EXTENSION NOTES

Ontario

PROMOTING A HEALTHY FOREST THROUGH TREE MARKING

If your woodlot is ready for a thinning or harvest, tree marking, when properly applied, can ensure that your woodlot is being managed at a sustainable level while maintaining the values that contribute to long-term forest health. Tree Marking is a management tool that will allow a landowner to achieve multiple benefits within the woodlot. These include maintaining an aesthetic appearance, providing habitat for wildlife, creating sustainable growing conditions and supplying a continuous flow of forest products. In addition to enhancing ecosystem values at a landscape level, the woodlot owner is also provided with a source of revenue that will increase over time. The objective of this note is to introduce the concept and benefits of tree marking. However it is strongly recommended that a certified tree marker do the marking since they have extensive and ongoing training to ensure that all the considerations for both sustainable timber production and conservation of biodiversity are incorporated in tree marking.

THE ECONOMICS OF USING TREE MARKING

Tree marking remains one of the most cost-effective tools for improving growing conditions in the woodlot while adding value and volume for future cuts. Marking costs for hardwood woodlots and plantations remain a fraction of the cost associated with other treatments such as planting, site preparation and mechanical tending. Hardwood lumber prices have been on a fairly constant rise over the past 25 years, with only minor fluctuations regionally. When you consider these market trends and understand how your woodlot responds to growth and increased quality over time, you can readily appreciate the return on investment of tree marking.

On average a managed woodlot is capable of growing 60 board feet per acre per year (.75 m^3/ha). Over a period of 20 years a 100 ac (40 ha) woodlot could realize an additional 120,000 board feet (600 m^3). Based on trends in veneer and high quality sawlog prices and demand, return on investment can compete favourably with other investment tools without the same high level of risk. As impressive as these returns can be the woodlot owner is also left with a woodlot that remains aesthetically pleasing and meets many other values we associate with having a healthy woodlot.

WHAT IS TREE MARKING?

Tree marking involves the selection of individual trees to be harvested, while leaving trees to grow for future harvests and to provide wildlife habitat. The actual process of tree marking is recognized as being both an art and a science. Historically, many of our forests were subjected to various types of uncontrolled harvest. This included clearcutting in tolerant hardwood forests where this type of silvicultural system was inappropriate and varying degrees of "high-grading," a term that refers to woodlots that have had only the largest and best-quality timber harvested These unregulated disturbances, in combination with other factors, such as disease and insects, can lead to a forest with irregular stand structure and unpredictable growth. In the absence of sound forest management these forests often display a lack of regeneration of favorable species and poor spacing of smaller diameter stems.

When properly applied, tree marking can actually reverse many of the historical, negative impacts that unregulated cutting has created in our forests. This often requires two or more cutting cycles and adhering to the guidelines of selection and shelterwood system management.

Trees to be cut through tree marking are physically identified through the application of paint on the tree. Depending on the management system being used, trees are marked in a colour that indicates the tree is to be cut or in some cases a colour that indicates the tree should not be cut. The objective of marking is to optimize growth for all trees being retained rather than attempting to maximize growth on a few individual trees. Marking also allows the forest manager to make changes, if necessary, to selected trees before the harvest takes place.

UNDERSTANDING BASAL AREA

Basal area refers to the area, in square metres, of the cross-section of a tree measured 1.3 metres (breast height) above the ground. For illustration purposes, another way of looking at basal area would be to visualize a hectare of trees cut off at 1.3 metres above the ground and then measuring the surface area of each tree at the 1.3 metre point. Adding up the surface areas of all trees would be the basal area of that hectare. For management purposes retaining an average basal area of 20 m^2/ha, representative of all size classes 10 cm and up is recommended.

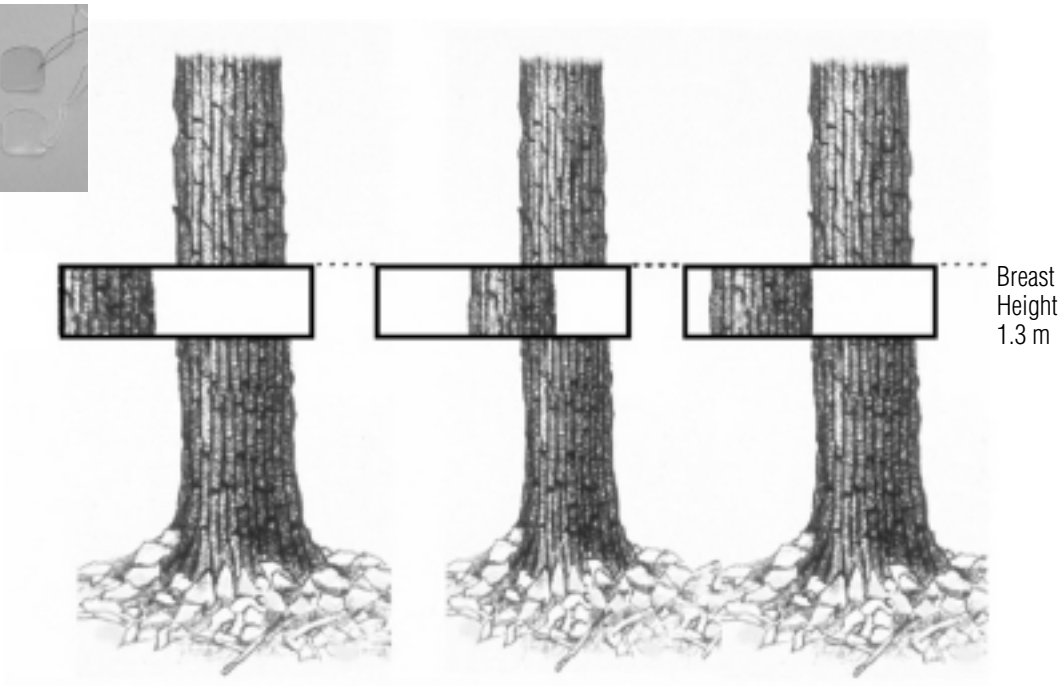
The most common instrument in use for measuring basal area is the wedge prism. In Ontario we traditionally use a metric prism calibrated to a factor of two. When using a factor-two prism, you would count the number of trees that are in a plot as seen through the prism, and multiply that number by two to obtain the basal area for that specific point in the forest. If there was 15 trees counted in your prism plot the basal area would be 15 x 2 for a BA of 30 m^2/ha. Normally, trees 10 cm and larger are measured with the prism.

The wedge prism is a thin wedge of glass that bends light rays. When a tree is viewed through the prism, the result is a split image as illustrated below:

How to use a wedge prism:

- The prism may be held at any distance from the eye, but the prism must always be directly over the centre point of your plot. You rotate your body around this centre point; you do not stand on one spot and spin.
- Starting from an easily identified direction, all trees in a 360° sweep are viewed and counted, or not as the case may be. The target height to view your tree is at breast height, which is 1.3 metres above ground level (See graphic below for determining which trees to count and where to aim.)
- Borderline trees may be alternately counted as half a tree or every second borderline tree counted as one tree.
- Trees which are obscured can be viewed by temporarily moving the sampling point a sufficient distance at right angles to the direction of sighting.
- Maintain the same distance to your target tree to determine whether it is counted or not.
- Where, as in most cases, the object is to assess measurable, live basal area for silvicultural purposes, trees less than 10 cm DBH and dead trees are often excluded.
- Basal area per hectare is the product of the prism Basal Area Factor (BAF) and the number of trees counted in a 360° sweep. For example, if the number of trees counted is 14, and the BAF is 2, the basal area estimate will be 28 m^2/ha for that one sample plot. The average BA of the stand is simply the average of all of the estimates combined.

Prism



This tree is OUT.
Do not count.

This tree is IN.
Count.

This tree is BORDERLINE.
Count as a half, or count every other borderline as IN.

DEVELOPING A MARKING PLAN

Prior to any tree marking, a marking plan or marking prescription should be developed (See Sample *Tree Marking Prescription Form*). This plan should provide the marker with information that will guide them in developing a marking strategy for the conditions of that particular forest. Some considerations for the development of a marking prescription include the history of the stand, tree species present and desired in the future, quality of the stems, size distribution, stocking or basal area, frequency of cutting cycles and wildlife habitat requirements. Also to be considered are the long-term interests of the landowner or forest manager.

To assist in collection of information for the marking prescription, it is recommended that a pre-cut inventory be conducted to help determine the number and distribution of trees of different sizes. Tree sizes are divided into four classes based on diameter at breast height (DBH) that coincide with potential forest products. It is important that all four size classes be inventoried, noting the amount of polewood (10 – 24 cm), small sawtimber (26 – 36 cm), medium sawtimber (38 – 48 cm) and large sawtimber (50 cm +). While recording the size classes present in the woodlot, it is important to note the quality of each stem. Individual trees are recorded as being AGS (acceptable growing stock) or UGS (unacceptable growing stock). Once the basal area and percent AGS versus UGS is known, you can start to formulate a target stocking level that will bring the stand closer to the recommended levels. This in known as the *"Ideal Basal Area"* target. (See tally form "*Stand Analysis for Harvest or Intermediate Cutting"*.)

While forest products to be removed will be an important component in relationship to woodlot revenue, economics and products alone should not be the driving influence behind your tree marking decisions. This is very important in unregulated stands that do not have a history of being managed. Once the stand has been properly marked and cut, future harvesting will provide predictable volumes, products and increased revenue. Again, depending on the stand history and structure, this may take two or more cutting cycles.

WHAT PAINT COLOUR TO USE

A group of universal paint colours is used for tree marking in Ontario. This helps avoid confusion when selling standing timber, particularly to logging contractors that may be cutting in several geographic locations throughout the year. The standard colours and their purpose are shown below:

Paint Colour	Colour Meaning
Yellow or Orange	Trees to be cut for harvest or tending
Blue	Trees to be retained (not cut)
Red	Boundary line or reserve boundary
White	Research plots
Black	Correction marking, to mark over mistakes

When applying paint to the tree, it should be done in a manner that makes it visible from all sides of the tree. One technique used is 2–3 dots at DBH (1.3 m above the ground) and a vertical line mark at the base of the tree. This approach makes paint visible from three of the possible four sides of a tree. The second and most common technique is a painted band around the tree at breast height followed with a base mark at ground level (see picture at right). This system makes the marked tree visible from all angles. The base mark is essential for monitoring logging to ensure only marked trees are being cut, or designated residual trees are not cut.

STAND ANALYSIS FOR HARVEST OR INTERMEDIATE CUTTING

OWNER _____ COMPARTMENT _____

LOCATION _____ STAND # _____

_____ Working Group(FRI) _____

TOWNSHIP _____ FOREST UNIT _____

AERIAL PHOTO NUMBER _____ SITE CLASS _____

STAND ACCESS _____

_____

Prism Tally: BAF 2 m²/ha

Stations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Tallied	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Stand Analysis Tally (by species, size class, and quality class)

Tree Size Classes	Polewood 10–24 cm		Sawtimber Small 26–36 cm		Sawtimber Medium 38–48 cm		Sawtimber Large 50 cm +		Total All	
Species	UGS	AGS	UGS	AGS	UGS	AGS	UGS	AGS	AGS	UGS
Total Trees										
BA (m²/ha)**										
BA (m²/ha) Total										
Target BA (m²/ha)										
Ideal BA (m²/ha)										

**Total trees (____) x BAF (____) = (____) Actual BA/ha
# of stations (____)

Other Site Information Used For Prescription Development

Topography_____

Soil Moisture _____

IRM Considerations _____

Stand Access _____

Other Concerns _____

Regeneration Notes _____

TREE MARKING PRESCRIPTION

OWNER _____ COMPARTMENT _____

LOCATION _____ STAND # _____

_____ Working Group(FRI) _____

TOWNSHIP _____ FOREST UNIT _____

AERIAL PHOTO NUMBER _____ SITE CLASS _____

STAND ACCESS _____

_____

OBJECTIVES

LONG TERM: _____

SHORT TERM: _____

STAND INFORMATION: (Based on Stand Analysis Cruise)

SPECIES COMPOSITION: _____ STAND AREA (ha:) _____

AGE CLASS: _____ HEIGHT (m): _____ STOCKING (%): _____

REGENERATION NOTES: _____

_____

STAND QUALITY NOTES: _____

_____

SITE & TOPOGRAPHY NOTES: _____

_____

BASAL AREA DISTRIBUTION (m^2/ha);

Tree Size Classes (cm)>>>:	10-24	26-36	38-48	50+	TOTAL
Actual Basal Area (m^2/ha):					

STAND PRESCRIPTION

Treatment Instructions:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Integrated Resource Management INSTRUCTIONS:

_____

_____

_____

_____

_____

_____

_____

FOLLOW-UP RECOMMENDATIONS

_____

_____

YEAR OF NEXT CUT _____

RECOMMENDED BASAL AREA DISTRIBUTION OF CUT

Tree Size (cm)	ACTUAL BA (m^2/ha)			BA TO CUT (m^2/ha)			RESIDUAL BA (m^2/ha)		
	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL
10-24									
26-36									
38-48									
50+									
TOTAL									

PRESCRIPTION PREPARED BY:

DATE:

PRESCRIPTION APPROVED BY:

DATE:

PUTTING PAINT ON THE RIGHT TREE

Upon completion of the marking prescription and/or the management plan, the task of tree marking to upgrade the overall quality of the stand begins. Many factors will influence the decision of what trees will be marked for cutting but one of the first decisions should include the removal of risk trees and other unacceptable growing stock (UGS).

Unacceptable growing stock is a term used to describe trees that are either currently in decline or are expected to decline, with little chance of ever improving in quality. Tree marking should use a "worst first" approach by marking the UGS trees for removal. Exceptions will be made in retaining some UGS for meeting wildlife tree targets, such as cavity and stick nest trees. Also, some UGS may have to be retained to achieve the targeted basal area and future stand structure.

Acceptable growing stock refers to stems that are currently of good to high quality and can be expected to maintain and or improve their quality into the next cutting cycle. These stems will generally contribute to the future structure and quality of the stand.

As a rule of thumb, marking decisions will start with using what is known as the "Risk Factor." Risk trees include stems having defects that are causing decline or will lead to future decline of that individual tree. Risk factors to look for include:

- trees with obvious cankers or fungus growth, particularly spore producers
- advanced insect borer wounds
- severe lean or sweep that could lead to windthrow
- low "V" forking in the crown that could lead to stem splitting
- broken and dead tops that are indicating tree decline

False Tinder Fungus on Butternut

Sugar Maple Borer damage

Low V-fork on Beech

When assessing quality, defects are generally broken down into three categories. The presence of major defects indicates that the tree will degrade rapidly and these trees are always considered UGS. An example of a major defect would be trees that produce fungus growth, such as False Tinder Fungus. The second category of defect is known as moderate defect, indicating the tree will degrade slowly. Depending on the severity and stage of the defect, moderate defects can be UGS or AGS. An example of a moderate defect would be scarring caused by the Sugar Maple Borer. The third defect category is minor defect and trees with these defects are expected to maintain their quality over the cutting cycle. An example of a minor defect would be a burl. For more information on defects and their categories, refer to the attached *"Summary of major, moderate and minor defects in conifers and hardwoods and their affect on tree classification."*

In addition to assessing risk, other factors that will influence your marking include consideration of stocking using basal area, (see illustration on using a BA prism), diameter distribution, spacing of crop trees, as well as retention of mast trees and species diversity that will contribute to wildlife values and forest health. The table *"Summary of tree marking guidelines for the provision of wildlife habitat and the conservation of biodiversity"* provides a listing of recommendations.

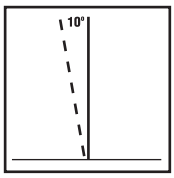
It is important to recognize that when you commit to a management scheme using tree marking, care be taken to avoid over marking the woodlot in an attempt to eliminate all the unacceptable growing stock. If the stand has never been managed, it often takes two cutting cycles to reduce the amount of defect to a manageable level. As a general rule for selection management, no more then one third of the existing basal area should be removed in one cutting cycle. In terms of measurable basal area, it is recommended that the basal area not be reduced below 20 m^2/ha. The overall stocking or basal area targets should not be compromised, as this would delay future cutting cycles and could have a negative effect on stand structure and composition.

In summary, tree marking compliments the goal of achieving a sustained and enhanced forest ecosystem. It allows both the forest manager and the logging contractor to see what trees will be removed to achieve this goal. Depending on the history of your forest and your comfort level with understanding forest conditions, you may want to consider using a Certified Tree Marker to assist you with your management goals. Once properly marked it is essential that the harvesting follows careful logging techniques that will complement your marking efforts.

SUMMARY OF MAJOR, MODERATE AND MINOR DEFECTS IN CONIFERS AND THEIR AFFECT ON TREE CLASSIFICATION

Importance of Various Defect Indicators		
Major Defect (tree will degrade rapidly) **(Always UGS)**	**Moderate Defect** (tree will degrade slowly) **(UGS if severe)**	**Minor Defect** (alone, these defects rarely influence classification)
Fomes Root Rot	**White Pine Weevil Damage**	**Burl**
Shoestring Root Rot	**Pine Engraver Beetles**	**Crook and Sweep**
Tomentosus Root Rot	**Root Wounds**	
White Pine Blister Rust	**Feeding Damage** (porcupine, sapsuckers)	
Velvet-Top Fungus	**Broken or Dead Top Crown Dieback** (if more than 50% dieback, class as UGS)	
Red Ring Rot		
Butt Flare (Barrelling)	**Lean** (more than 10º)	
	Fire Scar	
	Lightning Injury	
	Mechanical Damage (stem wounds)	

SUMMARY OF MAJOR, MODERATE AND MINOR DEFECTS IN HARDWOODS AND THEIR AFFECT ON TREE CLASSIFICATION

Importance of Various Defect Indicators		
Major Defect (tree will degrade rapidly) **(Always UGS)**	**Moderate Defect** (tree will degrade slowly) **(UGS if severe)**	**Minor Defect** (tree will maintain quality over cutting cycle) (alone, these defects rarely influence classification)
Spine Tooth Fungus	**Mossy Top Fungus** **(always UGS)**	**Burl**
Punk Knot		**Crook and Sweep**
Clinker (Cinder) **Fungus**	**Sugar Maple Borer** (if healing whiteface, class as AGS) (if darkface, class as UGS)	**Epicormic Branching**
Coal Fungus		**Whiteface Scar**
Yellow Cap Fungus		
Shoestring Root Rot	**Spiral Seam**	
False Tinder Fungus	**Frost Cracks and Seams**	
Eutypella Canker ***(Cobra)***	**Sunscald**	
Nectria Canker ***(Target)***	**Black Knot** (on black cherry) (UGS if more than 50% of the crown is affected)	
Artist's Conk		
Butt Flare ***(Barrelling)***	**Small Darkface Scar** ***less than 900 cm²*** *(less than 12 x 12 inches)*	
Black Bark		
Large Darkface Scar ***greater than 900 cm²*** *(greater than 12 x 12 inches)*	**Lean >10º** 	
Fire Scar		

SUMMARY OF TREE MARKING GUIDELINES FOR THE PROVISION OF WILDLIFE HABITAT AND THE CONSERVATION OF BIODIVERSITY

General principles for conserving biodiversity	Ecosystem diversity	• apply silvicultural practices that perpetuate the natural diversity of forest communities across the landscape (i.e., maintain oak on oak sites, hemlock on hemlock sites etc.) • maintain a natural mix of tree species within each stand—when selecting among trees of similar quality and spacing, favour retention of the less common species
	Species diversity	• protect critical habitats for rare species • maintain habitat features required by common species
	Genetic diversity	• apply correct marking principles (e.g., retain appropriate crop trees) • for isolated stands of regionally rare tree species (e.g., red spruce), retain at least ten individuals per hectare and at least 100 individuals per stand
Site-specific habitat features	Stick nests	• active or inactive stick nests belonging to bald eagles, ospreys, herons, red-shouldered hawks, Cooper's hawks and northern goshawks should be protected following guidelines described in *Forest raptors and their nests in central Ontario (Szuba and Naylor 1998)* • prior to harvest, verify activity status of suspected nests of bald eagles, ospreys, herons, red-shouldered hawks, Cooper's hawks, and northern goshawks that were located outside the nesting season • retain trees containing stick nests belonging to broad-winged hawks, red-tailed hawks, sharp-shinned hawks, barred owls, long-eared owls, great horned owls, merlins, or ravens, and adjacent trees with touching crowns
	Winter cover for moose and deer	• maintain at least 60% canopy closure in trees 10 m or greater in height in stands providing important winter thermal cover — hemlock, red spruce, and cedar provide the best cover — some clumping of residuals is better than a completely uniform spacing • in hardwood stands in deer yards: - maintain at least 60% crown closure in pockets (> 0.04 ha) of conifers - retain clumps of 3–5 conifers (at least 10 m tall) - retain solitary scattered conifers when they link shelter patches
	Moose summer habitat	• maintain high residual canopy closure (80%+) in critical summer thermal shelter • follow prescription for marking within buffer area surrounding aquatic feeding areas
	Edges,ecotones, and interior habitat	• maintain a high residual basal area (20+ m^2/ha), a high canopy closure (70+%), produce only small canopy openings, and maintain a 30 m uncut buffer along hard edges in woodlots that contribute to the supply of significant interior habitat in highly fragmented landscapes
	Old growth forest	• to retain some of the key habitat and aesthetic features of old growth hardwood forest: - adjust stand structure targets to retain more residual basal area or proportionally more basal area in medium and large sawlog-sized trees - create some group selection openings to encourage regeneration of mid-tolerant hardwoods - retain cavity trees, large mast trees, large solitary conifers, and supercanopy trees
	Riparian forest and fish habitat	• modify marking within 30–90 m of waterbodies providing fish habitat based on slope and type of aquatic ecosystem • retention of stick nests, cavity trees, and supercanopy trees is especially important in riparian areas
	Small streams, seepages, and woodland pools	• retain high canopy closure (remove no more than 50% of the basal area) within 15 m of small streams and significant (> 200 m^2 surface area) seeps and woodland pools

Site-specific habitat features	Wetlands	• apply guidelines for fish, waterfowl, moose aquatic feeding areas, ospreys, and herons as appropriate • create some larger openings (40+ m wide) adjacent to wetlands containing beaver lodges • for forested wetlands, remove no more than 50% of the basal area in any cut
	Rare vascular plants	• protect patches (tree length reserve)
Other habitat features	Cavity trees	• retain at least six living cavity trees per hectares (about 1 m^2/ha) based on the following order of priority—trees with 1. pileated woodpecker roost cavities 2. pileated woodpecker nest cavities 3. other woodpecker nest cavities or natural den cavities 4. escape cavities 5. woodpecker feeding cavities 6. high potential to develop cavities • retain a mix of species • trees should be at least 25 cm DBH (at least 1/ha 40+ cm DBH), with no obvious safety hazards
	Mast trees	• retain a minimum of eight mast trees per hectare (about 1.5 m^2/ha) • oaks are best—beech, black cherry, and hickory are good— basswood, walnut, butternut, and ironwood are fair—a mix of species is good • retain dominant or upper codominant trees at least 25 cm DBH and preferably 40+ cm DBH • retain trees with wide, deep, symmetrical crowns with lots of fine branches and few dead branches • retain trees with evidence of use by wildlife (e.g., bear claw marks) if crowns are in good condition
	Scattered conifers in hardwood stands	• retain at least ten large conifers per hectare (about 2 m^2/ha) • retain long-lived conifers such as hemlock, red spruce, white spruce, white pine, or cedar that are at least 25 cm DBH and preferably 40+ cm DBH
	Scattered hardwoods in conifer stands	• follow guidelines for stick nests, cavity trees, and mast trees in all conifer stands
	Supercanopy trees	• retain at least one supercanopy tree (60+ cm DBH) per four hectares in upland forest • retain at least one supercanopy tree per 650 m of shoreline around lakes occupied by eagles or ospreys
	Veterans	• on final removal cuts under the shelterwood silvicultural system, retain at least ten vigorous dominant or codominant trees per hectare capable of providing future supercanopy trees • retain long-lived species that can grow for another rotation such as tolerant hardwoods, oaks, white pines, red pines, white spruces, and hemlocks

Source: Adapted from *Ontario Tree Marking Guide* (available in 2004)

GLOSSARY OF TERMS

Aquatic ecosystem – areas where water depth is greater than 2 metres

Biodiversity – the total variability of life on Earth, including the diversity of genes, species and ecosystems

Cavity trees – trees with holes that are used or can be used by wildlife for roosting, nesting, escape, or feeding.

Cutting cycle – planned interval between major harvesting operations in the same stand

DBH – diameter at breast height (1.3m)

Cavity Tree

Ecotones – an area in close proximity to an edge between two different plant communities that is influenced by edge conditions (i.e. more light)

Ecosystem – a system of plants, animals and other organisms, together with the non-living components of the environment, functioning as an independent unit.

Genetic diversity – diversity of genes among members of the same species or population

Hard edge – boundary between two extremely different areas (forest and agricultural field)

Interior habitat – habitat that is not influenced by edge conditions

Mast trees – trees that produce edible fruits (i.e. oak, beech, hickory, cherry, basswood, walnut, ironwood)

Moose aquatic feeding areas – areas where moose feed on floating and submerged plants

Mast Trees

Residual trees – trees left standing after a harvest

Residual Basal area – the basal area per hectare of trees left standing after harvest

Riparian forest – forest bordering lakes, rivers, streams, seeps and woodland pools

Seeps – small areas of groundwater discharge typically located along lower slopes of hills.

Selection system management – periodic partial-cutting, controlled by basal area, using vigor and risk characteristics to determine individual tree selection. An uneven-aged silvicultural system.

Shelterwood system management – an even- aged system where the mature over story is removed in two or more successive harvests designed to provide a seed source and protection for regeneration.

Shelterwood System

Sticknests – platform of sticks (twigs to small branches) constructed by various bird species for nesting.

Stocking – a measure of the adequacy of tree cover on an area, in relation to a pre-established norm, expressed in terms of crown closure, number of trees, basal area, or volume.

Summer thermal cover – areas of high conifer cover used by moose to avoid heat stress in summer.

Supercanopy trees – large living trees that emerge above the main canopy of a stand

Winter thermal cover – conifer stands or groups of trees that provide thermal cover for wildlife by blocking wind and having higher ambient night time winter temperatures and lower daytime temperature fluctuations

Supercanopy Trees

Woodland pools – small depressions that fill with spring melt-water but may be dry during part of the growing season.

WHERE DO I GO FOR HELP

- Community Private Land Resource Stewardship Councils
- Local Forest Industry–Private Land Coordinator
- Ministry of Natural Resources

OTHER MATERIALS AVAILABLE INCLUDE:

- *A Tree Marking Guide For The Tolerant Hardwoods Working Group In Ontario*
- *A Silvicultural Guide for the Tolerant Hardwood Forest in Ontario*
- *A Silvicultural Guide for the Great Lakes-St. Lawrence Conifer Forest in Ontario*
- *A Silvicultural Guide to Managing Southern Ontario Forests*
- *Making Cents Out of Forest Inventories: A guide for small woodlot owners.*
- *A Landowner's Guide to Selling Standing Timber*
- *Ontario Tree Marking Guide* (available in 2004)

EXTENSION NOTES AVAILABLE INCLUDE:

- *Choosing A Silviculture System*
- *Do You Have A Healthy Woodlot?*
- *Forestry Talk: A Glossary Of Common Terms*
- *Managing Young Hardwood Stands For Sawlog Production*

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