

# AG-Ventures

## Agriculture Business Profiles

September 2003

Agdex 300/830-1

### Private Woodlot Enterprises

The purpose of this factsheet is to introduce private woodlot enterprises as potential business opportunities. While it's recognized that many environmental and non-timber values can be obtained from private forests, they aren't the topic of this profile. This profile focuses on the key management issues associated with harvesting and marketing logs and timber. This profile is designed to be a resource for individuals who currently own woodlots, as well as individuals considering an investment in a woodlot. This management overview of woodlot enterprises isn't intended to be a substitute for individuals making their own thorough assessment of all the key factors that would influence the success of their individual operation.

#### 1. Industry Highlights

- Proper woodlot management can provide the owners of private forestland with personal, economic and environmental benefits.
- **Non-economic/personal reasons** for owning private woodlots include:
  - personal residences
  - hunting and fishing
  - timber for own use
  - seasonal residence
  - recreation use
  - heritage
  - spiritual values
- **Economic reasons** for owning private forestland include:
  - agri-tourism
  - eco-tourism
  - produce timber for sale
  - complement to agriculture crops
  - forest grazing
  - income generation to supplement other land use
  - investment for future generation
  - investment for retirement
  - produce and market non-timber products
- **Environmental considerations** associated with owning private forestland include:
  - preserving wildlife habitat
  - wetland conservation
  - watershed health
  - maintaining aesthetics
  - preventing soil from water and wind erosion
  - maintaining streams and stream banks
  - maintaining groundwater levels by trapping snow
  - absorbing fertilizers, pesticides, heavy metals and other pollutants
- Owners who view their woodlot as a business enterprise, manage their woodlots in order to achieve:
  - a desired income
  - increased productivity
  - enhanced product quality
  - maintained or enhanced environmental conditions
  - improved forest for themselves and for future generations



Agriculture and  
Agri-Food Canada

Agriculture et  
Agroalimentaire Canada

**Alberta**  
AGRICULTURE, FOOD AND  
RURAL DEVELOPMENT

- Owners of private forestland may choose to leave their woodlots for conservation benefits, to use a one-time tree harvest to fund other activities or to manage forests for sustainable income.
- An estimated nine per cent of the productive forestland in Canada is privately owned by timber companies or small woodlot owners.<sup>1</sup>
- Estimates of forestland ownership for the Prairie provinces are given as follows:<sup>2</sup>

**Table No. 1 Ownership of Forestland by Province (thousands of hectares)**

Total Forestland by Ownership	Alberta	Saskatchewan	Manitoba	Prairies
Provincially owned	32,974	27,881	24,619	85,474
Federally owned	3,441	502	382	4,325
Privately owned	1,527	423	1,276	3,226
Other	272			272
<b>Total Forestlands</b>	<b>38,214</b>	<b>28,806</b>	<b>26,277</b>	<b>93,327</b>
% Privately owned land	4.00%	1.47%	4.86%	3.46%

- In Alberta, as in the other Prairie provinces, privately owned forestland is a portion of total forested lands. Most of these private lands tend to have better access to existing roads and access to timber.
- Private woodlot enterprises can produce many marketable products. These products include logs, value-added timber products, berries, mushrooms, herbs, grazing opportunities for cattle, ginseng and recreation destinations.
- The most common production process involves sustainable harvesting an existing stand of native trees and selling the logs to forest companies or a small sawmill operator. Many landowners also harvest timber for firewood.
- The economic potential of harvesting trees from private woodlots is determined by the land base, the species of trees, log size, volume, quality of logs, as well as the capital, labour and management applied to the enterprise. Most woodlot enterprises require other sources of income for individuals to achieve their desired livelihood.

- Owners of coniferous forest (spruce, pine and fir) who practice reforestation and effective planning may be able to generate a regular income while maintaining the recreational, wildlife and other special values of their land.
- At current prices and costs, owners of deciduous forest (poplar, aspen and birch) may generate sufficient income from a one-time harvest.
- Woodlot operators also have a number of opportunities to add value to their trees. These opportunities include the following activities:
  - logging the trees and selling decked logs
  - logging the trees and hauling them to the mill
  - sorting the logs in order to realize the premiums paid for peeler or other high quality logs
  - milling the timber into rough or dressed lumber
  - producing specialized products such as fence posts, siding, building logs hardwood flooring and panelling
  - intensive silviculture, using fertilizers, pruning, thinning, weeding and irrigation to increase the quality of the wood
- Table No. 2 shows the estimates of timber harvested from private forestlands in Alberta<sup>3</sup>:

**Table No. 2 Estimates of Timber Harvested from Private Land in Alberta (thousand cubic metres).**

Year	Private			
	Pulpwood		Roundwood	
	Softwood	Hardwood	Softwood	Hardwood
1990			N/A	N/A
1991			436	556
1992			661	366
1993			1,070	664
1994	16		2,578	1,603
1995			1,494	1,675
1996			552	1,716
1997	143 r	1019 r	1184 r	1970 r
1998	40 p	704 p	397 r	1547 r
1999		789 p	519 p	1888 p
2000		966 p	397 r	1839 p

*Source: National Forestry Database Program, Canadian Council of Forest Ministers.*

1 A profile of the Private Woodlot Industry in Alberta; by Ezra Consulting Inc., March 1996; p.3.

2 National Forestry Database Program, 2002. Canadian Council of Forest Ministers: Source: [http://nfdp.ccfm.org/index\\_e.php](http://nfdp.ccfm.org/index_e.php)

3 National Forestry Database Program, 2002. Canadian Council of Forest Ministers: Source: [http://nfdp.ccfm.org/index\\_e.php](http://nfdp.ccfm.org/index_e.php)

- As indicated in Table No. 2, significant volumes of hardwood and softwood have been harvested from privately owned land.
- The trend toward increased harvesting of trees from private lands in Alberta is expected to continue due to the following factors.
  - There is increased demand for timber in North America and the world.
  - Much of the wood supply on public lands in Alberta is fully committed. This is resulting in increased interest by the forest industry in alternate sources of wood fibre, such as privately owned woodlots.
  - The volume of wood coming from private land has generated interest by government and industry in promoting private woodlots.
  - Changes in technology have created commercial markets for deciduous species (aspen, birch, balsam poplar).
  - There is a need for agricultural diversification.
- The key activities in managing a woodlot are:
  - setting goals and objectives
  - acquiring a detailed knowledge and inventory of the woodlot
  - making decisions about how to best use the woodlot to achieve the goals of the owner
  - planning the methods and procedures to be used in operating the woodlot
- The following issues and policies will affect the future economic performance of private woodlot enterprises in Alberta:
  - environmental concerns
  - taxation policies
  - government policies
  - an infrastructure to support small-scale woodlot enterprises
- Government, conservation groups and industry support for woodlot management has grown in Alberta. Since December 2000, a Woodlot Extension Pilot Program has existed in Alberta. The program is a joint venture between governments, conservation associations and forest companies.
- The program goals are:
  - increased awareness of economic and environmental implication of agriculture area forest management
  - increased landowner participation in sustainable woodlot management
  - to encourage integrated community land use planning

## 2. Regulatory Basics

- There are no specific laws in Alberta that determine what owners of private forestland can and can not do when managing their trees. However, there are regulations pertaining to environment, fisheries, soils, fire prevention and transportation that influence the activities of individual woodlot operators.
- The owners of private forestland must recognize that it's their responsibility to comply with all regulations, even though they may not be involved in the actual logging.
- The *Soil Conservation Act* requires all landowners to take steps to prevent soil loss or deterioration and to stop existing soil loss or deterioration.
- The *Forest Prairie and Protection Act* requires landowners to reduce or eliminate any fire hazards such as those created by logging operations. Landowners will be penalized for failure to comply and could be charged with the fire fighting costs in cases where a fire escapes, requiring provincial or municipal action to extinguish it.
- The *Alberta Environmental Protection and Enhancement Act* is intended to protect air and water quality. This legislation assures that proper conservation and reclamation practices are used on land affected by activities such as logging. Assistance in establishing proper practices is available through Alberta Environment and Sustainable Resource Development area offices.
- The *Water Act* is intended to regulate activities that alter the flow of water, alter the direction of water flow or alter the level of water. Water is defined as all water on or under the surface of the ground.
- The *Federal Fisheries Act* prevents landowners from any undertaking that either disrupts, alters or destroys fish habitat.
- The *Forests Act* and *Motor Transport Act* require individuals who are hauling logs on public roads to comply with weight restrictions, emergency precautions and transportation records requirements.
- **A permit must be purchased** from Sustainable Resource Development (Private Land Haul Permit) to haul coniferous trees or logs exceeding 2.2 metres in length on any public road.

- The *Municipal Government Act* gives local municipalities the power to enact by-laws that can influence or even limit logging activities on private land. Some municipal districts have made a development permit a requirement for logging private land. Increased municipal control can be expected as a result of public outcry.
- Landowners are responsible for compliance under the *Workers Compensation and Occupational Health and Safety Acts* when contract loggers are working on their property.
- The *Income Tax Act* doesn't have specific provisions for woodlot enterprises. As a result, woodlot operators tend to be treated as part-time farmers rather than full-time farmers. In addition, the *Income Tax Act* treats the revenue from a one-time harvest differently than revenue that is sustainable long-term income.
- At the provincial level, woodlot operators don't receive the same fuel tax reductions that farmers receive for primary agricultural production.
- Municipal tax assessments, under the *Municipal Government Act*, allow farmland to be assessed on its productive value while woodlots (that aren't farmed) may be assessed on fair market value. This assessment is likely to be much higher and result in higher property taxes.
- Burning of any kind on privately owned forestland during the period April 1 to October 1, requires a burning permit from the local municipality.

### **3. Marketing Basics**

- The demand for timber is driven by consumer demand for wood products including housing, newsprint, paper products and furniture.
- Before selling their timber, landowners should know the following:
  - timber quality and what products can be manufactured from that timber
  - the total volume of merchantable timber in different units
  - the types of timber
  - the type of contracts
  - the options for selling timber
  - how to control the harvesting operation

- The Alberta timber market consists of the deciduous market and the coniferous market. These markets have their own unique supply and demand factors and their own price cycles.
- In the **deciduous market**, hardwood species (poplar and aspen) are sold to mills/processors to be used in the production of pulp, oriented strandboard (OSB) and lumber. The demand for this timber is driven by the demand for paper products, OSB and lumber.
- In the **coniferous market** or softwood market, spruce, pine and fir (S-P-F), logs are sold to forest mills/processors to produce construction lumber, plywood and pulp. Softwood lumber is sold into both domestic and export markets where it's mainly used for residential and commercial construction. Individual woodlot owners need to know the manufactured products being produced and the raw materials required by different mills in order to assess the best returns for their particular timber stand.
- The value of tree species depends on product produced from timber.
- The most lucrative market for private timber in Alberta is the market for S-P-F lumber. These logs are used to produce dimension lumber, boards, studs, railway ties, rough sawn timbers, decking, planks, laminated stock, moldings, panelling and specialty components.<sup>4</sup>
- Forest companies that produce plywood or veneer purchase peeler logs. Peeler logs are larger sizes of softwood timber, particularly white spruce and Douglas fir. These command a premium price over logs used for lumber. The key elements of a peeler log are low taper, a stump diameter of 12 inches or greater, length of 16 feet or more, little or no outside scarring, and straightness.
- Small quantities of Alberta hardwood are processed into planking, lumber, boards, pallets, specialty furniture and specialty panelling.
- Many Alberta mills use coniferous (softwood) and deciduous (hardwood) wood fibre to produce various grades of pulp. The main source of coniferous wood fiber is wood chips acquired from sawmills or poorer quality smaller sized coniferous logs. Mills that use deciduous wood fibre prefer to buy aspen.

4 Marketing Timber From Private Land in Alberta; by Koinonia Corporation, September 1993

- Mills that produce OSB primarily buy aspen. However, certain amounts of balsam poplar and birch are also purchased.
  - Other potential markets for timber products from private woodlots include:
    - Companies that produce fence posts use small diameter lodgepole pine, tamarack and jack pine timber. These firms require logs that range from six feet in length with a two inch top, to 10 feet in length with a seven inch top. Larger size trees can be used for poles and rails.
    - Log home builders require larger diameter spruce or pine logs with specified top diameters, low taper and straight grain.
    - Firewood dealers buy logs or stove length blocks, either split or not split. These dealers buy (dry) dead conifer, green conifer, birch, balsam polar and aspen. Birch has the highest value.
  - Non-timber markets for special forest products may offer another opportunity for private woodlot owners. Twigs, mosses and lichens can be harvested and used in the production of floral arrangements, craft supplies, furniture, foods and pharmaceutical products. Berries, herbs and mushrooms can be harvested and sold directly to consumers or to distributors with access to consumer markets.
  - Landowners may consider value adding their timber. The decision to pursue a value-added market opportunity should consider the following factors:
    - there is additional income and additional costs associated with processing and marketing the product
    - special skills and attitude are required to realize the market opportunity
    - size, stability and accessibility of the value-added market needs to be considered
  - Timber can be sold in a number of different forms. The following marketing options are available to woodlot operators who are prepared to process their trees into a more useable form:
    - The landowner may take responsibility for logging and hauling the logs to the mill. Payment is by a **delivered wood price**, which ideally covers the logging, loading and hauling costs, as well as a return for the trees (stumpage). This option gives woodlot owners the flexibility to sort their logs and to deliver to alternative buyers in order to gain a better price.
    - The landowner can log the timber and have the mill responsible for loading and hauling the logs. The landowner is paid a **decked wood price**, which ideally covers logging costs and provides a return for the trees harvested. The landowner has the flexibility to sort logs and deal with more than one buyer.
    - If the mill takes responsibility for logging and hauling the timber, the forest owner is paid a price on the stump. The woodlot owner isn't required to do any of the work involved in harvesting and hauling the logs. However, the landowner needs to closely supervise the harvesting operations to ensure that environmental concerns are met and there are no discrepancies concerning the volume of wood taken.
    - Woodlot owners may also do their own logging or purchase logs to manufacture lumber with a portable mill. The lumber is sold (by the thousand board feet) to lumber yards or directly to consumers.
- Different forest companies may have prices quoted in different units. Woodlot owners must be able to convert these prices to a common unit (usually dollars per cubic metre) in order to make comparisons. Units include:
- by the metric tonne
  - by the cubic metre
  - a foot board measure (fbm)
    - one board foot is the equivalent of a board measuring 1" x 12" x 12"
- The factors used to convert weight to volume vary from area to area and according to the species and quality of the timber. When converting from weight to volume, the following factors affect the weight per cubic metre:
- Different species have different wood densities.
  - How green or dry the timber is affects the weight per cubic metre. Logs can dry without reducing their volume.
- Woodlot owners should know the specific conversion factor that is being applied to their logs by a forest company.

**Table No. 3 Conversion Factors**

Convert From	Convert To	Multiply By
Cubic metre of green coniferous	metric tonne	.82 to .87
Cubic metre of green deciduous	metric tonne	.90 to 1.1
Thousand board feet (mfbm)	cubic metre ( $m^3$ )	4.292
Cubic metre	thousand board feet	0.233

- Private woodlot owners sell their timber by contracting with a logger or a forest company. Written or oral contracts establish the responsibilities of the landowner and the purchaser when selling private timber. Written contracts should be used to minimize any misunderstandings between a landowner and the timber buyer.
- Key issues to be specified and clarified in a contract are as follows:
  - the parties involved (e.g., seller, buyer and contractors names)
  - land location
  - which trees or stands of timber are to be harvested
  - an estimate of the amount of timber to be harvested and the basis for final payment
  - when logging is to begin and when it must be completed
  - environmental restrictions to protect the condition of the land at the end of the contract
  - specific follow-up work that is to be performed by the logger with respect to removal of damaged trees, repairs to fences, reclamation and reforestation
  - the unit price to be paid for the timber as well as the schedule of payments
  - liability insurance requirements, Worker's Compensation Board compliance and other regulations that require permits should be noted
- The following types of contracts are used by landowners and forest companies:
  - **lump sum contract**
    - The landowner agrees to a lump sum payment to be received at the start of the contract which covers the trees harvested and the impact on the land. The contract specifies the condition of the land at the end of logging.
  - **cutting contract**
    - The landowner agrees to offer a minimum volume of timber for sale each year. The price may be predetermined or based on some formula.
  - **land lease with timber purchase**
    - The land is leased annually and payment for the timber is by either a lump sum at the beginning of the contract or at the time of harvest.
- **lease land and timber**
  - Both land and timber are leased.
- **increment contract**
  - An annual payment is made to the landowner based on the expected annual growth for the land.
- **management services agreement**
  - The forest company provides management services in exchange for the right to purchase the timber. Services include developing a management plan. The landowner agrees to give the company a predetermined amount of timber at a predetermined price each year or the right of first refusal on any timber sold.
- Landowners should be familiar with timber market trends. Timing the sale of timber is very important and a landowner has to be prepared and have a plan to take advantages of markets.
- ***The critical marketing issues*** for woodlot owners are:
  - determining the volume of merchantable timber they have
  - determining quality of timber
  - determining the best time to sell timber
  - determining the best market for the timber
  - negotiating an acceptable contract and monitoring the logging operations

#### 4. Production Basics

- The focus of production management is on determining the use of the forestland, as well as the production methods and practices that will enable a privately owned woodlot to contribute to the personal, economic and environmental goals of the owner.
- The initial production decision for the woodlot owner is to determine the use of the private forestland. In making this decision woodlot owners need to consider their goals, the capability of the land for timber production or agricultural production, and the environmental effects of harvesting trees.
- An essential production activity for a woodlot owner is knowing the number of merchantable trees or the volume of useable wood they have to sell. This can be accomplished by:
  - completing a timber inventory
    - This involves collecting specific information on tree species, numbers, size, age, quality, average diameter and height.

- completing a sustainable management plan
  - Developing a sustainable management plan for the woodlot is essential when creating a marketing strategy. It establishes the harvesting levels, the harvesting methods, the quantity of timber to be marketed in a given time frame and the condition the forested land is to be left in after logging operations are completed.
- The planning process necessary to produce a management plan consists of the following steps:
  - Clearly establish the personal and business goals. Goals should reflect economic, personal and environmental needs of the owner.
  - Establish the production, marketing and financial objectives for the woodlot that contributes to the overall goals of the owner.
  - Develop an operating plan for the woodlot. The operating plan focuses on implementing the activities (logging, hauling, etc.) that are necessary to achieve the objectives set for the woodlot and contribute to the goals of the owner.
  - Monitor the results achieved by the operating plan to determine if the objectives for the woodlot are being achieved.
  - Determine when conditions change and when the woodlot owner may have to modify the plan to realize new opportunities or minimize the impact of new obstacles.
- Woodlot operators need to have a good understanding of the basic woodlot management activities including:
  - the regeneration and growing characteristics of the various species of trees in their woodlot – silviculture
  - harvesting methods (e.g., selective, shelterwood and clear-cutting)
  - stand tending practices (e.g., thinning, pruning, brushing, weeding and other practices)
  - forest protection (e.g., insect and diseases protection and fire protection)
  - safety considerations
- Proper timber harvesting is very important. The steps involved in harvesting timber are as follows:
  - selection of the area and trees to be harvested
  - planning of trails and landings for the harvest operation, with consideration for both the efficiency of the harvest operations and environmental soundness
  - felling of trees
  - limbing of trees
  - topping of trees
  - bucking of trees
  - moving the felled trees to a central point for loading
  - loading the logs and hauling them to the specific market
  - managing the debris and preparing the area for regeneration
- The landowner needs knowledge of utilization standards. Utilization standards refer to the amount of a standing tree that is used commercially. These standards vary for each species and for each final market. Generally, a tree is considered useable when it has a diameter of greater than six inches (15 cm) at the stump, a diameter of greater than four inches (11 cm) at the top and a length of 16 feet (4.88 m). Logs with more than 50 per cent rot will be left behind.
- Landowners should also know that other land use alternatives for privately owned forests are:
  - managing the woodlot to achieve a sustained timber yield, long-term supplemental income and maintain the environmental benefits
  - a combination of forestry and agricultural – agroforestry (e.g., grazing, tree plantation)
  - a combination of managing the woodlot for sustained yield
  - conserving the forest is required to maintain its well being, even though no development activities take place
- **The focus of production management** in a woodlot enterprise is to make effective decisions concerning the use of the land, the management of the woodlot and the harvesting process. The focus of these production decisions is to gain good levels of timber productivity, produce good quality timber and improve the overall condition of the forest.
- *The Woodlot Management Guide for the Prairie Provinces*, produced under the Federal Provincial Partnership Agreement in Forestry, provides detailed information about the woodlot management on the Prairies.<sup>5</sup>

<sup>5</sup> Woodlot Management Guide for the Prairie Provinces; The Farm Woodlot Association of Saskatchewan; 1993.

## 5. Economic/Finance Basics

- Woodlot managers need to evaluate the economic consequences for a number of issues. These include:
  - economic returns available from harvesting the timber on privately owned land
  - woodlot returns compared with agricultural returns – short and long-term return
  - economic returns from intensive management of a woodlot-poplar plantation
  - economic returns of fast-growing tree plantations compared with agricultural returns
- The economic returns from timber of a private woodlot vary according to:
  - the species of the timber
  - log size
  - total volume
  - timber quality
- On the stump is the price paid to a landowner for standing timber. Historical ranges in stumpage prices are from \$2 per cubic metre for standing aspen to a high of \$60 per cubic metre for large high quality logs.
- The following are historical estimates of the value of standing timber in Alberta based on timber prices and logging costs.

**Table No. 4 Estimates of Average Alberta on the Stump Prices from 1997 - 2002**

Timber	Ave. Value at Mill (\$/m <sup>3</sup> )	Logging Cost (\$/m <sup>3</sup> )	Hauling Cost (\$/m <sup>3</sup> )	Price to Landowner (\$/m <sup>3</sup> )
Softwood to Alberta mill	\$65	\$20	\$15	\$30
Deciduous to Alberta	\$29	\$12	\$14	\$3

- These values provide private woodlot owners with estimates of the value of standing timber. Determining the value of timber in a specific woodlot requires detailed estimates of timber prices, logging costs and hauling costs.

- The following budget shows the detailed estimates of revenues and expenses that would be required to estimate the value of standing timber. Here are two economic scenarios available to landowners with natural woodlots:
  - under scenario number one, the landowner can hire contractor and sell standing timber
  - under scenario number two, the landowner can do some work and sell timber to company at mill site
- These scenarios apply to individuals, such as farmers, who have aspen/coniferous bush land that is left idle or used as rough pasture. As well, the aspen or coniferous must be ready to harvest and merchantable.
- Assessing the economic potential of various types of woodlots and different management methods requires evaluating the long run flows of revenues and costs. The following budgets provide estimates of the returns to a quarter section (160 acres) woodlot for both deciduous timber and coniferous timber.
- The timber on this quarter section is ready for harvesting when the growth of aspen is 160 cubic metres per year or 110 cubic metres per year for coniferous trees.
- Scenario No.1 – Potential revenue at different timber prices
  - In this scenario, landowners sell standing timber to a contractor. There is no cost for aspen reforestation. Most of the aspen is going to regenerate by suckering and the cost for regeneration is minimal.
  - Artificial reforestation could be necessary for coniferous trees, depending on site and seed sources. Further costs may be associated with coniferous regeneration.
    - In scenario two, the landowner is doing the falling, limbing, topping, bucking and loading. Sensitivity tables at various prices and yields are included.

## **Scenario No 1. Selling standing timber with projected prices**

No reforestation cost

### **Aspen/Balsam Poplar**

Size of woodlot 160 acres (64.75 ha)	64.75					
Estimate of annual sustainable harvest (cu metres)	160					
Price per cubic metre	\$3					
Projected prices for aspen per m <sup>3</sup>	\$3	\$5	\$7	\$9	\$12	\$15
Sale of logs	\$480	\$800	\$1,120	\$1,440	\$1,920	\$2,400
Direct expenses (taxes + office overhead*)	\$580	\$580	\$580	\$580	\$580	\$580
Net return \$/ha	-\$100	\$220	\$540	\$860	\$1,340	\$1,820
Net return for 160 acres	-\$100	\$220	\$540	\$860	\$1,340	\$1,820

### **White Spruce/Jack Pine**

Estimate of annual sustainable harvest (cu metres)	\$110					
Projected prices for coniferous per m <sup>3</sup>	\$30	\$35	\$40	\$45	\$50	\$55
Sale of logs	\$3,300	\$3,850	\$4,400	\$4,950	\$5,500	\$6,050
Direct expenses (taxes + office overhead *)	\$580	\$580	\$580	\$580	\$580	\$580
Net return \$/ha	\$2,720	\$3,270	\$3,820	\$4,370	\$4,920	\$5,470
Net return for 160 acres	\$2,720	\$3,270	\$3,820	\$4,370	\$4,920	\$5,470

*Please see scenario 2 for fixed expenses*

## **Scenario No. 2 Sale of natural aspen poplar and coniferous**

Capital equipment (saws etc. at fair market value)	\$1,000 over ten years, no salvage, \$100/yr	
Size of woodlot 160 acres (64.75 ha)	64.75	
Conversion rate, 1 tonne is equal to	0.9294 cu metres	
Amount of land harvested each year	1 ha	
Scenario developed based on deciduous or coniferous (we realize that most parcels of land are of mixed forest)		
Estimate of annual sustainable harvest (cu metres)	160	110
Price per cubic metre fob mill	\$28	\$50
All prices per ha except loading and skidding which is per m <sup>3</sup>		

	Deciduous Aspen	Coniferous Spruce
<b>Revenues</b>		
Sale of logs	\$4,480	\$5,500
<b>Direct Expenses</b>		
	<b>per ha</b>	
Following items done by owner except skidding		
Felling	\$0	\$0
Skidding (\$4 per cubic meter)	\$4.00	\$640
Limbing, topping, bucking	\$0	\$0
Roads & landings	\$0	\$0
Loading (based on \$2 per tonne)	\$1.86	\$297
Fuel & lube*	\$18.53	\$19
Machinery repairs (based on 3% of fmv)	\$30.00	\$30
Hauling (per m <sup>3</sup> )	\$14.00	\$2,240
<b>Total Direct Expenses</b>	<b>\$3,226</b>	<b>\$2,233</b>
Contribution margin	\$1,254	\$3,267
<b>Fixed Expenses</b>		
	<b>per ha</b>	
Depreciation logging mach & equipment (fmv \$1,000 @ 10%)	\$100.00	\$100
Depreciation buildings (fmv \$500 @ 5%)	\$25.00	\$25
Land taxes	\$9.88	\$640
General & office overhead **	\$2.47	\$160
General farm maintenance **	\$2.47	\$160
<b>Total Fixed Expenses</b>	<b>\$1,085</b>	<b>\$1,085</b>
Return to owner's labour, management & capital	\$169	\$2,182
Return to quarter section based on harvesting 1 ha per year	\$169	\$2,182

\* based on \$18.53 per ha and 1 ha harvested per year

\*\* based on a 6 quarter sections (338.5 ha) farm

In this scenario landowner is doing: falling, limbing, topping & bucking

Hauling is contracted out.

### **Deciduous Sensitivity Table**

Estimate of annual sustainable harvest (cu metres)		160				
Price per cubic metre fob mill		\$28				
<i>Annual Sustainable Harvest (cu metres)</i>						
Return per ha	\$169	150	155	160	165	170
	\$18	-\$1,412	-\$1,421	-\$1,431	-\$1,440	-\$1,449
	\$23	-\$662	-\$646	-\$631	-\$615	-\$599
	\$28	\$88	\$129	\$169	\$210	\$251
	\$33	\$838	\$904	\$969	\$1,035	\$1,101
	\$38	\$1,588	\$1,679	\$1,769	\$1,860	\$1,951
Break even on price with yield at 160 m <sup>3</sup> ann. Growth		\$26.94				
Break even m <sup>3</sup> ann growth with price at \$28 per m <sup>3</sup>		154 cubic metres				

### **Coniferous Sensitivity Table**

Estimate of annual sustainable harvest (cu metres)		110				
Price per cubic metre fob mill		\$50				
<i>Annual Sustainable Harvest (cu metres)</i>						
Return per ha	\$2,182	100	105	110	105	110
	\$40	\$881	\$982	\$1,082	\$982	\$1,082
	\$45	\$1,381	\$1,507	\$1,632	\$1,507	\$1,632
	\$50	\$1,881	\$2,032	\$2,182	\$2,032	\$2,182
	\$55	\$2,381	\$2,557	\$2,732	\$2,557	\$2,732
	\$60	\$2,881	\$3,082	\$3,282	\$3,082	\$3,282
Break even on price with yield at 110 m <sup>3</sup> ann. Growth		\$39.19				
Break even annual growth with price at \$50 per m <sup>3</sup>		66 cubic metre				

### **Deciduous Sensitivity Table**

Scenario 2 is based on an estimate of sustainable harvest of 160 cubic metres growth per hectare per year and a selling price of \$28 per cubic metre. The deciduous sensitivity table is the summary of running the scenario a number of times with a range

- \* The deciduous sensitivity table is the summary of running the scenario a number of times with a sustainable harvest range of 150 to 170 cu metres per ha per year and prices from \$18 - \$38 per cubic metre. The output is return per hectare. The example in scenario 2 is in the middle of the table at \$28 per cubic metre and sustainable harvest growth of 160 cu metres per year.

The breakeven price with sustainable growth at 160 cubic metres per year is \$26.94 per cu metre.

The breakeven annual growth with a price of \$28 per cubic metre is 154 cubic metres per year.

- \* Note in the table that returns are negative per hectare at all prices below \$23 per cubic metre even when growth is 170 cubic metres per year.

### **Coniferous Sensitivity Table**

- \* The coniferous sensitivity table is the summary of running the scenario a number of times with a sustainable harvest range of 100 to 110 cu metres per ha per year and prices from \$40 - \$60 per cubic metre. The output is return per hectare. The example in scenario 2 is in the middle of the table at \$50 per cubic metre and sustainable harvest growth of 110 cu metres per year.

The breakeven price with sustainable growth at 110 cubic metres per year is \$39.19 per cu metre.

The breakeven annual growth with a price of \$39.19 per cubic metre is 66 cubic metres per year.

- \* Note in the table that returns are positive per hectare at all prices below \$40 per cubic metre and growth is 100 cubic metres per year.

- The next opportunity for landowner might be leasing land to forest companies for fast growing poplar plantations. Currently, there are two scenarios that are available to landowners:
  - leasing the land to the forest company while the forest company pays the landowner for maintenance of plantations
  - leasing the land to the forest company with no maintenance contract
- Table No. 4 shows a conventional quarter section in the gray wooded soil zone, with four generations of canola, barley, wheat and oats followed by six years of forage, four years of cereal/oilseeds and six years of forages. No ownership costs are assumed as landowners are evaluating alternatives.
- Traditional agriculture scenario
  - The traditional agriculture scenario has been developed from numbers supplied by Alberta Agriculture, Food and Rural Development's (AAFRD) economics unit. The crop yields, revenues and costs were developed from long-term values in the grey wooded soil zone. The cash flow over a 20-year period was used to give a net present value for the operation and to help make it comparable to other operations. Although the returns on an annual basis are typically positive, it must be understood that these are averages and that annual returns could be significantly higher or lower depending on the crop, the year and the individual farm operation.
- Leased land with option for a maintenance contract
  - The leasing scenario is developed using the assumption that a forest company (e.g. Alberta-Pacific) leases the land from the landowner for twenty years for a poplar farming operation. The lease price is based on local agricultural rent rates and is adjusted during the 20-year term, based on changes in local rental rates and inflation.
  - The income from maintenance is for the first five years of activity, when the majority of maintenance activity is completed. After year five, the trees are well established and need little to no maintenance. The rates paid to the landowner are based on current contract prices that are paid by the forest company (e.g. Alberta-Pacific) for maintenance activity.
- The expenses for the maintenance activities are based on the numbers supplied through the AAFRD economics unit and may be higher than actual because the expenses are based on larger equipment, overhead and farm maintenance activities.
- Leased land with no maintenance contract
  - The same assumptions are used for this scenario, except all maintenance revenues and costs are deleted. There are some fixed costs left in that make assumptions about overhead, farm maintenance and building depreciation.
- Assumptions
  - Revenue, expenses and other information is supplied by Alberta Agriculture, Food and Rural Development's Economics and Competitiveness Division. The cereal, oilseed and forage summaries were developed by George Rock, Business Management Specialist-Crop/New Ventures, Leduc.
  - Crop yields and prices are based on long-term annual rotations and long-term prices. The cropping assumptions are listed below.

**Table No. 5 Long-term cropping assumptions**

Crop	Yield	Price
Polish canola	21 bu	\$6.75
Feed barley	55 bu	\$2.50
Spring wheat	36 bu	\$4.00
Feed oats	75 bu	\$1.50
Forage crop	1.8 t	\$60.61

- A discount rate of 11 per cent in tables 6, 7 and 8 is a measure of risk (TSE 300 about 11 per cent over time). Assume this enterprise is of similar risk.
- Inflation is calculated at two per cent annually, on both revenues and expenses.
- The rotation length was set at 20 years for comparison purposes.
- Seeding, preparation and maintenance costs were taken from current Alberta-Pacific Poplar Farm Program estimates. These PFP estimates are from company contract service price and include variable cost, paid labour and profit to contractor. A more accurate reflection could be developed based on landowners' actual costs.
- Fixed costs in the leasing scenario were derived from AAFRD numbers. Leasing with no maintenance shows lower fixed costs due to lower overhead and farm maintenance costs.

**Table No. 6 Estimates of returns of cereal/oilseed and hay rotation Grey Wooded Soil Zone**

	<b>Year 0</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 20</b>	<b>20 Year Total</b>
Per ha per year										
<b>Revenues</b>		<b>Canola</b>	<b>Barley</b>	<b>Wheat</b>	<b>Oats</b>	<b>Forage</b>	<b>Forage</b>	<b>Forage</b>	<b>Forage</b>	
Annual crop sales		\$330	\$336	\$343	\$350	\$200	\$300	\$306	\$396	\$2,561
<b>Direct Expenses</b>										
Seed, grow, and maintain costs	\$150	\$153	\$156	\$159	\$79	\$81	\$83	\$107		\$968
Fuel, repairs, insurance and misc	\$64	\$66	\$67	\$68	\$35	\$36	\$37	\$47		\$420
Unpaid labour	\$10	\$10	\$10	\$11	\$6	\$6	\$6	\$8		\$67
<b>Total Direct Expenses</b>	<b>\$224</b>	<b>\$229</b>	<b>\$233</b>	<b>\$238</b>	<b>\$120</b>	<b>\$123</b>	<b>\$125</b>	<b>\$162</b>		<b>\$1,455</b>
<b>Fixed Expenses</b>										
Depreciation, taxes and farm overhead	\$80	\$81	\$83	\$85	\$86	\$88	\$90	\$116		\$708
<b>Total Fixed Expenses</b>	<b>\$80</b>	<b>\$81</b>	<b>\$83</b>	<b>\$85</b>	<b>\$86</b>	<b>\$88</b>	<b>\$90</b>	<b>\$116</b>		<b>\$708</b>
Return per ha to labour and management	\$26	\$26	\$27	\$27	-\$6	\$89	\$91	\$118		\$397
Net present value		\$221								

**Table No. 7 Returns of Leased land with maintenance option for landowner Grey Wooded Soil Zone**

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 20	20 Year Total
Per Hectare Value										
<b>Revenues</b>										
Lease income	\$62	\$62	\$63	\$64	\$66	\$67	\$68	\$70	\$90	\$1,562
Maintenance income	\$110	\$100	\$196	\$128	\$96	\$64				\$694
<b>Total Revenue</b>	<b>\$172</b>	<b>\$162</b>	<b>\$259</b>	<b>\$192</b>	<b>\$162</b>	<b>\$131</b>	<b>\$68</b>	<b>\$70</b>	<b>\$90</b>	<b>\$2,256</b>
<b>Direct Expenses</b>										
Variable maintenance expenses	\$32	\$32	\$33	\$33	\$34	\$35				\$199
<b>Fixed Expenses</b>										
<b>Total Fixed Expenses</b>	<b>\$79</b>	<b>\$79</b>	<b>\$81</b>	<b>\$82</b>	<b>\$84</b>	<b>\$86</b>	<b>\$22</b>	<b>\$23</b>	<b>\$29</b>	<b>\$872</b>
Return to labour and management	\$61	\$51	\$146	\$77	\$44	\$11	\$46	\$47	\$61	\$1,186
Net present value	351									

**Table No. 8 Returns of leased land with no maintenance contract Grey Wooded Soil Zone**

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 20	20 Year Total
Per Hectare Value										
<b>Revenues</b>										
Lease income	\$62	\$62	\$63	\$64	\$66	\$67	\$68	\$70	\$90	\$1,562
<b>Total Revenue</b>	<b>\$62</b>	<b>\$62</b>	<b>\$63</b>	<b>\$64</b>	<b>\$66</b>	<b>\$67</b>	<b>\$68</b>	<b>\$70</b>	<b>\$90</b>	<b>\$1,562</b>
<b>Expenses</b>										
Depreciation buildings	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$5	\$89
Land taxes	\$7	\$7	\$7	\$7	\$7	\$8	\$8	\$8	\$10	\$177
General and office overhead	\$4	\$4	\$4	\$4	\$4	\$4	\$4	\$5	\$6	\$101
General farm maintenance	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$4	\$76
<b>Total Fixed Expenses</b>	<b>\$18</b>	<b>\$18</b>	<b>\$18</b>	<b>\$18</b>	<b>\$19</b>	<b>\$19</b>	<b>\$19</b>	<b>\$20</b>	<b>\$25</b>	<b>\$443</b>
Return to labour and management	\$44	\$44	\$45	\$46	\$47	\$48	\$49	\$50	\$64	\$1,119
Net present value	263									

- The lease rate for poplar farming is based on a local rent rate for highly productive land of \$25/acre or \$63/hectare.
  - The labour cost is \$10 per acre.
- Tables 6, 7 and 8 show comparisons between traditional agricultural crops and poplar plantations with above mentioned two scenarios.
- Disclaimer:** The figures presented in this section are based on current conditions. As income and expenses are highly variable, returns associated with this enterprise can fluctuate in future years. These budgets are not an endorsement of the viability of the woodlot enterprise.
- Based on these assumptions, the three options are considered profitable and the projects could proceed as net present value (the sum of future cash flows back to the present time frame) is greater than zero. Ranking these options is from greater to lesser. Leased land with a maintenance contract, is greater than leased land without maintenance contract, which is greater than returns of cereals and oilseeds (\$351, \$263 and \$221 respectively). Keep in mind that these figures are current for these assumptions only. Small changes in unit prices and costs could change absolute values and rankings quickly. Also, this analysis does not consider cash flow considerations, like having the money to pay taxes when the woodlot is growing and little or no revenue is received.
  - At this time, specific revenue and cost information for poplar plantation enterprises may be difficult to obtain. Potential landowners must be prepared to research and carefully estimate revenues, costs and operating requirements for their proposed enterprise.
- Financing woodlot operations is a separate, but related issue. Conventional lenders, such as banks, are likely to see a woodlot as a high-risk venture. In order to acquire the capital needed to develop an enterprise, individual managers will be required to have:
- a solid business plan
  - high levels of equity capital to put into the venture
  - access to capital from private sources such as family and friends
  - a sound production process

**The critical economic issue** for woodlot operators is to be able to assess the economic returns available to a woodlot under a number of different conditions and management programs. The key factors affecting the profitability of an individual woodlot enterprise are the price received for timber, timber yield and costs incurred in operating the woodlot.

## 6. Key Management Issues

- If you continue to investigate this business opportunity, it's essential that you are able to answer the following questions concerning the management and operation of a private woodlot.
  - Are you prepared to learn all you can about woodlots, visit existing operations, join the industry associations, attend workshops and read all you can about forestry and timber production?
  - Do you understand timber markets and know the needs of the buyers that you will be marketing to?
  - Have you clearly defined the production practices you need to implement in order to produce the quality of timber required by your markets?
  - Are you aware of the amount of time you have to devote to managing your woodlot?
  - Are you aware of the resources required to develop and operate a private woodlot?
  - Are you aware of the returns that can be expected?
  - Are you prepared to develop a complete business plan for a woodlot enterprise?

## 7. Publications

*The Alberta Woodlot Directory*  
1996 Edition

Available through the Woodlot Association of Alberta  
*Conservation and Logging on Private Land in Alberta*  
Information Packaging Centre  
Alberta Agriculture, Food and Rural Development

*Marketing Timber From Private Land in Alberta*  
Canada-Alberta Partnership in Forestry  
Alberta Environmental Protection  
Publication No. I/510

*Woodlot Management Guide For the Prairie Provinces*  
Farm Woodlot Association of Alberta

## A Glossary of Woodlot Terms

**Board-foot** – A volume measure of lumber being one foot wide, one foot long and one inch thick (12 in. x 12 in. x 1 in. = 144 cubic inches). Dressed lumber is actually smaller, due to planning and finishing.

**Bucking** – Cutting a felled tree into specified log lengths.

**Chips** – Small pieces of wood used for pulp, fuel or pressed board manufacturing.

**Clear-cut** – A logging method where all merchantable trees in a defined area are harvested; an area where this logging has been used.

**Commercial thinning** – Thinning in which trees are removed from the site and have commercial value.

**Coniferous** – Trees which bear cones such as pine, spruce and fir.

**Cord** – A volume measure of stacked wood. A standard cord is 4 x 4 x 8 feet or 128 cubic feet of space.

**Cutblock** – An area from which timber is harvested.

**Deciduous** – Trees which lose their leaves in the fall.

**Decked** – Timber is piled in an orderly fashion for loading.

**Diameter at breast height (DBH)** – The stem diameter of a tree measured at breast height above ground level, or 1.3 metres.

**Even-aged** – Applied to a stand of trees in which there is relatively little age difference between individual trees.

**Green lumber** – Lumber with a moisture content greater than that of air-dried lumber.

**Hardwood** – A term used to describe broadleaf, usually deciduous trees such as oak, ash and elm. It doesn't refer to the hardness of the wood.

**Merchantable timber** – The portion of a tree or trees that has attained sufficient size, quality and/or volume to make it suitable for harvesting.

**Peeler** – A log from which veneer stock will be cut.

**Plywood** – A wood product constructed of three or more layers of veneer joined with glue and laid with the grain of adjoining plies at right angles to one another.

**Pulp** – Mechanically ground or chemically digested wood fibres used in the manufacture of paper and paper products.

**Pulpwood** – Wood cut or prepared for manufacture into wood pulp.

**Reforestation** – The natural or artificial restocking of an area with forest trees.

**Regeneration** – The process by which the forest is replaced or renewed.

**Roundwood** – This term is used to describe the logs or wood products that are accepted by the mills for further processing.

**Selection method** – An uneven-aged silviculture system that involves the removal of single or small groups of trees throughout a stand. This method involves repeated cutting in order to maintain the uneven-aged character of the stand.

**Selective harvesting** – A timber harvesting method that removes only some of the mature trees. Selective harvesting isn't necessarily used to encourage regeneration.

**Shelterwood method** – An even-aged silviculture system in which mature trees are removed in two or more cuttings to allow for the establishment and early growth of new seedlings under partial shade and shelter of older trees.

**Silviculture** – The art and science of growing and tending a forest.

**Stand** – A group of trees distinguishable from other groups of trees in terms of some common characteristics such as species composition and tree size.

**Stand tending** – Activities such as weeding, pruning or thinning that are undertaken to benefit the growth or quality of a forest.

**Stumpage** – The value of timber as it stands uncut in the forest.

**Thinning** – The removal of trees in an overstocked stand to give the remaining trees adequate room for growth.

**Timber** – A term loosely applied to forest stands or their products.

**Utilization standard** – The size, species or quality characteristics that determine whether a tree or a portion of trees is merchantable.

**Veneer** – A thin sheet of wood cut on a lathe or slicing machine.

**Volume** – A measure of the amount of wood. In metric this is in cubic metres ( $m^3$ ), in imperial it can be board feet (fbm), cords or cunits (100 cubic feet).

**Woodlot** – tract of land of any size and shape that contain naturally occurring or planted trees.

**Original sources for this glossary were:**

1. *Conservation and Logging on Private Land in Alberta;*  
Canada-Alberta Partnership Agreement in  
Forestry, 1994.
2. *Definitions, A Short List; Woodlot Management*  
Series, Publication No. 11, Alberta Forestry  
Association.
3. *Woodlot Management Guide for the Prairie Provinces;*  
produced by The Farm Woodlot Association of  
Saskatchewan.

**Compiled by:**

Toso Bozic – Sustainable Woodlot Specialist, Alberta Agriculture, Food and Rural Development

George Rock – Farm Management Specialist, Alberta Agriculture, Food and Rural Development

Allan Robertson – Poplar Farm Coordinator, Alberta Pacific Forest Industries Inc.

**For more information:**

Visit Alberta Agriculture, Food and Rural Development's website at: <http://www1.agric.gov.ab.ca>

Contact Alberta Agriculture, Food and Rural Development's Ag-Info Centre (toll-free) at 1-866-882-7677