



Timber Sale Planning and Forest Products Marketing:

A Guide for Montana Landowners



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Table of Contents

Introduction	2
Forest Management Planning	3
Forest management plan components	3
1. Property Description.....	3
2. Management Goals and Objectives	4
3. Schedule Management Activities	4
Forest management planning assistance	4
Timber Sale Planning	6
Steps in the timber sale process.....	6
1. Seek assistance from a professional forester	6
2. Mark property & sale boundaries	7
3. Mark the trees to be harvested.....	8
4. Estimate the volume and value of the marked trees	9
5. Determine the type of timber sale	10
6. Determine bidding procedures	13
7. Advertising the timber sale	13
8. Selecting the buyer	14
9. Writing a timber sale contract.....	16
9. Permits and notifications	17
10. Monitor the Sale	18
Marketing Forest Products from a Timber Sale	19
Conceptual Model of the Forest Products Value Chain	19
Common Montana Forest Products	19
Common Montana Forest Products	20
Merchandising Forest Products	21
Conclusion	21
Appendix A – Forest Products Measurements	22
Forest Products Measurement Units	22
Board Foot	22
Cord	22
Linear Measurements	22
Weight.....	23
Measuring logs	23

Introduction

Congratulations! If you are reading this then you most likely enjoy the privilege of owning forest land in Montana. However, along with the privilege of ownership comes the responsibility of good forest stewardship. This document aims to assist your stewardship efforts by discussing the process of timber sale planning and forest products marketing. You may have decided to harvest and market your timber because:

- it is recommended in your forest management plan
- your timber needs to be salvaged after storm, insect, disease, or fire damage
- improve forest health
- limit fire hazards
- you have financial needs

Whatever your reason for deciding to harvest and market your timber, timber sale planning and marketing forest products are complex processes that occur infrequently and can involve large amounts of money. As a result, both require careful planning and professional assistance. Accordingly, this publication approaches timber sales and forest products marketing from a planning and professional assistance perspective. This approach is called forest stewardship – the active management of forests and related resources so that their aesthetic and economic values are sustained. The guiding forest stewardship principles include:

Sustainability – land management activities (such as harvesting trees) should be judged on their ability to meet the needs of today without jeopardizing the ability of future generations to meet their needs.

Landscape linkages – recognition that land management activities on small privately owned parcels can potentially impact the natural resources in an entire drainage, valley, or region.

Interconnected resources – forest stewardship provides landowner's with a framework defining and prioritizing management objectives, which allows landowners to identify the relationships among the forest's many resources.

Finally, this publication serves as a comprehensive information resource for private landowners. It is not meant to be a definitive "how to" guide because too many aspects of timber sale planning and forest products marketing are dependent on your unique forest stewardship objectives and the characteristics of all other parties involved.

Forest Management Planning

Since actively managing forests and their related resources is complex, *forest management planning* is an essential first step in the timber sale and forest products marketing process. In other words, take the time to write a forest management plan before you harvest and market any trees. A forest management plan is a written document made up of three elements – a written property description, a list of management goals and objectives, and a schedule of management activities.

Forest management plan components

1. Property Description

The property description is an informational overview of your property. It should contain enough descriptive detail to identify the property's unique features. In addition, there should be a discussion about how those features either limit or facilitate meeting your management objectives. A typical property description might include the following:

- 1) A map of the property including:
 - a property tax identification number and the property's assessed value
 - a legal description of the property
 - the property boundaries and total acreage
 - information about any existing easements
 - management unit boundaries (management units are specific areas of the property designated for special management activities. For example, a timber stand, meadow, grazing area, wetland area, etc.)
 - roads, trails, streams, lakes, ponds, intermittent streams, and other unique land features
 - an aerial photo of the property
- 2) A discussion of the management opportunities and limitations imposed by the:
 - property's soil types
 - water resources
 - topography (level, rolling, steep)
 - access (roads and trails)
 - property's land-use history (impacts of former timber harvests, grazing, fire, disease, mineral extraction, etc.)
- 3) An inventory of the property's current resources, often called a "stewardship inventory" or "management timber cruise." Typically information focuses on trees – their size (height and diameter), species present, age, and tree distribution across the property. Additional data might be collected about the property's other resources – wildlife, other plants, recreation, minerals, water, oil and gas, cultivated fields, dwellings and other improvements.

2. Management Goals and Objectives

For the best chance at long-term forest stewardship success, clearly defining your land management goals and objectives is critical. Defining goals and objectives is made easier by considering all of the information in your property description. Goals are general statements that express a desired end result. Objectives, on the other hand, describe specific measurable activities designed to achieve the goals. For example, a common landowner goal is to realize income from the sale of timber while maintaining the property's wildlife and grazing resources. The objectives accompanying such a goal might be managing for a sawlog harvest every 5 to 10 years, seeding 10 percent of the property with grasses, forbs, and shrubs for grazing, increasing wildlife food and cover so that the deer population is maintained at 25 deer per square mile. Note each of the previous examples contained specific, quantifiable objectives. It is also important to note that some objectives are not compatible with other objectives. In such cases, each objective may have to be met on separate areas of the property.

3. Schedule Management Activities

The final component in a forest management plan is creating a schedule for completing specific management activities. A good rule of thumb is that each scheduled management activity should be accompanied with explanations of – what, where, why, and when. The schedule should cover activities for the next 10 to 20 years.

Examples of scheduled forest management activities might be:

- road building, culvert installation, and road maintenance
- timber sale preparation – marking trees, property boundaries, and sale boundaries
- timber harvesting
- slash treatments
- fencing
- reforestation through planting or seeding
- noxious weed control

Forest management planning assistance

Writing a forest management plan may seem overwhelming, but the good news is that professional assistance is available from a variety of sources. For example, Montana Department of Natural Resources and Conservation service foresters are available for planning assistance on a *limited basis* (call DNRC to determine availability). There is no charge for their services. DNRC service forestry can be contacted at:



Montana Department of Natural Resources & Conservation
Division of Forestry
2705 Spurgin Road
Missoula, Montana 59804-3199
Phone: 406-542-4300
Web: <http://www.dnrc.state.mt.us/forestry/>

The Natural Resource and Conservation Service is a federal agency that offers land management assistance to Montana's forest landowners. They have offices throughout Montana.



Natural Resources Conservation Service
10 East Babcock Street
Federal Building, Room 443
Bozeman, MT 59715-4704
Phone: (406) 587-6813
Web: <http://www.mt.nrcs.usda.gov/>

The Montana Tree Farm System is a non-profit organization affiliated with the National Tree Farm System and American Forest Foundation. Tree Farm provides assistance to private landowners with 10 or more acres and who join the Tree Farm organization. Two membership levels exist – Certified Tree Farms are those members who have a written forest management plan and demonstrate sustainable forest management practices. Pioneer Tree Farms are members who join but do not possess a written forest management plan or demonstrated commitment to sustainable forest management practices. After joining (at no cost) a professional forester inspects the property and meets with the landowner to discuss management objectives. The professional foresters volunteer their time and are available only as their schedule permits.



Montana Tree Farm System
P.O. Box 17276
Missoula, MT 59808
Web: <http://www.mttreefarm.org/home.htm>

Similar to the Tree Farm program and DNRC service foresters, consulting foresters can also assist you in forest management planning. However, consulting foresters charge a fee. Many landowners are skeptical about the value provided by a consulting forester because they believe the costs of hiring a forester will outweigh the benefits. However, a number of studies have shown that landowners developing a forest management plan and then selling timber with consulting forester assistance consistently report greater satisfaction, generate greater revenues, and are left with higher value, healthier forests than those landowners who sell timber without assistance. Thus, unless you are experienced with the many issues raised in this publication, professional assistance (even if you have to pay for it) is likely to help you. The State of Montana DNRC maintains a consulting forester directory at:

<http://www.dnrc.state.mt.us/forestry/Service%20Forestry/ForestryAssistance/Consultingdirct.pdf>

Finally, you can write your own forest management plan while attending a forest stewardship workshop. The Montana State University Extension Forestry service offers a three day workshop at various locations throughout the state each year. Landowners attending the workshop receive classroom and field instruction that culminates in a written forest stewardship plan that is developed by the landowner. The forestry extension service contact information is below:



Montana State University – Extension Forestry
Forest Stewardship Program
32 Campus Drive, MS 0606
Forestry Building Room 209
Missoula, MT 59812-0606
Phone: 406-243-2773
Web: <http://www.forestry.umt.edu/extensionforestry>

Timber Sale Planning

After you have completed a forest management plan, a timber sale is likely to be one of your first management activities. This is because timber sales are a major land management tool that can:

- facilitate the regeneration of a new crop of trees
- increase the growth rate, vigor, and quality of unharvested trees
- generate income
- meet other non-timber production objectives such as:
 - creating wildlife habitat
 - improve grazing
 - clear an area for cultivation or to create a vista point
 - create roads and trails (enhance access)

Steps in the timber sale process

1. Seek assistance from a professional forester

Similar to creating a forest management plan, professional assistance is strongly recommended when conducting a timber sale. Assistance is available from either of two sources. First, Montana's DNRC maintains a staff of service foresters who can assist landowners with most aspects of a timber sale. However, their allowable time with any single landowner is limited so it is a good idea to call a DNRC office to check the availability of service foresters.

A list of state DNRC service foresters is available at:

<http://www.dnrc.state.mt.us/forestry/Service%20Forestry/ForestryAssistance/dnrcserviceforesters.htm>

Professional consulting foresters are the second source of assistance available to landowners. Generally consulting foresters have a college degree in forestry and you enter a contract that obligates the consulting forester to represent your interests during a timber sale. Unlike DNRC service foresters, they charge a fee for their services, but are available statewide and can spend as much time as necessary with a landowner. Consulting forester fees can be based on:

- the number of acres involved
- an hourly rate for work completed
- a percentage of timber sale revenues
- a fee per unit of timber sold

Since there are no legal standards regarding forestry consultants in Montana, be aware that log purchasing agents and/or timber brokers may represent themselves as professional consulting foresters. However, the objectives of log purchasing agents and timber brokers may limit their ability and commitment in serving your best interests. This is because a log purchasing agent represents a mill and he or she is interested in purchasing logs for the mill at a favorable price. Similarly, a timber broker buys logs and then sells them to other brokers or mills.

Like choosing any other service related business it is a good idea to talk to several consultants before selecting one to work with. During this process remember that forest management is both science and art. Thus, opinions about forest management options may differ among consultants. As a result, it is important to choose a consultant who you feel understands your goals and objectives and will work with you to meet them. Finally, a consultant should be able to provide you with references from previous clients.

When considering a consulting forester, it is important to check their credentials. Members of the Association of Consulting Foresters (ACF) are certified to have the proper forestry education and experience in providing independent forestry services to the public. Members are held to high standards of continuing education and a strict code of ethics. Conflicts of interest with regard to representing a landowner are forbidden. A list of ACF consulting foresters can be found at:

<http://www.acf-foresters.com>

In addition to the ACF website, the Montana DNRC maintains a directory of Montana's consulting foresters at:

<http://www.dnrc.state.mt.us/forestry/Service%20Forestry/ForestryAssistance/Consultingdirct.pdf>

2. Mark property & sale boundaries

Clearly marking property and/or timber sale boundaries before any logging is essential, since cutting someone else's trees, called timber trespass, can result in significant monetary damages. Both State and Federal courts can award a landowner whose trees have been "trespassed", monetary damages up to three times the tree's stumpage value along with other reasonable or necessary costs. The landowner, logger, or both may be responsible for paying the monetary damages.

Property lines are generally marked with flagging or by painting trees located along the property line. In cases where exact property boundaries are not known, it is essential to agree on, and clearly mark property boundaries with neighboring landowners prior to harvesting any trees. Any such agreements should be written and signed by both parties.

It is also good to talk to neighbors if access to your property is a problem. Many times neighboring properties provide access points that decrease the logging and hauling costs. Again, any agreements about access provisions should be documented in writing and signed by both parties.

If you are harvesting trees from only a portion of the property, marking timber sale boundaries is also important. This is because sale boundaries can denote which areas are slated for specially designed timber harvesting prescriptions. Sale boundaries can also protect ecologically sensitive areas on a property such as wetlands or protect areas important to a landowner for personal reasons.

3. Mark the trees to be harvested

Silviculture is the art and science of producing and tending a forest. Therefore, timber management on a given piece of property is likely to follow widely accepted silvicultural practices. However, in addition to timber management, you may have other land management goals that must be factored into the silvicultural prescription. For example, is the harvest goal to thin the existing stand so that the remaining trees will grow better? Or is it to create forest conditions suitable for the next crop of trees to regenerate, Or is it to create wildlife habitat? Once the goal of the harvest has been determined, there are a number of ways to designate the trees to be harvested:

Area limit – this is the simplest method because an area is defined and all trees within its boundaries are for sale. It is appropriate when the management goal is to create a clearcut that will favor the regeneration of shade intolerant tree species, or when the management goal is to convert the land to another use. Despite its apparent simplicity, there is potential for misunderstandings with this method because buyers are often interested only in certain species and sizes of trees in the defined area. As a result they may be willing to incur only the expenses associated with harvesting the trees they desire. The landowner, on the other hand, may expect all trees in the area to be harvested. For such reasons it is important to have a contract with the logger that defines performance expectations.

Diameter limit – in this method all trees within a specified diameter range are designated for harvest. The most common approach is that all trees larger than a certain diameter are designated for harvest. Note that it is important to specify where a tree's diameter will be measured. The most common point is DBH (diameter at breast height, which is 4.5' above ground level). Some buyers may prefer measuring diameter on the stump. This method often results in a "high grade" cut – cutting all of the biggest and best trees and leaving the smaller and inferior trees. In many cases the trees remaining after a "high grade" cut are too stunted to begin growing quickly after the harvest. While the current payoff is greatest for this type of harvest, the next harvest will be limited to poor-quality, low-value trees.

Single tree selection – in this method each tree designated for sale is marked with paint spots. The objective of this type of harvest is leave a well stocked stand of healthy trees by removing the over mature and poor quality trees. The unharvested trees can grow more quickly and with better form because of increases in growing

space, sunlight, moisture, and nutrient availability. An important practical consideration is that all paint spots are easily visible for potential buyers and loggers. This might mean consistently marking the all trees on, for example, the north side. Also, in the case of high value trees a paint spot might also be applied to the stump. When logging is finished the stump paint is still visible and the landowner can verify that only marked trees were cut.

Note that in some cases, the trees to be left may be marked rather than the trees to be harvested. In other cases, this tree selection method is used even though not all trees are marked. Usually this is because the trees are of such low value that it is not worth the time and expense to mark all of them. During such a timber sale, the contract between the logger and landowner usually specifies what trees will be harvested. For example, a contract may read “all merchantable Douglas fir less than 14” in diameter at breast height will be harvested.” Such contract provisions save the time and expense of marketing trees, but usually means that the landowner or consulting forester must spend extra time overseeing logging operations to insure compliance.

Seed tree and shelterwood – these methods are used when the goal of the harvest is to naturally regenerate trees that are moderately shade tolerant. In both of these methods the majority of trees on a site are removed and only a few scattered large healthy trees are left standing. The remaining trees serve as a seed and shade source for the next crop of trees. Important practical considerations for this type of harvest include timing the harvest during a heavy seed production year of the desired regeneration species and using a harvesting system that will scarify the soil (expose mineral soil) to insure the best chance of seed germination. Ground based logging systems such as a log skidder or dozer should provide adequate scarification.

4. Estimate the volume and value of the marked trees

An **appraisal timber cruise** is the process of estimating the volume, value, and quality of trees marked for sale. Since an appraisal cruise focuses only on trees to be harvested, it differs from a **management timber cruise**, which collects data about many aspects of a property’s resources. A typical appraisal timber cruise yields the following information:

- gross volume of merchantable trees by product type (See **Appendix A** for a description of forest products measurements)
- net volume of merchantable trees by product type
- logging conditions
 - slope
 - probable locations for log landings, skid roads, and log truck access
 - expected timing of logging operations (e.g. some areas can be logged virtually year round, while others require logging only during certain ground conditions)

A timber cruiser is someone trained in the art and science appraising standing timber. Typically, he or she samples a small percentage of the trees marked for harvest,

recording tree species, diameter at breast height, and number of merchantable 16' logs for each tree sampled (**Figure 1**). To get these measurements timber cruisers use special tools – a diameter tape or cruising stick for measuring diameter and a clinometer or cruising stick for measuring tree height.

After a cruise has been completed, the timber sale's total volume and value by species is estimated by extrapolating from the sample tree measurements. The result is an estimate of gross timber volume. A more refined timber cruise might also estimate the net timber volume by subtracting for rot, dead trees, sweep, etc. It is important to note that, despite the availability of sophisticated cruising methods and tools, experience is a key ingredient for accurate estimates of timber volume, value, and quality.

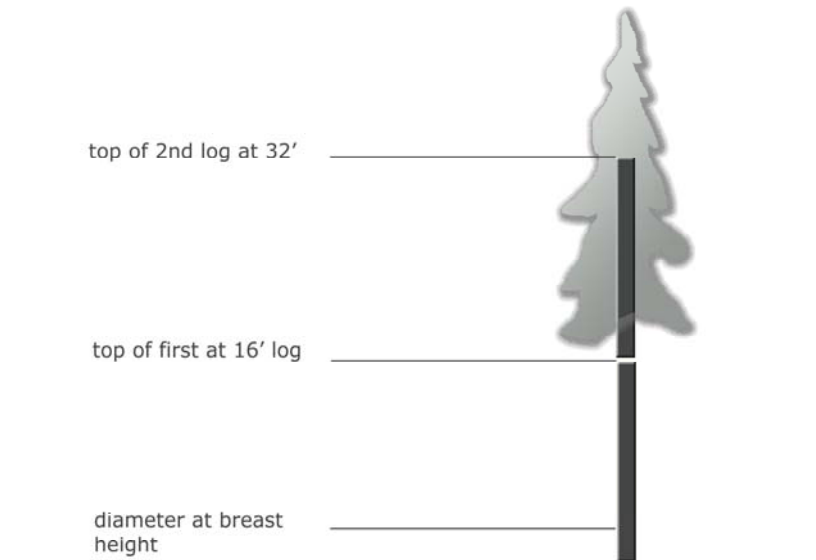


Figure 1. A timber cruiser samples a small percentage of the trees marked for harvest in a timber sale. For each tree he or she records the species, diameter at breast height, and the number of merchantable 16' logs in the tree (2 in this example). The cruiser may also record information about log quality.

5. Determine the type of timber sale

After the trees are marked for harvest and you have an idea of their volume and value you have another choice. You can **harvest your own timber** and then sell the resulting forest products? Or you can **sell stumpage** – selling someone else the right to harvest your standing trees? The following sections outline some considerations under both scenarios:

Harvesting your own timber – if you have the time, experience, and skills, you may choose to harvest the selected trees yourself. The benefits of a self harvest are that you have complete control over the harvest and you may receive substantially more revenue from the timber sale because you do not have to pay a logger for harvesting the trees. The disadvantages are that logging requires a lot of experience. For example, it is an extremely dangerous activity that can easily result in injury or death. Insurance laws are very strict in the forest products industry and proof of worker's compensation and general liability insurance may be required to sell forest products to some buyers. It is a good idea to check on such insurance requirements with potential buyers before

harvesting begins. In addition, logging in some areas may require expensive specialized equipment. Finally, improper cutting, handling, or transport of logs can seriously decrease their value.

Landowners choosing to harvest their own timber should keep the following points in mind.

- Locate a buyer and sign a written contract that specifies the buyer's prices and product specs **before** any trees are harvested.
- Have a clear understanding of the buyer's specifications and requirements (e.g. minimum/maximum diameter, minimum/maximum log lengths, quality requirements, and the amount of material the buyer can accept in a given time period).
- Know your legal responsibilities regarding insurance and tax liabilities. In addition, if you employ others during logging, know Occupational Safety and Health Act requirements, worker's compensation, and liability insurance.
- Use safe well maintained equipment and follow all recommend safety procedures.

Finally, a landowner who chooses to harvest his or her own timber must also decide whether to sell the resulting products at the **roadside** (on the landing) or **delivered** to the mill. Selling at the roadside means the buyer is responsible for arranging the transport of the products to the mill. Selling delivered on the other hand means the landowner is responsible for arranging transport. Again, a landowner may be able to realize greater revenues if he or she can transport the products for a lower cost than the mill.

An alternative to harvesting your own timber is to contract with a logger for his or her services. Under this scenario, a landowner pays a logger a set fee to harvest and transport all designated trees to a landing. The fee is usually a negotiated amount per thousand board feet, per cord, or per ton of material harvested and transported to a landing. The negotiated logging fee will vary depending on factors that affect logging costs – size of the trees, skidding distances, slope, etc. Although a logger may assist a landowner in marketing the products, in this scenario it is the landowner's responsibility to negotiate an agreement with a buyer for the products.

Selling stumpage – as discussed above, harvesting and delivering forest products to a buyer is a complicated process. Therefore, many landowners decide to sell their timber as **stumpage** – selling someone else the right to harvest your standing timber. Stumpage sales can occur in two basic forms **lump sum** and **unit sales** (note there are several variations of unit sales outlined below). The key difference is that in a lump sum sale, the actual volume and value of forest products harvested is not measured. Instead, buyers estimate the volume and value of the timber while it is still standing. In contrast, during a unit sale all forest products are scaled for volume and/or judged for quality after they are harvested. Payment is calculated by tallying the volume and quality of the various products and computing their value based on previously agreed upon unit prices. The following section outlines each sale type (and their variations in greater detail):

Lump sum – in a lump sum sale the seller receives a single price (lump sum) for all trees designated for sale. In lump sum sales, the buyer’s offer is based on his or her estimated volume, value, and quality of the standing trees rather than the actual volume, value, and quality of the logs, post, poles, and pulp manufactured from those trees. For this reason potential buyers carefully inspect the designated trees prior to making an offer. From the landowner’s perspective, lump sum sales are the easiest to administer and offer the easiest method for comparing offers among potential buyers. They also are not dependent on any future event, such as damage to the standing timber from a storm, insects, fire, disease, or theft. The winning bidder may pay the entire lump sum at once or make a down payment and then the balance. It is a good idea for the landowner to receive full payment prior to harvesting.

Unit sale, or scaled sale – in a scale sale the landowner is paid for the quality and volume of each unit of wood harvested. Prior to harvesting, the landowner and buyer agree on a price per unit. Note that unless the price offered is “camp run” (one price for all logs regardless of species or quality), there are likely to be a number of price categories based on the number of trees species and the various size and quality grades within each species. After the trees are harvested, each piece is scaled for volume and (depending on the market) judged for quality (**figure 2**). The pieces can be measured (scaled) using a number of measurement units – board foot, cord, linear foot, ton, cubic feet, etc. (see **Appendix A** for a description of forest products measurements). It is important to understand who is responsible for scaling prior to harvesting. This is because a landowner and mill are at odds regarding scale (the landowner wants a scale with the greatest volume and quality while the mill wants the opposite) it may be a good idea to hire an independent third party to act as a scaler. For this reason scale sales are more difficult to administer than lump sum sales.



Figure 2. Log scaler measuring log volume and quality

Percentage Unit Sale – in a percentage sale a landowner and logger agree to split the payment from a mill. The mill payment is based on scaling the volume and value of forest products when they arrive in the mill yard. The percentage split between the landowner and logger varies depending on the value of the timber and the logging difficulty.

Lump Sum/Unit Sale Hybrid – in some cases landowners and buyers may work out a hybrid sale in which the landowner is guaranteed a certain lump sum amount (usually paid in advance), but the forest products harvested from the sale are also scaled by unit for volume and quality. If the scaled value exceeds the guaranteed lump sum amount the landowner is paid the balance.

6. Determine bidding procedures

Among the sale types listed above, a landowner may select a buyer from the following bidding procedures:

Single offer – in this procedure the landowner and buyer negotiate a price for the standing timber. The advantage is that the landowner does not have to invest a lot of time and effort in finding a buyer. The disadvantage of this method is that the landowner is not likely to obtain the best price for his or her timber because the buyer is not facing any competition. The following situations might call for this approach:

- When the landowner has only a small amount of timber or poor quality timber, there may be only one buyer interested in the sale.
- If markets for the species and products for sale are so poor that few buyers would be interested.
- If you know and want to work with a particular buyer who has a good reputation.

Oral Auction – in this procedure buyers gather at a specified time and place and orally bid on the designated forest products. It is appropriate when a very large or very high value piece of timber is for sale. Otherwise it is not likely that a large number of bidders will show up.

Written Sealed Bids – in this procedure the buyer and sale price are determined through written sealed bids. Potential buyers are notified a month or two in advance of a scheduled bid opening. Prior to the bid opening buyers inspect the sale, prepare, and submit their bids. At the bid opening, buyer's representatives are often present, but their presence is not required. Sealed bids are generally received by hand delivery or mail. Written sealed bids usually produce the best results for private forest landowners.

7. Advertising the timber sale

When you choose to sell timber through a written sealed bid or oral auction, you must advertise the timber sale to potential buyers. The purpose of the timber sale advertisement is to notify buyers of the sale and convince them that your timber will meet their needs. The

best way to do this is to provide them with good information about the sale in a document called a **timber sale prospectus**. The prospectus should contain the following information:

- A legal description of the property
- A map of the sale area and property access points
- Dates the property is open for inspection
- A description of the harvest goals and management objectives
- A description or designation of the trees for sale
- Who marked the timber
- If the trees are individually marked for sale, provide the number of trees marked by species and a volume estimate by species. If the trees are not individually marked provide an estimate of total volume.
- Address to which bids can be mailed
- Date time and place the bids will be opened or oral auction held
- Reserve the right to refuse any or all bids or offers
- Information about a performance bond (requires the bidder to include earnest money along with their bid)
- List of contract provisions, such as timing of harvests
- Any equipment restrictions or cleaning requirements to prevent the spread of noxious weeds
- A requirement that the winning bidder must be able to provide proof of general liability and worker's compensation insurance during the term of the contract.

Consulting foresters maintain mail lists of potential buyers. The Bureau of Business and Economic Research at the University of Montana maintains a database of Montana's forest products manufacturers. It is available online at <http://www.mmis.umt.edu>. The timber sale can also be advertised in newspapers and trade journals, but direct mailings are generally most effective.

8. Selecting the buyer

In a single offer situation there is obviously no choice to be made. However, in a bidding situation you may be surprised at the wide dollar range in bids. This is because each buyer is likely to have different markets and uses for the timber. Selecting the highest bid is the most tempting, but other considerations should also come into play. For example, in a scaled sale you may have to subtract log hauling costs from the bid price. Thus one mill offering a higher bid, but located farther away and thus with higher deliver costs may actually yield less revenue than a nearer buyer with lower deliver costs. Another consideration is the skill level and professionalism of the logging crew. This is especially true if the goal of the harvest is to maximize growth on the residual trees. A poorly skilled and unprofessional logging crew can damage residual trees, thereby seriously reducing their value. Thus, a key question is whether the high bidder is an independent logger or a primary forest products manufacturer (e.g. a sawmill, post and pole mill, or pulp mill). If it is an independent logger you will have a better idea of who will actually perform the logging and can get references to help make a judgment about their skill and professionalism. If it is a sawmill it is less clear who will perform the logging. This is because some primary manufacturers operate their own logging crews while others contract with independent loggers. Thus, if a primary manufacturer is the high bidder it is a good idea to learn who will perform the logging operations.

A good source of information about Montana loggers is The Montana Logging Association (MLA), an organization dedicated to advancing the profession of logging in Montana. One of their main activities is administering a logging accreditation program and maintaining a list of Montana accredited logging professionals. MLA's contact information is:



Montana Logging Association
2224 Montana Hwy. 35
PO 1716
Kalispell, MT 59903
Phone: 406-752-3168
Web: <http://www.logging.org/>

Another consideration when selecting a logger is determining whether their logging equipment matches your timber sale's terrain and harvest method. For example, some loggers fell trees with chainsaws (manual felling) while others use mechanized processors (mechanized felling) **Figure 3**. Also loggers differ based on their yarding system. Ground based skidding works best on flatter terrain, while cable skidding systems are needed for steep slopes **Figure 4**.



Figure 3. On the left, a sawyer manually felling a tree. On the right, a timber processor mechanically felling a tree



Figure 4. On the left, a ground based log skidder. On the right a cable yarding system, which is used on steep slopes to transport felled logs from the stump to a landing area

9. Writing a timber sale contract

After the buyer and seller have reached an agreement through any combination of sales types and bidding procedures outlined above, it is *essential* to draft a timber sale contract. Oral or “handshake” agreements often lead to misunderstandings and may not be enforceable in court. A written contract, signed by both parties sets the performance expectations that protect the buyer and seller from misunderstandings. Although there are a number of “sample” timber sale contracts available, every timber sale is slightly different and is likely to contain specific, unique provisions. Therefore, it is a good idea to have an attorney draft and execute a contract. It may also be in the best interest of both parties to register the contract in the county where the sale is located. Registering the contract may benefit the landowner regarding tax implications arising from the timber sale. The buyer may benefit if title to the property changes hands before the timber is harvested.

A timber sale contract should contain the following statements/provisions:

- The seller is the lawful owner of the property conveyed in the contract.
- The buyer and his or her employees have the right to access the property as necessary to perform the contract.
- Total amount to be paid by the buyer, and when the payment(s) will occur if a lump sum sale. If a scale, percentage, or hybrid sale the price per unit volume for all species and grade classifications, and how, when, and where and by whom the volume and quality will be determined. Finally, when payment will be made for the scaled amounts.
- A legal description of the property, where access is located and information about access easements if any.
- A description of the trees designated for harvest (e.g. all trees marked with paint) and the expected utilization standards (e.g. all harvested trees will be utilized to a 4” top diameter). Also, provisions for unharvested trees that were designated for harvest.
- Designation of responsibility for permits and notifications.
- Provisions for damage to residual trees.
- Provisions for cutting trees not designated for harvest.
- Requirement for all harvesting activities to comply with Montana’s Best Management Practices for water quality.
- The length of the contract and how an extension may be arranged.
- A disclaimer of the landowner’s liability for personal injury during the buyer’s performance of the contract. In addition, there should be a provision requiring the buyer to demonstrate proof of general liability and worker’s compensation insurance coverage during the period of the contract.
- Require a pre-harvest meeting on the harvest site including the seller, buyer, and consulting forester to clarify performance expectations.
- Both parties must sign the contract, have it witnessed and/or notarized.
- A provision for harvesting operations to cease if certain weather conditions occur – extremely dry fire hazard conditions, very wet conditions, in which logging equipment will damage the soil.
- A provision stating how logging slash will be disposed of and which party will hold the slash disposal bond.
- A provision stating the expected post-harvest condition of the roads and landings.

- A provision that logging equipment be washed before entering the site so that the chances for spreading noxious weeds are minimized.

9. Permits and notifications

Relative to other states which have enacted forest practices laws, there are few laws, permits, or notifications required when harvesting timber in Montana. Instead the State of Montana primarily relies on landowners and contractors to voluntarily comply with Montana's BMP's (best management practices) for water quality **Figure 5**. BMP's are forest management activities that have been identified as having a lighter impact on the land and therefore representing the best available methods for protecting water quality and forest soils. Example BMP's include – “no logging” buffer zones around streams and lakes and proper road and culvert construction. In Montana, compliance with BMP's is voluntary.

One exception is the State Slash Law (Title 76, Chapter 13, Part 4). Its purpose is to minimize wildfire hazard through the control of post harvest timber slash and debris on private land. Montana DNRC administers and enforces the law by requiring all landowners and contractors involved in commercial timber harvesting operations to enter into a bonded requirement called a Hazard Reduction Agreement (HRA). The HRA specifies the requirements for post-harvest slash disposal.

The Streamside Management Law is another state regulated standard that specifies forest practices in streamside management zones (SMZ). An SMZ is a buffer strip that serves as a natural filter along the edges of streams, lakes, and other bodies of water, which helps to keep sediment out of the water body. SMZ Law only applies to bodies of water that meet the definition of a stream, lake, or other body of water. The law is administered and enforced by Montana DNRC's forestry division. The Montana DNRC publication, “Montana Guide to the Streamside Management Zone Law & Rules” (**Figure 7**) further describes the law.

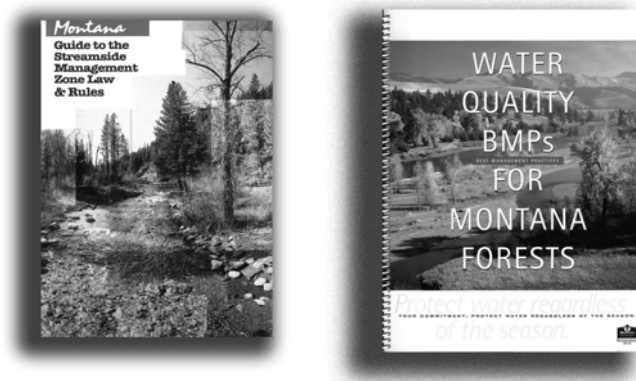


Figure 5. *Montana Guide to the Streamside Management Zone Law & Rules* and *Water Quality BMPs for Montana Forests*. Both publications are available from MSU extension

10. Monitor the Sale

The timber sale is not over after you have signed a contract. You still have to monitor the harvesting activities to insure contract compliance. Thus, before harvesting starts you should schedule a meeting with the logger, consulting forester, and yourself to discuss the contract, view property lines, landing areas, access points, etc. After harvesting starts it is also a good idea to visit the harvest site regularly. Remember that harvest sites are hazardous areas and you should always announce your presence to logging crews. If you have questions or complaints you should discuss them with the logger immediately. Many times such issues can easily be resolved. Your presence demonstrates to the logger your interest in completing the harvest per the contract specifications. In addition to your monitoring, your consulting forester should also be monitoring the sale. When hiring a consulting forester you should discuss the level of harvest monitoring they will provide.

Marketing Forest Products from a Timber Sale

Conceptual Model of the Forest Products Value Chain

When marketing forest products from a timber sale it is useful to first develop a conceptual understanding of Montana's forest products value chain, **Figure 6**. Each link in the value chain provides the other links with materials and or services. For example, private landowners supply primary manufacturers (buyers) with raw material. Meanwhile, consulting foresters, loggers and truckers provide services to landowners and primary manufacturers.

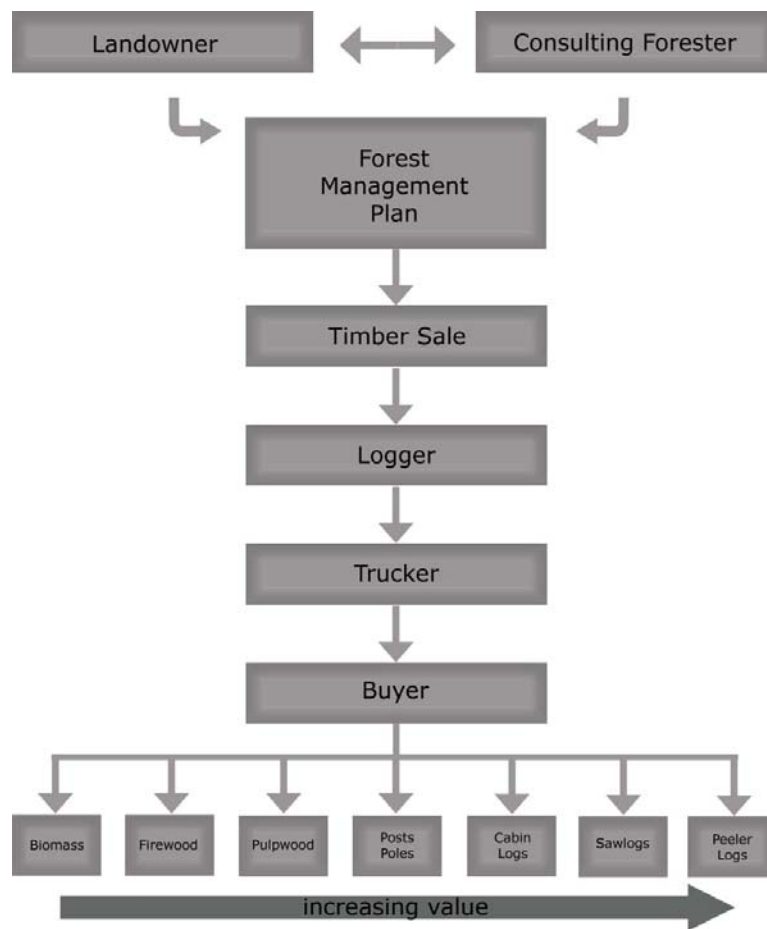


Figure 6 A conceptual model of Montana's forest products value chain.

Common Montana Forest Products

Montana's forests are primarily softwoods and the most commonly utilized species include: Douglas fir, lodgepole pine, ponderosa pine, western larch, and Engelmann spruce. Given this timber resource, timber sales in Montana typically produce the following *primary forest products*¹:

Sawlogs – are used to manufacture lumber and are purchased by sawmills. They are tree sections generally cut into lengths anywhere between 17' to 45'. The minimum and maximum diameters accepted varies by sawmill but as a general rule most mills will not take sawlogs less than 4.5" in diameter at the small end of the log. It is a good idea to get log specifications from a mill prior to harvesting trees and processing them into logs.

Peeler logs – are logs used to manufacture veneer, which is used to make plywood panels. Peeler logs are purchased by a veneer mills. Most peeler log buyers specify that tree sections be cut into lengths that are multiples of just over 8'. This is because a common plywood panel size is 4' x 8'. Thus the 8'+ length requirement (the extra length is a trim allowance) allows the cutting of veneer for 8' long panels. Peeler logs have a larger small-end diameter requirement than sawlogs. In addition, there may be a maximum diameter specification. Generally, buyers prefer peeler logs in the 10-14" small-end diameter range, there are specifications about the allowable size and location of branch knots, and buyers require the logs to be cut square at both ends and all branches must be trimmed flush with log surface.

Cabin (House) logs – these logs are used to manufacture log-style homes. Depending on the style of log home and the manufacturer there are likely to be strict specifications regarding log size (diameter and length) and well as the amount of sweep allowed.

Post and Pole logs – post and pole logs are generally small diameter and used to manufacture posts used for fencing and poles use for gates, small light poles etc. Recently many post and pole manufacturers are creating posts and railings for use in log home decks.

Pulpwood – there are few size (diameter) or quality restrictions for pulpwood. There may be a preferred length requirement so it is a good idea to contact the pulp wood buyer prior to harvesting trees and processing pulpwood to length. Pulpwood is used to manufacture various paper products.

Firewood – similar to pulpwood, there are no quality, size, or length requirements for firewood products. However, landowners should consider this market only after trying to sell their products to all other markets. This is because firewood has low value relative to other products and firewood buyers generally only want a limited quantity.

Biomass – in situations where a timber sale is located close to a plant that burns biomass to produce power, you may be able to sell slash and unmerchantable logs to the power plant. Similar to firewood, biomass markets are a low value use for timber products and should be considered only when all other potential markets have been exhausted. The

¹ "Primary forest products" refers to products arising directly from the forest which have not been processed into value added products (e.g. logs and pulpwood).

slash and unmerchantable logs need to be chipped prior to burning. Preferably this is done on the logging site; however, in some cases slash is hauled to a centrally located collection site and then chipped. The advantage of selling biomass is that it can offset post-harvest slash disposal costs.

Merchandising Forest Products

Most primary forest products manufacturers design their mills for a particular size, specie(s), and grade of log. For example, a post and pole manufacturer generally needs straight, small diameter logs. This is important because many forest products manufacturers buy a whole timber sale and when the timber is harvested, a percentage of the logs produced are not the right size, shape, or species. As a result, the manufacturer often resells the unusable logs to another manufacturer that can use them. This process is called log sorting or log merchandising. If you have sold your timber in a lump-sum sale, then the buyer will sort the logs to their highest value use. In some cases (generally when there is enough volume to warrant sorting) it is possible to sort logs at the log landing rather than letting the buyer sort them at his or her manufacturing facility. Sorting at the landing allows the owner of the logs (generally either the logger or the landowner) to capture the highest value for the logs. Sorting separates the logs into categories based on species, size, length, and quality. The various categories are then sold to different buyers. For example, your timber sale might yield Douglas fir and ponderosa pine logs. One buyer may be willing to pay a high price for the ponderosa pine, but is not very interested in the Douglas fir and therefore not willing to pay a good price for the fir. Sorting timber sale products takes time, money, and a comprehensive knowledge of local markets. Therefore, it is usually best to rely on the judgment of a consulting forester or logger about whether a sorting operation is cost effective.

Conclusion

Forest management planning, timber sale planning and conducting a timber sale are hard work, but they all pay off – yielding a sustainable, healthy forest that can be enjoyed for generations.

The key points to remember are:

- Write a forest management plan before a timber harvest
- Seek assistance from a professional forester when:
 - writing a forest management plan
 - writing a timber sale plan
 - selling timber
- With the advice of a professional, decide whether to sell your timber as a “lump sum” or “unit sale”
- Know the common forest products produced from timber sales and try to steer the products into the highest value use

Appendix A – Forest Products Measurements

Harvesting trees yields a variety of forest products – sawlogs, peeler logs, log-cabin logs, post and pole logs, pulp and firewood. Accordingly, there are a variety of units used to measure the volume of each product. Each of the common forest products measurement units are outlined in the following section.

Forest Products Measurement Units

Board Foot

A board foot has been defined as a piece of wood 1" thick by 12" wide by 12" long (Figure 7). It is the unit of measure for lumber products sold in North America. To calculate the number of board feet in a piece of lumber, multiply its thickness in inches by width in feet by length in feet. For example, a 2"x4"x8' board has 5.33 board feet in it (4" x 0.16' x 8'). A complicating feature of lumber measurement is the difference between a piece's *actual size* and its *nominal size*. For example, the 2" x 4" board mentioned in the previous example is actually 1.5" x 3.5". Thus 2" x 4" is the nominal size and 1.5" x 3.5" is the actual size. This difference is due to the fact that wood shrinks when it dries and because some wood fiber is lost when the board is surfaced. The convention in softwood lumber industry is to base board foot measurements on nominal width and thickness dimensions. All length measurements are actual size.

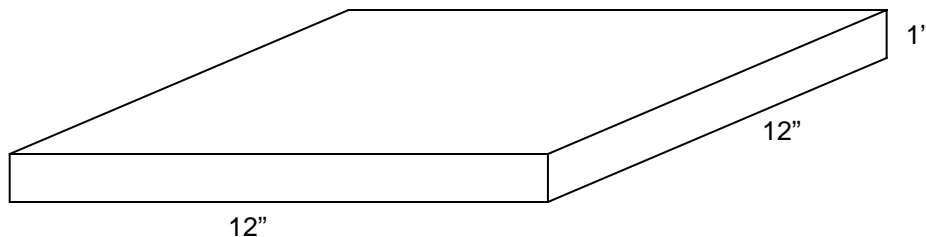


Figure 7. 1 board foot = 1" thick x 12" wide x 12" long

Cord

A cord is defined as a volume of neatly stacked wood measuring 4' wide x 4' high x 8' long = 128 cubic feet. However, because of empty spaces between pieces of wood and bark, a cord usually contains less than 90 cubic feet of wood. Cords are the most common measurement unit for pulpwood and firewood.

Linear Measurements

Many specialty products such as utility poles, post, pilings, and cabin logs are measured in terms of length. This is because product characteristics such as diameter, length, and strength are more important than the product's actual volume.

Weight

In cases where logs are uniform in diameter, length, and taper and are low in value, it is more cost effective for log buyers to estimate volume based on the weight of a batch of logs (usually a whole truckload). The volume estimate is based on a conversion factor derived from periodic check scaling (both scaling and weighing the same batch of logs). It is important to check scale log loads periodically because conversions are affected by the species of log (different species have a different densities), log size, the moisture content of the logs, and the amount of sapwood and heartwood. Like any scaling method, weight scaling can be more advantageous to one party than the other. Weight scaling is more likely to be advantageous for a landowner when the logs are harvested in the spring and they are full of sap, thus, weighing more. During the summer months logs decked on a landing for several weeks or a month will dry out and thus, weigh less. During the winter logs are frozen and don't change much in weight over time.

Measuring logs

As was mentioned board feet are the units used for buying and selling lumber. Similarly the volume of logs is measured in board feet. Log volume is an estimate of board feet of lumber that any log will yield. The log volume estimate is derived through *log scaling* – the practice of measuring a log's diameter in inches and length in feet and converting those measurements into an estimate of board feet in a log (Figure XX). These measurements are converted to board feet by a formula called a log rule. When estimating the number of board feet a log will yield, log rules take into account factors such as saw kerf, log diameter (which affects the proportion lost as slabs when the log is squared up), taper, and presence of sweep, bow, or crook in the log. In the history of the sawmill industry in the United States and Canada over 50 log rules have been used. Today, only a few remain in common use – Doyle, International $\frac{1}{4}$ ", and Scribner. In Montana and most of the Pacific Northwest, buyers use the Scribner scale, or if the board foot volume in each log is rounded to the nearest 10 feet, Scribner Decimal C. The Scribner log scale was developed in 1846 and based on the following assumptions:

- 1" lumber will be sawed from the log
- log diameter is measured at the small end of the log
- logs have no taper (e.g. they are perfect cylinders)
- a $\frac{1}{4}$ " kerf (kerf is the amount of wood removed (sawdust) as the saw passes through the log. It is equal to the width of the saw blade)

Overrun occurs when a sawmill recovers more board feet of lumber from a log than was estimated from scaling the log with a log rule. For example, if a log is estimated to contain 100 board feet, yet yields 110 board feet, then the overrun is 10 percent. Some overrun is typical for mills in Montana, but the amount varies greatly depending on the average log size and kerf (the amount of wood lost during a cut due to the width of the saw).