Fundy Model Forest

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Report Title: Best Management Practices: A Practical Guide for New Brunswick's Private Woodlots

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The Fundy Model Forest…
…Partners in Sustainability

"The Fundy Model Forest (FMF) is a partnership of 38 organizations that are promoting sustainable forest management practices in the Acadian Forest region."

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Canadian Institute of Forestry
Canadian Forest Service
City of Moncton
Conservation Council of New Brunswick
Fisheries and Oceans Canada
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Eel Ground First Nation
Elgin Eco Association
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Environment Canada
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Best Management Practices:
A Practical Guide for New Brunswick's
Private Woodlots

Introduction

Given that the private woodlot owners of New Brunswick control 30% of the provinces total area, the use of best management practices and the adoption of sustainable management strategies on private lands is requisite in any kind of landscape level planning. As such, there is a need for materials outlining and promoting the use of BMP's on private forest lands. It was with this in mind that INFOR presented its proposal for the development of a Best Management Practices Guide to the Fundy Model Forest.

With the financial assistance provided by the Fundy Model Forest and the Sustainable Forestry initiative, INFOR Inc. developed a field guide of outlining best management practices (BMP's) for the private woodlot owners of New Brunswick.. We decided that the format must be user friendly and concise, and would take the shape of a quick-reference field manual. The guide was designed to make landowners aware of all relevant best management practices, provincial and Federal legislation, while providing critical contact information should more details be required. This manual was written for the general public (who was assumed to have little or no forestry knowledge) so all technical language was condensed into layman's terms. Content was developed though a constant process of revision with drafts being sent to multiple reviewers from several organizations in the region. The final result is a pocket-sized guide that represents the most current and critical best management practices, legislation and management strategies for New Brunswick's private woodlot owners.

Methodology

We conducted an extensive literature review to survey the content and format of current BMP manuals in use across North America. Upon review we selected a pocked-sized spirally bound format as it seemed the easiest to carry and use in the woods.

Instead of focusing upon one or two subjects, we felt that the manual should reflect all of the major areas of concern in private forest management as well as explaining any laws and regulations that apply to private owners. INFOR's first draft was circulated to numerous individuals and organizations for review including the Canadian Forest Service, The Department of Natural Resources, the Federation of Woodlot Owners, the Department of Environment and Local Government, Several forest products marketing boards and the SFI implementation committee. Changes and additions were suggested by all participants in this manner for several drafts. Once the content was finalized a final draft was again circulated to check for any errors and omissions before sending it off to the printer.

The final draft of the manual was sent around to several printers with a list of paper weight specifications for quotes. Unipress in Fredericton who has an excellent working relationship with INFOR came in with the lowest quote and so were selected.

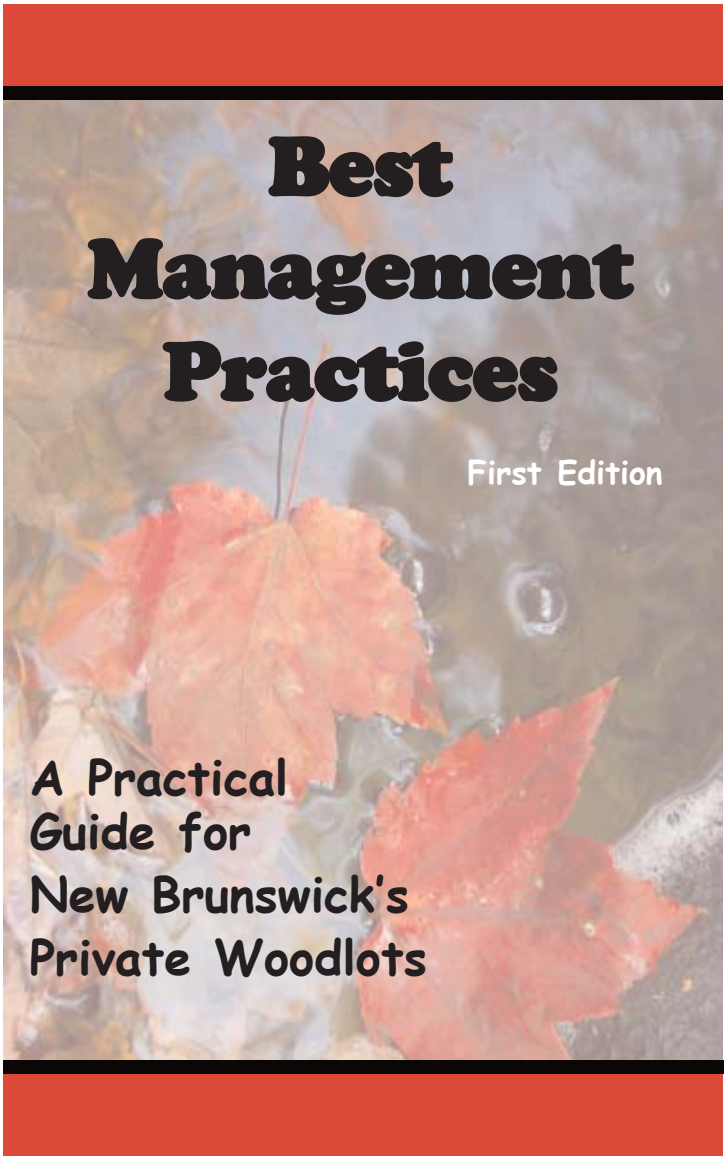
Ronald Fournier was sent a copy of the final draft for translation which was subsequently reviewed to ensure that terminology appropriate for the target audience was used.

Discussion of Results and Conclusions

The result of this project is guide itself, **Best Management Practices: A Practical Guide for Private Woodlots in New Brunswick**. A first run has been printed in both French and English, with the intent that subsequent printings will allow reviews and updates be made on a regular basis to keep this guide current and applicable. All organizations that helped participated in the review process have expressed great interest in the manual and it value to private forestry in New Brunswick. INFOR has also received a steady stream of inquiries into the guide from the general public, suggesting that our target audience will accept and use it as a management planning resource tool.

Deliverables

Best Management Practices: A Practical Guide for New Brunswick's Private Woodlots
Full colour
83 Pages
Spirally bound
Waterproof paper


Best
Management
Practices
First Edition
A Practical
Guide for
New Brunswick's
Private Woodlots

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RÉSEAU DE FORÊTS MODÈLES

SUSTAINABLE FORESTRY INITIATIVE®
SM NEW BRUNSWICK IMPLEMENTATION COMMITTEE

Thanks to the following for their help in preparing this guide:

N.B. Depeartment of Natural Resources
N.B. Department of Environment and Local Government
Maritime College of Forest Technology
The New Brunswick Federation of Woodlot Owners
The Canadian Forest Service
SFI Implementation Committee
NB Forest Products Marketing Boards

Complied by Christopher Dickie, INFOR Inc. 2005

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What are Best Management Practices?

As our knowledge of the forest has grown, we have come to understand that our actions within the forest landscape have significant impacts upon the environment. Poor forest management results in the degradation of water quality, species habitat, and the resource itself. Poor operating practices not only result in unnecessary damage, but can place lives at risk when proper safety procedures are not followed. The term **best management practices (BMP's)** describes "the most current techniques generally agreed upon as reducing the impacts of forestry operations on the environment while minimizing effects upon cost and productivity"[1].

Currently, private woodlot owners in New Brunswick must be aware of and abide by several Federal and Provincial acts which affect activities on private lands. The **Clean Water Act, Clean Environment Act**, **Endangered Species Act** and **Species at Risk (SARA) act** are just some of the acts that regulate management activities which may adversely affect the quality and functioning of watercourses and wetlands or

species identified as being endangered, threatened or as having special status. Beyond mandated management practices, the private landowner has the responsibility of practicing good stewardship. Management should strive to, at the very least, leave a site in as good a condition as it was before activities began. It is important that the private owner has an appreciation for the potential effects of their actions so that they can make informed management decisions.

Where to Begin: Forest Management Plans

Whether you are an experienced woodlot owner or just starting out, there is no substitute for the guidance and direction provided by a forest management plan. The seven forest products marketing boards located throughout the province offer private woodlot owners the opportunity to have a management plan drafted for their woodlot. Such a plan will give you a detailed description of your woodlot, including stand mapping, timber quality and quantity, an assessment of wildlife habitat and general notes concerning various issues of interest.

The plan author will work with you to

develop management activities designed to meet your objectives and make recommendations as to how these goals can best be achieved.

Having a management plan prepared for your woodlot may also qualify you for the Intergenerational Tax Credit. This program allows the transfer of managed woodlands between generations (i.e. father to son) without requiring the payment of capital gains tax. For more information, contact your local forest products marketing board (*see* **Contact Info**).

Certification

Today, there are several certification programs employed in Canadian forests, each designed to ensure a minimum standard of quality in forestry operations. Recognizing the environmental and economic benefits of forest certification, there is now a program designed by woodlot owners for woodlot owners available in New Brunswick. The Pan Canadian certification program is dedicated to the development of sustainable forestry practices on private woodlots. This voluntary program sets targets and guidelines to help private owners develop management

strategies according to best management practices, fostering healthy forest resources and ecology.

The only way you can have your private woodlot certified under the Pan Canadian system is to have a management plan written by a qualified individual. For more information on Pan Canadian Certification contact your local Forest Products Marketing Board.

Initial Planning

Planning is the first step of any forestry operation and is one of the most important BMP's to consider. Proper planning will help to improve efficiency, limit time delays and environmental damage resulting from oversights that would have been caught with adequate forethought. Planning your operation in advance will allow you to identify regulations pertaining to your operation and give you time to apply for necessary permits.

Boundary Lines

It is imperative that you confirm the

location of your property boundaries **BEFORE** beginning any activities on your property.

Involve/inform your neighbours of your management activities to maintain good relations and avoid any problems.

Conduct reconnaissance to try and find any evidence of the old line (blazed trees, pins, an old fence etc). In some cases, lines may be re-marked without a new survey from pre-existing lines.

Ensuring that all of your boundaries are well marked should eliminate the potential for trespassing onto adjacent properties. This may be as simple as touching up pre-existing blazes and markers, or it may require a survey.

If a line is entirely absent and there is no evidence of its former placement, a new survey is required. No other method will provide a legally binding boundary line. **Only a surveyor can legally establish a boundary line.**

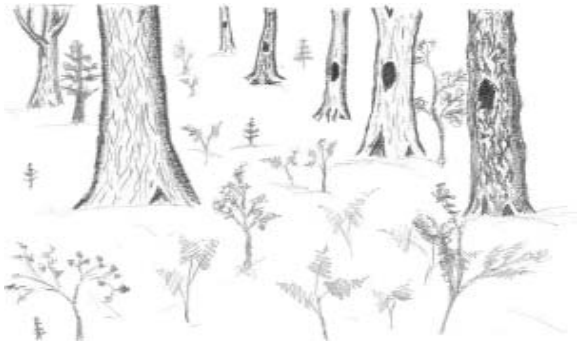
It is a criminal offense to alter a surveyed boundary line. This includes cutting

down a blazed tree, pulling a pin or stake, moving a cairn or otherwise altering a line.

The following are guidelines to help you update and maintain proper boundary lines:

Underbrush may be cleared up to approximately 1 metre (3 feet) on each side of the centre line, depending on the forest density.

Large, healthy, unblazed trees on the line should not be cut, and leave some smaller trees as well. These will serve as future line markers.



Example of a Blazed Line

Trees within approximately 1 metre (3 feet) of the centre line can be blazed to indicate the location of the centre line. Blazing should be

done so that the blazes are pinched, pointing towards the centre of the line. Old blazes or other physical evidence must not be disturbed, because this is evidence of the age of the original survey work. If you are blazing a tree which has existing blazes, then blaze above or below those existing blazes, so original evidence is not destroyed.

Blaze only live trees, preferably the largest.

Unblazed trees or deadfalls that must be cleared should be laid flat on the ground to the side of the line.

Mark corners well and replace posts with durable, easily visible materials and paint.

Preliminary Site Visit - Walk your Woodlot

A preliminary site visit will give you the chance to find wet areas, intermittent streams or features that should be preserved or avoided while harvesting.

Walk proposed roadway and look for any

unmapped watercourses, wetlands, sensitive areas or critical wildlife habitat.

Seasonal watercourses may only appear to be dry channels at certain times of the year and some wetlands will be dry too. If you are unsure if you are looking at a wetland or not, contact your local **Department of Natural Resources** (DNR) or **Department of Environment and Local Government** (DELG) office for help.

The placement of roads and landings is critical to the ultimate success of any operation and can cause severe damage to the environment if done improperly. Roads are often the largest expenditure made by a private landowner, so their proper location and construction is vital.

Minimize the number of stream and wetland crossings when planning your road. Fewer crossings mean less potential environmental damage and fewer permits and regulations for you to deal with. **Remember, if you alter a watercourse, even unintentionally, you are liable for the consequences of your actions by law.**

Choosing the Right Activities

Stand and site characteristics must be taken into account when deciding on a course of action in your woodlot. Your personal goals will give a starting point as to the type of operation you require (commercial thinning vs clear cutting, etc.). It then becomes a matter of custom-tailoring the selected intervention to suit the character of your stand.

The following are points you must consider when designing forestry activities:

Stand Age

- Young stands - is it ready for pre-commercial thinning?
- Is the stand still growing vigorously?
- Is volume declining?

Regeneration Habits/Species Characteristics

-What are the natural characteristics of the tree species present? Are they short or long lived?
- Selection vs Clear cut – should be based upon

species characteristics
-Is planting required to achieve the desired species composition (species present)?

Drainage

-Is there potential for soil/watercourse damage?
-Can the site be worked with minimal damage or impacts on water quality (while following any laws/regulations)?

Habitat Quality

-Significance to wildlife
-Can habitat be improved? For which species?
-Are species at risk or other unique species present?
-Are provisions for habitat maintenance required?
-Comply with relevant regulations (endangered species act etc.)

Access

-Is it easily accessible - do roads need to be built?

-Access issues—crossing crown lands, adjacent woodlot owners etc.
-Cost of access
-Environmental consequences of access

Marketability

-Type of products/state of current market for your products
-Projected volumes - are there merchantable quantities?
-Quality of timber to be extracted
-Ensure 100% utilization

Non Timber Forest Products (NTFP) opportunities

—Are there other potential sources of income from non-timber or unconventional forest products? Value-adding potential?

Other Points to Consider

The harvest method selected should reflect the species present, their age, size and number of stems per hectare. As an example, clear cutting a 100 hectare patch of mature tol-

erant hardwood (sugar maple, beech, yellow birch) would not be recommended as a best management practice. Tolerant hardwoods are not usually subject to large scale, stand replacing events. Selectively harvesting 30% of the total volume (and not just the best trees) is a closer approximation to the normal pattern of stand development.

Choosing the right time of year to enter any given stand will help to minimize the potential for site damage. Sensitive areas, areas with high soil moisture and those prone to rutting and excessive soil disturbance are best entered after freeze-up or when dry in late summer.

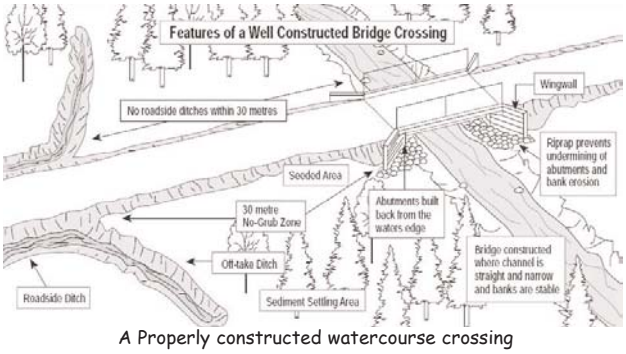
Road Building

Well-built roads provide access for silviculture, fire suppression, recreation and serve as a framework for future forestry operations. Roads have a major impact upon forest soils, water and ecology, and must be properly constructed to minimize potential site degradation.

Initial Planning: Roads

The timing of road construction should be determined with significant thought given to the weather. Avoiding wet weather and times of high soil moisture (spring) will make construction easier and reduce the risk of erosion and watercourse contamination.

Lay out roads with future operations in mind. Stands to be harvested in the foreseeable future should be considered when laying out your road network. In other words, optimize your road building - build the shortest road possible that allows the greatest access and future expansion.



A Properly constructed watercourse crossing

Road Design and Construction

Roads and landings should be located on level ground and away from watercourses where possible as they are the primary source of silt contamination.

Make sure that roads are well ditched and crowned. Properly built roads will drain water effectively and minimize erosion.

Do not run ditches into a watercourse. Off-take ditches should run out into vegetated areas at least 30 metres from a watercourse or wetland to trap sediments so they do not enter watercourse or wetland.

Make full use of off-take ditches, cross drains and catch basins to deal with runoff. Effective drainage will minimize erosion and siltation.

Harvesting will require trucking - include turning areas in your road layout.

Consider the equipment you will be using and design your roads accordingly.

Watercourse Crossings

Even if you contract out all forestry activities to a certified forest worker, ultimately you are liable for any resulting damage to a watercourse. Consequently, you must be aware of all applicable regulations pertaining to activities occurring on your property. A summary of New Brunswick's **Watercourse and Wetlands Alteration Regulation** is given in the Watercourse Protection section of this document and at **www.gnb.ca**. A copy of watercourse crossing technical guidelines can be obtained from the Department of Environment and Local Government (DELG) or on line at **www.gnb.ca/0009/0371/0005/index.htm**

Crossing Locations

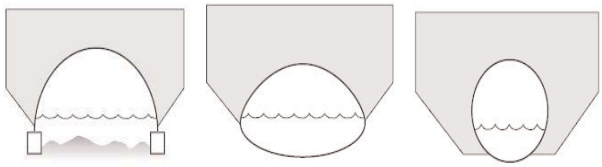
Crossings should be aligned at right angles to the waterway to minimize the necessary span length. Avoid areas of easily eroded, unstable materials such as sand or silt. Choose a portion of the waterway that is straight and unwinding with a stable bank.

Proper Sizing

Proper culvert and bridge size is based upon the peak flow (total volume of water) likely to occur in a given watershed once in 100 years (100 year flood). Peak flow is influenced by the size of the watershed, the type of soils present, average precipitation levels and land use type (ie farming). When an application is made to install a watercourse crossing, DELG will evaluate the likely 100 year peak flow **and review proposed culvert sizes to ensure that they are adequate. Contact you local forest products marketing board for help determining propoer culvert sizing.**

Types of Culverts and Bridges

Culverts are used for crossing small waterways and as runoff control devices for roads. Culverts help direct the flow of water, preventing erosion of ditches and roadbeds. Cross drains are simply culverts crossing a road, connecting the ditches on either side to manage heavy runoff. Several types of culverts are used in road construction, including open bottom culverts and pipe culverts. Open bottom culverts essentially sit over top of the watercourse, while pipe culverts must be set into the bed of the watercourse. Both have their merits and dissadvantages in road construction.



Open Bottom Pipe Arch Round

Culverts

Culverts should be installed "in the dry" during low water to avoid disturbing fish migrations and reduce siltation. This means that the

water should be diverted so that silt is not introduced into the watercourse while allowing fish to pass.

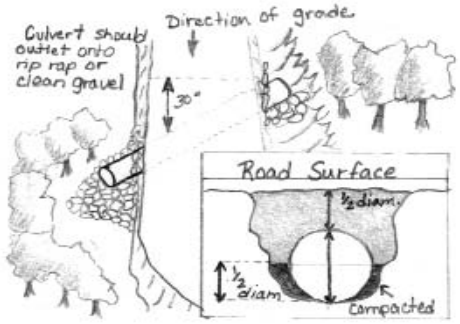
Use sediment control measures where there is a risk of sediment entering a watercourse or wetland.

Using a pump-around system to work "in the dry

Seed exposed soil to stabilize them reducing erosion.

Backfill culverts so that they are covered to a depth of half their diameter. Improperly seated, shallow culverts will be pushed upwards by frost and will not last long or function properly.

Bury culverts (not open-bottom) at least 6 inches into the streambed to allow fish to pass.



A properly intalled culvert

Make sure that culverts are well supported along their length by stable material (crushed gravel, etc).

Cross Drains

Cross drains should be installed at set intervals based upon the slope of the roadbed.

Slope %	Spacing (metres)
gentle (1% - 2%)	90
moderate (3% - 9%)	45
steep (>10%)	30

Proper Spacing of Cross Drains on Woods Roads

The minimum acceptable diameter for cross drains is 300mm.

Cross drains must be installed at a 30 degree angle down-slope, with a 4% slope in grade to facilitate flow (bury the downhill end slightly deeper)

Watercourse crossings should be well planned and include features to meet all DELG watercourse protection regulations.

Bridges

Single-span bridges span a watercourse and do not interfere with its bed, similar to open-bottom culverts. Bridges may be used for small scale crossings or to span large watercourses.

Single-Span Bridge

Options for Silviculture

Silviculture refers to the means of controlling the establishment, composition, character and growth of forest stands to satisfy specific objectives. This covers the full range of forestry activities, from planting to harvesting. There are numerous options for woodlot owners considering silvicultural activities. Whether planting, pre-commercial thinning or harvesting mature timber, there are numerous systems and strategies available to meet your objectives. Each system may be modified in its approach to suit local conditions and individual goals.

Planting

The need for planting is highly dependent upon your personal objectives, the current state of your woodlot and its recent history. Planting is a means of speeding up stand regeneration while providing the opportunity to determine the species that will be present. In many cases, planting after harvesting is not necessary as abundant natural regeneration will quickly establish itself.

Plantations can be established in a number of ways, by planting only one species or mixing several together and by varying the way they are arranged (in rows or random) and the number planted per hectare (density).

Things to Consider When Planting

Carefully choose the species to be plant-

ed. Each species has a specific set of requirements for soil, water and climate conditions, and most do very poorly if they are not all met.

Don't plant trees too close together, doing so may stunt their development. Two metres between trees generally promotes rapid growth while maintaining good form

Store seedlings in a cool, shaded place. Monitor them regularly and water them if necessary. This is critical for bare root seedlings.

Plant seedlings to the proper depth - Seedlings should be planted to the root collar, visible on the stem just above the roots.

Bare roots must be planted with roots straight down, not curled back up

Seedlings must be well planted, held tightly in the ground. With your foot, firmly compact the ground in front of and behind seedlings to root them in place. Air spaces around roots will dry them out and can lead to root rot.

In areas with a deep duff layer (like peatmoss), kick it away with your foot to expose the mineral soil below before planting.

Flag planted trees every so often so that you can see where you have planted. This will make it easier to meet your objectives.

Check your work to make sure you are meeting your target density (number of trees

planted per hectare). An example would be to measure out a 10 metre by 10 metre square, counting the number of trees inside and multiplying by 100.

Pre-Commercial Thinning

Pre-commercial thinning reduces the number of trees in a stand using a brush saw or thinning saw (looks like a weed eater with a sawblade instead of cord), allowing those remaining to grow as fast as possible. It also provides a means of changing the abundance of species in the stand and the overall quality of the remaining trees. The resulting stand will determined by the "pecking order" employed to select trees for removal, based upon your goals for the stand. Consideration should be given to maintaining the balance of species found naturally in the stand.

As an example of a pre-commercial thinning strategy, you may want to develop high quality hardwood sawlogs. To do this, you would develop a list or "pecking order" that describes which species will kept, in order of importance. In this case, you would want to keep high value species such as sugar maple, yellow birch, black

cherry and white birch while removing grey birch, fir and other softwoods. Tailor your pecking order to achieve your particular strategy.

Things to Consider when Pre-Commercially Thinning

Timing is critical when planning to pre-commercially thin your woodlot. Begin too soon in a stand's development, and the efficiency of the activity (how much thinned per day, response of the trees) will be compromised. Wait to long, and you may be losing volume that could be captured by commercially thinning, and your stand will not develop volume as rapidly as it could.

Do not leave cut trees leaning against uncut ones. This can cause damage to or deform uncut trees.

Stumps should be no taller than your boot. There should be no green shoots left on cut stems.

Crop trees (those left uncut) must be selected according to the determined pecking order.

Crop trees must not be damaged in any way. This includes accidental cuts and scuffed bark.

Leave clear trails free of debris for easy access as a safety precaution should an emergency occur.

Commercial Thinning

Partial harvesting, also known as commercial thinning, is designed to capture marketable timber while helping to improve growing conditions and quality within the stand. As trees increase in size, their numbers are reduced through natural competition. Commercial thinning harvests this volume that would otherwise be lost to the landowner.

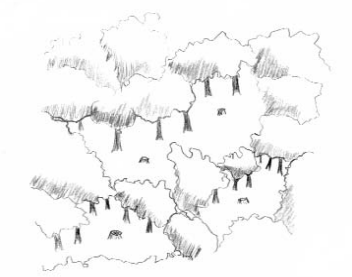
Harvesting Systems

Harvesting is the removal of merchantable timber from a forest stand. It may be done in any number of ways, to suit individual goals, stand and market conditions. Removing all of the timber from a stand in one pass results in

an **even-aged stand** - all trees in the new stand will be the same age. Partial harvesting (removing a few trees at a time at regular intervals) will create an **uneven-aged stand** (trees of multiple ages). Both systems have their advantages and disadvantages, depending upon your personal goals and the nature of your woodlot.

Single-tree and Group Selection

This method of harvesting removes individual trees or small groups of trees from the stand at regular intervals. It provides a means of improving the overall quality of the timber in the stand and growing conditions while generating income on a regular, sustained basis.

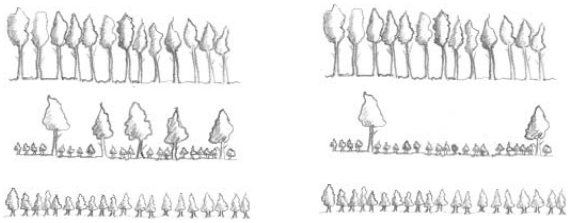


Stand structure after a selection harvest

Single-tree and group selection result in uneven-aged stands. This harvest strategy may be used in any stand type where stand improvement is an objective. Single-tree and group selection allows for the maintenance of tolerant species (species that can grow in shade) such as sugar maple, beech, yellow birch, oak, red spruce and balsam fir.

Shelterwood and Seed-Tree Harvesting

Shelterwood harvesting involves the total removal of all merchantable timber in two to three cuts. Shelterwood harvesting leaves widely spaced, good quality mature trees to produce seed after the first cut, establishing the next generation. Mature trees are left to create the proper growing conditions for the species to be



Shelterwood System Seed-Tree System

regenerated. Once the new regeneration is big enough, the remaining overstory is removed.

Seed tree harvesting is similar to the shelterwood system but with fewer, widely-spaced seed-trees left. These are in-turn removed when regeneration has been established. Both systems create even-aged stands.

Both systems can be used to manage for a variety of hardwood and softwood species.

Things to Consider when Harvesting using Shelterwood or Seed-Tree Methods:

Leave vigorous, healthy, high-quality and windfirm trees for seed source. This will promote the development of quality regeneration.

Protect regeneration when making the first cut and removing the remaining overstory. Regeneration can be protected by carefully spacing and flagging trails and limiting machine movement outside of designated areas.

Clearcutting

Clearcutting removes all merchantable timber from a site in one cut. Although widespread, clearcutting in many New Brunswick stand types is not the prefered method for stand management. Clearcutting generally results in the re-growth of an even-aged stand of fast growing, short-lived species, although this depends upon the original stand conditions and the surrounding forest type. In some cases, clearcutting is the appropriate tool to compliment stand type and landowner objectives. Consider your long-term goals before deciding to clearcut and consult your local forest products marketing board or a qualified forestry professional.

Employing a Contractor

Many landowners do not have the time or equipment to perform large-scale operations in their woodlot and so employ contractors to carry out the work for them. As when hiring any service, there are several points to consider.

Before choosing a contractor, **ask for references** and follow up on them. Are previous clients and marketing boards happy with the work? Were there any troubles?

Ask for a tour of some recent operations similar to those you are considering. This is a great way to get a feel for the quality of job you can expect.

Use a formal contract to clearly outline the details of the work to be done and the responsabilities of both parties. Contact your local forest products marketing board for more information concerning drafting a contract.

Harvesting

Constant monitoring of progress, residual damage and adherence to your cutting plan will ensure the success of your operation. Keep an eye on the weather and avoid working during periods of heavy rain as this can lead to heavy rutting and erosion.

Work Permits

Work permits are required to allow most forestry activities during fire season (3rd Monday in April until the end of October).

Work permits can be obtained at any Ranger office in the province at no cost and are required before work can begin. Watercourse and wetland alteration permits are covered in the watercourse regulation section of this document.

Initial Planning: Trails

Unlike roads, trails are the undevelopped paths through the forest by which timber is

removed. They are not bulldozed, ditched or crowned, but are simply created as machines move through the forest. As with roads, proper trail layout will improve harvesting efficiency while reducing potential negative site impacts.

When formulating your cutting plan, walk all proposed main trails to identify any un-mapped wet areas or areas of special concern.

Avoid wet or sensitive areas, flag "no entry zones" where harvesting is not allowed.

Avoid steep slopes where possible to limit rutting, soil/water disturbance and reduce the risk of personal injury.

Plan trails to minimize skidding distance, improving efficiency and reducing required operating time. Trails should access timber designated for harvest by the most direct route, yet avoid sensitive areas, watercourses and areas that are not scheduled for harvest.

Intersecting trails should be laid out at angles less than 30 degrees with respect to the main trail. This will help to limit damage to trail-

side trees. Plan out trails with designated bumper trees around which loads can be turned, protecting trees and regeneration to be left. These trees will be the last to be harvested.

Exposing mineral soil will help to stimulate certain types of regeneration, but rutting should be avoided. Ruts alter the flow of water across the landscape and contribute to erosion.

Timber Selection

When selectively harvesting your woodlot, choosing the right trees to remove is crucial. The tendency to "take the best and leave the rest" is likely not the best strategy for your woodlot. By taking only the top quality growing stock the most genetically desirable traits are removed, diminishing the quality of future trees.

Trees should be selected for removal based upon the following, in order of importance:

-Trees showing signs of disease or decline

-Trees with poor form or mechanical damage likely to degenerate or detract from quality

-Stunted trees that will not respond to better growing conditions

- Trees that are the most likely to blow down or suffer wind damage between now and the next harvest

-Trees whose value will not improve between now and the next harvest

-Remaining selection should focus upon creating optimum spacing for the remaining trees. Species left should be windfirm, meaning they are unlikely to blow down or suffer wind damage.

Rutting and Residual Damage

Selecting the right machinery for the job and time of year will yield the highest efficiency while minimizing residual stand damage.

Use slash to minimize soil compaction and rutting. Cease operating until the soil dries or make a new trail if rutting continues.

Do not fill ruts on trails with soil pushed in from another location. Fill ruts with slash to

trap sediments and break up water flow. As it decomposes new soil will form helping to fill them in.

Know your machine and its limitations. Do not overload as this will lead to unnecessary rutting and machine wear.

Use a winch to access timber on steep slopes or valley bottoms. This will keep you out of danger while preventing excessive rutting and soil disturbance.

When using a winch try and use the full length of your main line. Doing so will limit the amount of driving required in the stand, minimizing damage to root systems and soil compaction.

Directional felling is the ability to fall trees in a desired direction and location. Practice directional felling and use it to reduce hang-ups, damaging other trees and to improve your productivity. If using a winch, hitch to the top of the tree stem where required to reduce the amount of damage sustained to surrounding trees and regeneration.

Keep roads well maintained. Clean up slash, fill ruts and install erosion control devices (waterbars, hay bales) where required. Well maintained roads promote good drainage and help to minimize runoff/siltation problems. Avoid hauling or operating in wet conditions as this will cause excessive damage to the roadbed.

Keep the site clean. Pick up and properly dispose of all waste, including food and beverage wrappers/containers, broken parts, used filters etc. Garbage contaminated with petroleum or chemical products should be disposed of according to regulations. See the Petroleum Products section for more details.

Product Utilization

Make the most of the resource. Eliminating waste means more money in your pocket.

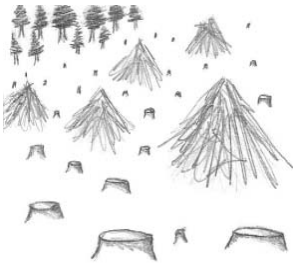
Consider full tree markets where they exist - they generally involve reduced harvest cost and time. Harvest to produce high value products i.e. sawlogs, veneer, studwood.

Know your markets and fully utilize all trees. Keep stumps low and cut trees to full potential length to get 100% utilization.

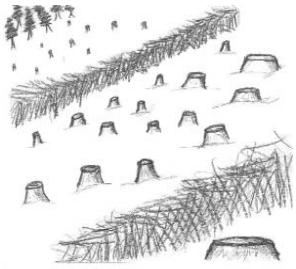
Keep an eye on market trends and time your harvest accordingly. Always check with your local forest products marketing board for market conditions.

Debris Management

Although there are several approaches to the management of harvesting debris (slash), it is now generally agreed that slash should remain



Slash piles



Wind-rowed Slash

on site, evenly distributed across the cut. As slash breaks down it returns nutrients to the soil helping to maintain productivity.

Workplace Safety

You must be aware of all employer and employee obligations as outlined in the Occupational Health and Safety Act. As a landowner you have the legal obligations of an "owner" as outlined under this act by the Workplace Health and Safety Compensation Commission (WHSCC). As a landowner employing a contractor, you are obligated to make all reasonable efforts to ensure safe practices are followed.

Have all necessary safety equipment on site and make sure all staff are well trained and aware of safety procedures.

Basic safety clothing when harvesting should include:

-Hardhat, undamaged with proper fit
-Hearing protection i.e. earmuffs or plugs
-Vision protection - Hardhat screen, safety glasses
-Kevlar cutting pants in good condition
-CSA approved cutting boots - specifically intended for chainsaw use

-Chainsaw gloves
-Personal fire extiguisher such as an Ansel-pac powder fire retardent
- Have a radio or phone on site in case of emergency.

Where chemicals are to be used, **Workplace Hazardous Materials Information System** (WHMIS) training will ensure that all reasonable precautions have been taken to assure their proper use and handling.

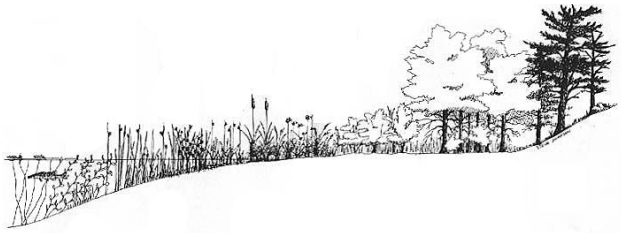
It is highly recommended that all forestry workers have current First Aid certification. At least one person on site must be a designated first aid provider.

Do not work alone. Make sure that somebody knows your whereabouts at all times.

Keep a fully stocked first aid kit on site able to handle any likely emergency including broken limbs, bleeding and allergic reactions.

Watercourse Protection

Many definitions of "Best Management Practices" single out their application to the protection of watershed health. Watercourses, wetlands and wet areas are heavily influenced by forestry activities, with the deposition of silt being accounted among the greatest threats to aquatic ecosystem health. There are numerous best management practices which directly and indirectly serve to protect the health and functioning of watercourses and wetlands at risk



from forestry activities. Following these simple guidelines will help you to avoid damaging watercourses and risking possible prosecution.

Provincial Watercourse and Wetland Regulations

As part of the Clean Water Act, the

Province of New Brunswick has enacted the New Brunswick "**Watercourse and Wetland Alteration Regulation**" which seeks to minimize the impacts of forestry, agricultural, development and recreational activities on watercourse and wetland quality and functioning. This regulation requires landowners to obtain a permit for any activities within 30 metres of a designated watercourse or wetland. Applications for permits and inquiries for additional information may be made at your local Department of the Environment and Local Government office or at any Service New Brunswick office.

You are responsible for ensuring that no alteration to water quality or quantity occurs as a result of your actions, whether a permit is required or not, and you are legally liable for damage to any watercourse, regardless of size.

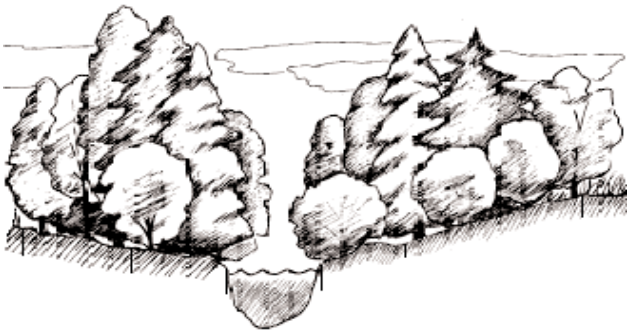
In 2003, the Province amended the existing Watercourse Alteration Regulation to include wetlands. Since the inclusion of wetlands into the legislation, any activity within 30 metres of a wetland greater than 1 hectare (2.5 acres) in size also requires a permit. If the activity occurs within 30 metres of a wetland smaller

than 1 hectare (2.5 acres) that is part of a watercourse, then the activity requires a permit, regardless of the wetland size.

Watercourse and wetland regulations are complicated and subject to interpretation, so it is highly advisable that you contact your local Department of Environment and Local Government office before beginning any activities that may affect wet areas on your property.

Why do We Need Buffers?

The reasoning behind the mandatory creation of watercourse buffers stems from the



A Forest Stream Buffer

recognition of the importance they play in several landscape functions.

Buffer strips along watercourses are treed areas left to help trap sediments before they have a chance to enter watercourses. This is extremely important when the potential for erosion from logging roads, skid trails and landings is considered. Buffer strips shade watercourses, cooling them for cold water loving species (e.g. speckled trout) and provide habitat. Buffers act as corridors for the movement of wildlife across the landscape. They serve as temporary and permanent habitat for a multitude of plants, animals and birds. There are countless reasons why it is important to respect the need for buffers.

Forestry Operations and Buffers

Watercourse and Wetland Alteration (WAWA) permits may allow limited operations inside of watercourse buffers. Current regulations may permit limited harvesting (30% volume removal) in approved buffers.

Permits are required for pre-commercial

thinning operations within the 30 metre buffer of a watercourse or wetland as well.

When pre-commercially thinning inside the buffer, all trees and brush must be left in place, and none may enter the watercourse. Contact DELG for further details before you begin.

Guidelines for Operating in Buffers

No machinery is permitted within 15 metres of a watercourse. Machines operating inside the 30 metre buffer may cause significant soil disturbance so plan your trails carefully.

If you are permitted to operate within the first 15 metres of a watercourse or wetland buffer, be sure to count your skid trails when calculating 30% volume removal.

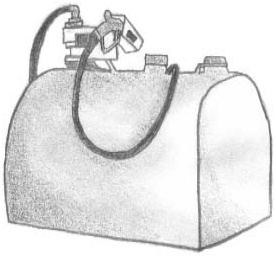
DO NOT allow slash or debris to enter the watercourse.

Do not pile wood within 15 metres of a watercourse or anywhere that debris may flow into a watercourse

Petroleum Products

You are likely aware of the environmental damage caused by petroleum spills. Even minor spills that might not seem to be significant can cause serious contamination.

The Federal Transportation of Dangerous Goods Act requires all petroleum products to be properly transported and stored in approved containers to minimize the potential for spills. Storing fuel in unapproved containers can pose a serious risk to the environment and the community while in transport.



Federally approved Slip Tank

Slip tanks, portable fuel tanks with a capacity between 450 and 5000 litres must meet a national standard and are subject to yearly inspections and testing. As of January 1, 2005 all such tanks must be visually inspected and pressure tested by a registered inspection facility. For information regarding inspections and approved inspection facilities contact Transport

Canada (information provided in **Contact Information**).

If you have a tank manufactured after January 1, 2003 used to carry flammable liquids it must conform to one of two standards. For tanks holding between 450 and 3000 litres, your tank has to have meet one of the two following specifications: **UN standard mobile IBC to CGSB 43.16**

Tanks with greater than 3000 litre capacity must conform to: **TC 306/406 to CSA B620**

Contact **Transport Canada** for a list of certified inspection stations or for more help.

Be sure to check that tanks meet these requirements when selecting a new tank.

Remove all used containers, contaminated materials and garbage from the site. Deposit them in designated disposal facilities.

Collect used oil, including engine oil, hydraulic fluid, lubricating oils and transmis-

sion fluid, in clean containers and dispose of at designated return facilities. This is the only acceptable method of dealing with used oil.

Empty oil containers are to be disposed of in the same way as household hazardous waste.

Regularly inspect machinery to check for leaks or mechanical problems that could lead to spillage. **FIX PROBLEMS IMMEDIATELY**.

In the case of a broken line or active leak, shut down and repair in place when possible to limit spillage.

Consider using alternate, biodegradable lubricants when possible.

Use care when filling cans, tanks, saws etc. not to overflow and spill. Consider using anti-spill nozzles, funnels etc.

Do not perform maintenance within 30 metres of a watercourse or on a slope next to a watercourse.

Spills

Spill kits are available from safety supply dealers, auto and truck parts stores and equipment dealers. They must be on site during any mechanical operation where spills are possible.

Have spill kits handy. Ensure that all workers are familiar with their use. Place contaminated earth in in sealed containers and dispose of at an approved facility.

All spills MUST be reported to the Department of the Environment and local Government. Call **1-800-565-1633** for advice on how to handle cleanup after hours, or contact your local DELG office during regular business hours.

All spills must be addressed. You are responsible for their immediate and thorough cleanup.

Wildlife Habitat and Biodiversity

Wildlife is the blanket term given to all organisms living independent of mankind. This includes mammals, birds, reptiles, insects, plants and any other non-domesticated living creature you might encounter.

Consideration must be given to wildlife habitat when planning and conducting activities in your woodlot. Although private woodlands are generally fairly small (on the order of 100 acres/40.5 hectares), individual parcels of land can have regional ecological significance. For instance, your woodlot may contain the only productive deer wintering habitat in the region. Activities that degrade the quality of this habitat could have serious impacts upon the population in your area. When designing a management strategy, consider all of your goals and try to integrate wildlife into your long-term plans.

There are a number of project orientated activities that wooldot owners can undertake to create or improve wildlife habitat on their property - brush shelters, release and care of wild apple trees, putting up nest boxes, etc. will

all help to improve habitat quality and encourage wildlife.

Endangered Species Act

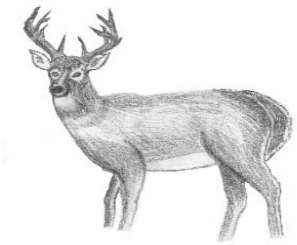
Beyond the principles of good stewardship, there are provincial and federal regulations which may affect your choice of management activities. These regulations apply to species listed under the **NB Endangered Species Act** and the **Federal Species at Risk Act**. Species protected by these regulations can be referenced by accessing the province of New Brunswick web site at: **www.gnb.ca/0078/fw/wstatus/index-e.asp** and the Federal site at: **www.speciesatrisk.gc.ca**

If these species are present in your woodlot, you must abide by all pertinent regulations.

Since the arrival of Europeans over 400 years ago, New Brunswick has lost 8 native species. As of November, 2004, there are 8 species listed as endangered and 5 as threatened in New Brunswick.

Deer Wintering Areas

Whitetail deer are at the northern extreme of their range here in New Brunswick and are susceptible to winter kill, most notably caused by deep snow and extreme cold. Unlike native moose and caribou, whitetails have comparatively short legs and small hooves which limits their ability to travel and forage in deep snow. To help sustain deer populations, biologists have identified the habitat types that provide the best chance of success for winter survival.



Male white-tailed deer

Winter deer habitat includes stands with:

- Conifer and conifer-hardwood stands (excluding tamarack, pine, poor-site spruce and most pure black spruce types).
- Conifer Crown closure >=50% composed of trees greater than 10 metres tall. Usually requires more than 20m^2/ha basal area

- Average conifer diameter of 18cm
- >10% ground cover of available browse species
-Minimum 150 metre stand width

Many stands will fit this desciption, not all of which will be active deer habitat. There will also be stands that don't fit this description that do shelter deer. Look for signs of deer use including tracks, scat and browsing.

Maintaining Deer Wintering Areas

As far as food and shelter quality are concerned, white cedar and hemlock are valuable components of deer wintering areas. These trees provide shelter, forage and are long -lived. Where possible, these species should be left to help preserve the quality of deer wintering areas.

Snags—Dead and Dying Trees

Snags, dead standing and dying trees provide critical habitat to a number of species. Cavity nesters, including woodpeckers and wood ducks use snags to rear their young, forage for food and roost. A variety of mammals use snags

for shelter and forage as well. It is important to consider snags and their function, and to include them in your management plan.

Snags are generally un-merchantable, so cutting them is of little economic value. Snags should be left when possible, so long as they pose no hazard to forest workers or recreational users.

Wildlife Trees

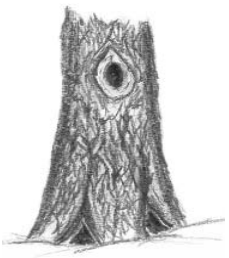
Before you begin harvesting, take a walk through your woodlot and try to identify any trees that are being actively used by wildlife. Wildlife trees can be alive or dead and may often be hard to spot. These trees might include:

Escape trees — hollow trees with a hole at the butt used by mammals to escape predators.

An escape tree

Cavity trees — hollow trees used by birds

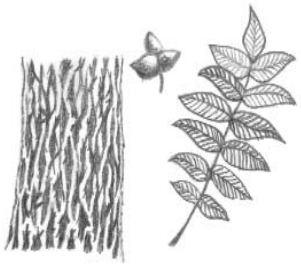
and mammals for nesting, rooting or feeding.



A cavity Tree

Nesting/roosting trees — Trees that have active nests in them. Raptor (birds of prey) nests can be hard to see as they are generally located in the top of the crown. Woodchips around the base may indicate that woodpeckers are using the tree.

Fruit/Seed Bearing Trees—Trees and shrubs that provide seasonal food sources such as beech, white and yellow birch, red oak, cherry, wild apple trees and butternut should be left to continue providing forage for local wildlife.



Butternut (*Juglans cinerea*)

If you find any active trees, clearly flag them and make sure that all people involved with the operation are aware of their location. Avoid active nests by leaving an un-cut buffer around them.

Trees of Special Concern

Make yourself aware of uncommon trees or trees with management concerns when planning and implementing your harvest. For example, butternut is declining in the province due to butternut canker, a fatal fungus. Leaving butternut to serve as seed trees is advisable, as the small monetary gain from their sale can not offset the potential loss of this species.

White Pine (*Pinus strobus*)

- Identify and leave disease-free beech

- Leave species uncommon or rare to your area as a source of seed (i.e. black cherry in the north)

- Leave white pine seed trees (not just poor quality trees) for quality seed source.

Non-Timber Forest Products (NTFP's)

In addition to the numerous conventional timber products derived from private woodlots in New Brunswick, there are a number of opportunities for income from non-timber forest products. These include such things as fiddleheads, blueberries, mushrooms, Christmas trees, ground hemlock and tips for wreaths and greenery. There are best management practices associated with all NTFP's, and you should make yourself familiar with them before beginning any new enterprise.

Ground Hemlock

Taxol is a chemical compound found in ground hemlock (***Taxus canadensis***), a forest shrub native to Eastern Canada. This compound is very effective in the control of certain cancers, and demand for raw materials is increasing. To ensure a sustainable supply of this life-saving drug, it is important that ground hemlock be harvested in a sustainable manner.

Etiquette and Legal Considerations of Harvesting

Harvesting ground hemlock on private land without permission is illegal. Harvesters need to ask the landowner's permission **BEFORE** entering private property.

When to Harvest

All ground hemlock tip harvesting should be done between August and March/April, since the levels of Taxol are higher during this period making for better quality material. Also, harvesters should wait at least 4 years before re-harvesting a shrub.

How to Harvest

It is very important to only harvest branches from plants that are 1 metre or more in height. This minimum plant size is recommended to help ensure that plants are sufficiently vigorous to withstand harvesting.

In order to minimize damage to plants, pruning shears must always be used; tearing or

breaking branches should be avoided. The cut should always be made just above side branches since this allows the lateral branches just below the cut to grow and replace the removed shoot.

Harvesters should only remove up to three years of growth on each of the harvested branches.The harvestable sections of branches are easily recognizable by the colour of the bark since new shoots typically stay green for up to three years before becoming brown and woody.

Your caring for the resource will help ensure a healthy growing ground hemlock tipping industry for years to come.

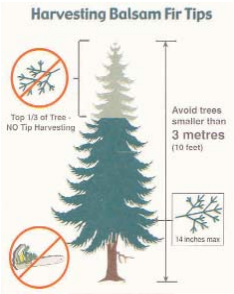
Balsam Fir Tipping

The same etiquette described above for harvesting ground hemlock applies to tipping. Do not trespass, and make certain that you obtain permission before harvesting.

Harvesting Tips

Most experience pickers do not use hand clippers, but snap tips off.

Tip only trees taller than 3 metres (10 feet).



No tips should be removed from the top 1/3rd of the tree. Doing so may cause damage.

No more than 1/3rd of the remaining tips should be harvested.

Investigate your market before you begin to harvest - know what your buyer wants.

Get tips to market quickly. Balsam tips are perishable and quality begins to decline immediately after harvesting, especially if stored improperly.

Wear Blaze Orange - tipping usually coincides with hunting season.

Fiddleheads

Fiddleheads are the unopened fronds of the ostrich fern (*Matteuccia struthiopteris*). Fiddleheads are generally found on moist sites

along floodplains in the spring, ususally before the trees have leaved out. There is a substantial harvest of fiddleheads in New Brunswick every year, with a lot of people making a fair amount of money for a few days work. Although there are some larger buyers out there, most people sell fiddleheads from their laneway, to fruit stands or friends and family. Although there are no clearly defined guidelines for harvesting, general courtesy should apply. Do not tresspass, and ask permission before picking on somebody else's land. Make sure you are picking the right ferns, as similar ferns may be poisonous.

Blueberries

Blueberries come from one of two sources; commercial farms that produce large volumes of cultivated berries for market and small volumes of blueberries picked from wild (un-tended) plants. Blueberries for commercial production are not planted. Berry patches are

cultivated in areas where they occur naturally. If you do not have any blueberries in your woodlot, it is unlikely that you will be able to establish a blueberry field. On the other hand, if you do have wild blueberries, you may be able to develop your own blueberry operation. Contact the **Department of Agriculture, Fisheries and Aquaculture** for more information on blueberry production.

Wild Mushrooms

The Acadian forest supports all sorts of different species of mushroom. Some people have turned the collection and cultivation of wild mushrooms into profitable businesses while others enjoy collecting for their own dinner table. There are numerous delicious and edible mushrooms in New Brunswick's woods, but there are also some of the most poisonous species found in North America. **Picking mushrooms to eat is not recommended unless you are VERY experienced. Even with experience and the help of field guides and other available literature, it**

is all to easy to make a fatal mistake.

Christmas Trees

In New Brunswick, Christams trees are grown in plantations and are cultivated from naturally occuring or "wild" stands. Even though you may have an abundance of fir on your property, or an old field you would like to plant, not all locations are well suited to the production of Christams trees. Although fir will survive in a wide range of conditions, it only thrives within relatively specific soil and climatic conditions. Before begining a Christmas tree operation, it is advisable to have a full soil analysis (including soil texture) conducted. Soil analysis will indicate the ability of your woodlot to produce Christmas trees and likely causes of health problems related to the soil. For more information on soil testing contact INFOR Inc. (see **Contact Information** section below)

Maple Syrup

The production of maple sugar products has a long history in New Brunswick. They are made from the concentrated sap of the sugar maple (Acer saccharum), collected in the springtime during periods of overnight freezes and daytime thaws. Sugar production can be an enjoyable hobby and a profitable business, but do not underestimate the time and monetary commitments required for either.

Much of the equipment used prior to 1994 may contain lead-bearing materials, either in the form of lead solder, galvanized metal or ternplate, a lead-bearing alloy. If you intend to begin sugaring, make certain that you use only lead-free equipment. Lead poisoning can lead to serious health issues.

Sugar bush management is different from conventional timber management in that producers are concerned with how much sap the tree is producing, not the volume and commercial value of the wood. If you are interested in sugar production, but are unsure if your woodlot is suitable, contact your local forest products marketing board or INFOR Inc. for more information.

Contact Information

INFOR Inc.
1350 Regent Street
Fredericton, N.B.
E3C 2G6
1-877-450-8787 (Maritimes only)
(506) 450-8787
www.infor.ca

Fundy Model Forest
701 Main St., Suite 2
PO Box 5184
Sussex, NB
E4E 7H7
Phone: 506-432-7575
Fax: 506-432-7562
www.fundymodelforest.net

Sustainable Forestry Initiative (SFI)
New Brunswick Implementation Committee
www.nbsfi.ca
Report inconsistent practices at:
1-888-SFI-4888

New Brunswick Federation of Woodlot Owners

259 Brunswick St. Suite 304
Fredericton, N.B.
E3B 1G8
(506) 459-2990
Fax: (506) 459-3515
nbfwo@nbnet.nb.ca

Department of Natural Resources (DNR)

Hugh John Flemming Forestry Centre
1350 Regent Street
Fredericton, New Brunswick
www.gnb.ca/0078/index-e.asp

Transport Canada

Information concerning the transportation and storage of dangerous goods - slip tanks

National Headquarters (Ottawa)
(613) 990-2309
1-888-675-6863
www.tc.gc.ca

Atlantic Region (New Brunswick, Prince Edward Island, Nova Scotia, and Newfoundland & Labrador)
PO Box 42
Moncton, New Brunswick
E1C 8K6
Telephone: 1-800-387-4999
www.tc.gc.ca/Atl

Department of the Environment and Local Government (DELG)

Watercourse and Wetland Alteration Program
Fredericton
20 McGloin St., E3A 5T8
P. O. Box 6000
Fredericton, NB.
E3B 5H1
Phone: 457-4850 Fax: 453-6862

DELG Regional Offices

Bathurst Office:
(506) 547-2092 Fax: 547-7655
159 Main St., Suite 202
Bathurst, N.B.
E3A 1A6

Miramichi Office:
(506) 778-6032 Fax: 778-6796
316 Dalton Avenue
Miramichi, N.B.
E1V 3N9

Moncton Office:
(506) 856-2374 Fax: 856-2370
428 Collishaw Street
Moncton, N.B.
E1C 3C7

Saint John Office:
(506) 658-2558 Fax: 658-3046
8 Castle Street
Saint John, N.B.
E2L 3B8

Fredericton Office:
(506) 444-5149 Fax: 453-2893
565 Priestman Street,
Suite 301 Priestman Centre
Fredericton, N.B.
E3B 5X8

Grand Falls Office:
(506) 473-7744 Fax: 475-2510
65 Broadway Blvd.
Grand Falls, N.B.
E3Z 2J6

New Brunswick Forest Products Marketing Boards

YSC Forest Products Marketing Board
1350 Regent Street
Fredericton, N.B.
(506) 444-6644
YSC@nbnet.nb.ca
http://www.ysc.nb.ca

SNB Forest Products Marketing Board
PO Box 4473
13 Drury's Lane
Sussex, N.B. E4E 5L6
(506) 433-9860
Fax: (506) 433-3623
snb@nbnet.nb.ca
http://www.snbwoodcoop.nb.ca

SENB Forest Products Marketing Board
PO Box 5074
3124 Lakeville Rd.
Shediac, N.B. E4P 8T8
(506) 532-1150
Fax: (506) 532-6500
senbmb@nbnet.nb.ca

Northumberland County Forest Products
Marketing Board
PO Box 494
101 McMurdo Street
Miramichi, N.B. E1V 3M6
(506) 622-4010
Fax: (506) 622-6317
nwoodlot@nbnet.nb.ca

North Shore Forest Products Marketing
Board
PO Box 386
2807 Miramichi Ave.
Bathurst, N.B. E2A 3Z3
(506) 548-8958
Fax: (506) 548-1165
nsfpmb@nbnet.nb.ca
http://www.forestrysyndicate.com

Carleton-Victoria Forest Products Marketing Board
330 Centreville Rd.
Florenceville, N.B. E7L 3K4
(506) 392-8290
Fax: (506) 392-8290
cvwpa@nbnet.nb.ca
http://www.cvwpa.ca

Madawaska Forest Products Marketing Board
870 Rue Canada Rd.
Edmunston, N.B. E3V 3X3
(506) 739-9585
Fax: (506) 739-0859
odvdm@nbnet.nb.ca

Blueberries

New Brunswick Wild Blueberry Growers Association
(506) 755-3544

New Brunswick Department of Agriculture, Fisheries and Aquaculture
P.O. Box 6000
Fredericton, N.B. E3B 5H1
Telephone: (506) 453-2666

Christmas Trees

New Brunswick Christmas Tree Growers Coop
(C/O INFOR Inc)
1350 Regent Street
Fredericton, N.B.
E3C 2G6
1-877-450-8787 (Maritimes only)
(506) 450-8787
www.infor.ca

Maple Syrup

New Brunswick Maple Syrup Association
(C/O) INFOR Inc)
1350 Regent Street
Fredericton, N.B.
E3C 2G6
1-877-450-8787 (Maritimes only)
(506) 450-8787
www.infor.ca

Common Name	Latin Name	Critical Habitat	Federal Status	NB Status
		Birds		
Piping Plover melodus subspecies	*Charadrius melodus melodus*	Nests above the normal high-water mark on exposed sandy or gravelly beaches.	**Endangered**	**Endangered**
Yellow Rail	*Coturnicops noveboracensis*	Typically found in marshes dominated by sedges, true grasses, and rushes, where there is little or no standing water (generally 0-12 cm water depth), and where the substrate remains saturated throughout the summer (i.e. damp fields and meadows, on the floodplains of rivers and streams, in the herbaceous vegetation of bogs, and at the upper levels (drier margins) of estuarine and salt marshes).	Special Concern	May be at Risk
Short-eared Owl	*Asio flammeus*	Prefers extensive stretches of relatively open habitat of marshland and deep grass fields (i.e. abandoned pastures, fields, hay meadows, grain stubble, airports, young conifer plantations and marshes in the winter).	Special Concern	Sensitive
Roseate Tern	*Sterna dougallii*	Along coasts, salt marsh islands and beaches with sparse vegetation.	**Endangered**	At Risk
Eskimo Curlew	*Numenius borealis*	A variety of coastal and terrestrial habitats including salt marshes, meadows, pastures, old fields, intertidal flats and sand dunes.	**Endangered**	Status Undetermined
Peregrine Falcon anatum subspecies	*Falco peregrinus anatum*	Nests on steep cliffs, usually near wetlands, including artificial cliffs such as quarries and buildings.	Threatened	**Endangered**
Least Bittern	*Ixobrychus exilis*	Freshwater marshes, where dense tall aquatic vegetation is interspersed with clumps of woody vegetation and open water.	Threatened	At Risk
Bicknell's Thrush	*Catharus bicknelli*	Breeds mainly in high elevation, dense and stunted fir/spruce forest.	Special Concern	May be at Risk
Barrow's Goldeneye, eastern population	*Bucephala islandica*	Balsam fir-white birch forest near lakes, and more specifically, small, high elevation lakes north of the St. Lawrence Estuary and Gulf.	Special Concern	Sensitive
Red-shouldered Hawk	*Buteo lineatus*	Deciduous or mixed-wood forests (10 - 100 hectares) containing shade-tolerant hardwood trees close to wetland areas.	Special Concern	May be at Risk
Harlequin Duck, Eastern population	*Histrionicus histrionicus*	Spend most of the year in coastal marine environments, but they move inland each spring to breed along fast-flowing turbulent rivers.	Special Concern	**Endangered**
Bald Eagle	*Haliaeetus leucocephalus*	Near freshwater lakes, rivers, estuaries, and on marine islands (favours areas where fish are plentiful).	Not At Risk	**Endangered**
Loggerhead Shrike	*Lanius ludovicianus migrans*	Pastureland, old fields and natural grasslands are the most conspicuous aspects of Loggerhead Shrike breeding and wintering habitat.	N/A	At Risk

Common Name	Latin Name	Critical Habitat	Federal Status	NB Status
Fishes				
Redbreast Sunfish	*Lepomis auritus*	Streams and lakes which have rocky bottoms.	Special Concern	Secure
Shortnose Sturgeon	*Acipenser brevirostrum*	Inhabit large tidal rivers (riverine environments, migrate upstream in the spring and downstream in the fall, and also inhabit areas of salt water).	Special Concern	Sensitive
Lake Utopia Dwarf Smelt	*Osmerus sp.*	Southern NB, in Lake Utopia spawning in the slow-flowing tributaries of Lake Utopia.	Threatened	At Risk/Secure
Atlantic Salmon, Inner Bay of Fundy populations	*Salmo salar*	Clean, cool, flowing water free from chemical or organic pollution.	**Endangered**	May be at Risk
Insects				
Maritime Ringlet	*Coenonymphya tullia nipisiquit*	Strictly limited to salt marsh habitats.	**Endangered**	**Endangered**
Monarch Butterfly	*Danaus plexippus*	Abandoned farmland, along roadsides, and other open spaces wherever milkweed (Asclepius) and wildflowers (such as Goldenrod, asters, and Purple Loosestrife) exist.	Special Concern	Sensitive
Lichens				
Boreal Felt Lichen, Atlantic population	*Erioderma pedicellatum*	Trunks and branches of trees in moist, mature forests. Its preferred host is balsam fir.	**Endangered**	N/A
Mammals				
Gaspé Shrew	*Sorex gaspensis*	Prefers rock outcrops and talus slopes in highlands where there are steep slopes.	Special Concern	May be at Risk
Eastern Cougar	*Felis concolor couguar*	Forested land with steep, rugged terrain inhabited by large prey such as deer.	N/A	**Endangered**
Canada Lynx	*Lynx canadensis*	Structurally diverse forests, from early successional stands to to those with dense thickets and large woody debris.	Not At Risk	**Endangered**

Common Name	Latin Name	Critical Habitat	Federal Status	NB Status
Plants				
Furbish's Lousewort	*Pedicularis furbishiae*	Ice-scoured banks of St. John River.	**Endangered**	**Endangered**
Gulf of St. Lawrence Aster	*Symphyotrichum laurentianum*	Grows in brackish sand or mud and is usually found in dry areas of salt marshes, on coastal dunes or on the littoral fringe.	Special Concern	**Endangered**
Parker's Pipewort	*Eriocaulon parkeri*	Grows on firm, mostly submerged mud or silt-covered gravel or cobbles of open mudflats and tidal marshes in fresh to slightly brackish tidal rivers and estuaries.	N/A	**Endangered**
Anticosti Aster	*Symphyotrichum anticostense*	Ice and high water scoured limestone outcrops or gravel along the banks of fast flowing rivers that cut through boreal forests.	Threatened	**Endangered**
Pine-drops	*Pterospora andromedea*	Forest floor in old-growth coniferous forests.	N/A	**Endangered**
Prototype Quillwort	*Isoetes prototypus*	Found in freshwater lakes, ponds, rivers and streams.	N/A	**Endangered**
Bathurst Aster	*Symphyotrichum subulatum*	Grows in areas where salt water is present; it is found in salt marshes or in saline sands and gravel that occur at or just below sea level.	Special Concern	**Endangered**
Southern Twayblade	*Listera australis*	Mature hardwood forests on calcareous (limestone) soils, mature cedar on calcareous soils, and peatlands.	N/A	**Endangered**
Reptiles				
Leatherback Turtle	*Dermochelys coriacea*	Atlantic waters from June to October (Northumberland Strait/Gulf of St. Lawrence, but has also been observed in the lower Bay of Fundy).	N/A	**Endangered**
Wood Turtle	*Glyptemys insculpta*	Riparian areas of streams, creeks and rivers with open canopy forests.	Special Concern	Sensitive

1 - http://www.wipapercouncil.org/fun7.htm - definition of BMP's

Notes

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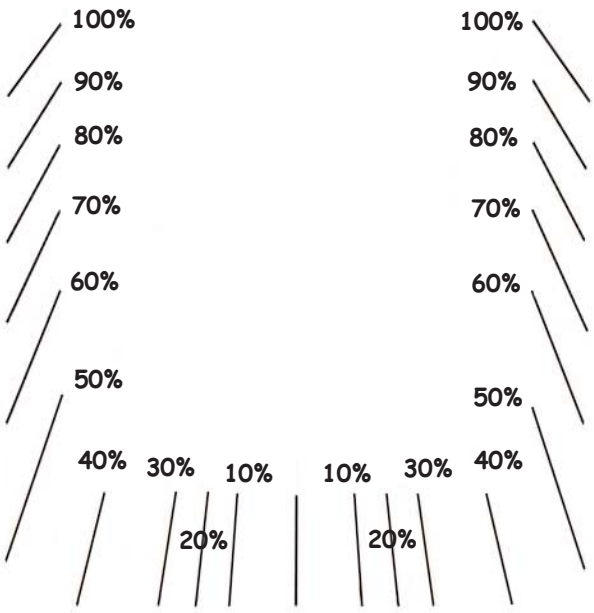
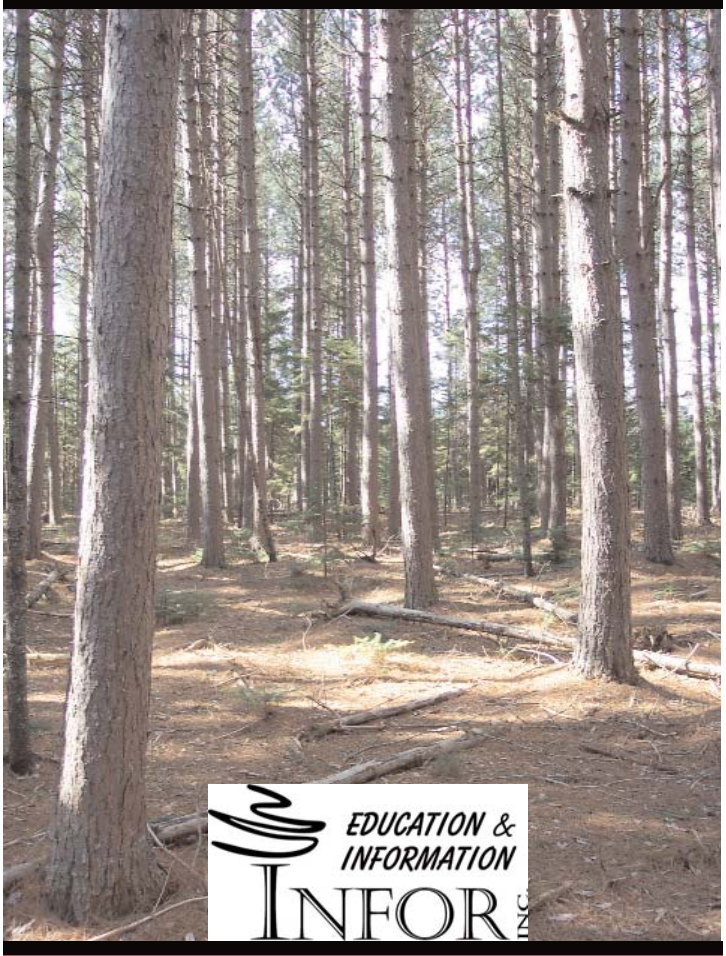
Punch a hole where indicated above and attach a string with a washer to weigh it down. Sight along the road using the spiral binding as a guide. The percent slope will be indicated by the position of the string along the scale below





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