

2004 Timber Consumption, Procurement Behavior, and Investment Issues for Maryland Sawmills.

Introduction

Forests across Maryland are increasingly recognized for their growing importance towards meeting the many needs of society. Today it is well understood by most people that both the economic and the ecological functions of forests are deeply inter-connected, and if we are to sustain the multiple benefits derived from our forests, then we must manage the forests accordingly.

Forest management is the art and science of perpetuating these benefits today and for future generations. Forest management focuses on tending any particular forest so that the desired “outputs” are produced which best meet the goals of the landowner or forest manager. Forest management activities often require physically changing the conditions of the forest to improve the ability of the forest to produce the desired benefits, and many of these activities incur a financial cost. Markets for forest products offset these costs and accordingly provide landowners with an incentive to actively manage their forests. Some management activities yield immediate income, while other activities are undertaken today with the prospect of increasing incomes from the sale of improved forest products in the future.

This report summarizes the volumes of wood harvested from Maryland’s forests and provides regional comparisons of wood supply issues important to the forest industry and the health of the overall forest resource.

Methodology

Surveys were mailed to 98 sawmill businesses both within Maryland and in neighboring States registered as Forest Products Operators (FPOs), a designation legally required for purchasers or processors of raw forest products (see Maryland Annotated Code NRA 5-608) . The FPO database includes stationary sawmills, portable sawmills, pulpmills, wood dealers, loggers, land clearing contractors, firewood producers, and other miscellaneous operators. A “manufacturers survey” was mailed to all sawmills (including portable mills) asking various questions about their wood consumption and general procurement practices for the 2004 calendar year. Loggers were mailed a separate “loggers survey” requesting general information about harvesting practices and trends they observed regarding harvest sizes and landowner attitudes towards timber harvest. Licensed foresters were mailed a “foresters survey” requesting for similar information. Firewood producers, land clearing contractors and the other categories of FPOs were not surveyed.

Response Rate, Regional Distribution, and Mill Sizes

Of the 98 sawmills mailed a survey, a total of 33 sawmills responded to the survey (a 33% response rate). Most of the responses were returned from in-State mills, yet a significant response from out-of-State mills (9 mills, 27%) was

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received, with most of those from Pennsylvania. This was not unexpected given the large proportion of Maryland's border shared with Pennsylvania. Only one mill from West Virginia responded and no responses were returned from Delaware or Virginia.

Of the 33 responses, 19 (58%) reported an output exceeding 1 million board feet (mmbf). (To help clarify the results of some of the survey questions discussed later in this report, "large mills" are defined as producing 1 mmbf or more.)

Table 1. Response rate of sawmills shown by mill size and region.

<i>REGION</i>	<i>SMALL MILL</i>	<i>LARGE MILL</i>	<i>TOTAL MILLS</i>	<i>% of total responses</i>
West	3	1	4	12%
Central	7	2	9	27%
South	1	2	3	10%
East	3	5	8	24%
Out-of-State	0	9	9	27%
TOTAL	14	19	33	

Notes:

- (1) Large mills are defined as producing at least 1 million board feet annually.
- (2) Regions are defined by County as follows:
 - West – Garrett, Allegany, Washington, Frederick
 - Central – Carroll, Howard, Montgomery, Baltimore, Harford, Cecil
 - Southern – Anne Arundel, Prince Georges, Charles, Calvert, St. Mary's
 - Eastern – Kent, Queen Anne's, Caroline, Talbot, Dorchester, Wicomico, Worcester, and Somerset

Maryland Timber Production

Each sawmill was asked to accurately estimate their total wood purchases from all sources (e.g., purchased direct from landowners as standing stumpage or purchased as gatewood from other suppliers). Total volume of annual timber harvest is a very important statistic used for a variety of purposes in developing policy goals, resource management programs, economic development, and a host of other important purposes. Therefore, since not all sawmills responded to the survey, known mill capacities derived from other sources was used to compare against the responses from each region in an attempt to estimate the volume of total production not reported.

Since not all of the mills returned the survey, it is not possible to directly tally the total timber harvest from Maryland forests. However, by comparing the reported total mill consumption figures with the reported volumes coming from just Maryland forests, a ratio estimator can be derived to predict the volume of the Maryland harvest. Using this methodology, it is estimated that **total timber**

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volume harvested from Maryland forests in 2004 was 146 million board feet (International scale).

Total volume of timber purchased by Maryland sawmills from all sources – stumpage and gatewood from both within and beyond Maryland -- **is estimated to be 171,694,114 board feet.**

Home to the bulk of Maryland's pine resource (which yields high volumes per acre), the sawmills of the Eastern region accounted for slightly more than one-half (51%) of the total statewide timber harvest. Combined consumption of the Western, Central, and Southern regions accounted for one-quarter (25%) of the state-wide timber harvest. Out-of-State mills accounted for 24% of the total harvest, nearly equal to the total consumption estimated for the Western, Central, and Southern regions combined.

Maryland is a relatively small State and shares borders with four other States, and therefore it would be reasonable to assume that many of Maryland's sawmills would garner a significant portion of their timber from out-of-State sources. Surprisingly, the results of the survey indicate otherwise: more than half of all Maryland sawmills (responding to the survey) reported sourcing **90% or more of their timber from Maryland forests.** More than half of all the large sawmills buy 75% or more of their timber from Maryland sources. On average, 71% of all timber processed by a Maryland mill was grown in Maryland. The presence of the local in-State forest industry clearly offers financial incentives for Maryland landowners to actively manage the health of their forests.

Also of interest is the importance of Maryland's forests to the out-of-State mills. Those out-of-State mills that rely on Maryland grown timber do so for a very significant 47% of their fiber needs.

Pulpwood and other forest products consumption is not reported to protect the confidentiality of those few enterprises engaged in that sector of the industry.

PROCUREMENT BEHAVIOR

Log Scales

Buying and selling of timber can be described in the simplest terms as converting wood into cash. Arriving at a dollar amount requires estimating the volume of timber and equating that volume with a cash equivalent negotiated by the buyer and seller. Log scales are used in making these conversions, and different scales yield different results. Some log scales are favored over others depending upon the custom of the local industry in that particular region. For example, the Doyle scale is the most frequently used in Maryland (52% of respondents), but only west of the Chesapeake Bay. Eastern Shore timber transactions are handled

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mostly with the International-1/4 scale. A handful of mills reported using basic tonnage for conversions.

Table 2. Preference of various log scales by Region.

<i>Log Scale</i>	<i>West</i>	<i>Central</i>	<i>Southern</i>	<i>Eastern</i>	<i>Out-of-State</i>	<i>Total</i>
International		1		5	3	9
Doyle	4	5	3		4	16
Scribner					1	1
Tons		2		2		3
Not reported		2		1	1	4

Stumpage vs. Gatewood

Mills generally use two options for procuring the wood they require. They can purchase timber as it stands directly from the landowner (which is known in the trade as “stumpage”), or, they can buy timber from a second party such as a logger or wood dealer and pay for it as it is delivered to their woodyard (known in the trade as “gatewood”).

More than half of all mills responding to the survey procure 75% or more of their timber as stumpage yet only 57% of all the timber harvested in Maryland is sold as stumpage. This may at first appear to be a contradictory statement, but it is not. This means that while the majority of mills buy most of their timber directly from landowners, a large volume of timber is procured indirectly from independent loggers and wood dealers. A closer examination indicates that large mills buy a greater proportion of their timber as stumpage while smaller mills rely on gatewood. Half of all large mills buy 80% or more of their timber as stumpage, and an average 72% of all timber bought by large mills is in the form of stumpage. The implications of these statistics to forest management are many. As one example, foresters should keep these figures in mind when considering means of reaching landowners with information pertaining to selling timber.

Table 3. Percentage of timber purchased by mills in the form of stumpage.

Region	% Stumpage -- Average	% Stumpage -- Median
West	69%	90%
Central	48%	50%
South	55%	70%
East	51%	70%
Out-of-State	66%	75%
Large Mills	72%	80%
All Mills combined	57%	75%

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Tract Sizes (Harvest Sizes)

Understanding trends in tract size data is useful for many purposes. One of the most important is that trends in the size of timber harvests serve as an indicator of parcelization of the land base. Increased parcelization of the land base has economic and environmental implications because each individual landowner manages for different purposes. This makes achieving goals at the broad landscape level more difficult. As land units become smaller the relative return on investment for improvement practices drops precipitously, meaning that as forest ownerships become smaller and smaller there are fewer incentives for the landowner to manage the forest productively. Also, as the land base gets divided among more and more landowners the likelihood of conflicts between landowners over management practices tends to rise, also making it more difficult to actively manage. From the perspective of a mill or logger, smaller acreages typically yield less total volume to absorb the costs of staging equipment and installing BMPs, which are largely independent of tract size. Since mills and loggers earn money only on products they actually produce, small tracts require harvesting systems that can efficiently enter and extract the products. Therefore, timber tracts too small to economically harvest are forsaken – the landowner receives no benefit from management investments and the local economy receives no benefit from raw materials harvested.

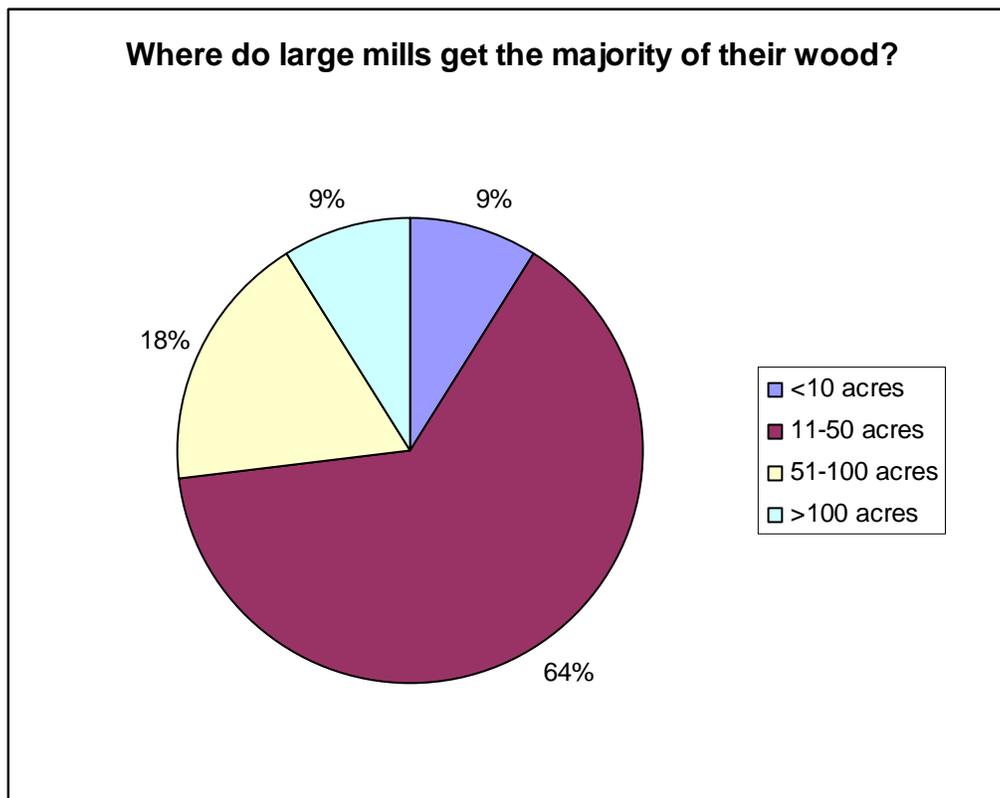
Another important purpose of tracking tract size trends is gauging the ability of the industry to adapt to a changing resource. Some tracts are simply too small to support a commercial timber harvest of any sort and so procurement efforts will heavily seek those tracts that are large enough to return a profit on investment. Studying trends in tract sizes entered by timber harvesters offers clues about the relative health of the industry as a whole. For example, if tracts generally thought to be too small for profitable operations are being entered more and more frequently, then one conclusion to be drawn is that the industry in that locality is suffering from a lack of available resources. Alternatively, the same data trend could also indicate that the industry has improved its ability to operate on tracts which were formerly too inefficient for making a profit.

The survey results indicate that 83% of the respondents received at least a portion of their wood needs from very small tracts (i.e., less than 10 acres) during 2004. Small tracts (i.e., 11 to 50 acres) were similarly utilized. As tract sizes increased, the percentage of mills utilizing them decreased. Only 46% of all mills received wood from large tracts (i.e., 51 to 100 acres) and just 33% of all mills utilized wood from very large tracts (i.e., 100 acres or more). This seems to indicate that timber harvesting options remain viable for owners of small parcels. Owners of larger parcels proposing large timber sales should understand that fewer mills have the capacity to engage in large sales offerings.

Understanding that the majority of mills will procure timber from small tracts while relatively few mills buy large tracts illustrates just a part of the story regarding the

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effects of tract size. Assuming that tract sizes will continue to shrink with each passing year, it is important to understand how the industry targets tract utilization, especially in regards to small tracts. Analyzing the survey data reveals the relative importance of tract size to wood procurement success. For example, 88% of all mills reported securing the majority of their wood needs from tracts less than 50 acres in size. Only 12% of all mills get their wood primarily from large tracts of 50 acres or more. A closer examination reveals that nearly two-fifths (38%) of mills rely primarily on very small tracts of less than 10 acres to fulfill the majority of their wood needs. Important to note, however, that those mills relying primarily on very small tracts also were small mills --- the large mills principally relied on tracts between 11 and 50 acres. Regional differences were noted as well. Mills in Western region tended to focus more on larger tracts while the mills in Central (which are mostly small mills) reported relying nearly exclusively on very small tracts of less than 10 acres.



Species Used

According to US Forest Service data, about 64% of Maryland's roundwood harvest is in hardwood species. Softwood species – mainly loblolly and Virginia pine – are concentrated in the eastern part of the state. Not surprisingly, poplar and oaks are the principal species sought by the industry across Maryland, with loblolly pine topping the list in Eastern Region and black cherry favored in

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Western region. Interesting to note is the strong preference for soft maple in Western region. Also of interest is the apparent lack of interest (relative to other species) for sweetgum in the Eastern region.

Most Favored Species by Region

Region	Top 1 Spp	Top 5 Spp
West	cherry	Cherry, soft maple , hard maple, red oak, white oak,
Central	poplar	Poplar, red oak, white oak, soft maple, cherry
South	poplar	Poplar, red oak, white oak, soft maple, sweet gum
East	loblolly	Lob, VaP, other red oak, other white oak, soft maple

Residues

Essentially all bark production is captured by the mulch market. Paper mills consume 2/3 of hardwood chips and 3/4 of pine chips, with balance of chips used for mulch, fuel, and animal bedding. Pine sawdust is marketed exclusively as bedding, especially poultry. Hardwood sawdust is mainly used as animal bedding (86%) with some going as fuel (14%). Large mills market 100% of residues.

Procurement Radius

Procurement radius is defined as that distance that mills will extend their stumpage purchasing efforts in their normal course of business. This distance is typically expected to be influenced by supply (and availability) of preferred species, weather conditions which affect access and harvest operability, and harvesting and transportation costs. Analysis of the survey responses indicates the following findings:

- No correlation between mill size and procurement radius appears to exist. While variations of procurement radii between individual mills certainly exist, the data clearly demonstrated that small mills were just as likely to regularly travel as far as large mills to secure their timber supply.
- Large mills reported having an average procurement radius of 59 miles for sourcing stumpage to their mill. Half of the mills reach out to 50 miles; a number of mills regularly traveled 100 miles. One mill reported satisfying its timber needs within 15 miles of its gate.
- A minority of large mills (35%) are showing a trend of increasing their procurement radius in recent years; most large mills have not changed their radius (60%). Small mills mostly remain unchanged but some (18%) have actually reduced their radius.

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- Survey respondents were asked to rank in order of importance those factors that most influenced their procurement radius. In order of frequency (i.e., highest to least) these factors are listed below:
 - Willingness of landowner to sell
 - Stumpage price
 - Loss of forestland base
 - Access and operability
 - Logging costs
 - Size of tract / overall timber volume offered
 - Current inventory on yard
 - Competition
- Large mills that have increased their procurement radius rank “logging costs, competition, and tract size” much higher in the list than do the mills with stable procurements zones. Common sense concurs that mills in need of more timber will go further to find it.
- Most of the large mills (67%) reported not changing their procurement zones within the last 3 years (since 2001). Those that did expand seem to be responding primarily to competitive forces affecting overall procurement costs, which could in fact be a result of diminishing availability of timber.
- Industry as a whole adjusts their procurement efforts in response mainly towards timber availability issues (eg, landowner willingness to sell timber and general availability of timber in the landscape).
- As expected, stumpage price and logging costs directly influence distances mills travel for timber. Current woodyard inventory and degree of competition were ranked low, suggesting mills freely expect to compete for their timber and mills generally establish a known “presence” within a geographic area from which they regularly procure timber.
- Procurement decisions of large mills are driven largely by cost issues (ie, stumpage price and logging costs). Finding landowners willing to sell timber is listed as less of a factor. This could possibly be explained by the fact that large mills tend to be concentrated in rural areas (ostensibly with more landowners willing to sell timber) and the small mills are mostly found in the suburban counties with fewer forested tracts and fewer landowners willing to sell timber.

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FUTURE THOUGHTS

Wood Supply Concerns

- Majority of mills –both large and small—express some concern about timber supply.. Less than 1/3 of all mills are not concerned about current timber supplies; however, 4/5 of mills are very concerned about long term availability. Small mills are more concerned about timber supplies now and in the future than are the large mills. A troubling finding, however, is that some mill owners reported they are not concerned about wood supplies 25 years from now, apparently because they don't plan to be in business then. For obvious reasons, this finding should be of great concern to anyone interested in the long-term sustainability of healthy forests.

How Does Timber Availability Affect Re-Investment?

- The majority of those concerned about future timber supplies intend to continue re-investing in their operations. Yet 1/3 of those concerned about timber supply plan to dis-invest in their operations.
- Some Positive Quotes:
 - “looking forward to higher yields and product diversifications to support investment”;
 - “technology = profit + competitiveness”
- Some Negative Quotes:
 - “no need to invest in equipment for a questionable timber supply”;
 - “am currently downsizing”;
 - “looking to clearing operations as future timber supply”;
 - “government restrictions discourage capital investment”;
 - “have already expanded as much as current timber supply allows”

Terminal Harvests

Terminal harvests are defined as those that result from a conversion of forest to non-forest, typically associated with commercial or residential development. Significant disparity between large mills and small mills exists in the percentage of wood derived from terminal harvests. Smaller mills are more likely to be engaged in terminal harvests, presumably due to the smaller acreages typically involved with land conversions. Smaller harvests translate into lower volumes of wood harvested, decreasing harvesting efficiency. Mobilization and demobilization costs are absorbed by a lesser overall production, raising production costs per unit of wood harvested. Also, terminal harvests tend to require more flexibility on the part of the logger (eg, complex harvest boundaries, more attention to retention areas and protection of individual trees, and ability to start or stop work on short time frames), thus making these harvests less amenable to

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the larger logging operation which must focus principally on production volume. For all these reasons, small mills are best suited to profitably adapt to the special challenges presented by terminal harvests. Larger mills focus their procurement efforts on larger tracts and those that promise high operational efficiencies, and the small volumes and vagaries of operations typically involved with terminal harvests provide neither. (Field observations seem to suggest that larger mills tend to utilize loggers with more and bigger equipment, and therefore require larger tracts and minimal work stoppages necessary to meet profitable efficiencies.)

A troubling indicator: while the percentage of terminal harvests presents a general observation of the intensity of forest loss due to development in a region, it also portends a troubled future for the mills. Since the forest industry relies on the sustainability of its raw material (ie, timber from forests) a high rate of terminal harvests indicates that the mills are dependent upon an unsustainable finite supply of available timber. This pattern is most pronounced in Southern and Central regions. While this dynamic does not seem to be problematic as of yet in the Eastern or Western regions (as currently reported from the mills within those regions), the issue of long-term availability of timber is nevertheless a concern for the future.

This data could mean that large mills are not yet in a position of having to target this source of timber, or, it could mean that small mills best occupy that particular procurement niche. In either case, tracking the trend of reliance on terminal harvests for overall wood needs will remain an important metric since it has clear implications for the long-term viability of the industry, and thus forest management capabilities.

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FINAL THOUGHTS

Sawmills represent a very significant industry providing financial benefits to landowners, employment, public treasuries, and attractive economic multipliers throughout all regions of Maryland as well as neighboring States. Markets for timber products make possible the ability to manage forests for a range of desired outcomes, and understanding the facets of those markets enhances our ability to carry out forest management activities today and anticipate future opportunities and challenges. Understanding the dynamics of the industry aids our ability to adapt with change and make decisions that foster the continued health and sustainability of the industry itself. Without this knowledge, informed decisions cannot be made and positive change becomes pure luck.

This survey has yielded much useful information for sawmill owners, loggers, landowners, foresters, and policy-makers. However, this survey provides a static description of the industry at just one particular moment in time, 2004 in this case – results of future surveys will demonstrate trends. While understanding the magnitude and status of various metrics holds obvious value, it will be the realization of the direction these same metrics move with time that offers the most important knowledge.

All survey participants voluntarily shared their private data for compiling this report. Your cooperation and trust are appreciated with the sincerest thankfulness and respect.

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Highlights

- Total timber volume harvested from Maryland forests in 2004 was 146 million board feet (International scale).
- Total volume of timber purchased by Maryland sawmills from all sources – stumpage and gatewood from both within and beyond Maryland -- is estimated to be 171,694,114 board feet.
- Oak, poplar, cherry, and loblolly pine are the species most sought. Soft maple ranks higher than expected in Western region, while sweetgum ranks considerably lower than presumed in Eastern region.
- The presence of the local in-State forest industry clearly offers financial incentives for Maryland landowners to actively manage the health of their forests.
- Large mills buy a greater proportion of their timber as stumpage while smaller mills rely on gatewood
- Small mills rarely purchase large tracts of timber (i.e., 50+ acres) while large mills tend to not buy very small tracts (i.e., less than 10 acres). This is a key piece of information for those marketing timber.
- Small mills were just as likely to regularly travel as far as large mills to secure their timber supply. Mills on average travel 59 miles to secure timber.
- Slightly more than 1/3 of large mills indicate they have increased their procurement radius, apparently in response to competition for larger tracts with reduced “per unit” logging costs.
- Strategies for retaining competitiveness focus on investing in new technology and market diversification. However, some mills are not optimistic about their ability to remain competitive and apparently are resigned to eventual shut-down.
- Most mills, both small and large, report a concern about the long-term availability of timber into the future.
- Some mill owners are not concerned about wood supplies 25 years from now, apparently because they don't plan to be in business then. For obvious reasons, this should be of great concern to anyone interested in the long-term sustainability of healthy forests.
- Terminal harvests represent a more significant overall source of timber to small mills. Many small mills rely on terminal harvests for the majority of their wood sourcing, while large mills currently do not.