

PRINCE EDWARD ISLAND
DEPARTMENT OF AGRICULTURE AND FORESTRY
FORESTS, FISH & WILDLIFE DIVISION

ECOSYSTEM-BASED
FOREST MANAGEMENT STANDARDS MANUAL

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INTRODUCTION

The forest of Prince Edward Island (PEI) is part of the Acadian Forest region. The Acadian Forest is generally described as a complex forest, found at a zone of transition between the Boreal Forest to the north and the Deciduous Forest to the south. The Acadian Forest incorporates a blend of both conifer (softwood) species and deciduous (hardwood) species. Typically, forest stands regenerate by means of small, frequent natural disturbances leading to a forest dominated by late successional species. In disturbed areas, plant and tree species quickly establish and replace the trees that once occupied that area. Disturbances that create large openings (e.g. fire, spruce budworm, blowdown), which lead to entire stands being replaced, are uncommon.

Prince Edward Island's forest has changed dramatically since the first European settlers arrived. Historically, about 98 % of PEI was covered with long-lived, shade-tolerant species such as red spruce, sugar maple, yellow birch, American beech, white pine, and eastern hemlock. These large, high quality trees were of immense value to the new inhabitants of PEI. White pine was selectively removed to create masts for ships, and a variety of other species were used in ship construction, which experienced a boom on the island in the mid 1800s.

The largest single impact on the Island forest was the extensive land conversion in the 1800s to create farms, roads and settlements and by 1900 only about 30 % of the Island remained forested. Much of today's forest has been cutover many times; often for fuelwood, so this young forest has not had the time to mature to a late successional stage. As a result, the current forest contains a higher percentage of shorter-lived species than were originally present.

In addition to a source of very valuable wood, the Acadian Forest is also home to a wide variety of forest plants and wildlife. As the forest has changed through the years, so have the associated plant and animal communities. Some wildlife species are dependant upon large tracts of forested land. Others occupy smaller tracts but require the presence of treed corridors to travel from one forest patch to another. When the forest is divided into smaller unconnected patches it becomes unsuitable for some wildlife species. In these fragmented landscapes, treed corridors, such as hedgerows, can provide valuable habitat and dispersal opportunities. Large upright trees, both living and dead, accommodate a wide array of species that require tree cavities for nesting. They are often used in sequence by different species—as one smaller species finishes with the cavity, another larger one can excavate a greater space within the tree. Species that make use of cavity trees include chickadees, nuthatches, woodpeckers, tree swallows, wood ducks, flying and red squirrels, saw-whet owls, and American kestrels.

Forested land provides many ecological goods and services including: water filtration and storage, erosion and runoff reduction, shading of streams and protection from winds. Water management is a priority for the residents of PEI. Increasing the amount of forest in a watershed can improve water quality.

Prince Edward Island is the most densely populated province in Canada. Additionally, the land ownership on PEI is predominantly private. This presents unique challenges for management beyond individual properties. An important consideration for landowners is that decisions made on their property can, and often do, have an impact on neighboring properties and the larger landscape.

Harvesting forest products in a sustainable way, respecting the ecological goods and services provided, ensures that our forest will continue to provide economic, ecological and recreational services to future generations.

SCOPE AND PURPOSE

This is a technical document and is intended to be used by forest professionals—including but not limited to foresters, forest technicians, contractors, and informed woodlot owners— to assist in the management of the forest of Prince Edward Island. Professionals working on the publicly-owned forest or those that are working on privately-owned forest and intend to pursue incentives under the forest enhancement program should use this document to guide their prescriptions. The objective of any intervention that is carried out under the influence of this document is to improve the quality of the forest. At a provincial-scale, the forest is a resource that provides multiple values and should not be exploited in a manner that would promote one value at the expense of the others. As such, this document provides guidelines for managers to prescribe and implement appropriate treatments in appropriate forest conditions.

GENERAL STANDARDS

The following standards are to be considered as part of each treatment eligibility guideline and assessment procedures for assistance where applicable.

Harvest

All stumps must be cut to less than 15 cm (6 in.) in height and below the lowest green limbs, unless tree form makes this impossible or specified in the management plan. Then stumps must be cut as close to the ground as possible. Trees cut and not removed must be laid as close to the ground as conditions permit to accelerate decomposition. These trees are not permitted to rest against or be supported by residual trees.

All harvest sites must be prescribed in an approved forest management plan.

On clearcut harvest sites, the foliage and branches should either be left on site or returned after the tree is processed.

On non-clearcut harvests, whole tree harvesting is acceptable.

On sites being harvested for biomass production (chip form) the Guidelines as stated in 'Department of Environment, Energy and Forestry: Biomass Guidelines', (Schedule 3) must be followed.

Planting

Covertypes dominated, prior to disturbance, by White Spruce, Balsam Fir, Black Spruce, Eastern Larch, White Birch, Trembling Aspen, Red Maple of poor quality growing in low sites, and plantation grown Red Pine are eligible for all planting treatments.

Covertypes dominated , prior to disturbance, by Red Spruce, Eastern Hemlock, American Beach, Eastern White Cedar, Sugar Maple, Red Oak, White Pine, Red Maple of good quality growing on upland sites and all unplowed forest area are normally eligible for enrichment planting only.

All cleared land or past agriculture land will be eligible for planting.

All areas to receive a planting treatment must be evaluated to determine if there is sufficient appropriate natural regeneration (see definition) to produce a viable stand. Any area stocked in excess of 1800 stems/ha throughout the site, with a species or combination of species identified as eligible for treatment would not qualify for the full planting treatment. The area would still be eligible for a partial planting treatment to augment natural regeneration.

Density ranges for hardwood and softwood species will be specified in the management plan and must conform to the treatment guidelines. In general, hardwoods should not be planted in areas where grass is the dominant vegetation unless appropriate mitigation measures are used to minimize meadow vole damage and black spruce should not be planted on previous agriculture land.

The planter shall submit information on a planting report form detailing the amount of trees planted on a property, no later than one day following the completion of planting on an individual property.

All planting tools must be approved by the Department prior to sites being planted.

The planter is required to transport trees from the holding area (J. Frank Gaudet Nursery or District Holding Site) and between the planting sites. The movement of the seedlings shall be in a vehicle equipped to provide protection to the seedlings.

Seedlings shall be held at a planting site for a maximum of 30 hours from the time of delivery until planting. All seedlings held at a planting site shall be stored in such a manner as to prevent drying.

Stocking must meet specifications as provided on the designated pre-treatment planting form within plus or minus five percent. Payment may be limited to the prescribed stocking or allowed variance.

Entire designated planting sites must be completed.

Seedlings shall be planted in appropriate microsites where they have adequate moisture and drainage to allow vigorous growth.

The angle between the main stem of a planted seedling and the horizontal plane shall be no less than 75 degrees.

The root of the tree is to be planted in such a manner that the roots are not jammed into the planting hole, sharply bent, or twisted in a circular manner.

The soil around the root plug or roots of the planted seedling shall be compacted and covered by mineral soil with the planter's fingers or the planter's foot in such a manner as to prevent the free circulation of air between the root plug and the surrounding soil.

Seedlings shall be planted at a depth whereby the top of the rooting medium or the root collar is less than or equal to 2.5 cm below the surface of the surrounding mineral soil or material from the Ah (humus) layer.

All planting sites shall be subject to assessment procedures approved by the Department, which are used to determine the quality and quantity of seedlings planted.

Payment may be withheld until planting containers are returned to the nursery or holding areas for pick up.

Diversity Enhancement

Cover patches shall be greater than 25 m² in size. Larger sizes are preferred for wildlife purposes. The design and distribution of the area retained as cover patches should vary with the site characteristics. A clearcut harvest treatment that exceeds 2 ha on a property must incorporate a minimum of 15 m wide vegetation corridor between clearcut blocks (corridors can be created larger that allow for management). The vegetation corridor is a no cut zone except for an opening to permit access to each block (i.e. machinery or recreation). Cover patch area and corridor area must comprise 15 % of the clearcut harvest area. For clearcuts less than 2 ha. in size, cover patches must comprise 7 % of the clearcut area. The distribution of vegetation corridors and cover patches is dependant on the vertical structure within the stand, the presence of snags, cavity trees, legacy trees, and wind firmness. Where possible, cover patch distribution should accommodate subsequent silviculture operations for the purpose of minimizing operational costs and maximizing the final area of retention in cover patches.

All harvest sites must retain a minimum of 15 trees per hectare (\geq 18 cm diameter at breast height [dbh] and preference given to tree \geq 24 cm dbh) that may be within cover patches. A mixture of live hardwood and softwood trees where possible. A minimum of 5 healthy trees/hectare of good form \geq 18 cm dbh. and 30 % live crown, within patch and strip cut areas, shall be left as legacy trees. When present, Trembling Aspen are preferred for legacy trees as they have the greatest potential for providing cavities for the longest period of time.

Effort should be made to retain existing cavity trees and incorporate them into leave patches of legacy trees.

Coarse woody debris (CWD) must be retained on all harvest sites with a minimum of 200 debris pieces per hectare. Each debris piece must have an average diameter greater than or equal to 7.5 cm and a minimum length of 2 m.

To increase tree species diversity in plantations, plantation maintenance, cleaning treatments, non-commercial, and commercial thinning activities, a minimum of 15 % of the residual density must be comprised of alternate tree species. Unplanted areas within a plantation such as cover patches, slash piles, vegetation corridors, bull pens that have resulted from road construction, or unsuccessful planted areas can be left untreated to attain this goal. It is preferable to leave hardwood in softwood treatments and vice versa. These alternate tree species must comprise part of the plantation throughout the rotation.

When a treatment consists of a thinning and the treated stand is adjacent to open or exposed areas, a 15 m buffer strip is to be left untreated to minimize wind penetration into the stand.

When a stand contains a low density of Red Spruce, Eastern Hemlock, White Pine, Yellow Birch, Sugar Maple, White Ash, Black Ash, or Red Oak, these individual trees are to be left as seed trees.

Rare plants and animals are to be conserved so that no rare or endangered species are lost (Schedule 1).

Tree Shade Tolerance Chart

<u>Tolerant</u>	<u>Intermediate</u>	<u>Intolerant</u>
Red Spruce (rS)	White Spruce (wS)	Eastern Larch (La)
Balsam Fir (bF)	White Pine (wP)	Red Pine (rP)
Eastern Hemlock (eH)	Red Oak (rO)	Poplar/ Trembling Aspen (Po)
Beech (Be)	Red Maple (rM)	White Ash (wA)
Eastern White Cedar (eC)	Yellow Birch (yB)	White Birch (wB)
Black Spruce (bS)		
Sugar Maple (sM)		

This chart indicates the shade tolerance of different tree species. Successful promotion of target species will require the following:

1. seed source
2. appropriate light (temperature) conditions for species
3. seed bed appropriate to facilitate germination
4. moisture

General

Management is to be conducted in a safe manner and abide by all safety laws.

Waste, litter and other forms or garbage must be properly disposed of in the manner prescribed by the Island Waste Management Corporation.

Equipment must be well maintained and be inspected for leaks daily by the equipment operators. If leaks are found, they are to be fixed immediately. Fuel or lubricant spills and leaks must be contained, immediately cleaned up and reported.

All forest management treatments must be done in a manner to minimize erosion.

All necessary permits (e.g. watercourse and wetland activity permit) must be obtained before work begins.

INFRASTRUCTURE

Woodlot Management Plan

The woodlot management plan will provide a framework for the implementation of forest management treatments to meet the owner's objectives (e.g. to increase biodiversity, improve timber quality, enrich wildlife habitat, minimize environment impacts). The woodlot management plan must be approved by the Department prior to starting any treatments.

The operations identified in the plan should be planned over a minimum ten-year interval and, where necessary, revised every five years. The plan must include a treatment summary outlining the implementation of operations and the anticipated outcomes from each completed treatment. A woodlot management plan requires, but is not limited to, the following:

- defines the lands to which it applies;
- the purpose and scope of the plan for a ten year period;
- provides a general description of the ownership for the area under consideration;
- provides a description of the woodlot;
- identifies the protection needs of the woodlot (i.e. fire, water course, rare plants);
- describes the silvics of the species, which will be managed;
- identifies biological, physical and legal constraints on the development of the woodlot;
- specifies the long term planning objectives for the woodlot;
- describes the amount and type of work to be undertaken.
- stand tally information
- stand treatment prescriptions
- map of property
- woodlot owner objectives
- woodlot access
- stream management (if applicable), wildlife enhancement, and biodiversity section.

ROAD AND WATER DIVERSION CONSTRUCTION

Environmental and General Standards

Before developing a new forest road or trail a forest technician, forester, or other qualified person must develop a road or extraction trail plan. The purpose of this plan is to design a road or trail layout to provide access for this property or property block for one or more purposes and to minimize environmental impacts. This plan must consider environmental mitigation to address various property and property block features including slope (topography), soil types, wetlands, watercourses, rare vascular plants, risk management, and other features. In addition, roads and trails should be periodically assessed to minimize public safety concerns from the utilization of the roadway.

New water course crossing work shall normally be confined to the period between June 15th and September 15th unless work is required to mitigate an existing erosion problem (e.g. bridge failure or road rutting). Heavy equipment is prohibited within 15 m of a watercourse without a permit.

Debris that does enter the stream must be removed immediately in accordance with provincial and federal regulations, with the least site disturbance possible. The debris must be moved outside the buffer or ditch unless it is required as part of a management prescription for positive wildlife enhancement within a management plan or agreement and in compliance with any permits issued by the Department.

Unstable road surfaces that have the potential to cause siltation in a watercourse must be seeded with “highway seed mix” and/or mulched using hay or straw crushed into the road surface. If the construction is completed after September 15th, then mulching is mandatory and seeding is not an acceptable treatment.

A belt of undisturbed vegetation, buffer strip, must be left between the road right-of-way and any body of water, with the exception of stream crossing locations for which the Environment Division of the Department of Environment, Justice and Labour has issued a watercourse and wetland activity permit. Buffer strips consisting of natural vegetation help provide protection for bodies of water from the discharge of road drainage and provide corridors for movement of wildlife (www.gov.pe.ca/environment/buffer-zones)

Road Construction (Class 1, 2, and 3)

Definition:

All road classes are multipurpose woodlot access roads characterized by a crowned road surface and nominal ditches. Road classes are defined as follows:

- Class 1 road construction is an industrialized road allowing the woodlot owner to extract forest products by large equipment (e.g. skidders, porters, trucks, etc.);
- Class 2 road construction is a low impact road allowing the woodlot owner to extract forest products by small equipment (e.g. tractors, All Terrain Vehicles, etc.).
- Class 3 road construction is used in wet terrain to increase the bearing capacity of the driving surface.

Guidelines and Assessment Procedures

Right-of-way

- Class 1 right-of-way must be at least 8 m in width;
- Class 2 right-of-way must be at least 5 m in width
- Class 3 right-of-way must be at least 8 m in width.

Right-of-ways and bullpens shall be clearcut and merchantable wood removed.

Right-of-ways without bullpens must be at least 10 m in width.

All merchantable wood remaining in the right-of-way may be left to help address course woody material provisions.

Dozing and Shaping Road

The travel surface of a Class 1 and 3 roads is 4 m.

The center of the travel surface of a Class 1 road must be crowned 10-15 cm above the shoulders to allow for run-off.

The shoulders of the travel surface of a Class 1 must be elevated between 15-30 cm above the base of the ditches, unless otherwise stated in the plan.

The travelled surface of Class 2 roads is 3.5 m.

The center of the travel surface of a Class 2 must be crowned 10-15 cm above the shoulders to allow for run-off where necessary.

Bulldozing of the right-of-way must be conducted with a minimum of damage to adjacent trees, which must remain standing.

Where bullpens are used, any substance not used in the sub-grade construction must be deposited in the bullpen.

In the exceptional circumstances where bullpens are not used, any substance not used in the sub-grade construction must be deposited at the outer extremity of the right-of-way. This must be done in a method so as to provide access through this grubbed slash to the woodlands bordering the road at 20 m intervals on both sides of the road.

Road grades should not exceed 10%, except over short distances, and then must not exceed 12%.

Ditches must be constructed when necessary.

Additional Class 3 Requirements

Materials acceptable for increasing bearing capacity are: trucked shale, Geotextile fabric, geogrid, slash, and/or on site material if the on site material has mineral soil with the necessary characteristics to provide an acceptable road surface, that will allow compaction, grading and surface drainage without excessive rutting, slumping and washout. All materials excluding slash must be placed and shaped on the roadbed.

Geotextile fabric must be covered with at least 50 cm of shale and/or nearby soil.

A slash mat must be covered to a minimum depth of 30 cm with shale and/or nearby soil.

On-site material for covering the roadbed must be excavated from the road ditches to be located on both sides of the roadbed.

Width between ditches must not exceed 6 m unless turnarounds are desired and deemed necessary.

Slope of ditch sides must no exceed a 2:1 slope vertical to horizontal on shoulder slope and 1.5:1 on backslopes.

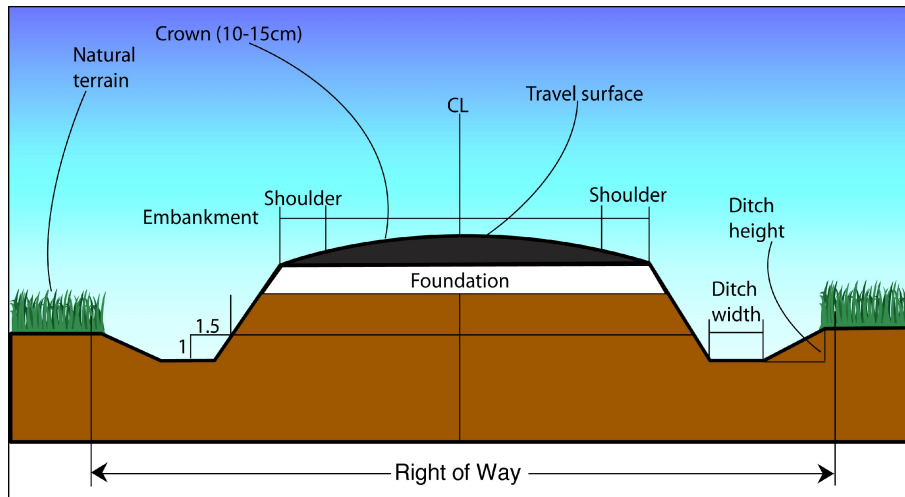
Ditches must be graded and aligned in such a way to ensure adequate drainage. The maximum non-ditched section of road shall not exceed 200 m.

If ditched, turnarounds or branch roads must have a culvert at their intersection.

Access for enter/exit points must be provided at approximately every 500 meters of road length. Where appropriate, these must contain culverts.

Road Fill

Definition:



The use of transported shale or rock to increase the bearing capacity of all classes of roads passing through short distances of wet ground, over flood plains leading to stream crossings, or to repair areas of rutting.

Guidelines and Assessment Procedures:

The volume shall be determined as part of the road specifications and shall be prescribed and used during construction or until the end of the next construction season following initial construction.

Only wet sections of the road over 5 m and less than 50 m in length, where insufficient on site material is present within 100 m shall be considered in calculating the volume.

To cross a flood plain leading to a stream crossing, only that section of road over 5 m and less than 50 m from the stream crossing shall be considered in calculating the volume.

Road Maintenance

Definition:

The control or elimination of vegetation on a road surface.

Eligibility Criteria:

The road must meet all criteria in the Class 1, 2 and 3 Road Construction section.

Guidelines and Assessment Procedures:

The treatment may include the pulling, grubbing, mowing, and/or cutting of unwanted vegetation from the road surface.

The treatment is to be carried out prior to starting a silviculture treatment.

All vegetation is to be cut off at ground level.

After treatment is complete, the road must meet all criteria in the Class 1, 2 and 3 Road Construction section.

Water Diversion Structure

Definition:

A structure placed in the roadbed in such a way so as to remove water from the surface of the road and direct it from the travelling surface or to move water accumulated in a ditch to the other side of the road.

Guidelines and Assessment Procedures:

The structure is to be constructed level with or slightly below the road surface and sloped to ensure adequate water flow. If a wooden construction, all materials of less than 6 cm nominal thickness must be pressure treated. The structure must be built in such a manner that there is a bottom that will prevent erosion. The ditch flow must be diverted into the structure where appropriate with a structure of non-erodible material.

Water Course Crossing

Definition:

A structure placed in or over a water course, normally consisting of either a metal culvert or wooden bridge.

Guidelines and Assessment Procedures:

Before constructing a permanent water course crossing, all alternatives should be examined such as access from a joining property or the use of a temporary water course crossing. A watercourse alteration permit for temporary or permanent water course crossings must be obtained from the Environment Division of the Department of Environment, Justice and Labour.

Construction must comply with the P.E.I. Watercourse Alteration Guidelines (available from the Department or at www.gov.pe.ca/environment/buffer-zones)

Forest Management Lines

Definition:

A line cut and clearly marked around the perimeter of a property. Such a line is not intended to be or to replace a legal survey. Rather its purpose is to mark the limits for forest management activities between adjacent properties.

Guidelines and Assessment Procedures:

Determine if lines are needed during the plan preparation.

All owners sharing a given forest management line must sign a Forest Management Line Agreement acceptable to the Department.

All wooded lines must be cleared to a minimum width of one meter. All blazed trees must have a minimum height of two meters and a minimum diameter of 10 cm. The blaze must occur on both sides of the line at intervals of 15 m, or such that blazes are visible one to the next. Legacy trees are not to be blazed.

A 5 m vegetation corridor must be left between the forest management line and any subsequent clearcut treatments.

On trees beside the line, blaze the side of the tree facing the line and each of the sides at right angles to this side. All blazes must be painted with red or orange tree paint.

Where an offset line is specified in the Plan, the line will be not more than 3 meters from the actual line and trees on the line will be marked on both sides in the direction of the line.

Where no suitable tree exists, the line shall be marked by a metal stake or pipe having a minimum diameter of 15 mm with a minimum of 100 cm protruding above ground, and topped by flagging or painted at intervals of 15 m or less. A suitable tree is one that is living, healthy and greater than 10 cm in diameter and in no case can it be an alder.

Recreation Trails

Definition:

A defined route developed to improve recreation access within or through an area for one or more of the following purposes walking, hiking, skiing, wildlife viewing, mountain biking, or such other non-motorized uses.

Guidelines and Assessment Procedures:

A forest technician, forester, or other qualified person must develop a trail plan. The purpose of this plan is to design the trail layout and standards to provide the intended access for this property or property block for one or more purposes and to minimize environmental impacts especially erosion.

Mitigating techniques should be considered when dealing with property features such as: slope (topography), soil types, wetlands, rare vascular plants, risk management, and other features. Trails should be periodically assessed to minimize public health risks.

Owners may wish to consider future maintenance costs when designing recreation trails. Generally, trails will be designed to minimize costly infrastructure treatments such as water course crossings and cut and fill operations. Where these are required to meet the objectives of the plan, then the minimum standards for water course crossings or surficial grubbing will be modified to address the maximum weight requirements of the intended use.

A policy of avoidance will reduce overall costs for maintenance (e.g. select shaded routes where there will be minimal tree harvesting, seedling propagation and pruning required, avoid wet areas and steep slopes).

Establish a trail width and height that addresses the width and height required for the intended purpose. Ensure seasonal use is evaluated (e.g. snow shoeing height to higher than walking height).

Stump height on the established trail should normally be at or below the soil surface.

Use trail curvature to address both opportunity enhancement and safety (e.g. short visibility distances for wildlife viewing verses cross country skiing safety).

Use proper pruning techniques to minimize stem damage, which might cause tree and shrub disease entrance or transference. Do not use a chainsaw to prune side branches.

TREE ESTABLISHMENT

Mechanical Site Preparation

Definition:

The process of preparing a suitable number of micro-sites (i.e. mineral soil exposure, brush redistribution, and vegetation control) by mechanical means for the purpose of slash, duff or grass reduction for a prescribed stocking and survival of the planted seedlings, or the modification of a site to enhance the establishment and survival of natural regeneration, or a combination of these objectives.

Eligibility Criteria:

An appropriate pre-harvest covertime (see General Standards).

The site in its pre-treatment condition, does not contain a suitable number of micro-sites to allow full stocking as prescribed or the seedlings would be subjected to sufficient stress to cause unacceptable mortality.

Guidelines and Assessment Procedure:

Sufficient micro-sites to allow the planting of at least ninety percent of the density prescribed or the creation of sufficient mineral soil exposure to achieve natural regeneration of at least ninety percent of the density prescribed.

Manual Site Preparation

Definition:

The process of preparing a site for the purpose of slash and/or duff reduction and increasing the survival rate of planted seedlings or for the preparation of seedbeds suitable for germination of seed and establishment of seedlings.

Eligibility Criteria:

An appropriate pre-harvest covertime (see General Standards).

The site in its pre-treatment condition does not contain a suitable number of adequate micro-sites for prescribed stocking.

Field sites will be eligible for treatment where existing vegetation impedes growth and survival of planting and/or seed germination.

The treatment is to be conducted immediately prior to establishment to attain the maximum benefit and in no case shall the treatment be conducted in excess of nine months prior to the establishment date.

Guidelines and Assessment Procedure:

The creation of sufficient micro-sites to allow the establishment of at least 90 % of the prescribed density.

The minimum micro-site area would normally be 0.10 m². The micro site can be of any shape, however, it must be capable of receiving a planted seedling and/or seed such that there is a minimum clearance of 15cm to the nearest undisturbed ground cover. Unless otherwise prescribed, the micro-site is to consist of bare mineral soil.

The treatment is for control of seedling debarking weevil (*Hylobius sop*), grass, slash and/or duff.

Manual Brush Piling

Definition:

The piling of harvest residue by hand. May be one treatment or part of other treatments in preparing an area for natural regeneration and/or planting.

Eligibility Criteria:

An appropriate pre-harvest coertype (see General Standards).

The presence of sufficient brush which interferes with natural regeneration establishment and/or planting.

Guidelines and Assessment Procedures:

Visual inspection that the site is sufficiently free of harvest residue to allow natural regeneration establishment and/or planting at the density prescribed.

Authorization of incentive payment will be made only after all site preparation treatments are completed.

Visual inspection of sufficient micro-sites to allow the natural regeneration establishment and/or planting of at least ninety percent of the density prescribed.

Chemical Site Preparation

Definition:

Chemical suppression of undesirable vegetation prior to establishment, for the purpose of reducing competition and increasing the survival rate of established seedlings.

Eligibility Criteria:

An appropriate pre-harvest coertype and species diversity (see General Standards).

To be used where other techniques have proven to be unsuccessful in an appropriate pre-harvest coertype.

Field sites are eligible for treatment where existing vegetation impedes establishment and/or survival of seedlings.

Pre-application inspection to confirm presence of potential competition vegetation and absence of rare plants.

Guidelines and Assessment Procedures:

Post application inspection that the potential competition vegetation has been treated.

The treatment should be conducted with a goal of providing control of at least 90 % of the density prescribed.

Registered herbicides shall be applied according to label specifications by a licensed applicator in accordance with the Pest Control Products Act (Canada) and the Pesticide Control Act (PEI) and related regulations.

Full Planting

Definition:

The planting of designated seedlings appropriate to a site in an area without sufficient natural regeneration to achieve a prescribed stocking.

Eligibility Criteria:

An appropriate pre-harvest covertype (see General Standards).

Sites individually or in combination with more than one site on the woodlot, totalling at least 1 ha in size.

Pre-treatment inspection to confirm adequate control of slash, duff, and/or vegetation as well as the appropriateness of the species and seedling size to the proposed site. Where planting of mixed species are to be carried out, the compatibility and survival of each species should be taken in to account.

Guidelines and Assessment Procedure:

Seedlings produced from the J. Frank Gaudet Tree Nursery are to be used.

For softwood species, the acceptable density range for assistance is 1500 to 3000 properly planted seedlings per ha. Planting densities greater than 3000 seedlings per ha will be eligible for a maximum assistance applicable to 3000 seedlings per ha.

For hardwood species, the acceptable density range for assistance is 1200 to 2500 properly planted seedlings per ha. Planting densities greater than 2500 seedlings per ha will be eligible for a maximum assistance applicable to 2500 seedlings per ha.

Seedlings are to be planted to the specifications outlined in t.

Fill Planting

Definition:

The planting of designated seedlings appropriate to a site in an area partially stocked with previously planted seedlings.

Eligibility Criteria:

An appropriate pre-harvest covertime (see General Standards).

The area must have been previously planted.

Sites are in suitable condition to support seedlings appropriate to the site and the site is not presently adequately stocked with planted seedlings of good vigour.

Sites will be considered for fill planting when the planted seedling density and adequate natural regeneration is less than 70 % of the original prescribed planting density. A replant of a site when the planted seedling density and adequate natural regeneration is more than 70 % of the original prescribed planting density is to be considered a new plantation with a new plantation number.

Planted seedlings must have sufficient growing space to favour survival and a reasonable chance to mature as part of the original crop. Where fill planting is being conducted, the height differential between the original crop and the fill planting must not exceed 1 m (1.5 m for white pine as fill plant species).

Guidelines and Assessment Procedure:

A post-planting assessment to determine that the seedlings were planted properly in the prescribed site. Seedlings are to be planted to the specifications outlined in this document.

Desired planting density would normally be that required to return the plantation to its original density. However, this may be modified if the vigour of a significant number of the original seedlings is poor.

Enrichment Planting

Definition:

The planting of designated seedlings in an area stocked with immature or mature trees and is in a suitable condition to support seedling survival. For example, the objective of planting seedlings may be to contribute to enhancement of wildlife, conservation or restoration of rare species, and increase species diversity.

Eligibility Criteria:

The planting density would normally be within a range of 200 to 1500 seedlings per ha on sites compatible with the shade tolerance and micro-habitat needs of the species.

If the treatment is to be completed in conjunction with manual site preparation, the treatments must be

conducted within the same planting season.

Guidelines and Assessment Procedure:

A post-planting assessment to determine that the seedlings are planted to the specifications outlined in this document.

Manual Maintenance

Definition:

The elimination or suppression of undesirable vegetation competing with established seedlings by means of hand or hand held tools for the purpose of reducing competition and increasing the growth and survival rate of established seedlings.

Eligibility Criteria:

An appropriate pre-harvest covertype and species diversity (see General Standards).

Areas that support undesirable competition that is or has the potential of competing and/or harming the established seedlings.

A minimum crop tree density of 70 % of the desired density is required.

Areas where the primary competition is raspberry or blackberry (*Rubus* spp.) and/or annuals are not eligible for manual maintenance.

Areas must have an average crop tree height between 0.5–6.0 m or have been established for a minimum of three growing seasons, including the year of treatment. Other areas will be considered on an individual merit bases (including areas where the height of the trees is above 6 m) with prior notification and interpretation from the Department.

Guidelines and Inspection Criteria:

The treatment may include the pulling, grubbing, or cutting of unwanted vegetation from around established seedlings.

Plantations should be scheduled for treatment prior to competition suppressing crop trees.

Competition control zones are to be established around each seedling.

When woody stems are cut off, the maximum stump height is to be 15 cm and cut stems must be kept off of the crop trees.

When woody stems are to be broken but intact, the maximum height of break is to be 2 m and stems must be kept off of the crop trees. The owner is to be made aware of the possible safety concerns of this practice.

Larger woody stems may be girdled.

The treatment should not result in damage to more than 5 % of the established seedlings. Damage is considered to be bark damage where exposure of sapwood is greater than 1 cm².

Competing vegetation should be reduced and crop trees be free of significant lateral and overhead competition for a period of at least two growing seasons, including the year of treatment.

Chemical Maintenance

Definition:

Chemical suppression of undesirable vegetation that is competing with established seedlings for the purpose of reducing competition and increasing the rate of growth or survival of established seedlings.

Eligibility Criteria:

An appropriate pre-harvest covertime and species diversity (see General Standards).

Areas that support undesirable competition that is or has the potential of competing with established seedlings. A maximum of two treatments per site are eligible.

A minimum density of 70 % of the prescribed establishment density is required. If the density is below 70 %, then the chemical maintenance treatment must be followed by a planting treatment, provided the site qualifies for planting treatment.

Guidelines and Inspection Criteria:

Visual inspection to confirm presence of undesirable competition.

Verification that the undesirable vegetation has been treated, through visual inspection.

Registered herbicides shall be applied according to label specifications by a licensed applicator in accordance with the Pest Control Products Act (Canada) and the Pesticide Control Act (P.E.I.) and related regulations.

STAND IMPROVEMENT

White Pine Blister Rust Pruning

Definition:

The removal of live branches from white pine trees to prevent the spread of white pine blister rust by increasing air flow within stand and produce valuable knot free trees.

Eligibility Criteria:

The area was previously planted or naturally regenerated in white pine.

Prune only white pine trees.

Crop trees must be at least 2 m in height.

Guidelines and Assessment Procedures:

The pruning must be achieved utilizing a handsaw or a pruning saw. A pruning shear may be used if branches are less than 2 cm in diameter.

All lower branches are to be removed to a minimum of 25 % and a maximum of 50 % total tree height.

All pruned branches may be left on site.

Prune only during dormant season.

Always make pruning cuts on the outside of the branch collar, leaving a maximum branch stub of 0.5 cm in length.

If more than 5 % of the residual stems sustain damage, then the treated area will not be eligible for incentive payment.

Damage is considered to be bark damage where exposure of sapwood is greater than 1 cm².

Crop Tree Pruning

Definition:

The removal of live or dead branches from crop trees to produce valuable knot-free trees.

Eligibility Criteria:

This treatment is to select crop trees for future clear bole development.

The species eligible for crop tree pruning are: sugar maple, yellow birch, red oak, white ash, red spruce, eastern hemlock, white pine, red pine and eastern larch. Red maple and largetooth aspen may be treated if pre-approval is granted by Department. Non-native species eligible for crop tree pruning are Norway spruce and Japanese larch.

Softwood crop trees must be dominant or co-dominant, straight and free from insect, disease or damage, and with a minimum live crown of 50 %.

Hardwood crop trees must dominant, co-dominant, or intermediate, straight and free from insect, disease or damage, a minimum live crown of 30 %, and must not show signs of epicormic branching.

The stand must have the health and vigor to grow for a minimum of 20 years.

Guidelines and Assessment Procedures:

The pruning must be achieved utilizing a handsaw and/or pruning saw. A pruning shear may be used if branches are less than 1 cm in diameter.

Initial pruning must completed to a height of 2.5 m to a maximum of 50 % of the crop trees.

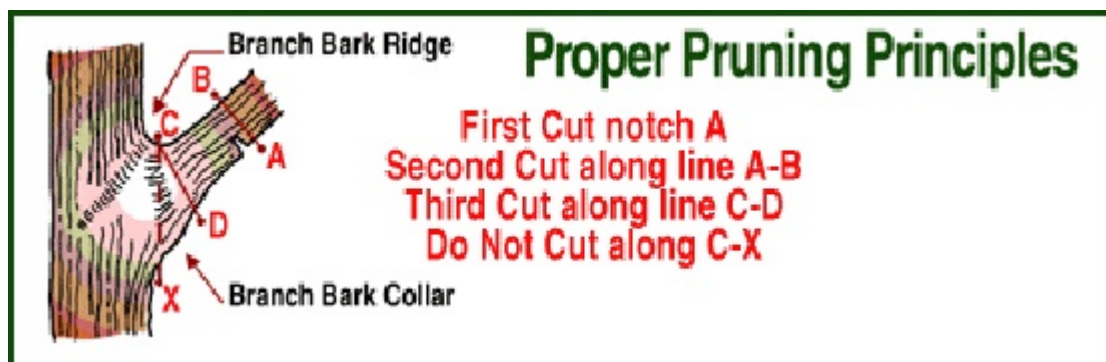
If pruning is carried out prior to thinning, then future extraction trails should not be pruned.

Prune during dormant growing season.

Always make pruning cuts on the outside of the branch collar leaving a maximum branch stub of 1 cm in length.

All work shall be completed in such a way as to minimize damage to crop trees. Damage is considered to be bark damage where exposure of sapwood is greater than 1 cm².

If more than 5 % of the treated stems sustain damage, then the treated area will not be eligible for incentive payment.



Pre-commercial Hardwood Thinning

Definition:

The spacing of a naturally regenerated stand in the sapling stage where stand height is between 4–8 m. This treatment should result in a hardwood stand with a mix of at least 15 % softwood and with healthy, vigorous trees capable of accelerated growth.

Eligibility Criteria:

Residual stem species include sugar maple, red maple on upland sites, yellow birch, red oak, white ash, black ash, white birch, white pine, or other high quality species with crop tree potential.

Initial stand density of greater than 4000 stems per ha is required.

Dominant stand height should be between 4–8 m. Other stands may be considered on individual merit based on the interpretation of the Department.

Guidelines and Assessment Procedures:

Residual stand density must meet species-specific standards set in the Prince Edward Island Forestry Handbook.

Post-treatment stand density of between 1600-3000 stems per ha, uniformly distributed throughout the site.

If present, 15–30 % of the residual density should be of good quality softwood trees.

Trees selected as crop trees must have a minimum of 40 % live crown and be of good health and form.

Trees with large crowns that interfere with higher quality trees or desired species could be girdled to create a wildlife tree.

Untreated areas, to a maximum of 10 % of the total area, should be left in the original condition. These areas shall be calculated as part of the treatment area for the purpose of incentive calculation.

Felled trees should be laid as close to the ground as possible.

Pre-commercial Softwood Thinning

Definition:

The spacing of a naturally regenerated stand in the sapling stage where stand height is between 2–6 m. This treatment should result in a softwood stand with a mix of at least 15 % hardwood and with healthy, vigorous trees capable of accelerated growth.

Eligibility Criteria:

Residual tree species should be eastern larch, red spruce, black spruce, white spruce, eastern hemlock, red pine, white pine, and balsam fir.

Initial stand density of greater than 4000 stems per ha is required.

Dominant stand height should be between 2–6 m. Other stands will be considered on individual merit based on the interpretation of the Department.

Guidelines and Assessment Procedures:

Residual stand density must meet species-specific standards set in the Prince Edward Island Forestry Handbook.

Residual densities should be set in relation to stand height and the shade tolerance of the species. Density should generally range from 1800–3500 stems per ha.

If present, 15–30 % of the residual density should be of good quality hardwood .

Residual crop trees must have a minimum of 40 % live crown and be of good health and form.

Untreated areas, to a maximum of 10 % of the total area, should be left in the original condition. These areas shall be calculated as part of the treatment area for the purpose of incentive calculation.

Trees with large crowns that interfere with higher quality trees or desired species could be girdled to create a wildlife tree.

Felled trees should be laid as close to the ground as possible.

Crop Tree Release

Definition:

The release of healthy immature trees, which have the potential to develop into high quality trees. This management objective is to maximize growth of veneer or sawlog-quality trees.

Eligibility Criteria:

Crop tree species include sugar maple, red maple on upland sites, yellow birch, red oak, white ash, red spruce, eastern hemlock, white pine, white birch and largetooth aspen.

The stand must have the health and vigor to grow for a minimum of 20 years.

The stand must contain a minimum of 100 uniformly distributed potential crop trees per ha.

A potential crop tree is described as a tree with a clear bole 2.5 m in length and at least 3 sides clear from defects.

Crop Tree Defects

bulges	large burls
cankers	hollow butt log
seams/splits	crooked
butt rot	crotch
conks	dead top
sweep (>5 cm. over a 2.5 length)	branches > 2 sides
large branches	significant bark or root damage
significant die back of branches in live crown	

Guidelines and Assessment Procedures:

A minimum of 100 uniformly distributed crop trees per ha released on at least 3 sides in a manner to prevent or minimize epicormic branching on the clear bole of the tree.

Crop tree have a minimum of 30 % live crown with potential to grow for 20 years.

All crop trees selected must have a minimum 12 cm dbh.

A minimum of 15 wildlife trees per ha must be left and/or created. The trees may be girdled to create stand diversity and eventually coarse woody debris or released to promote growth and seed.

Legacy trees should be left to grow.

All work shall be completed in such a way as to minimize damage to the residual stand. Damage is considered to be broken limbs and/or bark damage that exposes greater than 10 cm² of sapwood per tree. A maximum of 5 % damaged crop trees will be allowed per treatment.

No more than 30 % of merchantable basal area is to be removed.

Commercial Hardwood Thinning

Definition:

The thinning of dense hardwood pole stage (immature) stands to improve tree quality, growth, species composition species diversity, and extend the life of stand. The treatment is designed to promote the growth of the best quality trees in the stand for veneer and sawlog products, as well as, provide a quality seed source for natural regeneration.

Eligibility Criteria:

Hardwood crop tree species include sugar maple, red maple on upland sites, yellow birch, red oak, white ash, white birch, and largetooth aspen. Softwood crop tree species include white pine, red spruce, white spruce and eastern hemlock.

The stand must have the health and vigor to grow for a minimum of 20 years.

The stand must contain a minimum of 250 uniformly distributed crop trees/ha.

A crop tree is described as a tree with a clear bole 2.5 m in length and at least 3 sides clear from defects.

Crop Tree Defects

bulges	large burls
cankers	hollow butt log
seams/splits	crooked
butt rot	crotch
conks	dead top
excessive sweep (>5 cm.)	branches on more than 2 faces
large branches	significant bark or root damage
significant die back of branches in live crown	

Guidelines and Assessment Procedures:

Residual stand density must meet species-specific standards set in the Prince Edward Island Forestry Handbook.

Maximum merchantable basal area removal is 30 %. This should be reduced for shade tolerant species.

A minimum of 250 crop trees/ha released on at least 3 sides.

Crop trees must be dominant or codominant, have a minimum of 30 % live crown, a minimum of 12 cm dbh, and be of good health and form with a potential to grow for 20 years.

A minimum of 15 wildlife trees/ha must be left and/or created. The trees may be girdled to create stand diversity and eventually coarse woody debris or released to promote growth and seed.

Legacy trees should be left to grow.

All work shall be completed in such a way as to minimize damage to the residual stand. Damage is considered to be broken limbs and/or bark damage which exposes greater than 10 cm² of sapwood per tree. A maximum of 5 % damaged crop trees will be allowed per treatment.

Commercial Softwood Thinning

Definition:

The thinning of dense softwood pole stage (immature) stands to improve tree quality, growth, species composition, species diversity, and extend life of stand. The treatment is designed to promote the growth of the best quality trees in the stand for veneer and sawlog products, as well as, provide a quality seed source for natural regeneration.

Eligibility Criteria:

Softwood crop tree species include red spruce, white spruce, hemlock, white pine, red pine, balsam fir, and eastern larch. Hardwood crop tree species include white birch, yellow birch, sugar maple, red maple of upland sites, white ash, black ash, or red oak.

The stand must have the health and vigor to grow for a minimum of 20 years.

The stand must contain a minimum of 500 uniformly distributed crop trees per hectare.

A crop tree is described as a tree with a bole 4 m in length and free of the following defects;

Crop Tree Defects

bulges	large burls
cankers	hollow butt log
seams/splits	crooked
butt rot	crotch
conks	dead top
excessive sweep (>5 cm.)	significant bark or root damage
significant die back of branches in live crown	

Guidelines and Assessment Procedures:

Residual stand density must meet species-specific standards set in the Prince Edward Island Forestry Handbook.

Maximum Basal Area removal is 40 %.

A minimum of 500 quality uniformly distributed crop trees per hectare.

All crop trees selected must have a minimum of 12 cm dbh.

Crop trees must be dominant or codominant, have a minimum of 30% live crown, and a potential to grow for 20 years.

A minimum of 15 wildlife trees/ha must be left and/or created. The trees may be girdled to create stand diversity and eventually coarse woody debris or released to promote growth and seed.

Legacy trees should be left to grow.

All work shall be completed in such a way as to minimize damage to the residual stand. Damage is considered to be broken limbs and/or bark damage which exposes greater than 10 cm² of sapwood per tree. A maximum of 5 % damaged crop trees will be allowed per treatment.

Commercial Plantation Thinning

Definition:

The thinning of dense softwood plantations to improve tree quality, growth, species composition, species diversity, and extend life of stand. The treatment is designed to promote the growth of the best quality trees in the stand for veneer and sawlog products.

Eligibility Criteria:

Softwood crop tree species include red spruce, white spruce, black spruce, Norway spruce, eastern hemlock, white pine, red pine, balsam fir, Japanese larch, and eastern larch. Hardwood crop tree species include white birch, yellow birch, sugar maple, red maple, white ash, black ash, or red oak.

The stand must have the health and vigor to grow for a minimum of 20 years.

The stand must contain a minimum of 500 uniformly distributed crop trees/ha.

A crop tree is described as a tree with a bole 4 meters in length and free of the following defects;

Crop Tree Defects

bulges	large burls
cankers	hollow butt log
seams/splits	crooked
butt rot	crotch
conks	dead top
excessive sweep (>5 cm.)	significant bark or root damage
significant die back of branches in live crown	

Guidelines and Assessment Procedures:

Residual stand density must meet species-specific standards set in the Prince Edward Island Forestry Handbook.

Maximum basal area removal is 40 %.

A minimum of 500 quality uniformly distributed crop trees/ha.

All crop trees selected must have a minimum diameter of 12 cm at breast height.

Crop trees must be dominant or codominant, have a minimum of 30% live crown, and a potential to grow for 20 years.

A minimum of 15 wildlife trees/ha must be left and/or created. The trees may be girdled to create stand diversity and eventually coarse woody debris or released to promote growth and seed.

Legacy trees should be left to grow.

All work shall be completed in such a way as to minimize damage to the residual stand. Damage is considered to be broken limbs and/or bark damage which exposes greater than 10 cm² of sapwood per tree. A maximum of 5 % damaged crop trees will be allowed per treatment.

Select Tree Harvest

Definition

A harvest technique carried out in a pole staged or older stand. This is a multi pass treatment over a period of time. This treatment can be utilized to harvest mature and/or over mature trees (or specific/undesirable trees to achieve the objective of the prescription). This treatment is used to modify the vertical structure of a stand (uneven age management) and create crown space to favour established remaining trees. This treatment will help create micro-habitat for natural regeneration and create coarse woody debris.

Eligibility Criteria:

Greater than 75 % of the stand is pole staged or older.

Stands shall normally be well rooted and wind firm with little existing wind throw unless it is managed primarily for the acceleration of height growth of tolerant planted seedlings.

The residual stand is to be harvested over a long period of time (i.e. 20 years) to create vertical structure (uneven age management) and to change from intolerant species to tolerant species if this not already the case.

Guidelines and Assessment Procedures:

Maximum tree removal is 10% of the merchantable basal area per year.

Residual stand must have a minimum average live crown ratio of 30 %.

Monitoring of harvest will occur during the first 3 year period and then every 3 years hence.

All work shall be completed in such a way as to minimize damage to the residual stand. Damage is considered to be broken limbs and/or bark damage which exposes greater than 10 cm² of sap wood per tree. A maximum of 5

% damage to remaining trees will be allowed per treatment.

The residual stand appears wind firm.

Initial cuts shall be distributed as uniformly as possible through out the stand.

Injured trees, trees with reduced live crown ratios, less wind firm trees and areas with advanced regeneration should be targeted for harvest.

Clearcut Strip Harvest

Definition:

A management technique carried out in pole-stage or older stands by harvesting at least 85 % of the trees in an area with a strip width equal to 0.3–2 tree stand heights. This is a multi pass treatment over a period of time. This treatment is used to modify the vertical structure of a stand, create openings to accelerate the height growth of planted seedlings, to create micro-habitat for natural regeneration, and other purposes. Strip cuts can be oriented to minimize or maximize the number of hours of full sunlight to shade or light for different purposes.

Eligibility Criteria:

Remaining average live crown must have a minimum of 30 %.

Greater than 75 % of the stand is pole staged or older.

Stands shall be well rooted and wind firm with little existing wind throw.

The residual stand is to be retained for a period prescribed in the management plan and the management objective is achieved. For natural regeneration purposes, this would normally be a minimum of 5 years following treatment and until strip cut areas are adequately stocked with planted or natural regeneration seedlings. Other objectives would require the management of the stands for much longer periods and could include a sequence of incremental cuts following the initial treatment.

Guidelines and Assessment Procedures:

All work shall be completed in such a way as to minimize damage to the residual stand. Damage is considered to be broken limbs and/or bark damage which exposes greater than 10 cm² of sap wood per tree. A maximum of 5 % damaged crop trees will be allowed per treatment.

Extraction methods promoting scarification shall be encouraged. The scarification should be conducted with a goal of creating up to a maximum 3200 micro-sites/ha adequately prepared and evenly distributed throughout the leave strip.

Each strip harvest intervention shall be prescribed in the management plan. Normally the strip widths would be 0.3–2 times the average stand tree height. Depending on the objectives, the retention strip would be 2–5 times

the strip width. This would vary depending on the species, age, and health of the stand when the treatment is commenced.

For seedling regeneration purposes, the harvest strips are best oriented right angles to the direction of seed dispersing winds.

Slash shall be broadcast throughout the harvest patch unless another treatment is prescribed in the management plan.

Clearcut Patch Harvest

Definition:

A management technique carried out in a pole staged or older stand by using a harvest which removes the trees in an area with a width equal to 0.3 –2 tree stand heights. The maximum patch size opening that can be created is 0.5 ha (approximately 70 m diameter). This is a multi pass treatment over a period of time. This treatment is used to modify the vertical structure of a stand, create openings to accelerate the height growth of established seedlings, to create micro-habitat for natural regeneration, and create coarse woody debris. Patch harvests can be of various shapes to create shade or light for different purposes.

Eligibility Criteria:

Remaining stands must have a minimum average live crown ratio of 30 %.

Greater than 75 % of the stand is pole staged or older.

Stands shall normally be well rooted and wind firm with little existing wind throw unless it is managed primarily for the acceleration of height growth of tolerant planted seedlings.

The residual stand is to be retained for a period prescribed in the management plan and the management objective is achieved. For natural regeneration purposes this would normally be a minimum of 5 years following treatment and until patch cut areas are adequately stocked with planted or natural regeneration seedlings. Other objectives would require the management of the stands for much longer periods and could include a sequence of incremental cuts following the initial treatment.

Guidelines and Assessment Procedures:

Extraction methods promoting scarification shall be encouraged. The scarification should be conducted with a goal of creating up to a maximum 3200 micro-sites /ha adequately prepared and evenly distributed throughout the patch.

All work shall be completed in such a way as to minimize damage to the residual stand. Damage is considered to be broken limbs and/or bark damage which exposes greater than 10 cm² of sap wood per tree. A maximum of 5 % damaged crop trees will be allowed per treatment.

Excluding trees retained as legacy trees, snags, or cavity trees, all merchantable wood is to be removed, placed in such a way as to facilitate extraction, and/or piled to create wildlife habitat.

The patch cut size shall be that prescribed in the management plan.

The residual stand appears wind firm.

Initial patch cuts shall be distributed as uniformly as possible through out the stand.

The injured trees, trees with reduced live crown ratios, less wind firm trees and areas with advanced regeneration should be targeted for harvest.

Slash shall be broadcast throughout the harvest patch unless the management plan prescribes another treatment for a purpose considered valid by the Department.

Clearcut Block Harvest

Definition:

An even-aged management technique, in which new seedlings become established in fully exposed micro-environments after removal of greater than 85% of the existing trees. Regeneration can be planted or natural regeneration seedlings.

Eligibility Criteria:

Covertypes eligible for treatment are white spruce, balsam fir, eastern larch, black spruce, white birch, trembling aspen, plantation-grown red pine and red maple in low lying areas that are mature or older.

Other stands will be considered on individual merit based on the interpretation of the Department.

Guidelines and Assessment Procedures:

Individual block cuts will not exceed 2 ha. A minimum of 15 m vegetation corridor is to be left between cuts for wildlife. These vegetation corridors can be designed as such to allow a size that provides opportunities for management and economic return. Once the adjacent stand has reached a height of 4 m, the vegetation corridors can be harvested.

All work shall be completed in such a way as to minimize damage to residual stems. Damage is considered to be broken limbs and/or bark damage which exposes greater than 10 cm² of sap wood per tree. A maximum of 5 % damaged residual trees will be allowed per treatment.

Extraction methods promoting scarification shall be encouraged. The scarification should be conducted with a goal of creating up to a maximum of 3200 micro-sites/ha adequately prepared and evenly distributed throughout the block.

Slash shall be broadcast throughout the harvest block unless another treatment is prescribed in the management plan.

Uniform Shelterwood Harvest

Definition:

An even-aged management technique, practised on older stands to establish a new crop or release an existing crop of desirable seedlings before the next or final harvest of the overstory. One or more partial cuts of the overstory are often utilized to provide conditions favourable for the establishment and growth of natural regeneration. With the exception of trees left for legacy tree purposes, the final harvest should normally occur when the desired regeneration has attained a height of 1–3 m.

Eligibility Criteria:

Selected softwood stands must contain at least 20 m²/ha of the desired species (eastern hemlock, red spruce, white pine, white ash, red oak, yellow birch, sugar maple and red maple) with at least 12 m²/ha being softwood species (eastern hemlock, red spruce, white pine). The stand must contain over 30 m²/ha of merchantable basal area.

Selected hardwood stands must contain at least 12 m²/ha of the desired species (red oak, white ash, yellow birch, sugar maple, red maple, eastern hemlock, red spruce, white pine, balsam fir) with at least 8 m²/ha being hardwood species (red oak, white ash, yellow birch, sugar maple, and red maple). The stand must contain over 20 m²/ha of merchantable basal area.

Residual trees must have a minimum of 30% live crown and be of good health and form.

Guidelines and Assessment Procedures:

A maximum of 40 % of the original basal area may be removed. This may be increased to 50 % if pre-approval is granted where the stand is sheltered and consists of well rooted trees.

The partial cuttings should remove the poorest quality trees and maximize the residual stand content of desired species exceptions are acceptable for trees that enhance wildlife habitat.

The residual stand must have sufficient vigour to allow it to remain in a healthy state for 20 years following treatment.

All work shall be completed in such a way as to minimize damage to residual stand. Damage is considered to be broken limbs and/or bark damage which exposes greater than 10 cm² of sap wood per tree. A maximum of 5 % damaged crop trees will be allowed per treatment.

Seed Tree Harvest

Definition:

A harvest technique carried out in pole staged or older stands. This may be a single- or multi-pass treatment and can be utilized to selectively harvest trees that are mature or older. This treatment is used to modify the stocking, species composition and the vertical structure of the stand and create crown space to favour natural regeneration establishment.

Eligibility Criteria:

Selected stands must contain at least 20 m²/ha of the desired species (eastern hemlock, red spruce, white pine, white ash, red oak, yellow birch, sugar maple and red maple).

Remaining stand must have a minimum average live crown ratio of 30 %.

Greater than 75% of the stand is pole stage or older.

Stands shall normally be well rooted and wind firm with little existing wind throw unless it is managed primarily for the acceleration of height growth of tolerant planted seedlings.

The harvest goal is to create vertical structure and provide a source of seed of the desired species to encourage the establishment of natural regeneration.

Guidelines and Assessment Procedures:

The residual stand should have an average minimum basal area of 8 m² or greater.

All work shall be completed in such a way as to minimize damage to the residual stand. Damage is considered to be broken limbs and/or bark damage that exposes greater than 10 cm² of sap wood per tree.

Harvesting and extraction should not be carried out during soft ground conditions to reduce rutting and root damage to residual trees.

The residual trees appear wind firm.

Initial cuts (and residual seed trees) shall be distributed as uniformly as possible throughout the stand.

SPECIAL ENHANCEMENT TECHNIQUES

Nesting Box Establishment

Definition:

Nesting boxes are important to some species that have lost many natural nesting sites due to habitat destruction. Old dead or dying trees are important natural nesting sites for these birds. Cavity nesting birds in Prince Edward Island include chickadees, flickers, bluebirds (rare), nuthatches, tree swallows, barred owls, saw-whet owls and kestrels. Specially designed nesting boxes are also beneficial to bats and flying squirrels.

Eligibility Criteria:

The placement of nesting boxes to be utilized as temporary nesting sites to enhance areas with few, or unsuitable, natural cavities (i.e. cavity trees) are present until these areas have natural cavities. A Forest Management Plan which meets minimum requirements as specified by the Department of Agriculture and Forestry. If appropriate, tree species in which a diameter needed for the desired cavity nesting wildlife species are present, one tree should be girdled near the nest box.

The Forest Wildlife Manual has designs for potential nest boxes that could be established. Nest box designs must meet size standards for the desired species and be placed according to appropriate height and entrance hole aspect. Holes that are too large allow predators to enter the nest and prey on eggs and young. Other small design details may make the difference between an occupied nesting box and a vacant one. Northern Flickers like to excavate their own nesting site, so placing a block of partially rotted wood in the box may entice them. Nuthatches like nest boxes that are sheathed with tree bark.

Try to do minimal damage to the tree when you **attach your nesting box**. Don't wrap bands around the trunk that will restrict growth, and if you attach the box with screws, use the smallest screws that will hold the house securely in position. It is preferred that nesting boxes are to be attached to trees using wooden dowels or aluminum nails.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

The nesting boxes may to be established in the area under the Forest Management Plan at a number dependent on the species at a maximum of 2/ha.

The landowner will be responsible for having the nesting boxes cleaned every year (Refer to *P.E.I. Forest Wildlife Manual*).

ASSISTANCE:

Two nesting boxes per hectare per species to a maximum of 10 per Forest Management Plan.

Artificial Brush Cover Piles and Nesting Areas

Definition:

The placement of natural materials from previous harvests or such other materials as may be appropriate (see *P.E.I. Forest Wildlife Manual*) for the purpose of improving wildlife habitat. Adequate resting and escape cover is critical to proper management of ground-nesting birds, snowshoe hare, and other small game. Although living brush is preferable, in most cases you can build artificial brush piles to supply immediate shelter for many species where natural cover is limited. Artificial brush piles conceal and protect wildlife from predators and the weather, and they establish a medium for seed germination and plant growth.

Eligibility Criteria:

Suitable locations for brush piles include woodland borders, clearings, and other sites adjoining feeding and nesting cover. Brush piles help to prevent erosion and provide wildlife cover when placed along the head of a gully, but never place them in the middle of an eroding wash. They may also be appropriate near impoundments, and other wetland places in open terrain. Place them where the surrounding area is lacking in natural cover. The optimum distance between brush piles, will vary according to site characteristics and target species. When properly constructed and located, brush piles can serve as a versatile management technique for wildlife in a variety of forest settings.

A Forest Management Plan which meets minimum requirements as specified by the Department

The artificial cover piles and artificial nesting areas are to be constructed using harvested materials from a previous treatment in the stand or materials from another area (See *P.E.I. Forest Wildlife Manual*). When using materials from another stand, avoid materials that appear to carry materials that are diseased.

Artificial nesting areas are to be constructed to the specifications in the *P.E.I. Forest Wildlife Manual*. The minimum surface area of 1.2 m² with a minimum height of 1 m.

See also other cover enhancement techniques with the placement of logs, roots, and other materials.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

As the cover pile decomposes, additional new branches should be added to retain the integrity of the treatment.

Assistance:

A maximum of 10 per Forest Management Plan.

PLANT AND ANIMAL SPECIES OF SPECIAL CONCERN

Includes but not limited to uncommon, rare or endangered endemic wild plant or wild animal or any species listed in Schedule 1.

Conservation and Restoration

A field evaluation in an appropriate season is required to determine:

- the presence of any species of special concern;
- a review of the availability of and juxtaposition of various covertypes and ages on the property and nearby the property based on the landowners goals; and
- any special conditions which are or will probably affect the health and vitality of various plant communities with the goal of preparing conservation and restoration recommendations to meet the landowners or communities objectives.

Rare Plant Species

Definition:

The identification, conservation, and propagation of forest dependent vascular plants that are rare on P.E.I. (i.e. S1 and S2 species) or, such other plants which the P.E.I. Department of Agriculture and Forestry from time to time identifies to increase their availability as seed sources for species conservation purposes.

Eligibility Criteria:

Probable presence of forest dependent rare vascular plants on P.E.I. based on the woodlot covertype and features seen in the field and knowledge of the Dr. Doug Sobey's publication "Analysis of the Ground Flora and Other Data Collected during the 1991 Prince Edward Island Forest Inventory: II Plant Community Analysis".

A vascular plant inventory must be prepared by a qualified Botanist or other person highly skilled in vascular plant identification registered with the Department of Agriculture and Forestry.

Knowledge of the conservation and restoration requirements of the species proposed in the plan and the inclusion of these measures in a Forest Management Plan which meets minimum requirements as specified by the Department of Agriculture and Forestry.

The species proposed for restoration meets the micro-climate conditions within the stand in which the treatment is to be applied.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

Monitoring and reporting on the success of the conservation or restoration techniques.

Rare Animal Species

Definition:

The conservation and restoration of forest dependent native animals that are rare on P.E.I. (i.e. S1 and S2 species), the conservation of raptor nest trees, and the identification or conservation of such other animals which the P.E.I. Department of Agriculture and Forestry from time to time identifies.

Eligibility Criteria:

Probable presence of forest dependent rare animals based on a knowledge of their life history and population status and an assessment of the forest cover type data for the presence of tree species of the appropriate size and configuration.

An inspection of the forest stands to identify recently used raptor nests or the presence of limiting factors by a wildlife biologist, forest technician, forester or such other person with the skills to inspect these stands for the identified species and limiting factors.

Knowledge on the conservation and restoration requirements of the species proposed in the plan and the inclusion of these measures in a Forest Management Plan which meets minimum requirements as specified by the Department of Agriculture and Forestry.

Development and implementation of a plan to conserve the species.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

For raptor nests, meet the conservation criteria identified in the *Forest Wildlife Manual* or as approved by the *Forest, Fish and Wildlife Division*.

Shall monitor and report on the success of the conservation or restoration techniques.

**The Landowner may be able to place a Conservation Easement on the property and receive financial compensation for the land as well as some tax benefits.*

Game Bird and Mammal Habitat Conservation or Enhancement

Definition:

Based on a landowner's objectives for the property, the assessment of the property for any limiting factors for game birds or mammals habitat needs of species desired by the landowner (e.g. Ruffed Grouse display logs, American Woodcock display space, foraging habitat).

Eligibility Criteria:

The lack of display or game habitats based on the interpretation of the available covertypes on the property based on a knowledge of the life history and population status of the desired species.

An inspection of the forest stands to identify game habitats by a wildlife biologist, forest technician, forester or such other person with the skills to inspect these stands for the identified limiting factors.

Knowledge on the conservation and enhancement requirements of the desired species proposed in the plan and the inclusion of these measures in a Forest Management Plan which meets minimum requirements as specified by the Department of Agriculture and Forestry.

Development and implementation of a plan to conserve the habitats.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

Meet the conservation criteria identified in the *Forest Wildlife Manual* or such other reference material as required to create or enhance the desired features.

Shall monitor and report on the success of the conservation or restoration techniques.

Hedgerow and Shelterbelt Planting

Definition:

The planting of one or more rows of strategically placed evergreens, deciduous trees, and/or shrubs in an area to create a hedgerow or shelterbelt of a desired height and density for the purposes of reducing wind and erosion and creating habitat for wildlife, and will provides the landowner with economic benefits as well. Properly designed shelterbelts, especially over 10 rows wide, offer shade and reduce air conditioning costs throughout the warm season. During the winter months, they serve as a windbreak, reducing heating costs by as much as 30 %. Additionally, the shrub layer catches drifting snow, lessening the need to invest time and money in snow removal Furthermore, planting trees on your land usually increases property values.

Eligibility Criteria:

A map laying out the necessary features such as buildings, crops, soil types, soil drainage, soil fertility, wind exposure, salt spray, sand/silt movement, septic tanks, overhead lines (power, cable, telephone), roadways, satellite dish(s), and other relevant features.

A knowledge of landscape planning and tree silvics.

Develop a management Plan which meets minimum requirements as specified by the Department of Agriculture and Forestry.

Implementation of the plan.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

Meet the planting standards set out by the Department of Agriculture and Forestry.

Monitor and report on the success of techniques.

Invasive Species Removal or Control

Definition:

The removal or control of a species that does not naturally occur in Prince Edward Island and whose introduction does or is likely to cause economic or environmental harm or harm to human health listed in Schedule 2.

Eligibility Criteria:

The presence of an invasive species on the landowner's property (Schedule 2).

Knowledge of the techniques which could be allowed to stop the spread or eliminate the invasive species presence on the property.

Willingness to implement an invasive species control plan for the property.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

Removal or control should be completed after consultation with the Department of Agriculture and Forestry.

Monitor and report on the success of techniques.

Landscape Level Seed Production Orchards

Definition:

The planting of small orchards of one or more species (e.g. red oak, white pine, white ash) to generate seed which then will be spread by mammals and birds or the wind at a landscape level.

Eligibility Criteria:

A list of appropriate species for this purpose for Prince Edward Island.

The silvics of the species and an inspection of the planting site to ensure its suitability.

The lack of this species at a landscape level within the normal seed spread range around the orchard.

Willingness to plant the species and to manage the orchard to maximize its seed production potential.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

Establishment of seed orchards should be done under the consultation of the Department of Agriculture and Forestry.

Monitor and report on the success of techniques.

Riparian Management Zone

Definition:

The land and vegetation bordering a watercourse or wetland that works to provide many ecological functions, improving water quality, water absorption and storage, flood control, recharged groundwater reserves, protecting stream banks from erosion, habitat for aquatic and terrestrial wildlife. This treatment is intended to compliment other treatments and allow additional care in the prevention of watercourse or wetland degradation.

Eligibility Criteria:

Under the Forest Enhancement Program a Riparian Management Zone shall be defined as the 50 m zone adjacent to the boundary of a watercourse or wetland.

The area within the Riparian Management Zone must qualify for a Forest Enhancement Program treatment. A landowner who wishes to manage the **15m buffer zone** adjacent to a watercourse or wetland is required to obtain a permit from the Department of Environment, Labour and Justice. Forested buffer zones cannot be converted to any other land use.

Guidelines and Assessment Procedures:

The area within the Riparian Management Zone is treated as per the eligibility requirements of the treatment.

If a permit is obtained to work inside the **15m buffer zone**, in addition to complying with all permit conditions, all cut trees or tree parts must be removed beyond the flood line of a watercourse or at least 5m from the boundary of a watercourse or wetland. They must be deposited where run-off will not move them into the watercourse.

Use techniques approved by the Department of Agriculture and Forestry which can be found in *Beneficial Management Practices for Riparian Zones in Atlantic Canada*.

As Riparian Management Zones are very productive in wildlife, the density of cavity trees is to be increased to 25-30/ha.

DEFINITIONS

ALTERNATE SPECIES:

Any tree or shrub species that is not selected as a timber or non-timber crop tree which is retained in various silvicultural prescriptions such as plantation cleaning or thinning with the intention of retaining that tree or shrub for species diversity and richness and to promote the cycling of nutrients and minerals to surficial soil layers.

APPROPRIATE NATURAL REGENERATION:

Any tree species that is selected as a crop tree which is retained in various silvicultural prescriptions such as plantation cleaning or thinning.

BASAL AREA:

The cross sectional area of a tree at breast height. Basal area may be measured in square meters per tree or in square meters per hectare.

BREAST HEIGHT (B.H.)

The standard height, 1.30 meters above ground level, at which the diameter of a standing tree is measured.

BIODIVERSITY:

Biodiversity, or biological diversity, refers to the variability among living organisms - within species (genetic diversity), between species (species diversity), and in ecosystems (ecosystem diversity). Biodiversity is important not only for its intrinsic value but also for what it provides us with, for example, clean air and water, compounds for new medicines, and seeds for new crops. Loss of species or change in species composition can threaten ecosystem health and affect our economic and socio-cultural sustainability.

BUFFER STRIPS:

Land covered with vegetation to provide protection for a specific feature such as streams, watercourse, wetlands, natural areas, and sensitive areas.

BULL PEN:

An artificial or natural opening of sufficient size to allow the placement of primarily the organic soils, slash, and roots from a road building operation while minimizing damage to the adjacent trees.

CAVITY TREE:

A tree, alive or dead, preferably greater than 20 centimeters in diameter at breast height (B.H.) and preferably greater than seven meters in height, which may or may not have existing cavities used by wildlife for roosting and/or reproduction. (See also snag tree).

COARSE WOODY DEBRIS OR COARSE WOODY MATERIAL:

Downed woody material with a diameter of greater than or equal to 7.5 cm and a length of greater than or equal to 2 meters retained to create micro-habitats for a variety of plant and wildlife species.

COMMERCIAL THINNING:

A felling made in an immature or mature stand to modify the species composition, accelerate growth and/or select tree composition to increase the ratio of residual trees of desired form, species, and structure for timber or non-timber purposes in which all merchantable trees felled must be cut and piled on a trail system or in a manner to benefit wildlife.

CONTOUR PLOWING:

A form of mechanical site preparation utilizing a single furrow plough to overturn sods to create planting micro-sites. The ploughing is to be completed perpendicular to the slope of the land. Sufficient contact must be developed between the overturned sod and the ground to prevent drying of planted seedlings.

COVER PATCH:

An unharvested area retained within an area which has been cleared of the dominant vegetation, kept as cover for wildlife diversity and for retention of natural vegetation, having an area of at least 25 square meters but preferably more. Ideally the patch should contain vegetation in different canopy levels and at least one cavity tree or legacy tree preferably both. The area is to be excluded from treatments and allowed to evolve naturally with possible enrichment planting. Areas of 100 or more square meters are preferable to address the best mix of ground cover, shrubs, and trees, the heights, dead wood, fallen trees, leaning trees, upturned roots, dense canopy cover, and other factors found on sites.

CROP TREE:

Any tree selected to become or form a component of a future harvest.

CROWN:

The part of a tree bearing live branches and foliage.

CROWN CLASS - DOMINANT:

Trees with crowns extending above the general level of the main canopy of trees and receiving full light from above and partial light from the sides.

CROWN CLASS - CO-DOMINANT:

Trees with crowns forming the general level of the canopy and receiving full light from above but comparatively little from the sides.

CROWN CLASS - INTERMEDIATE:

Trees with crowns extending into the lower portion of the main canopy of trees, but shorter in height than the co-dominant/dominant trees and receives little direct light from above and none from the sides.

CROWN CLASS - SUPPRESSED:

Trees with crowns entirely below the general level of the canopy of trees, receiving no direct light either from above or from the sides.

CROWN CLASS - WOLF TREE:

Trees of poor or irregular form that serve as desired forest structure to achieve one or more desired silvicultural/wildlife objective(s) or trees which deleteriously impact the growth of adjacent crop trees.

CULVERT:

A metal, wooden, plastic or concert conduit through which water can flow.

DAMAGED RESIDUAL:

A tree left standing after a silvicultural operation in which the cambium layer on the main stem(s) has been damaged. Damage is considered to be bark damage and/or broken limbs which exposes greater than 10 square centimeters of sap wood.

DIAMETER AT BREAST HEIGHT (DBH):

The stem diameter of a tree measured at breast height (1.30 meters above ground height).

DEBRIS:

A term used to describe any loose material that has entered or has the potential to enter a water course or a wetland. This includes gravel, clay, rocks, stumps, branches, trees, lumber, and any other material used in a stream crossing construction process. Any fallen trees present in the watercourse within five meters of the stream crossing structure would also be considered debris.

DENSITY:

The number of trees per hectare.

DUFF:

The combination of litter (the uppermost layer of organic debris on a forest floor including freshly fallen leaves, twigs, and bark that is slightly decomposed) and the less decomposed humus on the forest floor.

EARLY SUCCESSIONAL SPECIES:

Trees or shrub species that thrive in open grown (full light) conditions such as pin cherry, white birch, and eastern larch. These species are largely intolerant of shade.

ECOSYSTEM:

A self-sustaining community that consists of a dynamic set of living organisms interacting with each other and with their environment.

EXTRACTION TRAIL:

A narrow corridor used to place and/or extract harvested wood or other forest product to a forest road. Extraction trails are normally the width of the extraction machinery (forwarder, skidder, tractor and trailer, etc) plus the added width required to address rough terrain so as to minimize stem damage on residual trees.

FARM EQUIPMENT:

For use in mechanical site preparation, an agriculture plough and harrow or agriculture rotovator.

FOREST STAND:

A collection of trees uniform enough in species composition, height, density, and age and other attributes such as structure to be considered as a separate and distinct unit.

FOREST:

An area of land which has or will have at least 10% of the land in trees.

FOREST ECOSYSTEM:

A community of plants, animals and microorganisms, and the physical environment they inhabit, in which trees are the dominant life form.

FOREST MANAGEMENT:

The multiple-use management of forest resources for sustained yields of wood, water, wildlife and recreation. Multiple use includes timber management, watershed management, wildlife fisheries management, and recreational management.

FULL PLANTING:

An area of land on which tree seedlings have been planted to achieve 1800 to 3200 seedlings/hectare.

GIRDLING:

The removal of bark and cambium around a tree to cause mortality.

HABITAT:

Habitat describes the location and environmental conditions in which a particular organism normally lives.

HARDWOOD TREES:

Broad-leaved trees with leaves that are shed annually.

HARDWOOD STAND:

A group of broad-leaved deciduous trees in which greater than fifty percent of the overstory trees are hardwood. (See also forest stand or stand)

INVASIVE SPECIES:

Non-native species which aggressively spread or invade habitats and are often considered weeds or pests.

LATE SUCCESSIONAL SPECIES:

Either hardwood or softwood trees or shrubs that have the potential to grow well in shade such as sugar maple, red maple, beech, eastern hemlock, white pine, and ground hemlock.

LEGACY TREES:

A legacy tree is a standing live tree with great size (diameter and/or height), old age, historical value, or rarity.

LIVE CROWN RATIO:

The percentage of total tree height that has green (live) branches.

MATURITY CLASS:

An arbitrary grouping of trees or stands based on the production of tree products for a desired use such as timber or other tree product. The term is most often used by forest timber managers but can also be used for other forest based crops.

REGENERATING:

Trees or stands that are established after a deliberate or natural disturbance but are not free to grow from competition.

IMMATURE:

Trees or stands that have grown past the regeneration stage but are not yet mature to be harvested.

MATURE:

Trees or stands that are sufficiently developed to allow partial or full harvesting of the products identified for this tree or stand.

OVER MATURE:

Tree or stands past the normal mature stage for the type of tree or stand on that site and which are undergoing declined from wind damage or biological conditions at this site.

MERCHANTABLE TREES:

Normally all live standing trees 9 cm or greater at dbh.

MERCHANTABLE WOOD:

All merchantable tree or tree parts that have been felled to be utilized for a specific purpose.

MANAGEMENT PLAN OR AGREEMENT:

A document which describes an area of land and which defines the management objectives and treatments to be implemented to achieve these management objectives. This document may form part of or include reference to the Eco-system Forest Management Manual or such other document that describes the minimum standards which will be used in implementing management treatments or prescriptions.

NATIVE SPECIES:

A species which naturally exists in a given region or jurisdiction and was not introduced by humans during the written historic period for this region or jurisdiction. For clarity, species native to PEI are those listed S1 to S5 on the Atlantic Canada Conservation Data Centre's tracking lists for PEI. (www.accdc.ca)

NATURAL AREA:

A specific area of land which is identified to protect the feature for which it was identified. It may be an area identified as part of a management plan or an area designated legally under the Natural Areas Protection Act.

NATURAL CAPITAL:

The natural resources and the ecological systems that provide vital life support systems. It includes all the familiar resources used by humans (air, water, soil, plants, animals, minerals, oil, etc.) and encompasses all living ecological communities and the ecological services of these communities as well as the movement between communities and resources.

NATURAL REGENERATION:

Renewal of a vegetation cover by natural seeding, sprouting, suckering, or layering.

NEST TREE:

A term used in relation to a tree's potential to create nest cavities and it refers to a live or partially dead mature aspen, beech, maple or birch with a minimum diameter at breast height of 20 cm.

NON-TIMBER FOREST PRODUCTS:

Any product or value which derives from forests except primarily round wood products such as pulp, studwood, logs, and fuelwood.

PARTIAL HERBICIDE APPLICATION:

A ground herbicide application on where the complete site does not receive direct application. Most often undertaken with either band or spot application.

PARTIAL PLANTING:

An area of land on which tree seedlings have been established intermittently by planting (200 to 1000 seedlings/ha).

PATCH CUTTING:

One or more cuts in woody vegetation completed to encourage the regeneration of trees, shrubs, or other plants, to create a maturity class different from the vegetation which existed prior to cutting, or to create shade and microclimate conditions for planting to encourage appropriate plant survival and or form. Normally, patch cuts are limited to stand openings between 0.3 and 2 times the stand height.

PLANTATION:

An area of land on which the predominant woody vegetation was established through planting trees or shrubs or their cuttings and/or seeding trees or shrubs to achieve a prescribed density, and which is managed primarily for production of one or more crops. See also Full Planting.

PRE-COMMERCIAL THINNING:

A felling in a young stand to reduce vegetative competition to favour a particular species or group of species and/or to accelerate the growth of particular crop trees. Typically, the felled trees will be non-merchantable.

PROVINCIAL FOREST:

Forested properties under the management of the Forests, Fish and Wildlife Division and include but are not limited to forests designated under the Forest Management Act, The Natural areas Protection Act and the Wildlife Conservation Act. These include properties designated under one of the 22 Provincial Forests area or a Satellite Provincial Forest.

PRUNING:

The cutting of tree limbs to modify either stem form for a particular use or to reduce disease infection rates in crop trees or insect infestations.

REPLANTING:

Establishment of a tree plantation by planting seedlings or transplants on an area that was previously forest or plantation.

REGENERATION CUTTING:

A felling of individual trees or groups of trees with the primary objective of promoting desirable regeneration of trees, shrubs, or other plants, to create a maturity class different from the vegetation which existed prior to cutting, or to create shade and microclimate conditions for planting to encourage appropriate plant survival and or form.

S-RANK:

A code which identifies the species and community rarity or conservation status at a sub-national (provincial) scale. In this document:

S1 means - Extremely rare, may be especially vulnerable to extirpation (typically 5 or fewer occurrences or very few remaining individuals);

S2 means - Rare, may be vulnerable to extirpation due to rarity or other factors (6 to 20 occurrences or few remaining individuals);

S3 means - Uncommon, or found only in a restricted range, even if abundant at some locations (21 to 100 occurrences);

SE means - Exotic, an exotic established in the province (e.g. Purple Loosetrife or Coltsfoot); may be native in nearby regions; and

SNA means - Not Applicable, a species that is not a suitable target for conservation activities.

SCARIFICATION:

The manual or mechanical preparation of a desired seed bed or planting site. The treatment will result in exposure of mineral soil or reduction of the humus layer to enhance germination and/or growth of particular species or create a temporary reduction in plant or animal competition to achieve specified silvicultural objectives.

SEED BED:

An area with modified soil structure sufficient in size to promote the establishment of the desired species from seed.

SHRUB:

A woody plant usually growing with several equally strong stems and less than about 4.6 meters (15 ft) maximum height.

SITE INDEX:

A numerical index used to indicate the productive potential of a site, defined as the height in meters of a tree species at B.H. age 50.

SITE PREPARATION:

Manual, mechanical or chemical treatment of a potential planting site by the removal or control of unwanted vegetation or slash and/or the break up and mixing of soil layers prior to planting or to encourage selected species.

SKIDDER:

A vehicle used to move harvested wood from stump to roadside using skidder cables or grapples.

SNAG OR SNAG TREE:

A standing dead or leaning tree preferably greater than 20 cm in diameter at breast height.

SOFTWOOD:

Cone-bearing trees with needle or scale-like leaves.

SOFTWOOD STAND:

A group of relatively homogenous trees forming a silvicultural or management entity in which greater than fifty percent of the overstory trees are softwood.

SPECIES DIVERSITY:

The number of native species located in a given area.

SPECIES RICHNESS:

It is a measure of diversity within a given area. In its simplest form, it is the number of native species present in the area, less the number of exotic species present.

STEM:

For the purpose of conducting a stem count for determination of total stand density, a stem shall be considered as any tree in excess of 1.3 meters in height.

STREAM BUFFER:

Buffer strips consisting of natural vegetation provide protection for bodies of water from the discharge of road drainage and provide corridors for movement of wildlife. Selective harvesting to promote long lived trees and

to maintain a healthy forest is desirable within this buffer strip. Within buffer strips, wood removal should be limited to use of draft animals, cables, or snowmobiles to minimize harvesting damage. Under the Environmental Protection Act, the buffer strip must be at least 20 m wide on each side of all water courses and wetlands where the slope is less than or equal to 9 %. On all slopes of greater than 9 %, a minimum buffer of 30 m must be established on watercourses and wetlands. In addition, on steep slopes along streams (watercourses) within Provincial Forests or Satellite Provincial Forests, an additional buffer width will be established so that the minimum buffer equals $10 \text{ m} + 1.5 \times \text{the average slope}$ (e.g. on a 25% slope, the minimum buffer would be 47.5 m).

STRIP CUT:

Felling done in strips in a stand for the purpose of promoting desirable regeneration and/or wildlife habitat. Strip cuts encourage the regeneration of trees, shrubs, or other plants, create a maturity class different from the vegetation which existed prior to cutting, and create shade and microclimate conditions for planting to encourage appropriate plant survival and or form. Strip width and compass orientation used to create greater or lesser amounts of shade.

STOCKING:

A qualitative expression of tree cover on an area in terms of number of trees in relation to a pre-established norm.

THINNING:

A felling made in a stand to effect a species change, or accelerate diameter growth of residual trees, and to improve the average form of the remaining stems for a desired purpose.

TRAIL PERCENTAGE:

That portion of a stand that is used for extraction trails expressed as a percentage of the total stand area. Trail width includes both travelled and non-travelled surface, measured as the average width between residual stems.

TREE:

A woody plant usually with a single main stem and generally growing more than 6 meters (20 ft) high.

TREE PLANTATION:

An area of land on which tree seedlings have been established by planting or seeding to produce an intended product.

TREE REGENERATION:

The regeneration of trees from seed, root suckers, stump suckers, or layering of tree parts. Besides seed, most hardwoods when cut below the lowest living branch will regrow from either the root system (e.g. trembling aspen) or stump suckers (e.g. sugar maple or white birch) while most softwoods will die when they are cut below the lowest green branch. Few tree species will naturally regenerate when a branch is buried in the soil by a natural even such as blowdown (e.g. eastern white cedar).

UNPLOUGHED FOREST:

Land which was never cultivated for farming or pasture and is treed.

VALUE ADDED PRODUCT:

The creation of one or more products from the base commodity product e.g. fresh fruit being converted into jams, jellies, syrups, or dried berries.

VEGETATION CORRIDOR:

An area of standing trees and shrubs with a minimum width of 15 meters left within a treatment site for the provision of vegetation cover, habitat diversity, vertical structure and to benefit wildlife (i.e. movement, food, cover) between cover types.

VERNAL POOL:

A temporary pond created in forest depressions which dries out. Longer lived vernal pools are often important breeding habitat for salamanders, newts, frogs and toads.

WATERCOURSE:

The full length and width of the sediment bed, bank and shore of any stream, spring, creek, brook, river, lake, pond, bay, estuary or coastal water body or any part thereof, whether the same contains water or not, but does not include

- (i) a grassed waterway, or
- (ii) a tap drain, unless a watercourse has been diverted into the tap drain;

For the purpose of forest riparian zones the watercourse must have a defined sediment bed and flow-defining banks that connect with a larger watercourse; or it exhibits a continuous flow of water during any 72-hour period from July 1 to October 31 of any year.

WATER COURSE / WETLAND MANAGEMENT ZONE:

The water course management zone is an operable forest management area which is large enough to encourage contractors to conduct treatments. It is defined as the total length of the water course and the adjacent 50 meter strip of land on each side of the water course. The wetland management zone shall be defined as the 50 meter strip of land adjacent to the perimeter of a wetland.

WATERSHED:

All land in PEI can be divided into areas called watersheds. Each watershed consists of all the land that water flows over or through to get to a particular river or stream. For example, the Winter River Basin, located northeast of Charlottetown, is a watershed.

WETLAND:

Lands commonly referred to as marshes, salt marshes, swamps, bogs, flats and shallow water areas that are saturated with water long enough to promote wetland or aquatic biological processes which are indicated by poorly drained soil, water-tolerant vegetation, and biological activities adapted to a wet environment;

WILDLIFE:

Wildlife includes, but is not limited to, plants, spiders, birds, reptiles, fish, amphibians, and mammals, if nondomesticated.

WILDLIFE TREE:

Any tree selected to become or form a component of a stand for the benefit of wildlife.

SCHEDULE 1

VEGETATION SPECIES RARITY AND/OR CONSERVATION STATUS

<u>Latin Name</u>	<u>Common Name</u>	<u>S-rank</u>	<u>Habitat</u>
<i>Amelanchier fernaldii</i>		S1	
<i>Anemone canadensis</i>	Canada Anemone	S1	
<i>Botrychium dissectum</i>	Cut-leaf Grapefern	S1	Pastures, swampy woods, mixed HW
<i>Botrychium simplex</i>	Little Grapefern	S1	Rocky slopes and rich hardwoods.
<i>Brachyelytrum septentrionale</i>	Northern Short-husk	S1	Mixed woods or rich hardwoods
<i>Cardamine diphylla</i>	Toothwort	S1	Rich, deciduous woods
<i>Cardamine maxima</i>	Large Toothwort	S1	
<i>Carex bromoides</i>	Brome-like Sedge	S1	Wet woods
<i>Carex comosa</i>	Bearded Sedge	S1	
<i>Carex folliculata</i>	Northern Long Sedge	S1	Swampy woods
<i>Carex gynocrates</i>	Ridged Sedge	S1	Wet coniferous woods
<i>Carex haydenii</i>	Hayden's Sedge	S1	
<i>Carex lurida</i>	Sallow Sedge	S1	
<i>Carex radiata</i>	Eastern Star Sedge	S1	
<i>Carex tenuiflora</i>	Sparse-Flowered Sedge	S1	
<i>Carex tribuloides</i>	Blunt Broom Sedge	S1	
<i>Carex wiegandii</i>	Wiegand's Sedge	S1	
<i>Conioselinum chinense</i>	Hemlock Parsley	S1	Cool wet woods and ravines
<i>Cornus rugosa</i>	Round-leaved Dogwood	S1	Rocky slopes and dry woods
<i>Crataegus holmesiana</i>	Holmes' Hawthorn	S1	
<i>Cystopteris tenuis</i>	Mackay's Brittle Fern	S1	
<i>Dalibarda repens</i>	False Violet	S1	Shady, moist coniferous woods
<i>Danthonia compressa</i>	Flattened Oat Grass	S1	
<i>Dicentra cucullaria</i>	Dutchman's Breeches	S1	Rich calcareous woodlands
<i>Dryopteris filix-mas</i>	Male Fern	S1	
<i>Elymus virginicus</i>	Virginia Wild Rye	S1	
<i>Equisetum scirpoides</i>	Dwarf Scouring Rush	S1	Rich, moist woods and mossy banks
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	S1	
<i>Galium aparine</i>	Common Bedstraw	S1	
<i>Glyceria laxa</i>	Northern Mannagrass	S1	
<i>Goodyera oblongifolia</i>	Menzies' Rattlesnake-plantain	S1	
<i>Hamamelis virginiana</i>	Witch Hazel	S1	Moist, acid woods and shore thickets
<i>Hieracium umbellatum</i>	Umbellate Hawkweed	S1	
<i>Laportea canadensis</i>	Wood Nettle	S1	Riparian woods
<i>Listera australis</i>	Southern Twayblade	S1	
<i>Milium effusum</i>	Tall Millet Grass	S1	
<i>Ophioglossum pusillum</i>	Northern Adder's-tongue	S1	Open slopes, edge of old logging roads

<i>Orobanche uniflora</i>	One-flowered Cancer Root	S1	Damp thickets, woods and meadows
<i>Oryzopsis asperifolia</i>	Rough Mountain-rice	S1	Open, dry woods
<i>Osmorhiza longistylis</i>	Aniseroot	S1	Moist woods and clearings
<i>Ostrya virginiana</i>	Ironwood	S1	Rich, deciduous woods
<i>Packera schweinitziana</i>	Swamp Ragwort	S1	Swampy mixed woods
<i>Pilea pumila</i>	Clearweed	S1	Riparian woods and moist, shaded areas
<i>Platanthera blephariglottis</i>	White Fringed Orchid	S1	
<i>Platanthera hookeri</i>	Hooker's Orchid	S1	
<i>Poa alsodes</i>	Grove Meadow Grass	S1	Rich deciduous woods
<i>Polygala sanguinea</i>	Purple Milkwort	S1	Open woods, clearings, old burn sites, roadsides
<i>Polygonum scandens</i>	Climbing False Buckwheat	S1	
<i>Polypodium appalachianum</i>	Appalachian Polypody	S1	
<i>Polypodium virginianum</i>	Rock Polypody	S1	
<i>Polystichum braunii</i>	Braun's Holly Fern	S1	Rich woods, calcareous soils
<i>Ranunculus pensylvanicus</i>	Pennsylvania Buttercup	S1	
<i>Rubus elegantulus</i>	Showy Blackberry	S1	
<i>Salix candida</i>	Sage Willow	S1	
<i>Schizachne purpurascens</i>	False Melic Grass	S1	Open, often rocky, woods
<i>Solidago altissima</i>	Tall Goldenrod	S1	
<i>Solidago macrophylla</i>	Large-leaved Goldenrod	S1	
<i>Sphenopholis intermedia</i>	Slender Wedge Grass	S1	
<i>Thalictrum venulosum</i>	Northern Meadow-rue	S1	
<i>Amelanchier canadensis</i>	Canada Serviceberry	S1?	
<i>Crataegus chrysocarpa</i>	Fireberry Hawthorn	S1?	
<i>Epilobium coloratum</i>	Purple-veined Willowherb	S1?	
<i>Humulus lupulus var. lupuloides</i>	American Hops	S1?	Most thickets and woodland edges
<i>Ranunculus recurvatus</i>	Hooked Buttercup	S1?	
<i>Rubus pensylvanicus</i>	Pennsylvania Blackberry	S1?	Roadsides and woodland edges
<i>Botrychium lanceolatum var. angustisegmentum</i>	Lance-leaved Grapefern	S1S2	Rich hardwoods
<i>Carex hystericina</i>	Porcupine Sedge	S1S2	
<i>Carex vesicaria</i>	Inflated Sedge	S1S2	
<i>Claytonia caroliniana</i>	Carolina Spring Beauty	S1S2	
<i>Galium labradoricum</i>	Labrador Bedstraw	S1S2	
<i>Lycopodium obscurum</i>	Flat-branched Tree-clubmoss	S1S2	
<i>Lycopodium sabinifolium</i>	Juniper Club-moss	S1S2	Open, dry woods
<i>Mitchella repens</i>	Partridgeberry	S1S2	Coniferous or mixed woods
<i>Muhlenbergia glomerata</i>	Spiked Muhly	S1S2	
<i>Platanthera obtusata</i>	Blunt-leaf Rein Orchid	S1S2	Cedar bogs, mossy hummocks of coniferous swamps and moist deciduous woods
<i>Platanthera obtusata</i>	Blunt-leaved Orchid	S1S2	
<i>Pyrola chlorantha</i>	Green-flowered Wintergreen	S1S2	Mostly coniferous woods
<i>Rubus vermontanus</i>	Vermont Blackberry	S1S2	Roadsides and woodland edges

<i>Viburnum lantanoides</i>	Hobblebush	S1S2	Cool, moist, mixed woods
<i>Actaea pachypoda</i>	White Baneberry	S2	
<i>Agrimonia gryposepala</i>	Hooked Agrimony	S2	
<i>Andromeda polifolia</i> var. <i>glaucophylla</i>	Bog Rosemary	S2	
<i>Angelica atropurpurea</i>	Purple-stemmed Angelica	S2	
<i>Aralia racemosa</i>	American Spikenard	S2	
<i>Betula pumila</i>	Bog Birch	S2	Boggy thickets
<i>Botrychium matricariifolium</i>	Daisy-leaved Grapefern	S2	Rich hardwoods
<i>Botrychium multifidum</i>	Leathery Moonwort	S2	
<i>Carex deflexa</i>	Northern Sedge	S2	Open woodlands
<i>Carex pedunculata</i>	Long-stalked Sedge	S2	Deciduous or mixed woods
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	Broad-leaved Enchanter's Nightshade	S2	
<i>Corallorhiza maculata</i>	Spotted Coralroot	S2	
<i>Corallorhiza trifida</i>	Early Coralroot	S2	
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	Yellow Lady's Slipper	S2	Cedar swamps, calcareous areas, rich woods
<i>Cypripedium reginae</i>	Showy Lady's Slipper	S2	Calcareous bogs, cedar swamps
<i>Dulichium arundinaceum</i>	Three-Way Sedge	S2	
<i>Epilobium strictum</i>	Downy Willowherb	S2	
<i>Eriophorum viridicarinatum</i>	Green-keeled Cottongrass	S2	
<i>Eupatorium perfoliatum</i>	Boneset	S2	Damp meadows, ditches, shores
<i>Fraxinus nigra</i>	Black Ash	S2	Swamps and river bottomlands
<i>Glyceria canadensis</i>	Canada Manna Grass	S2	
<i>Goodyera repens</i>	Rattlesnake Plantain	S2	Calcareous cedar swamps
<i>Goodyera tessellata</i>	Checkered Rattlesnake Plantain	S2	Dry coniferous woods
<i>Liparis loeselii</i>	Loesel's Twayblade	S2	
<i>Listera convallarioides</i>	Broad-lipped Twayblade	S2	Mossy woods, cedar swamps, Calcareous areas
<i>Listera cordata</i>	Heartleaf Twayblade	S2	Moist banks and coniferous woods
<i>Muhlenbergia mexicana</i>	Mexican Muhly	S2	
<i>Oclemena nemoralis</i>	Bog Aster	S2	
<i>Osmorhiza claytonii</i>	Hairy Sweet-cicely	S2	Moist woods and clearings
<i>Packera aurea</i>	Golden Groundsel	S2	
<i>Panax trifolius</i>	Dwarf Gingseng	S2	Rich, deciduous woods
<i>Pinus resinosa</i>	Red Pine	S2	
<i>Platanthera aquilonis</i>	Tall Northern Green Orchid	S2	
<i>Platanthera orbiculata</i>	Large Round-leaved Orchid	S2	Wet deciduous or mixed woods
<i>Polygonum arifolium</i>	Halberd-leaved Tearthumb	S2	Swampy areas
<i>Potamogeton obtusifolius</i>	Blunt-leaved Pondweed	S2	
<i>Pyrola asarifolia</i>	Pink Pyrola	S2	Coniferous woods
<i>Ranunculus gmelinii</i>	Gmelin's Water Buttercup	S2	
<i>Rubus chamaemorus</i>	Bakeapple	S2	Acid bogs
<i>Rudbeckia laciniata</i>	Cut-Leaved Coneflower	S2	
<i>Symphyotrichum boreale</i>	Northern Bog Aster	S2	Calcareous soils, cedar swamps, shores

<i>Viola pubescens</i>	Downy Yellow Violet	S2	
<i>Carex aquatilis</i>	Water Sedge	S2?	
<i>Hieracium canadense</i>	Canada Hawkweed	S2?	
<i>Mimulus ringens</i>	Square-stemmed Monkeyflower	S2?	
<i>Carex stricta</i>	Tussock Sedge	S2S3	
<i>Carex trisperma</i> var. <i>billingsii</i>	Billings' Sedge	S2S3	
<i>Cirsium muticum</i>	Swamp Thistle	S2S3	
<i>Clematis virginiana</i>	Virgin's Bower	S2S3	Bottomlands, thickets, woodland edges
<i>Eurybia macrophylla</i>	Large-leaved Aster	S2S3	
<i>Geum canadense</i>	White Avens	S2S3	Rich woods and thickets
<i>Glyceria borealis</i>	Northern Manna Grass	S2S3	
<i>Lycopodium complanatum</i>	Northern Running-pine	S2S3	Dry, open woods
<i>Lycopodium hickeyi</i>	Hickey's Tree-clubmoss	S2S3	
<i>Lycopodium lagopus</i>	One-cone clubmoss	S2S3	
<i>Malaxis unifolia</i>	Green Adder's Mouth	S2S3	Coniferous woods, logging roads, woodland edges
<i>Petasites frigidus</i> var. <i>palmatus</i>	Arctic Sweet Coltsfoot	S2S3	Cool, moist woods
<i>Populus balsamifera</i>	Balsam Poplar	S2S3	
<i>Stellaria borealis</i>	Boreal Stitchwort	S2S3	

Sean Blaney, AC CDC. March 22, 2012

SCHEDULE 2

INVASIVE SPECIES

Synonyms

Phalaris arundinacea
Frangula alnus
Myriophyllum spicatum
Hieracium lachenalii
Pinus sylvestris
Alliaria petiolata
Elymus repens
Polygonum cuspidatum
Acer platanoides
Elodea canadensis
Ranunculus repens
Lythrum salicaria
Echinocystis lobata
Rhamnus cathartica

Common Name

Reed Canary Grass
Glossy Buckthorn
Eurasian Water-Milfoil
Common Hawkweed
Scotch Pine
Garlic Mustard
Quackgrass
Japanese Knotweed
Norway Maple
Canada Waterweed
Creeping Butter-Cup
Purple Loosestrife
Wild Mock-Cucumber
Buckthorn

Schedule 3

Department of Environment, Energy and Forestry Biomass Guidelines

Given the growing interest in biomass as an alternative for fossil fuels, it is timely for the Department of Environment, Energy and Forestry to articulate its policy with respect to standards for wood biomass harvests. Please ensure that this policy is communicated to appropriate staff, including but not limited to those with responsibilities related to environmental impact assessment, permitting and forest management. It is expected that projects receiving permits, approval or other forms of regulatory endorsement, financial assistance, or incentives from this Department will comply fully with this policy.

There are two major pathways proposed biomass projects may follow:

(1) No public investment. In cases where the project involves no public investment, the only mandatory requirement would be compliance with existing legislation such as the Environmental Protection Act, Wildlife Conservation Act, *etc.* Public investment would include:

- grants or loans for start-up, capital, or operating costs;
- silvicultural or other land management incentives provided through Departmental programs (e.g. Forest Enhancement Program, ALUS); or
- green credits or certification from Government.

(2) Public investment. In cases where the project anticipates either direct capital or operating assistance, or the involvement of our forest management programs (e.g. for post-harvest planting or management), our policy will be to ensure proposals meet additional standards as follows:

(A) No land conversion (harvest area will remain in forest production) –

- I. All harvest sites will require a pre-harvest management plan meeting the standards set out in the Forests, Fish and Wildlife Division's *Ecosystem-based Forest Management Manual*;
- II. All harvests must be in compliance with the standards set out in the Forests, Fish and Wildlife Division's *Ecosystem-based Forest Management Manual*;
- III. For clearcut harvests, only the tree bole may be removed, with branches and foliage to be spread throughout the harvest site (i.e. no whole tree removal);
- IV. For commercial thinnings and other non-clearcut harvests, whole tree harvest is allowed, but stumps must be left *in situ*; and
- V. All biomass harvest sites must be mapped via GPS and the map files submitted to the Forests, Fish and Wildlife Division

(B) Land conversion (harvest area is to become agriculture or another non-forest use) – Clearcut harvests on sites being converted to agriculture or other non-forest uses are exempt from the management plan requirement and other standards of the *Ecosystem-based Forest Management Manual*. In such cases, the Forests, Fish and Wildlife Division will monitor the harvest site for a period of 10 years or until the conversion occurs. If conversion does not occur within this time, penalties may be levied for non-compliance with the standards of the *Ecosystem-based Forest Management Manual*.

To compliment these standards and encourage sustainable forest management, the Department will work to educate land owners and the forest industry about highest and best use of wood products and ways that fuel wood harvest can be used to enhance forest quality.