

Managing Your **Private Woodlot**



A GUIDE TO BEST MANAGEMENT PRACTICES



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Table of Contents

1) Introduction

- A - Purpose of Best Management Practices
- B - Benefits of Best Management Practices
- C - Woodlot Management

2) Developing Timber Sales Contracts

- A - Pre-Harvest Planning
- B - Selecting a Contractor
- C - Pre-harvest Meeting and Inspection
- D - The Bid Process and Negotiating a Deal
- E - The Timber Sales Contract
- F - Self-Audit Checklist

3) Harvesting

- A - Planning & Design
- B - Operational Activities
- C - Post-operational Activities
- D - Self-Audit Checklist

4) Reforestation

- A - Reforestation
- B - Site Preparation
- C - Wildlife and Environmental Considerations
- D - Follow-up Monitoring and Treatment
- E - Self-audit Checklist

5) Forest Protection

- A - Insect and Disease
- B - Fire Protection
- C - Self-audit Checklist

- Section One -

Introduction

Contents

A – Purpose of Best Management Practices...2

Target Audience...2

What are Best Management Practices (BMPs)?...2

Best Management Practices are Not...3

Why Develop Best Management Practices?...3

B – Benefits of Best Management Practices...3

Environmental Stewardship...3

C – Woodlot Management...5

Management Planning...5

A - Purpose of Best Management Practices

1. Target Audience

This manual was developed for use by both woodlot owners and contractors who deliver harvesting services to private landowners in Manitoba.

2. What are Best Management Practices (BMPs)?

- The Best Management Practices Manual for Manitoba's Private Woodlots is a menu of practical guidelines based on the best scientific information available at the time.
- BMP's are the operational guidelines required to achieve both the short-term economic goals and the long-term vision of the woodlot management plan.
- BMPs are designed to be flexible, recognizing that both site conditions and the landowner's objectives vary. Determining the most appropriate practices to use on a particular site depends on the informed judgment of the landowner, contractor and a woodlot specialist.
- BMPs are designed to help contractors and landowners meet three goals:
 - 1)To conduct woodlot management activities in an environmentally responsible manner.
 - 2)To minimize damage to the forest resource and sustain the productive potential of the woodlot.
 - 3)To ensure that the landowner's rights and interests are respected.

3. Best Management Practices (BMPs) are:

- **Not** intended to replace any existing regulation or law.
- **Not** a substitute for a management plan.
- **Not** intended to act as a substitute for obtaining professional help.

4. Why Develop Best Management Practices BMP's?

The primary purpose for BMP's is to raise the level of forestry practices on private land.

When a landowner has taken the time and effort to develop a Woodlot Management Plan, it must be assumed that he or she is interested in sustaining and enhancing both the long-term economic and environmental potential of his/her woodlot resources. In other words, the landowner's goal is stewardship of woodlot resources.

By adopting the applicable practices in this manual and following the recommendations of a registered woodlot management plan, the landowner will be moving one step closer to fulfilling woodlot certification requirements if they eventually choose to follow that route. The landowner will also avoid the following scenarios:



Safety hazards



Poor timber utilization



Environmental damage



Rutting and soil compaction

B - Benefits of Best Management Practices

Environmental Stewardship

The practices in this manual were developed to help landowners work with contractors to achieve their woodlot management goals. When contractors help landowners to enhance the vigor, health and quality of their woodlots, they increase Manitoba's potential to generate sustainable forestry revenue from private land and in turn, help Manitoba to benefit from enhanced water storage, water quality and biodiversity.

Benefits of Riparian management include clean water, less soil erosion and improved wildlife habitat



well managed woodlots provide recreation opportunities



Manitoba's privately owned wooded lands are currently facing a number of challenges, including:

- Natural decline of forest cover. Without natural disturbance or human management, trees age, lose their vigor and die.
- Large-scale harvesting of private forestland for export markets. Due to shortages of wood supply in North America, Manitoba landowners are facing increasing export driven demand and prices for private land timber.



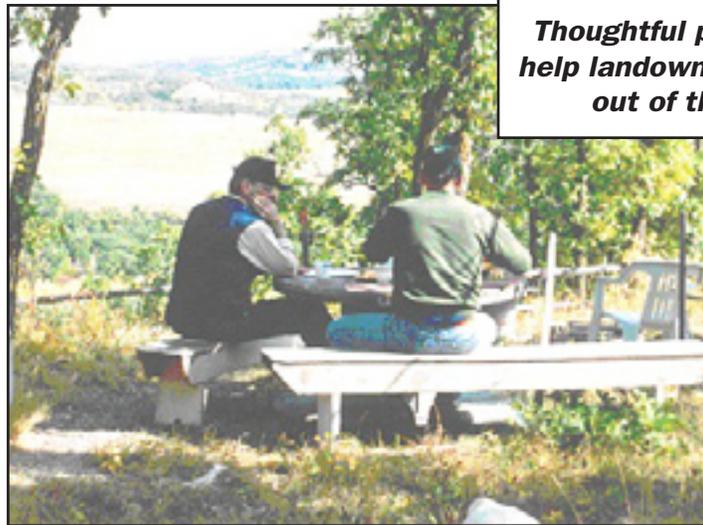
a well managed woodlot will provide income for the landowner without depleting the resource

C – Woodlot Management

Management Planning

Woodlot management planning provides a strategy that allows the landowner to make informed decisions with respect to the forest resource. Woodlot management provides an option for landowners who are interested in using private timber resources as a means of creating a new source of sustainable income as well as potential for local jobs and a rural value added economy.

A Woodlot Management Plan is a written document that includes the individual landowner's objectives, a detailed map of the property and timber stands, an inventory of the forest resource, as well as the recommended long and short-term management prescriptions that will achieve the landowner's objectives.



Thoughtful planning will will help landowners get the most out of their woodlot

The Role of Woodlot Specialists

The role of the woodlot specialist is to maximize the economic and environmental benefits for landowners, communities and Manitoba by providing the private landowner with technical support that leads to a written management plan.

- Section Two -

Developing Timber Sales Contract

Contents

- A - Pre-harvest Site Planning...10**
- B - Selecting a Contractor...12**
- C - Pre-Harvest Meeting and Site Inspection...12**
- D - The Bid Process and Negotiating the Deal...12**
 - 1.) The Scaled Volume Sale...12
 - 2.) Method and Timing of Payment...13
- E - The Timber Sales Contract ...13**
 - Sample Contract...14**
- F - Self-audit Checklist...17**

Timber Sales Contracts

Timber sales contracts are the foundation for landowner/contractor relationships. Formal contracts outline the expectations of both parties by clearly defining the terms and conditions associated with a timber sale. Contracts not only protect the landowner's rights and interests, they protect the contractor's interests by minimizing the potential for disputes.

The following process assumes that the landowner has the basic data and information necessary to negotiate a timber sale – i.e. volume and management options based on either a Timber Assessment or a Registered Woodlot Management Plan.

- 1) The landowner and a woodlot specialist complete a pre-harvest site assessment in the woodlot and discuss potential markets.
- 2) The landowner selects a potential logging contractor(s) by obtaining contact information and references.
- 3) The landowner, potential contractor(s) and the woodlot specialist have a site inspection meeting to revisit the woodlot and discuss terms of the proposed timber sales contract.
- 4) The contractor offers a bid price for the timber resource. The landowner accepts or rejects the bid or can attempt to negotiate the sale price.
- 5) The landowner and contractor complete a timber sales contract either with or without the assistance of the woodlot specialist.

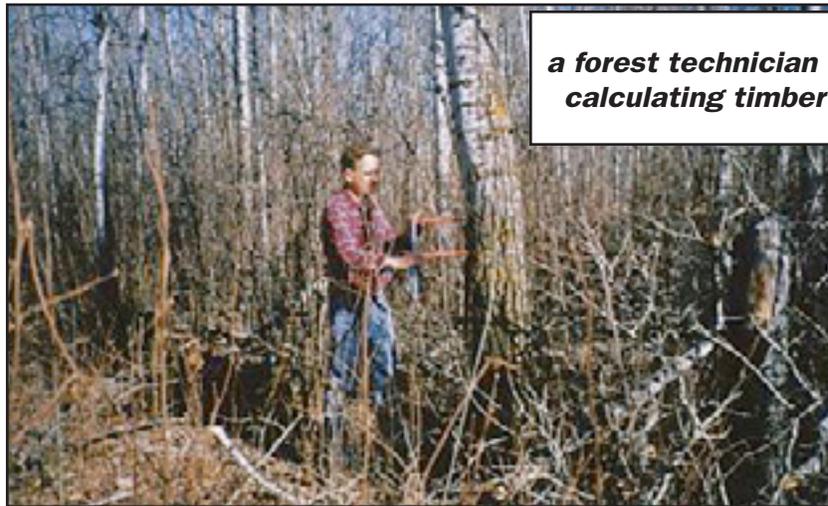
A - Pre-harvest Site Planning

Prior to having a woodlot specialist commence pre-harvest site planning, it is highly recommended that the landowner have a woodlot management plan or timber assessment in place. This provides the landowner with the basic information necessary for making an informed decision, including volume by species, health and vigor of the stands, as well as management options. This data and information are the basis for completing the pre-harvest site planning.

The Pre-harvest Site Planning process includes:

- Locating property boundaries, trails and/or areas of special interest to the landowner (If available, use GPS for added accuracy).

- Developing a harvesting prescription.



a forest technician can assist in calculating timber inventories

- Marking harvest areas or individual trees for harvest.
- Determining the season and timing of harvest, as well as the means of removing logs.
- Locating designated skid trails, log pile landings and access points.
- Locating environmentally sensitive no harvest zones.



No harvesting along creeks, rivers, or streams

- Defining standards for merchantable timber, minimum stump heights, woody debris etc.
- Listing the landowner's expectations with regards to residual tree damage and other post-harvest conditions in the woodlot.
- Estimating harvest volumes.
- Estimating regeneration costs, if applicable.

B - Selecting a Contractor

Since the best indicator of the potential success for a harvest operation is a contractor's previous work, it is in the landowner's best interests to get references and perform the necessary due diligence. Potential sources of information and referrals include:

- Local landowners who have recently had harvesting completed on their property.
- The local woodlot specialist.
- The local Manitoba Conservation office.

C - Pre-Harvest Meeting and Site Inspection

Once the landowner has identified potential contractor(s), a pre-harvest meeting and inspection is recommended. Both the landowner and contractor(s) should be present at the pre-harvest inspection. It is advisable to include a woodlot specialist in this process.

The pre-harvest inspection gives both parties the chance to view the potential harvest area and discuss the draft terms and conditions of the Timber Sales Agreement. **It is critical that the landowner disclose all of the terms and conditions he/she desires, allowing the contractor(s) to make an informed bid.**

It is also recommended that the landowner ensure the prospective contractor(s) is familiar with the Best Management Practices manual at this point in the process.

D - The Bid Process and Negotiating the Deal

Once the logging contractor has viewed the proposed harvest site and discussed the landowner's terms and conditions, the contractor can then decide whether or not they want to bid. In order to ensure the landowner receives a competitive price for their resource, it is a good idea to request a bid from more than one contractor.

The most common bid type is the **scaled volume sale**.

1.) The Scaled Volume Sale

The logging contractor offers to pay a set rate per unit of volume harvested (i.e. \$ per cord). In addition, bids may reflect the difference between pulp and saw logs. The bid price may depend on the quality of timber harvested.

After reviewing the bid(s), the landowner must decide to accept the bid, re-negotiate terms and conditions or reject the bid. Landowners must recognize, that while they have every right to identify “strict” performance standards, these restrictions may reduce the contractors’ efficiency.

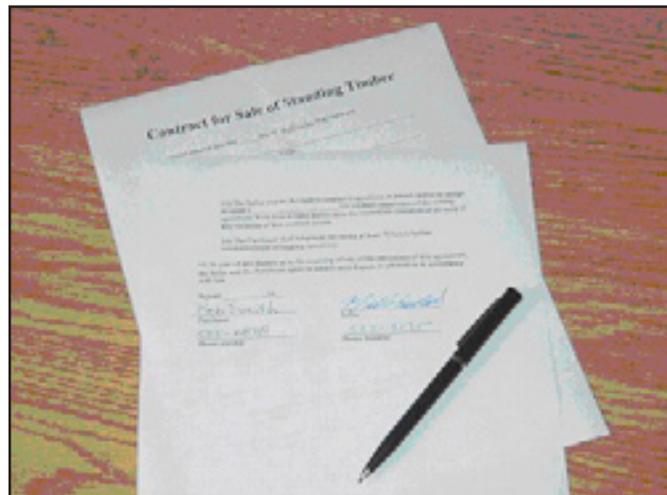
2.) Method and Timing of Payment

The method and timing of payment must be clearly specified, and may include any combination of the following:

- A security deposit.
- Progress payments, including what triggers payments and/or the time frame between progress payments.
- A means of verifying volume. The simplest way is for the logging contractor to provide a load slip or scale receipt from the mill with each payment to verify the volume sold.

E - The Timber Sales Contract

The timber sales contract is a legally binding document that is developed to protect the rights and interests of both parties involved. In order to be effective, the contract should clearly address any and all issues of interest to both parties.



Sample Contract

This sample contract is a generic document that can be used as a template for developing a legally binding timber sales contract. The contract should be customized to suit your specific needs. Both parties may realize the benefit of involving a woodlot extension specialist in the process.

Contract for Sale of Standing Timber

This contract entered into this ____ day of _____, 20__ between,

Seller

Address

Hereinafter known as the Seller, and

Purchaser

Address

Hereinafter known as the Purchaser.

Description of the Sale Area

Legal Description(s) _____

Area of Woodlot _____ acres

Area to be Harvested _____ acres

Paid by Scale Sale

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

Species: _____ Price: _____ / cord

Species: _____ Price: _____ / cord

The Purchaser agrees to pay the Seller the following for all pulpwood quality trees designated for harvest, under the conditions set forth in this contract:

Species: _____ Price: _____ / cord

Species: _____ Price: _____ / cord

- II. The Purchaser agrees to pay the Seller \$_____ by cheque or money order, as down payment upon signing of this agreement. The balance should be paid to the seller at regular intervals during the logging operations. A copy of all truck hauling load slips shall be supplied to the Seller in order to provide accurate timber volume records for payment.
- III. The purchaser agrees to buy, upon the terms herein stated, all trees designated for felling. The total estimated merchantable volume of trees is approximately

List species and (cords)

IV. The Seller further agrees to the following:

- 1) The Seller guarantees title to the forest products covered by this contract and to ensure boundaries are clearly defined or marked prior to the commencement of cutting.
- 2) The Seller guarantees that the Purchaser and his/her contractor shall have right-of-way over the property for the purpose of harvesting and removing the timber purchased via the following route or routes:

_____ as
per attached map, from _____, 20__ to _____, 20__.

- 3) To guarantee that the purchaser shall be allowed space for the purposes of log piling and loading trucks at an agreed location.

V. The Purchaser agrees to the following:

- 1) The forest products sold herein shall be felled and removed from the property on or before _____, 20__, provided that excessive rainfall does not hamper hauling operations. The purchaser agrees that any trees or logs remaining on the property after this date become the property of the Seller.
- 2) Trees shall be cut so that the stump heights are not higher than the diameter of the stump, to a maximum of 12" (30cm).
- 3) The Purchaser shall utilize and remove all merchantable timber 100" (254cm) in length down to a 4"(10cm) top end.
- 4) The Purchaser shall fell and skid all trees designated for harvest in such a manner as to prevent rutting to the ground and prevent damage to young growth and other trees not designated for harvest.
- 5) The Purchaser shall repair to original condition, immediately after logging operations have been completed, all damage caused by logging to fences, culverts, bridges, utilities or other improvements damaged beyond ordinary wear and tear.

- 6) All trees designated for harvest shall be felled to the ground. Partially severed standing trees and lodged trees must be pulled to the ground by the Purchaser daily.
- 7) All tops and slash shall be cut to within 4 ft (1.2m) of the ground. All such logging debris shall be cleared from all roads, trails, landing sites and property adjoining the woodlot.
- 8) No garbage shall be left on the property during or after the operation.
- 10) The Purchaser shall take necessary steps to prevent and to suppress any forest fires on the sale area.
- 11) The Purchaser shall adhere to Best Management Practices that are specified as an attachment to this agreement.
- 12) The Purchaser shall not assign this contract to a third party, in whole or in part, without prior consent of the seller.
- 13) The Seller is released from any and all claims for injury or damage to property, however caused, which may be sustained by the Purchaser or his employees while carrying out operations on the woodlot under this agreement.
- 14) During the entire term of this contract, the Purchaser shall have in force a general public liability and property insurance policy that protects the Seller.
- 15) The Seller retains the right to conduct inspections in person and/or to assign an agent (_____) to conduct inspections of the cutting operations from time to time and to order the immediate cessation of all work if any violation of this contract occurs.
- 16) The Purchaser shall telephone the Seller at least 72 hours before commencement of logging operations.

VI. In case of any dispute as to the meaning of any of the provisions of this agreement, the Seller and the Purchaser agree to submit such dispute to arbitration in accordance with law.

Date _____, 20__

Purchaser

Seller

Phone number

Phone Number

F - Self-Audit Checklist

Before commencing the development of a Timber Sales Contract ...

Obtain basic data and guidance on management options from a woodlot specialist. If you do not have a Timber Assessment or Registered Woodlot Management Plan, write down your personal goals, priorities and concerns.

This should include:

- Volume by species
- Management and regeneration options by species
- Current market values and trends

A - Pre-harvest Assessment and Planning

The landowner and woodlot specialist have completed the pre-harvest planning, including:

- Confirming landowner objectives, issues and/or restrictions
- Marking and mapping the stand(s) or individual trees for harvest
- Marking and mapping skid trails, log landings and access
- Identifying and mapping environmentally sensitive or restricted areas
- Estimating volumes by species

B - Selecting a Contractor

- Landowner performs due diligence in researching potential logging contractors
- Ask neighbors for references
- Visit cutblocks on private land and evaluate post harvest conditions relative to your personal standards and criteria
- Ask a woodlot specialist

C - Pre-harvest Site Meeting and Inspection

- Walk the proposed harvest area with potential contractors preferably with a woodlot specialist present
- View all potential harvesting areas and discuss all landowner terms and conditions with the potential contractor

D - The Bid Process and Negotiating the Deal

- Set a deadline for receiving bids
- Interested contractors submit a bid for the contract
- Landowner reviews bids and decides whether to accept, reject or negotiate terms and conditions

E - Writing the Contract

Landowner drafts a contract. Potential topics include:

- Access, skid trails and log landing locations (with maps)
- Stumpage rate by species (and end use)
- Method of payment
 - Advance, security deposit or performance bond
 - Progress payments, including the trigger or interval –i.e. load slip or weigh scale
 - Final inspection and payment
- Rights and means of terminating the contract
- Important performance standards and criteria
 - Season of harvesting and timing, including last date to remove logs
 - Operating restrictions including slopes, stream crossings, and saturated soils
 - Limbing and slash
 - Other factors
- Final inspection and payment
- Landowner and contractor each receive a signed version of the final contract.

- Section Three -

Timber Harvesting

Contents

A - Pre-Harvest Planning...20

- 1.) Harvesting Prescriptions...20
- 2.) Harvest Area Preparation...22
- 3.) Skid Trails and Landings...23
- 4.) Wildlife and Environmental Considerations...24
- 5.) Riparian Areas...25

B - Operational Harvesting Activities...27

- 1.) Felling, Bucking and De-limbing...27
- 2.) Skidding, Forwarding and Decking...28

C - Post-Harvest Assessment...29

D - Self-Audit Checklist...30

Timber Harvesting

The goal of best management practices is to integrate environmental considerations into timber harvest operations, so as to sustain woodlot resources and create long-term environmental, economic and social benefits. The following will contribute to sustainable woodlot management.

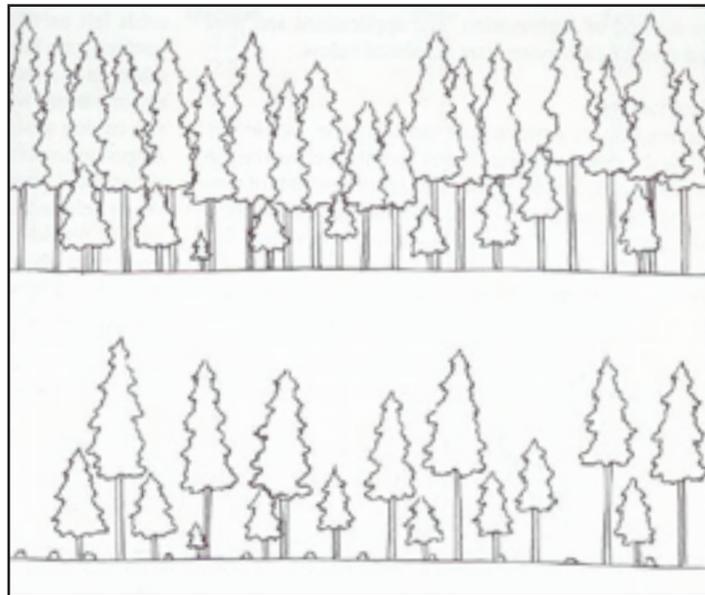
A - Pre-Harvest Planning

1.) Harvesting Prescription

The main consideration in preparing a harvesting prescription is to match the harvesting system with the ecology and reproductive strategy of the dominant tree species. For example, the type of harvesting prescription for an even aged pine or poplar stand is significantly different from an uneven aged mixed hardwood stand of ash, basswood and maple. Never the less, the general goal is to regenerate the stand to the combination of tree (and shrub) species that evolved over time to match the site. This can be accomplished through natural regeneration or through the use of treeplanting (See Section 4 – Reforestation).

The following is a brief description of two common harvesting prescriptions and the corresponding forest type in Manitoba:

a - The Selection System



The main principle behind the selection harvesting system is to balance the volume of wood harvested with the amount produced through new growth in the stand. In theory, stand renewal allows for regular harvesting with no net loss of timber over a long-term period, as well as enhanced biodiversity and ecological functions. The semi-shade tolerant hardwoods and softwoods are ideally suited to this type of harvesting. Stands dominated by green ash or white spruce are good

candidates for the selection system.
Two types of selective harvesting systems are:

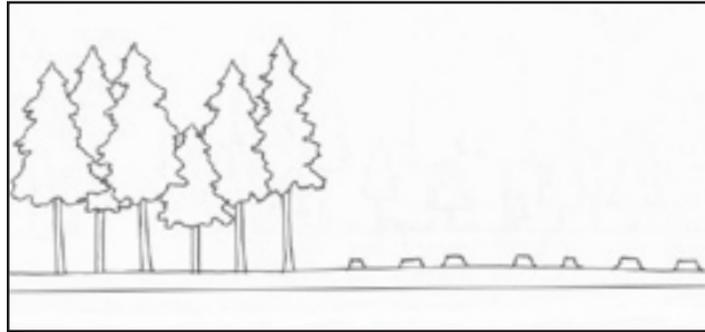
i - Single Tree Selection

Single tree selection removes individual trees from the stand on a regular basis over time. After several selective cuts, the stand will have a range of tree ages and sizes. This treatment is often effective in improving the health and vigor of a woodlot with tree species that are shade tolerant.

ii - Group Selection

Group selection removes small groups of mature trees within a stand in a series of harvests occurring at regular intervals over time. The objective of this treatment is to create a mixture of small tree and shrub groups throughout the stand. Similar to a single tree selection, tree species suited to this system would typically be at least moderately shade tolerant.

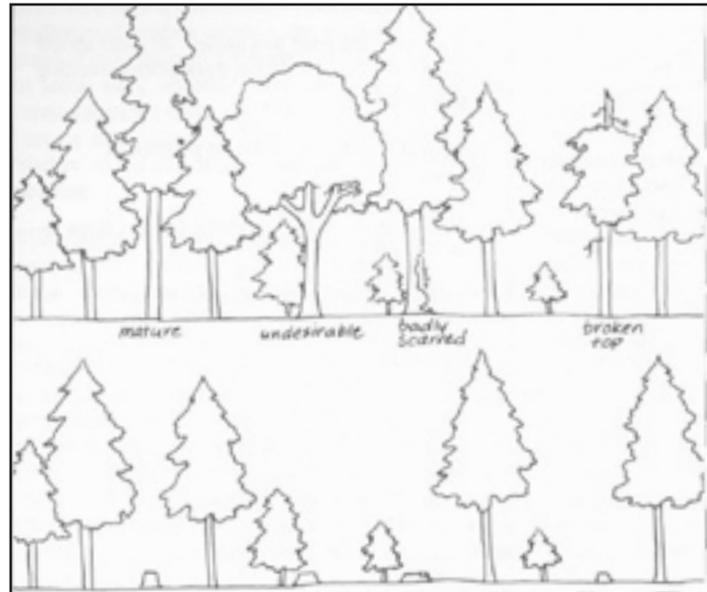
b - Clearcut



A Clearcut removes all merchantable trees in an area during a single harvest cut. This results in the site being regenerated as an even aged stand.

While clearcutting has a bad reputation, it is the preferred harvesting strategy for pioneer (shade intolerant) species that typically establish after a disturbance, such as fire – e.g. poplar or pine. In woodlots, the issue is a matter of scale. If the stand is healthy and vigorous, small patch cuts create a mosaic of age classes and biodiversity as well as the potential for a series of future commercial harvests over time. Conversely, if a woodlot is starting to lose economic value due to rot, larger clearcuts may be required to take advantage of the remaining economic potential and to renew the stand.

c - Timber Stand Improvement (TSI)



Timber stand improvement (TSI) is an ongoing process which includes activities that improve the composition, structure, condition, health and growth of even-aged or uneven aged stands. While selective logging in a riverbottom hardwood stand is a typical example of TSI, a series of progressive clear-cut harvests in a mature aspen stand may also fulfill the same objectives.

TSI practices are meant to increase the economic value of the stand by improving the growth and form of crop trees. Fortunately, TSI also results in both immediate and long-term enhancement of the health, vigor, value and biodiversity of woodlot resources.

TSI or Full Vigor Forestry is an investment in the future of a woodlot. It starts with identifying future crop trees and reducing competition for light and nutrients. TSI removes a proportion of the unhealthier trees and leaves the healthy trees to grow. In the process, landowners may generate sustainable economic returns from harvesting and utilizing the unhealthy trees.

2.) Harvest Area Preparation

Preparing the harvest area prior to the commencement of any work will reduce the possibility of contractor confusion and ensure objectives are met.

BMPs for Preparing Harvest Areas

- Clearly mark the desired harvest boundaries with paint or flagging
- Clearly mark trees that have been selected for a singletree selection or group selection cut
- Clearly mark or flag off special interest exclusion areas
- Mark cut boundaries and exclusion areas on a map attached to the timber sale agreement

- Notify neighbors of the harvesting activity if they are in close proximity and could be affected in any way

3.) Skid Trails and Landings

Skidding logs has the potential to be one of the greatest impacts of woodlot harvesting. Proper planning and operator guidance can reduce this potential.

BMPs for Designing Skid Trails and Landings

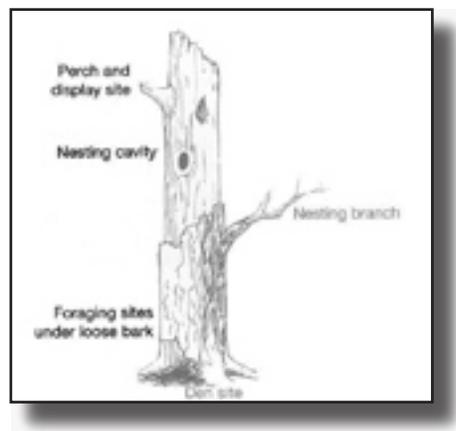
- Make use of existing trail systems whenever possible
- Skid trails should always be located and designed to minimize damage to soils, residual stands and riparian areas
- Rather than using a random skidding pattern, concentrate traffic on a designated skid trail system to minimize the amount of harvest area affected by soil compaction and disturbance
- Lay out the designated skid trail system so as to minimize the number of trails required. Only 10-15% of the harvest area should be composed of primary skid trails.
- If harvest area is relatively flat and obstacle free, use the “herringbone” skid trail design. The herringbone skid trail design reduces residual tree damage and soil disturbance.
- In order to minimize rutting and erosion problems, lay out designated skid trails intended for use during the summer and fall seasons in well-drained sites only. If this is not possible, delay harvesting until the winter when the ground is sufficiently frozen and less susceptible to disturbance.
- Ensure the width of the skid trails will accommodate logging equipment.
- Avoid creating sharp curves– if unavoidable widen trails in the curve.
- Consider leaving “bumper trees” or high stumps around corners of skid trails to reduce the possibility of damaging standing timber alongside the trail. Damage to a tree reduces growth potential, while increasing the risk of insect and disease attack.
- On steep slopes lay out designated skid trails parallel (not perpendicular) to contours, so as to minimize erosion potential. If this is not possible, skid trails should never exceed a 30% slope on unstable soils.
- Keep the number of landings used to a minimum. Wherever feasible, use existing landings.
- Landings should be located on upland, stable ground and outside of riparian management zones (RMZs).

4.) Wildlife and Environmental Considerations

Wildlife and environmental considerations should be integrated into harvest planning to minimize potential negative impacts. A few simple practices can increase biodiversity, thereby enhancing wildlife habitat.

BMPs for Wildlife and Other Environmental Considerations

- Take the proper precautions to avoid the degradation and destruction of any wildlife habitat protected under the Species at Risk Act and Manitoba Endangered Species Act (See appendix IV for both provincial and federal contact information).
- Design irregular boundaries for large patch cuts and clearcuts in order to simulate natural landscapes and create visual barriers for wildlife.
- Leave an unharvested strip between any roadway and the harvest area to reduce the line-of-sight and the potential for use by poachers. Ensure that the buffer is of sufficient width to reduce the occurrence of blowdown. 2 1/2 times the height of the average tree typically serves as a sufficient buffer width.
- Add curves to trail system to minimize line of sight.
- Position access trails at an angle to the main road, rather than perpendicular, to minimize line of sight.
- Use natural features, such as topographic changes, wetland interfaces or timber type changes for block boundaries.
- Create a variety of patch sizes, if using a patch cut system, to provide potential habitat for a wider range of wildlife species.
- Mark and retain 3 hard “snags”/acre (live trees with rot) or 2 soft “snags”/acre (dead standing trees) to provide nesting, feeding and escape cover for birds and small mammals. Make special effort to preserve high-use snags, which can be identified by the presence of cavities.



- Use extreme caution when working around “snags” which are to be retained. Remove the “snag” if it poses a hazard. Safety First!
- Mark and retain “mast trees” or trees that appear to possess a high amount of seed in an attempt to retain a valuable food source for birds and mammals – e.g. oaks.
- If possible, coordinate harvests with good seed crop years to maximize potential natural regeneration.
- In clearcuts, retain some “leave trees” or live standing trees for wildlife purposes in the harvest area. Choose leave trees, preferably in clumps, that appear healthy and wind firm to reduce the chance of windthrow or the spread of disease to future regeneration. (See Appendix I)
- Mark and retain other areas that provide special resource values: colonial water bird nests, eagle and osprey nests, habitat of endangered species, and recreational areas.

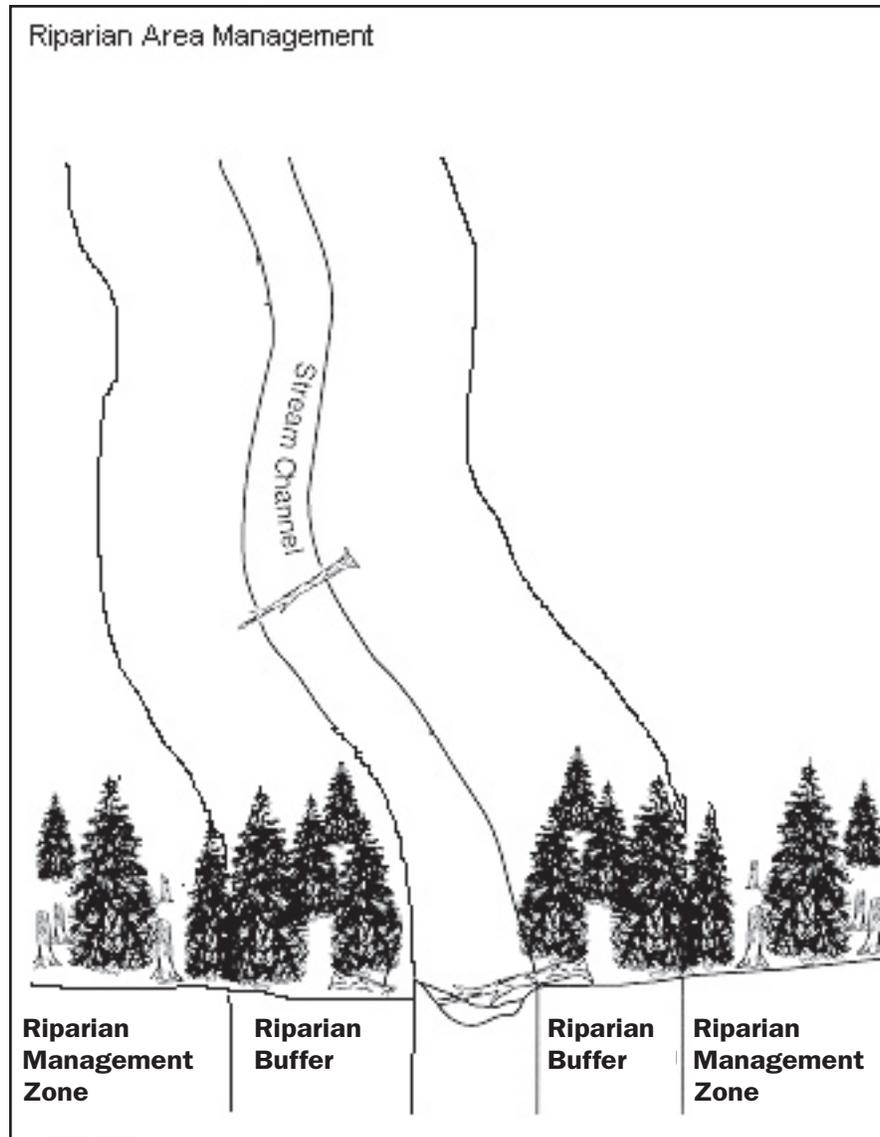
5.) Riparian Areas

Riparian areas, which are areas adjacent to streams, water bodies or wetlands, play an extremely valuable role in the health of an ecosystem. The vegetation and forest floor in a riparian area help to stabilize streambanks, regulate water temperature and act as a “filter strip”, stopping pollutants and sediment from entering the water. By disturbing the vegetation and forest floor in a riparian area, damage could be done to the quality of fish habitat, as well as to the general stability of the channel.

Landowners and contractors have a responsibility under the federal Fisheries Act not to harmfully alter, disrupt or destroy fish habitat. Fish habitat includes riparian areas. A section of the act also prevents persons from depositing a deleterious substance, like sediment, in waters frequented by fish, unless authorized.

BMPs for Harvesting in Riparian Areas

- Never clear-cut adjacent to a water body or watercourse. This would be considered a HADD under the federal Fisheries Act (See appendix IV)
- Leave special “Riparian Management Zones” (RMZ) of the appropriate size around all streams, water bodies or wetlands. (see diagram on next page)



- The RMZ width is recommended to be at least 60 feet (20 meters) on either side of the water body. Depending on the size of the waterbody and the slopes involved, the RMZ may be larger. (See Appendix II for recommended widths)
- Harvesting in the RMZ should be restricted to a light singletree selection harvest operation only. Heavy machinery should not be allowed in the RMZ. A woodlot specialist can assist in determining a reasonable level of harvest in the RMZ.
- Limit mineral soil exposure to less than 5%, well distributed throughout the RMZ.
- Within the RMZ, maintain a zero disturbance “riparian buffer” directly adjacent to the waterbody. A “riparian buffer” should be approximately as wide as the height of an average tree in the area (approximately 50ft (16 meters) from the top of the stream bank).
- Harvesting within the riparian buffer should be limited to removing dying and diseased trees

only. These trees may topple, uproot soil and cause riverbank erosion if left standing.

- Do not fall trees into the watercourse and manually remove any slash that lands in the watercourse.
- Ensure that the understory vegetation and soil are left undisturbed in the riparian buffer.
- Clearly mark and map the restricted harvest RMZ and the no disturbance “riparian buffer”.
- Consider an attempt to leave only trees that appear wind-firm in the RMZ.
- Never skid through a riparian buffer, up a streambank or across a stream.
- Plan landings or re-fueling/maintenance areas at least 330 ft (100 meters) from the high water mark.

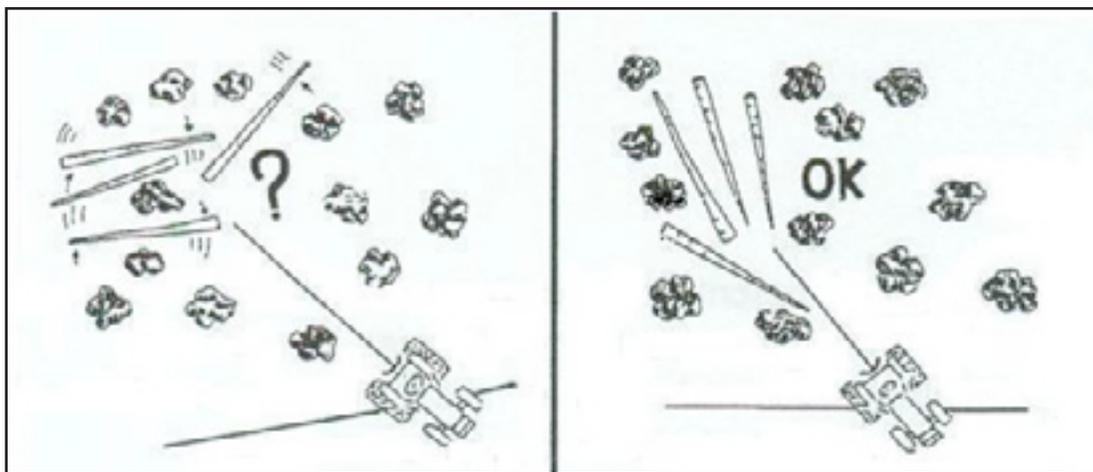
B - Operational Harvesting Activities

1.) Felling, Bucking & De-limbing

Felling timber in a woodlot can cause considerable environmental disturbance. Proper felling techniques can minimize disturbance as well as maximize the value of the timber extracted.

BMPs for Felling, Bucking and De-limbing

- Especially in selective cuts, it is important for the harvester to plan where the trees will fall, so as to minimize damage to remaining trees. Damage to the crowns and trunks of remaining trees can provide entry points for insects and disease that can lead to reduced future value.
- Ensure trees fall in a direction that facilitates skidding so as to minimize damage to the trunks of standing “leave” trees.



- Ensure trees fall away from RMZs. Skidding trees out of RMZs may cause soil disturbance that can lead to erosion and sedimentation.
- Remove trees that may pose a hazard to people using the woodlot in the near future.
- Keep stump height to a minimum in order to maximize timber utilization. No more than 12 inches in height (30 cm or no higher than its own diameter).



- Avoid using machinery in wet areas to minimize soil compaction and rutting. If this is not possible, delay harvesting until the ground is either dry or frozen.
- When feasible, de-limb and top trees at the stump to retain nutrients and seed on site.
- Limbs and tops should be broken down by equipment to maximize soil contact and speed slash decomposition.
- Slash piles should not exceed 4 ft (1.2 m) in height and should not be left around the base of remaining trees.
- Within riparian management zones slash piles should not be left within 50 ft (15 meter) of the high water mark.
- Remove “bumper trees” at the end of the harvest. Bumper trees are left intentionally along curves of skid trails to prevent damage to remaining trees.

2.) Skidding, Forwarding and Decking

Proper planning and operator guidance can minimize the potential for excessive site disturbance and economic loss. Careless skidding practices can disturb ground cover and compact soils, resulting in reduced site productivity and erosion or damage to valuable standing timber. By using environmentally responsible practices, these problems could be minimized.

BMPs for Skidding, Forwarding and Decking

- Always use designated skid trails wherever possible. Never allow skidder operators to push unplanned trails to shorten skidding distances or access additional timber.



- On wet or sensitive soils, defer harvesting until winter to reduce site disturbance caused by skidding.
- Do not skid across streams or up streambanks.
- Skid across slopes, instead of up and down, to minimize the potential for erosion.
- Consider using skid cones to reduce soil disturbance caused by the logs.
- Keep the length of time that timber sits decked to a minimum, in order to reduce the potential for log quality degradation.
- If specified by the timber sales contract, create separate log decks for pulp and sawlogs.

C) Post-Harvest Assessment

Once harvesting activities have been concluded, there are a few important practices that should be completed to assure that a responsible harvest has taken place.

Post-harvest BMPs

- The contractor should remove all equipment and logs from wet areas prior to the end of winter.

- The contractor must remove all logs, equipment and garbage (oil and parts) from the woodlot within the timeframe specified in the contract.



- The contractor and landowner should walk through the harvest area together to evaluate the site. This will give both parties the opportunity to ensure that the end result meets the terms of the timber sale contract and the goals of the landowner.



D - Self-Audit Checklist

It is recommended that the checklist be completed at three stages of the harvesting operation:

- a) Pre-Harvest Planning
- b) Operational Harvesting Activities
- c) Post-Harvest Assessment

Only those practices that are relevant to the operation need to be assessed.

Harvesting

a) Pre-Harvest Planning

Landowner Pre-Planning

- Pre-walk the site with a woodlot specialist to identify and mark specific areas of interest – e.g. family aesthetic interest, environmental risk, etc.
- The proper harvesting prescription has been chosen based on the recommendations of the Woodlot Management Plan.

Harvest Area Preparation

- Harvest area clearly marked and mapped prior to commencement of harvesting.
- Trees clearly marked in single-tree or group selection and/or contractor knows criteria for selection.
- Riparian Management Zones and other special interest areas marked and mapped for exclusion from harvest.
- Map of exclusion areas added to timber sales contract.
- Neighbours notified of harvesting operation if they are impacted in any way.

Skid Trails and Landings

- Existing trails used wherever possible.
- Designated skid trail system planned rather than randomly selected.
- Designated skid trails designed to minimize the number of trails required.
- Seasonal skid trails designed in wet areas for winter use only.
- Width of trail easily accommodates logging equipment.
- Curves in trail are gradual. If unavoidable, widen trail at curves.
- Designated bumper trees along skid trails and corners.
- Designated skid trails designed parallel, not perpendicular, to slopes.
- Number of landings kept to a minimum and planned for upland stable ground wherever possible.

Wildlife and Environmental Considerations

- Irregular boundaries planned for large patch cuts and clear cuts.
- Unharvested strips left between harvest area and vehicle accessible roadways.
- Curves designed in trail system.
- Block boundaries follow natural features wherever possible.
- Variety of patch sizes planned for multiple patch cut systems.
- Marked 3 hard and 2 soft snags per acre.
- Harvest coordinated with good seed crop year.
- Marked as many mast trees as possible for retention.
- Marked “leave” trees to be left in harvest area, either in patches or individually.

Riparian Areas

- Marked and mapped the appropriately sized, restricted harvest Riparian Management Zones (RMZs) and zero harvest “buffer strips”.
- Designated a re-fueling/maintenance area at least 330ft (100m) from riparian areas.

b) Harvest

Felling, Bucking and De-limbing

- Provided guidance to contractor and operators to minimize damage to standing timber.
- Felled trees in a direction that facilitates skidding timber directly out of the stand.
- Felled trees away from RMZs.
- Removed hazard trees.
- Minimized stump height (below 12 inches or 30 cm).
- Avoided using machinery in wet areas or deferred harvesting until winter.
- De-limbed and topped trees at the stump.
- Minimized slash pile height (below 4 ft or 1.2 m in height).
- Removed bumper trees at end of harvest.

Skidding, Forwarding and Decking

- Always followed designated skid trails
- Did not create unplanned skid trails or landings.
- Did not skid across streams or up streambanks.
- Skidded across slopes, not up and down.
- Used the “Herringbone” skid trail design where operationally feasible.
- Used skid cones.
- Minimized the time logs were kept decked at the landing.

c) Post-Harvest Assessment

- All logs and equipment were removed from wet areas prior to the end of winter.
- All logs, equipment and garbage were removed within the designated timeframe.
- The contractor and landowner evaluated harvest together and completed self-audit checklist.
- Terms of contract were met. Landowner received full payment.

- Section Four - Reforestation

Contents

A - Reforestation...34

- 1.) Reforestation Strategies...34
- 2.) Natural Regeneration...34
- 3.) Assisted Regeneration (Tree Planting)...35

B - Site Preparation...37

C - Wildlife and Environmental Considerations...37

D - Follow – up Monitoring and Treatment...38

E - Self-audit Checklist...39

A - Reforestation

Reforestation includes the process of planting or regenerating a site following timber harvest or natural disturbance. It is an essential component of sustainable woodlot management and a valuable tool for achieving management objectives. A number of activities may be part of the reforestation process including site preparation, planting and various follow-up treatments.

A reforestation strategy should be developed prior to harvesting. The reforestation strategy will be directly related to the chosen harvesting prescription and can typically be found in the landowner's woodlot management plan (Harvesting Prescription page 20).

1.) Reforestation Strategies

The reforestation strategy should specify the recommended method of regeneration and any site preparation activities, if necessary. There are a variety of factors that will determine an acceptable reforestation strategy for a particular site. Some factors include:

- The chosen harvesting prescription for the site. (Harvesting Prescription page 20)
- Whether natural regeneration will result in the preferred species for the site.
- Ecological characteristics of the stand type present.
- The presence of a seed source and advanced natural regeneration.
- Attributes of the stand such as the presence of a competitive shrub understory.

A woodlot specialist will assist the landowner in determining the method of regeneration that would be most suitable for a particular site.

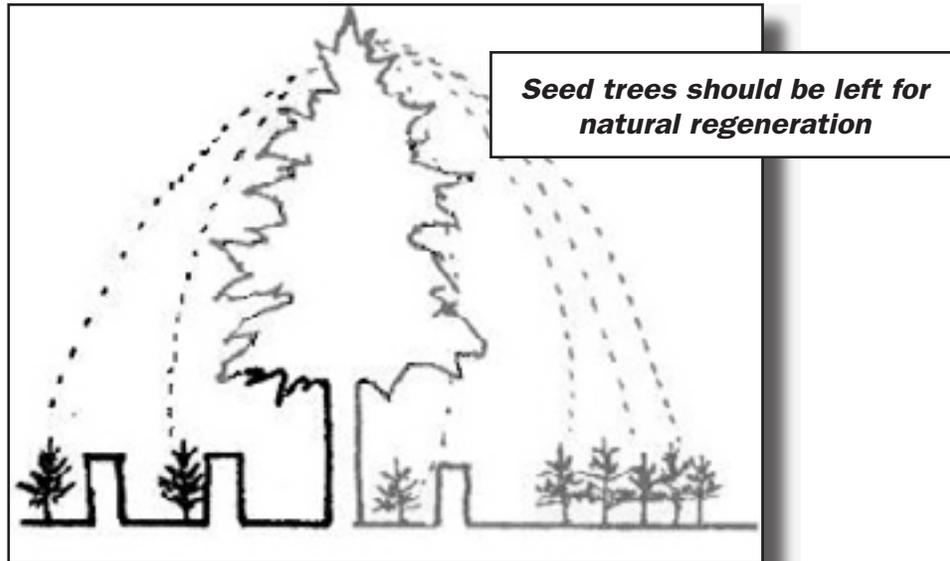
2.) Natural Regeneration

Natural regeneration includes root suckering, stump sprouting or natural seeding. In most instances natural regeneration is less costly, less time consuming and conserves genetic diversity.

BMPs for naturally regenerating a site

- Protect young trees in the understory by marking and excluding areas from harvesting and skidding operations.
- Ideally, protect young trees with full, healthy crowns and between 10 to 20 feet (3 to 6 meters) in height.
- In trembling aspen stands, have a woodlot specialist assess the site to determine a suitable season for harvesting. Depending on the site factors present, the season of harvest could influence regeneration success.

- Retain selected seed trees scattered throughout the harvest area. Approximately 4 to 10 trees per acre (10 to 25 trees per hectare) should be sufficient.



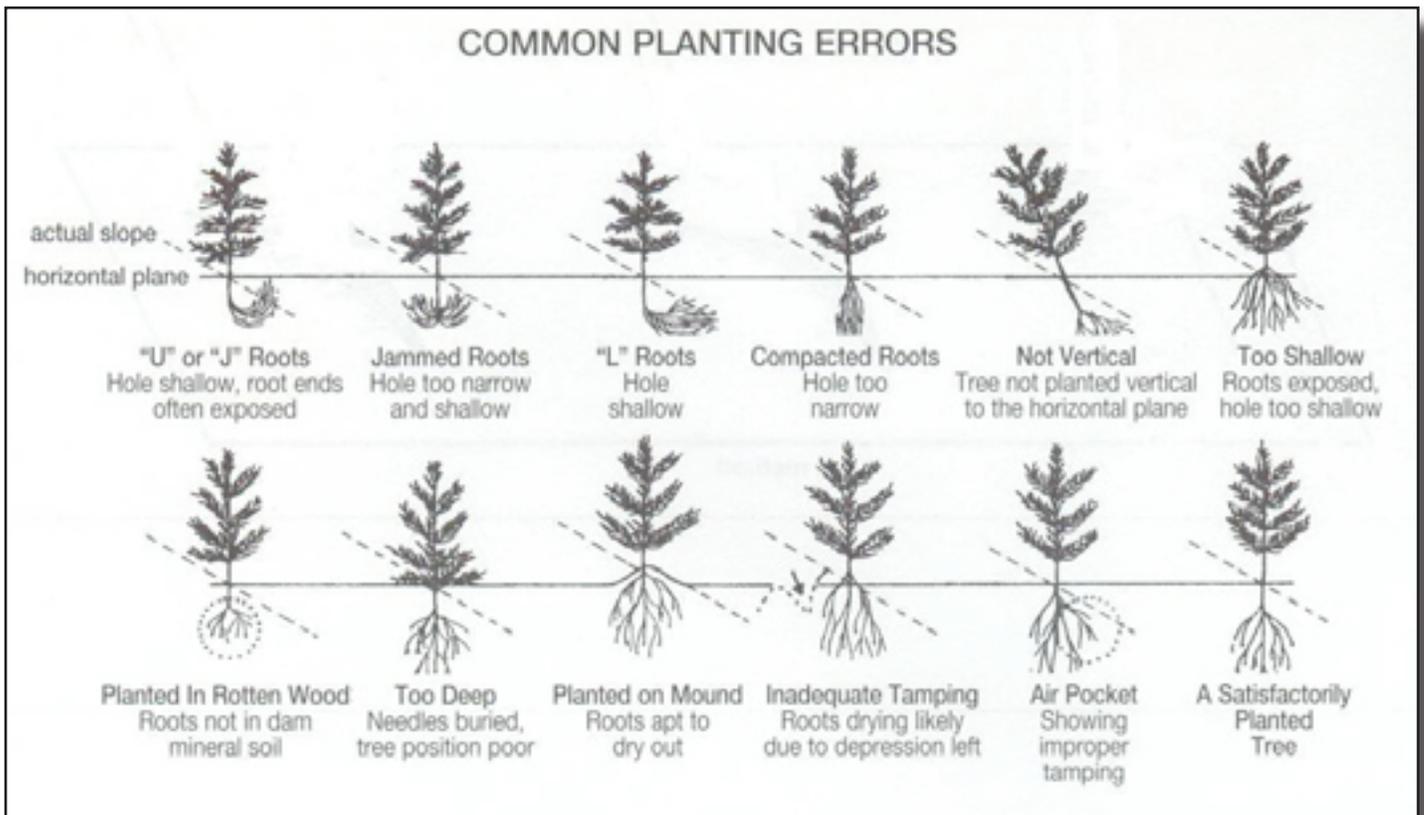
- Mark and retain only seed trees that are of good form and health. This will permit trees with preferred genetic traits to distribute more seed. (Be sure to retain the proper gender, female, in the case of many hardwoods).
- In order for seed trees to be successful, it is important to ensure the trees are wind firm and the proper soil conditions exist for seed germination. The woodlot specialist can help assess these conditions.

3.) Assisted Regeneration (Tree planting)

Tree planting may be used as the lone reforestation strategy or in combination with natural regeneration methods.

BMPs for Tree planting

- Always plant soon after harvest to allow seedling establishment before competition becomes an issue. This reduction in competition will likely decrease the probability that further treatment will be needed.
- Consider planting on an annual basis. This will keep reforestation efforts at a manageable scale.
- Choose a species that suits the site. Consider factors such as site capabilities, soil and moisture requirements, sunlight requirements, historical vegetation, and variation in growth rates.
- Take the time to pick favourable microsites and plant trees properly.



- Plant trees at a spacing that is consistent with the desired management objectives and acceptable for the species used (See Appendix III).
- Plant offset or irregular rows near roadways to reduce line of sight and create more naturally appearing stands.
- Use good quality seedling stock.
- Handle all seedling stock gently and store in a moist and cool place.
- Keep seedlings out of heat or high winds to avoid drying prior to planting.
- Plant as early as possible in the spring, no later than mid June.
- Consider using devices to protect seedlings from deer and rodent damage in high-risk areas. For example, stucco wire or cardboard tree wraps may be effective in reducing mortality due to animal damage.
- Never plant an invasive exotic species in a woodlot.

B - Site Preparation

On some sites it may be necessary to include a site preparation method in the reforestation strategy. Site preparation may be useful in reducing herb and brush competition or stimulating natural regeneration.

BMPs for Site Preparation

- If potential exists for high competition from a herb or shrub understory, consider a site preparation treatment. Using your foot, a shovel or a mattock to reduce vegetative competition and expose mineral soil is often sufficient.
- To reduce the competition under a decadent aspen stand, it may be best during harvest to make a couple of passes over the shrubs trampling them with equipment. Depending on the site, this may need to be done during the winter months to reduce soil compaction.
- Consider scarifying soil in the vicinity of seed trees to enhance germination success.

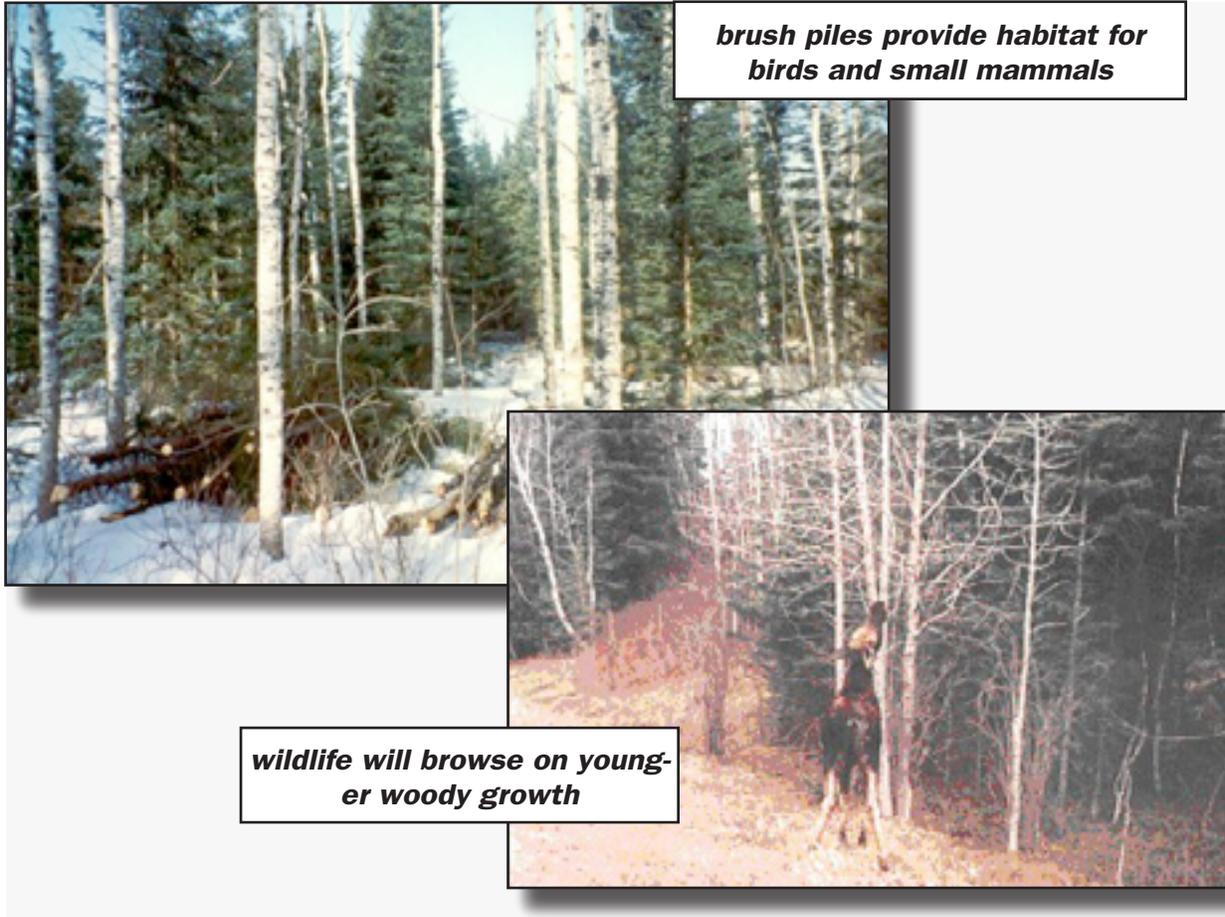
C - Wildlife and Environmental Considerations

The process of reforesting a site can have impacts on various aspects of environmental quality including wildlife habitat. There are certain practices that can remedy these environmental impacts and even improve the quality of wildlife habitat.



BMPs for Wildlife and Environmental Considerations

- Promote mixed species. Mixed species stands increase diversity, which provides a wider range of wildlife habitat



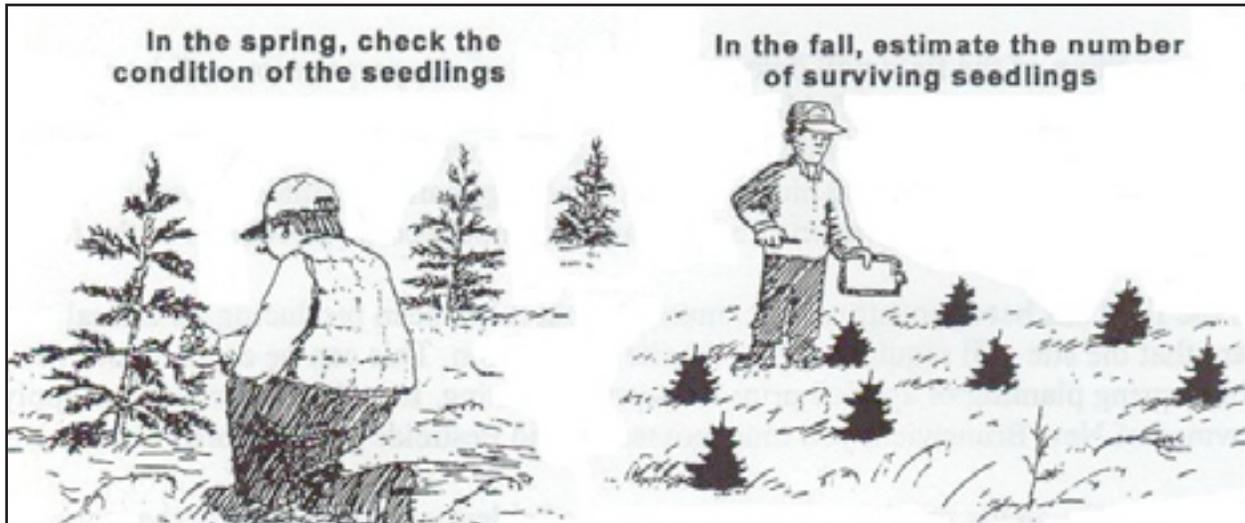
- If using pesticides, herbicides or fertilizers, read and follow the directions as stated on product labels.
- Leave at least a 25-ft (8 m) buffer along surface waters when chemicals are being applied by ground methods.
- Apply chemicals during appropriate weather conditions only. Preferably calm and dry.

D - Follow-up Monitoring and Treatments

The reforestation effort is rarely complete directly after the initial regeneration activities. Considerable mortality due to disease, competition, severe weather or wildlife may be common on many sites. Follow-up monitoring and treatments are crucial to compensate for mortality and ensure successful reforestation.

BMPS for Follow-up Monitoring and Treatments

- Regularly monitor sites to assess regeneration survival. A visual assessment in the fall of the first couple of years would be ideal. Treatments can then be planned for the following spring if needed. A final assessment should also be completed in approximately five to seven years time. (See provincial stocking guidelines in appendix III)



- Provide prompt follow-up treatment when needed. For example, “in-fill” planting, brushing and/or herbicide may be required to ensure plantation success.

E - Self-Audit Checklist

a) Reforestation

- Reforestation strategy developed prior to harvesting.

Natural Regeneration

- Effort taken to protect trees in the understory during harvest operation.
- Protected softwood understory is between 10 to 20 feet (3 to 6 meters) tall and with a full healthy crown.
- Proper season of harvesting determined by woodlot extension specialist.
- Seed trees left scattered throughout the harvest area. (Applicable to seed tree harvest only)
- Retained healthy seed trees that possess good form.
- Woodlot extension specialist assessed site to ensure soil conditions are suitable for seed tree regeneration.

Assisted Regeneration

- Site planted the spring following harvest to reduce competition related problems.
- Planted tree species suit the site.
- Time taken to plant trees properly and in favourable microsites.
- Trees planted at an acceptable spacing.
- Plantation rows offset or irregular to reduce line-of-sight.

- Good quality seedling stock used.
- All seedling stock handled gently and stored in a moist cool place.
- Seedlings kept out of heat or high winds to avoid drying.
- Guards to protect seedlings from deer and rodent damage used in high-risk areas.

b) Site Preparation

- Herb and/or shrub control treatment used in high competition areas to create favourable planting microsites.
- Shrub competition reduced during harvesting of decadent aspen stands.
- Soil scarified in vicinity of seed trees to enhance germination success.

c) Wildlife and Environmental Considerations

- Promoted mixed species to increase diversity.
- All label directions followed when applying chemicals.
- 25-ft. (8 m) chemical free buffer left along all surface waters.
- Chemicals applied during appropriate weather conditions only.

d) Follow – Up Monitoring and Treatment

- Site regularly monitored to assess survival of regeneration.
- Prompt follow-up treatment used when necessary.

- Section Five -
Forest Protection

Contents

A - Insect & Disease...42

B - Fire Protection...44

C - Self-audit Checklist...45

Forest Protection

Since insects, disease and fire, all have the potential to seriously reduce the economic and fundamental values of a woodlot, protection is in the best interest of landowners.

A - Insect and Disease

Manitoba's trees are subject to a variety of insect pests and diseases with impacts ranging from temporary reductions in growth to severe damage and mortality. The best strategy for a vigorous and healthy woodlot is to implement beneficial management practices.

BMPs for Managing Insects and Disease

- Inspect woodlots frequently throughout the growing season. Know what is normal, so that you can recognize signs of emerging pest problems.
- Look for patterns and locations of symptoms such as die back, defoliation, discoloration or wilting.

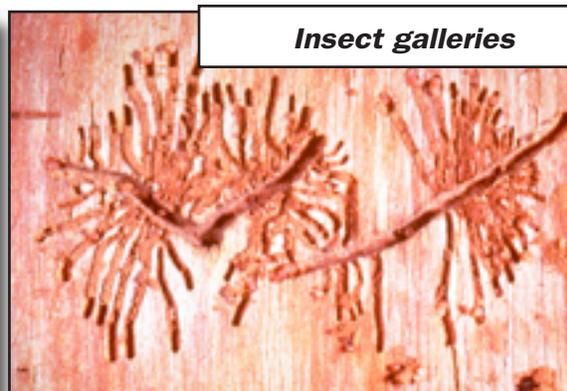


Forest Tent caterpillars feed heavily on foliage

- Look for signs of infestation such as webs, cocoons, conks, larva or insects.

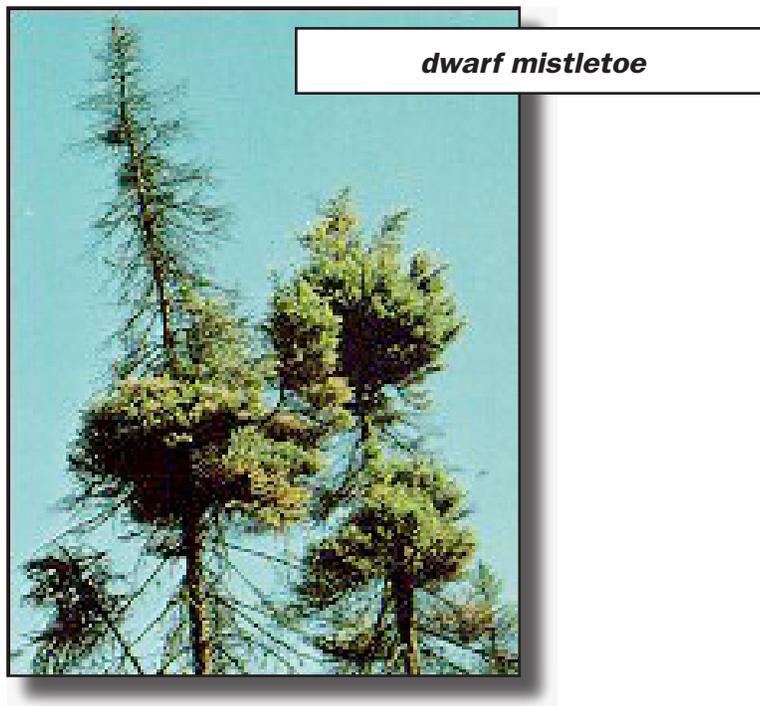


Conk fungus is an indication that the stand is overmature. Many trees will have centre rot and/or stain



Insect galleries

- Collect and send pest and/or foliage samples to your local woodlot specialist. Ask for advice on pest control options.
- Keep abreast of new and emerging introduced pests that may be entering your region. Non-native pests often tend to be very damaging, so keep on top of the latest in pest prevention measures.
- If chemical control is recommended, follow the manufacturer's approved application rates and procedures.
- Harvest planning should focus on the removal of diseased, malformed, crowded, damaged and/or dying trees that are either infected or more susceptible.



- Prune and dispose of infected branches – i.e. by burning.
- During harvesting, avoid soil compaction and logging damage that weakens trees and increases points of entry for pests.
- Consider planting a variety of species that may increase biodiversity and pest resistance.

B - Fire Protection

While forest fires are nature's means of forest renewal, the economic costs and personal impact of wildfires can be catastrophic to woodlot owners. Fortunately, landowners can plan and take actions that minimize potential losses.

BMPs for Fire Protection



- In areas of concern, consider harvesting stands with high fuel loads.
- Design harvest plans to create a variety of age classes, as young stands have a minimal fuel load and therefore are less prone to fire.
- Create a fireguard between neighboring stands by clearing and maintaining a strip of bare soil, wider than the height of the adjacent trees.
- Use harvesting equipment to break down slash. This speeds decay, reduces fuel load and minimizes potential for ground fires to become crown fires.
- In areas of high fire risk, pile and burn heavy slash to reduce fuel load. Proceed with burning only when manpower and fire-fighting equipment are in place and conditions are suitable. (Be sure to obtain any necessary permits prior to burning.)
- Cut down tall, dead trees that could attract lightning strikes.
- When working in the woodlot, check the local Forest Fire Hazard Rating daily. Fire hazard information can be found at <http://www.gov.mb.ca/conservation/fire/> or through your local Manitoba Conservation office.
- During fire season, those working in the woodlot (especially chainsaw operators) must have easy access to fire-fighting equipment, including a fire extinguisher, shovels, axes and saws.
- Use common sense! Do not carry out work in the woodlot when fire danger is high.

C - Self-audit Checklist

a) Insect & Disease

- Inspect woodlots frequently to recognize changes in forest health.
- Ask woodlot specialists to identify pests and recommend control.
- Stay knowledgeable with regards to newly introduced pests, which may be entering your region.
- Follow pesticide manufacturer's application rates and procedures.
- Plan harvesting to eliminate sources of pest infestation.
- Harvest diseased, malformed, crowded, damaged and/or dying trees/stands.
- Plant a variety of species to increase diversity and reduce the risk of large scale infestation.
- Prune and dispose of infected branches. Sterilize pruning tools.

b) Fire Protection

- Design harvesting to eliminate dying stands with high fuel loads.
- Design harvesting to create age and species diversity.
- Create fire guards between adjacent high-risk stands/properties.
- Break down slash to speed decay and reduce the fuel load.
- Pile and burn heavy slash to reduce fuel loads.
- Obtain all necessary approvals/permits to burn.
- Remove tall, dead trees.
- Check Forest Fire Hazard rating and use caution when deciding to burn.
- Ensure chainsaw operators have fire extinguishers and access to other necessary equipment.



Appendices

Contents

I) Recommended amount of “Leave Trees”

**II) Recommended Riparian Management
Zone (RMZ) Widths**

III) Provincial Regeneration Standards

IV) Helpful Contacts

I) Recommended amount of “Leave Trees”

Option 1: Retaining leave trees in clumps, strips or islands.

It is recommended a minimum of 5% of each clearcut area be retained in leave clumps, strips or islands. Ideally this 5% should be strategically located around wetland inclusions, seasonal ponds or others areas of ecological importance. The benefits of leave clumps range from improved visual quality to enhancement of biodiversity.

Option 2: Retaining scattered leave trees.

Retaining scattered individual leave trees may be a more viable option on smaller or narrower cut blocks. Roughly 6-12 leave trees per acre (15-30 trees per hectare) are recommended. This option may not be suited for shade-intolerant species such as aspen and may inhibit regeneration.

Note: Retaining leave trees may simultaneously fulfill more than one management objective. For example, leave trees may benefit wildlife, provide seed for regeneration or improve visual quality.

II) Recommended Riparian Management Zone Widths

RMZ width in relation to stream width and slope:

Recommended RMZ width in relation to stream or waterbody width.		Recommended RMZ width in relation to land slope.	
Stream Width	RMZ Width	Land Slope	RMZ Width
< 20 feet	60 feet per side	10% - 20%	60 feet
20 to 40 feet	75 feet per side	11% - 20%	90 feet
> 40 feet	150 feet per side	21% - 40%	125 feet

Minnesota Forest Resources Council. Sustaining Minnesota Forest Resources: Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers and Resource Managers. 1999. Minnesota Forest Resources Council, St. Paul, Minnesota.
North Dakota Forest Service. North Dakota Forestry Best Management Practices. 1999. North Dakota Forest Service, Bottineau, North Dakota.

Note: It is recommended that after assessing both stream width and land slope, the greater of the two be implemented.

III) Provincial Regeneration Standards

Note: Although the provincial regeneration standards are not mandatory on private land, they are included here for the landowner's reference.

Stocking Standards

An attempt should be made to regenerate the post harvest area according to the stand type present prior to harvest. For example, a softwood site should be regenerated with softwood species.

Softwood Standard: An acceptable seedling is any native softwood species that has been established on the site for at least three years. The harvested softwood site is considered sufficiently regenerated if 75% or more of the area is stocked to acceptable softwoods.

Hardwood Standard: An acceptable seedling is any native hardwood species possessing a height of at least 1m. The harvested hardwood site is considered sufficiently regenerated if 75% or more of the area is stocked to acceptable hardwoods.

Mixedwood Standard: A combination of acceptable hardwood and softwood seedlings. The harvest area is considered regenerated if 75% or more of the area is stocked to an acceptable seedling with a minimum of 45% softwood stocking.

Tree Spacing / Density

Optimum tree spacing / density are based on the amount of stems per acre at establishment. The optimum density will change with time, as trees require more space for growth. It is recommended that you consult your local woodlot specialist for advice on manual thinning and optimal densities as the stand matures.

Manitoba Conservation - Forestry Branch. Manitoba Natural Regeneration Survey Manual. 1990. Winnipeg, MB

IV) Helpful Contacts

Department of Fisheries and Oceans (Freshwater Institute)

Phone: (204) 983-5000

E-mail: info@dfo-mpo.gc.ca

Manitoba Agriculture and Food and Rural Initiatives – Agro-Woodlot Program

Carman, MB

Ph: (204) 745-5630

www.gov.mb.ca/agriculture

Manitoba Conservation – Forestry Branch

Phone: (204) 945-7989

www.gov.mb.ca/forestry

Manitoba Endangered Species Information

Phone: (204) 945-7465

www.gov.mb.ca/conservation

Manitoba Forestry Association – Woodlot Program

Phone: (204) 453-3182

E-mail: mfainc@mts.net

www.mbforestryassoc.ca

Manitoba Model Forest

Phone: (204) 367-5232

Email: bdube@mb.sympatico.ca

www.manitobamodelforest.net

Species at Risk Information

Phone: (204) 984-0863

Woodlot Association of Manitoba

Phone: (204) 453-7102

Manitoba Christmas Tree Grower's Association

Phone: (204) 453-7105

www.realchristmastrees.ca

Glossary

Age Class: group of trees in a forest of the same age

Afforestation: The establishment of a tree crop on an area from which it has always been absent or for a considerable amount of time has been absent.

Biodiversity: The variety and abundance of species, their genetic composition, and the communities and landscapes in which they occur, including the ecological structures, functions and processes occurring at all of these levels.

Blowdown: A tree or group of trees being toppled by the forces of wind.

Bucking: The act of cutting tree-length logs into shorter specified lengths.

Bumper Trees: trees used during a skidding operation to prevent damage to other trees

Cavity trees: A hollow tree used by wildlife for roosting and reproduction by wildlife.

Conks: A hard, spore bearing structure of a wood-destroying fungus, which projects beyond the bark of a tree.

Crown Fires: fire travelling rapidly along the tops of trees, or crown, usually in a coniferous stand during very windy conditions. One of the most difficult fires to stop

Cutblock: A term typically used in conjunction with clear cutting to describe the harvest area.

Dieback: The death or wilting of foliage and branches on a tree or group of trees. Could be attributed to a variety of factors.

Decking: The process of stacking bucked wood in preparation for loading and transporting.

Defoliation: The loss of leaves on a plant or tree.

Erosion: The process by which soil particles are detached and transported by water, wind or gravity and deposited downslope or downstream.

Even-age: Describes a forest or stand within which all the trees are the same age or nearly the same.

Felling: The process of severing trees from stumps.

Forest Cover Types: A classification of a particular forest stand based on the dominant tree species of the overstory and their characteristics.

Fireguard: a cleared area around a forested stand to prevent the spread of fire.

Fuel Load: The amount of combustible organic matter that is present on a site.

HADD (Harmful Alteration, Disruption or Destruction): A Department of Fisheries and Oceans acronym meaning the Harmful Alteration, Disruption or Destruction of fish habitat.

In-fill: To interplant seedlings among existing trees that were planted or natural.

Integrated Pest Management: The maintenance of destructive agents, such as insects, by the combined use of a variety of preventative, suppressive, or regulatory tactics and strategies that are efficient and socially acceptable.

Invasive Exotic Species: Non-native species that spread through natural regeneration and require means to control the spread in the woodlot and to adjacent areas of the woodlot. (i.e. Carragana and Scots Pine).

Hardwoods: A term used to describe broadleaf, usually deciduous, trees such as the oaks, maples, ashes, elms and poplars etc. It does not necessarily refer to the hardness of the wood.

Harvesting Prescriptions: recommended operational strategies which describe how the forest will be harvested. The prescription chosen will determine how the next forest stand will regenerate.

Herringbone: A skid trail pattern characterized by an arrangement of rows of parallel lines, similar to the spine pattern of a herring.

Landing: The area where logs are collected for loading.

Leave Trees: trees not harvested because of their importance to the ecosystem (i.e. in a riparian area) or as a seed source.

Load Slip or Scale Receipt: A written receipt given to a contractor to verify the volume or weight of wood delivered to a mill.

Mast Trees: Trees which produce nuts, berries, or fruit.

Mattock: A tool, similar to a pick that can be used for breaking up ground.

Merchantable Timber: A tree or stand of trees that may be converted into salable products.

Microsite: The specific location on the ground where a tree is planted. Soil temperature, structure and moisture will vary depending on the microsite chosen for planting.

Natural Regeneration: Tree regeneration arising from natural means such as seed fall, root suckering or stump sprouting.

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

Primary Skid Trail: An arterial route used by skidders or forwarders to haul trees and logs to the landing. The bulk of the travel is typically concentrated on these routes in order to limit disturbance in other areas of the woodlot.

Pulpwood: Wood cut or prepared primarily for manufacture into wood pulp, for later manufacture of paper and allied products.

Riparian Management Zones: That portion of the riparian area where site conditions and ecological values warrant special management consideration.

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

Registered Management Plan: A written plan for the organized handling and operation of forest property. It usually includes data and prescribes measures designed to provide optimum use of forest resources according to the landowner's objectives.

Release: Freeing a tree or group of trees from more immediate competition by cutting or otherwise eliminating growth that is overtopping or closely surrounding them.

Residual Stand: Trees remaining uncut following any cutting operation. (Prairie woodlot)

Riparian Area: The area of land and water forming a transition from aquatic to terrestrial ecosystems along streams, lakes and open water wetlands.

Riparian Buffer – No Harvest Zone: an area set aside to protect water and soil in an ecosystem. No harvesting or resource extraction is allowed.

Riparian Management Zones: a special management area along a creek, river, lake, or stream. Specific plans are usually written to include wildlife habitat, and to protect water and soil resources

Rutting: The creation of depressions made by the tires of such vehicles as skidders, log trucks and pickup trucks, usually under wet conditions.

Sawlogs: A log that is relatively free of rot and large enough to be sawn into lumber.

Scarification: The process of removing the forest floor or mixing it with the mineral soil by mechanical action preparatory to natural or direct seeding or the planting of tree seedlings.

Seed Crop: The relative amount of tree seed that is produced in a particular year.

Seed Trees: Any tree that bears seed; specifically, a tree left to provide the seed for natural regeneration.

Shade Tolerance: The capacity of a tree or plant species to develop and grow in the shade of and in competition with other trees or plants. (Prairie woodlot) For example, White spruce has a relatively high degree of shade tolerance compared to aspen, which is shade intolerant.

Skidding: The process of sliding/dragging logs from the stump to a landing, usually applied to ground-based operations.

Skid Cone: cone shaped device used to skid cones along the ground with minimal resistance

Skid Trails: A pathway over which logs are skidded.

Slash: The residue left on the ground after felling, includes unused logs, uprooted stumps, broken tops, etc.

Snag: A standing dead tree.

Hard Snag: a standing tree with little decay

Soft Snag: a standing tree with advanced decay

Softwoods: Generally, one of the botanical groups of trees that in most cases have needle or scale-like leaves; the conifers.

Soil Compaction: The increase in soil density resulting from loads applied to the soil surface.
See Rutting.

Stand: An aggregation of trees occupying a specific area and uniform enough in composition (species), age and arrangement to be distinguishable from adjoining areas of forest.

Super Canopy Tree: A tree that possesses a crown that extends well beyond the average height of the stand.

Timber Assessment: The process of having a woodlot specialist sample a woodlot and provide estimates of timber volumes and species composition. A timber assessment may also identify areas of concern and provide harvesting suggestions.

Timber Stand Improvement: Forest management activities or practices intended to either improve growth and form of intended crop trees or manipulate stand composition. (Minnesota) For example, thinning, pruning or single-tree selection harvests.

Thinning: Removal of trees in an overstocked stand to give the remaining trees adequate room for growth.

Understory: The portion of the trees or other vegetation in a forest stand below the canopy.

Windfirm: Describes trees capable of withstanding heavy wind.

Windthrow: trees that have been uprooted and blown down in high winds. Trees left standing after a clearcut are prone to windthrow.

Woodlot: A forested area on private land that serves a variety of uses including timber harvesting, non-timber forest products, wildlife habitat, recreation and provides a wide range of other ecological benefits.

Woodlot Specialist: Personnel available to the public, free of charge, whose role is to maximize the economic and environmental benefits for landowners, communities and Manitoba by providing the landowner with technical support that leads to informed decision making.

Index

Assisted regeneration.....	35	Pre-harvest site planning	20
Bidding for timber.....	12	Reforestation strategies	34
Contracts.....	13, 14	Riparian areas	25
Clearcut.....	21	Riparian buffers.....	25
Disease.....	42	Riparian management	
De-limbing.....	27	zones (RMZs)	26
Decking	28	Sample contract.....	14
Felling.....	27	Scaled volume sale.....	12
Fire protection	43	Seed tree	35
Group selection system	21	Selecting a contractor	12
Harvest area preparation	22	Single-tree selection system	21
Harvesting prescriptions	20	Site preparation.....	37
Insects	42	Skidding.....	28
Lump sum sale	12	Skid trails and landings	23
Management planning	7	Timber Stand Improvement	22
Natural regeneration.....	34	Tree and stand improvement.....	22
Negotiating a timber sale.....	12	Tree planting.....	35
Payments.....	13	Types of bid.....	12
Post-harvest.....	28	Wildlife considerations.....	24
Post-reforestation monitoring.....	39	Woodlot management.....	7
Pre-harvest meeting and site			
Inspection.....	12		

