PRINCE EDWARD ISLAND

DEPARTMENT OF ENVIRONMENT, ENERGY AND CLIMATE ACTION

FORESTS, FISH AND WILDLIFE DIVISION

ECOSYSTEM-BASED

FOREST MANAGEMENT STANDARDS MANUAL

October 2025

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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 in 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 coniferous (softwood) 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 early successional tree species quickly establish and replace the trees that once occupied that area. Disturbances that create large openings (e.g. fire, large wind events, insect damage), which lead to entire stands being replaced, are uncommon but are expected to increase in frequency as one of the effects of a changing and warming climate.

As the climate continues to warm, many tree and plant species will experience a gradual shift in their distribution and presence. This habitat and species change is not unique to PEI, this effect of the changing climate will be felt across Canada as species ranges shift Northward. Habitat presence that is conducive to cold hardy species such as white spruce, balsam fir, eastern white cedar and others is projected to decline with the increased effects of climate change within the century. Species that benefit from a warmer climate, predominantly hardwood species such as red maple, red oak, white pine and others will likely replace these species. These expected shifts were described by Dr Charles Bourque from a 2010 study which is available on the Government of Prince Edward Island, Environment, Energy and Climate Action website. Forest management strategies will need to adapt to the changing forest compositions by adjusting treatment types, harvest intensities and species retention.

Prince Edward Island's forests have 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 Islands forests 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 fuel wood, 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 being 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 dependent 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.

Forested land provides many ecological goods and services including water filtration and storage, erosion and runoff reduction, shading of streams and protection from winds. Some other examples of habitat that are present on the landscape and are of conservation importance include forested wetlands and vernal pools. Water management is a priority for residents of PEI. As such, Islanders are actively involved in many types of water and watershed management programs through provincial and non-government organizations. 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 for 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 forests 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. Please refer to the Department of Environment, Energy and Climate Action website or your local PEI Forests, Fish and Wildlife office for further forestry and field services resources.

GENERAL STANDARDS

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

Woodlot Management Plan

The woodlot management plan will provide a framework for the implementation of forest management treatments to meet the owners objectives (e.g. to increase biodiversity, improve timber quality, enrich wildlife habitat, minimize environmental 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 revised when necessary. 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:

- Woodlot owner objectives
- 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 access
- Stream (if applicable), wildlife, and biodiversity enhancement and management

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

On harvest sites other than block, patch and strip harvests, whole tree harvesting is acceptable.

Harvesting and extraction should not be carried out in conditions that result in damage to residual trees, erosion, rutting, soil compaction or puddled soils, as outlined in the road and water diversion construction section.

On sites being harvested for biomass production (chip form) the guidelines as stated in Department of Environment, Energy and Climate Action (herein referred to as the Department): Biomass Guidelines, (Appendix 1) 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 beech, eastern white cedar, sugar maple, yellow birch, 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. When planting hardwood species, proper mitigation procedures should be used to limit browsing damage from various mammals, and black spruce should, generally, not be planted on previous agriculture land.

The planter shall submit information on a planting report form detailing the number 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.

An effort should be made to plant the entire designated planting site whenever practical.

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

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

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

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, pre-commercial and commercial thinning treatments, non-commercial and commercial thinning activities, a minimum of 15 % of the residual density should 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 and conversely, softwood in hardwood treatments. 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 zone is to be left untreated to minimize wind penetration into the stand.

When a stand contains a low density of natural red spruce, white spruce, black spruce, eastern hemlock, white pine, red pine, eastern cedar, yellow birch, sugar maple, white ash, black ash, or red oak, these individual trees are to be left as seed trees.

Rare plant and animal species are to be conserved and managed upon official confirmation of presence by a PEI Forests, Fish and Wildlife professional as described in the Plant and Animal Species of Special concern section.

Environmental

Waste, litter and other forms of 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, rutting, soil compaction or puddled soils, as outlined in the road and water diversion construction section.

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

TREE ESTABLISHMENT

Mechanical Site Preparation

Definition:

The process of preparing a suitable number of 32-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 covertype (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:

The creation of sufficient micro-sites to allow the planting 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 15 cm to the nearest undisturbed ground cover. Unless otherwise prescribed, the micro-site consists of bare mineral soil.

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 covertype (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.

The treatment is for control of seedling debarking weevil, grass, slash and/or duff.

Guidelines and Assessment Procedure:

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

The minimum micro-site area would normally be 0.10 m^2. 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 15 cm to the nearest undisturbed ground cover. Unless otherwise prescribed, the micro-site consists of bare mineral soil.

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 covertype (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.

Visual inspection of sufficient micro-sites to allow the natural regeneration establishment and/or planting of at least 90 % 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 covertype and species diversity (see General Standards).

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

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, totaling 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 is to be carried out, the compatibility and survival of each species should be taken into 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 1400 to 2000 properly planted seedlings per ha. Planting densities greater than 2000 seedlings per ha will be eligible for maximum assistance.

For sites that are open grown and free of natural competition (i.e. retired fields), softwood species can be planted at 2000 to 2500 seedlings per ha. This higher density will promote self-thinning and self-pruning, thus promoting high-quality logs with clear boles. This stand treatment will require commercial thinning in the future to reach its full potential.

For hardwood species, the acceptable density range for assistance is 1200 to 2000 properly planted seedlings per ha. Planting densities greater than 2000 seedlings per ha will be eligible for maximum assistance.

Seedlings are to be planted to the specifications outlined in the General Standards, Planting section.

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 covertype (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.

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 what is 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.

When the total stems of new planted seedlings and natural regeneration equate to greater than 70% of the original prescribed density, the original plantation is to be considered failed, and a new plantation number must be created.

Enrichment Planting

Definition:

The planting of designated seedlings in an area already suitably stocked with crop tree species 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 1400 seedlings per ha on sites compatible with the shade tolerance (Appendix 2) and micro-habitat needs of the species.

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 handheld 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 and species is required.

Areas where the primary competition consists of shrubs such as raspberry or blackberry 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 basis (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 the stand entering the stem exclusion phase.

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 cm^2.

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 covertype 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 a planting treatment.

Guidelines and Inspection Criteria:

Visual inspection to confirm presence of undesirable competition by a PEI Forests, Fish and Wildlife technician.

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 (PEI.) 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 with white pine as the dominant crop tree species.

Guidelines and Assessment Procedures:

Prune only white pine trees.

Crop trees must be at least 2 m in height.

The pruning must be achieved utilizing a handsaw or a pruning saw. A pruning shear may be used if branches are less than 1 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 when the white pine blister rust is dormant.

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 cm^2.

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, white spruce, black spruce, eastern hemlock, white pine, red pine and eastern larch. Red maple and largetooth aspen may be treated if pre-approval is granted by the 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 be 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 vigour to grow for a minimum of 20 years.

Guidelines and Assessment Procedures:

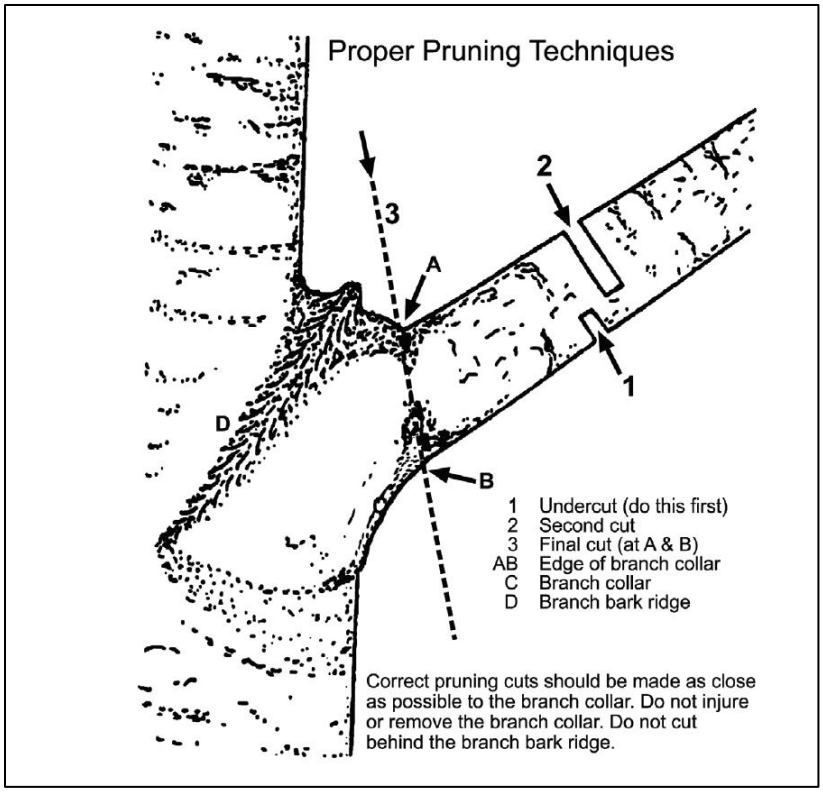
The pruning must be achieved utilizing a handsaw and/or pruning saw. A pruning shear may be used if branches are less than 1 cm in diameter.

Initial pruning must be 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. Pruning should take place only when trees are dormant.

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 cm^2.

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



Example of the proper pruning technique to mitigate damage to the crop tree.

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 an individual basis by the Department.

Caution should be exercised with species which are prone to epicormic branching.

Guidelines and Assessment Procedures:

Residual stand density must meet species-specific standards set in the Prince Edward Island Forestry Handbook, this information is available at your local PEI Forests, Fish and Wildlife office.

Post-treatment stand density of between 1600-2500 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, up 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, white spruce, black 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 an individual basis by the Department.

Guidelines and Assessment Procedures:

Residual stand density must meet species-specific standards set in the Prince Edward Island Forestry Handbook, this information is available at your local PEI Forests, Fish and Wildlife office.

Post-treatment stand density of between 1800-3000 stems per ha, uniformly distributed throughout the site.

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

Untreated areas, up 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, white spruce, black spruce, eastern hemlock, white pine, white birch and largetooth aspen.

The stand must have the health and vigour 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 the following defects:

- Bulges
- Large burls
- Cankers
- Hollow butt log
- Seams/splits
- Crook
- 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 dieback 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 trees 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 production for natural regeneration.

Legacy trees are to be retained and are not to be damaged.

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 cm^2 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, black spruce and eastern hemlock.

The stand must have the health and vigour 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 the following defects:

- Bulges
- Large burls
- Cankers
- Hollow butt log
- Seams/splits
- Crook
- 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, this information is available at your local PEI Forests, Fish and Wildlife office.

Maximum basal area removal is 30 %. This should be reduced for shade tolerant species (Appendix 2).

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 production for natural regeneration.

Legacy trees are to be retained and are not to be damaged.

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 cm^2 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, black spruce, eastern 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, or red oak.

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

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

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

- Bulges
- Large burls
- Cankers
- Hollow butt log
- Seams/splits
- Crook
- 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, this information is available at your local PEI Forests, Fish and Wildlife office.

Maximum Basal Area removal is 40 %.

A minimum of 500 quality uniformly distributed crop trees/ha. 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 production for natural regeneration.

Legacy trees are to be retained and are not to be damaged.

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 cm^2 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 the life of the 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 vigour 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:

- Bulges
- Large burls
- Cankers
- Hollow butt log
- Seams/splits
- Crook
- 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, this information is available at your local PEI Forests, Fish and Wildlife office.

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 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 are to be retained and are not to be damaged.

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 cm^2 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 is 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 should occur at each intervention by a qualified forestry professional.

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 cm^2 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 should be distributed as uniformly as possible throughout the stand.

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

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 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 promote the survival and growth of planted seedlings, to create micro-habitat for natural regeneration, and other purposes. Strip cuts can be oriented to alter the amount of sunlight able to enter the stand and thus influence the regeneration based on the shade tolerance.

Eligibility Criteria:

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

The remaining average live crown must have a minimum of 30 %, if the intention is to harvest the remainder on a second intervention. 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. Stands should also be well rooted and wind firm with little existing wind throw.

If this treatment is selected to harvest the overstory in such a way as to preserve advanced regeneration, a live crown ratio above the 30 % in the overstory is not a necessity. Trees retained for retention in the overstory should still be selected while prioritizing health, biodiversity and wind firmness. Advanced regeneration should be healthy with good form, with over 50 % live crown and over 1800 stems per ha of a desirable crop tree species, uniformly distributed over the treatment area.

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 cm^2 of sap wood per tree. A maximum of 5 % damaged crop trees will be allowed per treatment.

Extraction methods promoting scarification shall be encouraged when desirable regeneration is not present and should be 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 at right angles to the direction of seed dispersing winds. Slope, erosion and other operational considerations, such as existing access may also influence strip orientation.

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

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 different shade conditions that could be used to change the species' composition of a stand at the shade tolerance level.

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 could 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 when desirable regeneration is not present. The scarification should be conducted with a goal of creating up to a maximum 2500 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 cm^2 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 throughout 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 another treatment is prescribed in the management plan.

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:

(1) On any harvest site comprising an area greater than 2 hectares of forest land, the forestry operator shall ensure that at least 10 living, or partially living, trees are left standing for each hectare of forest land cut.

(2) The trees required to be left standing pursuant to subsection (1) shall be

> (a) in the same proportion by species as the forest stand being cut, however prioritizing tolerant hardwood species if present;
>
> (b) as large as or larger than, in height and diameter, the average height and the average diameter, measured at a height of 1.3 m from the ground, of the trees within the forest stand being cut; and
>
> (c) clumped together in accordance with the following:
>
> > (i) each clump shall contain no fewer than 20 trees,
> >
> > (ii) a singular clump will be used for areas up to 8 hectares in size, areas larger than 8 hectares can have multiple clumps throughout the block while still meeting the requirements, unless the stand being harvested is of significant wind throw risk where smaller retention patches could greatly decrease the wind firmness of

the remaining standing stems, special approval must be granted by the Department.

(iii) where there is one clump, it shall be situated at least 20 m but no more than 200 m from the edge of the forest stand being cut,

(iv) where there is more than one clump, clumps shall be situated no more than 200 m apart and at least 20 m but no more than 200 m from the edge of the forest stand being cut and,

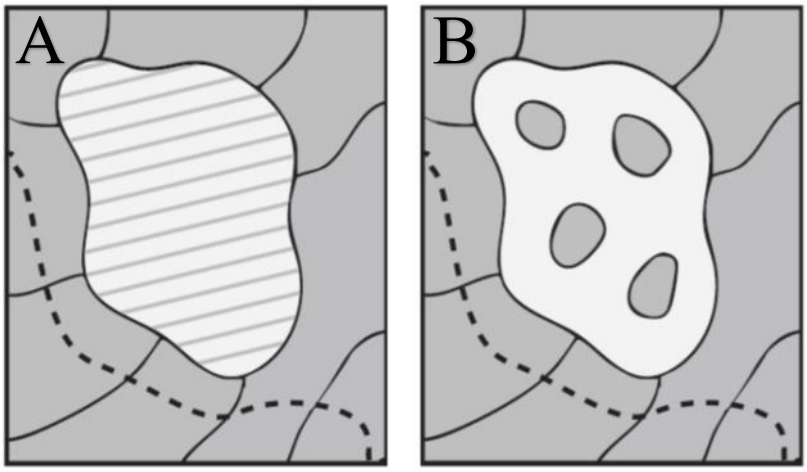
(v) there shall be no harvesting of trees within any clump.

(3) Trees required to be left standing pursuant to subsection (1) shall not be removed before the next harvest.

(4) A forestry operator shall ensure that levels of snags and coarse woody debris on all harvested sites are similar to natural patterns to the fullest extent possible with a minimum of 200 debris pieces per ha. Each debris piece must have an average diameter greater than or equal to 7.5 cm and a minimum length of 2 m.

(5) Unmarked areas prone to water accumulation such as the bottom of slopes, softer ground, vernal pools etc... should be prioritized for retention when they contain the required amount and distribution of trees pursuant to subsection (1).

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 cm^2 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 2500 micro-sites/ha adequately prepared and evenly distributed throughout the block. Slash shall be broadcast throughout the harvest block unless another treatment is Variable



Example of the block harvest treatment, “A” depicts the original stand that prior to harvest and “B” depicts the same stand post-harvest with retention patches left throughout.

Specialty Salvage:

In cases of natural events such as hurricanes, wildfires or insect damage that can alter large tracts of forested land, a salvage treatment may be utilized to harvest merchantable fiber and remove debris. Salvage treatments are to be held to the same requirements and specifications as a block harvest with a few exceptions. When leaving standing timber is not possible, retention patches of 15% of the area must be preserved to facilitate natural processes and wildlife habitat congruent with the disturbance event. Also, stump height requirements are not applicable when harvesting blown down trees due to the orientation of the stems.

Shelterwood Harvest

Definition:

An even-aged management technique, practiced 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.

It is also acceptable to complete this treatment as a single pass where the retained trees have no prospect of being harvested and are left for ecological purposes. A single pass treatment would aim to release advanced regeneration that is already present at sufficient or greater than sufficient levels in the stand. At least 50 % of desired advanced regeneration should be protected within the leave strips.

This treatment can be applied either uniformly, or in patches, depending on the specific site requirements.

Eligibility Criteria:

Selected softwood stands must contain at least 20 m^2/ha of the desired species (eastern hemlock, red spruce, white spruce, black spruce, white pine, white ash, red oak, yellow birch, sugar maple and red maple) with at least 12 m^2/ha being softwood species (eastern hemlock, red spruce, white pine). The stand must contain over 30 m^2/ha of merchantable basal area.

Selected hardwood stands must contain at least 12 m^2/ha of the desired species (red oak, white ash, yellow birch, sugar maple, red maple, eastern hemlock, red spruce, white spruce, black spruce, white pine, balsam fir) with at least 8 m^2/ha being hardwood species (red oak, white ash, yellow birch, sugar maple, and red maple). The stand must contain over 20 m^2/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:

For stands that lack consistent favorable regeneration a maximum of 40 % of the original basal area may be removed.

This may be increased to 60 % if the stand is sheltered and consists of well rooted trees. The advanced regeneration should be comprised of a favorable species and consistent (>1400 stems/ha) throughout when removing this volume from the stand. This style of harvest should prioritize the protection and retention of advanced regeneration on the site. Stands should be left for at least 5 years following harvest before thinning of the understory takes place.

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. This can be done in strips, preferably oriented at right angles to the direction of seed dispersing winds. A patch method can also be used with opening of 0.3 ha or less, distributed uniformly through the harvest area when possible.

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 the residual stand. Damage is considered to be broken limbs and/or bark damage which exposes greater than 10 cm^2 of sap wood per tree. A maximum of 5 % damaged crop trees will be allowed per treatment.

Seed Tree Harvest

Definition:

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 m^2/ha of the desired species (eastern hemlock, red spruce, white spruce, black spruce, white pine, white ash, red oak, yellow birch, sugar maple and red maple).

The 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 m^2 or greater.

The residual trees appear wind firm.

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

When completing in a single pass, the live crown ratio of the advanced regeneration should be at least 50 %. Stocking should be at full planting stocking level or above for the desirable species present. Canopy tree retention should be windfirm and the density can be adjusted depending on the ideal light conditions for the regeneration. Machine strips should be wide enough for the machine to travel and pile wood (so processed wood is not left damaging the regeneration in the strips). Leave strip width will vary based on the reach of the piece of equipment used.

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 cm^2 of sap wood per tree.

Harvesting and extraction should not be carried out in conditions that result in rutting or damage to residual trees.

Wildfire Fuel Mitigation

Definition:

Reducing the fuel load and combustibility in the extended areas of a property so if a wildfire does occur then it would burn at a lesser intensity and be easier to manage. This technique targets coniferous trees and does not remove all risk of a wildfire since forested and grassy areas will always carry some level of risk. The purpose of this technique is to mitigate risk, danger and losses to homes, communities and infrastructure in areas where wildfire is present.

Eligibility Criteria:

Covertypes that feature over 50 % softwood species and live crowns exceeding 50 % within 100 meters of a structure. Standing softwood stands within 100 meters that are in severe decline or dead that do not meet the live crown requirement are also eligible. Structures include homes, storage areas/sheds, communities, and other fire susceptible infrastructure that would benefit from fuel mitigation. Hardwood dominated stands provide a natural fuel break and do not require intervention. Any site regardless of species is eligible if a qualified forest professional determines there to be increased risk due to severe blowdown.

Guidelines and Assessment Procedures:

This technique is generally small scale and best suited for a chainsaw, and depending on stem size, a brush saw.

Coniferous trees are to be spaced in such a way that crowns are 2-3 m apart, trees must also be basally pruned 2 m up from the ground. All brush and harvested trees must be limbed, bucked and placed into centralized piles. Deciduous trees, woody shrubs and ground vegetation do not need to be managed. The piles of wood and debris must be removed from the site, either by burning in a controlled manner or be moved off the site to be chipped, sold for biomass or timber when piece size permits or moved to an area where wildfire does not threaten any structures. When burning, suppression equipment must be readily available such as back tanks, hand tools, established hose lay or muskeg. Piles can also be burned in the wintertime when the fire risk is much lower. All work shall be completed in such a way as to minimize damage to the residual

stand. Trees must not be felled into other trees and when basally pruning trees, saws must not cut into the cambial layer under the bark. Burn piles should be placed in such an area where flame heights and radiant heat does not burn or singe surrounding trees and vegetation. If removing wood and debris from the site, machinery should be small enough to not need a designated path or damage the ground.

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, 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 Environment, Energy and Climate Action.

Trees present that are large enough to accommodate a nest box, specific to the target species. One tree should also be girdled near the nest box.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

The PEI 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.

Damage to the tree should be minimal and it is preferred that nesting boxes are to be attached to trees using wooden dowels or aluminum nails.

The nesting boxes may 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 PEI Forest Wildlife Manual on the government website).

Assistance:

Two nesting boxes per ha 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 PEI 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. When natural cover is limited, artificial brush piles can be used to conceal and protect wildlife from predators and the weather, as well as provide a medium for seed germination and plant growth.

Eligibility Criteria:

Site or stand is lacking in natural ground cover and the property owner wishes to enhance wildlife habitat.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

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.

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 PEI 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 PEI. Fish and Wildlife Manual. The minimum surface area of 1.2 m^2 with a minimum height of 1 m.

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.

Riparian Management Zone

Definition:

The land and vegetation directly adjacent to bodies of water such as streams, ponds, lakes, bogs and wetlands. This area can be very productive for animal and plant life because of the increased moisture and nutrient contents.

Eligibility Criteria:

For any harvest within the legislated riparian zone, the landowner must follow the requirements outlined within the Environmental Protection Act and may be required to obtain a watercourse, wetland and buffer zone activity permit from the Department of Environment, Energy and Climate Action.

For a landowner that wishes to voluntarily extend their riparian management area to 50 m. To be eligible for this treatment, only the additional riparian management area may receive the following harvesting methods that are intended to retain vertical structure in the stand, eventually creating a multi cohort stand; Select tree harvest, Strip harvest, Patch harvest, Shelterwood harvest, and Seed tree harvest.

Forested buffer zones cannot be converted to any other land use.

Guidelines and Assessment Procedures:

Use the harvest specific techniques outlined in this document.

As riparian management zones are very productive in wildlife, the density of cavity trees is to be increased to 25-30/ha.

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 mammal's habitat needs of species desired by the landowner (e.g. Ruffed Grouse display logs, American Woodcock display space, foraging habitat).

Eligibility Criteria:

A lack of game habitats identified by a consultant and confirmed by a PEI Forests, Fish and Wildlife professional.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

Meet the conservation criteria recommended by a PEI Forests, Fish and Wildlife professional that has assessed the property.

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, erosion and creating habitat for wildlife. 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 % and they can also act as a snow drift catch.

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 Environment, Energy and Climate Action.

Guidelines and Assessment Procedures:

Shall meet the eligibility criteria for this treatment listed above.

Meet the planting standards set out by the Department of Environment, Energy and Climate Action.

Monitor and report on the success of techniques.

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 should 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 block, patch or strip harvest 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 not be more than 3 m 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 a woody shrub such as an alder.

Recreation Trails

Definition:

A defined route developed to improve recreation access within or through an area for non-motorized uses.

Guidelines and Assessment Procedures:

A forester, forest technician, 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 safety 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 surface of the soil.

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.

PLANT AND ANIMAL SPECIES OF SPECIAL CONCERN

Includes but not limited to uncommon, rare or endangered native plant or animal or any species listed on the Government of Prince Edward Island, Division of Environment, Energy and Climate Action website.

Rare Plant and Animal Species

Definition:

A naturally occurring plant or animal species on Prince Edward Island whose population is of conservation concern, specifically species designated with an S1, S2 or S3 rank by the Atlantic Canada Conservation Data Centre.

Eligibility Criteria:

The identification of a species of conservation concern by a consultant and confirmation of its presence by a PEI Forests, Fish and Wildlife professional.

The site proposed for restoration and conservation meets the necessary conditions for the species of concern.

Guidelines and Assessment Procedures:

Species specific conservation and restoration requirements must be identified and a plan proposed by a consultant must then be approved by a PEI Forests, Fish and Wildlife professional.

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

**The Landowner may be able to place a Conservation Agreement on the property, please visit the Government of PEI website for more information.*

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.

An up to date list of invasive species, identification aide and other information can be found at the PEI Invasive Species Council website.

Eligibility Criteria:

The presence of an invasive species on the landowner's property identified by a consultant and confirmed by a PEI Forests, Fish and Wildlife professional. The consultant may also propose a plan to remove or control the species which would then have to be approved by the department.

Guidelines and Assessment Procedures:

Notify your local PEI Forests, Fish and Wildlife office of suspected invasive species presence and so a technician can confirm.

Inspect vehicles and equipment for invasive species when moving between sites, particularly if an invasive species is present at one site but not the other.

Inspect vehicles and equipment inside and out for where dirt, plant material and seeds may be lodged or adhered to interior and exterior surfaces. Pay close attention to the underside of the vehicle/equipment, radiators, spare tires, foot wells and bumper bars.

Vehicle/equipment should be cleaned if inspection identifies visible dirt clumps and plant material or when moving between sites. Note cleaning should take place on a hard surface (e.g., pavement, gravel) away from watercourses, wetlands, or natural vegetation.

Clean the interior of the vehicle/equipment by sweeping, vacuuming or using compressed air. Clean anywhere dirt or seeds can collect, including floor, foot wells, pedals, seats, and under the seats.

Clean the exterior of the vehicle/equipment by knocking off all clumps of dirt, using a high-pressure hose and a stiff brush and/or pry bar to removal remaining dirt clumps or plant material.

Pay close attention to vehicle/equipment undersides, wheels, wheel arches, guards, chassis, engine bays, radiator, grills, and other attachments.

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 ZONE:

A buffer zone is the 15-meter area surrounding all watercourses and wetlands on PEI.

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 COURSE 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 have 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.

CULVERT:

A metal, wooden, plastic or concrete 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.

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 1400 to 2500 seedlings/hectare.

FORESTED WETLAND:

Forest communities where the water table is at or near the surface, soil conditions are water-saturated, or standing water is present, and at least 30 % of the surface area is covered by woody vegetation. For example, shrub swamps, treed swamps, fens, bogs. Forested wetlands are biodiversity hotspots in PEI and should be prioritized for conservation in forest management.

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.

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 decline from wind damage or biological conditions at this site.

MERCHANTABLE TREES:

Normally all live standing trees 9 centimeters 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.

NATURAL REGENERATION:

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

NEST TREE:

A term used in relation to a trees 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 centimeters.

NON-TIMBER FOREST PRODUCTS:

Any product or value which derives from forests except primarily round wood products such as pulp, stud wood, 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.

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.

RIPARIAN MANAGEMENT ZONE:

The riparian 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.

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 centimeters 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 50 percent of the overstory trees are softwood.

SPECIES DIVERSITY:

It is a measure of species richness within a given area by classifying the species by a certain attribute, such as but not limited to, native or nonnative.

SPECIES RICHNESS:

The number of species located in a given area.

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.

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 are 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 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 event 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.

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 a grassed waterway, or 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.

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.

WET FOREST

Forest communities with water at or near the surface but are not wet enough to support wetland vegetation. Often these are black spruce-dominated stands with true wetlands within them.

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 non domesticated.

WILDLIFE TREE:

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

APPENDIX 1

ROAD AND WATER DIVERSION CONSTRUCTION

Environmental Standards

Before developing a new forest road or trail, a forester, forest technician, 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 plants and wildlife species, 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. Historic infrastructure should be identified and prioritized for use. Older forest roads may not have an associated permit for any water crossings and should have a PEI Forests, Fish and Wildlife professional complete a site visit to ensure that water crossings are adequate or if environmental mitigation techniques are needed prior to re-establishment. There are a variety of possible mitigation measures that can be established during design, construction, hauling, and maintenance of roads. The Prince Edward Island Watercourse, Wetland and Buffer Zone Activity Guidelines should be reviewed before any and all forest road construction takes place, this document can be found on the Government of Prince Edward Island website.

New water course crossing work shall normally be confined to the period between June 1st and September 30th 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. Consideration should be given to the installation of temporary crossings to reduce long-term impacts to streams and rivers. Temporary crossings also allow for easier road deactivation, further reducing any potential for environmental impacts.

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.

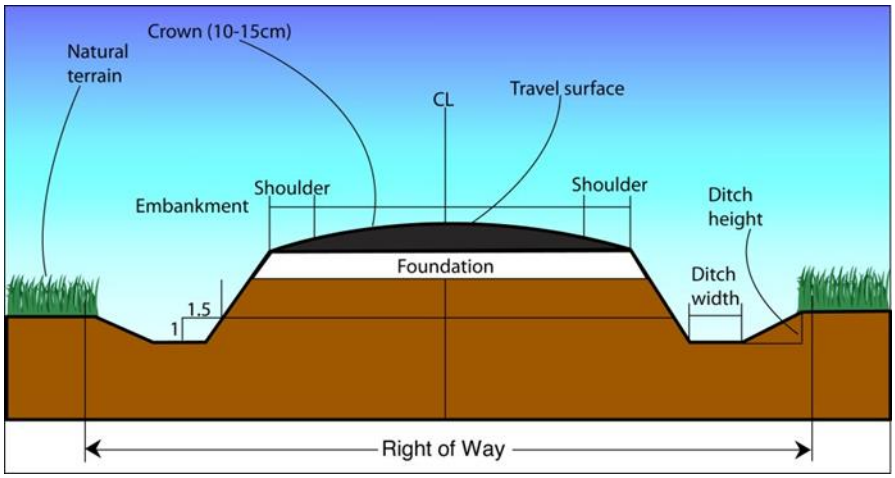
Unstable road surfaces that have the potential to cause siltation in a watercourse must be seeded with a highway seed mix and/or mulched using hay or straw crushed into the road surface. If the construction is completed after September 15th, then mulching is mandatory, and seeding is not an acceptable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

A belt of undisturbed vegetation, buffer zone, must be left between the road right-of-way and any body of water, with the exception of stream crossing locations for which the Department of Environment, Energy and Climate Action has issued a watercourse and wetland activity permit, which can be found online at the Government of Prince Edward Island website. Buffer zones

consisting of natural vegetation help provide protection for bodies of water from the discharge of road drainage and provide corridors for movement of wildlife.

Municipal bylaws and other planning regulations may vary buffer width within specific watersheds of the province. Defer to these standards when planning road and water diversion activities.

Road Construction (Class 1, 2, and 3)



Example of roadway construction with labels.

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 must be at least 8 m in width
- Class 2 must be at least 5 m in width
- Class 3 must be at least 8 m in width

Right-of-ways and bullpens shall be harvested and merchantable wood removed where practical. 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 coarse woody debris provisions.

Dozing and Shaping Road

The travel surface of all road classes shall have a minimum depth of 300mm if select borrow as per the Department of Transportation and Infrastructure General Provisions an Contract Specifications for Highway Construction document, this can be found on the Government of PEI website.

The travel surface of 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 large enough and aligned in such a way to carry runoff from moderate to severe storms for all forest roadways.

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 except 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.

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

Slope of ditch sides must not 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.

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.

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 or 3 Road Construction section as appropriate.

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 or 3 Road Construction section as appropriate.

Water Diversion Structures and Sediment Barriers

Definition:

A structure placed in the roadbed in such a way 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.

Sediment barriers should be constructed during the low flow period, from June 1st to September 30th of every year. Structures that could be used include berms, dykes, swales, check dams, straw bales, silt fences, mulching, stabilization blankets and slope drains.

Construction must comply with the PEI Watercourse, Wetland and Buffer Zone Activity Guidelines, this document can be found on the Government of Prince Edward Island website.

Water Course Crossing

Definition:

A structure placed in or over a water course, normally consisting of either a plastic, 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 with already established forest roads and crossings 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, Energy and Climate Action.

Construction must comply with the PEI. Watercourse, Wetland and Buffer Zone Activity Guidelines, this document can be found on the Government of Prince Edward Island website.

Prevention of Soil Compaction, Puddled Soils and Rutting

Definition:

Soil compaction occurs when soil particles are squeezed together so tightly that it reduces the space available for air and water. This reduced space limits how much air and water can move through the soil, thus affecting seedling establishment and root growth.

Puddled soil occurs when there is repeated mixing of soil when it is wet. Multiple layers are mixed together resulting in a degraded, dense and structureless medium.

A rut is a depression made into the soil surface when the soil strength is not adequate enough to support an applied load. A rut is considered any depression human caused that has a depth of 15 cm or greater and is 2 m in length or greater.

Guidelines and Assessment Procedures:

All forest professionals involved with designing and implementing a management plan should identify all potential wet and sensitive areas to mitigate damage from establishing new infrastructure and machinery. Landowners and non-government forestry practitioners are encouraged to contact their local Forests Fish and Wildlife office to have a professional identify/confirm wet areas with a field visit and provincial depth to water table data.

Road Deactivation

Definition:

Road deactivation places a forest road in a stable state to mitigate erosion and sedimentation indefinitely.

Temporary infrastructure, such as single span bridges, should be removed, and proper signage and berms should be installed on both sides of the hazard to warn of deactivated road. Road surface, cross drains and ditches should be left in such a state to mimic natural drainage patterns.

APPENDIX 2

Department of Environment, Energy and Climate Action Biomass Guidelines

Forest biomass can be used as an alternative for fossil fuels when heating or producing energy. The following are the standards required by the Department of Environment, Energy and Climate Action for this management treatment. 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. Any questions or concerns should be directed to your local PEI Forests, Fish and Wildlife office.

There are two major pathways 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.

(2) **Public investment**
This pathway 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.

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 Divisions Ecosystem-based Forest Management Manual;
II. All harvests must be in compliance with the standards set out in the Forests, Fish and Wildlife Divisions Ecosystem-based Forest Management Manual;
III. For block, patch and strip 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 harvests other than block, patch and strip 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)** Harvest 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*.

APPENDIX 3

Tree Species Shade Tolerance Chart

Tolerant	Intermediate	Intolerant
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 (ewc)	Yellow Birch (yb)	White Birch (wb)
Black Spruce (bs)		
Sugar Maple (sm)		