



A Landowner's Guide to Selling Standing Timber

Managing your woodlot for profit and pleasure . . .



A LANDOWNER'S GUIDE TO SELLING STANDING TIMBER

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A Landowner's Guide to Selling Standing Timber



THE ONTARIO TRILLIUM FOUNDATION
LA FONDATION TRILLIUM DE L'ONTARIO



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Ontario Woodlot Association
275 County Road 44, R.R. #4
Kemptville, Ontario
K0G 1J0

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The project team consisted of:

- Chris Lincoln – Upper Trent Valley Chapter of the Ontario Woodlot Association
- Wade Knight – Executive Director, Ontario Woodlot Association
- Bob Penwell – Peterborough District Forester, OMNR, Retired
- Duncan Armstrong – Stewardship Coordinator, Peterborough County
- Glenn McLeod – Stewardship Coordinator, Northumberland County
- Dave Pridham – Stewardship Coordinator, Victoria County
- Charlotte Breadner – Stewardship Administration Assistant

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Introduction

Selling standing timber is not a simple task. If you are a landowner with no experience, you need to take some time to learn about the many steps involved. We have two words of advice – “seller beware.”

Most people sell products from their woodlots on only two or three occasions in their lifetime. Landowners who are not familiar with the intricacies of selecting and harvesting trees, market values, dealing with contractors and consultants, or legal considerations – may find themselves earning a lot less than they should.

Although most loggers and timber buyers are reputable business people, some landowners have sold their timber for a fraction of what it was worth. Woodlots have been stripped of their best trees, leaving little of value for the future. In other cases, trees, forest trails, wildlife habitat and streams have been damaged by irresponsible logging activities.

A Landowner's Guide to Selling Standing Timber provides a comprehensive, step-by-step explanation of the process. Following these guidelines will help ensure a fair business deal for both the seller and buyer of standing timber. The guide also recommends ways to ensure that woodlots are managed in a sustainable manner, so that biodiversity and natural features like wildlife habitat, wetlands, and streams are protected.

This guide has been written for general use with as little technical language as possible. However, since forestry has its own jargon, a glossary is included. Also, lumber is still processed and sold in Ontario in imperial measurements, so both metric and imperial units appear in this guide.

Woodlots are as different and varied as individual people. Each has its own management history, unique features, and variety of tree species. Although it is difficult to provide economic advice that will apply to all woodlots, *A Landowner's Guide to Selling Standing Timber* does explain the financial and natural benefits of managing a woodlot for the long term. It is intended that both you and your land will prosper from this advice.

At the East Central Woodlot Conference, in February 2001, a local landowner related his personal experience about how he was approached by a local logger who offered him \$5,000 to mark and harvest his small woodlot. The logger claimed that the woodlot contained very little of any value. The landowner decided to do some research and contacted other loggers for bids. As a result, on a shared value sale the landowner made \$15,000 on his harvest. In addition, the landowner himself had chosen every tree that was cut.

In 1992, when the Ontario Ministry of Natural Resources still provided tree marking services, a landowner called the Lindsay office to ask for some advice. He had been offered \$8,000 for the harvest rights to his woodlot. Two months later, another buyer offered him \$15,000. The woodlot was marked for a sustainable harvest by MNR staff. The marked timber was then advertised in a timber sales bulletin. The landowner ended up receiving \$28,000 for the marked trees, and will be able to have future harvests every 12 to 15 years.

Section 1 Selling Standing Timber – The Basics

Landowners often sell their timber to loggers or buyers who approach them about harvesting their woodlot. Most of the time, both parties are happy with the transaction, but unfortunately there are some exceptions. Your woodlot may be worth much more than a potential buyer offers you. If a buyer approaches you about taking timber from your land, you have something of value. (It is unwise to rely on only one buyer for information about the value of your trees.)

There is a process for selling standing timber which ensures that you receive fair value for your product and that your woodlot is well managed.

Here are a few basic tips:

- ◆ **Become informed.** This booklet tells you how to find out what you have in your woodlot, its value, and how to organize a timber sale.
- ◆ **Take a basic inventory of your woodlot.** An inventory will tell you about the variety, age and number of trees growing on your land.
- ◆ **Develop a management plan.** Whether you are harvesting for a source of revenue or for attaining other objectives, you will benefit from some planning. A management plan will help to ensure the long-term sustainability of your woodlot.
- ◆ **Mark the trees you intend to harvest.** Only after the trees are marked can you compare bids from interested buyers.

It is unwise to rely on only one buyer for information about the value of your trees

- ◆ **Get more than one bid** (preferably three or more).



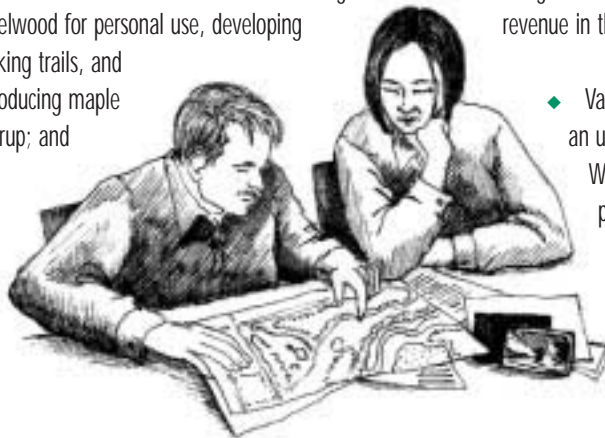
- ◆ **Ask logging contractors for references.** Make sure that you consult these references and take time to look at woodlots already harvested by loggers you may hire.
- ◆ **Monitor the logging job from the first day.** Tell the logger immediately if you are not happy with any aspect of the harvest operation. Good operators want to hear what you are thinking and will address your concerns.
- ◆ **Have a contract that protects your interests.** All buyers have their own contracts, but they may not offer complete protection to you. A sample contract is provided in this booklet.

Tell the logger immediately if you are not happy

Section 2 Managing for the Long Term — What's in it For You?

A high-quality hardwood stand or pine plantation can produce income in the tens of thousands of dollars. This does not include the value of trees that are retained for future harvests, or other intangible values such as wildlife habitat. These assets need to be managed. By developing a good management plan you will:

- ◆ Maximize income from your woodlot (possibly for this harvest and definitely over the long term);
- ◆ Lessen negative impacts on wildlife and natural features (In fact, with a properly planned harvest, it is possible to enhance wildlife habitat);
- ◆ Minimize any impact on aesthetic and recreational values;
- ◆ Enhance future activities such as harvesting fuelwood for personal use, developing hiking trails, and producing maple syrup; and



- ◆ Comply with local regulations or bylaws governing forest harvests.

Many landowners sell harvest rights to their woodlands with little planning or properly marketing their product. A timber harvest should be approached as a financial opportunity and deserves the research and planning that any business venture requires.

It has taken your woodlot decades to get to the point where its timber is ready for harvest. Do not be pressured into selling quickly without acquiring the information that you need to make an informed decision. Except under very extraordinary conditions, timber does not deteriorate appreciably in a few months, or even in two or three years. Buyers may say that markets have never been higher; however, over time, timber values continue to increase.

Why does sustainable management pay more in the long term?

Woodlots harvested selectively, on the basis of good management and marketing, will always provide greater revenue in the long term for these reasons:

- ◆ Values for high-quality timber have increased at an unprecedented rate over the last ten years. With a diminishing supply of high-quality forest products, and an increasing demand worldwide, timber values should continue to climb (see Figure 1 on page 7).
- ◆ Markets which accept only forest products from woodlots certified as being

managed / harvested on a sustainable basis are an emerging trend. In the future, forest products harvested from sustainably managed woodlots may have more value than those from non-certified forests.

- ◆ A planned forest harvest will take out the right trees (mature trees and trees with poor-quality stems) and will provide the best growing conditions for the remaining ones.
- ◆ Due to past mismanagement, many woodlots contain large numbers of mature low-quality trees. It pays, in the long run, to remove as many of these trees as possible to provide growing space for smaller, higher-quality trees or to create openings to stimulate natural regeneration. It is recommended that no more than one-third of the basal area¹ should be removed at one time.

It pays to let your trees grow until they are
"economically mature"

- ◆ Trees start to reach their highest value when their diameter at breast height is greater than 14 or 15 inches, outside the bark. At these diameters, they are growing into the diameter range where they meet the basic size criteria for veneer,² the most valuable product. It pays to let your trees grow until they are "economically mature."

Landowners who plan a sustainable harvest to maximize the production of high-quality timber over the next 10 to 15 years will profit as prices continue to rise.

Table #1 on page 6 compares current and future values for a good-quality maple tree (12" DBH³) that could be harvested today, or managed to produce high-value timber in the future.

The information in Table #1 assumes the following:

1. These are "on the stump" values;
2. All values are calculated in today's dollars. No allowance is made for inflation, higher values due to product scarcity and increased demands, or for extra values for forest products from woodlands certified as being sustainably managed;
3. Most veneer volume comes from logs cut from the butt of the stem, with the highest grades of veneer requiring a minimum diameter of 13 to 14 inches inside the bark, at the small end of the log; and
4. The tree is of sufficient quality that one to two logs have veneer volume present.

¹ Basal area – the area, in square metres per hectare, of the cross-section of all trees measured at 1.3 metres above ground level. Knowing the basal area tells a forestry practitioner whether or not a stand is overstocked, understocked or growing at its optimum rate (approximately 20 square metres of basal area per hectare for upland hardwood – hard maple, beech, white ash). Basal area is most easily determined with an instrument known as a wedge prism.

² Veneer – A product manufactured from logs of exceptional quality. Veneer is processed either by turning a log on a type of lathe and scalping off a continuous, extremely thin strip of product as the log turns, or by slicing off longitudinal slices from one end of the log to the other. Most of the higher quality veneer logs are exported to mills in the northern states. Veneer volume in various woodlots varies from nil to considerable.

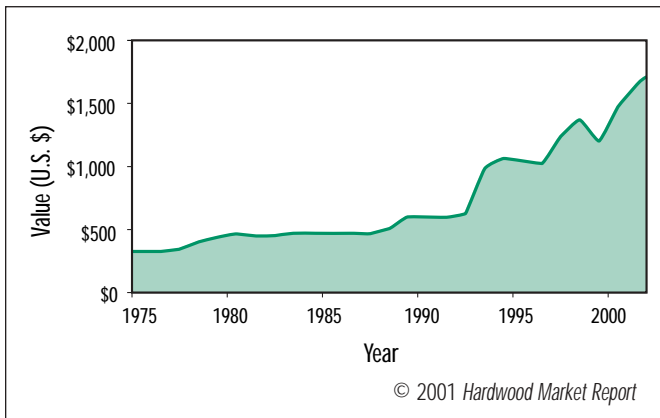
³ Diameter at Breast Height – (referred to as DBH). DBH is measured at 1.3 metres or 4.5 feet above ground and is the standard height at which a tree's diameter is measured in order to calculate volume when conducting forest inventory or when marking trees for harvest.

Table #1: Comparative Values for a High-Quality Hard Maple Tree Growing on an Average Site
(Illustrating options for timing of harvest – 15-year harvest cycles)

Age In Years	DBH	Height to Heavy Branching	Number of Logs to 10" Top Diameter (inside bark)	Total Volume (board feet)	Value / to Landowner for MFBM ⁴	Total Value For the Tree
50	12"	40'	One or two 8'6" logs (lumber grade)	97	Assume \$300.00	\$29.10
65	15"	40'	One 12' veneer log from the butt	91	Assume an average of \$1,000.00 for lower-grade veneer due to smaller diameter	\$91.00
			Two sawlogs totaling 28' in length (lumber grade)	77	Assume \$350.00	\$26.95
			Total	168		\$117.95
80	18"	40'	Two 8'6" veneer logs from the butt	151	\$1,000.00 to \$5,000.00 for veneer (assume an average of \$2,000.00)	\$302.00
			One 14' log (lumber grade)	76	Assume \$350.00	\$26.60
			One 8'6" log (lumber grade)	29	Assume \$350.00	\$10.15
			Total	256		\$338.75
95-100	22"	40'	Two 8'6" veneer logs from the butt	248	\$1,000.00 to \$5,000.00 for veneer (assume an average of \$2,000.00)	\$496.00
			Two sawlogs totaling 25 feet in length (lumber grade)	155	Assume \$350.00	\$54.25
			Total	403		\$550.25

⁴ MFBM – 1,000 Board Feet

Figure #1: Green Lumber Prices for Hard Maple Unselected FAS Grade — Northern Region (January 1975-2001)

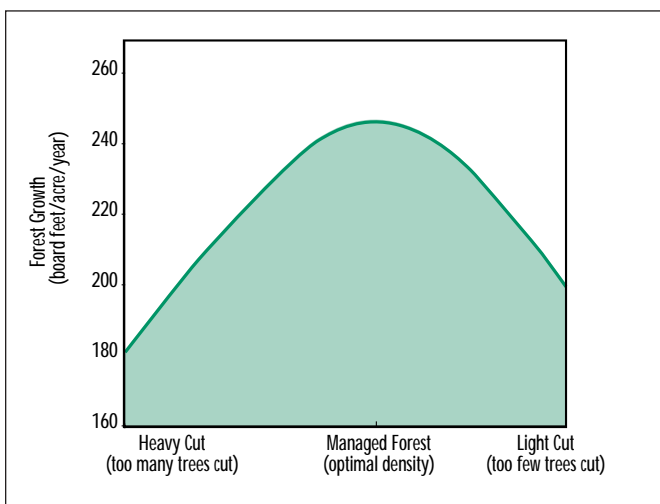


Prices are in U.S. funds per thousand board feet, based on standard N.H.L.A. grading rules. Landowners should use the information provided for gauging market trends only; local prices will vary within the region. Please contact sawmills in your local area for more information about local prices.

Figure #1 shows the increase in timber values over the last 25 years.

It is based on historical prices taken from the Hardwood Market Report (Memphis, Tennessee) as of January 1, for a 25-year period (1975–2001) for hard maple (unselected first and second grade – FAS) green lumber, northern region. Prices ranged from a low of \$325 in 1975 to a high of \$1,680 in 2001. All prices are on per thousand board feet basis and in U.S. dollars.

Figure #2: Managing to Maximize Growth and Financial Returns



To optimize the long-term financial return to a landowner, a woodlot should be managed to maximize the growth of trees, which can be used to produce high quality lumber (sawlogs). Figure #2 illustrates that a tolerant hardwood woodlot in eastern Ontario can be managed to produce an additional 60 board feet per acre per year by removing low quality trees (thinning) and retaining an optimal number of sawlog quality trees. Over a period of 20 years, a 100-acre woodlot could realize an additional 120,000 board feet of lumber through good management.

Management Planning – Basic Components of a Management Plan

Inventory: A good management plan is based on a sound forest inventory. This provides information on the kinds of trees you have, their relative quantity and quality, their size, as well as natural features such as wildlife habitat and water features. It should also analyze site productivity and the suitability of certain tree species for these soils. Your long-range objectives should be based on whether the inventory supports these objectives.

A good management plan is based on a sound forest inventory

Property Map: A detailed property map should be part of your plan. Basic requirements include property boundaries and forest compartments (stands of trees in the woodlot, such as mature maples, lowland cedars, or red pine). Access trails, water and habitat features, and other items of interest, such as the location of hawk nests or rare plants should also be noted. Your map should allow for new features to be added as you discover them.

Property History: Briefly describe how the property has been used in the past (e.g., for agriculture, livestock grazing, fuelwood) and major events such as forest fires or clearcuts.

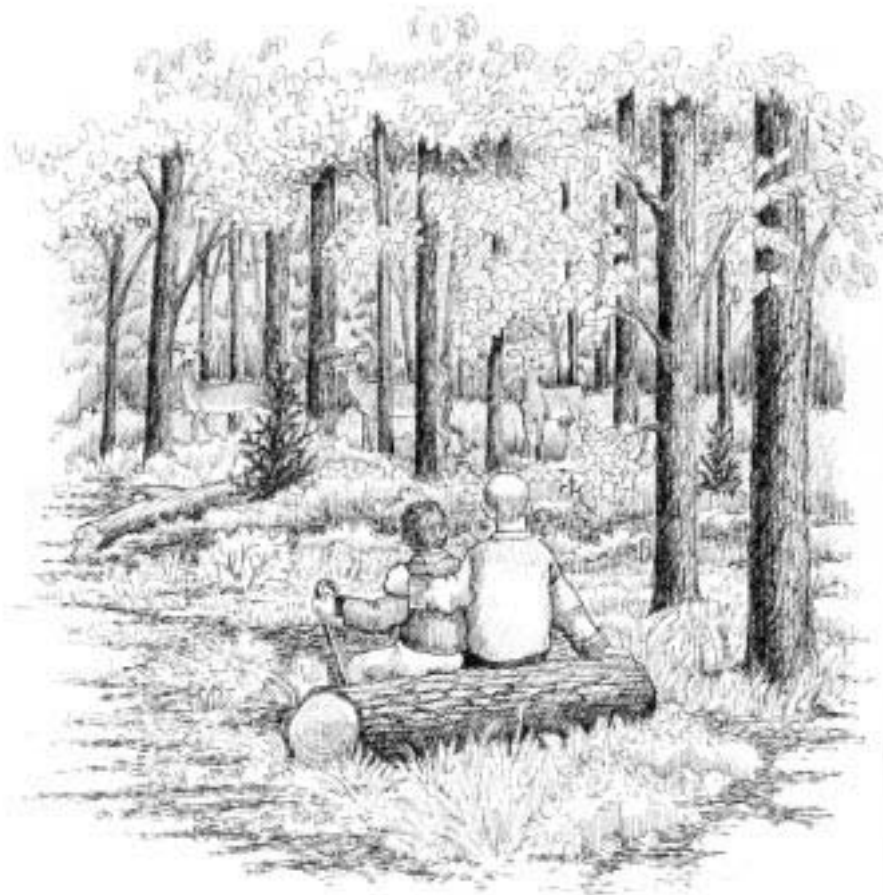
Objectives: Consider your long-range (usually 10 to 20 years) objectives first. For example, you may wish to retire on this property, harvest personal fuelwood, produce some



Managing a woodlot is a family affair. Balancing the family's goals and objectives can be achieved by preparing a management plan for your woodlot.

maple syrup, or harvest high-value sawlog and veneer products. Plans are usually divided into five-year segments. Specific activities that will contribute to the overall property objectives are described in each segment. After taking inventory, you can establish short-term goals for the first five years and plan activities with long-range goals in mind. Plans for harvesting should be based on the silviculture system most suited to your forest type. (Silviculture systems are described in Appendix 3.)

Management Prescriptions: Work such as tree planting, tree marking and harvesting should follow a prescription⁵ based on the site and forest inventory. The prescription should support your short-term and long-term objectives.



⁵ Prescription: A series of actions required to meet management objectives for a specific area, based on an assessment and inventory of that area.

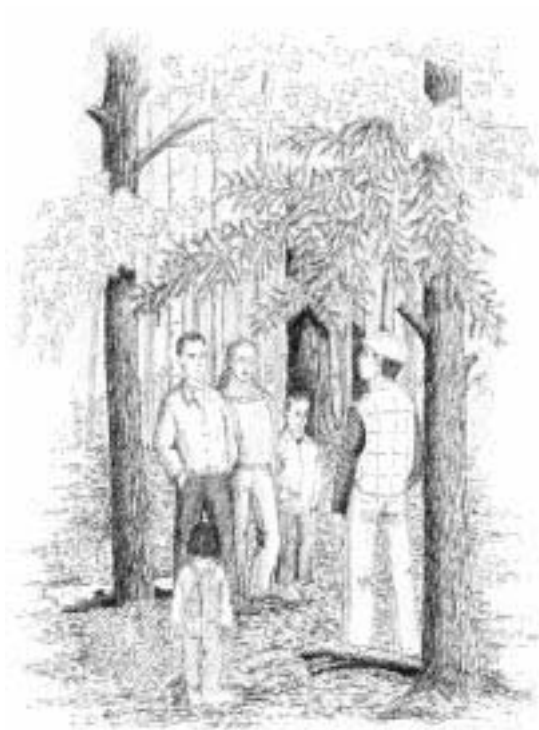
Monitoring: Regular inspections help maintain and increase knowledge of your woodlands. They will ensure that forest insect infestations, abnormal tree mortality or illegal activities (such as garbage dumping or timber theft) are identified and addressed.

Record Keeping: Your plan should include a section for record keeping. Examples of information that should be recorded include: the date of harvest, the amount of timber taken, notations about tree mortality, etc.

Management plan formats: Basic forest management plan formats can be obtained from the LandOwner Resource Centre in Manotick (see Appendix 1)

or by asking for *A Guide to The Managed Forest Tax Incentive Program* at any Ontario Government Information Centre or Ministry of Natural Resources office.

A management plan will help you to maximize your property's financial, recreational and natural potential; it may also help in your tax planning. A managed forest plan prepared by the landowner, or by a forestry consultant (and approved by a Managed Forest Plan Approver) may reduce the property taxes by 75 percent on forested land, depending on zoning. Contact one of the woodlot associations listed in the appendix of this guide for more information on the Managed Forest Tax Incentive Program.



Section 3 Do You Need Help?

Some landowners can organize a timber sale on their own. Others require professional help. As a woodlot owner, you need to decide whether you have the necessary knowledge and skills to do the job properly. Some questions to ask:

- ◆ Do I know whether my woodlot contains significant high-value products such as veneer?
- ◆ Do I want a buyer to tell me which trees should be harvested, what volume they will produce, and, in reality, have my woodlot managed by someone else?
- ◆ Am I able to market my forest products?

It may be in your best interests to seek the advice of a forest consultant

- ◆ Can I do the inventory (measure basal area, estimate acceptable growing stock⁶ and unacceptable growing stock,⁷ identify each species, etc.) and develop a tree marking prescription?
- ◆ Have I established the property boundaries between my woodlot and adjacent

properties? If not, can I determine their location and establish these boundaries accurately?

If the answer to any of these questions is “no” – it may be in your best interests to seek the advice of a forest consultant.



⁶ Acceptable growing stock: Trees suitable for retention in the stand for a least one cutting cycle (15 to 20 years). They are trees of commercial species and of such form and quality as to be saleable for sawlog products at some future date.

⁷ Unacceptable growing stock: These trees have a high risk of dying and are expected to decline over the next cutting cycle. They include trees that are of poor form and/or low quality.

An experienced consultant can smooth out the process of your timber sale, help you avoid pitfalls, and assist in developing a strategy to achieve your long-term objectives. Consultants provide a wide variety of services, from a basic half-day appraisal of your woodlot, to full services such as conducting an inventory and developing a prescription, marking trees for harvest, determining volume estimates of marked trees, marketing the forest product, locating boundary lines and carrying out cut inspections. Good consultants can put more money in your pocket, even after you pay their fees, and will help in the management of the remaining trees for greater value in the future.

Good consultants can put more money in your pocket, even after you pay their fees

Ask about a consultant's qualifications and experience.

Qualifications: Is the consultant a graduate of a recognized forest program at a university or college, or a qualified tree marker? Will the consultant do the marking or will an employee do it?

Experience: Does the consultant have significant forestry experience relating to the services you are seeking? Ask enough questions to ensure that the person you hire is qualified and will represent your interests.

References: You should ask for and check references.

Payment for marking services: This can be based on an hourly rate, or charged by the acre/hectare, or by the job. Sometimes payment is a percentage of the timber sale price. Consultants charge \$25 to \$35 per acre (February 2001) to do the tree marking, or more, depending on the services a landowner requests (e.g., an inventory, cut inspections, boundary marking, management planning, marketing).



Section 4 Preparing for Harvest

A successful forest harvest starts with choosing the trees that will be sold. A forest consultant may help with this task. Marking property boundaries, marketing your product, and locating log landings and trails are other essential jobs that should be carried out during the planning stages.

A successful forest harvest starts with choosing the trees that will be sold

Tree Cutting Bylaws

Before you begin, contact your municipal office to determine whether there are any tree cutting bylaws that you should be aware of. Such bylaws may:

- ◆ Set out the size of trees which can be legally harvested, establish minimum basal area requirements, and will require that your woodland be harvested according to good forestry practices;
- ◆ Require you to notify the county or region when you intend to harvest;
- ◆ Require information on which trees will be removed or left, and some stocking or density measurements.

Poor Logging Practices

In municipalities where no tree-cutting bylaw exists, much of the logging is done by high-grading; only the best-quality trees

are harvested. This results in a depleted and degraded woodlot, containing defective trees and species of lower value. As you plan your logging operation, you should be aware that most woodlands have been high-graded in the past.

You should be aware that most woodlands have been high-graded in the past

Diameter limit cutting is a form of high-grading where all trees, to a specified diameter limit, are removed. This often results in overcutting. Diameter limit cutting can severely impede the ability of the forest to produce high-value products and revenue in the future. Unfortunately, landowners that sell to loggers who use this system usually have not marketed their products and rarely receive fair market value.

Tree Marking for Selective Harvest

A tree marking prescription needs to be developed – one that is based on a complete inventory. A good prescription will ensure the sustainability and health of your woodlot. A prescription should consider:

- ◆ The quality of the tree. As much unacceptable growing stock (in all size classes) as possible should be removed to allow growing space for better-quality trees.
- ◆ Maturity of the tree. If your woodland is comprised of mostly large, mature trees, it may take two or three harvest cycles before all mature trees can be removed.



Trees should be marked at eye level on two or three sides of the tree and at ground level

You should know how many trees of each species were marked. This allows you to count the stumps of different species (for example, high-value hard maple or red oak) after the harvest. Trees should be marked at eye level on two or three sides of the tree, and at ground level (butt marking). Some paint should be evident on each stump after the harvest. In a small woodlot, a landowner may also mark (with a different colour) the butt of exceptionally high-quality trees that are intended to remain for a future harvest.

Volume Estimation – Standing Trees

It is important to prepare a summary of the volume of marked trees by species and product (veneer, log, or fuelwood) that you plan to sell. The tree marker can calculate the volume as the trees are being marked. Trees estimated to contain sawlog or veneer volume should be marked with a different mark than trees selected for fuelwood. For example, mark sawlog trees with dots (at eye level on two or three sides and at ground level); mark fuelwood trees with slashes (at eye level on two or three sides and at ground level).

Several buyers may bid on the same trees. A summary of the marked trees, estimated volume by species, and total fuelwood volume, will assist buyers as they inspect the woodlot before making a bid (see page 16). It is difficult to compare bids without a summary of the marked trees taken from your woodlot.

- ◆ Increasing the percentage of acceptable growing stock within the woodlot.
- ◆ Maintaining an average residual basal area of 20 square metres per hectare (to provide an optimum rate of diameter growth).
- ◆ Proper spacing of residual trees. For the remaining trees in the woodlot to achieve maximum size and value, sufficient crown space must be opened up during harvesting to encourage healthy growth and regeneration.
- ◆ Other features that you value in your woodlot (such as maple syrup production, fuelwood for personal use, wildlife, or recreation).

Volume Estimation – Scaling of Harvested Logs

Log scaling is used by the forest industry to measure (or scale) the volume of a log. The most common unit of measurement in southern Ontario is board feet or foot board measure (fbm). One board foot measures one inch by 12 inches by 12 inches. The forest industry uses a thousand board feet (mfbm) as a convenient unit of measurement.

The Ontario Log Rule (OLR) is the most commonly used rule in Ontario to scale sawlogs. The OLR provides a reasonable and consistent estimate of volumes (see Appendix 6) that can be recovered during milling, with slightly more being obtained with modern bandsaw mills. The measuring process includes the following steps:

- ◆ Measure the length of the log.
- ◆ Measure the diameter of the log inside the bark, at the small end.
- ◆ From these two measurements, estimate the gross volume of the log, before defects are deducted. For example, a 14-inch diameter log (measured inside the bark – small end) 16-feet in length would have a gross volume of 121 fbm (before deductions).
- ◆ Estimate the volume of the defects of the log, for example rot, seams, or other physical defects, which show in the face of either end of the log; crook or sweep in the length of the log.

- ◆ The estimated volume of the defect is deducted from the gross volume, providing the net volume for that log.

The Doyle Rule is another common method of scaling logs that is still used in some parts of the province. You should be aware of the following differences:

- ◆ For logs with a diameter of less than 22 inches inside the bark, at the small end of the log, the volume calculation is less than that of the OLR, and considerably less for logs smaller than 15 inches inside the bark, at the small end of the log.
- ◆ After 22 inches inside the bark, the Doyle Rule calculates a greater return than the OLR.

Marketing Your Forest Products

There are many markets for wood products, and demand can vary. Also, some buyers may have access to better markets than others. If you want to market your own timber, you can contact loggers or buyers yourself. Another option is to advertise in publications like the Ontario Woodlot Association's *S&W Report* or in the Ontario Forestry Association's *Forest Products Marketing Bulletin*. Proper advertising of your woodlot requires a summary of your forest products. Here is an example of a Tree Marking / Volume Summary that you should prepare for marketing purposes.

Tree Marking / Volume Summary

Landowner: Mr. Jim Smith
 Address: 511 Pickerel Lake Road, R.R. 1 Nesbitt, Ont. J9M 3P0
 Phone: (705) 234-5678 Fax: (705) 234-8765
 Woodlot Location: S½ Lot 5, Concession 12, Jacklin Township, Henry County
 Area to be harvested: 18 acres
 Woodlot Marked By: Canadian Forestry Consultants, Inc.

General property description / other comments:

This is generally a flat to gently rolling woodlot, with good dry-season access from County Road 5 across an agricultural field. A late fall or winter logging operation is preferable, after corn harvest. Large landing area beside woodlot.

Trees selected for harvest are marked with a yellow mark at eye level and at ground level for audit purposes. A yellow dot indicates a sawlog tree and a yellow slash indicates fuelwood or pulp. Quality of marked trees is quite high, with a significant veneer volume anticipated. Estimated volume of the marked trees summarized below is a total volume. No deduction has been made for defects.

Timelines: Written bids to be submitted to the landowner by September 15. Logging must be carried out during late fall or winter months.

Species	# of Trees	Average Diameter	Volume Estimate
Hard maple	190	17 inches	38,000 board feet
Beech	29	16 inches	5,510 board feet
White ash	28	15 inches	4,704 board feet
Hemlock	25	18 inches	7,250 board feet
Tops	272	@ .25 cords / tree	68 cords
Standing fuelwood (90% hard maple, 10% other hardwood)	325	12 inches	81 cords

Selecting a Logger

Before you start marketing the timber in your woodlot, take time to develop a list of reputable loggers. Here is some advice about where to start.

- ◆ Speak to local landowners who have recently had their woodlot cut. Ask if they were happy with the job, and if you can inspect their woodlot.
- ◆ Consider joining the local chapter of a woodlot association – you will receive a newsletter and information on local workshops, and will get to know the people in your community who are active in the forest industry. Also, contact your local stewardship council for information.
- ◆ Check local newspapers, forestry, or agriculture publications for advertisements for logging services.

- ◆ Contact local mills to find out where they buy their logs.
- ◆ Check to see if your municipality has a list of loggers.
- ◆ Consult the forest services directory available on the Ontario Woodlot Association's Web site <www.ontariowoodlot.com>. A listing of loggers by municipality can be found on this site.

Sorting out the Bids

Timber bids can be difficult to compare. Table #2 and Table #3 compare these types of sales:

1. **A lump sum bid** – provides one offer for all products harvested from the woodlot (veneer, sawlogs, fuelwood). Payment in full should be made prior to logging.

Table #2: Lump Sum Sale (i.e., full payment before work begins)

Advantages:	Disadvantages:
i. You will know before work starts what value you will receive for the marked trees, according to the volume estimated at the time of marking. You can ask for full payment prior to the start of work.	i. The buyer assumes the risk that the volume estimated by the tree marker is accurate. Bids may be conservative, as the buyer may not wish to offer a high bid in case the volume for the higher-quality products (i.e., veneer) is not present.
ii. You won't have to worry about any product leaving the property before payment has been made.	ii. If the veneer volume is higher than estimated, you won't receive the extra value.
iii. This process favours operators who can demonstrate better utilization and markets for the products (for example, can market fuelwood as well as veneer).	iii. Only practical for woodlot types where individual trees can be marked and volume estimated prior to harvest. Difficult for poplar or cedar stands.

2. **A scaled volume sale** – provides payment based on an agreed-upon price per thousand board feet of sawlog volume, and two or three prices for various veneer grades, according to a scaled volume. In the last few years as hardwood veneer values have escalated, this is probably the fairest system to both buyer and seller. A scaled volume sale should require a significant deposit or, preferably, full payment for logs as they are scaled, before they leave your property. Under no circumstances should you allow logs to leave your property before they are scaled, and at least partial payment has been received.
3. **A shared value sale** – payment is based on an agreed-upon split of the income received from mills for various products (for example, a fifty-fifty split for all sawlog volume, a sixty-forty split for veneer volume). This is basically another way of expressing the scaled volume sale.

Table #3: Payment by Scale After the Harvest and / or Shared Volume Sale (i.e., actual volume harvested)

Advantages:	Disadvantages:
<ul style="list-style-type: none"> i. There may be several grades of veneer, with some buyers interested in more grades than others, depending on their markets. There will be separate prices for each grade ii. This system is fairest to both buyer and seller (i.e., no surprises due to quality or quantity of high-value products). iii. Landowner may receive additional value for high-quality products. iv. A practical method for determining volume of certain species (e.g., cedar or poplar stands) where it is impractical for marking of individual trees. 	<ul style="list-style-type: none"> i. Who will do the scaling of the harvested logs? This needs to be addressed prior to signing an agreement. Usually, the veneer will be scaled in the bush (at no charge) by the veneer buyer's representative. ii. With remote properties, or if the owner is otherwise unable to be present at the time the woodlot is being harvested, trust can become a factor. Assurances need to be made that all wood is measured before it leaves the property. iii. Utilization may be lower for products of lesser value. This not only impacts the financial return to the landowner, it also impacts the quality of the job completed in the woodlot if low value trees marked for removal are not harvested (i.e. residual crop trees may not be released). Generally, interest is in the higher-value products, not fuelwood.

Closing the deal

After receiving and reviewing the bids, you may decide it would be better to sell according to the final scaled volume after harvest. You could negotiate for a combination of the above, with a minimum guaranteed value to be paid prior to the start of any work (payment at sawlog prices for the entire estimated volume). Final payment for premium products will be paid after the scaling of harvested logs and final determination of grade. The details of this type of sale would need to be covered in the timber sales contract.

No matter how you decide to sell your timber, you should receive at least partial payment before any product is harvested. The willingness of a contractor to meet this condition may be one of the criteria you use to decide who buys your timber.

Can you harvest your own woodlot?

You may decide to harvest your own woodlot. Here are some helpful suggestions:

- ◆ Ensure a market has been secured for the products to be harvested before you start to cut. It may take some time to compare bids and markets.
- ◆ Obtain log specifications for veneer and sawlogs. Find out how often veneer buyers are in your neighbourhood.
- ◆ Arrange trucking.
- ◆ Prepare a schedule to ensure that the wood is cut and transported to the mill within a reasonable period of time after harvest.
- ◆ Consider having a portable sawmill and skilled operator on site to better utilize lower-grade materials.

Section 5 Forest Harvest Operations

Once you have chosen a logger, discuss the following before harvesting begins:

- ◆ Landowner expectations regarding damage to residual trees and other post-harvest conditions;
- ◆ Access to the woodlot, in conjunction with any other land uses, such as agricultural crops;
- ◆ Timing of harvest, for example, after crops are off, during the winter months, during the summer months when the landowner lives at a vacation property, etc.;
- ◆ Location of trails for log skidding if trails do not currently exist;
- ◆ Location for log piling and sorting (you need road access for large trucks);
- ◆ Location of property boundaries;
- ◆ Damage which may occur to fences and other structures such as bridges, culverts or sugar shacks;

Take photographs of sensitive sites in your woodlot

- ◆ Post-harvest condition of existing roads and trails;
- ◆ How harvest operations will be carried out on sensitive areas (e.g., steep slopes, wetlands, and streams); and
- ◆ The need to power-wash all logging equipment so that seeds from invasive species (buckthorn, garlic mustard, purple loosestrife, etc.) are not left on your property.

Some of these points can be formalized in the timber sales contract. It is also wise to take photographs of sensitive sites in your woodlot (trails, rail fences, or structures) before logging begins. These pictures may be used as evidence if there is any disagreement over damage from harvest operations.

Road Construction and Maintenance

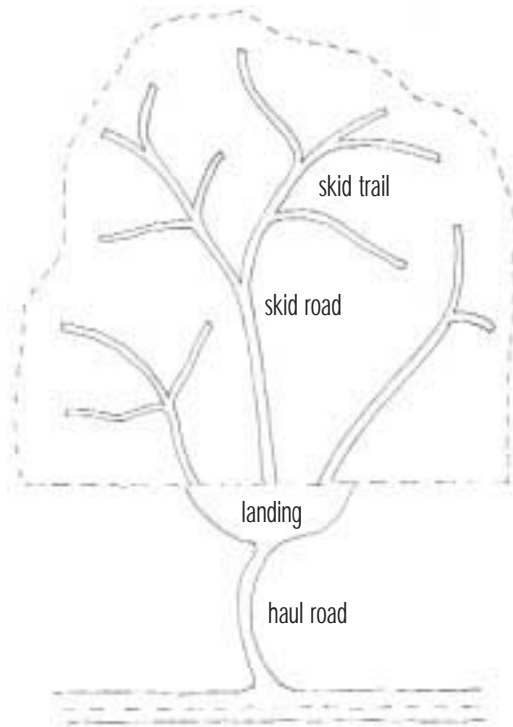
Access roads already exist in most small woodlots in southern Ontario. However, if you need to build a road it should be done in a manner that will have the least impact on water or other sensitive environmental features. When laying out a road, you should be aware of any control points⁸ that may limit your choices. Features to consider include:

- ◆ Rock outcrops – Roads should be located above or below these features. If you have to go through them, see if the rock can be ripped or broken as this will be less costly than blasting.
- ◆ Ridges – These features provide good road locations.

⁸ Control points are land features that may limit the choices available for locating a forest access road. Additional information on road construction can be found in the publication *A Landowner's Guide to Building Forest Access Roads*, United States Department of Agriculture, NA-TP-06-98. A copy of this guide can be downloaded from the web site <<http://www.na.fs.fed.us/spfo/pubs/stewardship/accessroads/accessroads.htm>>.

- ◆ Saddles – Look for these as points to cross ridges.
- ◆ Benches – These are good road locations and also provide good points for the location of junctions, switchbacks and landings.
- ◆ Wet meadows – Avoid locating roads in these areas.
- ◆ Streams – Wherever possible, avoid stream crossings. If this is unavoidable, look for a location that will minimize construction costs and have the least impact on water quality and fish habitat. There are other points to consider when building roads across streams.

- ✓ Consult the local conservation authority or MNR office about any legal restrictions.
- ✓ Always cross at right angles, at points where the stream is narrow.
- ✓ Select culverts large enough to accommodate spring runoff or heavy rain.
- ✓ Leave a buffer zone of undisturbed vegetation between the road and the stream.



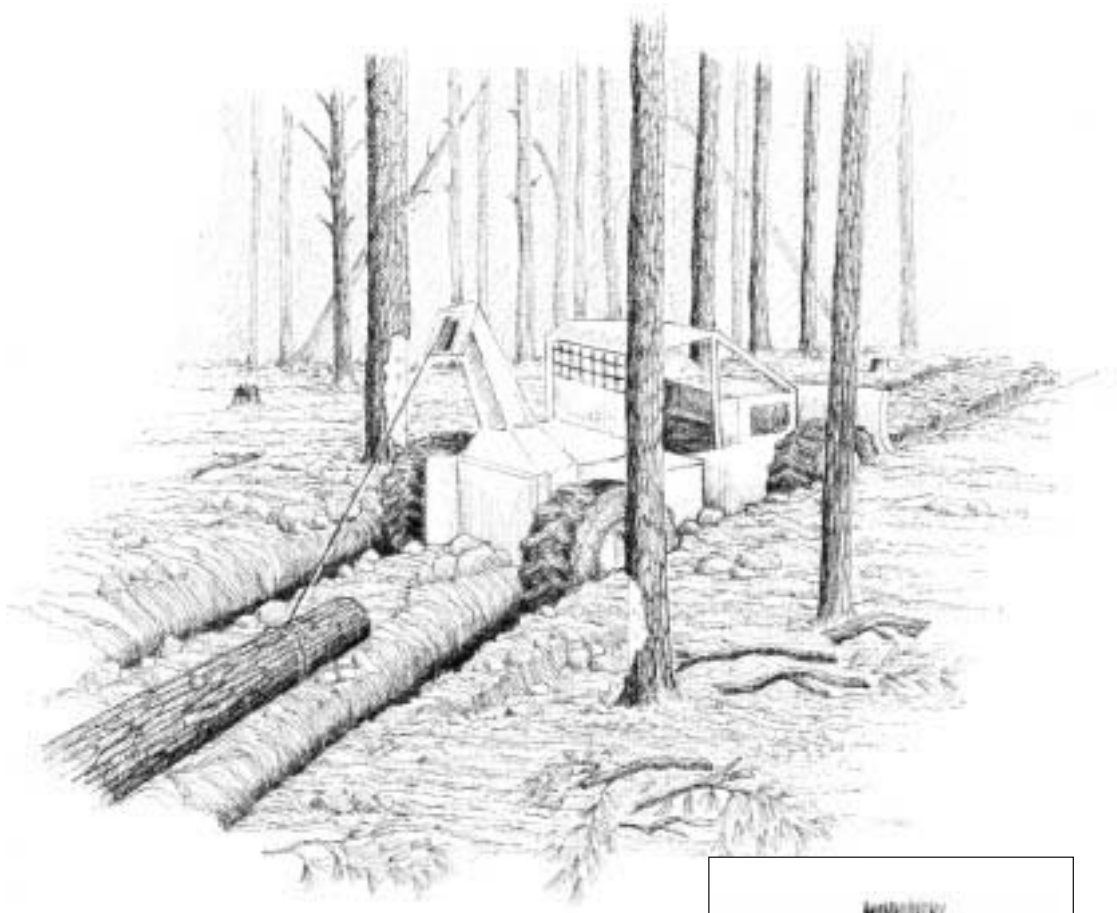
Carefully plan the layout of your skid trails. Keep in mind — the number of trails is often directly related to the amount of logging damage.

Logging Damage to Trees and the Site

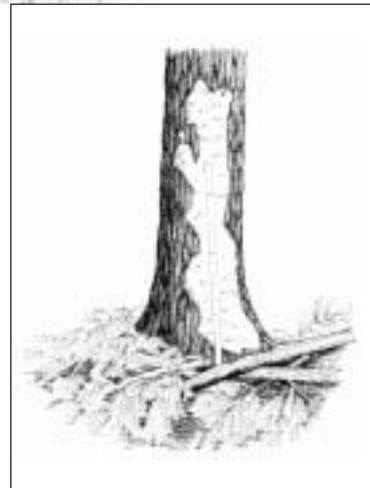
A key step in maximizing future financial returns for your woodlot is to minimize the damage to the remaining trees. However, landowners must realize that some damage inevitably occurs during harvesting operations. If you are concerned about the use of heavy equipment in your woodlot, smaller short-wheelbase skidders are an option. Horse logging can also be used to prevent damage to sensitive areas.

Landowners must realize that some damage inevitably occurs during harvesting operations

A LANDOWNER'S GUIDE TO SELLING STANDING TIMBER



A well-planned logging operation will help mitigate potential problems such as bark abrasion and rutting damage.



Damage to your woodlot can be minimized by:

- ◆ Negotiating a contract that clearly states your desire to minimize damage to residual trees and the woodlot.
- ◆ Carrying out regular cut inspections. The landowner should be at the woodlot for the first day of logging. You should immediately express any concerns to the logger.
- ◆ Correct timing of the operation. Harvesting is best carried out during the winter or during dry summers to avoid rutting. Harvesting should not occur from spring to late July, when trees are most susceptible to bark peeling.
- ◆ The skill and care of the skidder operator, including:
 - ✓ Trail location. Avoid sharp turns and steep slopes. Main trails should avoid stands of young trees, areas that are not being cut, and sensitive areas.
 - ✓ Winching logs to the skid trail. The skidder should not back up to each tree. Ensure that the skidder working in your woodlot is equipped with at least 25 metres of winch cable.
 - ✓ Using bumper trees. These are trees located on the curves of the skidder trail which protect other trees as the logs are skidded out.
- ◆ The skill and care of the feller, including:
 - ✓ Cutting trees so that the butt ends (the end cut from the stump) point to the skid trail; logs can be dragged with minimal swing movement.

- ✓ Felling trees in such a way that they do not damage the trees that remain after the harvest.

Assessing Logging Damage

After harvesting operations are complete, a minimum of 85 percent of the residual stems measuring 10 centimetres (four inches) and larger at DBH must be free of any major damage. At least 90 percent of the residual stems of the “acceptable growing stock” must be free of major damage (refer to Table #4 on page 24).

Here is a simple method of assessing damage, based on the minimum 85 percent factor. Walk a straight line through the harvested area. Count all trees over 10 centimetres DBH plus those with major damage occurring within five metres of either side of your line, (a 10-metre strip). For example, if you walk 100 metres and count 50 residual trees of 10 centimetres DBH or larger, and five trees with significant damage, then you have a minimum of 90 percent damage free. Take note of a few other items:

- ◆ Are some of these bumper trees (trees left on the inside of a curve to absorb the impact of logs and to protect other trees as the logs are being skidded out)?
- ◆ Do the damaged trees happen to be primarily fuelwood-quality trees, i.e., poor-quality trees? Perhaps the logger aimed falling or skidded trees towards these trees in order to save the high-quality stems.
- ◆ Do the damaged trees happen to be mostly higher-quality trees? This may have been done to convince you to allow the logger to harvest these trees.

Table #4: Assessing Logging Damage

Type of Injury:	A wound or injury is considered major when:
Bark scraped off	<p>Trees 10 – 31 cm DBH Any wound greater than or equal to the square of the DBH (e.g., for a 10-cm DBH tree a major wound is greater than 100cm²)</p> <p>Trees 32+ cm DBH Any wound greater than 1,000 cm²</p> <p>Note: Wounds on yellow birch (or ground contact wounds on other species) are considered to be major at 60% the size described above for all size classes. (e.g., 60 cm² for a 10-cm DBH tree or 600 cm² for any tree 32+ cm DBH)</p>
Broken branches	More than 33% of the crown is destroyed
Root damage	More than 25% of the root area is destroyed or severed
Bole of tree broken off	Any tree
Bent over	Any tree tipped noticeably
<p>Source: OMNR. 1998. <i>A Silvicultural Guide for the Tolerant Hardwood Forest in Ontario</i>. Ontario Ministry of Natural Resources, Queen's Printer for Ontario, Toronto. 500 pp.</p>	



Rutting / Site Impact Guidelines

You may decide these guidelines allow excessive compaction or “rutting” within smaller southern Ontario woodlots.

The guidelines in Table #5 were developed for Algonquin Park and are intended to be a guide for your reference.

Table #5: Rutting / Site Impact Guidelines for Algonquin Park

Skid Trail Category	Maximum Distance of Compaction per Skid Trail	Maximum Distance of Compaction per Landing	Operation Status
Minor – 15 cm or less compaction	Can be maintained over the length of the trail.	Can be maintained over the entire system of main skid trails.	None
Moderate – 16-30 cm of compaction	Can be maintained over the length of the trail.	Can be maintained over the entire system of main skid trails.	None
Major – 31-60 cm of compaction	120 m	480 m	<p>If maximum distance is greater than 120 m, cease operations on an individual trail. This may include up to 30 m of extreme compaction for an individual trail.</p> <p>If maximum distance is greater than 480 m, cease operations on the landing. This may include up to 120 m of extreme compaction for a landing.</p>
Extreme – compaction of greater than 61 cm	30 m	120 m	<p>If maximum distance is greater than 30 m, cease operations on an individual trail.</p> <p>If maximum distance is greater than 120 m, cease operations on the landing.</p>
<p>Source: OMNR. 1998. <i>A Silvicultural Guide for the Tolerant Hardwood Forest in Ontario</i>. Ontario Ministry of Natural Resources, Queen's Printer for Ontario, Toronto. 500 pp.</p>			

Section 6 Legal Considerations: Contracts, Taxes, and Workplace Safety Obligations

Sale of Standing Timber Contract

The following sample contract (page 27 to page 32) can be used as a guide for selling timber from your woodlot. However, prior to using any sample contract there are two important points you should consider:

A "sample" contract is a generic document. It is easy to copy the contract verbatim thinking it will cover all your needs however, in many cases it may not be adequate. You are advised to use a sample contract only as a general guide and it should be customized to suit your specific needs.

Consider using a lawyer to review the contract. Utilizing his experience is no different than asking the advice of a forestry practitioner to review different forest management options you may be considering to undertake in your woodlot.

Revenue Canada and Your Sale of Standing Timber

Is your woodlot part of a farm operation, non-commercial woodlot or is it a commercial woodlot? A commercial woodlot has a reasonable expectation of profit, and operating expenditures can be charged against income. A farm operation has implications for income reporting, capital cost allowance, and writing off certain assets.

Is your woodlot part of a farm operation or is it a commercial woodlot?

Canada Customs and Revenue Agency provides an *Income Tax Interpretation Bulletin, number IT-373R2 Woodlot (Consolidated) February 2001* that defines taxation of woodlots. Landowners can obtain a copy by calling Canada Customs and Revenue Agency at 1-800-959-2221, or by going to the Web site <www.ccr-aadrc.gc.ca>.

The best advice at this time is to obtain a copy of the bulletin and speak with your accountant about reporting revenue and associated woodlot expenses.

Workplace Safety and Insurance Board (WSIB) Considerations

A landowner could be held liable if an accident occurs on his or her property during a contracted harvesting operation. A subcontractor or owner-operator may be a worker or an independent operator for WSIB purposes. The landowner should consider the implications of such liability. The best advice for landowners is to call WSIB for a clearance certificate for the operator – a clearance certificate is a confirmation that an employer is registered and has met his or her obligations. (The information provided in Appendix 11 is from the Workplace Safety and Insurance Board.)

A landowner could be held liable if an accident occurs

- Sample -
Sale of Standing Timber Contract

This contract entered into this [] day of [] 20 [], between

[]
Seller []
Address

hereinafter called the Seller, and []
Purchaser

of []
Address, hereinafter called the Purchaser.

DESCRIPTION OF SALE AREA

Lot(s): [] Concession(s): [] Township: []

Area: [] acre / hectare County or Regional Municipality: []

Now therefore this contract witnesseth: (Select which option applies to you then proceed to section II (a).)

Option #1 – (Lump Sum Sale)

I. The seller agrees to sell and the Purchaser agrees to buy for the TOTAL SUM OF [] dollars (\$ []) under the conditions set forth in this contract, only those trees specified in this contract on the above tract of land.

Option #2 – (Paid by Scale Sale)

I. The Purchaser agrees to pay to the Seller the following amounts for all sawlog quality trees designated for harvest, under the conditions set forth in this contract: /

Species: [] Price: [] / m³ / fbm

Species: [] Price: [] / m³ / fbm

Species: [] Price: [] / m³ / fbm

and, pay to the Seller the following amounts for all pulpwood / firewood trees designated for harvest, under the conditions set forth in this contract:

Species: _____ Price: _____ / m³/ ton/ cord

Species: _____ Price: _____ / m³/ ton/ cord

Option #3 – (Shared Sale Price)

- I. The Purchaser agrees to pay to the Seller the following percentage split of all revenue derived from the sale of:
 - a) sawlog quality trees designated for harvest, under the conditions set forth in this contract. The landowner share of all revenue is _____ %.
 - b) pulpwood / firewood quality trees designated for harvest, under the conditions set forth in this contract. The landowner share of all revenue is _____ %.

.....

- II. a) The Purchaser agrees to pay to the Seller (\$ _____), by certified cheque or money order, as down payment upon the signing of this agreement, and
 - b) The balance of the purchase price, \$ _____, shall be paid to the Seller, by certified cheque or money order, within _____ calendar days of the signing of this agreement or prior to the commencement of logging operations, whichever comes first.

OR

- b) The balance of the purchase price to be paid prior to any wood being removed from the Seller's property. (for sale by scale and shared sale)
- III. (1) All marked trees, designated trees, or trees for sale, harvest, or felling, referred to in this contract have been marked.

(2) All trees of *sawlog* quality, which are designated for cutting, have been marked with yellow dot(s) at or about eye level and below stump height.

(3) All trees of *fuelwood* quality, which are designated for cutting, have been marked with yellow slash(es) at or about eye level and below stump height.

IV. The Purchase agrees to buy, upon the terms herein stated, only those trees designated for felling (as per III (2) and III (3) as follows:

Sawlog Species	# of Trees	Volume m ³ / fbm

Standing Fuelwood	# of Trees	Volume m ³ / cord

Fuelwood in Tops	N/A	
------------------	-----	--

V. The Seller further agrees to the following:

(1) To guarantee title to the forest products covered by this contract and to defend it against all claims at his/her expense.

(2) To ensure boundaries are clearly defined or marked, prior to the commencement of cutting.

(3) The mortgagee, _____ (if any), of the said lands hereby consents to the sale and removal of said timber.

(4) To guarantee that the Purchaser and his/her employees shall have the right-of-way over the property for the purpose of harvesting and removing the timber purchased herein via the following route(s):

_____ as per the attached map,

from _____, 20____ to _____, 20____.

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- (5) To guarantee that the Purchaser and his/her employees shall be allowed space for the purpose of log piling and loading trucks at the following location(s):

_____ as per the attached map,
from _____, 20____ to _____, 20_____.

VI. The Purchaser further agrees to the following:

- (1) The Forest products sold herein shall be felled and removed from the property on or before _____, 20____ (see V. (5)). The Purchaser agrees that any trees, logs, tree tops or other parts of trees remaining on the property after this date become the property of the Seller.
- (2) To notify the Seller by telephone, or in writing, at least 72 hours before the commencement of logging operations.
- (3) To fell and skid all trees designated for harvest so as to minimize damage to the residual stand and to prevent unnecessary damage to young growth and other trees not designated for cutting. Whole tops shall not be skidded.
- (4) To cut trees in such a manner as to leave evidence of butt marking (yellow) and so that the stump heights are not higher than the diameter of the stump, to a maximum of 60 cm.
- (5) To reimburse the Seller as liquidated damages and not as a penalty, the rate of \$ _____ for each unmarked tree (not designated) that is felled to the ground. This shall not be construed as permission to cut any tree not designated for cutting.
- (6) To reimburse the Seller as liquidated damages and not as a penalty, for all trees not designated for felling which are unnecessarily damaged due to carelessness by the Purchaser or his/her employee, as determined by the Seller/Seller's designated agent:
 - (i) At the rate of \$ _____ for each tree greater than 10 cm but less than 30 cm diameter at the stump.
 - (ii) At the rate of \$ _____ for each tree 30 cm or greater in diameter at the stump.
- (7) To repair to original condition immediately after logging operations have been completed, all damage caused by logging to roads, trails, fences, culverts, bridges, utilities or other improvements damaged beyond ordinary wear and tear.

- (8) In plantations, 'DOT' (disodium octaborate tetrahydrate) also known as 'Timbor' is to be evenly applied to conifer stumps. DOT and approved colour pigment to be supplied by Purchaser.
- (9) That any felled trees lost through theft, or destroyed or devalued in any way by fire, hurricane, tornadoes, lightning, ice storms, insects or diseases, during the term of this agreement, such losses shall be borne entirely by the Purchaser.
- (10) (i) That all trees designated for harvest shall be felled to the ground. Partially severed standing trees and lodged trees must be pulled to the grounds by the Purchaser daily.

(ii) All tops and slash are to be cut to within 1.2 metres of the ground. All such logging debris is to be cleared from all roads, trails, watercourses, and property adjoining the woodlot.
- (11) That no garbage or litter will be left on the property during or after the operation.
- (12) Not to assign this contract to a third party, in whole or in part, or employ subcontractors, without prior written consent of the Seller.
- (13) To obtain at his/her expense all permits from public authorities, which may be required in connection with the performance of this contract and to comply with all municipal, provincial, federal and other laws, statutes, ordinances and requirements.
- (14) To indemnify and save harmless the Seller from and against all claims, demands, loss, costs, damages, actions, suits or other proceedings by whomsoever made, brought or prosecuted for any damage or injury to persons or property occasioned in the carrying on of the operations of the Purchaser under this agreement or by any neglect, misfeasance, or nonfeasance on the Purchaser's part or on the part of persons employed by him or under his control.
- (15) That the Seller is released from any and all claims for injury or damage to property, however caused, which may be sustained by the Purchaser or his employees while carrying out operations on the woodlot under this agreement.
- (16) During the entire term of this contract, the Purchaser agrees to have in force a general public liability and property insurance policy or policies with a limit of at least \$2,000,000 for each occurrence that protects the Seller and the Purchaser against any claim arising out of any act or omission of the Purchaser, any employee of the Purchaser, or any of them, in the performance or intended performance of this contract.

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(17) The Purchaser agrees to comply fully with all the requirements of the Worker's Safety and Insurance Act and, without limiting the generality of the foregoing, agrees to pay all assessments made under the said Act against the Purchaser.

(18) To take all necessary steps to prevent and to suppress any forest fire on the sale area.

VII. The Seller and the Purchaser further agrees:

- (1) The Seller retains the right to conduct inspections in person and/or assign an agent to conduct inspections of the cutting operations from time to time and to order the immediate cessation of all work if any violation of this contract occurs.
- (2) In the case of any dispute as to the meaning of any of the provisions of this agreement, the Seller and the Purchaser agree to submit such dispute to arbitration in accordance with the Arbitration Act. Each contracting party will select one arbitrator and the two arbitrators selected shall select a third arbitrator, and the decision of the arbitrators shall be final.

Signed in duplicate this [] day of [] 20 [] .

[] (Witness for the Purchaser)	[] (Purchaser)
[] []	[] []
(Address/ Phone Number)	(Address/Phone Number)
[] (Witness for the Seller)	[] (Seller)
[] []	[] []
(Address/ Phone Number)	(Address/Phone Number)

Summary

As a landowner, you have several options for selling standing timber. You can carry out all the work yourself, or you can do some of the basic work and hire a forestry consultant to do the more complicated tasks. Another option is to hire a consultant to do all of the pre-harvest preparations. Or, you could choose to rely completely on the timber buyer to do everything – select the trees, tell you their value, draw up a contract, determine boundary and trail locations, and conduct the harvest; this is probably not the wisest choice.

Whatever decisions you make, you need to protect your own interests. Time spent with *A Landowner's Guide to Selling Standing Timber* will help you learn about the harvesting and selling process and allow you to enjoy the rewards that successful management of your woodlot will bring.

Appendix

A LANDOWNER'S GUIDE TO SELLING STANDING TIMBER

Appendix 1: Where to go for Assistance

There are a number of ways landowners can access information on woodlots. These include:

- ◆ Extension notes and publications
- ◆ Web sites
- ◆ Woodlot conferences and presentations
- ◆ Woodlot associations
- ◆ Woodlot-related agencies
- ◆ Forestry consultants
- ◆ Community groups
- ◆ Forest industry

Extension Notes and Publications

A number of organizations and agencies produce publications on woodlot management. Some examples are listed below. To find out where you can obtain publications, refer to the number listed to the right of the publication and cross-reference it with the source organizations listed in this section.

Extension Notes

The LandOwner Resource Centre has over 50 extension notes on various topics such as: forests, agroforestry, pests, water and wetlands, property management and wildlife.

Woodlot Management

Source

<i>A Guide to The Managed Forest Tax Incentive Program (MFTIP)</i>	5, 6, 8
<i>A True Picture — Taking Inventory of Your Woodlot</i>	4, 8
<i>Logging Damage: The Problems and Practical Solutions – Report No. 117</i>	7
<i>Making Cents out of Forest Inventories: A Guide for Small Woodlot Owners</i>	4
<i>Making Your Woodland Pay</i>	3, 4
<i>Ontario Woodlot Association — Private Land Forestry Code of Practice</i>	8
<i>Successful Forestry — A Guide to Forest Management</i>	6
<i>Taking Stock: Preparing an Inventory of Your Woodland</i>	4, 6, 9
<i>Understanding the Financial Costs and Benefits of Private Woodlot Management</i>	4
<i>Wood . . . Take a Stand and Make it Better</i>	4, 6

Forest Management and Silviculture

Source

<i>A Silvicultural Guide to Managing Southern Ontario Forests</i>	3, 5
<i>A Silvicultural Guide for the Tolerant Hardwood Forest in Ontario</i>	3, 5
<i>A Silvicultural Guide for the Great Lakes St. Lawrence Conifer Forest in Ontario</i>	3, 5
<i>A Tee-Marking Guide for the Tolerant Hardwoods Working Group in Ontario</i>	3, 5
<i>Silvics of North America</i>	3
<i>The Woodlot Management Handbook</i>	3, 6

Sugar Bush Management

Source

<i>Sugar Bush Management for Maple Syrup Producers</i>	4, 6
<i>North American Maple Syrup Producers Manual</i>	*

*The *North American Maple Syrup Producers Manual* is produced by Ohio State University Extension, in cooperation with the North American Maple Syrup Council and can be purchased from most distributors of maple syrup equipment.

Habitat Enhancement

Source

<i>Small Woodlands for Wildlife</i>	3
<i>Enhancement of Wildlife Habitat on Private Lands</i>	3
<i>Habitat Creation with Native Plants</i> (fact sheet)	2

Stewardship

Source

<i>Caring for Your Land</i>	6, 9
<i>Greening the Land: Principles, Guidelines and Cases</i>	4, 9
<i>Southern Ontario Woodlands at Risk</i>	2

Trails

Source

<i>Trails for the Twenty-first Century</i>	3
<i>The Complete Guide to Trail Building and Maintenance</i>	1, 3

General Reference

Source

A Pocket Guide to Ontario Trees and Some Woodland Plants4, 9
Shrubs of Ontario3
Trees in Canada3
Forest Plants of Central Ontario3

Source Organizations

1. Appalachian Mountain Club Books
 5 Joy Street
 Boston, MA 02108
 Web site <www.outdoors.org>
 1-800-262-4455
2. Federation of Ontario Naturalists
 355 Lesmill Road
 Don Mills, ON M3B 2W8
 Web site <www.ontarionature.org>
 (416) 444-8419
3. The Forest Shop
 R.R. #1
 Perth, ON K7H 3C3
 Web site <www.forestshop.co>
 (613) 233-4283
4. LandOwner Resource Centre
 P.O. Box 599, 5524 Dickinson St.
 Manotick, ON K4M 1A5
 Web site <www.lrconline.com>
 (613) 692-2390
5. Ministry of Natural Resources Information Centre
 P.O. Box 7000, 300 Water Street
 Peterborough, ON K9J 8M5
 Web site <www.mnr.gov.on.ca>
 1-800-667-1940
6. Ontario Forestry Association
 200 Consumers Road, Suite 307
 North York, ON M2J 4R4
 Web site <www.oforest.on.ca>
 1-800-387-0790
7. Ontario Forest Research Institute
 Ministry of Natural Resources
 P.O. 969, 1235 Queen Street East
 Sault Ste. Marie, ON P6A 5N5
 (705) 946-2981, ext. 271
8. Ontario Woodlot Association
 R.R. #4, 275 County Road 44
 Kemptville, ON K0G 1J0
 Web site: <www.ont-woodlot-assoc.org>
 1-888-791-1103

- | | |
|---|--|
| <p>9. Centre For Land and Water Stewardship
Richards Bldg., University of Guelph
Guelph, ON N1G 2W1
Web site: <www.uoguelph.ca>
(519) 824-4120 ext. 4359</p> | <p>11. Ontario Maple Syrup Producers Association
30950 Wyatt Rd., R.R. #6
Strathroy, ON N7G 3H7
Web site <www.ontariomaple.com>
(519) 232-4596</p> |
| <p>10. Ontario Federation of Anglers & Hunters
P.O. 2800
Peterborough, ON K9S 8L5
Web site <www.ofah.org>
(705) 748-6324</p> | <p>12. Ontario Professional Foresters Association
Unit #3, 8000 Yonge Street
Innisfil, ON L8S 1L5
Web site <www.opfa.on.ca>
(705) 436-2226</p> |

Other Sources

Web Site

- Aerial Photos and Maps – Ministry of Natural Resources<www.maps.mnr.gov.on.ca/mnr_docs/cat5.html>
 Ministry of Agriculture, Food and Rural Affairs<www.gov.on.ca/omafra>
 Ministry of Natural Resources<www.mnr.gov.on.ca>
 Ontario Stewardship<www.ontariostewardship.org>
 United States Forest Service<www.fs.fed.us>
 Ontario Species at Risk<www.rom.on.ca/ontario/risk.html>

Woodlot Conferences (dates are approximate)

- Lindsay Woodlot Conference — February
 Kemptville Woodlot Conference — February
 Grey Bruce Woodlot Conference — March
 Renfrew Woodlot Conference — October
 Trenton Fall Woodlot Conference — November

Woodlot management workshops are available. Contact your local stewardship council for details through the nearest Ministry of Natural Resources office or by visiting the Ontario Stewardship web site <www.ontariostewardship.org>.

Woodlot Associations

Ontario Woodlot Association
R.R. #4, 275 County Road 44
Kemptville, ON K0G 1J0
Web site <www.ont-woodlot-assoc.org>
1-888-791-1103

Ontario Forestry Association
200 Consumers Road, Suite 307
North York, ON M2J 4R4
Web site <www.oforest.on.ca>
1-800-387-0790

There are local chapters of the Ontario Woodlot Association in many areas of the province. To obtain a list, call the Ontario Woodlot Association. In some areas, there are also local woodlot owners' or loggers' associations. These organizations are not associated with any of the major provincial associations, but are active within their own community and can provide you with information about their industry.

Forest Management / Woodlot-Related Agencies

Ministry of Natural Resources
P.O. 7000, 300 Water Street
Peterborough, ON K9J 8M5
1-800-667-1940

Note — by calling the Ministry's central toll-free number listed above, you can be connected to your local district office anywhere in the province.

Canadian Forestry Service
Natural Resources Canada
Great Lakes Forestry Centre
P.O. 490, 1219 Queen Street East
Sault Ste. Marie, ON P6A 5M7
Web site <www.nrcan.gc.ca/cfs/>
(705) 949-9461

Forestry Consultants

The Ontario Forestry Association and the Ontario Woodlot Association are the best contacts if you wish to locate forest consultants working in your area. They maintain lists of consultants on their web site.

Community Groups

In each county or regional municipality, a community stewardship council will help landowners obtain information on resource management. To obtain a contact name and telephone number, call the Ministry of Natural Resources at 1-800-667-1940 or go to <www.ontariostewardship.org>.

Forest Industry

A list of forest industries in your area may be obtained from:

- ◆ woodlot associations
- ◆ stewardship council services directories
- ◆ your district Ministry of Natural Resources office

If you need additional information, contact your local stewardship coordinator, the Ontario Woodlot Association, or the Ontario Forestry Association.

Appendix 2: Other Forest Values

Landowners must be aware of non-timber values in their woodlands when determining property objectives. These values should be identified during the inventory and may include:

- ◆ A woodland's importance as an area of groundwater recharge. In the water cycle, the portion of water from rainfall or spring melt that doesn't run off, or isn't taken up by plants, will move downward through the unsaturated zone. When infiltrating water reaches the water table, it becomes groundwater recharge. Recharge replenishes water in aquifers or is discharged in springs, streams, lakes, or wetlands. Any flooding tends to be localized, with impacts lessened downstream.
- ◆ Wildlife habitat features – for example, cavity trees, stick nests for hawks or owls, or conifer thickets used by deer.
- ◆ Mast⁹ trees are extremely important for wildlife such as deer, turkeys, bears, and squirrels that require a high-protein diet to build up energy reserves for the winter. Oak, for example, can produce from 20 to several hundred kilograms of high-protein mast per hectare, depending on the number of trees present and the seed crop in a certain year.
- ◆ Natural protection for sensitive areas, such as erodible areas, headwater streams, springs, provincially significant wetlands and other wetlands, and steep slopes.
- ◆ Areas of Natural and Scientific Interest (ANSI) — contact your local Ministry of Natural Resources office to find out about ANSIs in your area.
- ◆ Old-growth characteristics of a forest, such as supercanopy¹⁰ white pine, oak or maple trees.
- ◆ Maple syrup production possibilities.
- ◆ Forest recreation.

Some of these values may be present now, or they may be enhanced through management. They should be inventoried and mapped. If you decide to hire a consultant to assist you with woodland inventory and with developing a prescription, you should explain what you hope to achieve.

Multiple-use Management

In most cases, landowners can manage for more than one value, even in small woodlots. Examples of compatible, multiple-use management include:

- ◆ Retaining hard maple trees of low potential for sawlog material for maple syrup production. These may be otherwise healthy or large-crowned hard maple trees (potentially high sap producers) on the edge of the woodlot. These fringe trees will also act as a buffer for heat and drying winds and help maintain the health of your woodlot.

⁹ Mast – The fruit and nuts of trees and shrubs (e.g. acorns, beechnuts, cherries) used by wildlife as a food source.

¹⁰Supercanopy – The crown of a living tree that extends up beyond the main canopy of a forest stand.

- ◆ Retaining five or six cavity trees per hectare for wildlife (for feeding, nesting and escape). See Tables #6 and #7. Note: Some cavity trees may have structural defects. The entire tree may be dead or dying and have large dead limbs. Any branches that are close to trails or that present safety hazards should be cut.
- ◆ Allowing decaying logs and some large branches to decompose where they have fallen to maintain forest biodiversity.¹¹ They provide habitat for small mammals, salamanders, snakes, insects and fungi, and return nutrients to the soil; seedbeds for some trees such as hemlock and yellow birch are also created.
- ◆ Retaining large, supercanopy white pine. These may contribute more to your property value for aesthetic reasons than they would as harvest income.
- ◆ Seeking advice on harvesting trees near active hawk nests.
- ◆ Logging sensitive areas with horses in dry seasons or during the winter.
- ◆ Managing the best trees for the production of veneer or high-quality sawlogs. Parts of your woodlot may be highly productive; other areas are not. You may decide to manage each area for separate objectives (logs and veneer in one part, maple syrup in another).
- ◆ Planning your recreational trails and allowing access for fuelwood harvest or maple syrup production when you

lay out trails for harvesting activities. Concerns you have about the trail condition after harvest should be covered in your contract and understood in advance by the logger.



¹¹Biodiversity (biological diversity) – The variety and variability among living organisms and ecosystems. Ecosystems with a high level of biodiversity are more stable and support a greater number of life forms.

Table #6: Cavity-Hole Nesters of Eastern Woodlots

Species	Optimum Diameter for Tree	Diameter of Hole	Height Above Ground	Habitat
Pileated woodpecker	40+ cm	10 x 12.5 cm	n/a	Older mature forests; large trees; extensive forests. An excavator that creates its own holes.
Screech owl	35 cm	8 cm	3-10 m	Open forest; meadow edges; orchards. A secondary user of cavities.
Great crested flycatcher	30 cm	5 cm	2-6 m	Forest interior; edges to a lesser extent. A secondary user.
Eastern Bluebird	20 cm	3.8 cm	1.5-3 m	Forest-field edge or savanna-like habitat. A secondary user.
Downy woodpecker	30 cm	3.2 cm	2-6 m	Dense young forest – an excavator.
Tufted titmouse	30 cm	3.2 cm	2-6 m	Deciduous forests; suburbia; a secondary user.
Black-capped chickadee	12 cm	3.2 cm	6-20 m	Almost any kind of forest. Secondary user.

Source: Adapted from information from the U.S. Forest Service – North Central Forest Experimental Station – U.S. Department of Agriculture; and Brian Naylor Southcentral Sciences Section, Ontario Ministry of Natural Resources.



White pine supercanopy trees

As natural areas in southern Ontario decline, preserving wildlife habitat becomes more important. Diverse woodlands which support a variety of wildlife are aesthetically pleasing and add value to property.

Table #7: Cavities Used by Birds and Mammals in Northern Hardwood Forests

Species	Optimum Diameter of Tree	Tree Type	Cavity Use
Wood duck	>45 cm	Live trees with broken tops and limbs	Nesting – a secondary user of cavities already excavated
Barred owl	>45 cm	Live trees with broken tops and limbs	Nesting and perching – a secondary user
N. saw-whet owl	20 - 45 cm	Live trees with broken tops and limbs; dead trees	Nesting, perching and roosting – a secondary user
Yellow-bellied sapsucker	20 - 45 cm	Live trees with broken tops and limbs; dead trees; live trees with central decay	Nesting, foraging, perching, and roosting; an excavator
Hairy woodpecker	0 - 45 cm	Primarily live trees with dead tops in central Ontario, but also dead trees and live trees with broken tops and limbs	Nesting, foraging, perching and roosting; an excavator
Red-breasted nuthatch	20 - 45 cm	Live trees with central decay; live trees with broken tops and limbs	Nesting, foraging and roosting; a secondary user
Big brown bat	60 cm hollow	Hollow	Roosting; a secondary user
Red squirrel	> 45 cm and > 60 cm hollow	Hollow and live trees with broken tops and limbs	Denning; a secondary user. Will use old woodpecker cavities
Flying squirrel	20 - 60 cm	Dead trees; live trees with central decay, dead tops and limbs	Denning; a secondary user
Porcupine	> 45 cm and > 60 cm hollow	Live trees with dead tops and limbs; hollow trees	Denning; a secondary user
Fisher	> 45 cm and > 60 cm hollow	Live trees with dead tops and limbs; hollow trees	Denning; a secondary user

Sources: Adapted from information in the *Guide to Wildlife Tree Management in New England Northern Hardwoods*; and Brian Naylor, Southcentral Sciences Section, Ontario Ministry of Natural Resources.

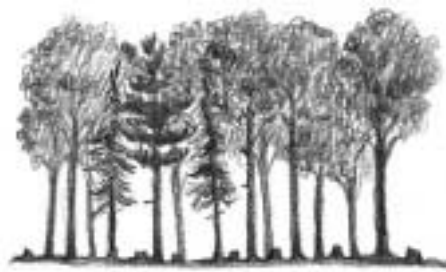
Appendix 3: Getting to Know the Trees in Your Woodlot

Your woodlot can be a long-term investment, and having some knowledge about how it works is an important part of being a successful woodlot manager. You should have a basic understanding of shade tolerance of various species, regeneration and what silvicultural practices to use in your woodlot.

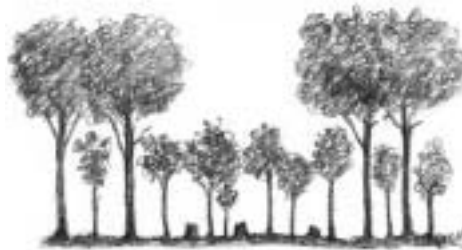
Certain principles for managing and harvesting woodlands are universally recognized. These harvesting or silvicultural systems are part of a process by which forests are tended, harvested and regenerated. The processes used to manage your woodlot are much the same as the ones you use in your garden. Seeds are planted; at an early stage the crop is thinned to optimize spacing and to maximize growth; the vegetables are harvested at maturity and more seed is sowed to regenerate another crop. It is the same in your woodlot – trees are a crop and will respond favourably to good management. Each silvicultural system is designed to ensure that adequate conditions are created for the growth of the remaining trees and to ensure that satisfactory regeneration of the desired species is obtained for the next harvest. In Ontario, the three primary silvicultural systems are – **selection**, **uniform shelterwood** and **clearcut**.

The application of any silvicultural system in a forest requires an understanding of many variables such as forest age, tree species, soil type and the site's capability for producing high-value timber. However, the primary consideration in selecting a silvicultural system to use in your woodlot is the development of forest regeneration. Tree cutting can be done

to manipulate the amount, type and growth of forest regeneration and optimize the long-term economic, environmental, and social values of your woodlot. Success in regenerating a tree species depends on having an understanding of the species' biological characteristics.



Selection system



Shelterwood system



Clearcutting system

The Link Between Shade Tolerance and Successful Regeneration

The key factor that affects tree species regeneration is shade tolerance. Shade tolerance refers to a tree species' ability to survive and grow in the shade of another tree.

Shade-tolerant species, such as sugar maple or beech, generally survive and grow in the understory of a forest, quickly responding with an increased growth rate when openings in the forest canopy occur. Species with intermediate tolerance to shade, such as basswood, may survive in the understory of a forest, but require larger



Shade tolerant species can survive in the shade beneath the lowest canopy for decades. When an opening appears in the canopy, they grow quickly to fill it.



Sugar maple Beech Hemlock



Mid-tolerant species need sunshine for at least part of the day to survive.



Yellow birch White ash Red oak



Intolerant species need full sunlight to survive. In open areas they can out compete more tolerant species.



Trembling aspen White birch Black cherry

openings in the canopy to start growing. Shade-intolerant species like white birch or poplar are rarely found in the forest understory. These intolerant species become established by seed and grow to dominate the site after a major disturbance such as “heavy” cutting or wildfire.

For some species, regeneration can be accomplished on the site by one tree-cutting operation. For instance, shade-tolerant species like sugar maple can establish and become vigorous advance regeneration under a closed forest canopy without intervention, and will develop once an opening in the canopy is created. The silvicultural system used to manage shade tolerant species is the selection system.

Other species with intermediate shade tolerance, like red oak and white pine, require several cutting operations to ensure successful regeneration. The first cutting operation is used to create small canopy openings, which will provide the conditions for establishment of vigorous regeneration. Sometimes the regeneration may be present, but it is dormant – it needs more light to stimulate growth. Subsequent cuts are then used to release the seedlings and allow them to grow into the dominant trees in the woodlot. The management system used to manage mid-shade tolerant species is the uniform shelterwood system.

Table #8 provides additional information on regeneration strategies for a number of the major tree species found growing in woodlots in southcentral Ontario.

Choosing a Silvicultural System

Harvesting or silvicultural systems can be generally categorized as either an “uneven-aged” or “even-aged”

system and are named after the method of the harvesting system used. An uneven-aged woodlot will contain trees in a wide range of ages and sizes. Normally, there are at least three distinct age classes present within the stand. Shade-tolerant species, such as sugar maple, beech and hemlock are most suited to being managed under this system. An even-aged stand is comprised of trees having no, or relatively small, differences in age (i.e., generally within a 20-year range). This system is most useful in the management of shade-intolerant species such as white birch, poplar and red pine.

By selecting the most appropriate silvicultural system, you can take advantage of the different shade tolerance of trees – thereby modifying the regeneration required to meet your silvicultural objectives. The three major silvicultural systems used in southcentral Ontario are described as follows:

1. Uniform Shelterwood Silviculture System – Even-aged Management System

The shelterwood system is the removal of all merchantable trees from a mature stand of timber in two or more partial harvest operations over a 20- to 40-year period that usually results in an even-aged stand. The purpose of this system is to provide light conditions necessary to allow the establishment of natural regeneration and to grow tree species which are moderately tolerant of shade such as red oak and white pine. Once the regeneration objectives have been met, the overstory is removed in stages, allowing for the further development of an even-aged forest in the open-light conditions to which these species are adapted.

Table #8: Regeneration Strategies in Private Woodlots for the Major Tree Species in Southcentral Ontario

Species	Primary Method of Establishment	Preferred Silvicultural System	Canopy Openings Required for Seedlings to Develop to at Least 3 Feet in Height	Canopy Openings Required for Trees to Develop Above 3 Feet in Height	Special Needs
Shade tolerant; Sugar maple, Beech	Advance growth*	Selection	None	1/2 height of forest	
Shade tolerant; Hemlock	Advance growth	Selection	None	1/2 height of forest	Seed source may be lacking.
Mid shade tolerant; Basswood	Advance growth, stump sprouts	Selection	None	Height of forest	
Mid shade tolerant; White ash, Hickory	Advance growth	Selection	None	Height of forest	
Mid shade tolerant; Red/white oak	Advance growth, seed	Uniform Shelterwood	2/5 height of forest	Height of forest or greater	Seedling development may require removal of other competing seedlings.
Mid shade tolerant; White pine, dry sites	Advance growth, seed	Uniform Shelterwood	2/5 height of forest or greater **	Height of forest	Seedling development may require removal of other competing seedlings.
Mid shade tolerant; White pine, good sites	Seed after wildfire	Uniform Shelterwood	2/5 height of forest	Height of forest or greater **	Planting may be required. Seedling development may require removal of other competing seedlings.
Intolerant; Red Pine	Seed after wildfire	Uniform Shelterwood	3/5 height of forest	Height of forest or greater	Planting may be required. Seedling development may require removal of other competing seedlings.
Intolerant Black Cherry	Advance growth, dormant seed	All	Varies from none to height of forest and greater. Canopy must be opened 2—5 years after establishment for continued survival.	Height of forest or greater	Seed source may be lacking.
Intolerant; White birch	Seed	Clearcut	Height of forest and greater	Height of forest or greater	
Intolerant; Poplar	Root Suckers	Clearcut	Height of forest and greater	Height of forest or greater	

*Advance Growth refers to young trees / saplings already naturally established in the forest prior to harvest.
 ** Creation of canopy openings required for growth of white pine trees should wait until regeneration is 20 feet in height to avoid damage from white pine weevil.
 Information in this table was compiled by Martin Streit, R.P.F., Management Forester, Domtar Communications, Cornwall, Ontario.

A typical three-cut uniform shelterwood harvest involves the following stages:

A preparatory cut prior to the seeding cut may be used to remove undesirable trees (low-quality, undesirable species) and to enhance the crown development of potential seed trees within the stand.

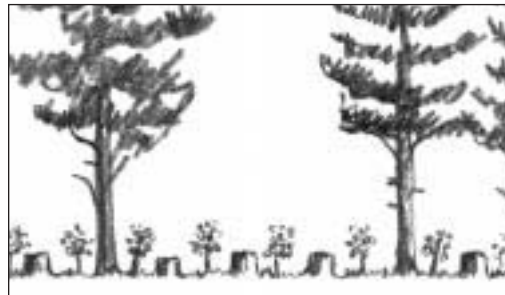
The regeneration or seeding cut in a uniform shelterwood system removes between 40 to 50 percent of the forest canopy, depending on the species composition, stocking, stand conditions and regeneration requirements of the stand. Poor-quality, unhealthy, suppressed and undesirable tree species are removed in the seed cut. Healthy, mature trees of the desired species, that have large crowns are left uniformly distributed over the site. This overstory provides the following benefits: a natural seed source of the desired species; control of undesirable hardwood and herbaceous competition; provision of site protection; and maintenance of aesthetic values as required. The growth rate of the overstory increases because of the thinning operation.

The removal cut will be completed when sufficient numbers of regeneration of suitable species are established and dominate over competing vegetation. Depending on the species and forest conditions, the removal of the overstory may be completed in one or two subsequent harvest operations. The first removal cut usually occurs 10 to 20 years after the first cut. If required, a second removal cut follows in another 10 to 20 years. Subsequent renewal activities may be required if sufficient desired natural regeneration does not develop. Additional management activities may include tree planting and the removal of competing vegetation (tending).

The uniform shelterwood system provides the following benefits: a natural seed source of the desired species; control of hardwood and herbaceous competition; provision of site protection; and maintenance of aesthetic values as required.



Preparatory cut



Seed cut



Removal cut

2. Selection Cut System – Uneven-aged Management

This silvicultural system allows for the periodic and regular removal of the mature and/or defective component of an uneven-aged stand composed primarily of tolerant or mid-tolerant shade tree species. The purpose is to maintain an uneven-aged class distribution, improve stand quality and vigour, and concentrate growth on high-value crop trees.

Using the selection cut system, every 10 to 25 years, single or small groups of mature trees are harvested to encourage regeneration in the stand, and to release immature crop trees. Openings created by cutting are similar to those created by the natural death of individual or small groups of trees due to disease, old age, or wind damage. Additional immature trees may also be removed from the balance of the stand as required to provide additional growing space for the remaining trees. Species such as sugar maple, beech, basswood and hemlock are most suited to this system. These species have adapted to regenerating and growing in the low-light conditions found in small openings in the forest.

In both single and group tree selection, emphasis is on the removal of unhealthy trees, undesirable species, poor-quality stems and mature trees in order to improve future value. High-quality, shade-tolerant and mid-tolerant crop and potential crop trees of a number of age classes remain in the stand. This system is managed on a basal area target. At no time should more than one-third of the pre-harvest basal area be removed, with a minimum residual basal area of 20 m² per hectare being retained. The self-perpetuating nature of the tolerant hardwood forest type

under conditions of minimal disturbance usually results in sufficient regeneration following a selection harvest.

Benefits of a selection harvest include: maintenance of even-age properties of the forests; favourable growth response on the remaining trees due to thinning; a natural seed source of the desired species and openings for regeneration; maintenance of aesthetics values and provision of site protection as required.

3. The Clearcut Silviculture System – Even-aged Management

The clearcut system allows for the removal of all merchantable trees from a mature stand of timber in one harvesting operation for the regeneration of an even-aged stand. In most cases, the clearcutting system is generally used for shade-intolerant tree species such as poplar and white birch and is usually done in blocks, strips or in patches.

The size of the clearcut is limited by the forest stand type boundaries, the need for site protection, protection of aesthetic values, the tree species' requirements for natural regeneration and wildlife habitat requirements. Depending on the size and shape of the cut, tree species' characteristics, and stand management objectives, natural regeneration (from seed or sprouts from stumps and/or roots) or the planting of tree seedlings may follow.

Due to the potential detrimental environmental impact clearcutting may have on your woodlot if used incorrectly, consultation with an experienced forestry service provider should be undertaken before implementing this silvicultural system.

This is only a brief introduction to the link between various degrees of shade tolerance and the regeneration requirements of different tree species. For more comprehensive information on the autecology¹² of tree species and the different silviculture systems for southern Ontario, you may want to read the Silvicultural Guide to Managing Southern Ontario's Forests (see Appendix 1 – Where to go for Assistance).

¹² Autecology – Refers to the study of the ecology of an individual tree species.

Appendix 4: Glossary of Forestry Terms¹³

Advance Growth – young trees established naturally in a forest prior to harvest or other management treatment.

Basal Area – the area, in square metres, of the cross-section of a tree measured 1.3 metres above the ground.

Biodiversity (biological diversity) – the variety and variability among living organisms and ecosystems.

- ◆ Includes differences within and between ecosystems, differences between species, and differences between members of the same species.
- ◆ A high level of diversity within a species, which is known as genetic diversity, helps the species survive massive climatic and environmental changes, such as those created by pollution or global warming.
- ◆ Ecosystems with a high level of diversity are considered to be healthy, more stable, and support a greater number of life forms.

Board Foot – the unit of measurement used to describe the volume of a log; one board foot measures 1 inch x 1 inch x 12 inches. The abbreviation is fbm (foot board measure).

Bole – the trunk of a tree.

Breast Height – a standard measuring point on a tree that is 1.3 metres above ground level. On a slope, breast height is measured on the uphill side of the tree.

Buffer – a zone or strip of forest or land that shields one area from another; commonly used for areas along streams and lakes or as a visual barrier.

Butt End – of any log is the larger end; this term is also used to identify the first log above the stump, i.e. the “butt log.”

Canopy – an almost continuous layer of foliage formed by the crowns of older trees. Shades the layers of vegetation below.

Cavity Tree – a standing tree, dead or live, that has a hole or holes where wildlife can make nests or dens, or escape predators.

Clearcut – a large opening created by cutting all the trees in one harvest; usually regenerates to an even-aged forest.

Conifer – a tree which is “evergreen,” it has cones and needles or scale-like leaves that are usually retained throughout the winter. Examples include pine, spruce, fir, cedar, and larch. The wood of conifers is referred to as softwood.

Control Point – land features that may limit the choices available for locating a forest access road.

Den Tree – a tree having a hollow or cavity used by animals for refuge or hibernation.

¹³The definitions for Appendix 4 were adapted from the following sources: OMNR. 1998. *A Silvicultural Guide for the Tolerant Hardwood Forest in Ontario*. Ontario Ministry of Natural Resources, Queen's Printer, Toronto. 500 pp. OMNR. 1997. *Forestry Talk: A Glossary of Common Terms*. Ontario Ministry of Natural Resources, Queen's Printer, 8 pp.

Diameter Limit Cutting – a form of high-grading where all high-quality trees down to a certain diameter, generally measured on the stump, are removed.

Dominant Species – the most numerous and vigorous species in an area of mixed vegetation.

Ecosystem – an interacting system of living organisms and their environment.

Even-aged Forest – a forest in which all the trees are within 20 years of the same age.

Forest Inventory – a survey of a forest area that describes and quantifies the physical characteristics of the trees and plants, including the species present, the abundance of each species, and other measures such as height, diameter and quality. An inventory may be done prior to the preparation of a management plan, the development of a specific work prescription, or for the purposes of establishing the value of a forest stand.

Forest Structure – the ages and sizes of the layers of plant vegetation within a forest; layers may include ground vegetation, shrubs, young trees, canopy trees and supercanopy trees.

Fuelwood – trees of insufficient quality for lumber or veneer logs; used for the production of firewood logs or other wood fuel.

Harvesting – the process of cutting trees to make wood products or fuelwood.

High-Grading – a form of logging that removes the largest, most valuable trees and leaves the less valuable trees or species to grow and regenerate the forest. Changes the species composition in a forest and can reduce the future commercial value and health of the forest.

Landing – the area where logs are collected and sorted into various products prior to loading for transport.

Log Scaling – the process used in the forest industry to measure (scale) the volume of a log.

Marking – the process of choosing trees to be harvested and trees to grow as future sources of wood products or fuelwood, wildlife habitat, or sources of seed for regenerating the forest.

Old Growth – a forest that has a large number of the features found in the forests that grew before European settlement. Southern Ontario's old-growth forest contained a great diversity of habitats and species, as well as trees of many ages and sizes.

Overstory – the portion of trees in a stand forming the upper crown cover.

Preparatory Cut – in the shelterwood silviculture system, this cut can be used to remove undesirable trees (low-quality or undesirable species) to enhance the crown development of potential seed trees within the stand.

Raptor – a bird of prey, e.g., hawks, owls, eagles, etc.

Regeneration – young trees (noun) or the process of growing young trees (verb):

- ◆ The growth of young trees can be promoted through natural or artificial means
- ◆ Trees naturally regenerate by producing seeds or by coppice growth
- ◆ People artificially regenerate forests by dispersing seeds, planting trees or stimulating coppice growth

Removal Cut – in the shelterwood silviculture system:

- ◆ Mature trees are harvested after young trees are established below them
- ◆ Increases the growth and survival rates of young trees by providing full sunlight

Riparian – areas adjacent to rivers and streams identified by vegetation, wildlife and other qualities unique to these locations.

Sawlog – a log of sufficient quality and size to be sawn into lumber.

Seed Cut – in the shelterwood silviculture system:

- ◆ Removes about half of the mature trees in a stand.
- ◆ Creates space so that the remaining trees can develop large crowns.
- ◆ Trees with large crowns produce more seeds and the shade that many species need to germinate and grow.

Silviculture – the science of growing trees.

Silvicultural Systems:

- ◆ **Clearcut** – all trees in a stand or portions of a stand are removed at the same time. The clearcut area may

be planted with seedlings after the harvest or left to regenerate naturally.

- ◆ **Selection** – individual trees or groups of mature and/or unhealthy trees are harvested on a selective basis. Leaves most of the trees and a variety of age classes to grow and regenerate the forest.
- ◆ **Uniform Shelterwood** – mature trees are harvested in a series of two or more cuts. Encourages natural regeneration in the shelter and shade of the remaining trees. A seed cut, removes about half of the large trees, leaving the rest to develop large crowns, which provide seeds and shade for regeneration. Subsequent cuts, called removal cuts, are conducted when saplings are well established beneath the mature trees. By removing the mature trees, the final cuts provide the new growth with sunlight and room to grow.

Snag – a standing dead tree that is decaying. Can provide habitat for many wildlife species and can be a safety hazard during logging operations.

Species – a group of plants, animals or other life forms that can interbreed.

Stand – a group of trees that can be distinguished from other vegetation by its composition, age, arrangement or condition.

Stocking – a relative measure of the quantity of trees in a stand. Can be expressed in terms of crown closure, number of trees, basal area or volume per hectare.

Supercanopy – a cluster of vegetation composed of tall trees that poke through the canopy. Usually conifers such as white or red pine; provide landmarks and nesting spots for birds.

Sustainability – the concept of producing a biological resource through management practices that ensure replacement of the harvested resource, by regrowth or reproduction, before another harvest occurs.

Tending – caring for trees:

- ◆ Can include thinning, pruning and other measures to reduce competition
- ◆ Increases survival rate, growth rate and commercial value of trees

Tolerance – the ability of a plant to germinate and grow in shade.

- ◆ Tolerant species such as maple, hemlock, and beech can grow in shade.
- ◆ Mid-tolerant species, such as oak, ash, and white pine need partial sunlight to survive.
- ◆ Intolerant species, such as white birch, poplar, and black cherry need full sunlight – also referred to as pioneer species.
- ◆ The growth rate of all species, including tolerant species, increases when the plants are exposed to more sunlight.

Uneven-aged Forest – a forest with trees of all ages and sizes, usually with at least three age classes.

Veneer – a high-value product manufactured by slicing a thin layer of wood from a log, either longitudinally from one end of the log to the other, or from the log as it turns on a type of lathe.

Appendix 5: Board Foot Volume Table for Standing Timber

A Quick Method of Estimating Approximate
Volume of Standing Timber

(Based on the Ontario Log Rule, Form Class #79)

DBH in inches	Merchantable Lengths in Feet																		
	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	44	48
10	16	20	24	28	32	35	37	40	44	46	46	50	53	55	58	60	61	64	67
11	20	26	31	36	41	44	47	51	55	58	60	64	67	70	73	75	77	82	86
12	25	31	37	43	50	54	58	62	67	71	74	78	82	86	91	94	97	102	108
13	30	37	45	53	60	65	70	75	80	85	90	95	100	105	110	114	117	124	131
14	36	46	54	63	73	79	85	92	99	105	110	116	122	128	134	138	142	151	160
15	42	53	64	75	85	92	99	108	116	122	129	136	143	150	157	162	168	178	189
16	49	61	74	86	98	107	115	125	135	142	149	157	166	175	184	190	197	210	222
17	56	70	91	101	112	122	131	143	154	162	170	180	190	200	211	219	226	241	255
18	62	78	94	110	125	136	147	160	173	183	193	204	215	227	239	248	256	273	290
19	70	88	105	123	141	153	166	180	195	206	218	230	243	256	270	279	289	309	329
20	78	98	118	138	157	172	186	202	218	230	243	257	272	287	302	314	325	348	370
21	87	109	131	153	175	191	207	225	243	257	271	287	304	320	337	352	362	388	413
22	96	121	145	169	193	208	224	246	269	290	311	325	338	356	374	389	403	432	460
23	106	133	160	186	212	232	252	275	297	315	332	351	371	392	413	429	445	476	508
24	117	146	176	205	234	256	278	303	328	348	367	384	401	429	457	475	492	528	563
25	127	159	191	223	255	279	303	330	357	378	399	423	447	472	498	517	536	574	612
26	137	172	207	241	275	301	327	357	387	410	432	458	485	513	541	562	583	625	667
27	149	186	222	260	298	326	355	398	420	444	468	497	526	558	589	612	635	681	727
28	161	203	242	282	323	354	385	420	456	482	509	541	573	606	640	665	689	739	789
29	173	217	260	304	347	380	414	452	490	520	549	583	617	652	688	725	743	792	852
30	187	233	280	327	374	410	447	488	529	561	594	631	667	705	743	773	802	861	921

Appendix 6: Ontario Log Rule

Volume in Board Feet for Logs
(Diameters in Inches and Lengths in Feet)

Top Diameter in Inches*	Length of Log in Feet											
	7	8	9	10	11	12	13	14	15	16	17	18
	Volume in Board Feet											
8	15	17	19	21	23	26	28	30	32	34	36	38
9	20	22	25	28	31	34	37	39	42	45	48	51
10	25	29	32	36	39	43	47	50	54	57	61	64
11	31	36	40	44	49	53	58	62	67	71	78	80
12	38	43	49	54	59	65	70	76	81	86	92	97
13	45	52	58	64	71	77	84	90	97	103	110	116
14	53	61	68	76	83	91	99	106	114	121	129	136
15	62	70	79	88	97	106	115	123	132	141	150	159
16	71	81	91	101	111	122	132	142	152	162	172	182
17	81	92	104	115	127	139	150	162	173	185	196	208
18	91	104	117	130	144	157	170	183	196	209	222	235
19	103	117	132	146	161	176	190	205	220	234	249	264
20	114	131	147	163	180	196	212	229	245	261	278	294
21	127	145	163	181	199	217	235	254	272	290	308	326
22	140	160	180	200	220	240	260	280	300	320	340	360
23	154	176	198	219	241	263	285	307	329	351	373	395
24	168	192	216	240	264	288	312	336	360	384	408	432
25	183	209	235	261	288	314	340	366	392	418	444	471

Lumber Recovery = $(0.55D^2 - 1.2D) L/12$.

D = Diameter (in.)

L = Length (ft.)

* Note – the diameter is measured in inches (inside the bark at the small end of the log).

Appendix 7: Cubic Metre Rule

Volume in Cubic Metres for Logs
(Diameters in Centimetres and Lengths in Metres)

Top Diameter in cm*	Length of Log in Metres											
	2.1	2.5	2.7	3.1	3.3	3.7	3.9	4.3	4.5	4.9	5.1	5.5
	Volume in Cubic Metres											
20	0.066	0.079	0.085	0.097	0.104	0.116	0.123	0.135	0.141	0.154	0.160	0.173
22	0.080	0.095	0.103	0.118	0.125	0.141	0.148	0.163	0.171	0.186	0.194	0.209
24	0.095	0.113	0.122	0.140	0.149	0.167	0.176	0.195	0.204	0.222	0.231	0.249
26	0.111	0.133	0.143	0.165	0.175	0.196	0.207	0.228	0.239	0.260	0.271	0.292
28	0.129	0.154	0.166	0.191	0.203	0.228	0.240	0.265	0.277	0.302	0.314	0.339
30	0.148	0.177	0.191	0.219	0.233	0.262	0.276	0.304	0.318	0.346	0.360	0.389
32	0.169	0.201	0.217	0.249	0.265	0.298	0.314	0.346	0.362	0.394	0.410	0.442
34	0.191	0.227	0.245	0.281	0.300	0.336	0.354	0.390	0.409	0.445	0.463	0.499
36	0.214	0.254	0.275	0.316	0.336	0.377	0.397	0.438	0.458	0.499	0.519	0.560
38	0.238	0.284	0.306	0.352	0.374	0.420	0.442	0.488	0.510	0.556	0.578	0.624
40	0.264	0.314	0.339	0.390	0.415	0.465	0.490	0.540	0.565	0.616	0.641	0.691
42	0.291	0.346	0.374	0.429	0.457	0.513	0.540	0.596	0.623	0.679	0.707	0.762
44	0.319	0.380	0.411	0.471	0.502	0.563	0.593	0.654	0.684	0.745	0.775	0.836
46	0.349	0.415	0.449	0.515	0.548	0.615	0.648	0.715	0.748	0.814	0.848	0.914
48	0.380	0.452	0.489	0.561	0.597	0.670	0.706	0.778	0.814	0.887	0.923	0.995
50	0.412	0.491	0.530	0.609	0.648	0.726	0.766	0.844	0.884	0.962	1.001	1.080
52	0.446	0.531	0.573	0.658	0.701	0.786	0.828	0.913	0.956	1.041	1.083	1.168
54	0.481	0.573	0.618	0.710	0.756	0.847	0.893	0.985	1.031	1.122	1.168	1.260
56	0.517	0.616	0.665	0.764	0.813	0.911	0.961	1.059	1.108	1.207	1.256	1.355
58	0.555	0.661	0.713	0.819	0.872	0.978	1.030	1.136	1.189	1.295	1.347	1.453
60	0.594	0.707	0.763	0.877	0.933	1.046	1.103	1.216	1.272	1.385	1.442	1.555
62	0.634	0.755	0.815	0.936	0.996	1.117	1.177	1.298	1.359	1.479	1.540	1.660

$$\text{Cubic Metres} = \frac{D^2 \times 0.7854 \times L}{10,000}$$

D = Diameter (cm)

L = Length (m)

* Note – the diameter is measured in centimetres (inside the bark at the small end of the log).

Appendix 8: Estimation of Fuelwood Volume in Standing Trees

Use the table below to determine the number of trees to yield one cord.

- ◆ Measure the tree's diameter, in inches, at 4.5 feet above ground level.
- ◆ No height estimation is necessary.

Diameter (DBH) in inches at 4.5 feet	Number of trees required to = 1 cord
5	35.0
6	20.0
7	15.0
8	11.0
9	8.0
10	6.0
11	5.0
12	4.0
13	3.5
14	3.0
15	2.5
16	2.0
17	1.7
18	1.5
19	1.3
20	1.2
21	1.0
22	0.9
23	0.8
24	0.7
25	0.6

Appendix 9: Heating Value of Some Native Tree Species

Species	BTUs for Air-Dried Cord
Rock elm	32,000,000
White oak	30,600,000
Bitternut hickory	29,200,000
Sugar maple	29,000,000
Beech	27,800,000
Red oak	27,300,000
Yellow birch	26,200,000
White ash	25,000,000
White elm	24,500,000
Red maple	24,000,000
Tamarack	24,000,000
Black cherry	23,500,000
White birch	23,400,000
Silver maple	21,700,000
Manitoba maple	19,300,000
Large tooth aspen	18,200,000
Hemlock	17,900,000
Trembling aspen	17,700,000
White pine	17,100,000
Basswood	17,000,000
White cedar	16,300,000
White spruce	16,200,000

BTU: British Thermal Unit — the heat required to raise the temperature of one pound of water one degree Fahrenheit.

Air-dried wood contains approximately 20% moisture and will yield about 5,800 BTUs per pound. Green wood containing about 60% moisture will yield only 4,100 BTUs per pound. The presence of gums, tannins, resins and oils in some species slightly increases the heating value.

Appendix 10: Metric and Imperial Lengths and Measures

Metric/Imperial Equivalents and Other Useful Measurements

Lengths	
1 inch	= 2.54 centimetres
1 surveyor's link	= 7.92 inches = 0.66 feet
1 foot	= 0.3048 metre
1 yard	= 0.9144 metre
1 rod, pole or perch	= 5.5 yards
1 chain	= 4 rods = 22 yards = 66 feet = 100 links = 20.1168 metres
1 mile	= 80 chains = 320 rods = 1,760 yards = 5,280 feet = 1.609 kilometres

Area	
1 square foot of basal area per acre	= 0.2296 square metres of basal area per hectare
1 square metre of basal area per hectare	= 4.356 square feet of basal area per acre
1 square chain	= 4,356 square feet = 404.69 square metres
1 acre	= 0.4047 hectares = 10 square chains = 43,560 square feet = 4,047 square metres
1 hectare	= 2.471 acres = 10,000 square metres
1 square mile	= 640 acres = 2.59 square kilometres = 259 hectares

Roundwood Weight	
1 cubic metre	
red pine (plantation)	= 980 kilograms
spruce	= 763 kilograms
white pine	= 854 kilograms
poplar	= 918 kilograms
maple	= 1,123 kilograms
1 cord	
red pine (plantation)	= 2,352 kilograms
spruce	= 1,831 kilograms
white pine	= 2,050 kilograms
poplar	= 2,203 kilograms
maple	= 2,695 kilograms

Wood Measures	
1 cubic metre	= 227 fbm (Ontario Log Rule) = 35.314 cubic feet
1 cunit	= 100 cubic feet of solid wood
1 cord	= 4 feet x 4 feet x 8 feet or 128 cubic feet, but contains only 85 cubic feet of solid wood when bark and air are taken into consideration
1 cord	= 2.4 cubic metres (approximate)
1 face cord	= 12 or 16 inches x 4 feet x 8 feet (Note: this is not a standard measure and retailers sell different measures.)
1 board foot (fbm)	= 12 inches x 12 inches x 1 inch
1,000 fbm	= 4.4 cubic metres of solid wood

Appendix 11: Workplace Safety and Insurance Board (WSIB) Information

Hiring subcontractors and/or owner-operators is a common practice in the logging industry. While at first glance those advantages of hiring a subcontractor or owner-operator may be appealing, the reality is there are many financial repercussions, which could significantly impact your business.

A subcontractor or owner-operator may be a worker or an independent operator for WSIB purposes. Workers are automatically covered in the logging industry and the principal is required to pay premiums for this coverage. On the other hand, WSIB coverage for independent operators is not mandatory. Here are some things you should know before you hire an independent operator.

What is an independent operator?

An independent operator is different from a regular employee or worker. An independent operator carries on a business, separate from the employer. Typically, an independent operator in the logging industry will have the following characteristics:

- ◆ The individual can sell logs to other purchasers for the best price possible.
- ◆ The individual reports to the government as a self employed business (Revenue Canada/GST).

- ◆ The individual owns and operates his/her own equipment.

The WSIB uses an organizational test to determine if a subcontractor is an independent operator or a worker.

What is the organizational test?

The WSIB organizational test uses specific criteria to determine if a person is an independent operator or a worker, for WSIB purposes. The key to remember is that the test is a complete examination of the work relationship between the individual and the firm who hires his/her services. Factors considered in the organizational test are subject to doing the work, the opportunity for profit or loss, and other applicable criteria that characterize the work relationship.

Sample questions used in the WSIB's organizational test include:

- ◆ Does the individual agree to complete a specific job and is he/she responsible for its satisfactory completion or subject to legal penalties for breach of contract?
- ◆ Does the person own, rent or lease the equipment necessary to work in woodland operations?
- ◆ What control and supervision are exercised over the work performed?

What are an employer's obligations and responsibilities when using independent operators?

Both parties (the individual offering services and the firm thinking of hiring the person) are strongly encouraged to complete the organizational test prior to beginning a work relationship so that everyone is clear about each other's responsibilities and obligations under the *Workplace Safety and Insurance Act*. The test will determine if:

- ◆ The person is an independent operator under the Act, and therefore not automatically covered for WSIB purposes. He or she has the options of opening an account with the WSIB and taking out voluntary coverage; OR
- ◆ The person is a worker under the Act and the company using his or her services is considered an employer and therefore responsible for the person's WSIB coverage.

Until you have obtained a decision from the WSIB on a person's status, the company hiring is required to pay premiums to the WSIB based on the individual's earnings.

You have hired an independent operator and you assume you're off the hook. Not so because. . .

- ◆ An independent operator who employs his or her own workers/helpers is an employer and must be registered with the WSIB.
- ◆ If you hire an independent operator who hires his/her own worker/helpers but does not register with the

WSIB, you as the principal may be held responsible for the operator's premiums and the cost of any injury.

In other words, it is the duty of the principal to ensure that the contractors working for you are required to be registered with the WSIB and remain in good standing, you must ask the contractor for a WSIB clearance certificate. A clearance certificate is a confirmation that an employer is registered and has met his/her reporting and payment obligations.

Note – a clearance certificate is NOT proof that a person has WSIB optional insurance for him/herself. An independent operator who does not obtain optional insurance with the WSIB may sue the principal and any other person or company for negligence.

Still confused? This is a real life situation. It could be You!

In the event of a work-related accident, a principal can be held responsible for independent operators who do not have coverage with the WSIB. The following examples illustrate why ensuring your independent operators have WSIB coverage is very important.

Company ABC Logging Inc. uses the services of John Davidson to manage the cutting of trees in an area covered by their forestry licence. John Davidson subcontracts the cutting to Tim Oakley. John Davidson did not request a WSIB clearance certificate from Tim. While cutting trees, Tim is seriously injured.

Example #1 — the WSIB is notified of the injury. The WSIB applies the organizational test and Tim Oakley is

considered an independent operator. As an independent operator without WSIB coverage, Tim sues John Davidson for negligence and is successful. John Davidson is unable to pay the award imposed by the courts and goes bankrupt.

Example #2 — the WSIB is notified of the accident and applies the origination test. Tim is considered a worker by the WSIB and, therefore automatically entitled to WSIB benefits. As John Davidson hired and paid Tim, he is responsible for the WSIB premiums. However, John Davidson did not register with the WSIB prior to Tim's accident. As a result, John was fined by the WSIB.

Furthermore . . . Company ABC Logging Inc. did not ask John Davidson for a WSIB clearance certificate to confirm that he was registered with the WSIB and was in good standing. Now, John cannot pay his WSIB bill. The WSIB has the authority to move the responsibility "up the chain" and collect from the principal (Company ABC Logging Inc.) who initially hired John to manage the cutting.

Company ABC Logging Inc. failed to receive a clearance certificate from John Davidson. Company ABC Logging Inc. can therefore be held responsible for any money John may owe the WSIB. Section 141 of the Workplace Safety & Insurance Act addresses a principal's liabilities regarding a subcontractor's responsibilities and provides the capability for the WSIB to deem the principal to be the employer. If you don't receive a clearance certificate, you may be held liable for other people's WSIB bills! Hiring

independent operators means taking the time to understand the different ways it could affect your business. This includes your WSIB obligations. Be careful, make sure you're covered – it makes good business sense!

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A LANDOWNER'S GUIDE TO SELLING STANDING TIMBER
