Woodlot Management Guide for Alberta

Beneficial Management Practices (BMP)

Agdex 300/01-1

Growing Forward 2

Alberta Government

Canada

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BACKGROUND

A woodlot is a tract of land of any shape or size that supports naturally occurring or planted trees. Most woodlots in Alberta are family-owned and are often operated as part of an agricultural operation. These properties occupy 3.6 million hectares of forested land in Alberta's agricultural zone, or 4% of the province's forested land base. Individual woodlots vary in size from a few hectares to several hundred; the average lies between 20 and 40 hectares. The report "Profile of Private Forested Sector in Alberta" suggests 10 to 20% of Alberta's timber supply is from privately owned land.

The value of woodlots is often measured by their ability to produce forest products, or to stimulate local or regional economies by creating or diversifying business activity and employment.

However, woodlots produce more than goods and services. Forests protect soil from wind and water erosion. They contribute to cleansing, filtering and stabilizing wetlands and water bodies, and provide habitat for a wide range of wildlife and plant species. Woodlots contribute to clean air and provide a place to commune with nature.

Objectives and use of this guide

This guide provides an introduction to basic woodlot management activities for landowners who are looking to increase their knowledge or experience with forestland management. It is intended to provide basic knowledge of woodlot beneficial best management practices so landowners can understand

the resources on their woodlots, develop goals and objectives and create a management plan for their land. This guide is not intended to be a one-stop information source. Landowners may want additional assistance or advice from forestry practitioners including woodlot extension specialists, forestry consultants or local forest industry firms interested in working with private landowners.

Beneficial Management Practices (BMPs) are listed at the end of each topic. The term “beneficial” rather than the more common term “best” is used to recognize that forest practices evolve as new information or techniques are developed. “Best” implies practices have reached a plateau and can no longer improve. The list of BMPs for each topic is intended as a summary and quick reference of practices considered beneficial based on current knowledge.

FOREST ECOLOGY AND ECOLOGICAL CLASSIFICATION

Forests are complex physical and biological systems in a constant state of change with countless numbers of factors interconnected in an infinite number of ways. Moisture, topography, soil properties, temperature, light and many other site factors all have an effect on what plant, animal and microorganism population will be found on a specific site at a specific time.

Forested areas support a wide range of vegetative and wildlife species. As conditions change, certain

species develop advantages or disadvantages and their populations change accordingly. Forested sites generally contain enough common characteristics to form areas that may be ecologically classified.

Classification takes into account various conditions such as soil, climate, moisture, and topography but forests are dynamic systems. Natural or man-made disturbances constantly affect the relationships in the systems and influence how forested areas develop.

Beneficial Management Practices

- Consult forestry practitioners knowledgeable in forest ecology and site classification to gain ecological knowledge about the woodlot. Consider preparing site classification maps for the woodlot.
- Develop (or use existing) maps that delineate forest stands based on characteristics that are practical to woodlot management. Use these maps along with ecological knowledge to manage the woodlot even at the forest stand level where appropriate.
- Know and understand the dynamics of forest succession when managing the woodlot. Ensure succession principals are considered for all long-term objectives and for immediate activities that result in any change in the forest cover.
- Apply site classification information to forest management activities to ensure actions such as pre-harvest silvicultural prescriptions, harvest methods and regeneration are consistent with the site's capability.

FOREST SOILS AND WOODLOT MANAGEMENT

All plant life in the forest originates from the thin layer of minerals, organic matter, water and air that we commonly call soil. A proper understanding of soil characteristics and their effect on plant growth and forest development is the key to good woodlot management.

Activities associated with forest harvesting can result in soil degradation (compaction, puddling, rutting, water erosion, loss of nutrients) if they do not adequately take into consideration existing site conditions.

Soil texture and drainage largely control the potential productivity and species suitability of a soil/landscape. Soil pH and electrical conductivity (salinity) can also have a major influence on the growth of tree and shrub species.

Maintaining a healthy organic matter layer on the soil surface is critical in ensuring the long-term productivity of the forest.

Soil rutting destroys soil structure and changes soil drainage patterns.
Photo: Toso Bozic

Beneficial Management Practices

Soil compaction, rutting and puddle formation are all detrimental to healthy soil. Compaction increases soil density and negatively affects rooting depth and normal root growth. Ruts are starting points for soil erosion while puddles destroy soil surface structures and may lead to the formation of surface crusts and restricted drainage. Using these beneficial practices will help alleviate all three conditions.

- Avoid operating heavy equipment on wet sites that will cause soil compaction, rutting, and puddle formation.
- Use heavy equipment only on dry or frozen ground and limit the number of passes over the same area.
- Development and use of skid trails, and felling trees towards the trails, reduces the travel area of harvesting equipment.
- Tracked vehicles cause less soil compaction than wheeled machines.

- Reduce harvesting related activities when soils are wet.
- Reduce problems with rutting by protecting existing forest floor organic layers, retaining harvest slash on site, using low ground pressure equipment, and reducing the number of passes of heavy equipment over the soil.

Tips to reduce water-caused soil erosion:

- Minimize road grades and install cross ditches.
- Ensure ditches and culverts are kept clear to allow water to flow freely.
- Cross streams perpendicularly without disrupting water flow.
- Maintain and improve vegetated buffer strips between roads and stream to help filter runoff.
- Slow water flow on roads with long slopes by installing drainage dips and waterbars.

Creek and buffer
Photo: Toso Bozic

Tips to reduce the risk of soil erosion during harvest operations:

- Maintain vegetative cover on erosion-prone land.
- Harvest during winter.
- Avoid soil disturbance on high-risk areas such as sloping land.
- Protect the forest floor to ensure good regeneration growth and productivity in future stands.
- Recognize and understand the different soil characteristics that affect tree growth or other woodlot management activities.
- Consider species suitability for different soil types.

WETLANDS AND WOODLOTS

In general, a wetland is described as any area where the land is saturated with water, contains water-loving plants, and supports biological processes that require wet areas.

The type and extent of wetlands are determined by climate, land features, surface and groundwater flows, vegetation and soils.

Wetlands are an important part of a healthy, functioning ecosystem and watershed. Aside from providing benefits to the environment, wetlands also provide important benefits to landowners and their woodlots by improving quality and quantity of water.

Riparian areas, which can contain forbs, willows and trees, extend beyond the perimeter of the wetland and provide extra stability to the whole wetland system. The additional layers of vegetation that thrive in riparian zones ensure the wetland continues to function at its best and to provide its many benefits.

Wetland surrounded by woodlots
Photo: Toso Bozic

Beneficial Management Practices

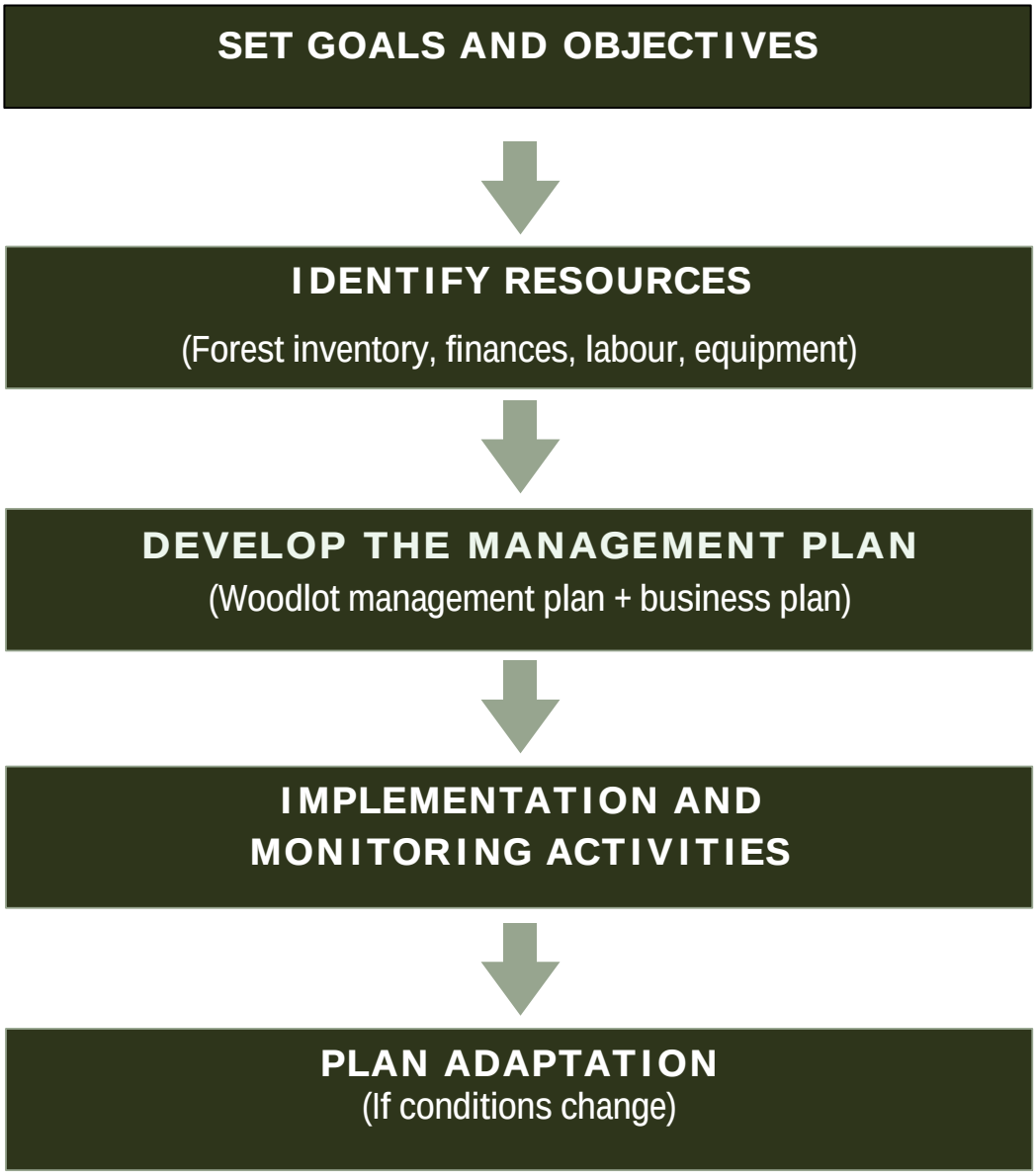
- Include wetlands management and conservation in the woodlot management plan.
- Do not use fertilizers or pesticides in wetlands or riparian areas.
- Maintain a healthy buffer of native vegetation around wetlands.
- Plant trees and shrubs along a riparian area.
- Keep wetlands intact. Do not drain or fill wetlands.
- Restore wetlands that have been drained.

- Maintain water levels. Do not interfere with natural inflows or outflows.
- Manage livestock access to water bodies or courses to conserve water and avoid damage to banks by providing off-site watering.
- Locate livestock shelter, feed and mineral supplements away from riparian areas.
- Control grazing duration in riparian areas.
- Avoid cultivating in riparian areas. Avoid cutting or grazing wetland margins until after mid to late July to protect nesting waterfowl.

WOODLOT MANAGEMENT PLANNING

People own and use woodlots for many and varied reasons. Some reasons are economic, such as harvesting timber or firewood, or collecting non-timber forest products such as wild fruit or mushrooms. Other reasons are related to the environment, such as developing and maintaining wildlife habitat, enjoying the aesthetics of forested land or using the land for recreation. Regardless of why woodlot owners choose to invest in forested land, the reasons for ownership form the objectives for the woodlot.

Creating an effective woodlot management plan requires technical knowledge, time commitment to develop the plan and resources to implement it. The following five steps summarize the management planning process:



Beneficial Management Practices

- Establish clear goals and objectives for the woodlot to meet the owner's needs.
- When formulating goals and objectives, include those that appear to be in conflict with one another.

- Consult or utilize the services of forestry professionals, extension specialists, financial advisors, and others trained in management planning.
- Before starting the planning exercise, ensure all legal boundaries have been established and any legal agreements that might affect the land are clearly understood.
- Identify the resources needed to develop a plan relevant to the owner's needs: woodlot resources, financial resources, equipment and labour requirements, and technical assistance.
- Include a woodlot inventory that is at a sufficient level of detail to meet the woodlot objectives.

Aerial photograph of a section of land
Photo: Ag-Canada - Prairie Farm Rehabilitation Center

- Utilize current maps and aerial photographs to represent resources and physical features of the woodlot. Update maps and photos as required.
- Formalize the plan as a written document that is easily understood and easily accessible.
- Develop a flexible management plan that to accommodate changes in woodlot resources, evolving objectives, and other areas.
- Use an integrated resource management approach to planning to accommodate multiple resources and resolve conflicting objectives.
- Record activities that demonstrate adherence to the plan. Include these records as part of the management plan.

THE WOODLOT INVENTORY

It is important to collect and assemble woodlot resource information needed to develop a practical plan for the woodlot.

Tree core
Photo: Toso Bozic

A wide range of information may be collected: information on trees, soil characteristics, topography, wildlife habitat, water, roads and other features. Information on vegetation may include tree species, size and volumes as well as understory species and any unique or rare vegetation.

A highly detailed inventory may not be needed for many small woodlots. A quick walk-through may provide enough information to set goals, while a more detailed inventory may be necessary to determine the timing of harvest or other management activities. The more information that is assembled, the more useful the inventory will be when developing management options and long-term use decisions for the woodlot.

Beneficial Management Practices

- Develop a well-defined plan that includes clear objectives for the woodlot. Objectives may be adjusted after information becomes available from the inventory.
- Ensure all legal boundaries are clearly marked on the ground and on maps or aerial photographs.
- Conduct a preliminary walk-through and note special land features of interest such as wet areas, occurrence of rare or unusual species, etc. and verify that maps are correct.
- Follow established sampling methodology when designing the inventory to obtain reliable timber volume estimates.

Using increment borer to determine the age
Photo: Toso Bozic

- Consider including non-timber values such as wildlife habitat, wild fruit or recreation potential as part of the inventory to broaden future opportunities.
- Utilize expertise and information available from government agencies, forest industries and forestry consultants.
- Maintain records showing stand boundaries, plot locations, timber volumes and other land features of interest, particularly to track and understand changes over time.
- Monitor the woodlot's productivity and forest changes by regularly updating the inventory.

Wood boring beetle damage and fire scarring
Photo: Doug Macaulay

WOODLOT HEALTH: PEST MANAGEMENT

Maintaining a healthy and vigorous forest is important to the woodlot owner. Pests threaten the overall health of the trees and compete with human uses of the forest. Some insects, disease-causing organisms or mammals cause only minor physical damage, while others limit growth or kill the trees. Many other factors have negative effects on the health of a forest such as drought and severe weather events like hail and ice storm. Careful planning by woodlot owners will reduce losses from damage and promote a “balanced” ecosystem.

Steps to Sustaining a Healthy Woodlot

A management program that emphasizes early detection and control will help reduce losses during pest outbreaks. A pest management program consists of the following steps:

1. Plan ahead
2. Conduct frequent inspections
3. Learn to recognize local pests
4. Decide if control is necessary
5. Integrate a pest management option

Beneficial Management Practices

- Develop and follow a pest management plan or strategy.
- Maintain biological diversity as a pest control strategy.
- Use natural control measures whenever possible. Use chemicals as last resort and make prudent use of chemicals consistent with all regulations.

- Encourage beneficial wildlife.
- Learn to recognize pests and their activities.
- Routinely monitor the incidences of insects and diseases on the woodlot and adjacent areas and maintain maps and records.
- If you have an insect problem, take appropriate action quickly – do not wait.
- Problems with insects are sometimes indicative of overall health issues with trees.
- Follow environmental guidelines for chemical containers and applicators.
- Ask for advice and guidance from qualified pest control practitioners.
- Involve/inform neighbours of pest management activities.

SILVICULTURE

Silviculture is the science of establishing, growing, tending, and harvesting trees. A silviculture system is a planned program of treatments scheduled throughout the life of the forest stand. These scheduled events range from harvesting the forest to regenerating and subsequently tending the new stand. The woodlot owner has many options to consider when choosing silviculture activities. Whether planting trees, thinning juvenile stands, or harvesting mature timber, there are numerous systems and strategies that can be adapted to suit local conditions and meet specific objectives.

Many factors must be considered before choosing a silviculture system. These factors include:

- Objectives
- Economics
- Regeneration
- Climate
- Current Stand
- Species suitability
- Wildlife
- Pest
- Time

The choices must be consistent with the objectives for the woodlot and should be based on knowledge of the outcomes of different silvicultural activities. Once the choices are made, the planning process can begin.

Beneficial Management Practices

- Develop a detailed plan to describe the silviculture activities to be undertaken. The plan should include the silviculture prescriptions, harvest method, site preparation method, reforestation strategies and operational details. Ensure the plan is consistent with the overall objectives for the property.
- Learn about the tree species that will be managed and select complimentary silvicultural systems.
- Choose a harvest system to facilitate the establishment of the kind of new forest desired: even-aged or uneven-aged, mixedwood or single species.
- Integrate clearcut block design with land contours to minimize soil erosion.

Clearcutting
Photo: Toso Bozic

- Consider the effects of increased wind exposure from clearcut blocks on the surrounding forest.
- Use irregular shaped cut blocks to improve wildlife habitat.
- Develop forest regeneration plans before harvesting begins.
- Natural regeneration of coniferous stands depends on seed availability. Schedule harvests to coincide with years of high seed production.
- Soil disturbances from logging will stimulate root suckering in aspen stands.
- Use selective harvest systems to manage mixedwoods for shade tolerant species in wind-firm stands.
- Leave high quality vigorous trees after selective logging. Do not degrade the stand by harvesting only the best trees.

- During selective logging, use designated skid trails to avoid damage to the residual trees.
- Disturbances from logging also expose mineral soil and create seedbeds or micro-sites suitable for seed germination.
- Consider manual patch scarifying to create good seedbeds or planting spots. Larger and heavier scarifying equipment is more costly and may be less efficient in small cutovers.
- Prescribed burning is a valuable site preparation tool; however the fire's effects are not always predictable and special measures must be taken to protect the surrounding area.
- Know and understand the regulations governing herbicides for use in forestry applications.
- Select planting stock or seed that originates near the area to be reforested.
- Protect seedlings from the weather elements at all times prior to planting.
- Seedlings should be planted as soon as possible after delivery. Ensure they are thawed before planting but do not allow them to exceed 5 degrees Celsius and break dormancy.
- Select planting spots that have a mixture of organic and mineral soil or mineral soil alone. The duff layer dries regularly and can lead to seedling mortality.

Selective harvesting
Photo: Toso Bozic

- When planting seedlings, ensure roots or root plugs are not clumped but are vertical in the planting hole.
- Gently but firmly pack soil around planted seedlings to eliminate air pockets around the roots.
- Spacing between planted trees should be based on the final product desired. Wider spacing will result in larger trees.
- Consider stand development trends over the long term when making spacing decisions. Natural mortality will reduce stand density throughout the life of the stand and affect timber products at the final harvest.

- Survey planted areas within one or two years to assess survival rates. Determine causes of excess mortality before replanting. Assess seeded areas to determine if additional action is required.
- Overlapping tree crowns indicates the site is fully utilized and trees may benefit from thinning.
- Monitor the growth rates of crop trees by measuring growth rings on an increment core taken at chest height. A decline in diameter growth indicates the stand could benefit from thinning.
- During thinning operations, consider maintaining species diversity to reduce widespread insect or disease infestation, spread of wildfires and to improve wildlife habitat.
- Manual or motor-manual thinning methods allow selection and spacing of crop trees. Mechanical methods such as strip thinning are nonselective and do not provide for inter-tree spacing.
- Prune only trees that are expected to grow vigorously for at least 20 years. Do not prune trees on the periphery of a stand.
- Do not prune more than one third of the live crown.
- Plan a stand tending operation to facilitate foot and machine travel.

WOODLOT ACCESS: ROADS, TRAILS, CULVERTS AND BRIDGES

Forest management operations such as timber harvests, reforestation, or stand tending may need access roads for workers and equipment to reach the operation site. Large woodlots may need foot and/or vehicular access to remote parts of the property for fire protection. The woodlot owner may want to create access routes for recreational purposes.

Construction of roads, trails and waterway crossings in a woodlot are potentially ecologically disruptive activities. Roads and trails leave a permanent mark on the landscape and waterways may be directly affected. However work can be planned and conducted to minimize these impacts and contribute to a sustainably managed woodlot.

Recreational trail
Photo: Toso Bozic

Beneficial Management Practices

- Develop a plan to identify the purpose and uses of the access, the location, and the construction methods and materials to be used.
- Consult with forestry practitioners including woodlot extension specialists on regulations governing access routes and waterway crossings and to gain current knowledge on locating and constructing access routes.
- When planning an access route, consider its range of uses and develop protective measures for sensitive or special sites.
- Utilize existing roadways, including routes on neighbouring properties instead of building new ones.
- Avoid waterway crossings whenever possible. If crossing is necessary:
    - Construct crossings at the straightest and most narrow segment of the stream.
    - Schedule crossing construction work in late spring or late summer when stream flow is lowest. Do not schedule construction during fish spawning season.
    - Install culverts perpendicular to the roadbed and parallel to the stream flow.
    - Prepare the culvert's inlet and outlet to minimize water turbulence.

    - Blocked culverts must be cleared immediately.
    - Locate a bridge or culvert downstream from fish spawning beds.
    - Consider installing a bridge if more than two culverts are needed for a crossing
    - Do not remove material from the waterway or the shoreline.
    - Restore disturbed streambeds or banks.
- Plan gentle curves and slopes. Avoid sharp turns and steep slopes.
- Limit the width of the right-of-way to twice the width of the roadway.
- Harvest trees in right-of-ways before road construction begins.
- Dispose of logging debris from right-of-ways.
- Seed right-of-ways to grasses and herbaceous plants.
- Plan winter roads for wet areas.
- Begin winter road construction after the ground has at least 35 cm of frost.
- Make winter roads short even when soil is frozen.
- Backfill winter roads with snow.
- Restore vegetative cover on disturbed areas around the crossing site including waterway banks.
- Limit the number of trees cut during the construction phase.

- Retain forest debris to maintain soil stability and firmness.
- Design recreational trails to limit access to specific areas.
- Plan recreational trails to traverse a variety of forest stands and sites of special interest.
- Recreational trails should be 3 m wide for ATV or snowmobiles (1 lane) and 2 m wide for foot traffic.
- All elements of a road and trail network should be inspected annually to identify maintenance and/or repair requirements.

HARVESTING TIMBER IN A WORKING WOODLOT: PROFIT AND SUSTAINABILITY

Harvesting timber is a costly but important woodlot activity. Although realizing a financial return is a major reason to harvest timber, changing species composition, removing damaged or diseased trees, or improving the quality and future value of the stand are also legitimate reasons for harvesting. Whatever the reason, the operation should be planned carefully to optimize the yield and to accommodate numerous

Tree harvesting
Photo: Toso Bozic

economic, social, and environmental concerns. The harvest plan must always be based on the objectives for the woodlot and must be complementary to other components of the woodlot management plan. Several harvest methods are available to the woodlot owner.

Beneficial Management Practices

Planning the harvest

- Develop a pre-harvest silvicultural plan to ensure logging techniques used are consistent with the objectives for the woodlot.
- Develop a harvest plan that specifies all operational aspects of the logging. The harvest plan must be complimentary to other components of the woodlot management plan.
- Investigate markets for timber products and markets for labour and harvest machinery before initiating a logging operation. Schedule logging operations to satisfy demands for timber products.
- Consult local regulations pertaining to timber harvesting, water and stream protection, and other land uses.
- Choose the type of harvest (e.g. selection or clear-cut) then select the appropriate harvest equipment.
- Hire skilled, recognized or certified logging contractors.
- Mark trees that will be cut (or trees that will be retained) for efficient and effective selection logging operations.

- Conduct logging operation during dry weather or during winter months to reduce the logging imprint.
- Opt for small and irregularly shaped cutovers and respect natural contours to minimize visual impacts of harvests.
- Plan skid trails, landings, processing sites, and other heavy traffic areas.
- Plan protective measures in advance for ecologically sensitive areas.

Photo: Toso Bozic

The logging process

- Opt for directional felling.
- Harvest wet areas when the ground is frozen.
- Deposit logging debris on skid trails to cushion underlying soils.
- Leave small islands of standing trees for wildlife in clear-cut areas.

- Avoid crossing streams with harvest machinery.
- Leave 10-15 metre wide strips as buffer zones around wet areas.
- Maintain a tree cover in riparian buffers by selectively logging up to 50% of the stems.
- Use light machinery when logging in buffer strips to avoid exposing soil. Winter logging is preferred in these areas.
- Avoid clear cuts on slopes greater than 30%.
- Begin harvesting at the top of the slope and proceed downhill.
- Consider the visual effect of logging on the landscape. Avoid straight-edged cutovers, protect summits, create a visual screen along roadways, and dispose of logging debris.

Skidding and forwarding

- Select an experienced logging contractor who understands the harvest objectives.
- Opt for winter logging.
- Delimb trees on skid trails.
- Avoid exposing mineral soil by machines' movements.
- Divert water from the ruts in skid roads. Divert water away from watercourses.
- Do not use watercourses as access roads.
- Cross streams at planned crossings.
- Maintain a clean work site. Dispose of all containers and discarded supplies and keep machinery well maintained.

Skidding
Photo: Toso Bozic

Tree processing

- Check standards and procedures to satisfy the timber buyers' requirements.
- Opt for delimbing at the stump so logging slash will be distributed throughout the cutover.
- Locate landing and piling areas away from public view.
- Keep timber processing activities away from watercourses.
- Avoid power lines during harvesting and processing operations.
- Sort timber by species.
- Protect woodpiles from wind and dirt.
- Clear processing sites of logging debris and break compacted soils after the harvest operation is completed.

Tree delimber
Photo: Toso Bozic

FOREST GRAZING

Woodlot owners may manage the forested portions of the property for timber production while maintaining agricultural crops and livestock in other parts.

Working forest systems have the potential to provide valuable cattle forage. Cattle grazing on forested land can occur successfully when appropriate management techniques to protect the forest system are utilized. Over-grazing, however, can cause long-term damage to the forest and negatively affect other uses such as timber production, wildlife habitat, and/or recreation.

Beneficial Management Practices

- Include a grazing component or separate grazing plan in the woodlot management plan.
- Grazing should not be planned on sites where regeneration difficulties are anticipated. Assess potential forested rangeland prior to timber harvest to determine if special measures will be required to regenerate the stand.
- Consider grazing as a thinning tool. Light to moderate levels of grazing may increase growth of young aspen suckers while heavy grazing will retard growth.
- Postpone grazing until June or later depending on the forage carryover from the previous year. Delaying grazing one day in the spring will extend the grazing season 3 days in the fall.
- Manage the intensity of grazing by applying livestock distribution tools such as strategic water and salt locations and temporary fencing.

Forest grazing
Photo: Sustainable Resource Development

- Utilize portable watering systems to manage animal movements.
- Match stocking rate to carrying capacity.

- Do not graze more than 30% of forage on cutover land to protect forest regeneration.
- Conduct frequent inspections to identify changes in range conditions that could lead to long-term damage to the carrying capacity.
- Maintain an even distribution of livestock throughout the grazing area.
- Herd animals into desired locations.
- Install fences to manage access.
- Construct or maintain forest roads and trails to encourage animal movements into treed areas.
- Minimize grazing on cutovers during fragile regeneration periods.
- Defer grazing on cutovers until at least the end of the first year after harvest and preferably until the second.
- Provide adequate rest to the land after grazing to allow forage to recover.

Woodlots protect feedlots from wind
Photo: Toso Bozic

- Develop multiple pasture or grazing sites to allow rotation of livestock and avoid overgrazing.
- Following timber harvest, graze at light to moderate levels with stocking rates based on the pre-harvest mature forest community. Aim for a forage utilization rate of less than 30% and a light "hoof-print" in deciduous cut blocks.
- Monitor grazed cutovers regularly to assess the forest regeneration.
- Conifer cutovers should be monitored for at least 5 years after harvest and deciduous or mixedwood cuts for at least 2 years.

AGROFORESTRY

Agroforestry is a land management approach that deliberately combines the production of trees with the production of agricultural crops and/or livestock. Agroforestry brings together the science of producing farm products with the science of growing trees. Blending agriculture and forestry with accepted conservation practices can optimize economic, environmental and social benefits. Agroforestry systems can be categorized into five areas of activity:

- Alley cropping
- Forest farming
- Riparian forest buffers
- Silvopasture
- Windbreak shelterbelts

Beneficial Management Practices

- Develop a well-defined plan that includes clear objectives of agroforestry activities and is complementary to the goals and objectives for the entire farm property.

Alley cropping in northeastern Alberta
Photo courtesy of PFRA

- Aim for multiple benefits such as timber values and crop protection values from shelterbelts.
- Design shelterbelts or other forested areas to maximize and optimize benefits to the landowner and the surrounding landscape. Consider the broader landscape when implementing agroforestry activities.
- Use natural or planted forest areas or belts to protect or enhance the quality of water bodies and to protect soil from wind erosion.
- Choose tree species best suited to the local growing conditions and to their desired function.

- Concentrate efforts to control weeds during the first three years after planting tree seedlings.
- Avoid cultivating for weed control after the first three years to minimize damage to seedling roots.
- Consider impacts of activities on neighbouring properties.

FIRE PROTECTION IN THE WOODLOT

Fire is a natural component of the forest ecosystem. The destructive or beneficial effects of a fire depend upon the nature of the fire and on the kind of disturbance or damage it causes.

As a destructive agent, a fire will damage timber, wildlife, range, aesthetic and recreation resources. Intense fires can cause immediate and long-term damage to soils and watersheds. Buildings, historical features, and other man-made improvements also may be damaged or destroyed. At times, these features become part of the fuel and contribute directly and/or indirectly to the difficulty and cost of controlling the event.

Fire can also play a beneficial role in many forest and range ecosystems. For example, fires create seed-beds, open cones to release seeds, recycle nutrients locked in the vegetation, control insects and diseases, reduce competition to seedlings from heavy grass and shrub cover and rejuvenate wildlife habitats.

Beneficial Management Practices

- Include fire management in the management plan.
- Include fire control as an objective when planning access roads.
- Communicate with neighbours about planned or existing burning activities.
- Be alert when burning is done on nearby properties.
- Monitor all activities on the woodlot. Activities that utilize machinery always have the potential to provide an ignition source for a fire.
- Limit access and restrict activity such as stand tending or forest harvesting during period of high or extreme fire danger.
- Consider a no smoking policy on the woodlot.
- Collect refuse such as bottles that might provide an ignition source during hot weather.
- Dispose of all fuel and lubricant containers according to provincial or municipal regulations.
- Keep access roads mowed to reduce the grass cover and collect woody debris from the roadsides.

Burnt house and forest area
Photo: Toso Bozic

- Manage fuel loads. Scatter slash to facilitate quick decomposition or pile and burn it during damp weather; prune trees up to 3 metres to restrict ground fires from spreading to the crowns.
- Construct fireguards by ploughing swaths 3 to 6 metres wide and reworking the swaths in the spring and mid-summer to minimize vegetative cover.
- Utilize strips of standing timber, particularly deciduous trees as fireguard and install fireguards around new plantations
- Consult with local fire control agencies about recommended equipment and legislated requirements.
- Upgrade water sources or develop new ones to fight fire during an emergency.
- Participate in community fire protection plans.
- Locate water tanks and firefighting equipment in strategic locations and ensure anyone working on the woodlot can easily access the equipment.
- Consider training opportunities for yourself and for others.
- Develop an observation routine especially during periods of high fire danger, after lightning storms, or while forestry work is underway, to detect and control fire in its early stages.
- Ask for assistance as soon as a fire is spotted. Do not wait!

- Follow established fire suppression techniques: mop up, and post fire patrol to ensure the fire is attacked effectively, is kept under control, and does not restart.

BUSINESS PLAN BASICS

A business plan is an important component of the woodlot management plan. All components of the woodlot management plan, including the business component, should complement each other and contribute to the overall objectives for the woodlot. Together with the goals and objectives, a business plan will outline financial aspects of the woodlot.

A business plan can be prepared by financial experts, professional foresters or by the woodlot owner. The complexity of the plan will depend on the range of activities that are scheduled and the financial implications of the actions. Regardless of how complex or simple, a business plan should have the following basic elements:

- Marketing
- Financial management
- Contracts
- Regulations and legal protection

Beneficial Management Practices

- Develop a business plan that is financially attainable and flexible enough to adapt to changing markets or other conditions. Business plans should address the market,

contracts, regulations, legalities, financial aspects and other business related issues.

- Ensure the business plan goals and objects are complimentary to the woodlot management plan.
- Understand the raw materials, like timber species and specifications, required to create products manufactured by local mills. Utilize this knowledge to assess the timber value of different forest stands in the woodlot and to maximize returns from the property.
- Sort logs to meet buyers' specifications and gain higher prices.
- The value to standing trees can be increased by additional processing – logging, piling, hauling, milling, etc. Increase revenues from timber by assuming some of the responsibility (and cost) for adding value.
- Before pursuing value-added opportunities consider the additional cost of processing and marketing, skill requirements, and the size, accessibility, and stability of the market.
- Consider the pros and cons of various timber selling options such as on the stump, at the landing, delivered to the mill gate, etc. before deciding how to market the timber.
- Convert prices to common units such as dollars per cubic metre before comparing prices from different buyers.
- Timber markets fluctuate. Study timber market trends to determine the best time to sell woodlot products.

- Conduct market surveys to gather information and use the results to develop a marketing plan and to support business decisions.

Flooring
Photo: Toso Bozic

- Understand the supply and demand for woodlot products that will be marketed. Know who is supplying and who is demanding the products and associated prices before entering the market.
- Once a business relationship is established, maintain good customer relations by ensuring reliability of supply, competitive prices, product satisfaction and high quality.
- Maintain detailed customer files as a marketing strategy.
- Consider the services of a professional forester who has expertise and experience in forest management, marketing timber products, and dealing with forestry contractors.
- At a minimum, maintain simple financial records of income, assets, and expenses to

monitor the financial status of the woodlot operation.

- Consult with financial experts about taxation or other financial issues.
- Always transfer verbal arrangements into written contracts to ensure both parties understand the terms and conditions of the agreement. A contract should never be signed until the terms and conditions are fully understood.
- Use sample contracts as a guide only. Do not adopt a sample contract as a final document.
- Know and understand the legal obligations of using contractors or hired labour.
- Be aware of regulations pertaining to the environment, fisheries, soils protection, fire prevention and transportation that will influence the activities of individual woodlot operators.

White spruce logs
Photo: Toso Bozic

WILDLIFE AND WOODLOTS

Wildlife and woodlots go hand in hand. One of the purest pleasures for woodlot owners is watching the daily activities of the various birds and animals associated with stands of trees. Interests in wildlife may include hunting and trapping, or more unhurried pursuits such as photography, bird watching and other leisure activities.

Beneficial Management Practices

- Develop a well-defined wildlife management plan that includes clear objectives for the species that will be managed.
- Use timber harvest systems that create or enhance wildlife habitat. Selective logging will reduce the size of openings in the forest and maintain the continuity in the forest canopy. Clearcut logging will disrupt the forest cover but will encourage natural regeneration of shade intolerant trees and shrubs, which is beneficial to many wildlife species.
- Plan forest harvests so that logged areas are scattered throughout the woodlot rather than in contiguous blocks. Cut block should be irregular shaped.
- Leave at least 6 dead standing, diseased, or deformed trees for nesting and feeding sites on cut blocks.
- Leave some logging slash on the ground for wildlife use.
- Plant fruit producing plants for wildlife feed. Include plant species like choke cherries that

retain fruit over winter months to provide year round feed.

- Develop transition zones of shrubs and grasses along edges of farm fields or logged blocks.
- Plant multi-row shelterbelts or forest belts. Curved rows are better than straight rows to increase the amount of edge and to reduce wildlife exposure down long sight lines.

Tree planting along the river
Photo: Toso Bozic

- Wildlife plantings should have taller tree species in the centre and shorter species along the edges. Viewed from the end, ideal plantings will have a dome shape.
- Plant or retain conifer trees for their thermal cover function. Include thermal cover trees near potential wildlife use areas.
- Develop or maintain wooded corridors that connect forested areas both within and beyond the property.
- Build nesting boxes or brush and rock piles to create wildlife nesting or cover sites.

- Leave 60 metre buffer zones around wetlands larger than one-half hectare and 30 metres around smaller areas.
- Conserve riparian zones by not logging, or by limiting logging activities to selective logging and only during winter months. Erect fences to protect these zones from livestock overgrazing or compacting moist soils.
- Adopt natural methods to control wildlife. Examples of natural controls are planting species undesirable to wildlife around areas to be protected, removing habitat such as ground cover for rodents, or attracting natural predators to control populations.
- Become familiar with the wildlife species present and their food and habitat requirements.

Hummingbird moth nectaring at a dandelion near Peace River
Photo: Bill Dehann

WOODLOT RECREATION

Many outdoor activities take place in a woodlot. Some are for fun, others for profit. Traditional outdoor recreation takes many forms and could include consumptive uses of the woodlot such as harvesting wildlife, wild fruit, or mushrooms. It can also incorporate non-consumptive uses such as cross-country skiing, horseback riding, hiking, or communing with nature. While these activities are for fun, they also have the potential to be for profit and can improve income from the property. Diversifying farm income by providing recreation opportunities on the land is well established in the agriculture community.

Beneficial Management Practices

- Consider safety and liability issues before allowing access to the woodlot. Purchase adequate insurance for protection against damage, injury and associated financial losses.
- Include a recreation component to the woodlot management plan.
- Conduct an inventory of recreation resources or collect recreation resource data in conjunction with the woodlot forest inventory.
- Consider the recreation value of forest management activities. For example cut blocks can provide wildlife viewing areas; regenerated cut blocks may demonstrate stages of forest succession, etc.

- Develop a trail and road network to all parts of the woodlot that will be accessed by visitors. Design the access to accommodate the primary purpose (hiking, skiing, logging equipment) but plan to accommodate other woodlot management activities.
- Locate firefighting equipment near areas of public use.
- Install fire rings or pits to encourage users to build fires in the same spot and prevent accidental ignitions.
- Provide firewood to discourage campers from damaging trees or other vegetation.
- Protect and preserve sites of cultural value.
- Consider providing services such as guiding or equipment rentals in addition to recreation experiences. Be flexible to accommodate changing seasons and thus changing demands for services.
- Develop a strong client base by actively promoting the recreation resources and services available.