

-Wood Products-Getting Wood to the Market

Adapted from the on-line Teachers Guide http://mff.dsisd.net



Timber Harvesting Systems Timber Sale Contracts Stumpage Raw Wood Products Federal Taxes on Timber Sale Income

What is a "harvesting system"?

While there are many combinations of equipment, a common set-up includes a feller-buncher and skidder. A feller-buncher is large machine that has big cutter on the end of a mechanical arm. This cutter is called a "head". The head holds the tree while it cuts the tree at the stump. The head can hold several trees at once, depending upon the size of the trees. The feller-buncher places the trees in small piles, where they are cut up, or "bucked", into logs by people with chainsaws. A "forwarder" then picks up the bunches of logs and carries them to a collecting point called a landing. Sometimes instead of a forwarder, a "skidder" will be used to pull whole tree stems to the landing where they are either bucked by hand or by a machine called a "slasher".

Another harvesting system combines a "processor" with a "forwarder". These are referred to as "cut-tolength" systems. A processor is a large machine that grabs, fells, and "bucks" trees to specified lengths. There are no chainsaws involved. The processor leaves piles of logs in the woods which a forwarder will pick up and take to the landing. A forwarder is a machine with a mechanical arm and log bunk. An "iron mule" is a common forwarder used in Michigan.

More common in the Lower Peninsula than in the U.P., is whole-tree skidding. The entire tree, sometimes with the branches and sometimes without, is pulled (or "skidded") from the woods to a landing. The entire bole or trunk is then loaded onto a truck and driven to the mill. Many of our utility pole and sawmill companies accept "whole tree" loads. This practice is especially common in northern Minnesota for delivery to pulp mills and OSB (oriented strand board) mills.





Top: an older "iron mule" Second: "forwarding" wood to the landing Third: modern processing "heads" Bottom: modern processor at work

Trees might also be chipped at the landing with the chips to be used for a variety of purposes. This practice is increasingly common in the southern states, but can be found around certain Michigan mills.

A pile of eight-foot logs (or 100" pulpsticks) that is four feet tall and four feet wide. That is a space of about 128 cubic feet, but an average cords has about 79 feet of solid wood. The rest of the space is air.

There are other kinds of harvesting systems in Michigan and even more in other regions of the country. Systems develop from the needs of area wood-using mills and the traditions that vary from region to region.

In the forested areas of Michigan, it is common to see logging trucks moving wood from the forest to the mill. We have over 800 logging and trucking companies that move wood to nearly 350 wood-using mills. Michigan's extensive road system allows this to happen. Most of Michigan's wood is transported by truck.

Railroads are also used to transport wood, especially over longer distances. Pulpwood might be brought to Michigan from Ontario, or high quality Michigan veneer logs might be sent to mills anywhere in the Midwest or beyond. Log buyers from other countries arrange for logs to be transported by ship. The Great Lakes and St. Lawrence Seaway make this possible.



On-site chipping operation (left) and chip vans being unloaded (right).

Truckers pick up logs in the forest at places called "landings". Landings are small clearings where loggers gather the logs. At the landings, the logs are loaded onto flatbed trailers. Often, the trailers are equipped with a mechanical claw that can pick up and load many logs at once. Operators can load an entire truck with about 15-20 *cords* in less than 60 minutes.

Logs are carefully chained into place so they do not shift during transport to the mill. From the landing, the truck must move slowly along rough forest roads until it reaches a good graveled road or a paved road. Once on a good road, the driver might travel a hundred miles or more to deliver the wood. However, trucking distances are usually less than that. Logs that are worth a lot of money can be transported farther, because the cost of the trucking is smaller compared to the high value of the logs. Pulpwood and other low-value material is less valuable, making transportation a proportionately higher part of the cost to the mill.



Loading pulpwood in the forest (left) and delivery to a mill (right).

The Timber Sale Contract

Most timber harvesting is done under a *timber sales contract*. Contracts vary widely. The federal government has a very long contract with many appendices, most of which don't deal specifically with the timber sale but more with background information and legal issues. Contracts with private forest owners tend to be only a few pages and reflect the kind of job that the forest owner wants to have done.

A timber sales contract is a key document that clarifies the understanding between the forest owner and the logging contractor. Neither party benefits from initiating a timber sale without fully knowing the expectations of each other. The fewer surprises that come up, the better. Forest owners should not be pressured into signing a contract or be blinded by the high value of good timber. Many times, forest owners don't fully appreciate the true monetary value of their resource. Timber should be treated the same as any other high value asset.

There are two broad categories of payment, lump sum and sale-by-scale. **Lump sum** is a single price for the whole sale. A **scale sale** is where different prices are paid for different species and products (logs, pulpwood, poles, bolts, etc.).

A **lump sum sale** is easiest to administer and easier when it comes to income tax time. However, it is less accurate than a scale sale. Often times, a lump sum payment is best for timber sales where the products come mostly from a single tree species and product. For example, a red pine thinning will consist mostly of red pine pulpwood. The same is true of an aspen clearcut, although some price adjustment would need to be made if a significant quantity of aspen bolts were present.

SOME of the items to consider in a timber sale contract (not intended to be a complete list of all possible contingencies). Each sale is unique and should be reviewed by a qualified forester to minimize the risk to forest owners and logging contractors.

Item	Explanation
Names & Addresses of seller and buyer Location of timber (legal description, etc.) Proof/guarantee of ownership by seller Stumpage prices Down payment specification Bond requirement Payment schedule Seller ownership until payment in full Date of sale closure Seasons/conditions when logging is prohibited Workman's Compensation & Insurance Contractor qualifications Termination clause Schedule for cutting of unmarked trees Treatment of slash Source of arbitration for disputes Specify access Specify scaler and scale method Stump height specifications Road, ground, and landing condition Explanation of timber markings Use of forest owner facilities Litter clause	Allows each party to check references on each other. Reduces chances for timber trespass. Mostly a protection for the logger! Prices per unit volume negotiated BEFORE signing. Usually 10-20 percent of estimated total sale value. \$500 to 10% of sale value, sort of like a deposit against damage. Larger sales should have payments built in before completion date. Maintains control of cut products by seller until payment is done. A definite ending date helps protect seller. Can be re-negotiated. Winter-only sale, wet periods, hunting seasons, etc. Assurance of compliance with state law and liability issues. Consider SFE* certification and MPLC* membership. Protects seller from non-compliance by buyer. Agreed upon penalties for certain unanticipated or improper cutting. Often important for visual and wildlife habitat reasons. A third party, maybe the consulting forester. Should be understood by seller, buyer, or adjacent owners. Mutual understanding between seller and buyer. Agreement in advance for scale sales. Mutual understanding, may be important in deep snow country. Clear understanding of ruts, holes, etc. during logging operations. Make sure buyer knows the sellers intent. Understanding for use of buildings fields bridges. etc
	Refuse left on-site, oil changes, etc.

Contract Suggestions

Solicit advice from an attorney, especially for high value sales.

Make sure all understandings are in writing. Oral agreements mean little in light of written agreements.

Make sure everyone understands everything in the contract. Make sure you ask questions!

Avoid mistakes in the contract. Check over several times.

Use language understood by everyone. Avoid "legalese".

Most contract clauses are enforceable only when the buyer is at fault. Loggers aren't responsible for events outside their control.

Seller must divulge any special consideration BEFORE negotiating a contract.

Do not sign a contract just to get the sale going. Understand everything first and take the time to think about it. All parties involved should have a copy of the contract.

* SFE = Sustainable Forestry Education.

* MPLC = Michigan Professional Loggers Council.

Sample contracts are available from MSU Extension offices and other sources. The MSU Extension publication number is E-1656 (from November, 1995).

Where there are a variety of tree species and products, such as in some northern hardwood stands, a **scale sale** will better reflect what gets harvested. The logger will pay for precisely what is harvested and the forest owner will get paid for the same. For example, much of a northern hardwood sale will consist of hardwood pulpwood, but there is often a mix of sawlogs and, perhaps, some high quality veneer. The veneer prices may bring several hundred dollars per 1000 board feet, depending upon the tree species. The hardwood pulpwood may run \$10-20 per cord. Setting a price for each species and product may provide the best equity for all parties involved.

Stumpage is the price of standing timber, before the trees are harvested. The person or group that owns the trees receives the stumpage payment from the logging contractor. Private forest owners too often don't think about the impact their stumpage income will have on federal income taxes. This is a specialized area of Internal Revenue Service codes. The value of stumpage will vary considerably with the tree species, product, location, season, market conditions, contractor equipment, distance to a paved road, and many other factors. There is no set price. To obtain the highest price for a particular stand of trees, timber sales are professionally bid out, usually by foresters. In the case of private sales, this process is best handled by a forestry consultant, unless the landowner has experience in this area. Of course, the highest bidder may NOT be the best choice for a particular sale. Logging contractors don't all have the same equipment and experience.

Stumpage is the price paid to the owner of standing timber, **before** the trees are harvested. Stumpage values vary WIDELY and change regularly. Essentially, the stumpage value of standing timber is whatever someone will pay. The are many variables that go into the pricing of standing timber. Some of these variables include species, product, contract specifications, season, market conditions, distance to market, stand volume, site conditions, and quality.

The following chart shows stumpage from Michigan state lands, across the entire state. It is NOT necessarily what a private forest owner can expect, nor does the chart reflect trends (which can be unstable and volatile for some species and products). However, the variability indicated in the chart demonstrates relative values and the wide range of stumpage values.

Michigan has over 800 logging companies, or "producers". Most loggers are independent contractors and run their own family businesses. Loggers must possess many skills to remain competitive and successful. They have to know about logging, of course, but they also need to be sharp with numbers and accounting, invest wisely, know basic mechanics to maintain and repair their equipment, be familiar with computers, know about forestry, and be able to work with private forest owners. It is a hard job with many risks. It is also commonly misunderstood.

DNR Stumpage Reports (state lands)	
From April, 2000 to March, 2001	
For the Ten Most Common Tree Species (by volume))

	Pulpwood	Sawtimber	
Species	(per cord)	(per 1000 board feet)	
Sugar Maple	\$3.85 - \$40.00	\$54.00 - \$1,189.05	
Red Maple	\$4.10 - \$64.89	\$30.00 - \$975.00	
Quaking Aspen	\$3.00 - \$52.00	\$23.00 - \$165.00	
Northern White Cedar	\$4.00 - \$35.00	\$47.00 - \$175.00	
Northern Red Oak	\$4.25 - \$36.27	\$70.00 - \$875.00	
Red (Norway) Pine	\$5.00 - \$74.79	\$84.00 - \$845.00	
Bigtooth Aspen	\$3.50 - \$5.58	\$44.00 - \$303.44	
Basswood	\$2.00 - \$33.10	\$49.54 - \$366.00	
Paper (White) Birch	\$2.25 - \$40.00	\$28.00 - \$500.00	
Eastern White Pine	\$2.00 - \$70.00	\$33.00 - \$350.00	
Mixed Hardwood	\$2.00 - \$72.40	\$20.00 - \$300.00	
Mixed Softwood	\$2.30 - \$46.25	\$57.00 - \$84.50	
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Note: There are product categories other than pulpwood and sawtimber.			
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NOTE: add years 2001-2006 to graph





In the old days, just about anybody with a strong back and taste for hard physical work could be a logger. Most of the labor was performed by human and animal muscle. Trees were felled by axe and cross-cut saw. Logs were "skidded" to the nearest waterway or railroad. Even in the mills, much of the log handling was done by brute force. Accidents were



common, some resulting in permanent disability or death. Things have changed a lot since then.

Today, there are many kinds of equipment and combinations of equipment used to harvest timber. Chainsaws are **not** used to harvest most of Michigan's trees. Those days, too, are mostly behind us. Most of the operation is done with machines. This is safer for the logger and modern harvesting systems are more



productive and efficient. They are also "lighter on the land" than historical logging techniques. However, the harvesting machines may cost a half-million dollars or more!

Raw Wood Products

As trees are manufactured into a wide range of products, there are many "value-added" steps along the way. Sometimes, the valueadded "food chain" can be many links long, and many chains cross-over. The web of wood products can be complex. However, in all cases, the first link in the chain has to do with products that are cut from the forest itself. We call these "raw wood" products. There a number of different kinds of raw wood

Board Foot: A board foot is a piece of wood that is 12 inches wide, 12 inches long, and 1 inch thick. The number of board feet in a log takes into account the shape of a log and the amount of wood lost to saw dust when sawing.

Definition - Cubic Foot: A cubic foot is a block of wood measuring the equivalent of 12 inches on all sides. A cubic foot will have less than 12 board feet because of the wood that is converted to sawdust when sawing.

products. "Roundwood" refers to raw products such as sawlogs, veneer, pulpwood, and poles. However, there are a number of other raw wood products, such as chips, firewood, boughs, maple sap, and Christmas trees.

Sawlogs

This is often the first kind of raw wood product that many people think of. These are logs cut to various lengths, from many different species, that eventually end up as lumber. In the USA, conifers make up the largest segment of lumber production. Much of our softwood (needle-bearing trees) lumber supply comes from Canada.

In Michigan, most of our sawlogs are hardwoods (broad-leaf trees). These sawlogs end up in many final products, such as furniture, window frames, pallets, moldings, and many other things.

A section of tree must meet certain specifications to become a sawlog. There are several sets of "grading rules" that spell out these specifications. Many buyers have their own twists to the rules, as well, depending upon what they process the sawlogs into. Grading rules take into account such things as log diameter, log length, amount of rot, the number and kind of surface defects, and log curvature (or sweep). At one time, most loggers simply cut sawlogs into eight-foot lengths. Today, log lengths vary considerably and placing a cut in the right place may make a difference of hundreds of dollars. Sawlogs are usually measured in units called "board feet" or "cubic feet". The metric measure is "cubic meters".

Pulpwood

Smaller diameter and lower quality wood is often sorted into a pulpwood pile. Pulp sticks are often further sorted by species, depending upon which mill the logger has a contract with. Most pulpwood ends up at a pulp mill where it processed into pulp. Bales of wood pulp are a commodity which is traded internationally. The pulp eventually gets

made into paper or a paper product. Pulp and paper mills often specialize in one group of paper products, therefore require certain species of trees. Different tree species have various chemical and mechanical properties. Wood chemists know which species best produce certain kinds of paper products. Tissues and paper towels need to have the long, strong fibers found in conifers such as red pine. Fine paper used in magazines and textbooks are usually made from hardwood fibers, which are shorter and bond well with certain coatings designed to accept ink better.



Pulpwood is measured in cords or tons. In the Lake States, a **standard cord pile** is four feet high, four feet wide, and made up of pulpsticks 100 inches long (eight feet plus four inches). One cord is about 79 cubic feet of solid wood within a 144 cubic foot space. Tons are usually measured by a truck scale located at the entrance of a mill. Trucks are weighed going in and going out. Prices based on weight will vary between seasons to account for the changing water content of the trees.

Having a market for low quality and small diameter wood is very beneficial to forest management. Most forest stands require a number of improvement thinnings in order to increase their value (in monetary terms, as well as visual terms and other measures). Unless these thinnings have commercial value, they are unlikely to happen. Most of the U.P. and parts of the L.P. have reasonably good markets for low quality and small diameter wood. However, forest management is economically difficult to implement in many part of Michigan due to a lack of markets for this kind of raw wood product.

Veneer Logs

Veneer logs are exceptionally high quality sawlogs. Veneer is thin layers of wood either shaved or peeled from logs and extends the use of increasingly uncommon high visual quality wood by being glued over lower quality wood. Veneer is used in final products such as paneling and furniture. Birds-eye maple is a rare condition that greatly increases the value of a log. It is actually a wood defect that enhances the quality of a log. The U.P. of Michigan is one of the few places in the world where birds-eye maple is found. Specifications for veneer logs vary with each company. A reject for one operation may be prime material for another. It all depends upon what a particular company makes from the veneer, or to whom the veneer mill sells its product to.



Birdseye pattern in sugar maple.

Whole Tree Logs

In some parts of Michigan, entire trunks from the stump to a prescribed top diameter are delivered to mills. Usually the limbs are removed where the tree is felled and the long stems (boles) are dragged (skidded) out of the woods. This is not a particularly common harvest method in Michigan, but is quite common in other regions, such as northern Minnesota, where it is the standard way to haul wood.

Posts, Poles, Bolts, and Cabin Logs

Certain species, such as red pine and northern white cedar, are especially popular for posts, telephone poles and log cabin construction. Sometimes, the highest value for these tree species can be in the form of utility poles and cabin logs. In most cases, specifications for log taper and log length are demanding. Management for these kind of products can produce harvestable results in a much shorter period of time, as well as increase the number of trees that will meet specifications. Also, it usually takes less time to grow a post, pole, or cabin log than it does a large diameter sawtimber tree. A bolt has variable definitions, but is often a bit smaller than a sawlog but larger than a pulpstick. There is usually enough quality to the bolt to manufacture into something other than wood pulp.

Chips

Wood chips can either be produced directly in the forest or as a value-added product at a mill. In Michigan, most chips are made from roundwood purchased from loggers, rather than produced in the forest. Often times, the bark needs to be removed before chipping, especially if the chips are to be used to make wood pulp. Chips might also be used for fuel, garden products, special panels, and other products. Chips made from debarked aspen are commonly made into oriented strand board in Michigan mills.



Firewood

Firewood production in Michigan coincides with peaks in alternative fuel prices. In the 1970s, fuel prices jumped as members of the OPEC nations controlled the world supply of petroleum. Many homes and businesses installed wood-using furnaces. Since the 1980s, firewood production has dropped. However, there are still many people who heat their homes with wood. Some businesses, schools, and other facilities utilize wood and wood-based products for heating. Some sawmills and pulp mills will burn wood waste to help meet their high demands for power. In the home firewood market, a "cord" usually means a "face cord". A face cord is usually a stack of wood four feet high and four feet wide, but the length of log or split piece will vary with the producer. Standard cords and face cords are not the same amount of wood. **Maple Sap**

In February and March, maple sap is collected throughout much of Michigan in order to produce maple syrup. Sugar maple is the most common tree to "tap" for sap because its sugar content is particularly high, maybe two to three percent sugar. On average, it takes about 40 gallons of sap to produce on gallon of maple syrup. A "sugar bush" is a forest stand where trees are tapped. Boiling the water off is energy intensive. Home sugar



bushes often use firewood as an energy source. Commercial operations might use natural gas or other fuel sources. Collection systems may be traditional buckets hung from taps that are collected periodically, or may be high-tech vacuum systems run with tubing.

Christmas Trees and Boughs

Michigan is a major producer of Christmas trees. Producing a Christmas tree takes a lot of tending and protection. Markets are quite competitive. Growers shipped about 3.2 million trees in 1999, nearly ten percent of the national production. Most of the state's production is exported. The most common trees produced are Scotch pine,

Douglas-fir, and Colorado blue spruce, although the area of each has declined significantly in the last three years. The "up and coming" species are true firs and white pine. They take longer to grow than some trees, but they command a better price.

Boughs are cut from many species, but mostly balsam fir. The boughs are used at Christmas time for wreaths and other kinds of trimming. There is also a strong market for funeral "blankets" made from boughs. Much of that market is in Chicago.



Non-Timber Forest Products

In addition to Christmas trees, boughs, and maple sap; the people of Michigan harvest many products from the forest that are NOT made of wood or not traditional wood products. Nuts, berries, medicinal herbs, mushrooms, twigs, flowers, greens, bark, and fibers are some of the items collected. People use these items for crafts, hobbies, income, ceremonial, and medicinal purposes. Much of the gathering supports important cultural and family traditions. Research on the Hiawatha National Forest revealed over 135 non-timber forest products collected by gatherers.

Woody Cellulosic Biomass

Using wood to replace non-renewable products involves some exciting emerging technologies. Various treatments and processes can use wood to produce electricity, heat, transportation fuels, synthetic oil, waterproof pellets, various chemicals, and other interesting useful products. For example, ethanol from corn has reached billions of gallons per year and the United States lead the world in ethanol production. However, using corn has drawbacks, such as negative environmental effects, protein by-products, storage issues, etc. Wood has none of these drawbacks and is available year-round.

Wood might be simply used in traditional co-generation plants to produce heat and electricity. Industries, schools, hospitals, and other "big box" buildings already use wood in this way. More modern techniques will produce heat and electricity in more efficient ways.

The idea of a woody "biorefinery" can be more attractive in many ways. A facility of this nature can work in combination with more traditional power plants. However, a refinery can produce more value-added products, such as oils, ethanol, and chemicals. These products can be economically distributed great distances. More important, to some, are the reduction of greenhouse gases (mostly carbon dioxide) and relieving our national dependency on foreign oil sources.

Federal Taxes on Timber Sale Income

A word or two about timber sale income affects on federal income taxes is important. However, a qualified tax preparer should be consulted to address an actual timber sale, as there are many variables to consider. When a person receives income, they must pay taxes on that income. Timber sale income can easily be in the tens of thousands of dollars. Following Internal Revenue Service guidelines, private forest owners can often



substantially reduce their federal income tax burden. There are three ways to do this.

- 1. Deduct applicable "basis" from the gross timber sale income.
- 2. Consider all other eligible deductions.
- 3. File timber sale income under capital gains.

Basis Deductions

The "basis" is a common accounting term which, in this case, means the monetary value of the timber at the time the timber was acquired. Land values are separate from timber values. If 50 percent of the timber is harvested, then 50 percent of the basis can be deducted. If all of the timber is harvested, then deduct 100 percent of the basis can be deducted. When timber has been owned for more than about 15 years, the basis value is sometimes rather insignificant.

Other Deductions

Most expenses that a forest owner might incur related to a timber sale can be deducted from the gross income. Survey costs, trail construction, consultant fees, timber marking costs, lawyer fees, and advertising and promotion costs are examples of some of the items that may be eligible. Claims must be justifiable and receipts need to be retained.

Capital Gains

A capital gain is the difference between what was paid for a "real" asset and what it is sold for. In the case of timber, the monetary value literally grows on trees. When the timber is sold, a lower tax rate can often be applied to the capital gain. For forest owners, ownership must be for at least one year prior to the timber sale. There are other qualifying rules as well, but most forest owners are most likely eligible for capital gains tax rates. Normally, family incomes (salary and wages) are filed as "ordinary income". Reported timber sale income as ordinary income should be avoided.



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