hamilton@fpinnovations.ca

ABSTRACT

Tolerant hardwoods are a significant component of the forests of eastern Canada and the northeastern United States. It is important to extract as much value as possible from the existing tolerant hardwood harvest to furnish an established wood manufacturing sector dependent upon quality raw materials. Pricing for tolerant hardwood logs is based upon the quality of the log which makes sorting by value a viable option for a harvesting operation. Marketing and selling the 'right' high quality log to the 'right' buyer can increase revenues to the forest operator and add value throughout the value chain as the logs work their way from manufacturers to end users.

We implemented a log value recognition program in an operational forest harvest in the Huntsville, Ontario region starting in 2008. A parallel marketing effort was made to sell logs to higher priced buyers. One year results indicate an increase in revenue of 12%/m³ harvested partially resulting from a 15 fold increase in the amount of veneer recovered. There was an increase in the percentage sawlog recovery which benefited the local sawmill and the landowner received an extra \$70,000 in stumpage. This win-win scenario was created through a company wide change in attitude towards value rather than volume driven rewards. Implications for the entire tolerant hardwood value chain indicate an increase in economic activity in excess of \$10 million from this change in one forest harvesting operation. We estimate the Province of Ontario's opportunity loss from current under-recovery of veneer is in excess of \$40 million annually. Some insights into factors causing this under-recovery are provided.

Keyword: Tolerant hardwoods, veneer, segregation, merchandizing

INTRODUCTION

The tolerant hardwood forest of South Central Ontario is a vast and valuable resource. Dominated by sugar maple and yellow birch, this forest is generally on site class 1 or 2 land with about 2,000,000 ha under Crown ownership and an equal amount privately owned. The Provincial Forest Inventory lists stands between 60 and 160 years old that grow on average 2.5 m³/ha/year. These forests provide significant wildlife habitat, environmental products, and other socio-economic benefits that are difficult to quantify but form part of Ontario's forest management goals. The location close to the large population centers of Southern Ontario guarantees an involved public.

The forest also supports a well established forest products sector. In the 2004-05 harvest levels on Crown land totaled about 500,000 m³ for tolerant hardwoods from 23,000 ha harvested under the single tree selection system (30-50 m³/ha) or the shelterwood system (50-70 m³/ha) (Stinson 2009). Unfortunately mill return data indicates only 1600 m³ of hard maple veneer and 2400 m³ of yellow birch veneer was directed to veneer mills. This low rate of veneer harvest (0.8%) is about half of the amount identified when detailed studies are undertaken (Stinson 2009). The under-recovery of veneer or other high value logs can lead to a substantial opportunity loss to the economy as multiplier effects work down the manufacturing chain.

FPInnovations initiated a project to see if a veneer recognition and segregation system would improve the veneer recovery rate and benefit the harvesters and millers of Ontario's tolerant hardwood forest. After an initial scoping period FPInnovations provided training and assistance to Tom Fisher Logging Ltd of Huntsville, Ontario who undertook a change in his operations to recognize, segregate, concentrate, and merchandize higher-value logs from his Crown land harvests. This paper provides some results from that project along with insight into factors that might be suppressing the veneer yield from Ontario's Crown owned tolerant hardwood forest. Benefits of directing the right log to the right mill at the right time are discussed.

IN TOLERANT HARDWOODS QUALITY IS JOB 1

Tolerant hardwoods have a somewhat unique characteristic in that the quality of a log can determine the price of a log. As long as the minimum size specification is met, there can be large differentials in price per unit volume depending upon the product (veneer, sawlog, and pallet/pulp/fuelwood) (Table 1). There can also be differences in price within a product category with slicer veneer and specialty added premiums over rotary veneer (Table 2). Prices per unit volume will generally increase by size for logs of the same quality (Table 3). There can be overlap at the top end of the sawlog category with the rotary veneer category as veneer logs can move down the progression; i.e. a veneer log can be sawn into lumber. Specific buyers might not always recognize and pay for all grades and some buyers might price based upon an upgrade from bucking off a defect near the end of a log. Tolerant hardwood product value is influenced by appearance and wood colour, grain, and figure can affect log price. In addition there might be differences in the measured volume of a log (scale). From a seller's perspective, all these factors can best be neutralized by getting competitive bids for the logs.

Table 1: Sample prices for hard maple logs, Jamesville, New York, USA, July 2008.

Log Grade	Diameter inside bark	Length (ft, in)	Quality	Price (US\$/'000)
Veneer	16"	9'6"+	no defect	\$2,000 to \$6,000
Prime	12"	8'-16'4"	4 clear faces	\$1000
#1	12"	8'-16'4"	3 clear faces	\$700
#2	12"	8'-16'4"	2 clear faces	\$350
Pallet	11"	8'-16'4"	sound, straight	\$250

Table 2: Comparison of slicer veneer, rotary veneer, and sawlog price for a similar size hard maple log, upstate New York, USA, July 2008.

Log Grade	Diameter inside bark	Length (ft, in)	Quality	Price (US\$/'000)
Standard slicer veneer	14"	9'6" or 10'6"	1/3 heart, no defect	\$2500
Clear rotary veneer	14"	9'6" or 10'6"	1/3 heart, small defect	\$1000
Sawlog clear	14"	8'-16'4" trim	One small defect	\$800

Table 3: A purchaser's price list that includes sawlogs only, New Hampshire, USA, July 2008.

Log Grade	Diameter inside bark	Length (ft, in)	Quality	Price (US\$/'000)
HM Prime	16"	10' – 16'	4 clear faces	\$700
HM Select	14"	8'-16'	4 clear faces	\$600

SEGREGATION, CONCENTRATION, AND MERCHANDIZING = VALUE-ADDED YARD

Segregation

The tolerant hardwood forest produces species and products with different prices making these forests good candidates for segregation. Segregating by species and/or product then moving the segregated products to different mills is a common practice in Ontario's tolerant hardwood forest. Segregation can take place at the stump, the landing, an interim yard, or a mill yard. Wherever the segregation takes place the difference in price must exceed the additional cost of the segregation for the system to work. If a Crown forest is licensed to a specific mill the

segregation process might not be a market based system depending upon the arrangements between the Crown, the harvester, and the mill.

Concentration

High-value tolerant hardwood stems are few and far between in the bush making concentration a potentially option. Concentrating logs of similar characteristics at a central location facilitates merchandizing and makes it worth while for purchasers of rarer products to ‘shop’ at the yard. Multiple buyers can be invited to examine concentrated wood providing additional marketing opportunities for the seller. Concentration can include a single harvester’s wood or multiple sources combined together with some sort of log tracking system to ensure all are paid fairly. Crown regulations in Ontario require Crown and Private land wood be kept separate and not intermixed in a yard. Again the cost of concentrating must be less than the increase in revenue received.

Merchandizing

Merchandizing involves altering log characteristics to meet buyer specifications or simply finding buyers for particular logs. Merchandizing yards can provide a better environment for re-manufacturing than in the bush where space might be limited and machinery not ideal for handling the products. Merchandizing yards also allow for marketing ‘waste’ products that would otherwise be left in the bush or at the landing. Again the increase in revenue must exceed the cost.

Value-added yard

Combining all three (segregation, concentration, and merchandizing) in one yard can be termed a value-added yard. Traditionally these activities are undertaken at a satellite yard which can be moved as the source of wood changes during the course of operations. The location of the yard must be carefully considered as product handling and trucking costs can be significant. In a free-market system, the implementation of a value-added yard must be cost competitive against installing similar activities at other steps in the wood processing chain.

In our implementation with Tom Fisher Logging Ltd. an in-bush recognition and recovery system was implemented for higher-value logs. Low value material was slashed and moved directly from the woods to the mill. Higher value material was brought to the value-added yard which was centrally located on a main highway near Huntsville Ontario (Figure 1). It was expected the yard might have to move if the woodlands being harvested shifted.

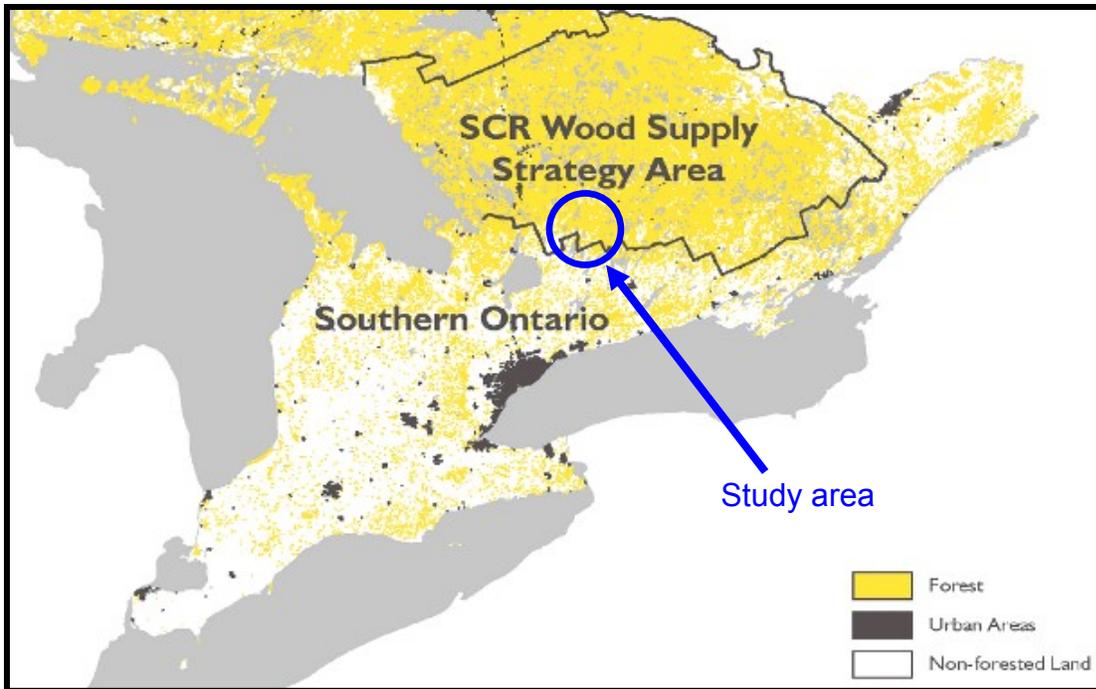


Figure 1: Study location and South Central Region of the Ontario Ministry of Natural Resources.

RESULTS

Differences in log prices

We investigated the differences in pricing by undertaking a virtual auction of 73 logs in the fall of 2008. All logs were identified and slashed in the bush and brought to a centralized yard near Huntsville, Ontario during a two week period. Two veneer buyers were invited individually to provide a scale, grade, and price for each log. One buyer was the traditional purchaser from a regional rotary mill who scaled using the Ontario Log Rule. The other purchaser was a broker from the US who scaled using the International Log Rule. Prices were normalized for the US dollar exchange rate at the time and any differences in trucking costs borne by the seller. A standard sawlog price was calculated at the normal bush run rate in place at the time. There were 40 yellow birch logs and 33 sugar maple logs in our test.

Interestingly if we sold all the logs to either of the two veneer purchasers our revenue was virtually identical (\$7,997 vs. \$8,180). Either veneer purchaser paid vastly more (average of \$8,089) than if we did not segregate by product and sold all the logs as bush run sawlogs to the local sawmill (\$1,900). We did not track the additional costs of identifying, segregating, and merchandizing the veneer logs to determine if segregation was profitable but the large difference in revenue over sawlogs was believed to eclipse the additional segregation costs (Hamilton and D'Eon 2010).

When we broke down the comparison by veneer purchaser we found approximately 1/3 of the logs had little difference in price (less than 25% difference), 1/3 had a moderate difference in price (26-100%), and 1/3 had a large difference in price (as much as \$225 for a log). If we merchandized and sold each log to the higher bidder per log we would sell 42 logs to buyer A and 31 logs to buyer B for a total revenue of \$10,175; an increase of 26% over selling the lot to either buyer. Differences were not one directional; i.e. either purchaser was equally likely to outbid the other. Buyer A bid higher on more sugar maple and Buyer B was more likely to purchase the yellow birch.

We did find differences in scaling of 11% which exceeds the normal standard of 5-7% for differences in the Ontario and International Log Rules but rarely explained the differences in price per log (Hamilton 2011). We found minor differences in log grade (+/- one grade) for 70% of the logs. We did find differences of three grades for 12% of the logs and differences of two grades for 18% of the logs which explained quite a bit of the differences in price. Specific buyers did not always recognize or pay for what another buyer found as a valuable characteristic.

Extra revenue from a year of running the value-added program

Tom Fisher Logging Ltd. ran the value-added program and yard for the 2009-2010 year (April 1st to March 31st). The program involved an in-bush recognition and sort along with concentrating and merchandizing at a central yard. The recognition started at the stump with the operators identifying and protecting high-value stems so they were not damaged prior to arriving at the landing. At the landing the slasher operator identified and bucked for value and set aside high-value pieces. Regular sawlogs, lower value pulp and fuelwood were handled as in previous years. An export permit was obtained from the Ontario Ministry of Natural Resources so some veneer logs could be exported to the United States. The traditional rotary veneer buyer was given first access to the rotary logs.

Prior to running the value-added program the logger was focused on volume recovery as payment was made to him by the volume harvested and not so much by value. Using the previous volume focused year as a comparison, the logger received 11.9% more revenue per unit volume of wood moved with the value-added program (Table 4). The percentage of veneer recovered went up 15 fold approaching the amounts obtained under experimental conditions and double the provincial average. The low value material percentage and revenue went down 14% and the sawlog material went up 13%. There were several additional side benefits including a more engaged employee team, less trucking, and less maintenance of equipment (Hamilton 2011). The trial was not designed to quantify the net profitability for the logger so we can only comment on the increase in revenue. The land harvested was part of the managed forest of that part of Ontario and there was no evidence the sites were any better in the value-added year than the previous year.

Table 4: Comparison of logger’s annual revenue focused on volume production vs. focused on value production for a single year’s harvest of 59,900 m³.

Product	Product price (\$/m ³)	Product split focused on volume (%)	Revenue when focused on volume	Product split focused on value (%)	Revenue when focused on value
Pulp/fuelwood	\$43	65.0%	\$1,674,000.	50.8%	\$1,308,000.
Sawlog	\$72	34.9%	\$1,505,000.	47.6%	\$2,053,000.
Veneer	\$207-218	0.1%	\$12,000.	1.6%	\$209,000.
Total:		100%	\$3,192,000	100%	\$3,570,000

Marketing was a major part of the program and Tom Fisher Logging Ltd. rapidly developed markets for various materials including figurewood, slicer veneer, and shorts (Table 5). These markets had not previously received wood from this part of the province. In the previous year only 100 m³ of rotary veneer had been recovered in Tom Fisher’s operation. The traditional buyer benefited from an increased supply that was concentrated in one place. The Crown received increase stumpage dues of \$70,000 as the provincial rates vary by product and the increase in sawlog and veneer recovery shifted wood to the higher stumpage matrix (Hamilton 2011). Exports to the United States totaled only 149 m³ from a 59,900 m³ harvest (0.25%).

Table 5: Veneer markets and shipments 2009-2010.

Veneer buyer	Total volume (m ³)	Average price (\$/m ³)	Maximum price (\$/m ³)
Columbia, rotary, Rutherglen, Ont.	614	\$207	\$465
Gravenhurst, specialty, shorts, Gravenhurst, Ont.	156	\$142	\$305
Freeman, specialty slicer, Kentucky, USA	149	\$322	\$1120
Miller, specialty, figurewood, New Brunswick	37	\$311	\$1700
2009-10 Total	956	\$218	

DISCUSSION

Recognizing, segregating, and moving the ‘right’ log to the ‘right’ mill at the ‘right’ time creates jobs and generates wealth. This is especially true in the tolerant hardwood forest where product and quality within a product can quickly change the economic potential of the wood. Veneer produces more milling jobs per m³ than sawlogs or pulp and high value veneer even more so

(Table 6). High value logs are in short supply and mis-directing a log to a lower end product mill reduces the capacity of the forest products sector to generate positive economic returns (OMNR 2003). Estimates of the value to the economy generated per unit volume are difficult to obtain but a study in Indiana found the end products exceed \$50 / bd ft of input or approximately \$10,000 / m³ (Swain 2006). Data from Quebec indicate approximately half that value (Clement 2005). Both these studies included sawlogs and veneer. Should Ontario return to a 1.6% veneer recovery rate for sugar maple and yellow birch and mill those logs in Ontario we estimate an additional \$40 million of economic activity would be generated for the province.

Table 6: Roundwood required per employee for various hardwood product mills.

Mill location	Product produced	m ³ used /year	Number of employees	m ³ /job
Durham	slicer veneer	30,000	415	72
Rutherglen	rotary veneer	50,000	320	156
Sault Ste. Marie	paper	400,000*	400	1000
Huntsville	sawlogs	125,000*	100	1250

*plus chips and other by-products.

Data source: OMNR 2005

The situation in Ontario is improving. Ontario switched from diameter limit harvesting and other systems to the single tree selection system in the mid 1970's and early 1980's for Crown owned tolerant hardwood stands. The selection system has been shown to improve quality in tolerant hardwoods and we expect to see these improvements in future harvests (Strong et al. 1995). Studies of tree grade to log grade and eventual board grade are lacking but the few undertaken clearly indicate the improved economics of managing tolerant hardwoods for quality (Fournier et al. 2006, Fortin et al. 2009). Logging damage during harvest can diminish these improvements and must be minimized (Morneault et al. 2007). Presentations at a recent Ontario workshop indicate corrections have been made to realize the gains from proper logging and single tree selection (D'Eon 2011). As Ontario's tolerant hardwood forests improve over time it will be important to ensure mechanisms are in place to recover the additional value created and value-added yards may play an increased role in the future.

CONCLUSIONS

Segregation, concentration, and merchandizing have been demonstrated as valid strategies to improve the value-added to Ontario's tolerant hardwood harvest. Proper markets at the two ends of the value range are equally important. Markets for low value material must be maintained so the stand improvement gains from the selection silvicultural system continue. Without markets for low value wood it is difficult to properly manage the stands. On the other end, high value specialty veneer logs that cannot be used to their full potential in Ontario's mills must be allowed to be easily marketed to their appropriate end-point. Without proper options for the high end material the anticipated gains will never be realized.

LITERATURE CITED

- Clement, R. 2005. Some data on the furniture industry. *Foret Davenir* Vol. 1 No. 1 page 2. Syndicat des propriétaires forestiers du Suc-Ouest du Quebec.
- D'Eon, S. 2011. Ontario tolerant hardwood tour Oct. 19-21, 2010. Ontario Professional Foresters Association Newsletter March 2011 No. 201 p. 11.
- Fortin, M., Guillemette, F. and S. Bedard. 2009. Predicting volumes by log grades in standing sugar maple and yellow birch trees in southern Quebec, Canada. *Canadian Journal of Forest Research* 39:1928-1938.
- Fournier, A., Woods, M., Stinson, A. and T. Zhang. 2006. Maximizing the value of hardwoods through intensive silviculture (Stokes Study). Forintek Canada Corp. General Revenue Report Project No. 3652, Progress Report 2005/06. 25 pp.
- Hamilton, P. 2011. Hardwood log valuation trial Huntsville, Oct 2008. IR-2011-04-12 FPInnovations, Pointe-Claire, Qc. 12 pp.
- Hamilton, P. and S. D'Eon. 2010. Identifying and segregating veneer grade hardwoods can earn logging contractors extra revenue. *Fibre Fact* 006, Canadian Wood Fibre Centre, Ottawa, Ont. 2 p.
- Morneault, A., Woods, M., and S. McPherson. 2007. Surveys and logger training for stand and site damage. *Canadian Ecology Centre Tree Tip* No.7. 2 p.
- OMNR. 2003. *Regional Wood Supply Strategies*. Ontario Ministry of Natural Resources, Queen's Printer for Ontario, Toronto. 76 pp.
- OMNR. 2005. Ontario's forest industry facility (mill) statistics 1999 to 2003. Ontario Ministry of Natural Resources. 267 pp.
- Stinson, A. 2009. Ontario's hardwood veneer supply, past, present, and future. Canadian Hardwood Plywood and Veneer Association Fall Meeting, Nov. 5, 2009.
- Strong, T.F., Erdmann, G.G. and J. N. Niese. 1995. Forty years of alternative management practices in second-growth, pole-size northern hardwoods. I. Tree quality development. *Canadian Journal of Forest Research* 25:1173-1179.
- Swain, R.M. 2006. *Indiana's Hardwood Industry: It's Economic Impact*. Indiana Department of Natural Resources, Division of Forestry. Downloaded from: http://www.in.gov/isda/files/Indiana_Hardwoods_and_Their_Economic_Impact.pdf