



Forestry Document

2011

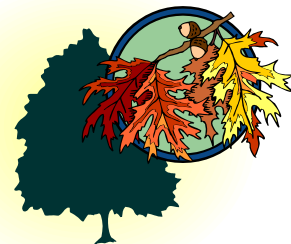
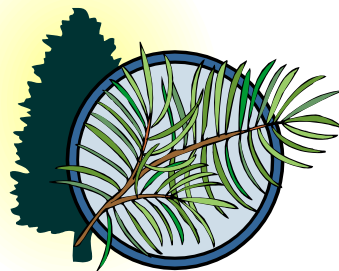
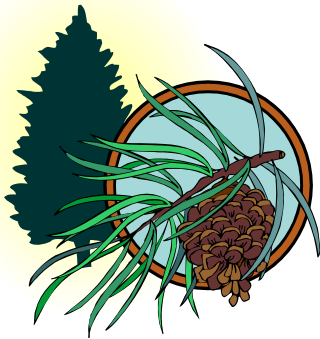


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Envirothon Learning Outcomes

Teachers! These are the Manitoba Curriculum Connections:

Reference Code

Students! These are the Envirothon Learning Outcomes. These are “testable”!

Students should be able to:

S4 – 3.6.1	1F	Define and give examples of terms used in forestry.
S4 – 2.1.4	2F	Identify trees and shrubs of Manitoba with a key or identification book.
S4 – 3.6.1	3F	Describe, relate and apply concepts of forest ecology including soil, forest types, tree communities, regeneration, biodiversity, competition, succession and forest fire.
S4 – 3.2.2	4F	Define eco-region and list the eco-regions of Manitoba; identify the vegetation (tree species and indicator species) associated with each.
S4 – 3.5.2	5F	Describe and apply concepts and principles of forest management including Silviculture practices, best management practices and sustainable development.
S4 – 3.5.2	6F	Describe the status of forestry in Manitoba and Canada.
S4 – 3.5.3	7F	Use basic forestry tools including callipers, increment borer, clinometers, prism, compass, diameter tape and tables.
S4 – 3.5.3	8F	Perform calculations using board feet and other forestry measurements.
S4 – 3.5.3	9F	Describe methods and procedures used in a forest inventory.
S4 – 3.5.3	10F	Name and describe careers in the forest industry.
S4 – 3.5.3	11F	Explain the economic, ecological, social and cultural importance of forests and forestry to Manitoba
S4 – 3.5.3	12F	Describe the components of certification.
S4 – 3.5.3	13F	Explain why certification of sustainably managed forests is important to Canada’s forest industry.
S4 – 3.5.1	14F	Identify and describe threats to Manitoba’s forest resources, both natural and human.
S4 – 3.5.3	15F	Develop general management goals and recommendations for a particular situation based on principles and methods of forest management.
S4 – 3.5.1	16F	Describe the potential impacts of climate change on Manitoba’s forests, including fires, pests and species migration.
S4 – 3.5.1	17F	Explain how forests and forestry practices can affect greenhouse gases.

Websites:

<i>Reference Code</i>	<u>Web sites</u>
2F	http://www.gov.mb.ca/conservation/forestry/publications/index.html http://www.cnr.vt.edu/dendro/dendrology/data_results_with_common.cfm?state=MB
3F	www.forestinfo.com http://mff.dsisd.net/Environment/Environment.htm http://web.extension.uiuc.edu/forestry/forest_health.html http://www.gov.mb.ca/conservation/forestry/mb-forests/index.html Forest Fires: http://www.cbc.ca/news/background/forcesofnature/forestfires.html http://www.gov.mb.ca/conservation/fire/mandate.html http://fire.cfs.nrcan.gc.ca/questions-eng.php
4F	http://www.gov.mb.ca/conservation/forestry/mb-forests/index.html
5F	http://www.gov.mb.ca/conservation/forestry/renewal/index.html http://www.for.msu.edu/extension/extensio.htm http://www.thinktrees.org/Woodlot_Program_Resources.aspx http://www.gov.mb.ca/conservation/forestry/woodlot/index.html http://www.fpac.ca/index.php/en/sustainable-solutions/ http://www.tembec-frm-manitoba.ca/FMP.htm
6F	http://canadaforests.nrcan.gc.ca/statsprofile
7F, 8F, 9F	http://web.utk.edu/~grissino/principles.htm http://www.cnr.vt.edu/dendro/forsite/equip.htm http://www.dnr.state.md.us/education/envirothon/forestry/measurements.html http://www.gov.mb.ca/conservation/forestry/woodlot/publications.html

10F	http://forestry.about.com/cs/employment/a/for_job_emplo.htm http://www.goforestry.ca/default.asp?mn=1.184.49.50&f=vac&searchlanguage=english
11F	http://www.manitobamodelforest.net/community_engagement.html http://cfs.nrcan.gc.ca/subsite/forest-bioproducts http://www.fao.org/forestry/nwfp/en/
12F	http://www.metafore.org/index.php?p=Forest+Certification+Resource+Center&s=147 http://www.certificationcanada.org/english/index.php
16F	http://www.climatechangeconnection.org/Impacts/Forests.htm http://www.manitobawildlands.org/cc.htm http://earthobservatory.nasa.gov/Study/BorealMigration/

Attached Documents:

<i>Reference Code</i>	<u>Attached Documents</u>
14F, 16F	Alien Forest Pests
12F,13F	Certification and Canada's Forests
6F	Five Year Report and the Status of Forestry French Translation of the Five Year Report and the Status of Forestry
7F	Forestry Equipment Techniques
3F	From Rock to Tree
6F, 11F	Manitoba Forestry - Sustainable Forest Unit
5F, 9F	Pre-Harvest Surveys
5F	Vegetation Management
17F	What trees can do to reduce CO2
5F	Buffer Management Report
2F	Field Guide-Native Trees of MB
6F, 11F	Forestry Statistics and Trends
4F, 6F, 11F	Manitoba's Forests
5F	MFA – Clear Cutting in Manitoba
6F, 11F	Priorities for Manitoba's Forests
5F	Water Quality Best Management Practices on Forested Lands

Introduction

Canada is a forest nation. Its forests cover 42% of its land mass and represent 10% of the world's forests and 30% of the world's Boreal Forest. Forests play an important role in the economic, social and spiritual well-being of Canadians.

Canada is in the unique position of having the majority of its forests (94%) under public ownership. The remaining 6% are owned by more than 425,000 private landowners.

Canada is the largest exporter of forest products worldwide. The economic health of the forest sector is important to the continued prosperity of the nation, generating 30% of all manufacturing investment.

One in 25 Manitobans work directly or indirectly in the province's forest industry in jobs from harvesting, hauling and paper and lumber production, to furniture, window, door and paper products manufacturing. In addition the recreation, tourism and travel industries are closely linked to the forest and all that it provides.

Forest ecosystems are shaped by dynamic processes. The populations, species, forest types and age classes that comprise Canada's forests are determined through cycles of disturbance

and renewal. Maintaining Biodiversity involves making land-use and resource management decisions that incorporate biodiversity needs, such as limiting the conversion of forests to agriculture (non-forest) and urban lands, creating protected areas, managing the harvest of forest plants and animals, preventing the invasion of foreign insects and diseases, and protecting wildlife habitat through well-planned forest management activities.

Sustainable development requires that Canada's forests maintain their ability to provide benefits for future generations. Sustainable development extends beyond trees to encompass the people in forest communities, including Aboriginal and treaty rights, and requires that the public become more involved in the decision-making process regarding forest use and management. Greater efforts must be made in understanding the relationships within forest ecosystems and between the environment and the economy.

Manitoba and Sustainable Development

Manitoba's vision of environmentally sound and sustainable economic growth is governed by the following principles and guidelines (these guidelines have equal status to the principles).

Conservation – Maintain essential ecological processes, biological diversity and life-support systems of our environment; harvest renewable resources on a sustained-yield basis; and make wise and efficient use of our renewable and non-renewable resources.

Enhancement – Enhance the long-term productive capability, quality and capacity of our natural ecosystems.

Global Responsibility – This principle requires that we think globally when we act locally. There is a need to work cooperatively within Canada, and internationally, to accelerate the merger of environment and economics in decision making and to develop comprehensive and equitable solutions to problems.

Integration of Environmental and Economic Decisions – Ensure that economic decisions adequately reflect environmental impacts including that on human health. Environmental initiatives shall adequately take into account economic consequences.

Prevention – Anticipate, prevent or mitigate significant adverse environmental (including

human health) and economic impacts of policy, programs and decisions.

Recycling – Reduce, reuse and recover the products of our society.

Rehabilitation & Reclamation – Rehabilitation and reclamation require repairing damage caused in the past. Future policies, programs and developments should take into consideration the need for rehabilitation and reclamation.

Scientific & Technological Innovation - To research, develop, test and implement technologies essential to further environmental quality including human health and economic growth.

Shared Responsibility – Acknowledge responsibility for sustaining the environment and the economy, with each being accountable for decisions and actions, in a spirit of partnership and open cooperation.

Stewardship – Stewardship requires the recognition that we are caretakers of the environment and the economy for the benefit of present and future generations of Manitobans. A balance must be struck between today's decisions and tomorrow's impacts.

Guidelines

- ❖ Encourage and support an efficient use of resources.

- ❖ Provide opportunities for public participation.
- ❖ Understand and respect differing social and economic views, values, traditions and aspirations.
- ❖ Integrate decision making and planning.
- ❖ Encourage and support access to adequate information.
- ❖ Encourage and promote the development and use of substitutes for diminishing resources.

Forest Ecosystem Based Management

Forest Ecosystem Based Management is the process of developing management principles and implementing actions (measures for that forest ecosystem that will preserve and ensure its stability and sustainability). The greater the biodiversity of a forest ecosystem the more stable it is and vice versa. (An ecosystem is a self-sustaining and independent interaction of abiotic and biotic factors in a community where these interactions occur.)

We are all part of natural ecosystems, and any study or management of those ecosystems must take us into account. In spite of our culturally constructed economic and social systems, we still depend on and are very much involved in the natural cycles of ecosystems.

In order to develop an ecosystem approach we must take an ecosystem point of view, which means a total systems approach and includes many things omitted in a less comprehensive view, i.e. no longer a single-purpose approach to the environment (harvesting trees without regard for wildlife, water, etc.). An ecosystem approach requires we take into account the relationship between artificial and natural environments and people.

In any given forest area, the forest manager has available not one but many different harvesting practices that can be adapted to the site, i.e. the

kind of forest, its location, the site conditions, the species composition, and management objectives. Today, timber harvests have to be planned around the timber, the structure and function of the forest ecosystem, the wildlife it holds, and esthetics. Based on social demands, the forest manager can adapt or modify the harvest, as the situation requires.

Fire Ecology

For many years ecologists ignored the importance of fire as an environmental influence. After regarding fire as destructive and as largely a human act, ecologists began to recognize fire as an important ecological force that is a part of the natural environment, along with moisture, temperature, wind, and soil.

Three conditions are necessary for fire to assume ecological importance: (1) an accumulation of organic matter sufficient to burn; (2) dry weather conditions to render the material combustible; and (3) a source of ignition. Two sources of ignition are lightning and people.

Fire has a pronounced impact on the ecosystem. It reduces dead and dry organic matter to soluble ash and releases phosphorus, calcium, potassium, and other elements for rapid recycling, stimulating new growth. Fire exposes the mineral soil, stimulates the germination of certain seeds (opens Jack pine cones for example), and may encourage erosion, changing the character of the site.

Carefully used, fire can be an important tool in the regulation and manipulation of vegetation. It can be used to improve forest stands and increase net productivity of grasslands. It can reduce the hazard of destructive forest fires by removing litter before it accumulates to a great degree, and can improve seedbed for regeneration of certain forest types and tree species. It can be used to improve wildlife habitats, to maintain certain fire-controlled ecosystems, to maintain the naturalness of wilderness areas, and even to improve the esthetics of the natural landscape.

Recent research suggests that nature's own forest management plan, which makes use of fire, insects and disease, flooding and wind damage, is the best model for conserving biodiversity in the forest.

Pre-Harvest Surveys

Pre-harvest surveys are considered an important component of sustainable forest management and are a requirement of Environment Act Licences issued by Manitoba Conservation to Forest Management Licensees.

During the forest management planning process, blocks are identified which must be investigated in order to confirm timber resources and identify non-timber values. Each block, and when required, the area within 100 metres of the proposed block boundaries, will be assessed to mitigate impacts of forest management activities on sensitive sites, waterways, wetlands, wildlife travel corridors, and wildlife habitat.

Data from pre-harvest surveys is summarized and incorporated on block summary forms. Block summary forms accompany each proposed cut block in Annual Operating Plans. Many sources of other information also contribute to plans and prescriptions. Aerial photographs, topographic maps, other surveys, personal experience and information provided by Manitoba Conservation are regularly used. While pre-harvest surveys themselves do not include direct recommendations for site-specific prescriptions, all the information is used by forest planners to help develop site specific prescriptions.

The information on timber and other resource values collected during pre-harvest surveys will

be used to develop harvest and renewal prescriptions that:

- ❖ Maintain site productivity
- ❖ Reduce resource use conflict
- ❖ Mitigate potential negative impacts
- ❖ Make operations more efficient/effective
- ❖ Conserve biodiversity
- ❖ Contribute to sustainable forest management.

Information collected during pre-harvest surveys may also enhance or correct existing resource information and enable comparisons of pre and post harvest conditions.

Timing – Pre-harvest surveys should be performed prior to including a block in an Annual Operating Plan. Surveys should be conducted between May and September to capture information during a range of seasons and migration times. Local knowledge and information should be used to determine times and locations. Some blocks located in wet, remote areas cannot be efficiently surveyed during this period. These sites could be surveyed in early spring or late fall in the absence of snow when the sites are still relatively accessible.

Pre-harvest survey methods proposed by each Forest Management Licensee will require the approval of Manitoba Conservation. Different survey design methods (fixed versus point sample, plot size, sample intensity) may be used if approved by Manitoba Conservation.

Forest Fire Management in Manitoba

Manitoba's Forest Zone covers 421,360 sq. km, of which 22% is considered commercially productive. These forest lands support three Forest Management Licence Holders, 234 Timber Sale Agreement Operators and 3,696 Timber Permittees. *The State of Canada's Forests 1995-96* states that Manitoba's value of shipments is \$595 million dollars. The forest industry employs more than 13,000 people, either directly or in allied or support industries. In addition, the Forest Zone contains over 200 commercial enterprises and is a destination for an array of recreational forest users, including 5,800 cottage owners.

The Challenge

As the majority of Manitoba's forest lands are boreal and subject to regular fire occurrences, wildfire management is a critical component of overall forest management for Manitoba Conservation. Wildfire management is a high priority because of the potential threat of fire to human life, property and valuable forest resources. Wildfire management activities are most intensive in areas where significant resource values are at risk. Manitoba Conservation Fire Program protects more than 334,000 sq. km of forest land within its forest protection zone. Data compiled since 1914 suggests that Manitoba can expect an average of 440 fires to burn over 189,500 hectares annually. Given the number of fires and their often

moveable locations, it is not possible or economically feasible to contain all wildfires. To manage a challenge of this magnitude, Manitoba Conservation uses an Initial Attack Response System that relies heavily on fire prediction, fire weather conditions and available suppression resources.

Management

Integrated fire management uses a combination of the newest technologies and basic response mechanisms. While there is no substitute for a dedicated fire fighter with a shovel and pack-pump, computer based technologies can help determine where that person will be more effective and what support is required.

Fire loss can occur in any forest area throughout the province. However, establishing priority protection areas is one way of breaking the protection task into manageable portions. Broad zones for resource protection have been established, which include the Agriculture Zone in southern Manitoba and the remote northern Observation Zone – where fire management is aimed at protecting local communities rather than resources.

The Primary Protection Zone, which contains most of Manitoba's productive forests, is subdivided into three priority zones: low, medium and high. These zones have been established to facilitate resource deployment to priority areas based on forecasted conditions.

This is especially critical for directing fire suppression response when several fire starts occur at the same time. Manitoba Conservation maintains a Forestry Value Priority Map to ensure efficient and appropriate responses to wildfires.

In the past few seasons, Manitoba's Fire Program has been using NFIS, the national Fire Information System, for forest fire administration and decision support. This system is a modern linked computer network that combines state-of-the-art fire behaviour science, communications, graphics and administrative budget and operational equipment databases for the Department's Regional and District Offices.

NFIS has been generally well received by the fire management community and provides the forest industry with up-to-date information. Additional modules and improvements will be added as the program continues to evolve. As well, Manitoba Conservation is investing in the expansion of its fire weather network which acts as the backbone of the program.

Fire suppression will always be a combination of the modern and the traditional, including people with shovels and pumps putting out fires. Manitoba has a fleet of five Canadair CL215 water bombers coordinated by air attack officers (bird-dogs). A fleet of mobile fire equipment warehouses supplements a well supplied and stocked initial attack base and air attack base network. These are spread throughout the

province's Primary Protection Zone. Seasonal contract aircraft are supplemented by casual hired machines as required. Manitoba is a member of the Mutual Aid Resources Sharing Agreement coordinated by the Canadian Interagency Forest Fire Centre (CIFFC) in Winnipeg.

To continually improve the ability to manage wildfire, Manitoba continues to support academic and Canadian Forest Service researchers in their studies by providing data and resources. The Department participates in national programs such as the National Fire Mapping project and international research projects such as BOREAS, a NASA project to assess the role of the boreal forest in global climate change.

Manitoba's integrated fire management approach includes letting some fires burn. While fire is a destructive force to individual trees and other life, it is an important ecological process in that it rejuvenates our boreal and mixed-woods forests by releasing nutrients and stimulating new growth. In areas where wildfires do not pose a threat to resources requiring protection, they may be left to burn. Recent studies have shown that due to years of 'fire exclusion', some forests have built up high levels of fire fuels. As a result, fires are larger, more severe and more difficult to control than if natural fire cycles had been in effect. Letting remote and non-threatening fires burn appears to make environmental and economic sense. The

challenge to fire managers is to balance protection of life and resources with ecological processes of the forest.

Manitoba currently has no fixed acceptable fire loss target. However, the forest inventory currently incorporates a 15% annual allowable cut reduction for all losses. During the most severe fire year in recorded history in Manitoba, 1989, 3.5 million hectares were lost to fire. Manitoba Conservation is continuing to refine its fire fighting capacity. Integrating new technologies with sound traditional practices is serving Manitobans well.

What Are Alien Forest Pests?

Any species, subspecies, variety, or race occurring in an area or ecosystem to which it is not native may be classified as an alien species. When they cause changes in ecosystems, displacing native organisms by predation or parasitism, by competition for space and nutrients or food, or by alteration of habitat, alien species are considered to be invasive. When their impacts are beyond acceptable levels, resulting in environmental damage and economic and social losses, alien species become known as pests. Boreal forests, mainly because of their relatively limited species complements, are considered particularly susceptible to alien species invasions, and even more so when disturbed. Over 300 species of tree-feeding insects from Europe have successfully invaded North America, compared with only 34 that have made the reverse journey (Niemelä and Mattson 1996). What most of these invasive species share, besides not having natural checks to their survival and spread, is that they are generalists: they reproduce quickly, disperse widely when given the chance, tolerate a fairly broad range of habitat conditions, and resist eradication once they are established.

Established Alien Forest Pests

In the past century, alien pests have become established in Canada with devastating effects on forest health, biodiversity, and timber and

other forest resource values. Examples include chestnut blight, Dutch elm disease, beech bark disease, balsam woolly adelgid, and white pine blister rust. Chestnut blight and Dutch elm disease have had such a devastating affect that the host species, American chestnut and American elm, respectively, have ceased to be a significant part of the deciduous forests of south-eastern Canada. They exist only as “ghost” trees, and ecosystems in the region now contain a different mixture of species (Hall et al. 1996, p. 11). When the pest does not damage the host tree species in its country of origin (often in the same genus it attacks in Canada), scientists here have little information with which to begin their search for controls.

Our current list of alien forest pests present in Manitoba is Dutch elm disease, smaller European elm bark beetle and white pine blister rust.

We also have a “watch” out for a list of pests that are not in Manitoba yet, but there is a real potential for them to become established here. They include the Emerald Ash Borer (deciduous species), Asian Longhorned Beetle (deciduous species), Mountain Pine Beetle on jack pine (presently in lodgepole and ponderosa pine throughout BC and Alberta, Brown Spruce Longhorned Beetle (coniferous species especially spruce) and the Pine Shoot Beetle (pine species). The Canadian Food Inspection Agency (CFIA) and Canadian Forest Service

(CFS) websites have more information regarding these and other alien forest pests.

New Arrivals and Expanding Ranges

Despite detection efforts at Canada's ports of entry, the frequency of introductions and the number of alien species are increasing. This trend results mainly from the use of shipping containers, direct point-to-point delivery of shipments, the increase in the volume of trade, and a broadening of trading partners, especially with the Pacific Rim and Asia. Trade volume is so large that on average only 1% to 2% of shipments are inspected. Rates of inspection are higher for targeted shipments, such as regulated commodities and shipments from certain countries of origin. Other countries achieve similar inspection rates.

One new arrival causing concern is the Asian long-horned beetle, *Anoplophora glabripennis* (Mots.). Transported in shipments from China, this wood-boring beetle could spread to Canadian forests (CFIA 1998; Allen 1998; Humble et al. 1998a; OMNR 1998). The beetle has already been the target of control campaigns in New York and Chicago, where millions of dollars have been spent to cut down thousands of infected city trees. This destructive beetle tunnels into healthy trunks and branches, eventually killing the tree. It mainly attacks broadleaf trees, including maples. Like many other introduced insects, the Asian long-horned beetle has no known natural predators in Canada

or in its native range. In China, foresters attempt to protect the poplar plantations from this pest by inter-planting with maple, its favoured host. This beetle has been intercepted numerous times in Canada.

Why is Information on Alien Forest Pests Needed?

Canada's forests are central to its economic, environmental, and social well-being, as well as to the very identity of Canadians. Forests filter the air we breathe and the water we drink and provide habitat for countless species of plants and animals. They also offer a multitude of spiritual and recreational values. Some 800 Aboriginal communities exist within the forest environment. In addition, the forest supports an economic sector that contributes substantially to the wealth of almost every part of the country, providing jobs for 880,000 Canadians, mostly in rural communities. Canada is the world's largest forest products exporter and forest products have been critical to Canada's ability to maintain a positive trade balance. In 1997, forest products contributed \$31.7 billion to Canada's surplus balance of trade.

Forest resource management is primarily the responsibility of the provincial and territorial governments; the federal government's role in forestry focuses on trade and investment, national statistics, science and technology (S&T), Aboriginal affairs, environmental

regulations, and international relations. The levels of government share responsibilities for, and cooperate on S & T, industrial and regional development, the environment, and other forestry matters. The Canadian Forest Service (CFS) - Natural Resources Canada - is the principal federal forest research organization in Canada. It addresses the issue of alien forest pests by providing provincial and territorial forest agencies, private sector forest managers, other federal departments and agencies, Aboriginal forest organizations, and non-governmental organization with relevant information.

Impacts of Alien Forest Pests

Organisms that spread naturally, in response to changing environmental conditions or because they are transported by wind, water or animals, into habitats in which they have not previously occurred usually do not make a great impact on ecosystems or their inhabitants. Most alien pests are accidentally introduced into Canada on imported goods, by travelers, or on vehicles; sometimes they are deliberately imported as ornamental plants, pets, and so on, and escape. Although most introduced organisms fail to survive and do not become established in this country, history has shown that the potential for damage is large if they do.

Certification: A Growing Market Initiative

What is Certification? – Certification is primarily about providing objective evidence of sustainable forestry management. It functions much like a financial audit, where independent experts verify a company’s performance against a set of objective standards and procedures for sustainability.

But certification is also about meeting social and community expectations. Are companies making their plans public, are they consulting neighbours as well as sharing the economic benefits by maintaining stable community employment? Credible certification standards include these types of considerations.

Does Certification Give Companies a Market Advantage? – In a way, yes. By providing an independent assurance of responsible forest management practices, certification helps consumers choose. Companies that can provide third-party audits have the added value of providing certainty, accountability and verifiability to retailers and consumers who want to give preference to products from well-managed forests.

While forest certification standards are currently voluntary initiatives, they may eventually become “the cost of doing business” in a global market. Consider that over 100 countries manufacture and sell wood and paper products

to consumers worldwide. Certification provides consumers, regardless of their location, with an objective, easily understood assurance that the forests from which a product came are being well-managed.

What is “Chain of Custody”? – Chain-of-Custody refers to the ability to track wood from the time it leaves the forest through the processing and marketing channels to the final consumer. Chain-of-custody is of particular interest to buyers of manufactured products who want to verify that a certified product genuinely comes from a certified source. In some cases, labelling is being used to identify wood from a certified forest.

Canada’s Certification Record

- ❖ In 1993, the Forest Products Association of Canada (FPAC) became a founding member of the Canadian Sustainable Forestry Certification Coalition and established a website dedicated to providing information on the status of all Canadian forest certifications (www.sfms.com).
- ❖ In 1999, the FPAC Board committed each member to seek independent audits of their forest management systems and practices. Today, every member is implementing third-party certification.

- ❖ By 2001, Canada had achieved independent, third-party certification on the largest area of managed forests in the world – over 67 million hectares (165 million acres).
- ❖ The Canadian forest industry actively supports the international *Mutual Recognition* initiative seeking to develop an equivalency mechanism between credible certification standards.

The four major certification standards used in Canada are:

- CSA (Canadian Standards Association)
- FSC (Forest Stewardship Council)
- ISO (International Organization for Standardization)
- SFI (Sustainable Forestry Initiative)

CSA – Canada’s National Sustainable Forest Management (SFM) Standard is based on international criteria for sustainable forest management and Canada’s own national SFM criteria which were developed by the Canadian Council of Forest Ministers. Approved in 1996, the CSA standard has a stringent public participation requirement, and companies are required to respect national criteria for SFM at the local level as well as address any additional local values. Third-party evaluations, such as the Council of European Paper Industries, have ranked the CSA amongst the best standards in the world. CSA recently launched an optional

chain-of-custody and labelling program in July 2001.

FSC – The Forest Stewardship Council is an international body which accredits certification organizations and endorses national or regional standards based on ten over-arching forest management principles and 56 criteria. The goal of FSC is to promote environmentally responsible, socially beneficial and economically viable management of the world’s forests. Founded in 1993 by a diverse group of representatives from environmental organizations, the timber trade, forestry professionals, indigenous peoples, community forestry organizations and certifiers, the FSC places a strong emphasis on social and public participation elements. FSC standards are performance-based standards, developed by stakeholder groups. Standards for most regions of Canada are under development at this time.

ISO 14001 – International Organization for Standardization, the ISO 14001 standard is the most widely recognized standard for environmental management systems (EMS) in the world. Established in 1994, ISO 14001 uses a management system approach for setting measurable goals and objectives, and demonstrating environmental achievements through a cycle of planning, implementation and measurement. While not specific to forestry, ISO 14001 requires companies to have the policies and processes in place to meet or exceed

all environmental regulations and to continually improve environmental performance. In Canada, most companies using ISO 14001 for forestry are incorporating sustainable forestry criteria consistent with those set out by the Canadian Council of Forest Ministers, which are nationally and internationally recognized.

SFI – The Sustainable Forest Initiative was developed by The American Forest & Paper Association for its membership, and is now available for use by any interested party through a licensing arrangement. This standard was developed for application in the USA where the vast majority of lands are privately owned and therefore, there is somewhat less of an emphasis on public participation. The SFI program is a comprehensive systems and performance-based standard that integrates the perpetual regeneration and harvesting of trees with the protection of wildlife, soil and water quality, biodiversity, and ecologically significant sights.

Over the past three years, AF&PA has strengthened the credibility of the standard by introducing a third-party certification process and an independent Sustainable Forestry Board with broad representation of interests to govern SFI. Canadian companies who export to the US are interested in this standard for the potential US marketplace recognition.

Why Canadian Companies are Certification Leaders

Canada's forest management practices are among the best in the world, and a key factor in that achievement is the expanded role of public participation. Canada's tradition of public dialogue is also behind the forest industry's commitment to certification. By voluntarily submitting their forest management activities to third-party audits, Canadian companies want to provide independent evidence of their good practices to buyers and consumers, as well as demonstrate their willingness to be publicly accountable.

Renewing Canada's National Commitment to Sustainable Forests

In 1998, Canadians renewed their commitment to sustainable forests nationwide by adopting a new five-year strategy aimed at bringing together the ecological, economic, social and cultural aspects of forest conservation and use.

The new National Forest Strategy (1998-2003) is a collective attempt by government, industry, environmental organizations, Aboriginal associations and others, to develop a formula that reconciles the growing range of expectations placed on Canada's forests and forest managers. Like its predecessor, the National Forest Strategy is the result of extensive public consultations by the Canadian Council of Forest Ministers, the 14 federal,

provincial and territorial ministers responsible for forests.

Web Contacts

Canada's Forest Network
Canadian Forest Service
Canadian Sustainable Forestry Certification Coalition
Canada's Model Forests
Canadian Standards Association (CSA)
Canadian Wood Council

Why Buyers Want More Environmental Guarantees

Concern over diminishing natural resources and the state of the environment in general has raised public and media attention around forestry. People want to know if harvested areas are being regenerated, if wildlife habitat is being protected and if the biodiversity of the forest is being maintained.

For their part, buyers want to show their customers and the public that they are making responsible purchasing decisions.

In a global market, where a customer can be thousands of miles away, providing evidence of well-managed forests is increasingly being done through independent, third-party "certification". Canada is a world leader in forest conservation, protection and sustainable use. With consumption of wood and paper growing, world demand should be met from countries with well-managed forests like Canada.

Why Choose Canadian Forest Products?

Canada's forest strategy is based on prudent harvesting and the regeneration of all harvested areas. We also maintain one of the largest undisturbed forests in the world, most of which will never be harvested.

A Unique Forest Management Process –

Almost all of Canada (94%) is publicly owned. Under the Canadian constitution, the country's 10 provinces and 3 territories have responsibility for forest management. And, because of public ownership, government agencies and forest companies are required to seek the views of a variety of forest users, including Aboriginal groups, local communities, and environmental organizations in order to incorporate recreational, social, wildlife and economic values into forest management planning.

Conserving Biodiversity –

Canada was the first developed nation at the 1992 Earth Summit to sign the Convention on Biological Diversity which is intended to conserve ecosystem species and genetic diversity. Following Canada's ratification of the Convention, federal, provincial and territorial governments conducted broad-based consultations with industry, the scientific community, conservation groups, academia and Aboriginal groups, which paved the way for the Canadian Biodiversity Strategy, released in 1995.

Partnering with First Nations – An independent study conducted in 1998 revealed a growing list of successful business relationships and involvement in Canadian forest management planning and fieldwork by Aboriginal communities. This growth has been supported by the creation of the First Nation Forestry Program in 1996. With \$25 million in federal funding, the First Nation Forestry Program has supported close to 1,000 projects and helped 3,900 First nations workers gain valuable experience and create more opportunities in forest-based businesses.

Canada's Forest Laws

- ❖ 94% of Canada's forests are publicly owned and strictly regulated to protect the environment.
- ❖ All forestry companies operating on public land are obligated by law to seek public input on their long-term forest management and development plans. When the plans and consultations are completed, they are submitted to government foresters for review and approval.
- ❖ Harvested areas are required by law to be promptly regenerated. Forest policies and regulations also safeguard biodiversity, soil and water quality and other ecological values.
- ❖ Canadian harvests are limited by annual allowable cuts (AAC), which are set by

government chief foresters and are based on the sustainable growth rate of the forest.

- ❖ Any major use or activity impacting on Canada's public lands is subject to environmental assessment and public review processes.

Forest Facts

- ❖ The total land area of Canada is 927 million hectares, about half of which is covered by forest (417 million ha / 1,030 million acres). Only one-quarter of Canada's forests are managed for commercial use (119 million ha / 294 million acres).
- ❖ Annually, Canada harvests less than 1% of its managed forest, approximately 1 million ha (79 million acres) of protected land, including 32 million ha (79 million acres) of protected forests.
- ❖ More than half of Canada's forests are naturally reforested. Natural re-generation is supplemented by the planting of 600 million seedlings per year.
- ❖ Over 30 different species of trees are used in replanting activities across Canada in order to remain faithful to the natural biodiversity of each area.

Glossary

Note: Words in italics are defined in later entries in the Glossary.

Advanced Regeneration: The young tree growing under an existing stand before it is logged. If advanced regeneration survives the logging operation it may form an initial part of a new stand.

Allowable Cut: The amount of wood *fiber* that may be harvested annually or periodically from a specified area over a stated period in accordance with the objectives of management.

Anadromous Fish: Salmon, shad, bass and others that migrate from the sea up a river to spawn.

Annual: A plant that completes its life cycle from seedling to mature seed-bearing plant during a single growing season, and then it dies.

Annual Operating Plans (AOP): Plans prepared and submitted annually by timber operators describing how, where and when to develop roads, harvest timber, and complete renewal of the forest. AOP's describe the integration of operations with other resource users, the *mitigation* of the impacts of logging, the reclamation of disturbed sites, and the *reforestation* of harvested areas.

Antler Sheds: Antlers that have been shed by ungulates (deer, moose, elk, caribou). When they are dropped naturally they are referred to as cast antlers or sheds.

Association: A grouping of plants and animals that repeatedly occur together in the forest region. Association may be identified in terms of their predominant tree association, as oak hickory forest.

Biennial: A plant that lives for two growing seasons, producing only leaves during the first season, flowers and seeds during the second.

Biodegradable: The property of a substance that permits it to be broken down by microorganisms into simple, stable compounds such as carbon dioxide and water.

Biome: A complex of *communities* characterized by a distinctive type of vegetation and maintained under the climatic conditions of the regions.

Biosphere: The part of the earth's crust, water, and atmosphere where living *organisms* can subsist.

Biota: The animal and plant life of a region or period.

Biotic Potential: The capacity of a population of animals or plants to increase in numbers under optimum environmental conditions.

Board Foot (fbm or bf): The amount of timber equivalent to a piece of wood 12 inches square and 1 inch thick. As the forest products industry changes to the metric system, it will probably use cubic metres for trees/logs and lumber in bulk and will measure in retail on a linear and piece basis.

B O D (Biochemical Oxygen Demand): A measure of the amount of oxygen used by microorganisms to consume biodegradable organic strength or waste water were discharged into a natural body of water.

Bog: A wetland ecosystem made up of in-situ accumulations of peat, either moderately or only slightly decomposed, derived primarily from sphagnum moss. Bog water is acidic, usually at or very near the surface, and unaffected by the nutrient-rich groundwater found in the adjacent mineral soils. Vegetative cover is typically dominated by ericaceous shrubs, sedges and peat moss, but trees may also be present.

Boreal Forest: Northern conifer forest.

Broadleaf: The term describing a plant with widebladed leaves, such as an oak or maple; generally refers to flowering trees in contrast to conifers.

Browse: To eat the twigs and leaves of woody plants. Deer, moose, and their relatives are browsers.

Buffer: A land area that is designated to block or absorb unwanted impacts to the area beyond

the buffer. Buffer strips along a trail could block views that may be undesirable. Buffers may be set aside next to wildlife habitat to reduce abrupt change to the *habitat*.

Canopy: Layer formed by the leaves and branches of the forest's tallest trees.

Carrying Capacity: The number of *organisms* of a given species and quality that can survive in a given *ecosystem* without causing deterioration thereof.

Carnivore: Any chiefly flesh-eating mammal of the order Carnivora, comprising dogs, cats, bears, seals, and the like.

Chaparral: Dense scrub vegetation of broadleaf, evergreen, or wintergreen shrubs.

- **cide:** From Latin, meaning kill; used in combination words, such as *pesticide*.

Chlorophyll: A group of *pigments* that produce the green hue of plants; essential to *photosynthesis*.

Clearcut: removal of an entire standing crop.

Clearcutting System: A *silviculture* system in which the old crop is cleared at one time; regeneration by artificial or natural means.

Climax: The relatively stable association that represents the final stage in a *sere* under existing conditions of soil and climate.

Commercial Forest Land: Forest lands capable of bearing merchantable timber currently or prospectively accessible and not withdrawn from use.

Commercial thinning: Any type of thinning production merchantable material at least to the value of the direct cost of harvesting it.

Community: All the plants and animals in a particular habitat that are bound together by *food chains* and other interrelations.

Cone: A structure composed of many spirally arranged scales in which pollen ovules are produced. Cones differ from flowers in that the ovules are borne on the surface of the scales, or

carpels. In a flower the carpels form a container called the pistil inside which the ovules are borne.

Conifer, Coniferous: A plant that bears its seeds in cones. Usually refers to *needleleaf* trees, although some needleleaf, such as yew, do not bear cones.

Conservation: The use of natural resources in a way that assumes their continuing availability to future generations; the intelligent use of natural resources.

Cubic Foot (ft³): The amount of wood necessary to produce a block 1 meter on a side or the equivalent.

Cubic Meter (m³): The amount of wood necessary to produce a block 1 metre on a side or the equivalent.

Cut Block: An area defined on the ground and planned for harvest, usually in one season.

Deciduous: Term describing a plant that periodically loses all its leaves in autumn. Most North American broadleaf leaves are deciduous. A few conifers, such as larch and cypress, also are deciduous. See *Evergreen*.

Decomposer: A plant or animal that feeds on dead material and causes its mechanical or chemical breakdown.

Dendrology: A branch of botany devoted to the study of trees.

Ecology: The scientific study of the relations of living things to one another and to their *environment*. A scientist who studies these relationships is called an ecologist.

Ecosystem: All living things and their *environment* in an area of any size. All are linked together by energy and nutrient flow.

Edaphic: Related to or caused by particular soil conditions, as of texture or drainage, rather than by physiographic or climatic factors.

Effluent: The outflows, usually offensive, from sewage or industrial plants, and the like.

Environment: The aggregate of surrounding things, conditions, or influences, especially as affecting the existence or development of people or of nature.

Environment Act Licence: A licence to operate a development (as defined in the Environment Act), issued to the proponent of the development by the Director responsible for the Environment Act, with such specifications, limits, terms and conditions as the director deems necessary to ensure effective environmental management of the development.

Environmental Resistance: The limiting effect of environmental conditions of the numerical growth of a population.

Ephemeral Drainage: Drainage that flows briefly only in direct response to precipitation in the immediate locality and whose channel is at all times above the water table.

Eutrophication: Enrichment of soils and water due to fertilization, sewage effluent, or other waters that carry a high plant-nutrient component.

Even-age Stands: Forest areas where the trees are all the same age due to planting or harvesting the entire area at one time. Even-age stands are desirable for species whose young trees do not thrive in the shade of older trees.

Evenflow: The production from a national forest or other unit of land of the same amount of timber each year for an indefinite period of time.

Evergreen: A plant that does not lose all its leaves at one time. Among trees, some broadleaf species, such as live oak, remain green all year, but most North American evergreens are coniferous. See Conifer; Deciduous.

Fen: A landscape of low-lying peat land, made up of partly to well-decomposed sedge (occasionally moss) materials, where the water is at or near the surface and fed by relatively fast-moving, nutrient-rich groundwater that is usually neutral or alkaline, and rich in calcium.

Fiber: Any long, narrow cell of wood or bast. Loosely used for wood elements in general.

Food Chain: A series of plants and animals linked by their food relationships. A green plant, a leaf-eating insect, and an insect-eating bird would form a simple food chain. Any one species is usually represented in several or many food chains.

Forest: A complex community of plants and animals in which trees are the most conspicuous members.

Forest Floor: The layer of decomposing material that covers the soil in a forest.

Forest Management: The practical application of scientific economic and social principles to the administration of a forest estate for specified objectives.

Forest Management Licences (FML): Forest companies that have agreements with the Province of Manitoba in regards to the management of their licenced areas.

Forest Practices: Activities that are conducted in the forest during all stages of forest management operations (e.g. surveys, harvesting, road construction, *silviculture*).

Forest Region: An extensive area of a continent in which the climax forest associations are closely similar. The major forest regions of North America are West Coast forest, Western Forest, Central Hardwood Forest, Tropical Forest, Northern Forest, and Southern Forest.

Forest Renewal Prescription: A detailed plan for returning a harvested area to productive forest.

Fungicide: Any chemical preparation used to control fungal pests.

Geographic Information Systems (GIS): A computer-based tool for mapping and analyzing events and objects on the landscape.

Girdling: Stripping or gnawing a section of bark around the trunk of a tree or shrub; may eventually kill the plant.

Grassland: A vegetation community in which grasses are the most conspicuous plants.

Growing Stock: All the trees growing in a forest or in a specified part of it.

Guidebook: A collection of *policies, guidelines, procedures* and *standards* related to a specific Forest practice.

Guideline: A guideline presents alternative *procedures* or *standards* that practices may incorporate to satisfy the principle upon which the guideline is based. To be enforceable a specific guideline must be stated on a Work Permit.

Habitat: The native environment of an animal or plant, or the kind of place that is natural for an animal or plant.

Hardwood: A deciduous or broadleaf tree. The wood from such trees. See *Softwood*.

Herb: Any flowering plant or fern that has a soft, rather than woody, stem.

Herb Layer: The layer of soft-stemmed plants growing close to the forest floor.

Herbicide: A substance or preparation for killing plants, and especially weeds. See *Pesticide*.

Heritage Resource: Anything of archaeological or historic significance.

Increment: Growth accretion generally expressed in volume per acre per year. Also, spoken of as annual yield.

Insecticide: Any chemical preparation used to control insects.

Intensive forestry: The practice of forestry so as to attain a high level of volume and quality of out turn per unit of area, through the application of the best techniques of *silviculture* and management.

Intermittent Streams: A stream in contact with the groundwater table that flows only at certain times of the year, such as when the groundwater table is high and/ or when it receives water from springs or from some surface source such as melting snow. It ceases to flow above the streambed when losses from

evaporation or seepage exceed the available stream flow.

Kerf: The narrow slot cut by saw as it advances through wood.

Landfill: A method of disposing of refuse on land by utilizing the principles of engineering to confine the refuse to the smallest practical area and to reduce it to the smallest practical volume.

Leaching: The removal of soluble substances from soil by percolating water.

Leader: The main shoot growing from the top of the tree with a single main trunk.

Life cycle: The continuous sequence of changes undergone by an *organism* from one primary form to the development of the same form again.

Lignin: The organic substance that holds together the individual fibers of wood. Lignin is responsible for the dark colour in pulp mill effluents.

Line of Sight: The distance that can be seen until the view is obstructed. The obstruction can be vegetation or topography.

Manitoba forest Ecosystem Classification System (FEC):

A system for classifying the commercial forest areas of Manitoba. The system consists of 33 vegetation types and 22 soils types, which are identified using keys.

Marsh: An area of low-lying land, poorly drained, periodically or permanently inundated with standing or slow moving, nutrient-rich water, and subject to seasonal fluctuations. Marshes usually have mineral soil base.

Mast: Trees which produce nuts; for example, oak, walnut.

Mast year: a year of above average nut production in a forest.

Microclimate: “Little climate”; the environmental conditions in a restricted area.

Microhabitat: A “small habitat” within a larger one in which environmental conditions differ from those in the surrounding area. A hole in a

tree trunk or an animal carcass is a microhabitat within the forest.

Mineral Links: Terrestrial sites used by big game animals as a source for essential minerals which includes both macro and trace elements.

Mitigation: Actions taken during the planning, design, construction and operation of works and undertakings to alleviate potential or adverse effects on the land base.

Mixed Forest: A forest that includes both coniferous and deciduous trees.

Monoculture: The raising of a crop of a single species, generally even-aged.

Mor: A type of forest floor formed by a thick mat of slowly decomposing matter, often conifer needles.

Mull: A type of forest floor and soil in which the decomposing matter, usually formed of broadleaves, decays rapidly. The humus is mixed thoroughly with mineral matter by earthworms and other small animals, so there is no sharp boundary between the forest floor and soil.

Multi-Use Forestry: Any practice of forestry fulfilling two or more objectives of management.

Muskeg: A mossy bog in the northern coniferous forest region.

Natural Selection: A process in nature resulting in the survival and perpetuation of only those forms of plant and animal life having certain favorable characteristics that enable them to adapt best to specific environment.

Needleleaf: Bearing needlelike leaves. See Conifer.

Nitrogen-fixation: The conversion of elemental nitrogen from the atmosphere to organic combinations or to forms readily utilizable in biological processes. Normally carried out by bacteria, living symbiotically in legumes or by free living soil bacteria.

Nonrenewable Resources: Substances such as oil, gas, coal, copper, and gold, which, once used, cannot be replaced, at least not in this geological age.

Non-operable areas: Areas within the operating area where the physical features of the landscape makes timber harvesting inappropriate.

Old Field: Farmland once cultivated, but now untended.

Other Related Values: All forest related values that are not derived from timber harvesting and the subsequent production of forest products.

Organic Matter: Chemical compounds of carbon combined with other chemical elements, and generally manufactured in the life processes of plants and animals. Most organic compounds are a source of food for bacteria and are usually combustible.

Organism: A form of life composed of mutually dependent parts that maintain various vital processes.

Partial Cutting: Tree removal other than by clearcutting.

Particulates: Small particles of liquid or solid matter.

Perennial: a plant that lives for several years and usually produces seeds each year.

Pesticides: any chemical preparation used to control populations of injurious organisms, plants, or animals.

Petroglyphs: Rock carvings (carved into large rock masses) created by native peoples to represent ideas, events or activities (e.g. rock paintings).

Photosynthesis: The process by which green plants convert carbon dioxide and water into simple sugar. Chlorophyll and sunlight are essential to the series of complex chemical reactions involved.

Picograph: A number of different techniques used by Native peoples to visually represent ideas, events or activities (e.g. rock paintings)

Pigment: A chemical substance that reflects or transmits only certain light rays and thus imparts colour to an object. For example, a substance that absorb all by red rays, which it reflects, will appear red. See Chlorophyll.

Pioneer: A plant capable of invading bare sites such as a newly exposed soil surface, and persisting there until supplanted by successor species.

Plantation: a humanmade forest, usually established by planting seedlings.

Plus Tree: An elite tree judged but not proven to be superior in some quality or quantity. Often used for seed collection.

Plywood: A composite product made up of cross banded layers of veneer, bonded with an adhesive.

Pole: A young tree usually between 4 and 8 inches (10 to 20 centimeters) in diameter.

Policy: Policy in this document refers to governing principles and corresponding procedures and standards of the Provincial Government.

Pollution: harmful substances deposited in the air or water or land, leading to a state of dirtiness, impurity, or unhealthiness.

Predator: An animal that lives by capturing other animals for food.

Prescribed Burning: The planned application of fire to natural fuels including logging slash with the intent to confine the burning to a predetermined area.

Procedures: Steps taken to implement a policy or guideline.

Pulpwood: Wood cut and prepared for manufacture into woodpulp.

Range: All lands, including forest land, that produces native forage in contrast to land cultivated for agricultural crops or carrying a dense forest. Also applied to the range if individual species of plants and animals.

Recycle: The salvage and reprocessing of used materials (such as paper, metals, glass, and cloth).

Reforestation: The replanting of trees in forests that have been affected by cutting, fire, disease, or other incursion.

Regeneration: Renewal of a tree crop whether by natural or artificial means. The regeneration period is the period required or allowed in the plan for regenerating following timber harvest.

Riparian zone: An area adjacent to streams, lakes and wetlands that is wet enough or inundated frequently enough to develop and support natural vegetative cover distinct from the vegetation in neighbouring freely drained upland sites.

Roading: The provision of roads in an area.

Rodenticides: Chemical preparations used against mice, rats and other rodents that may consume forestry seed or debark trees.

Rotation: The planned number of years between the formation of a forest crop and its final cutting at a specified stage of maturity.

Rutting Potential: Refers to the susceptibility of an area to be damaged by the repeat passage of machinery.

Sanitary Fill: Used to describe the dumping process whereby the garbage or other refuse is covered with soil, thus controlling smell, rodent activity, etc., and speeding the decay of organic substances.

Sapling: A young tree normally more than 41/2 feet (1.5 metres) high and less the 4 inches (10 centimetres) in diameter.

Savanna: A park-like grassland with scattered trees or clumps of trees.

Sawlog: A log considered suitable in size and quality for producing sawn timber.

Sawtimber: Trees fit to yield sawlogs.

Scavenger: An animal that eats the dead remains and wastes of other animals and plants.

Scrub: A low woody vegetation composed principally of shrubs.

Secondary Fiber: Fiber used as a raw material for making new products. The fibers have been reclaimed from waste paper or collected during the manufacture of paper and paperboard products.

Section Cutting: The annual or periodic removal of trees individually or in small groups.

Seral Stage: One community of a *sere*.

Sere: The series of communities that follow one another in a natural succession, as in the change from bare field to mature forest.

Shelterwood Cutting: Any regeneration cutting in a more or less regular or mature crop designed to establish a new crop under the protection of the old.

Shrub: A woody plant less than 12 feet (4 metres) tall, usually with more than one stem rising from the ground.

Silvicides: Any chemical preparations used to control unwanted trees.

Silviculture: The science and art of cultivating forest crops based on the knowledge of silvics, the study of the life history and general characteristics of forest trees and stands with particular reference.

Sink Holes: A funnel-shaped depression in the land surface that communicates with a subterranean passage developed by solution. It is common in limestone and karst regions.

Slope: The angle at which a planar surface is inclined relative to the horizontal.

Snags: Any standing dead, partially dead, or defective tree at least 3 meters tall.

Special Concern, Threatened and Endangered Species (SCTE): Classifications of the status of species populations as determined by the committee on the status of Endangered Wildlife in Canada (COSEWIC).

- **Special Concern (SC):** Indicates any indigenous species of fauna or flora that

is particularly at risk because of low or declining numbers, occurring at the fringe of its range or in restricted areas, or for some other reason, but is not a threatened species.

- **Threatened (T):** Indicates any indigenous species of fauna or flora that is likely to become endangered in Canada if the factors affecting its vulnerability do not become reversed.
- **Endangered (E):** Indicates any indigenous species of fauna or flora that is threaten with imminent extirpation or extinction throughout all a significant portion of its Canadian range.

Softwood: A coniferous or needleleaf tree.

Standards: Standards are established benchmarks that the implementation of a procedure can be measured against. They may be strict targets that must be achieved or exceeded, or they may be general goals against which implementation is measured.

Strata: A stand of trees with similar species composition, height, age, site, crown closure. A strata may be one or more stands with similar characteristics.

Sustainable Forest Management: The management of forests to meet current needs without prejudice to their future productivity, ecological diversity or capacity for regeneration.

Swamp: A type of wetland where trees or tall shrubs dominate a landscape characterized by periodic flooding. Swamps have nearly permanent, subsurface, nutrient-rich water flow through the substrate of mineral sediments and organic materials; peat accumulations are seldom present.

Thunderbird Nest: A spiritual site where aboriginal people have gone to seek visions. The site is usually constructed of rocks in a circle.

Understory Trees: The trees growing under the canopies of the larger adjacent trees.

Vegetation Types (V-Type): The classification assigned to a forest stand using a dichotomous classification key. The key is primarily based on

the presence and/ or abundance of vegetative species. The vegetation type is used in the Manitoba forest Ecosystem Classification System.

Windfirmness: An indication of the ability of the softwood understory to withstand significant winds after the overstory has been removed.

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