Sustainable Forest Management Plan for Canfor's Grande Prairie FMA area 9900037

Certification under CAN/CSA Z809-02

November 7, 2005

Sustainable Forest Management Plan
Canadian Forest Products Ltd.
Grande Prairie Division

Prepared By:

Dwight Weeks, RPFT
Forest Planner

Brad Engel, B.Sc. For, RPF
Resource Management Consultant

Jill Ashley, RPF
Forestry Supervisor

Approved By:

Jim Stephenson, RPF
Woodlands Manager

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Canfor would also like to thank the many individuals who provided information or contributed to specific components of this document.

Copies of this document are available for review at the public libraries in Grande Prairie, Spirit River, DeBolt, Grande Cache and Valleyview. Open houses and townhall meetings are held periodically in the South Peace area. Watch for advertisements in local newspapers for the dates and times. Additional information can be obtained by contacting:

Canadian Forest Products Ltd.
9401 - 108 Street
Postal Bag 100
Grande Prairie, Alberta
Canada T8V 3A3
Phone; (780) 538-7749
Fax: (780) 538-7800
www.canfor.com

The majority of the literature cited in this document is available for viewing at Canfor's Grande Prairie office.

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1. Introduction

1.1 Purpose

Canfor has implemented a very deliberate and comprehensive certification strategy that reflects its long-standing commitment to excellence in forest stewardship. The Company continues to build on its International Organization for Standardization (ISO) 14001 certification (1996) and approved Sustainable Forest Management Plan (SFMP) (2001) by certifying the current SFMP to Canadian Standards Association (CSA) to CAN/ CSA Z809-02 Sustainable Forest Management (SFM) System standards.

The Sustainable Forest Management Plan 2005 presented here, and its implementation, is intended to fulfil that commitment for Canfor's Grande Prairie Division Forest Management Agreement area 9900037.

1.2 CSA Z809-02 Standard (excerpts)

National standards of Canada are required to undergo a mandatory 5-year review, and as part of this process, CSA completed the review of the Sustainable Forest Management (SFM) Standard, CAN/ CSA Z809-96 (guidance) and CAN/ CSA Z809-96 (requirements), which were published in 1996. The 18-month review process was conducted by the CSA Sustainable Forest Management Technical Committee (CSA SFMTC), which consists of a balanced matrix from four chambers – academic/ professional, general interest, government/ regulatory authority and public interest. The review process consisted of meetings within the CSA SFMTC, as well as open public consultation and public review periods. The CSA SFMTC unanimously approved the revision of the Standard (CSA Z809-02) in 2002 (CSAI, 2002).

The Standard is more than a system standard; it is also a performance standard. It deals with performance at two levels:

- It prescribes use of a mandatory set of Canadian Council of Forest Ministers (CCFM) SFM criteria; and
- It gives the public the opportunity to assist in setting specific values, objectives, indicators and targets at the local forest level for each of the CSA SFM Critical elements.

The Standard requires a public participation process to set locally appropriate targets (including thresholds and limits). Moreover, the Standard sets the requirements for a public participation process, which allows the public to participate in the interpretation of the CCFM criteria and CSA SFM elements for the local forest.

The Standard is consistent with the internationally recognized ISO 14001 environmental management system standard. It is essential to have a management system that can assure the fulfillment all the CSA SFM requirements. A management system is the vehicle ensuring that both public participation and performance requirements are fulfilled in a systematic and predictable manner that guarantees continual improvement in the forest.

Continual improvement is central to the Standard. The Standard uses adaptive management procedures that recognize SFM as a dynamic process that must incorporate new knowledge acquired through time, experience, and research, and that must evolve with society's changing environmental, social and economic values. The standard requires

the organization to undertake an annual review of all its requirements, including performance requirements, to identify areas for continual improvement.

1.3 Canfor Corporation Guidance

Both the approved DFMP (Canfor, 2003) and this document are in conformance with the direction given in Canfor's corporate *Environment Policy* (Appendix 1) and *Canfor's Forestry Principles* (Appendix 2).

Canfor's corporate *Environment Policy* defines the commitments to responsible stewardship of the environment. The tenets of this Policy are supported and promoted throughout Canfor's operations and apply to both manufacturing plant and woodlands environments. The Policy includes commitments to comply with or surpass legal requirements, sets and reviews environmental objectives and targets to prevent pollution and to achieve continual improvement in environmental performance, to create opportunities for interested parties to have input into forest planning activities, and to practice forest management that recognizes the ecological processes and diversity and supports integrated use of the forest, among others.

Canfor's Forestry Principles ("the Principles") are based on the tenets of ecosystem management, continuous improvement, public involvement and third party verification of performance. Canfor views these Principles as a fundamental component in improving its existing sustainable forest management practices, ensuring the transparency of its operations and fulfilling sustainable forest management certification requirements. The Principles were approved and subsequently introduced to all Canfor operations in 1999. The following is a summary of the Principles:

1.3.1 Ecosystem Management

We will use the best science available to develop an understanding of ecological responses to natural and human-caused disturbances. We will incorporate this knowledge into higher level and operational plans by applying ecosystem management principles to achieve desired future forest conditions.

1.3.2 Scale

We will define objectives over a variety of time intervals (temporal scales), and at spatial scales of stand, landscape and forest.

1.3.3 Adaptive Management[1]

We will use adaptive management to continually improve forest ecosystem management. This will require the development and application of collaborative research and monitoring programs.

1.3.4 Old Growth

We will include old growth and old growth attributes as part of our management strategies and philosophy in the forests where we operate.

[1] Adaptive management is a learning approach to management that incorporates the experience gained from the results of previous actions into decisions. It is a continuous process requiring constant monitoring and analysis of the results of past actions which are used to update current and planned strategies" (Canfor, 1999a).

1.3.5 Timber Resource
We will ensure a continuous supply of affordable timber in order to carry out the business of harvesting, manufacturing and marketing forest products. Canfor will strive to maximize the net value of the fibre extracted for sustained economic benefits for employees, communities and shareholders.

1.3.6 Forest Land Base
We advocate the maintenance of the forest landbase as an asset for the future.

1.3.7 Health and Safety
We will operate in a manner that protects human health and safety.

1.3.8 First Nations
We will pursue business partnerships and cooperative working arrangements with First Nations to provide mutual social, cultural, and economic benefits and to address mutual interests.

1.3.9 Communities
We will engage members of the public, communities and other stakeholders in the delivery of the *Forestry Principles*. The process will be open, transparent and accountable.

1.3.10 Accountability
We will be accountable to the public for managing forest to achieve present and future values. We will use credible, internationally recognized, third party verification of our forestry operations as one way of demonstrating our performance.

1.4 Summary of Current Approved SFMP (July 2000)
In December 1999 Canfor's environmental management system (EMS) was certified to the ISO 14001 standard. The EMS provided a platform on which to build the sustainable forest management system required to meet the CSA Z809-96 standard. Canfor's Grande Prairie Forest Management Advisory Committee (FMAC) identified locally relevant values, goals, indicators and objectives that comprised the basis for preparation of a Sustainable Forest Management Plan (SFMP) under the CSA Z809-96 standard (refer to Section 3 for additional information). In June 2000, the SFMP 2000 was certified under the Standard.

The SFMP 2000 was incorporated into the Detailed Forest Management Plan (DFMP) prepared under the terms of Forest Management Agreement (FMA) 9900037 (Province of Alberta Order in Council 198/ 99). The DFMP was approved by the Alberta government on November 3, 2003.

The SFMP 2000 contains 25 values, 39 goals, 76 indicators and 88 objectives developed by the FMAC. Canfor's performance in achieving these objectives is reported in its *Annual Performance Monitoring Report* (Table 1).

Table 1. Performance in Achieving SFMP (July 2000) Objectives

SFMP Table Master
Table 1

Classification	Number
Number of objectives completed	7
Number of objectives met	56
Number of objectives not met	0
Number of objectives in progress	15
Number of objectives not due for reporting	10
Total number of CSA Z809-96 objectives [1]	**88**
Notes:	
1. From *2004 Annual Performanmce Monitoring Report*. Modified to exclude three non-SFMP objectives i.e., 7, 8, 9	

Source: Canfor compiled data

1.5 CSA SFMP Requirements

Canfor's *Environment Policy* (Appendix 1) includes a commitment to "*create opportunities for interested parties to have input into our forest planning activities*". The CSA Z809-02 standard requires that sustainable forest management planning be carried out in consultation with those directly affected by or interested in forest management. The *Environment Policy* commitment has been interpreted and extended to include the involvement of the public in the setting of local values, objectives, indicators and targets for the purpose of developing a sustainable forest management plan to fulfil this standard. The Forest Management Advisory Committee (FMAC) is the body that has provided this input and its Terms of Reference is included in Appendix 3.

Canfor is committed to respecting Aboriginal and treaty rights and interprets its *Environment* Policy to include respect for those rights. *Canfor's Forestry Principles* also commit us to "…pursue business partnerships and co-operative working arrangements with aboriginal people to provide mutual social, cultural and economic benefits and to address mutual interest" (Canfor, 1999a).

For the purpose of this SFMP 2005, Grande Prairie Division has chosen to adopt its FMA area as the Defined Forest Area (DFA), as shown in Figure 2. Under the CSA Z809-02 standard, the DFA is "a specified area of forest, land, and water delineated for the purpose of registration of a Sustainable Forest Management system. The DFA may or may not consist of one or more contiguous blocks or parcels" (CSAI, 2002).

It is recognized that Canfor is not the only operator with management responsibility within the FMA area. Alberta Sustainable Resource Development (ASRD) has the overall authority for approvals and ensuring that all objectives laid out in the Detailed Forest Management Plan (DFMP) are met. Forest management principles have been developed for planning deciduous timber allocations on the FMA area (Canfor, 2005c). A memorandum of understanding (MOU) (Canfor, 2004a) has been signed between Canfor and Tolko Industries Ltd. Canfor intends to enter into a similar agreement with Ainsworth Lumber Company Ltd.

Canfor has also been working with energy sector companies to minimize the loss of area due to their activities by integrating road and land use plans, where feasible. The activities of other timber resource users will be monitored to determine if their operations significantly impact DFMP objectives. Significant impacts will be reported to ASRD and the companies involved. Canfor will co-operatively work with all parties to determine if remedial actions are required.

Alberta Sustainable Resource Development has the responsibility for managing and approving energy sector activities. The energy sector does not have forest management responsibilities on the FMA area; however, their activities do affect the forest landscape of the FMA area. Canfor has the opportunity to review all energy sector applications and give consent for withdrawal of the lands from the FMA area. The activities are monitored and their impacts upon the DFMP and SFMP 2005 objectives will be assessed during the linear update process (which includes all industrial dispositions).

1.6 Canfor's Forest Management System (FMS)

After the amalgamation of Slocan with Canfor in late 2003, the Environmental Management Systems (EMS) and Sustainable Forest Management Systems (SFMS) were incorporated into a single system called Canfor Forest Management System (FMS). The FMS is a systematic means of identifying, addressing and managing environmental impacts and sustainable forest management commitments within Canfor's woodlands operations. It includes all activities from planning of woodlands operations performed by Canfor's employees, crews and contractors up to but not including the truck weigh scales.

The FMS is documented in the corporate *Canfor Forest Management System (FMS) Manual* that was released in May 2005. The Manual explains the core elements of the FMS for woodlands operations, how these operations continually improve environmental performance, and how the operations practice sustainable forest management. The manual also explains who is responsible for addressing requirements of ISO 14001, Clause 7 (*SFM System Requirements: The Continual Improvement Loop*) of the CSA Z809-02 standard and refers to the lower-level procedures and instructions that explain how specific tasks are carried out.

1.6.1 Management Review

The goal is for Canfor Management to stand back from the daily "noise" of the operation, and evaluate trends toward or away from the *Canfor Environment Policy*, the *Forestry Principles,* Sustainable Forest Management (SFM) commitments, and objectives and targets. Management reviews look backward at progress to date, and look forward to anticipate the need for changes to the Forest Management System (FMS).

Management reviews also evaluate the effectiveness of the FMS itself. Management review is the "Act" in the Plan-Do-Check-Act continual improvement cycle (Figure 1), comparing actual results with the original objectives and targets to determine where further improvement is needed.

Figure 1. Plan-Do-Check-Act Continual Improvement Cycle

Management reviews are conducted at two levels:

- Operations; and
- Canfor Corporate.

1.6.1.1 Operations Annual Review

Once per year at a minimum the operations hold a Management review. At these reviews the Woodlands Manager leads the management team in a discussion of:

- Progress toward objectives and targets, including significant aspects:
  - actual results versus the targets; and
  - status of programs/ action plans.
- Need to set new environmental objectives and targets;
- Summary of results from environmental audits;
- Trends in environmental non-conformances and non-compliances;
- Public process for SFM;
- Communications from external interested parties, including complaints;
- Trends with corrective and preventive action, and lessons learned from experience;
- Effectiveness of the FMS;
- Need to modify the FMS in response to:
  - changing legislation or other environmental requirements;
  - changes in the operation or in the FMA area;
  - advances in science and technology;

- input from parties with an interest in Canfor's environmental performance and SFM;

- Recommendations for improvement.

If the Management review shows negative trends (e.g. environmental objectives and targets are not being met) then the Woodlands Manager ensures action items are included in the Management Review records.

The Woodlands Manager ensures records of the Management review include:

- Copies of the materials presented;
- Action items that have been agreed to during the meeting;
- Description of any new objectives and targets, which have been set.

Management review records are posted on the operation's FMS Website, and a copy or link is also sent to the Manager, Certification and Market Support.

1.6.1.2 Corporate Annual Review

The Manager, Certification and Market Support meets with the Canfor Executive Management Committee (CEMC) to review:

- *Environment Policy* and the *Forestry Principles*;
- Company-wide trends in incidents;
- Company-wide progress with SFM implementation;
- Corporate commitments;
- Allocation of resources to the FMS (i.e. are the resources adequate?);
- Summary of operations' management reviews; and
- Recommendations for improvement.

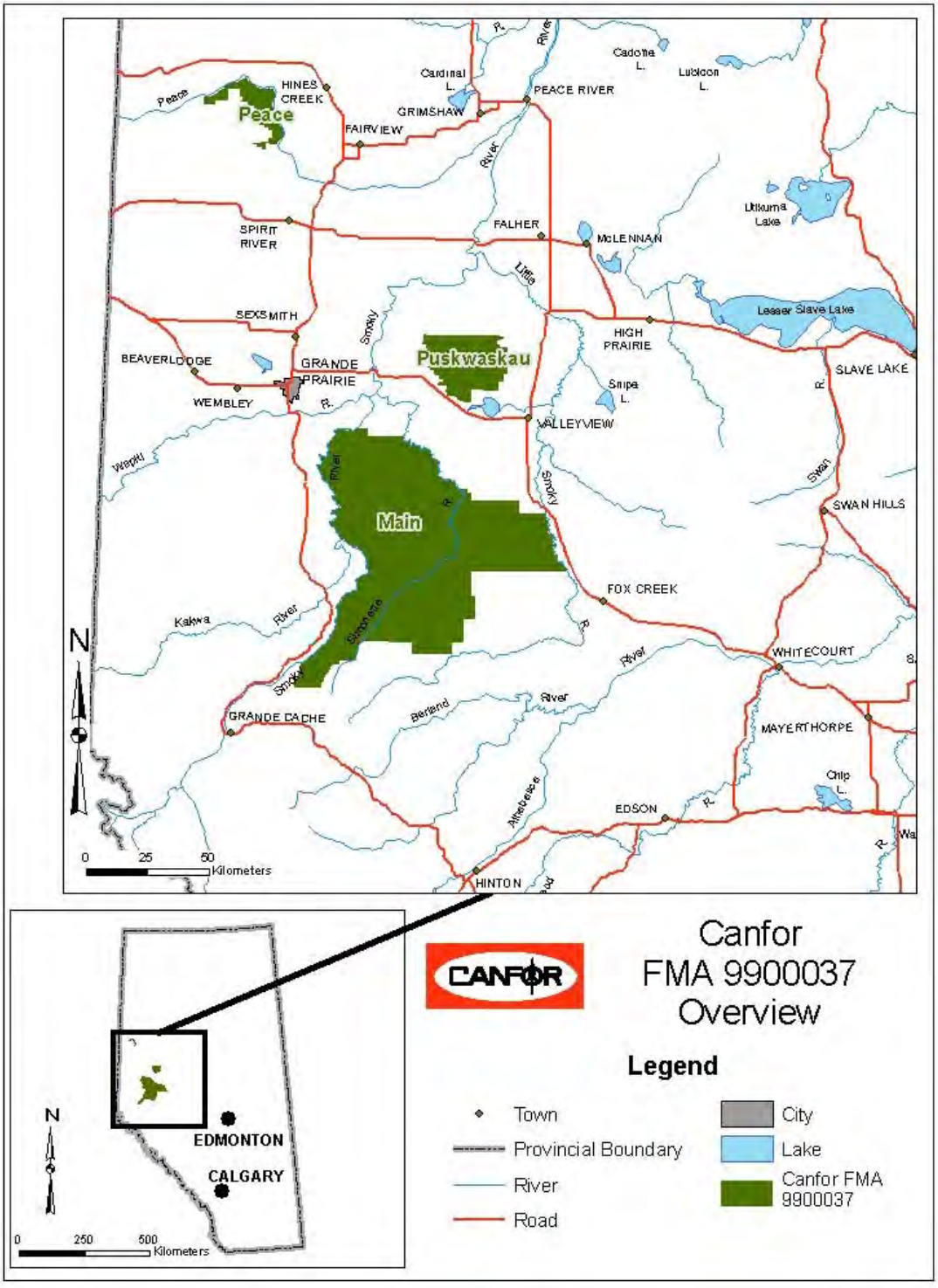
2. Description of the FMA area

On May 26, 1964, Canadian Forest Products Ltd. (formerly North Canadian Forest Industries Ltd.) entered into a twenty-year Forest Management Agreement (FMA) with the Province of Alberta that was renewed in 1978. The current Forest Management Agreement 9900037 (Canfor, 1999f) commenced May 5,1999 and expires May 2019, unless renewed under the provisions contained in the agreement. Canfor has been granted the rights to manage, grow, harvest, and reforest coniferous timber and to maintain and/ or increase the coniferous annual allowable cut, within a 649,160 hectare area. The approved coniferous annual allowable cut (AAC) as identified in the approved Detailed Forest Management Plan (Canfor, 2003) is 640,000 m^3 per year and the deciduous AAC is 453,712 m^3 per year.

Canfor's Grande Prairie Division has adopted its Forest Management Agreement FMA area as the defined forest area[2]. The FMA area is located in west central Alberta (Figure 2). It comprises three separate parcels of forested land identified as Forest Management Unit G15, with a total area of 649,160 hectares. The parcels are identified as Peace, Puskwaskau and Main.

[2] Defined Forest Area - a specified area of forest, land, and water delineated for the purpose of registration of a Sustainable Forest Management system. The DFA may or may not consist of one or more contiguous blocks or parcels (CSAI, 2002).

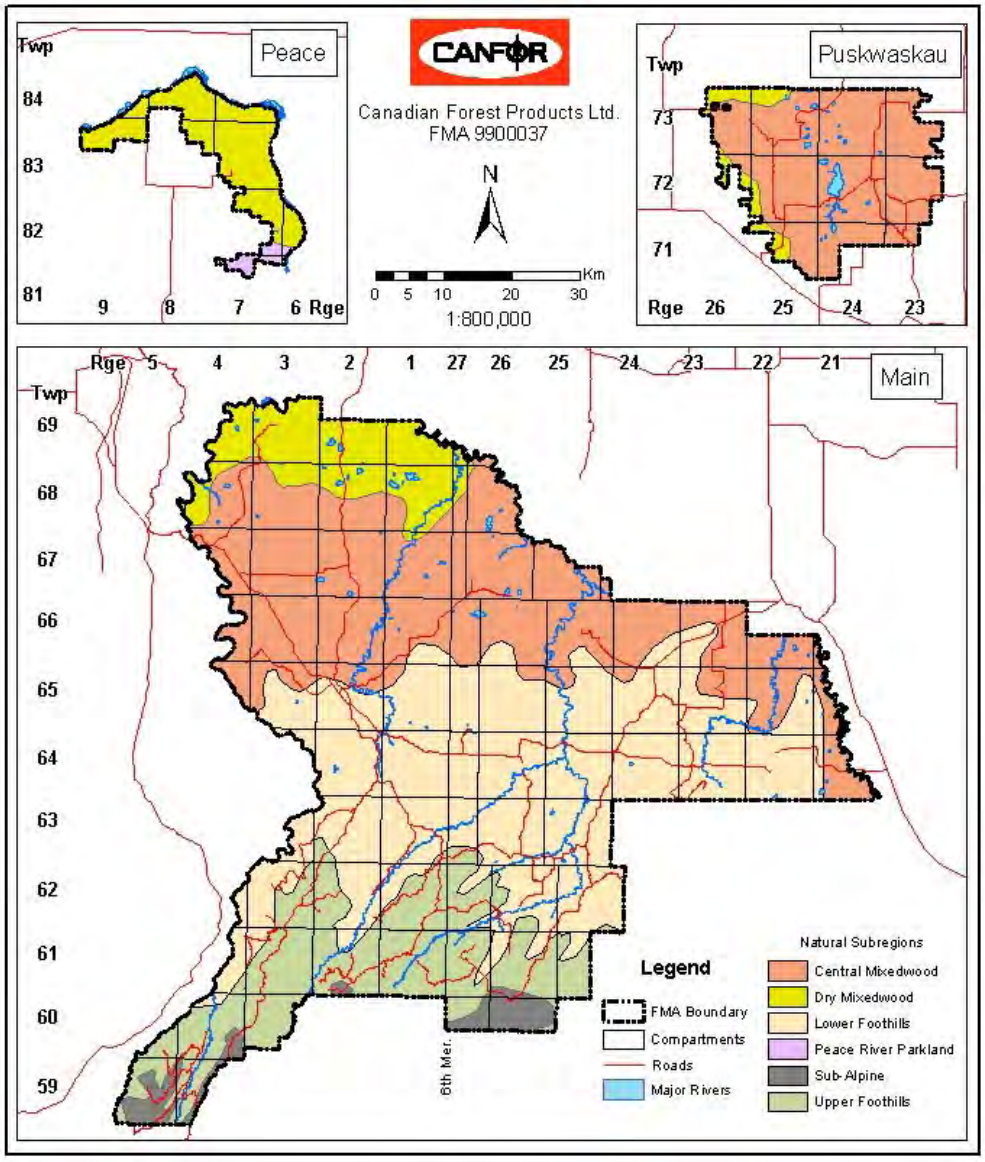
Figure 2. Location of the FMA area



2.1 Natural Subregions

The FMA area is located in the Central Mixedwood, Dry Mixedwood, Peace Parkland, Lower and Upper Foothills and Subalpine Natural Subregions[3] (Figure 3) as described by Achuff (1996).

Figure 3. Natural Subregions within the FMA area



[3] A Natural subregion is a division of the Natural region based on differences in regional climate, landform, bedrock geology and soils. The Natural subregion is more refined than a Natural region through variations in elevation in addition to distinctive vegetation associations. Natural subregions contain "reference" vegetation types that are characterized by climate and environment (moisture and nutrients).

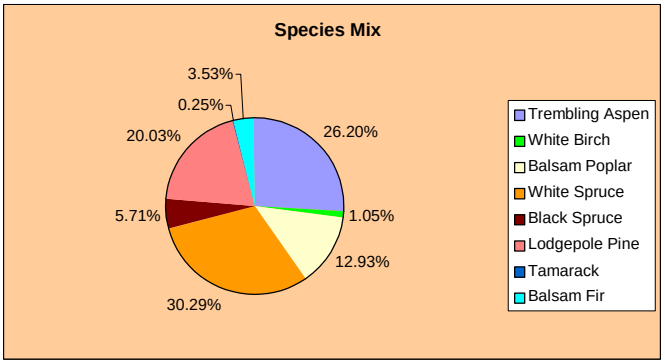
Coniferous trees dominate forest stands in the Upper Foothills and Subalpine. White spruce (*Picea glauca*) and lodgepole pine (*Pinus contorta*) are found in the lower elevations and Engelmann spruce (*Picea engelmanni*i) and subalpine fir *(Abies lasiocarpa*) located at higher elevations. In lower elevations of the Lower Foothills, Central Mixedwood and Dry Mixedwood, pure and mixed stands of trembling aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*) are interspersed with lodgepole pine, white spruce and balsam fir (*Abies balsamea*). Poorly drained depression areas and riparian zones throughout the region include, black spruce (*Picea mariana*), tamarack (*Larix larcina*), labrador tea (*Ledum groenlandicum*), willow (*Salix* spp.), peat and brown mosses (Sphagnum spp., *Tomenthypnum nitensm*, *Aulacomniun palustre*), and horsetails (*Equisetum* spp.).

These subregions are associated with foothills topography as well as undulating and rolling terrain. Stream elevations range from 400 m above sea level (ASL) near the Puskwaska River confluence with the Smoky River to over 1,700 metres ASL in the southern headwaters. Landscape features are a result of both continental and cordilleran glaciers covering the area during the Pleistocene epoch and morainal, glacial-fluvial and glaciolacustrine deposits being predominant (Halstead, 1993). Colluvial and residual bedrock materials frequent higher elevations of the Subalpine Subregion, while bedrock outcrops of marine shales and non-marine sandstones are frequent in the Foothills Subregions. The Dry and Central Mixedwood Subregions are characterized by till as ground moraine and hummocky moraine landforms with aeolian dunes and sandy outwash plains occurr throughout (Achuff, 1996).

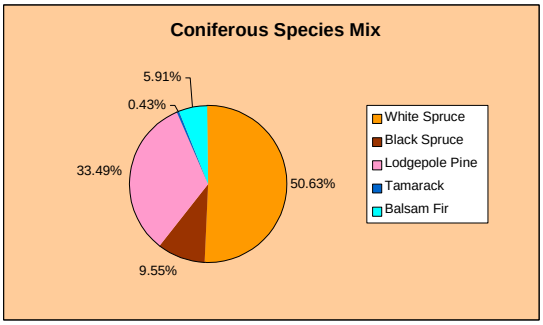
2.2 Species Mix

There are 8 primary commercial species within the FMA area – 5 coniferous and 3 deciduous (Figure 4). Approximately 60% of the trees are coniferous and 40% are deciduous. White spruce is the most common of the coniferous species closely followed by lodegepole pine. Trembling aspen is the most common deciduous species.

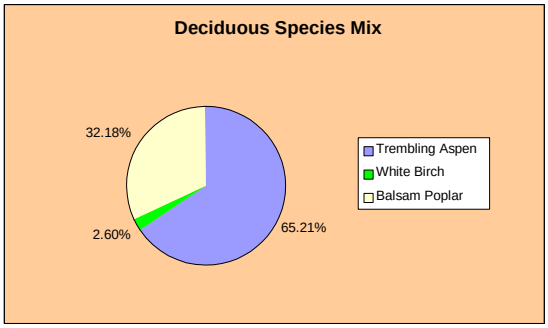
Figure 4. Tree Species Mix within the FMA area



FMA area Species Mix
Percentage distribution of the 8 primary tree species within the FMA area.



Coniferous Species Mix
Percentage distribution of coniferous.



Deciduous Species Mix
Percentage distribution of deciduous.

2.3 Landbase Components of FMA area

Table 2 lists all the components of the timber harvesting landbase for the FMA area. There are a total of 474,193 ha of forested landbase.

Table 2. Landbase Components of the FMA area

SFMP Tables Master.xls
Table 2

Classification	Area (ha)	Area (ha)	% of Total Area	% of Forested Area
Total landbase		**649,159.89**	**100.00**	
Reductions for non-forest				
Natural non-vegetated	12,959.91		2.00	
Anthropogenic non-vegetated	4,939.35		0.76	
Anthropogenic vegetated	4,946.51		0.76	
Non-forest vegetated	32,884.48		5.06	
AVI Attribute MODCON1 = "sc"	0.18		0.00	
AVI Attribute MODCON1 = "cl"	0.68		0.00	
Roads not included in AVI	1,132.95		0.17	
Total non-forest reductions	56,864.06	56,864.06	8.76	
Total forested landbase		**592,295.83**	**91.24**	**100.00**
Reductions to forested landbase				
Steep slopes (from AVI)	10,522.07		1.62	1.78
Slumps (from AVI)	42.51		0.01	0.01
Gravesites	5.15		0.00	0.00
DRS	320.48		0.05	0.05
Dunvegan West Wildland	686.15		0.11	0.12
Parabolic Sand Dunes Rare Physical Environment	5,480.31		0.84	0.93
Swan buffers	2,247.56		0.35	0.38
Watercourse buffers	37,715.86		5.81	6.37
Low productive (Yield Group 13)	25,821.55 [1]		3.98	4.36
River buffers (Beaver)	3.79		0.00	0.00
Non-allocated deciduous areas	9,837.93 [2]		1.52	1.66
Height/Age Reduction areas	18,383.65 [3]		2.83	3.10
Non-allocated birch areas	6,903.09 [4]		1.06	1.17
AOP Reserve Areas	132.69 [5]		0.02	0.02
Total reductions to forested landbase	118,102.79	118,102.79	18.19	19.94
Timber harvesting landbase		**474,193.04**	**73.05**	**80.06**

The changes that have occurred to this present landbase summary as result of the integration of the 2001 Annual Operating Plan (AOP) include:

1. Low productive - Yield Group 13 (SBLT/LTSB-U)
Approximately 11 ha of yield group 13 in proposed cutblocks are not included in low productive. In addition, one of the GIS inputs into the timber supply is an AOP coverage containing stands to be harvested in the near term. One of the assumptions built into the process is that all timber within an AOP block is economically operable. The AOP coverage that was present at the time of the Benchmark Report contained a block that overlaid approximately 5 ha of a yield group 13 (SBLT/LTSB-U) type. Despite this, the 5 ha was assumed to be operable. Under the updated AOP coverage, this particular stand was either modified or removed. The 5 ha of yield group 13 reverted back to inoperable.

2. Non-Allocated Deciduous Areas
The addition of stands classified as non-allocated deciduous areas which were removed from the Timber Harvesting Landbase (THLB). These are hardwood stands within G8C and E8 that are not part of the hardwood quota allocation.

3. Height/Age Reductions Areas
The addition of stands classified as height/age reduction areas which were removed from the THLB. These are stands which met the following height requirements:
- Yield group 12 (SBLT/LTSB – G,M,F) stands with heights < 16 and ages > 80.
- All other coniferous stands with height < 13 and ages > 80.

4. Non-Allocated Birch Areas
The addition of stands classified as non-allocated birch areas which were removed from the THLB. These are birch stands which have not been allocated.

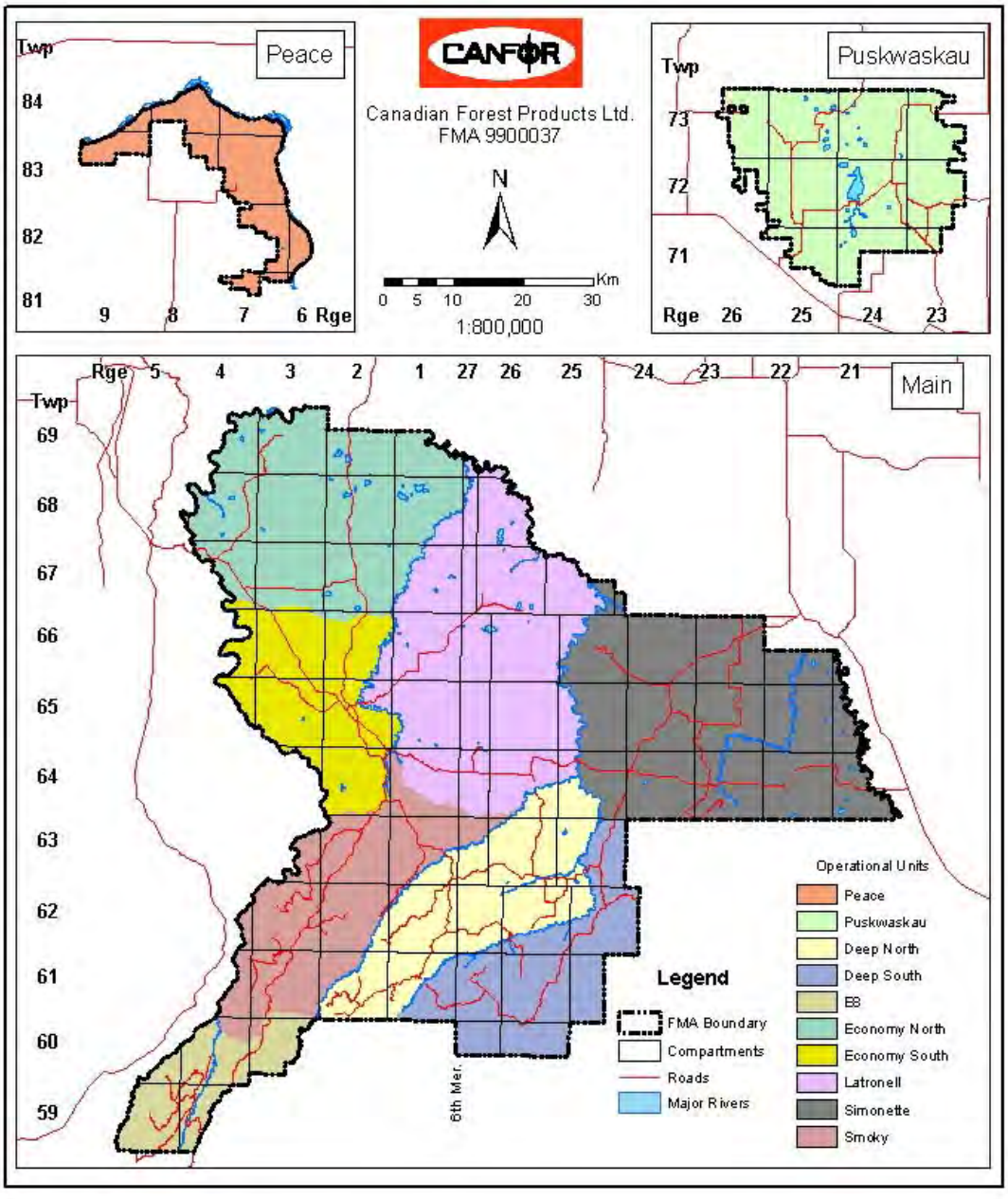
5. AOP Reserve Areas
The addition of stands classified as AOP reserve areas were removed from the THLB. These are polygons classified within the new AOP coverage as AOP blocks with a reserve status.

Source: ORM compiled data

2.4 Operational Units

Canfor established 10 operational units for the FMA area for administrative and operational purposes. These boundaries form logical operating units and were used in the *Resource and Timber Supply Analysis* (Canfor, 2003) for geographic harvest prioritization (Figure 5).

Figure 5. Operational Units



2.5 Other Resource Users within the FMA area

The resources of the FMA area are utilized by a number of other forest companies. The DFMP advances a coarse-filter approach[4] to forest management that maintains forests and wildlife habitat across the landscape. The objective of this approach is to have a neutral effect on other users within the FMA area.

2.5.1 Deciduous Forest Companies

Tolko Industries Ltd. (Tolko) and Ainsworth Lumber Company Ltd. have been granted the right to harvest deciduous species in the FMA area. Table 3 provides a breakdown of the deciduous allocations by quadrants.

Table 3. Deciduous Timber Allocations (m^3) within the FMA area

SFMP Table Master.xls
Table 38

DFMP QUADRANT	YEAR	FMA area					TOTAL FMA area	TOTAL QUADRANT
		Tolko (DTA G2C0001)[1]	Tolko (DTA G500001)[2]	Ainsworth	Tolko (DTA G150002)[3]	Tolko (DTA G150001)[4]		
1	1999	60,500					60,500	
	2000	60,500	108,424				168,924	
	2001	60,500	59,603				120,103	
	2002	84,162	59,603				143,765	
	2003	0	0			156,212	156,212	649,504
2	2004				169,000	156,212	325,212	
	2005			170,000	169,000	156,212	495,212	
	2006			170,000	169,000	156,212	495,212	
	2007			170,000	169,000	156,212	495,212	
	2008			170,000	169,000	143,765	482,765	2,293,615

Notes:

1 DTA G2C0001 was issued for the Puskwaskau parcel only. In 2003 this allocation was amalgamated into DTA G150001

2 DTA G500001 was issued for the main part of the FMA area. In 2003 this allocation was amalgamated into DTA G150001

3 DTA G150002 (167,817 m3) was issued to Tolko in 2004. The numbers in the table includes salvage as indicated in DFMP Approval Condition #4.

4 DTA G150001 was issued as an amalgamation of two previously issued allocations (DTA G2C0001 and G500001). An undercut of 62,237 m^3 from those allocations is applied to the first 5 years of DTA G150001 (2003 - 2007).

Source: Canfor compiled data - CKQ Decid Allocations 2005 temp.xls

2.5.2 Oil and Gas Sector

Much of northern Alberta, including the FMA area, is underlain with rich oil and gas deposits. Exploration and production of the petrochemicals found in these reserves have a significant impact on the local, provincial, national and international economies. The oil and gas sector has been, and will continue to be, a major factor influencing the boreal forest landscape (Stelfox *et al*, 1999).

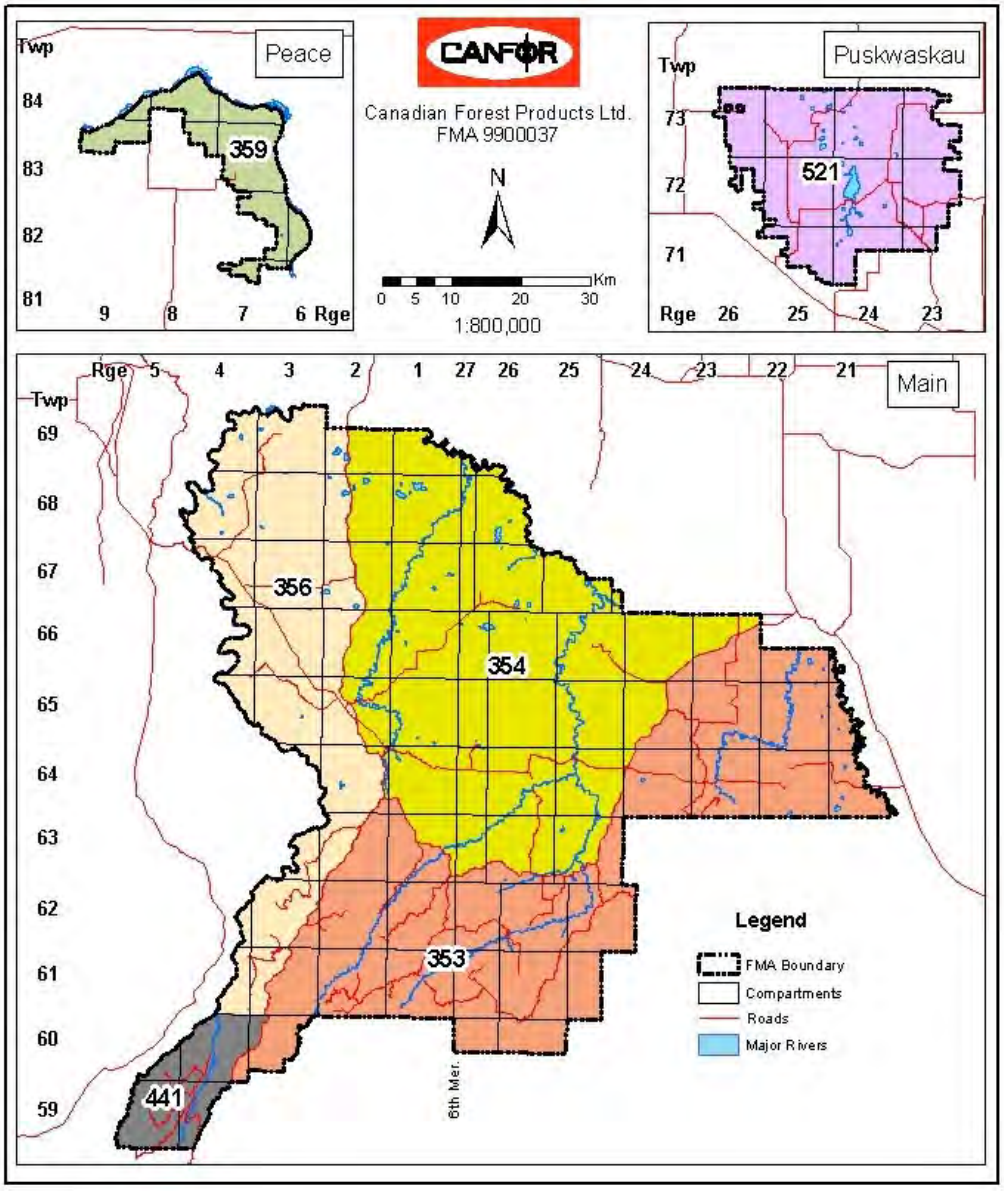
Mineral development and geophysical deletions within the FMA area take the form of license of occupation (LOC), pipeline rights-of-way, mineral surface leases and rights-of entry.

[4] Coarse-filter approach: maintaining vegetative communities, landscape patterns and processes (the coarse filter) within the limits of natural variability will result in the maintenance of the full complement of native plant and animal species.

2.5.3 Outfitters

Outfitters operate in all portions of the FMA area. According to information provided by the Alberta Professional Outfitters Society (APOS), there are 26 professional outfitters in the FMA area. Outfitters operate within Wildlife Management Units (WMU) established by Alberta Sustainable Resource Development (Figure 6). APOS maintains an official directory of outfitters that are permitted to operate in Alberta (http://www.apos.ab.ca).

Figure 6. Wildlife Management Units



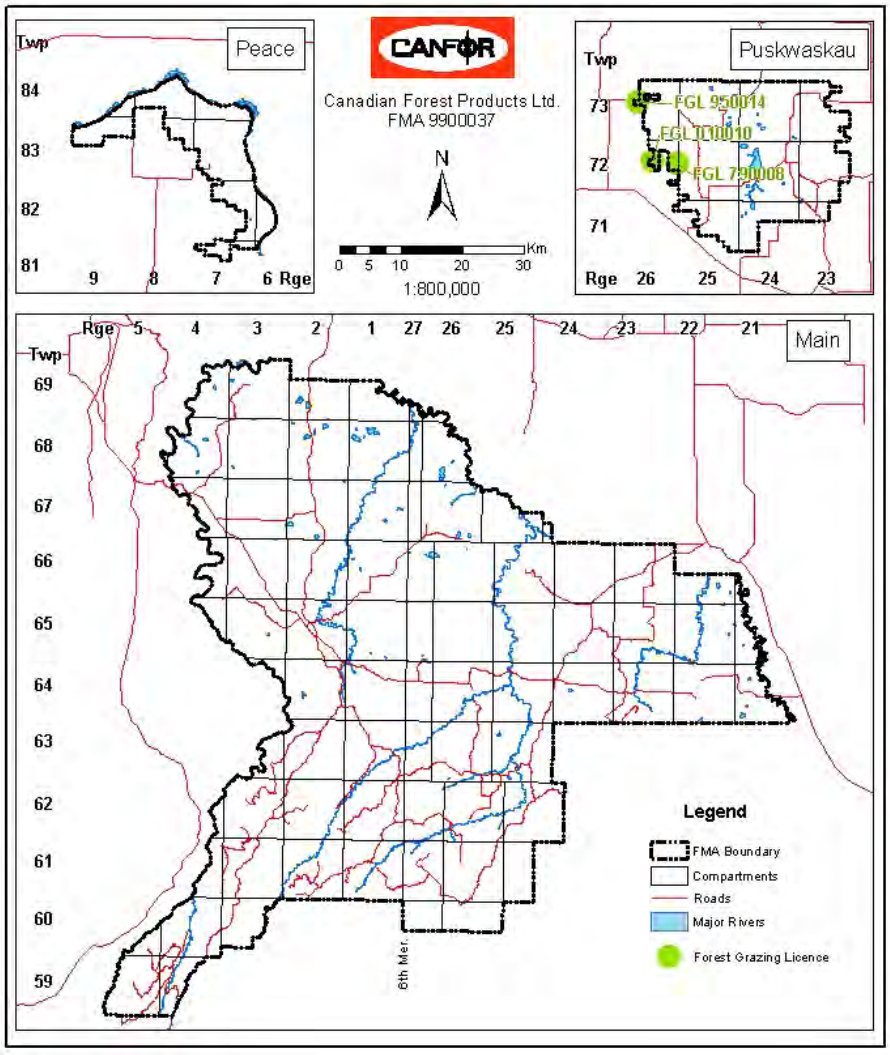
2.5.4 Grazing Dispositions

According to the *Public Lands Act, Dispositions and Fees Regulation* (Alberta Regulation 54/ 2000), a grazing disposition means a grazing lease, forest grazing lease, a grazing license, a grazing permit or a head tax grazing permit. There are 3 forest grazing licenses (FGL), comprising approximately 1,470 ha, within the FMA area (Figure 7).

In accordance with subparagraph 8(2)(d) of FMA Agreement 9900037:

…"after consultation with the Company, the Crown retains the right to authorize grazing dispositions within the FMA area provided, however, that the growth performance of the managed species is not impaired and the regeneration will not be damaged by domestic stock grazing to the point where the overall stocking is reduced below the reforestation standard as set out in the Timber Management Regulation, and provided the Company's rights to manage the area for timber production is not significantly impaired."

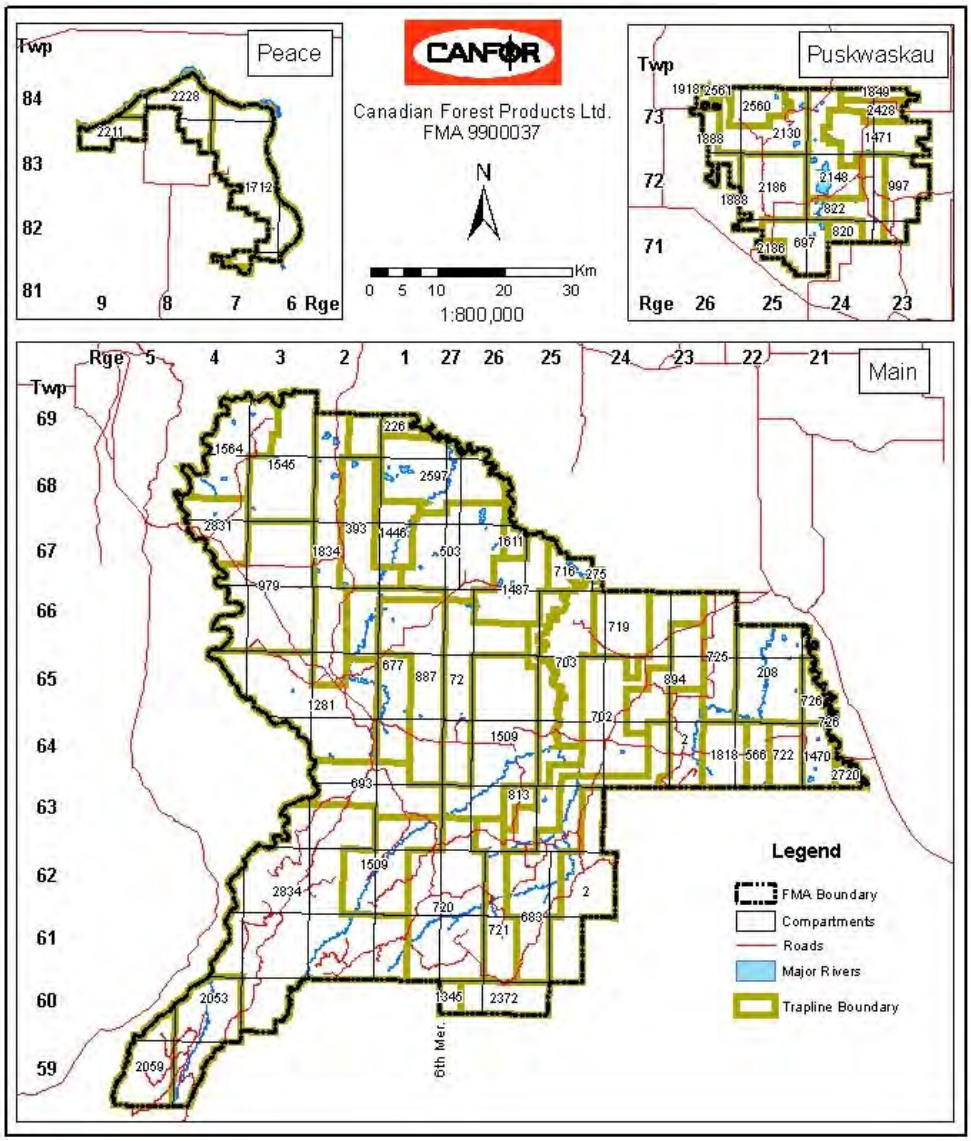
Figure 7. Grazing Dispositions within the FMA area



2.5.5 Trappers

There are 59 traplines in the FMA area (Figure 8). Canfor developed the *Trappers Consultation and Notification Program* (Canfor, 2004) to ensure all trappers affected by its Annual Operating Plan (AOP) are notified and made aware of all activities planned within their registered trapline. The Company retains 2 contractors to hand deliver annual trapper notifications regarding its harvesting and silviculture activities. Each senior trapper receives a map indicating the planned activities and the contractor answers any questions during his visit. Any concerns are noted on the notification form, dated, signed (if possible) and the completed forms returned.

Figure 8. Traplines within the FMA area



2.6 Local Users on the FMA area

2.6.1 Aboriginal People

As defined by the Constitution Act (1982),"Aboriginal people" includes the Indian, Metis and Inuit peoples of Canada.

Members of the Sturgeon Lake Cree Nation (SLCN) live on Sturgeon Lake Reserve No. 154 located near Valleyview, Alberta, which borders the Puskwaskau parcel of the FMA area. Reserve 154B, located at Goose Lake (64-24-W5M), provides SLCN members with an area for hay production. Today, members are involved in forestry, agricultural and other jobs. Trapping remains an important economic activity for some members.

The Aseniwuche Winewak Nation of Canada (AWN) was formalized in September 1994 by joining the six Aboriginal settlements surrounding the town of Grande Cache, Alberta. Aseniwuche Winewak is Cree for Rocky Mountain People. The members of AWN are non-status Indians descended from Cree, Beaver, Stony and Iroquois fur trappers and traders who lived in the area (AWN, 1997).

The Metis Nation of Alberta Association (MNAA) consists of a provincially elected executive and an elected executive for each of 6 Zones within the province. In the Grande Prairie area, Zone 6 Metis Nation represents three locals:

- Grande Prairie Local 1990;
- Red Willow Local 1929; and
- Aspen Grove Local.

2.6.2 Other Local Users

As stewards of the forest resource on publicly owned forest land, Canfor recognizes that the forest sector is crucially important to local people and local communities[5].

Canfor keeps local communities apprised of its operations through its *Public Involvement Program* (Canfor, 2001), which includes committee meetings, open houses and provision of planning documents in libraries.

Canfor has an open and transparent relationship with local communities that provides opportunities for stakeholders to identify issues and obtain input regarding Company activities. Meetings are held annually with the local Municipal Districts (MD) wherein Canfor makes presentations regarding its operations and answers any questions or provides information.

Roads and log hauling continue to be of interest to both Canfor and local communities. The Company strives to reduce the impact of the log haul by addressing local issues such as over-weight monitoring, safety and road bans.

The Forest Management Advisory Committee (FMAC) very strongly emphasizes that local communities need to benefit from the presence of the FMA area and the activities of the

[5] Local communities have been defined by the FMAC as those adjacent to the FMA area i.e., Valleyview, DeBolt, Fox Creek, Spirit River, Fairview, Grande Cache, and Grande Prairie. Municipal District (MD) of Greenview No. 16, MD of Spirit River No. 20 and County of Grande Prairie No. 1 are also deemed to be local communities.

industries that operate there. Canfor supports local communities and provides a range of benefits:

- Employment of local contractors;
- Purchase of goods and supplies;
- Salaries, benefits and wages;
- Community contributions;
- Recreational opportunities; and
- Local timber supplies.

2.7 Relationship between the approved DFMP and SFMP 2005

The relationship between the Detailed Forest Management Plan and the Sustainable Forest Management Plan 2005 is strong. In particular, many of the quantitative objectives that comprise the SFMP have their basis from the DFMP:

- Detailed discussions about the interplay of technical and social parameters;
- Technical calculations and justification for the proposed annual allowable cut; and
- Community input about larger social issues of forest management.

Both documents guide the strategic and operational decisions and plans made by the Company. The DFMP contains the resource management philosophies and goals, forest management objectives and the overall implementation strategy, while the SFMP 2005 provides updated quantitative targets and the processes for monitoring performance. The Forest Management Advisory Committee (FMAC) plays an integral role in the development of both documents.

2.8 Forest Management Activities on the FMA area

Forestry activities are conducted in accordance with legislation, regulations, ground rules, agreements and commitments (i.e. utilization standards, historical resources, watershed protection, habitat management, debris management, retention, etc.). A variety of activities are conducted to manage, grow, harvest and reforest coniferous and deciduous timber on the FMA area.

2.8.1 Planning

Forest planning involves a number of components required by the Alberta government, namely:

- Detailed Forest Management Plan (DFMP) that defines activities and provides detailed justification and environmental planning to support the annual allowable cut (AAC) for both coniferous and deciduous species in the FMA area. It also defines the spatial harvest sequence (SHS) for the first 20 years and provides an approved long-term access plan;
- Compartment Assessment (CA) which is required when information or major issues are identified that in ASRD opinion, have not been addressed in the DFMP. In the event that the SHS is deemed by Alberta to be inappropriate due to a significant change in circumstances since the approval of the DFMP, a compartment assessment describing current issues shall be required.
- 5 Year General Development Plan (GDP) which gives a comprehensive description of a forest operator's proposed harvest strategy, road building plans, and reclamation operations for a five-year period, and includes all licences and permits. The GDP is used to guide integration of activities.
- Final Harvest Plan (FHP) – which is a map and associated report describing the laid out harvest plan.
- Annual Operating Plan (AOP) - which describes operations in detail through a series of components that are submitted together at the same time, or as individual submissions on a schedule approved by Alberta, namely:
    - Operating Schedule and Timber Production;
    - Final Harvest Plans;
    - 5 Year General Development Plan;
    - Compartment Assessments as required;
    - Reforestation Program;
    - Fire Control Plan; and
    - Road Plan.

2.8.2 Harvesting and Road Construction

The Annual Operating Plan describes the harvesting plans for the FMA area. Harvest areas are generally harvested using conventional ground based harvesting methods. Timber is harvested using a feller buncher, skidded to roadside using either wheel or track skidders and processed as either tree length or cut-to-length logs. Loaders then load the logs onto a variety of logging truck configurations, which transport the logs to a mill. Horse and high-lead trials have also been conducted in the past.

Access into harvest areas is constructed utilizing excavators and crawler tractors. Gravel trucks and graders are used in both road maintenance and road construction activities. Roads are inspected on a regular basis and remedial repairs are identified in the annual Road Plan, which is a component of the Annual Operating Plan. This includes the road surface, road prism and drainage structures on the road systems.

Final Harvest Plans (FHP) provide the details on harvesting and road construction in the harvest areas. Prior to implementation, Alberta Sustainable Resource Development must approve deviations from the FHP that exceed limits expressed in the OGR.

2.8.3 Silviculture

A variety of silviculture techniques are used to prepare sites, regenerate, and tend harvested areas.

Silviculture prescriptions on coniferous and mixedwood harvest areas are conducted pre-harvest and are based on ecological site classification data. The prescriptions provide a plan of silviculture activities in order for the harvest area to meet legislated and DFMP requirements.

All harvest areas are reforested. The majority of coniferous and mixedwood harvest areas are planted with conifer seedlings; however, a minor amount of area may be aerial seeded. A variety of site preparation treatments are used to prepare these sites for seedling establishment including ripper plow, disc trenching, mounding, drag scarification, mulching, pile and burn, and raw plant. Deciduous harvest areas are generally prescribed as "leave for natural", but roads and landings may occasionally require site preperation and/ or planting with conifer seedlings.

Stand tending treatments are utilized to control competing vegetation (i.e. grass, shrubs, deciduous trees) and to maintain tree growth in coniferous and mixedwood stands. A variety of vegetation management tools, are utilized for stand tending including manual brushsaw treatments and herbicide treatments (i.e. aerial spray, backpack spray, basal bark treatment, hack and squirt and brushsaw with chemical stump treatment (cut/ stump).

2.8.4 Monitoring

Canfor has implemented a Forest Management System (FMS). Within the FMS there are documented operational management systems (i.e. operational planning, planting, road maintenance, etc.) for activities. Each operational management system includes key performance indicators (KPI) that are monitored. As well, the inspection and monitoring frequency of activities are determined based on risk. All non-compliances (against the law) and non-conformances (against Canfor's procedures) are documented and tracked.

To monitor the targets presented in this plan, the management review process, as described in Section 1.6.1, will be expanded to validate the effectiveness of the targets. Additional research will be directed to the validation process, as required.

Additional documents are completed to report on both SFMP and DFMP objectives to government and the public. The *Annual Performance Monitoring Report* presents the progress made in achieving SFM targets. The *5-Year Stewardship Report*, due in 2008, will report on the commitments made in the DFMP.

All harvested areas must meet legal establishment standards by year 8 for coniferous and mixedwoods areas and year 5 for deciduous areas. Performance standards must be achieved by year 14 for coniferous and mixedwoods and also year 14 for deciduous areas that did not pass the establishment survey. Harvest areas are monitored early in their life cycle to ensure they are on a trajectory to meet those standards.

3. Public Participation in Development of the SFMP

3.1 General

The inclusion of systematic and formal public input into the management of the forested landbase in the defined forest area is an essential element to the success of sustainable forestry management. According to the CSAI (2002): "the Standard [Can/ CSA Z809-02] gives organizations a system for continually improving their forest management performance and engaging interested parties in a focused public participation process. Certification to this Standard involves regular and rigorous independent, third-party certification audits".

The purpose of the CSA Z809-02 is to describe the components and performance objectives of a sustainable forest management system. When applied to a specific FMA area, this system will ensure that management objectives are set for the 17 critical elements of the 6 CCFM criteria for sustainable forest management (Table 4). Through a process of public participation, the CSA performance framework attains a local relevance in the form of locally determined values, objectives, indicators, and targets.

3.2 History of the Forest Management Advisory Committee (FMAC) 1995 to Present

Canfor adopted public participation as an essential element in its forest management strategy. In 1995 the first step was taken to form the Forest Management Advisory Committee (FMAC), comprised of local stakeholder groups who are directly affected by, or have an interest in, the management of the forest resources. The Committee, which first met in September, 1995 provided valuable input into the development of the Detailed Forest Management Plan (DFMP).

Canfor decided in July, 1999 to actively pursue CSA certification. On October 13, 1999, the FMAC was approached and requested to consider acting also as the public consultation committee for the development of values, goals, indicators and objectives of the CSA criteria and critical elements for a Sustainable Forest Management Plan (SFMP). At the December 1, 1999 meeting, the Committee agreed (via consensus) to take on the CSA process. When the mandate of the FMAC was expanded to include CSA certification, additional organizations were invited to participate.

The SFMP was completed in July 2000, and was registered to the CSA Z809-96 standard. To build upon its strengths, it was incorporated into the DFMP, which was approved by Alberta Sustainable Resource Development (ASRD) in December, 2003.

In December 2002 the FMAC commenced development of a CSA matrix (Appendix 5) containing values, objectives, indicators and targets compatable with the CSA Z809-02 standard. The matrix recieved final approval in August 2005[6].

[6] The FMAC has received a revised copy of the CSA matrix that describes the text revisions that arose while the SFMP 2005 was being written. These text changes did not change the intent of the target(s). It is anticipated that FMAC's final approval of the matrix will be available for the September audit.

An important component that contibutes to the success of the FMAC is its Terms of Reference (TOR) (Appendix 3). The TOR clearly state the goals, operating rules, methodology of making decisions, and dispute resolution mechanisms by which the Committee provides input to Canfor on an objective and fair basis. The original TOR was approved on February 23, 2000, and is reviewed periodically to ensure accuracy. The members of the FMAC, as of June 22, 2005, are listed in Appendix 4.

3.3 Forest Management Advisory Committee (FMAC) Role in the SFMP 2005

The primary task of the FMAC regarding the SFMP 2005 is to provide local values, objectives, indicators and targets to Canfor for the Criteria and Critical Elements as defined in CAN/CSA Z809-02 (CSAI, 2002):

- Values: an FMA area characteristic, component or quality considered by an interested party to be important in relation to a CSA SFM Element or other locally identified element;
- Objectives: a broad statement describing a desired future state or condition for a value;
- Indicators: a variable that measures or describes the state or condition of a value; and
- Targets: a specific statement describing a desired future state or condition of an indicator. Targets should be clearly defined, time limited and quantified if possible.

Appendix 5 contains the CSA Matrix for the SFMP 2005 that was developed by the FMAC during five meetings between December 4, 2002 and April 2005 (per. comm.). The content of the CSA Matrix was the creative result of the FMAC members working together to arrive at a consensus. Canfor provided the rewording and rephrasing of the technical content, with the approval of the FMAC. Section 4 of this document lists and discusses in detail the contents of the Matrix.

FMAC used the 6 Canadian Council of Forest Ministers (CCFM) Sustainable Forest Management (SFM) Criteria and 17 CSA SFM Critical Elements (Table 4) from CSA Z809-02 to set values, objectives, indicators and targets in the development of the SFMP 2005.

Table 4. CCFM Criteria and Critical Elements

SFMP Tables Master.xls
Table 3

Criteria		Critical Element	
1	Conservation of Biological Diversity	1	Ecosystem Diversity
		2	Species Diversity
		3	Genetic Diversity
		4	Protected Areas and Sites of Special Biological Significance
2	Maintenance and Enhancement of Forest Ecosystem Condition and Productivity	5	Ecosystem Resilience
		6	Ecosystem Productivity
3	Conservation of Soil and Water Resources	7	Soil Quality and Quantity
		8	Water Quality and Quantity
4	Forest Ecosystem Contributions to Global Ecological Cycles	9	Carbon Uptake and Storage
		10	Forest Land Conversion
5	Multiple Benefits to Society	11	Timber and Non-Timber Benefits
		12	Communities and Sustainability
		13	Fair Distribution of Benefits and Costs
6	Accepting Society's Responsibility for Sustainable Development	14	Aboriginal and Treaty Rights
		15	Respect for Aboriginal Forest Values, Knowledge and Uses
		16	Public Participation
		17	Information for Decision-Making

Source: Compiled from CSAI, 2002

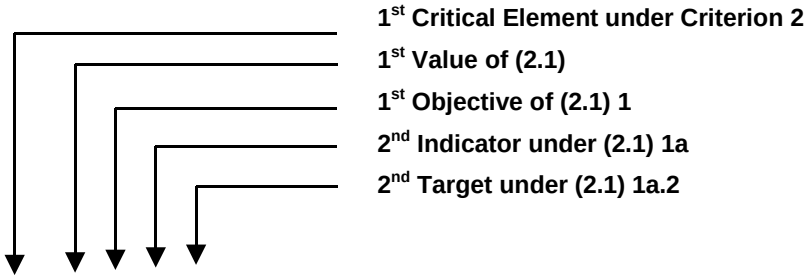
4. Values, Objectives, Indicators and Targets

4.1 CSA Performance Framework

As described in the previous section, the Sustainable Forest Management Plan (SFMP) 2005 was developed with the systematic and formal input from the Forest Management Advisory Committee (FMAC) as required by the Canadian Standards Association (CSA) CSA Z809-02.

This section provides the description of the values, objectives, indicators and targets established by the FMAC. The text for the Criteria and Critical Elements was taken as given from the standards. The FMAC, by consensus, decided upon the content for all values, objectives, indicators and targets. Canfor and its consultants then worked on the technical wording required for the indicators and targets.

A numbering system has been adopted for the subheadings in this section of the SFMP that is different from the previous sections. This has been done in order to assist the reader in being able to directly tie the detailed discussion found here to the CSA Matrix in Appendix 5. The text under each Critical Element, Value, Objective, Indicator, and Target have been given a unique alphanumeric identifier as follows (choosing one of the more complex examples):



(2.1) 1 a . 2. 2

In this section, each Criterion and Critical Element is contained in a yellow text box. All values, objectives, indicators and targets relating to them follow in sequential order. To avoid duplication, the FMAC chose indicators and targets that best represent each Criterion/ Critical Element; even though such indicators and targets may be equally as effective for another Criterion/ Critical Element.

1. Criterion

Conservation of Biological Diversity

Conserve biological diversity by maintaining integrity, function and diversity of living organisms and the complexes of which they are part.

Biodiversity is the variability among living organisms and the ecological complexes of which they are a part. It can be viewed in the context of three elements: ecosystems, species and genes. The conservation of biodiversity makes the forests productive and resilient, while enabling them to recycle nutrients and to provide clean water, oxygen and other life-supporting services (CCFM, 1997).

(1.1) Critical Element

Ecosystem Diversity

Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that naturally occur on the DFA.

An ecosystem consists of plants, animals and microorganisms interacting with their physical and climatic environment in a given area (CCFM, 1997). Ecosystems are dynamic; the processes of disturbance and renewal determine their composition.

(1.1) 1 Value

All natural ecosystems are important on the landscape

Maintaining representation of a full range of ecosystem types is a widely accepted strategy to conserve biodiversity and it is suggested for landscapes managed for forestry (Wells *et al* , 2003).

(1.1) 1a Objective

All current ecosystems are represented on the landscape at natural levels

(1.1) 1a.1 Indicator

Area (%) in each seral stage

Seral stage distribution is important for the conservation of biodiversity because it enables timber harvests to be planned so as to maintain a full range of successional habitats for wildlife and ecosystem types over the long-term (CCFM, 1997). Seral stages are defined by the age of the stand at breast height for different yield groups (Table 5).

Seral stage is a surrogate measurement, which reflects the status of the forest resource regarding biodiversity. In maintaining the biodiversity and the recycling of life sustaining elements, it is important that the impacts of forest management on seral stage distribution

be within the natural range of variability. The seral stage indicator offers a means to assess the results of forest management on the age structure, species composition and relative amount of wildlife habitat on the landscape.

Table 5. Breast Height Age Ranges for Seral Stages

SFMP Table Master.xls
Table 30

Yield Group	Description	Pioneer (1)	Young (2)	Mature (3)	Over mature (4)	Old (5)	Species	Years to Breast Height (BH)
1	AW +(S) - AB	0	1–20	21–70	71–110	110+	AW	6
2	AW +(S)-CD	0	1–20	21–70	71–110	110+	AW	6
3	AWSW/PBSW/BWSW	0	1–40	41–80	81–120	120+	SW	15
4	BW/BWAW+(S)	0	1–20	21–70	71–110	110+	BW	6
5	FB+OTHERS	0	1–40	41–100	101–120	120+	FB	15
6	H+(S)/S	0	1–40	41–80	81–120	120+	SW	15
7	PB+(S)	0	1–20	21–80	81–110	110+	PB	6
8	PL/PLFB+(H)	0	1–40	41–80	81–120	120+	PL	10
9	PLAW/AWPL	0	1–30	31–70	71–120	120+	PL	10
10	PLSB+OTHERS	0	1–40	41–90	91–120	120+	PL	10
11	PLSW/SWPL + (H)	0	1–40	41–90	91–120	120+	PL	10
12	SBLT/LTSB (G,M,F)	0	1–50	51–130	131–150	150+	SB	20
13	SBLT/LTSB(U)	0	1–50	51–140	141–160	160+	SB	20
14	SBPL/SBSW/SBFB	0	1–40	41–100	101–130	130+	SB	20
15	SW/SWFB + (H)-AB	0	1–40	41–90	91–120	120+	SW	15
16	SW/SWFB +(H)-CD	0	1–40	41–90	91–120	120+	SW	15
17	SWAW/SWAWPL	0	1–40	41–90	91–120	120+	SW	15

Note: Ages are breast height age
AW = aspen FB = balsam fir SW = white spruce PB = balsam poplar BW = white birch PL = lodgepole pine
SB = black spruce LT = tamarack

Source: Canfor, 2000

(1.1) 1a.1.1 Target
100% of the seral stages will meet the 2009 projections

The target seral stage distribution is one that approximates the expected distribution created by fire within the Foothills and Boreal Forest Natural Regions within the FMA area (Figure 9). The natural disturbance regime was forecast using a theoretical fire-return interval (ORM, 2000).

- **Acceptable variance**
  Seral stage distribution will be ± 20% of the 2009 projections as indicated in the approved DFMP (Figures I0 - 15).

- **Current status**
  The percent variance (Table 6) to the 2009 projections all meet the acceptable variance with the exception of pioneer in the Peace parcel. The primary reasons for this discrepancy is that no harvesting has occurred and the relatively small size of the Peace parcel. Table 6 also shows the current 2005 status. The area of each seral stage by year in the FMA area and the Peace, Puskwaskau and Main parcels is provided in Tables 7 -12.

  The characteristics of older forests provide biodiversity and important habitat for a number of species. Therefore, it is important to manage for old growth

attributes at various levels; stand, landscape and forest (Canfor, 1999a). The current area (2005) of old seral stage is indicated in Table 13.

Figures I0 - 15 indicate the present and forecast distributions for the FMA area and the Peace, Puskwaskau and Main parcels as compared to expected natural distributions. The range of natural disturbance is represented by the red “I beam” and the green bar represents the current or projected distributions. The observed differences between the target and forecasts are caused primarily by fire prevention and control and by anthropogenic disturbances.

Figure 9. Natural Regions within the FMA area

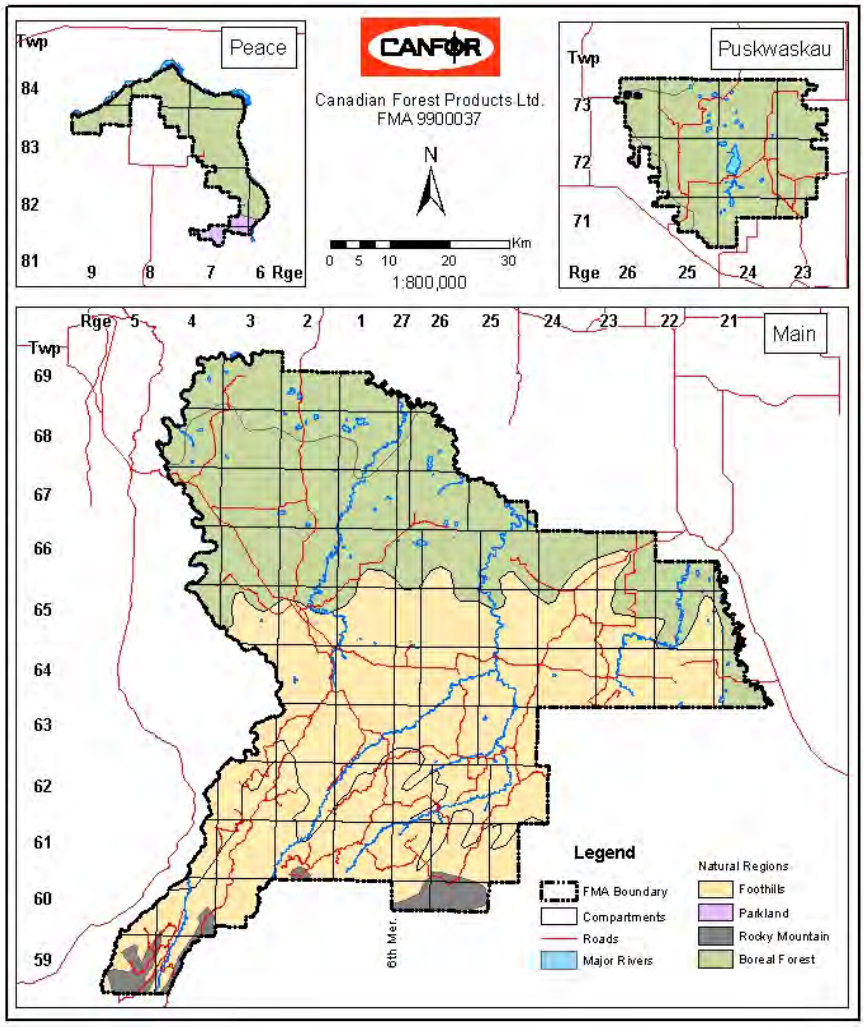


Table 6. Percent Variance to 2009 Projections[7]

SFMP Table Master.xls
Table 31

Parcel	Year	Seral Stage				
		Pioneer (1)	Young (2)	Mature (3)	Over Mature (4)	Old (5)
FMA area	2005	-6.3%	5.2%	-0.4%	3.7%	-24.0%
	2009.a	-6.8%	-4.8%	-2.5%	5.9%	5.9%
Peace	2005	47.9%	42.4%	-3.7%	-52.4%	-19.6%
	2009.a	100.0%	-0.3%	0.0%	1.6%	8.7%
Puskwaskau	2005	17.6%	34.0%	-44.7%	18.6%	-20.1%
	2009.a	-9.9%	-9.1%	-3.3%	15.4%	11.6%
Main	2005	-10.1%	-4.5%	4.3%	3.0%	-24.6%
	2009.a	-6.2%	-4.2%	-2.7%	5.2%	5.0%

Source: JS Thrower updated Projected 2009 Tables 3-8 Fig 1-6.xls

Table 7. Seral Stage Distribution for the FMA area

SFMP Table Master.xls
Table 32

Year	Area (ha) in each Seral Stage					Grand Total
	Pioneer (1)	Young (2)	Mature (3)	Over mature (4)	Old (5)	
1999	36,494	101,656	255,763	162,296	36,088	592,296
2005	**30,788**	**103,676**	**253,725**	**168,104**	**35,996**	**592,288**
2009.a	**30,623**	**93,807**	**248,510**	**171,915**	**47,434**	**592,288**
2009	32,716	98,290	254,826	161,829	44,635	592,296
2019	30,621	125,086	224,118	144,354	68,116	592,296
2049	31,200	141,109	171,743	139,379	108,865	592,296
2099	33,130	168,355	174,369	76,715	139,728	592,296
2199	34,517	168,122	211,500	41,648	136,509	592,296

Source: JS Thrower updated Projected 2009 Tables 3-8 Fig 1-6.xls

Table 8. Seral Stage Distribution for the Peace Parcel

SFMP Table Master.xls
Table 32

Year	Area (ha) in each Seral Stage					Grand Total
	Pioneer (1)	Young (2)	Mature (3)	Over mature (4)	Old (5)	
1999	243	3,567	20,503	1,232	391	25,936
2005	**141**	**3,363**	**20,801**	**1,242**	**391**	**25,937**
2009.a		**1,930**	**21,572**	**1,923**	**512**	**25,937**
2009	73	1,937	21,566	1,893	467	25,936
2019	364	1,219	14,770	9,025	559	25,936
2049	29	974	2,566	20,344	2,023	25,936
2099	20	6,234	1,109	882	17,691	25,936
2199	757	5,775	1,875	939	16,590	25,936

Source: JS Thrower updated Projected 2009 Tables 3-8 Fig 1-6.xls

[7] Note: In Tables 7 – 12, '2009.a' is a projection of the 2005 data

Table 9. Seral Stage Distribution for the Puskwaskau Parcel

SFMP Table Master.xls
Table 32

Year	Area (ha) in each Seral Stage					Grand Total
	Pioneer (1)	Young (2)	Mature (3)	Over mature (4)	Old (5)	
1999	5,615	19,560	20,405	12,929	5,157	63,667
2005	**3,972**	**21,956**	**21,278**	**12,052**	**4,411**	**63,669**
2009.a	**2,979**	**13,281**	**29,822**	**11,593**	**5,993**	**63,669**
2009	3,272	14,489	30,797	9,811	5,298	63,667
2019	3,145	16,297	31,409	7,711	5,106	63,667
2049	2,499	14,347	22,457	19,490	4,874	63,667
2099	3,340	23,330	16,456	10,479	10,063	63,667
2199	4,879	23,003	21,790	5,147	8,848	63,667

Source: JS Thrower updated Projected 2009 Tables 3-8 Fig 1-6.xls

Table 10. Seral Stage Distribution for the Main Parcel

SFMP Table Master.xls
Table 32

Year	Area (ha) in each Seral Stage					Grand Total
	Pioneer (1)	Young (2)	Mature (3)	Over mature (4)	Old (5)	
1999	5,615	19,560	20,405	12,929	5,157	63,667
2005	**3,972**	**21,956**	**21,278**	**12,052**	**4,411**	**63,669**
2009.a	**2,979**	**13,281**	**29,822**	**11,593**	**5,993**	**63,669**
2009	3,272	14,489	30,797	9,811	5,298	63,667
2019	3,145	16,297	31,409	7,711	5,106	63,667
2049	2,499	14,347	22,457	19,490	4,874	63,667
2099	3,340	23,330	16,456	10,479	10,063	63,667
2199	4,879	23,003	21,790	5,147	8,848	63,667

Source: JS Thrower updated Projected 2009 Tables 3-8 Fig 1-6.xls

Table 11. Seral Stage Distribution for the Foothills Natural Region

SFMP Table Master.xls
Table 32

Year	Area (ha) in each Seral Stage					Grand Total
	Pioneer (1)	Young (2)	Mature (3)	Over mature (4)	Old (5)	
1999	25,802	50,927	124,775	81,284	26,542	309,329
2005	**20,917**	**59,919**	**113,729**	**87,174**	**27,572**	**309,311**
2009.a	**22,261**	**63,315**	**111,171**	**79,636**	**32,929**	**309,311**
2009	22,238	64,079	114,088	76,751	32,171	309,329
2019	20,503	81,861	102,879	63,794	40,292	309,329
2049	17,538	91,137	93,990	53,423	53,241	309,329
2099	21,306	80,146	99,540	40,968	67,368	309,329
2199	18,617	89,590	104,227	23,887	73,008	309,329

Source: JS Thrower updated Projected 009 Tables 3-8 Fig 1-6.xls

Table 12. Seral Stage Distribution for the Boreal Forest Natural Region

SFMP Table Master.xls
Table 32

Year	Area (ha) in each Seral Stage					Grand Total
	Pioneer (1)	Young (2)	Mature (3)	Over mature (4)	Old (5)	
1999	10,692	50,729	130,988	81,012	9,547	282,967
2005	**9,871**	**43,756**	**139,995**	**80,930**	**8,424**	**282,977**
2009.a	**8,362**	**30,492**	**137,339**	**92,279**	**14,505**	**282,977**
2009	10,477	34,211	140,738	85,077	12,464	282,967
2019	10,118	43,225	121,240	80,560	27,824	282,967
2049	13,661	49,973	77,753	85,956	55,624	282,967
2099	11,824	88,209	74,829	35,746	72,359	282,967
2199	15,900	78,532	107,273	17,761	63,501	282,967

Source: JS Thrower updated Projected 2009 Tables 3-8 Fig 1-6.xls

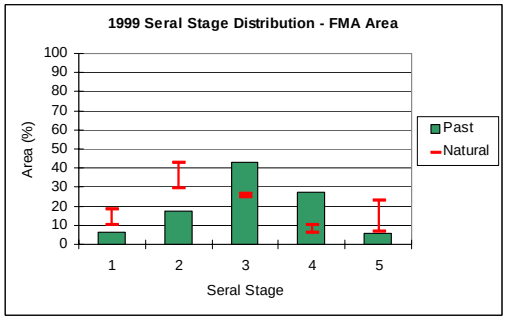
Table 13. Percent of Current Forested Landbase in Old Seral Stage

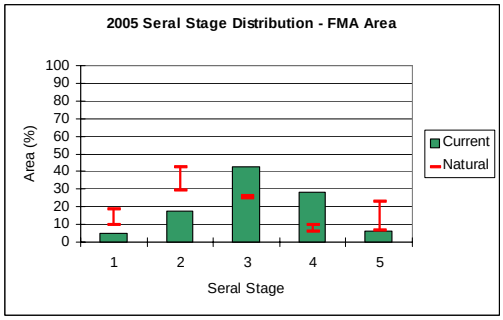
SFMP Table Master.xls
Table 33

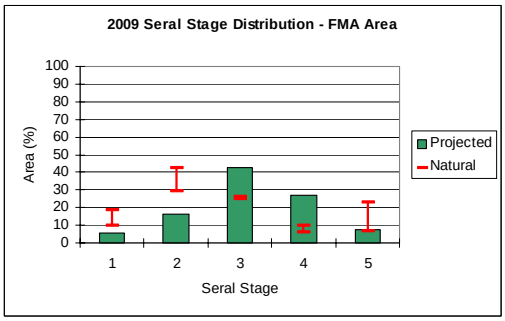
Parcel	Area in Old Seral Stage	Total Forested Area	% of Area in Old Seral Stage	% Natural Disturbance Range
FMA Area	35,996	592,288	6.1	7.0 – 23.4
Peace	391	25,937	1.5	3.8 – 21.4
Puskwaskau	4,411	63,669	6.9	3.8 – 21.4
Main	31,193	502,683	6.2	7.6 – 23.7

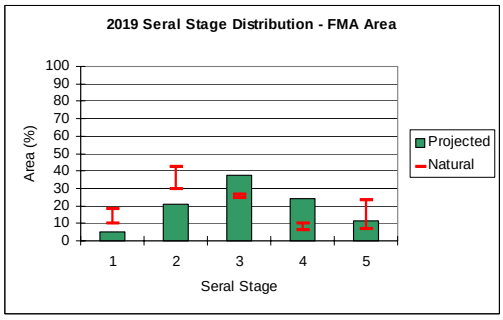
Source: JS Thrower 2005 compiled data

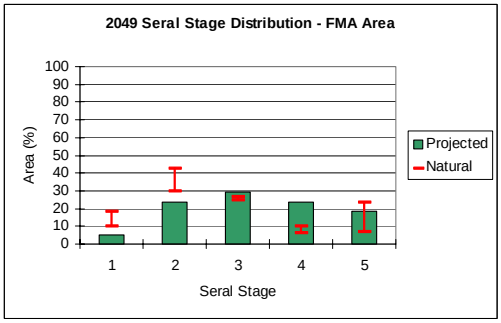
Figure 10. Seral Stage Distribution within the FMA Area

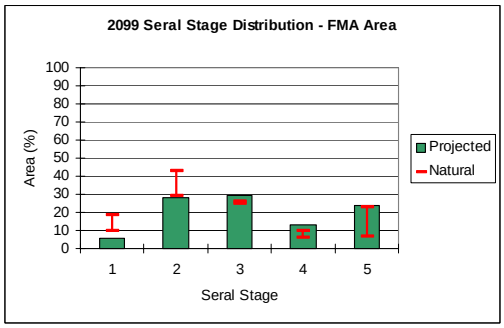












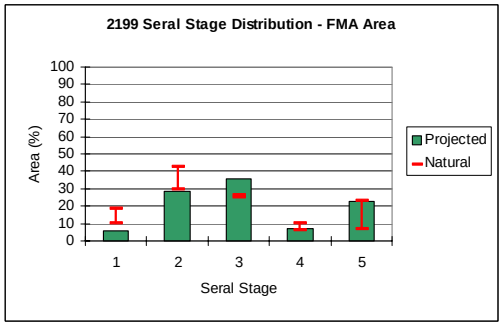
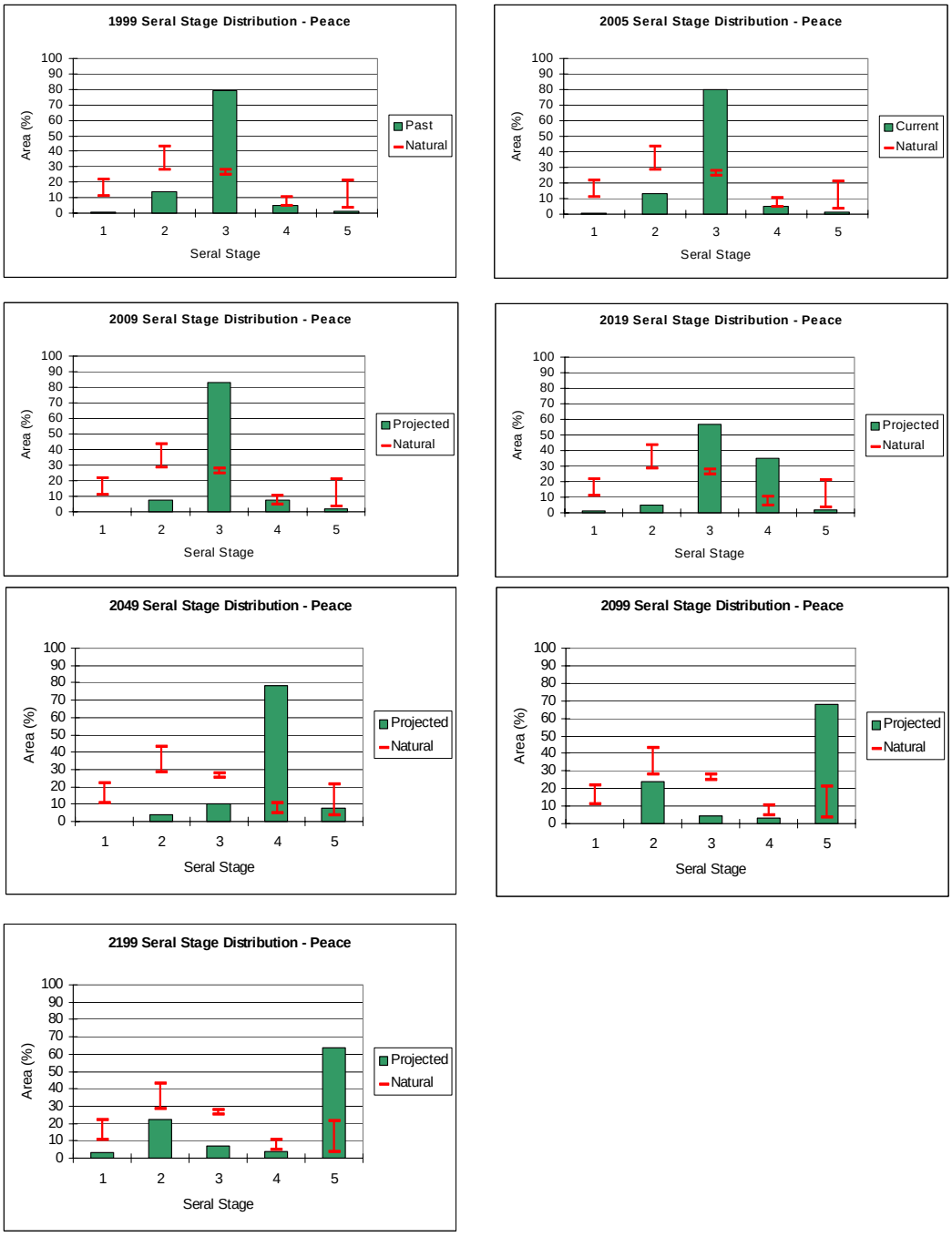
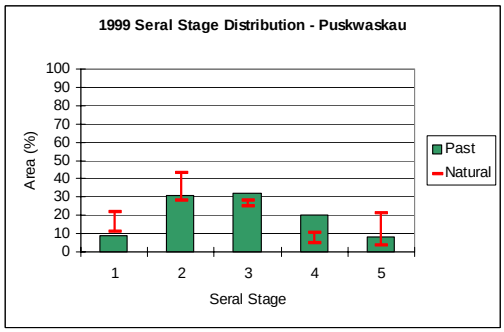


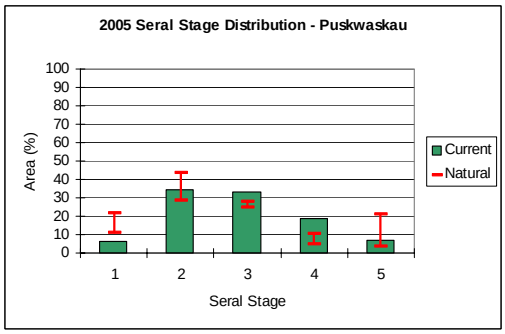
Figure 11. Seral Stage Distribution within the Peace Parcel

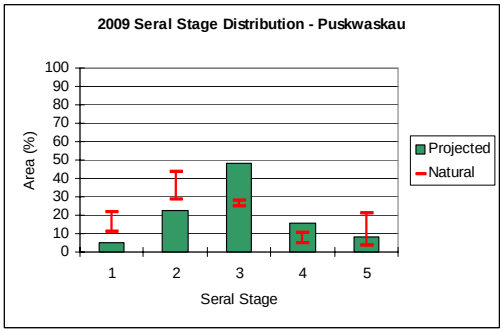


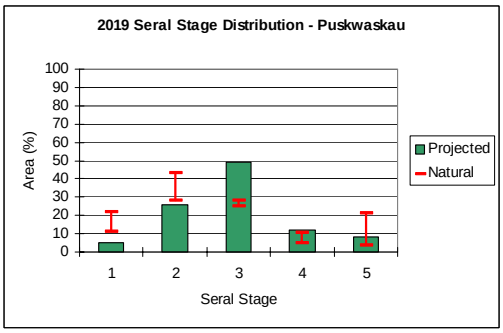
Note: 1 = Pioneer; 2 = Young; 3 = Mature; 4 = Over mature; 5 = Old
Source: ORM 2001 and JST 2005 Analysis - JS Thrower updated_Projected2009_Tables_3-8_ Fig_1-6.xls

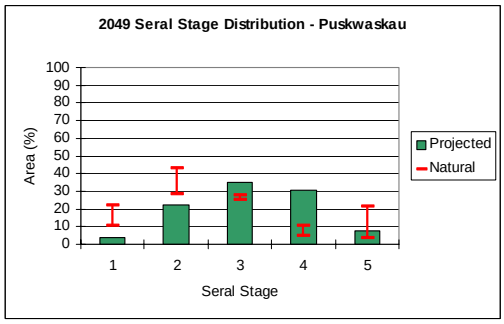
Figure 12. Seral Stage Distribution within the Puskwaskau Parcel

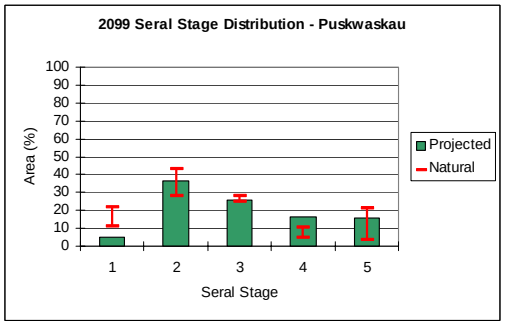


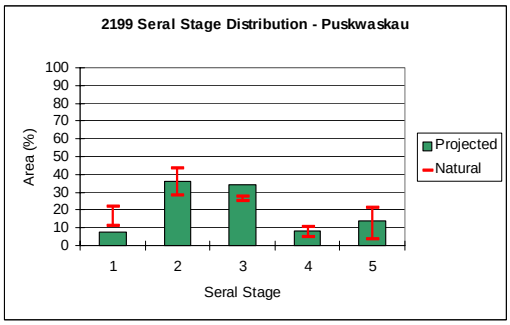






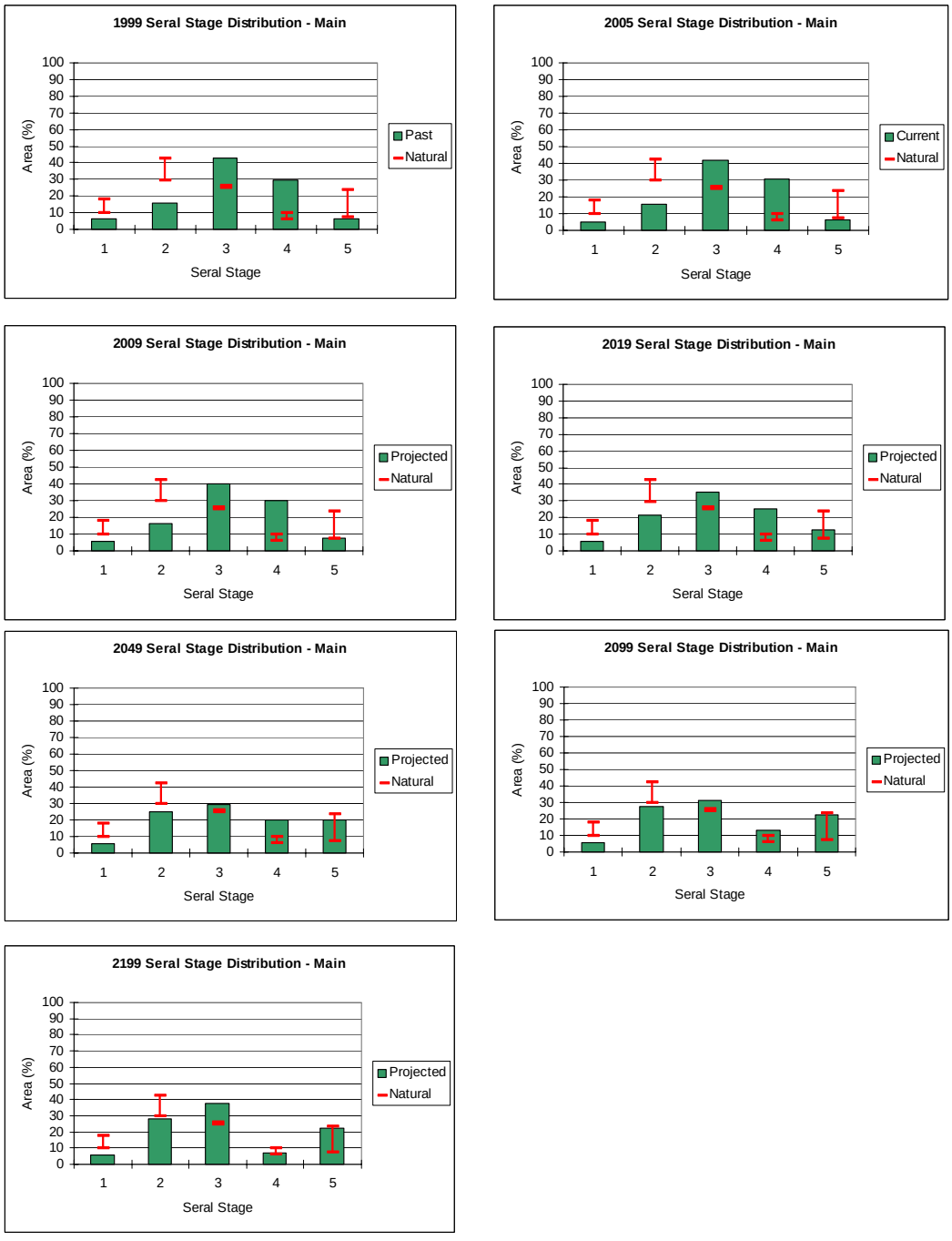






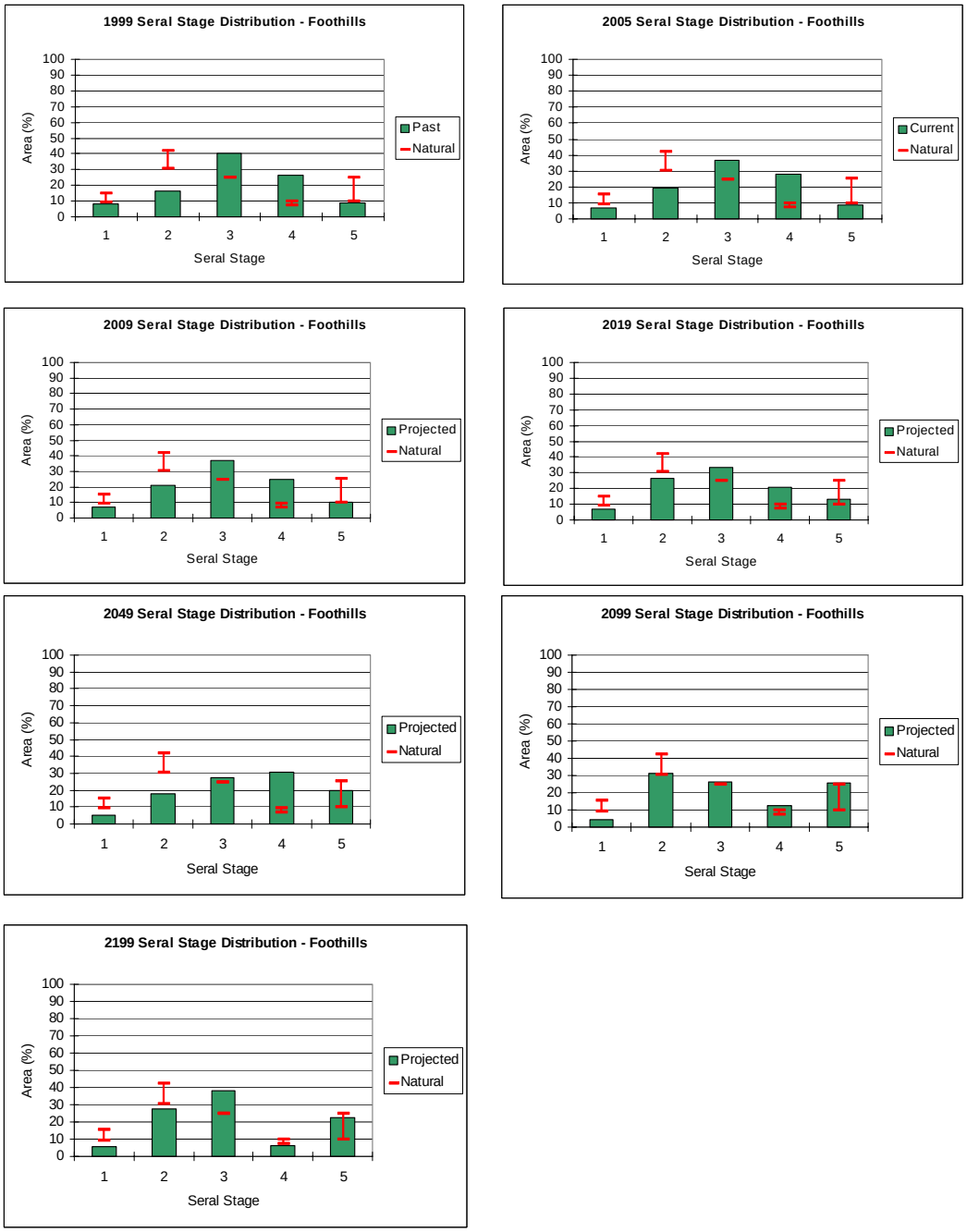
Note: 1 = Pioneer; 2 = Young; 3 = Mature; 4 = Over mature; 5 = Old
Source: ORM 2001 and JST 2005 Analysis - JS Thrower updated_Projected2009_Tables_3-8_ Fig_1-6.xls

Figure 13. Seral Stage Distribution within the Main Parcel



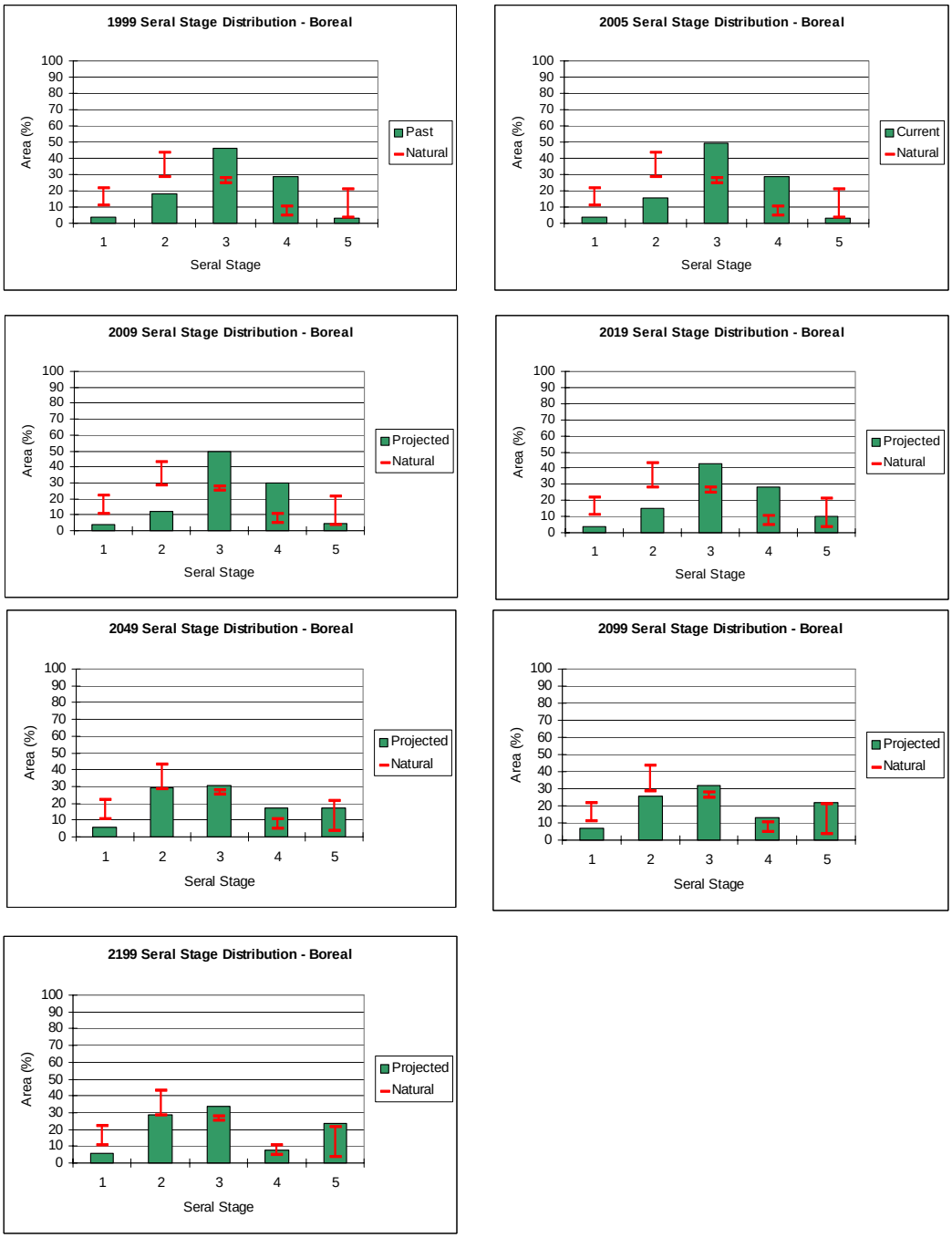
Note: 1 = Pioneer; 2 = Young; 3 = Mature; 4 = Over mature; 5 = Old
Source: ORM 2001 and JST 2005 Analysis - JS Thrower updated_Projected2009_Tables_3-8_ Fig_1-6.xls

Figure 14. Seral Stage Distribution within the Foothills Natural Region



Note: 1 = Pioneer; 2 = Young; 3 = Mature; 4 = Over mature; 5 = Old
Source: ORM 2001 and JST 2005 Analysis - JS Thrower updated_Projected2009_Tables_3-8_ Fig_1-6.xls

Figure 15. Seral Stage Distribution within the Boreal Forest Natural Region



Note: 1 = Pioneer; 2 = Young; 3 = Mature; 4 = Over mature; 5 = Old
Source: ORM 2001 and JST 2005 Analysis - JS Thrower updated_Projected2009_Tables_3-8_ Fig_1-6.xls

- **Forecasting assumptions and analytical methods**
  Seral stage distributions under a natural fire regime were modeled by using a theoretical fire-return interval (ORM, 2000). The amount of area in each seral stage in the FMA area and the Peace, Puskwaskau, and Main has been forecasted on the landbase for key points in time (Figures 7 - 12). The key points in time are for years 1999, 2005 (current), 2009, 2019, 2049, 2099, and 2199. It is assumed these time periods provide a reasonable picture of the variability of seral stage over time. These forecasts are based on the approved DFMP annual allowable cut.

- **Forest management activities**
  The management strategy is to work towards meeting the acceptable variance for those areas not currently achieving the target. This could be accomplished, for example, by deferring harvest of old and over mature seral stages until sufficient areas of old seral stage is available to achieve the acceptable variance.

- **Strategy and implementation schedule**
  Preliminary comparisons between current status and the target seral stages have been completed. All future harvesting plans will follow the strategic direction as outlined in the DFMP and be adjusted as required to meet the desired seral stages over time.

- **Monitoring procedure (monitoring results against forecasts)**
  The amount of area of each seral stage that is on the landscape will be compared to the expected natural distributions for 2009 and reported in the 2009 *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  All new harvesting plans will follow the strategic direction as outlined in the DFMP and the Operating Ground Rules (ASRD, 2004a).

(1.2) Critical Element

Species Diversity

Conserve species diversity by ensuring that habitats for the native species found on the DFA are maintained through time.

Species diversity refers to the variety of plants and animals in a particular area. An important component of sustainable forest management is ensuring that a population of species is not put at risk as a result of forest harvesting or regeneration (CCFM, 1997). In order to make responsible, sound, and effective decisions a resource manager must have an integrated management system that is designed to acquire and organize the knowledge used to facilitate a decision making process (Wildlife Working Group, 1991). The importance of baseline data for this type of management system and subsequent decision-making cannot be overstressed. This data is an essential element behind Canfor's commitment to ecologically based management as outlined in *Canfor's Forestry Principles* (Canfor, 1999a).

(1.2) 1. Value
Through time all current habitats are represented

Coarse filter management postulates that if habitat is maintained and available for selected wildlife indicator species, it is assumed that a wide range of habitat conditions suitable for many other species will be available (Rempel *et al,* 2004). The use of guilds can be a valuable tool when assessing the broad ecological aspects of a given area. Canfor has taken a coarse filter approach using wildlife guild modelling for moose (*Alces alces*), American marten (*Martes americana*), pileated woodpecker (*Dryocopus pileatus*), barred owl (*Strix varia*) and grizzly bear (*Ursus arctos*).

A fine-filter approach[8] was utilized for management of woodland caribou (*Rangifer tarandus caribou*) and trumpeter swan (*Cygnus buccinator*) habitat (refer to "Target (1.2) 1a.2.2").

Bull trout habitat has been evaluated using equivalent clearcut area (ECA), as presented in "Target (1.2) 1a.2.1".

(1.2) 1a Objective
Current species diversity is maintained on the landscape

A component of biodiversity monitoring is to follow species or groups to determine whether they face long-term changes in distribution. How populations of species are affected by environmental change is key to assessing the impact of human activities (CCFM, 1997).

Traditionally, wildlife species have been managed by assessing the amount and suitability of available habitat for a given species. The presence or absence of wildlife species and guilds may be indicative of the integrity, health, vigour, and functionality of ecosystems. Therefore, wildlife species and guilds, among other biotic components, can be good indicators of responsible forest management. Canfor has taken this approach, whereby habitat requirements and critical life requisites are modeled for a group of species that have similar habitat requirements. Geographic Dynamics Corp. (GDC) developed 5 guilds

[8] A species-by-species approach

(representing 27 key wildlife species) based on cluster analysis and canonical correspondence analysis, using two different habitat matrices (GDC, 2002):

- **Guild I: Old Growth Community** - these species, including American marten, primarily prefer coniferous-dominated over-mature stands that tend to have a high degree of structure (i.e., coarse woody debris, layered vegetation, etc.). Marten, however, also requires mature mixedwood stands. The old-growth community tends to prefer interior habitats. Species in this guild prefer coniferous dominated over-mature stands, with a high degree of structure and a spruce and/ or fir component. They also require interior habitats (i.e. 100 m from edge).
- **Guild II: Mature Deciduous Mixedwood or Coniferous Mixedwood with Large Snags Present** - these species, including pileated woodpecker and barred owl, tend to prefer mature deciduous and mixedwood stands with a fair amount of vertical structure in the form of snags. In general, snags greater than 35 cm in diameter at breast height (DBH) serve as good nesting and/ or roosting habitat for all of these species. In addition the majority of these species have small home ranges (i.e. <100 ha). Species in this guild prefer mature deciduous and mixedwood stands with some vertical structure in the form of large snags. They also require core area habitats (i.e. 100 m from edge).
- **Guild III: Large Home Range Guild** - these species, including grizzly bear and woodland caribou, have large home ranges and require a variety of undisturbed habitat types that contain functional corridors for traveling between habitat types.
- **Guild IV: Interspersion Guild** – these species, including moose, prefer an interspersion of habitat types. Open grasslands, shrublands, dense mixedwood and coniferous stands are all important to species in this guild. These species are generally mobile and have a preference for edge habitats
- **Guild V: Riparian Guild** – these species require habitats with diverse shrub cover in close proximity to watercourses or lakes. The exception is the trumpeter swan, which is entirely aquatic. Members of this guild also tend to prefer undisturbed riparian areas.

Table 14 indicates the wildlife guilds and general habitat requirements for 7 of the 8 selected indicator species. Bull trout is addressed separately in “Target (1.2) 1a.2.1”.

Table 14. General Habitat Requirments for Wildlife Guilds

SFMP Tables Master.xls
Table 28

Guild	Species	General Habitat Requirements
I	Winter wren	True "old-growth" species. Coniferous mixedwood and conifer stands (>70%spruce+fir) for 24 m tall stands, with a canopy closure of 70 – 90%
	Varied thrush	Dense (optimal at 75%) mature spruce and fir (>75%) stands
	American marten	Mixedwood to conifer stands with at least 50% spruce & fir, and canopy closure from 30–75% with coarse woody debris and mean height of 16 m
II	**Pileated woodpecker**	mature stands with 10 – 90% closure, snags >35 cm, and mean canopy dbh >16 cm
	Ovenbird	mature closed-canopied deciduous forests, with little underbrush
	Hoary bat	20 m tall stands with at least 10% conifer, between 10 and 70% closure
	Barred owl	Coniferous mixedwood to coniferous stands with high structural diversity, open understorey, large trees, at least 20% spruce or fir and deciduous
	Northern flying squirrel	Mixedwood stands with conifer composition and tree canopy closure between 50 to 80%
	Northern Goshawk	Mature to old mixedwood stands, open understorey, mean dbh 17 cm, lg. deciduous trees (>35 cm dbh), 50% canopy closure, 10 – 90% deciduous composition
III	**Grizzly bear**	Need pine stands for berry crops, with >10%shrub cover, and foraging areas with less than 80% canopy closure, but ideally <25%
	Woodland caribou	only herd of the woodland ecotype, where summer and winter range overlaps, primarily uses mixed conifer (pine\spruce) stands (40%), pine stands (19%) and treed muskegs (31%)
	Wolverine	mature stands important for cover (escape from predators), , although trees are not that important, so a generalist that naturally occurs in very low densities
IV	Deer mouse	some open areas, and probably some CWD
	Elk	Cover is found within stands >10 m and >70% cover with at least 30% spruce, pine or fir, grass cover for food increases linearly from 0 to 1, food habitat must be within 2 km of thermal cover, herbaceous plant cover increase from 0 to 1 linearly as are shrubs,
	Great-horned owl	Habitat generalist, mature mixedwood for nest sites and subcanopy flying room, interspersed with meadows is ideal, mean conifer height 13 m, 20% canopy closure, dense understory
	Wolf	variety of habitats, variety of habitat types probably similar to bears and require travel corridors
	Lynx	require mature old-growth type stands for denning, and earlier successional stands with vertical stratification for hunting hares
	Black bear	Large mature trees with canopy cover >70% and shrub cover >10%
	Snowshoe hare	Conifer stands denser than 16,000 stems/ ha with maximum layer height >3m
	Moose	Interspersed shrublands with forest cover, winter cover in dense conifers (>60% conifer cover), winter forage in deciduous trees <3m and all shrubs, and canopy closure at least 30%
	Mule deer	Cover related to mixedwood stands with at least 50% conifer and 75% closure, food is related to deciduous trees and shrubs <3m in height
	White-tailed deer	mixed foragers (grasses, forbs, and shrubs), canopies with >50% conifer comp. And >75% closure are good for cover, while stands with shrubs >50% cover and tree canopy closure <30% are ideal for winter
	Fisher	Coniferous mixedwood to mixedwood Stands at 80% canopy closure, and 15% shrub cover for shrubs >1 m tall and mean stand dbh at 30
V	Long-toed salamander	Maximum dispersal of 10 km around any active pond, within 200k m of any pond, need cover, trees plus shrubs plus cwd
	Common yellowthroat	marshy areas with high shrub cover, and no canopy, related to sapling richness >3 m in height, up to 12% tree cover
	Mink	Requires a permanent waterbody within 200m (stream, lake or pond), canopy closure of riparian vegetation (trees plus >2m shrubs) must be at least 75%, around 100 m from water, and beaver ponds, eutrophic lake and 1st and 2nd order streams are most important
	Trumpeter swan	small to medium sized shallow, isolated lakes with emergent and submergent vegetation

Notes:
Canfor's selected indicator species are indicated as **bold font**

Source: GDC, 2002: spp_reqmnts_table.xls

(1.2) 1a.1 Indicator
Habitat suitability rating

Consultation between members of the Forest Management Advisory Committee (FMAC), and Canfor resulted in the selection of the following 7 selected indicator species - moose (*Alces alces*), American marten (*Martes americana*), pileated woodpecker (*Dryocopus pileatus*), barred owl (*Strix varia*), woodland caribou (*Rangifer tarandus caribou*), grizzly bear (Ursus arctos), trumpeter swan (*Cygnus buccinator*) and bull trout (*Salvelinus confluentus*). Canfor elected to add grizzly bear (*Ursus arctos*) as an indicator species based on the recent recommendation by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for the species to be classified as Special Concern (Ross, 2002).

These species were selected because they require a broad and variable range of habitat. Thus, if a sufficient amount of habitat is maintained and available for these species, it is assumed that the FMA area will maintain a sufficiently wide range of habitat conditions suitable for other species that historically exist in the planning area.

All the indicator species in this section have been addressed through the wildlife guild process with the exception of bull trout (refer to "Target (1.2) 1a.2.1").

(1.2) 1a.1.1 Target
To maintain the 1997 habitat suitability rating for each ecosection group for the period 1997 - 2017 at the 1997 level

GDC's wildlife guild approach (2002) uses a habitat suitability rating based on ecosection group (Figure 16) scores. The scores are based on the value or proportion of several habitat variables deemed important for each wildlife guild. Each guild has a unique model equation that was built for habitat evaluation and quantification, for means of comparison among groups of ecosections. Generally the habitat models contain three variables, a critical general habitat element (e.g. amount of coniferous mixedwood and coniferous stands), a critical specific habitat element (e.g. amount of dense spruce/ fir stands) and an important landscape metric (e.g. amount of core area in preferred stands). A sample equation for the Old Growth Guild I follows:

S1 x S2 x S3 = habitat suitability rating score

Where:

S1 = Proportion of conifer mixedwood and conifer stands

S2 = Proportion of dense spruce and fir stands

S3 = Proportion of conifer mixedwood and conifer core areas

- **Acceptable variance**
  To maintain, within ±20%, the proportions (area) of general habitat, critical habitat and landscape metrics that contributes to each wildlife guild habitat suitability rating.

- **Current Status**
  A patch fragmentation analysis was conducted for the Peace, Puskwaskau and Main parcels (GDC, 2002). The analysis provided an indication as to the current (1997) suitability and operational sensitivity of habitat for each guild in the FMA area (Figures I7 – 26). The data is also presented graphically in Figures 27– 36.

Baseline habitat suitability rating scores were also developed for each parcel within the FMA area (Table 15).

Table 15. Habitat Suitability Rating Scores Wildlife Guilds I through V

SFMP Tables Master.xls
Table 52

Parcel	Guild I	Guild II	Guild III	Guild IV	Guild V
Peace	0.000253	0.0567	0.972	17.57	0.0000001
Puskwaskau	0.000092	0.0376	0.0245	25.99	0.000171
Main	0.001343	0.0313	0.113	13.63	0.000042

Source: GDC, 2002

To determine the impact of forestry succession on the habitat guilds, a successional stand projection model was applied to the FMA area on the forest inventory in an attempt to forecast changes to the mixedwood and coniferous landbase (GISmo, 2005). Refer to the *Forecasting and assumptions and analytical methods* sections for results.

Figure 16. Ecosection Groups Map

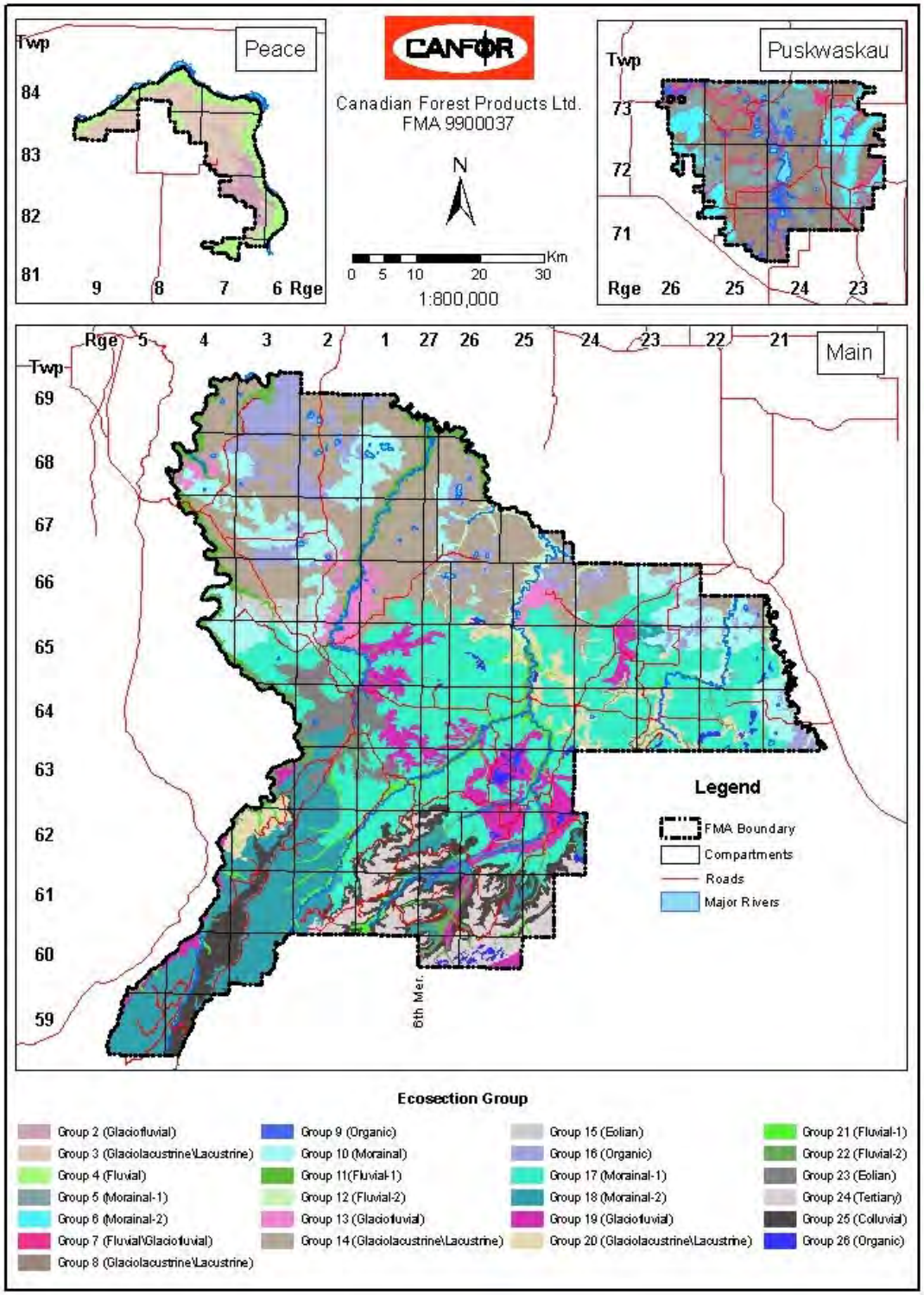


Figure 17. Old Growth Wildlife Guild (Guild I) Habitat Score

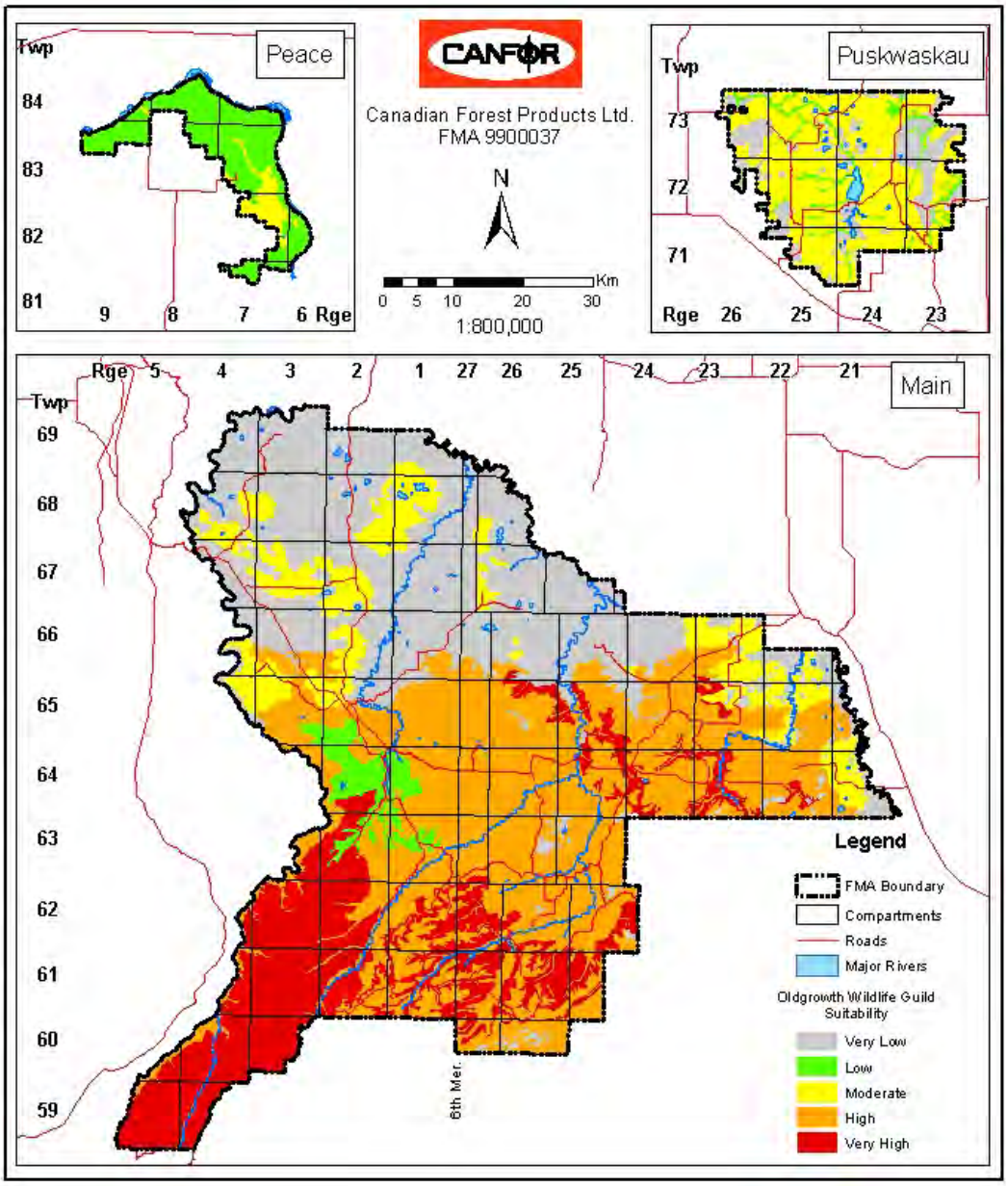


Figure 18. Old Growth Wildlife Guild (Guild I) Operational Sensitivity Score

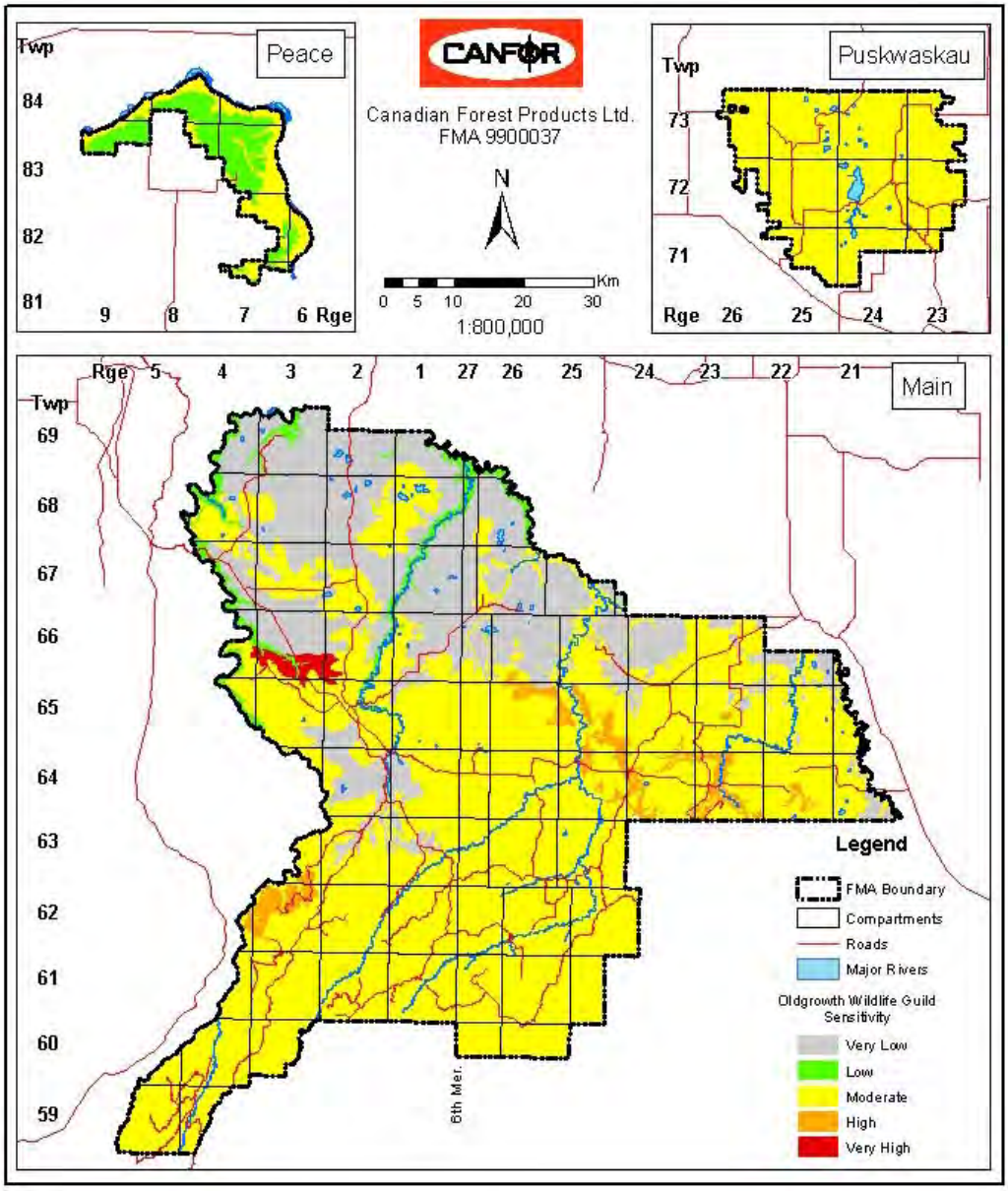


Figure 19. Snag Structure Wildlife Guild (Guild II) Habitat Score

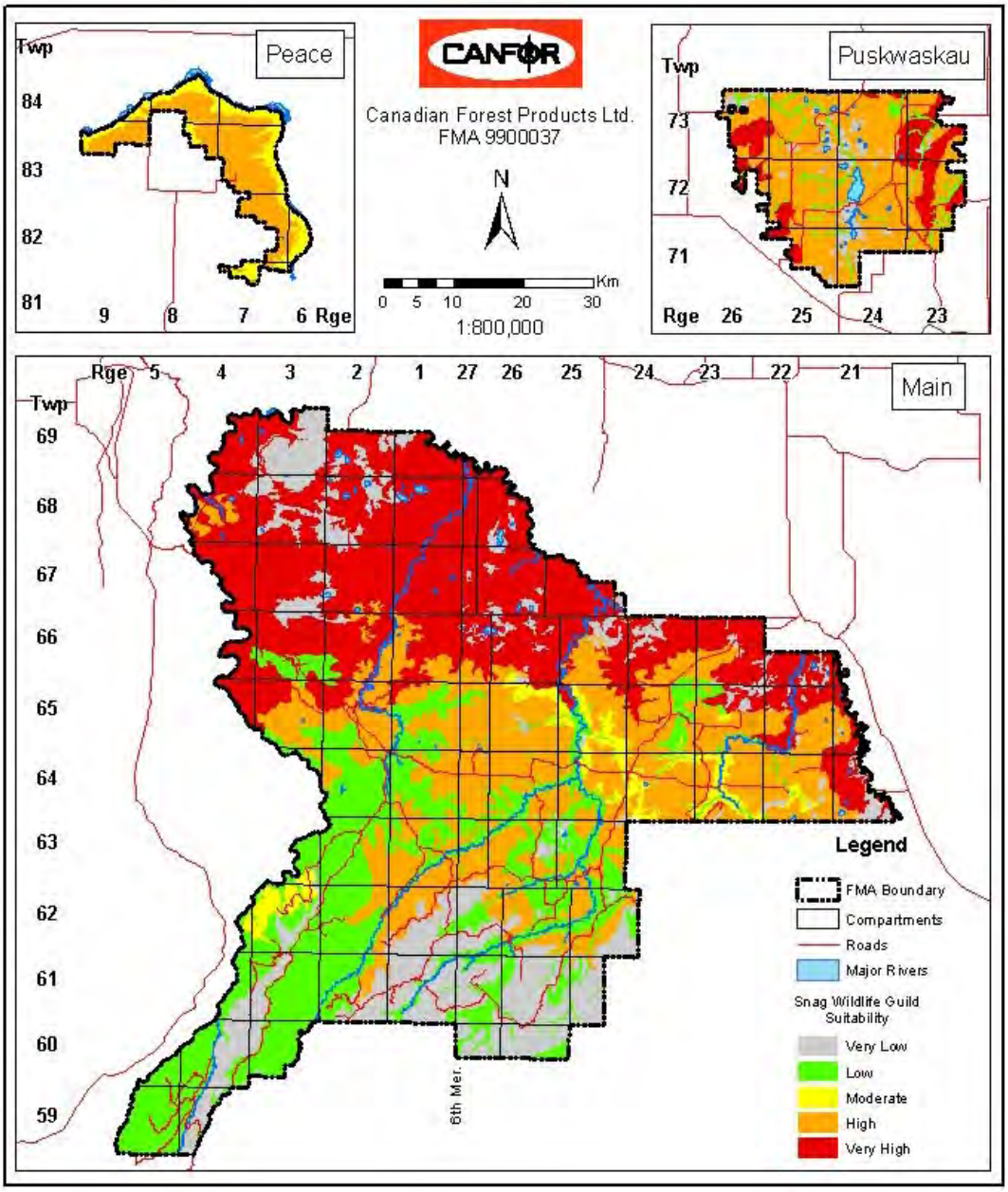


Figure 20. Snag Structure Wildlife Guild (Guild II) Operational Sensitivity Score

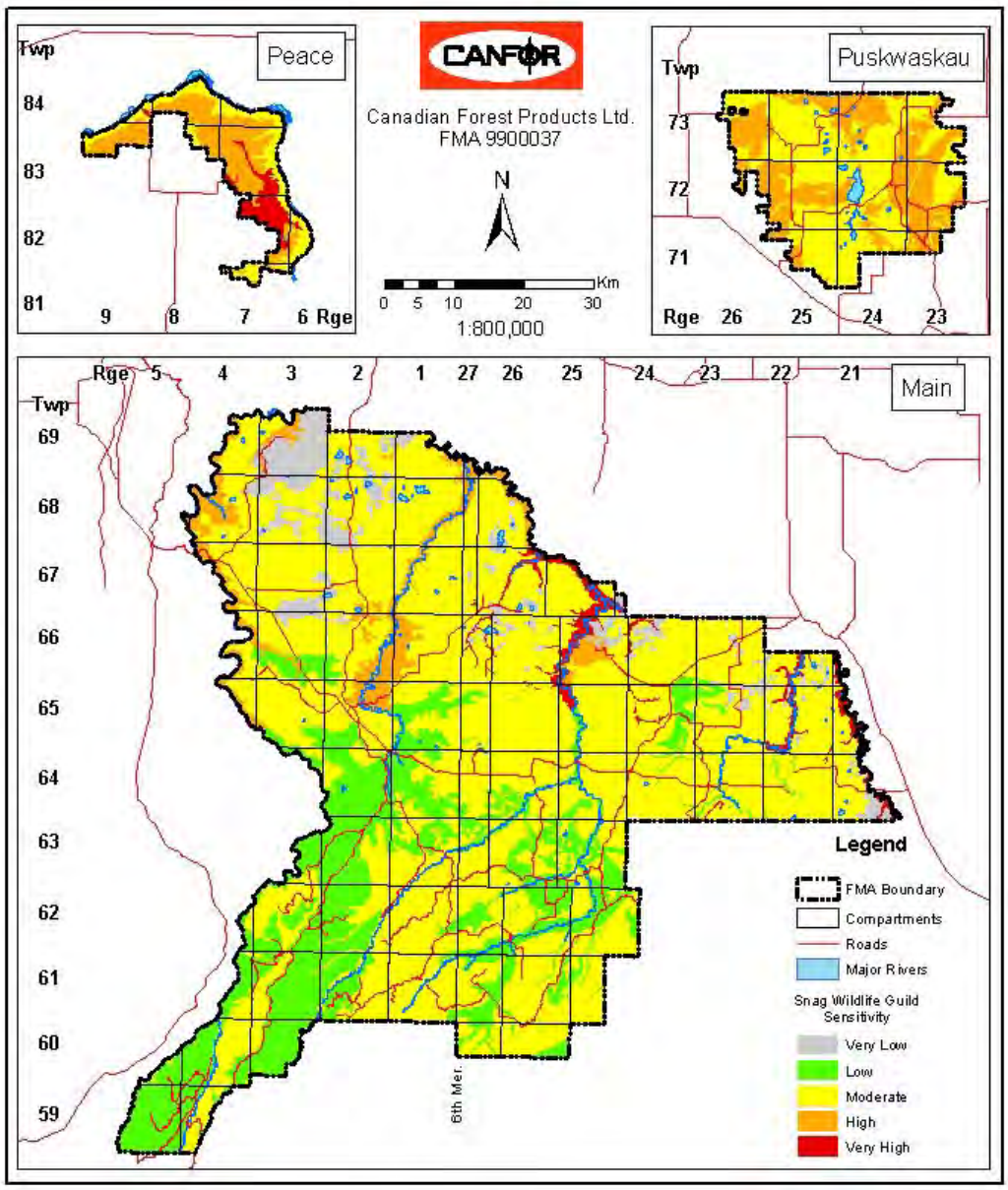


Figure 21. Large Home Range Wildlife Guild (Guild III) Habitat Score

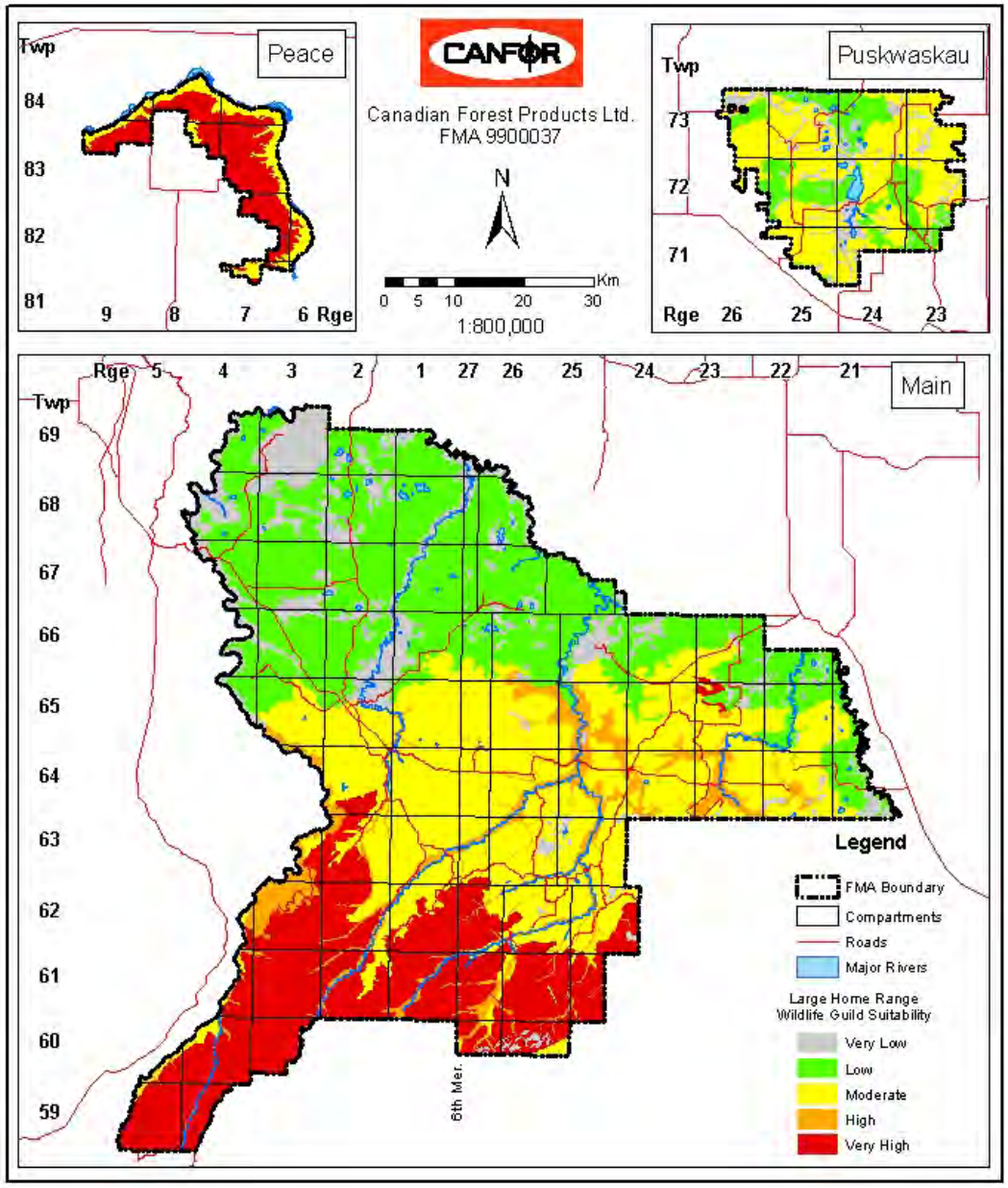


Figure 22. Large Home Range Wildlife Guild (Guild III) Operational Sensitivity Score

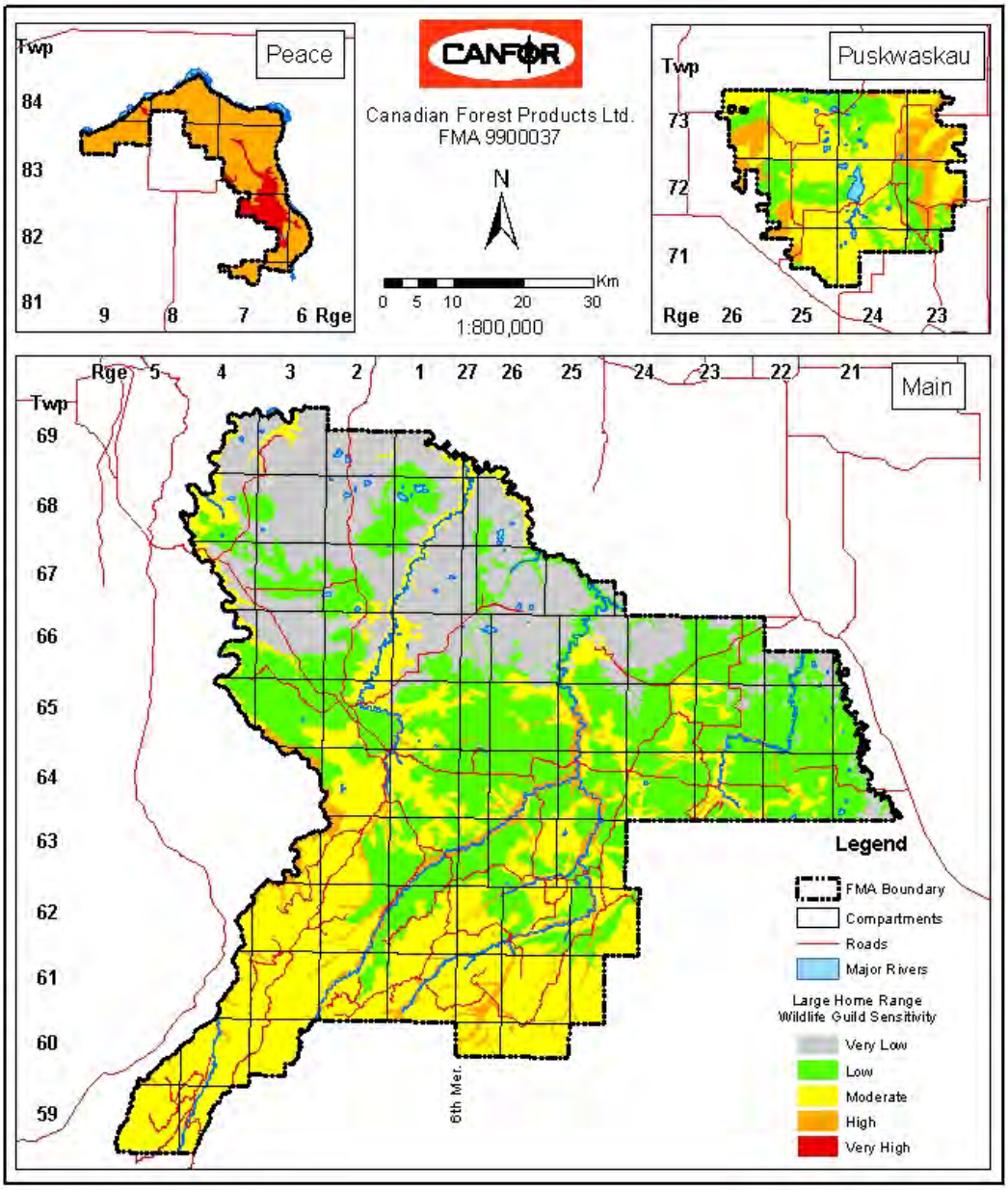


Figure 23. Interspersion Wildlife Guild (Guild IV) Habitat Score

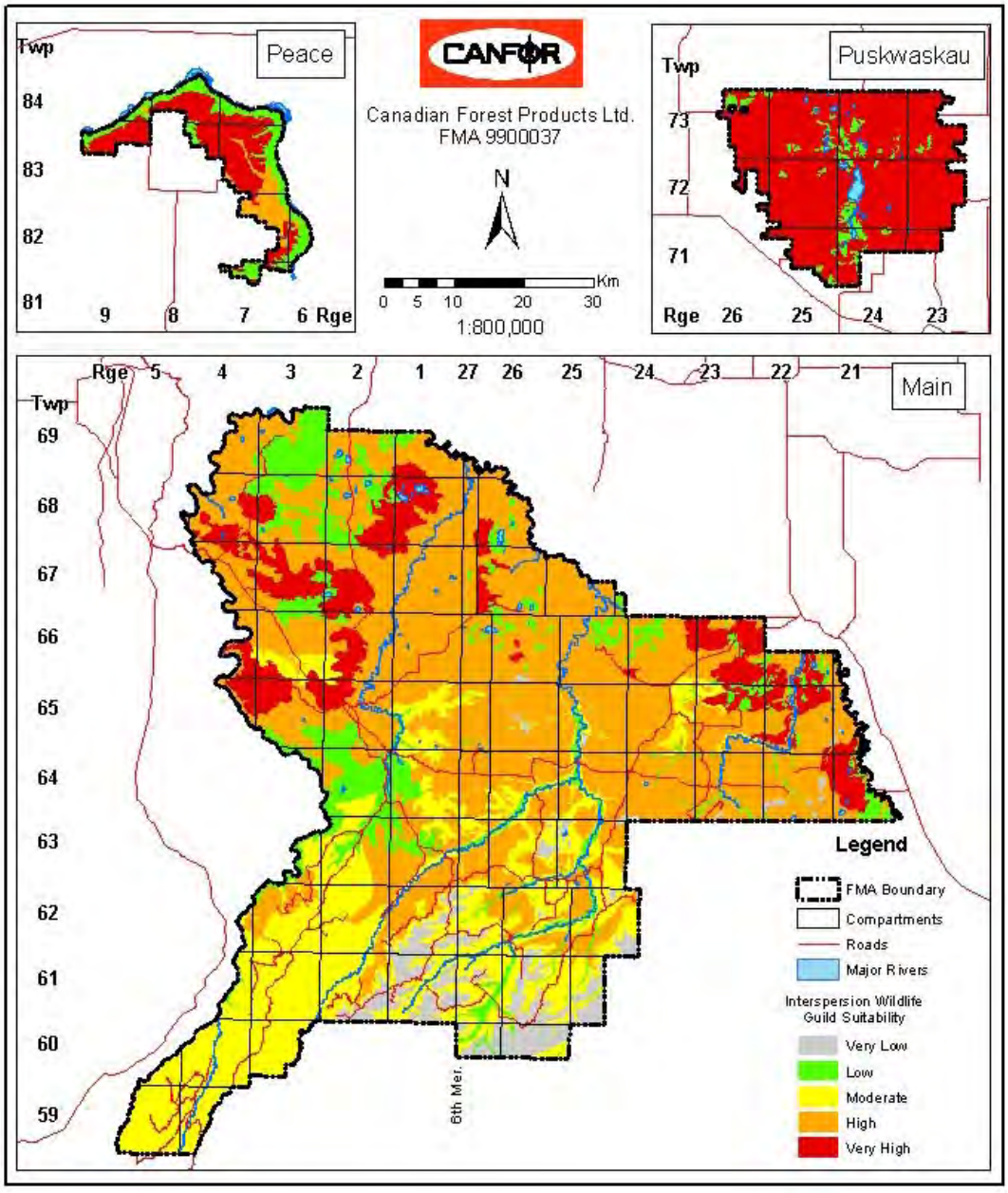


Figure 24. Interspersion Wildlife Guild (Guild IV) Operational Sensitivity Score

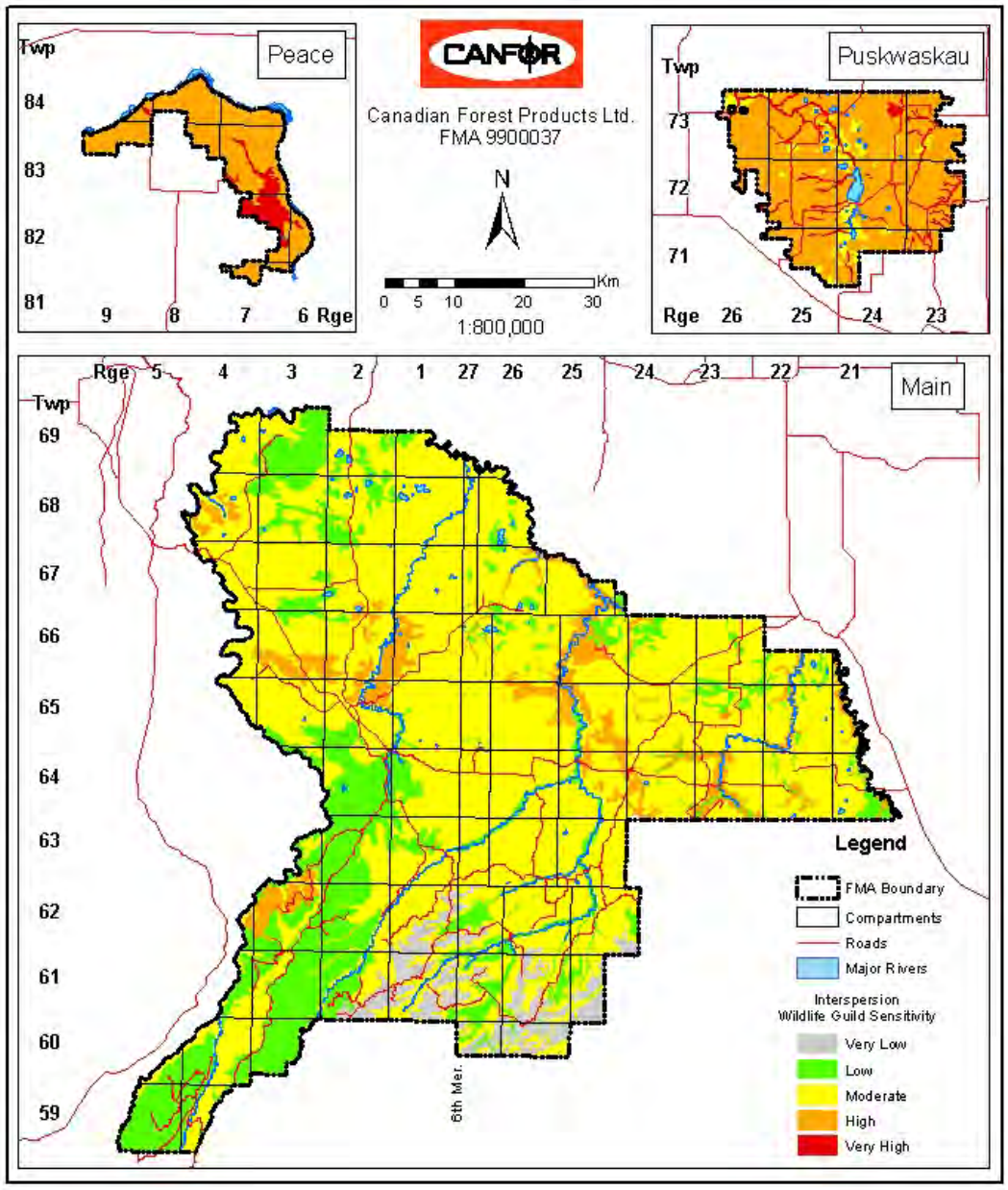


Figure 25. Riparian Wildlife Guild (Guild V) Habitat Score

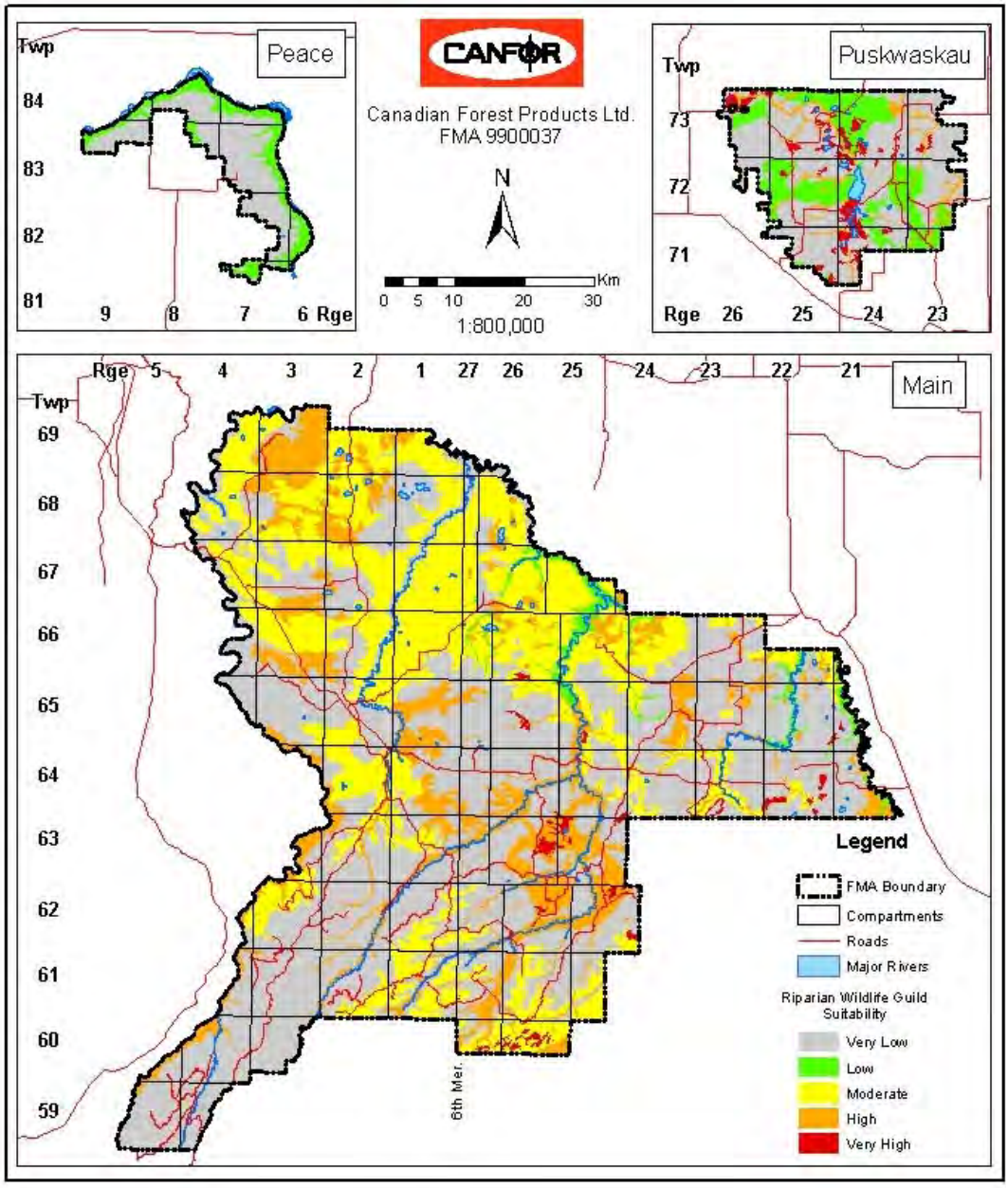


Figure 26. Riparian Wildlife Guild (Guild V) Operational Suitability Score

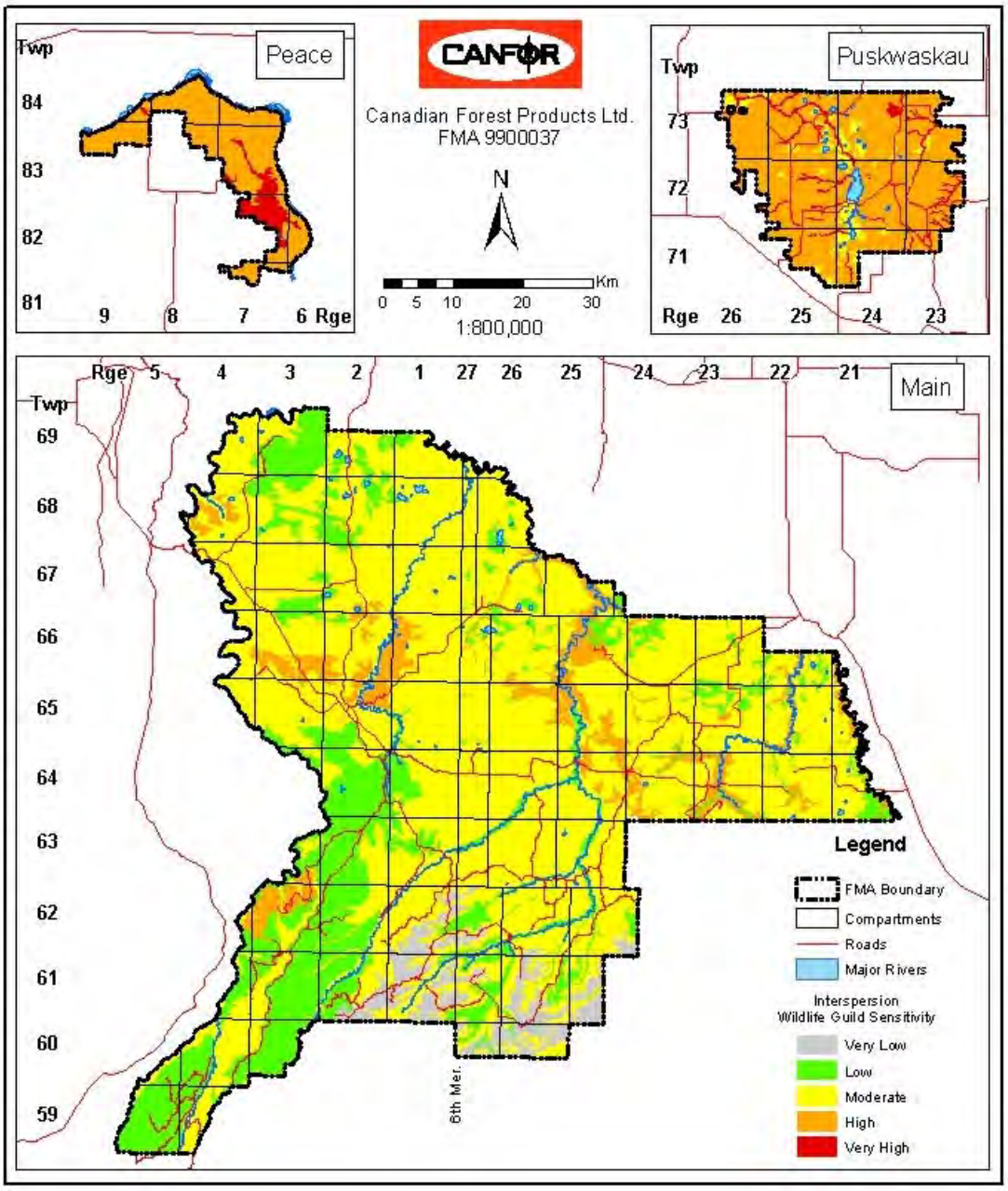


Figure 27. Guild I Suitability Ranking across Ecosection Groups

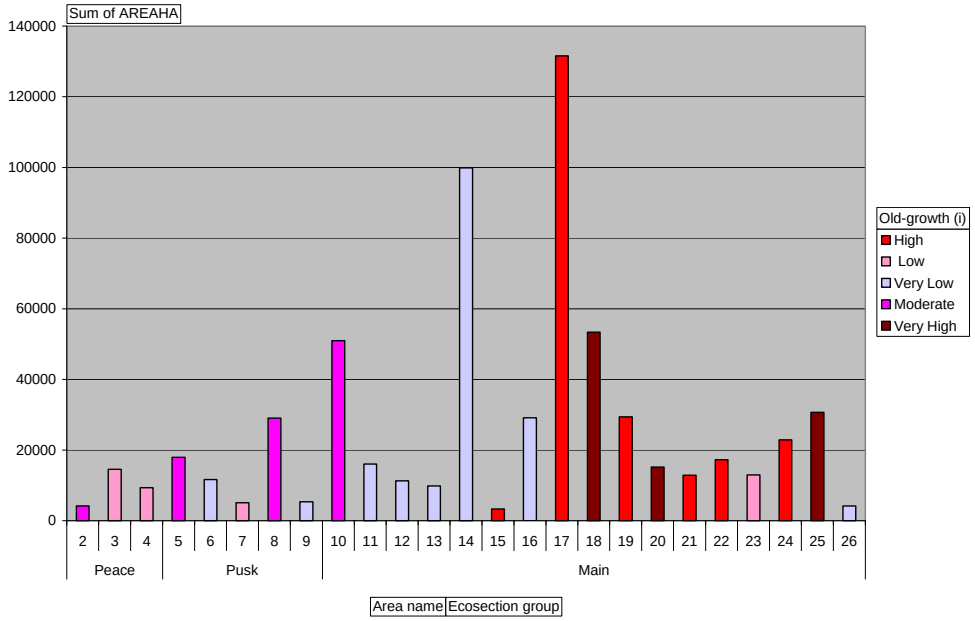


Figure 28. Guild I Sensitivity Ranking across Ecosection Groups

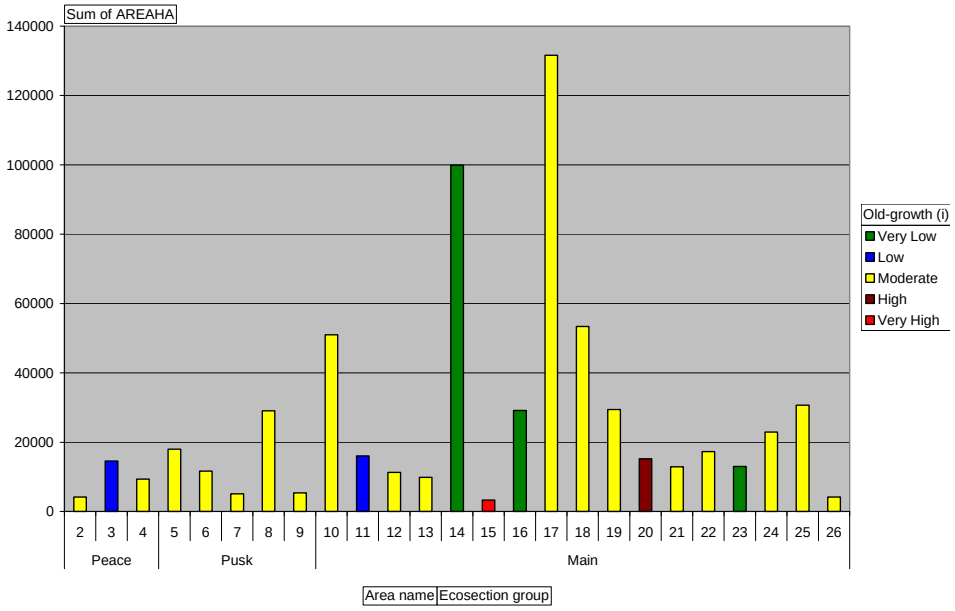


Figure 29. Guild II Suitability Ranking across Ecosection Groups

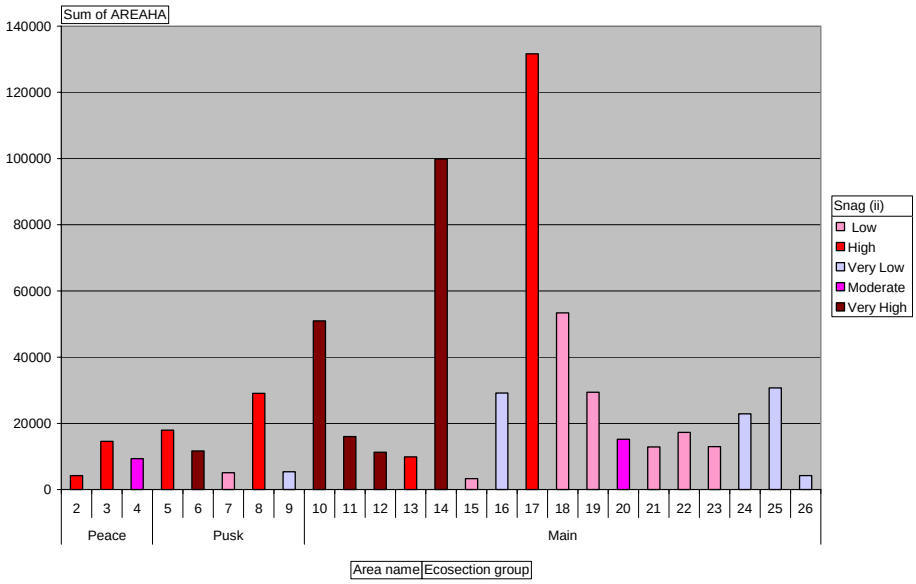


Figure 30. Guild II Sensitivity Ranking across Ecosection Groups

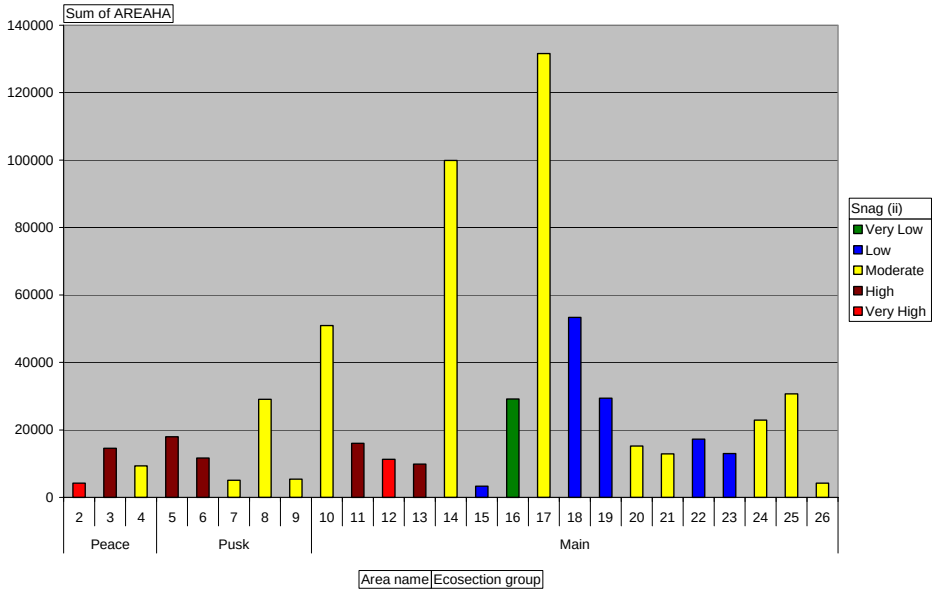


Figure 31. Guild III Suitability Ranking across Ecosection Groups

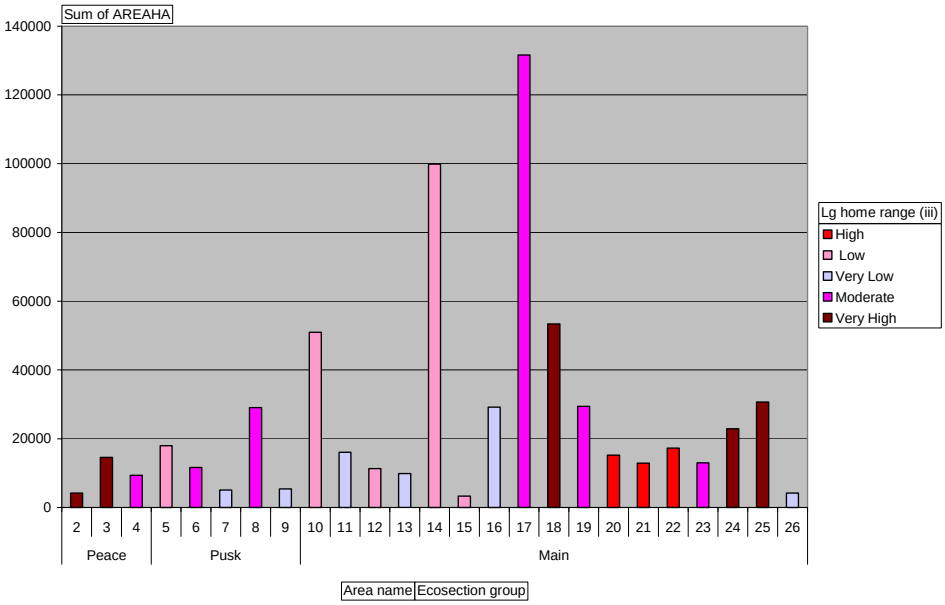


Figure 32. Guild III Sensitivity Ranking across Ecosection Groups

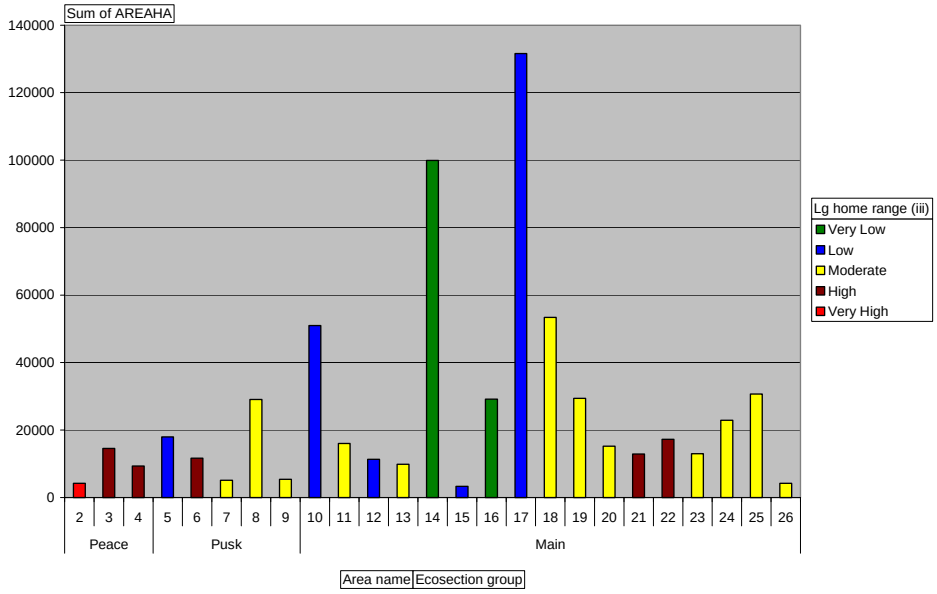


Figure 33. Guild IV Suitability Ranking across Ecosection Groups

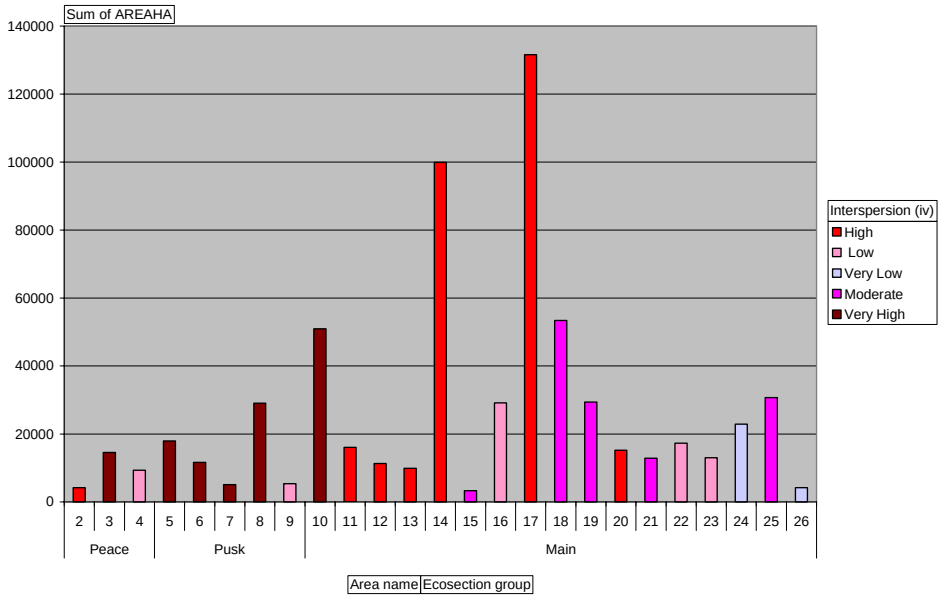


Figure 34. Guild IV Sensitivity Ranking across Ecosection Groups

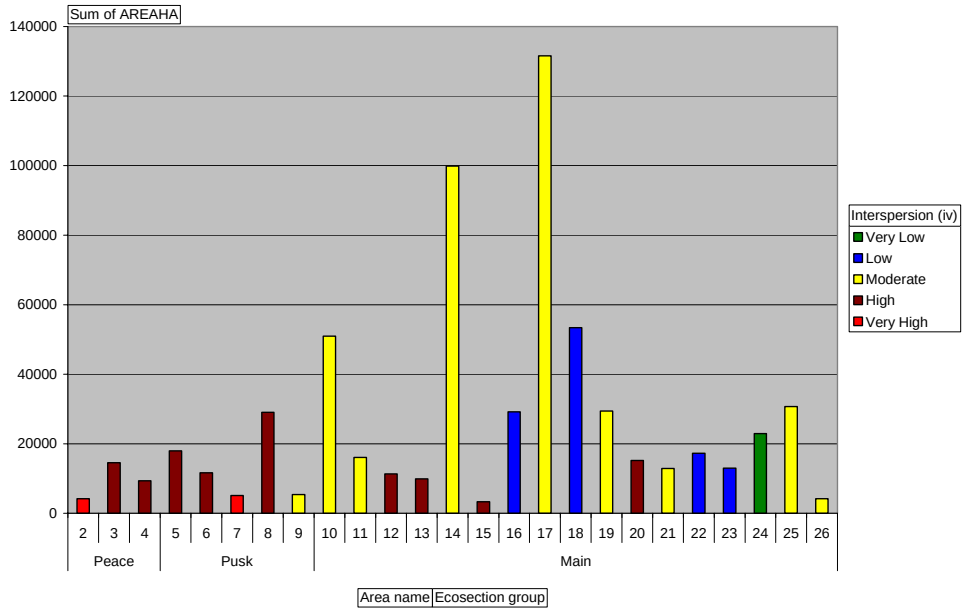


Figure 35. Guild V Suitability Ranking across Ecosection Groups

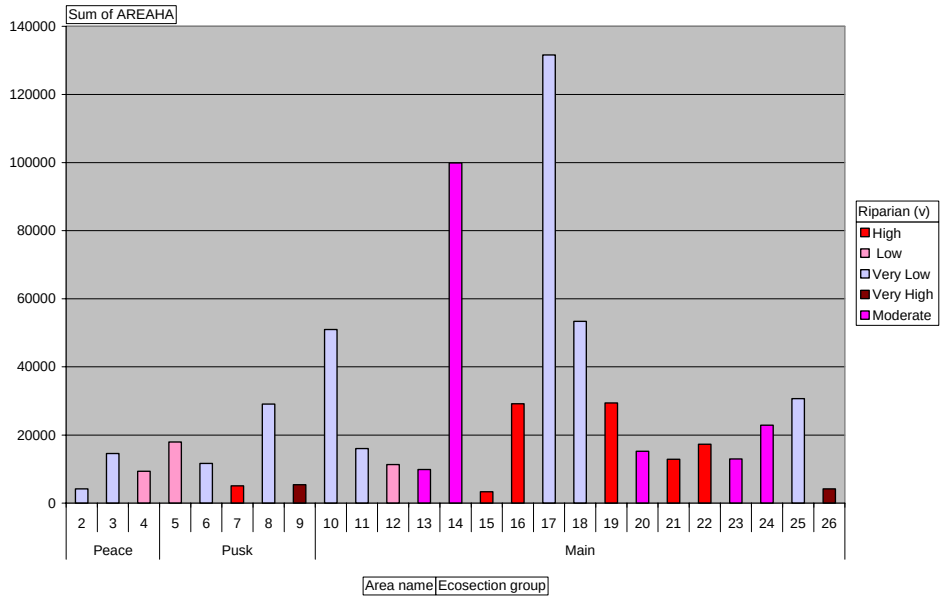
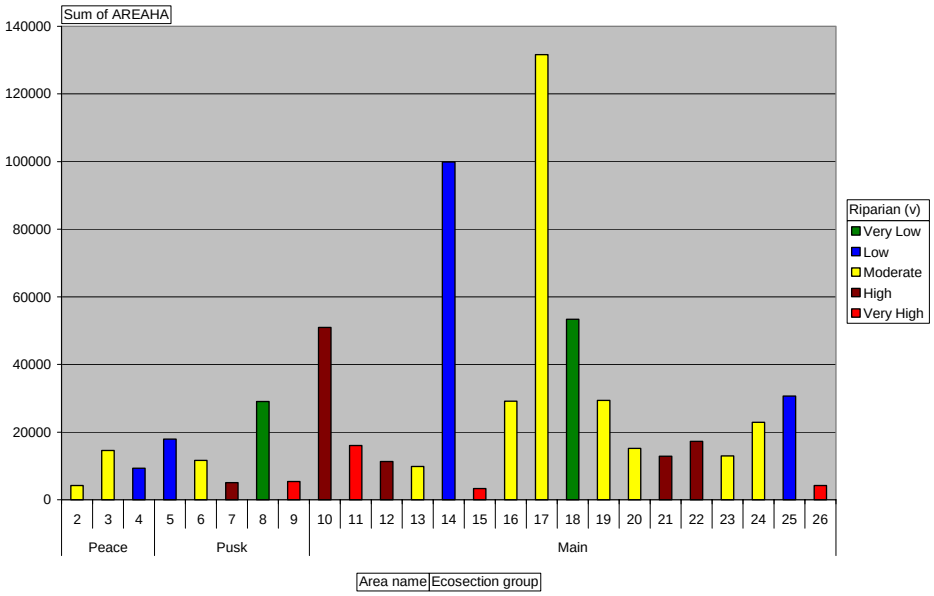


Figure 36. Guild V Sensitivity Ranking across Ecosection Groups



- **Forecasting assumptions and analytical methods**
  GISmo Solutions Ltd (GISmo) was retained to provide a method for projecting the wildlife guild suitability ratings at 2017 using equations from GDC (2002) and the approved harvest sequence. The objective was to determine the impact of forestry operations on wildlife guild habitats for a twenty year period (ending 2017).

GISmo utilized a succession stand projection model to forecast net change in areas for stand type successional shade response classifications (Table 16). The succession stand projection model is a stand level tree species replacement model based on a shade response tree species stratification described by Shugart *et al*. (1973), Kessell and Potter (1980), tree-by-tree replacement described by Horne (1976, 1981), data driven temporal stratification (i.e. seral stages), and an apical growth model[9] described by Canfor (1999). In order to chronologically evaluate stand level overstory dynamics, the central construct requires the development of an overstory replacement matrix that determines overstory change. The matrix also accounts for understory tree-species composition. For example, a stand dominated by tree-species "A" in the overstory and tree-species "B" in the understory determines a succession trajectory towards an overstory dominated by tree-species "B" (Kenkel et al. 1998). Seral stages (x-axis) are a data driven temporal stratification that determines when changes in overstory composition will occur. For example, a noticeable decrease in tree-species "A" volume coinciding with a noticeable increase of tree-species "B" volume at 100 years determines that the change from species "A" dominance to species "B" dominance will occur at this time.

The results of the forecast (Figure 37) are a net change in coverstate that demonstrates a relative equilibrium in succession during the *t0* (1997) and *t20* (2017) modeling period. It is critical to understand that the net change table is illustrating the equilibrium between stand types (i.e. the legend colors are the same for similar stand types), which is being maintained through the ecological conditions that drive the successional pathways (GDC, 2001). It is through the understanding of the shade response classification (Table 16) that the projections can be used for higher resolution habitat modeling and refinement of the Guild HSI values.

[9] An apical growth model is used to determine when understory shade-tolerant tree species become the overstory The model represents the apical growth rate determined from dominant and co-dominant tree species across stand-age. The model is applied to the replacement matrix using height, overstory and understory constraints.

Figure 37. Net Change In Coverstate Across Ecosection Groups

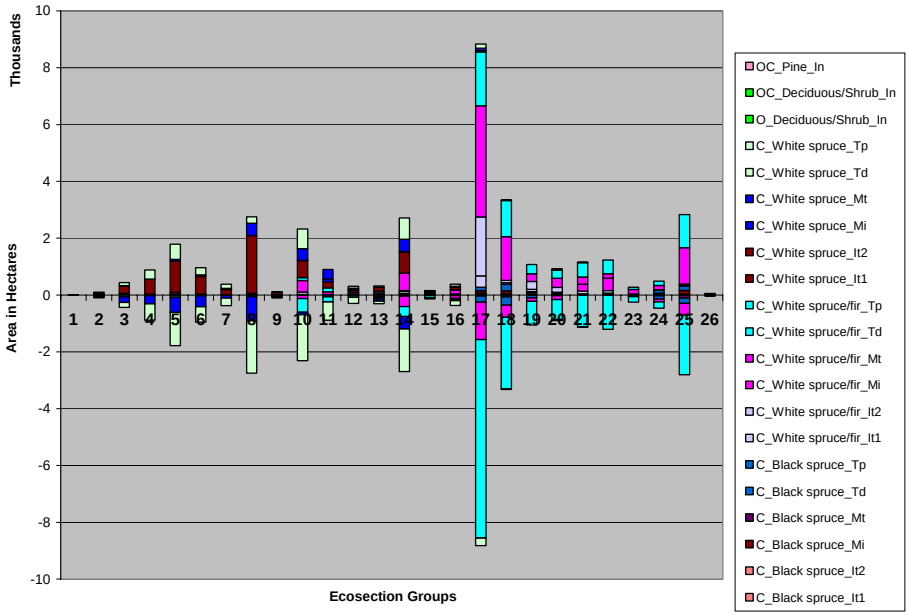


Table 16. Definitions for Successional Shade Response Labels (GDC, 2001)

Level 1			Level 2			Level 3	
Cover State	Label	Criteria	Cover State	Label	Criteria	Label	Criteria
Tolerant	T	Greater than or equal to 80% shade-tolerant tree species in overstory	Tolerant Pure	Tp	100% shade-tolerant tree species in overstory		
			Tolerant Dominating	Td	80 or 90% shade-tolerant tree species in overstory		
Mixed	M	Less than 80% shade-tolerant and less than 80% shade-intolerant tree species in overstory	Tolerant leading	Mt	Proportionally more shade-tolerant than shade-intolerant tree species in overstory		
			Intolerant leading	Mi	Proportionally more or equal shade-intolerant to shade-tolerant tree species in overstory		
Intolerant	I	Greater than or equal to 80% shade-intolerant tree species in overstory	Significant shade-tolerant understory	It	Greater than 20% shade-tolerant tree species when overstory is combined with understory	It1	Understory reaches overstory at seral stage 2 or 3
						It2	Understory reaches overstory at seral stage 4 or later
			No significant shade-tolerant understory	In	Less than or equal to 20% shade-tolerant tree species when overstory is combined with understory		

Results from the forecast (Graph XI) were compared between each guild and the corresponding ecosection group. **The results of the successional forecast for *t0* (1997) and *t20* (2017) indicate that overall, the change in coverstate during the twenty year period is at levels that should maintain the calculated guild ratings for suitability and sensitivity (GISmo, 2005).** The previous statement can be made because the resolution of the succession model is at a higher level than the ecosection groups used to define habitat areas. The changes to stands through successional growth are not dramatic enough to impact the general habitat requirements because the succession model at *t20* is not demonstrating major decreases in the tree species, but rather is modelling seral stage and canopy composition due to shade tolerance. There are marginal changes across all ecosection groups in coverstate primarily because of those stands that are in a climax or old mature seral stage being replaced at an equal to near equal rate as indicated by Figure 37. That should allow planning activities to continue without significant impact on the composition of the factors used to calculate the guild ratings.

- **Forest management activities**
  Canfor will continue to adhere to the harvest sequence and to monitor it in accordance with the DFMP.

- **Strategy and implementation schedule**
  GDC's Wildlife Guild report (2002) provided a model for ranking habitat suitability and sensitivity. The results of the model yielded some valuable insights into the use of this habitat model for forestry related activities. The most significant observation to come out of the forecasting was the understanding of the importance of scale between the successional model and the habitat guild resolutions (GISmo, 2005).

  GDC's guild model has proven to be robust enough to stratify the FMA area into strategic zones for protecting and evaluating the impact of industrial development upon groups of wildlife species. As a result, for the next DFMP Canfor will validate and refine the model in order to develop species-specific habitat management strategies at the operational level. A first step is to attach the current guild suitability and sensitivity ratings to the Alberta vegetation inventory (AVI). The second step will be to require the processing of each stand's attributes, including the dominant ecosite and to correlate the specific habitat requirements for each species that comprise the guilds. The result of integrating the guild ratings and the AVI stand/ wildlife species correlation will enhance long-term wildlife habitat management at the operational level and provide additional information that will improve future timber supply analyses.

  Inventory maps produced in the region of the FMA area during the period leading up to the fire suppression practices of the 1950s do not posses the spatial resolution or attributes that would make a pre-disturbance model more effective than the use of 1997 AVI data (per. comm., GISmo). However by April 2006, Canfor will evaluate the appropriateness of the 1997 baseline (GDC, 2002) by reviewing and actively monitoring the progress of Foothills Model Forest (FMF) initiative (FMF, 1999), which is attempting to model natural disturbance regimes. Canfor's objective is to increase its understanding of how to incorporate this leading research on natural disturbance into forest management planning.

- **Monitoring procedure (monitoring results against forecasts)**
  In 2008, Canfor will compare the baseline habitat suitability ratings (1997) to actual (2007) and the results will be reported in the *Five Year Forest Stewardship Report*.
- **Linkages to DFMP and Annual Operating Plan**
  The targets assist to achieve commitments in the approved DFMP regarding maintenance of habitat for 7 of the 8 selected indicator species. Bull trout has been addressed in a separate target ("Target (1.2) 1a.2.1").

(1.2) 1a.2 Indicator

Number of bull trout watersheds with ≥ 35% Equivalent Clearcut Area (ECA) above the H60[10] elevation

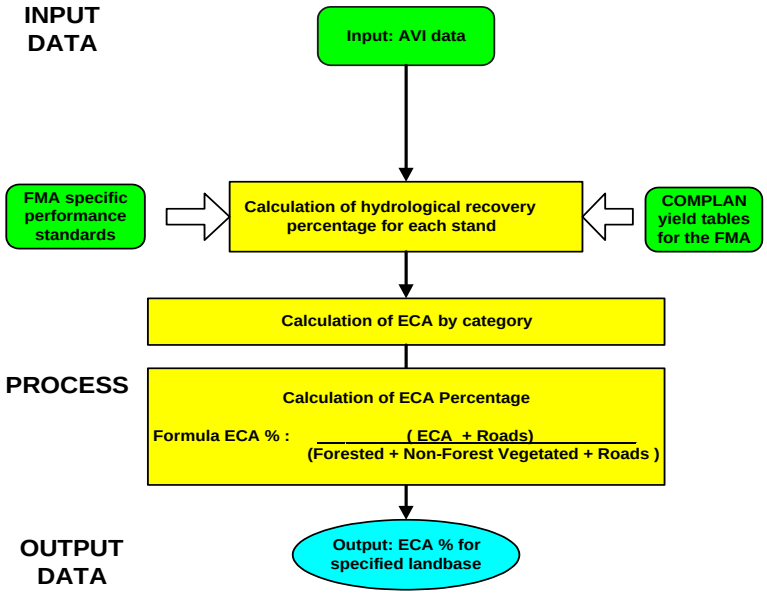
Fish habitat is dependent on water yield (quantity and timing of run-off) and water quality, which is, in part, dependent on the amount of vegetated cover within a watershed. If too much forest cover is removed at one time, the resultant water yield increases may affect aquatic habitat.

(1.2) 1a.2.1 Target

Annually, zero bull trout watersheds with ≥ 35% equivalent clearcut area (ECA) above the H60 elevation.

Water yield increases can be directly modelled, but equivalent clearcut area is often used as a surrogate. ECA is defined as an area that has been harvested, cleared or burned. It is a primary factor considered in evaluation of the potential effect of past and proposed forest harvesting on water yield. The process for calculation of ECA is provided in Figure 38.

Figure 38. Overview Process for Calculating ECA %



[10] H60 is the elevation above which 60% of the watershed lies (the watershed area above the H60 is considered as the source area for the major snowmelt peak flows).

- **Acceptable variance**
  The acceptable variance is for no more than 5 (3%) of the watersheds in the bull trout area to exceed 35% ECA above the H60 elevation.

- **Current status**
  The total bull trout area within the FMA area (Figure 39) is 242,828 ha (37% of the total FMA area) and contains 163 watersheds.

  The H60 line has been determined for all watersheds, which have been aggregated to a minimum of 500 hectares in the bull trout area (Figure 40).

  Watersheds were re-evaluated for ECA % in June 2005. More detailed data is provided in Appendix 6. As Table 17 indicates, only watershed #2057 exceeds the target. Although watersheds #4257 and #5642 exceeded the target in 1999, both have recovered sufficiently so they now meet the target.

  Watersheds that are above the target ECA of 35% are flagged for evaluation (refer to *Forecasting assumptions and analytical methods* below for a description of the procedure).

Table 17. Watersheds Above the ECA of 35%

SFMP Tables Master.xls
Table 37

Watershed ID	1999 ECA %	2005 ECA %
2057	48	40
4257	36	19
5642	37	32

Source: Timberline compiled data - Timberline ECA 28June 2005.xls

- **Forecasting assumptions and analytical methods**
  It is assumed that streamflow maxima will not adversely impact the ecosystem if no more than 20 - 40% of the total vegetated cover is removed within the area above the H60 within a defined watershed.

  Each year the ECA % is calculated prior to submission of the Annual Operating Plan. Any ECA that is over 35% is re-evaluated and a course of action is undertaken. For example the amount of area proposed for harvest may be reduced.

Figure 39. Bull trout watersheds within the FMA area

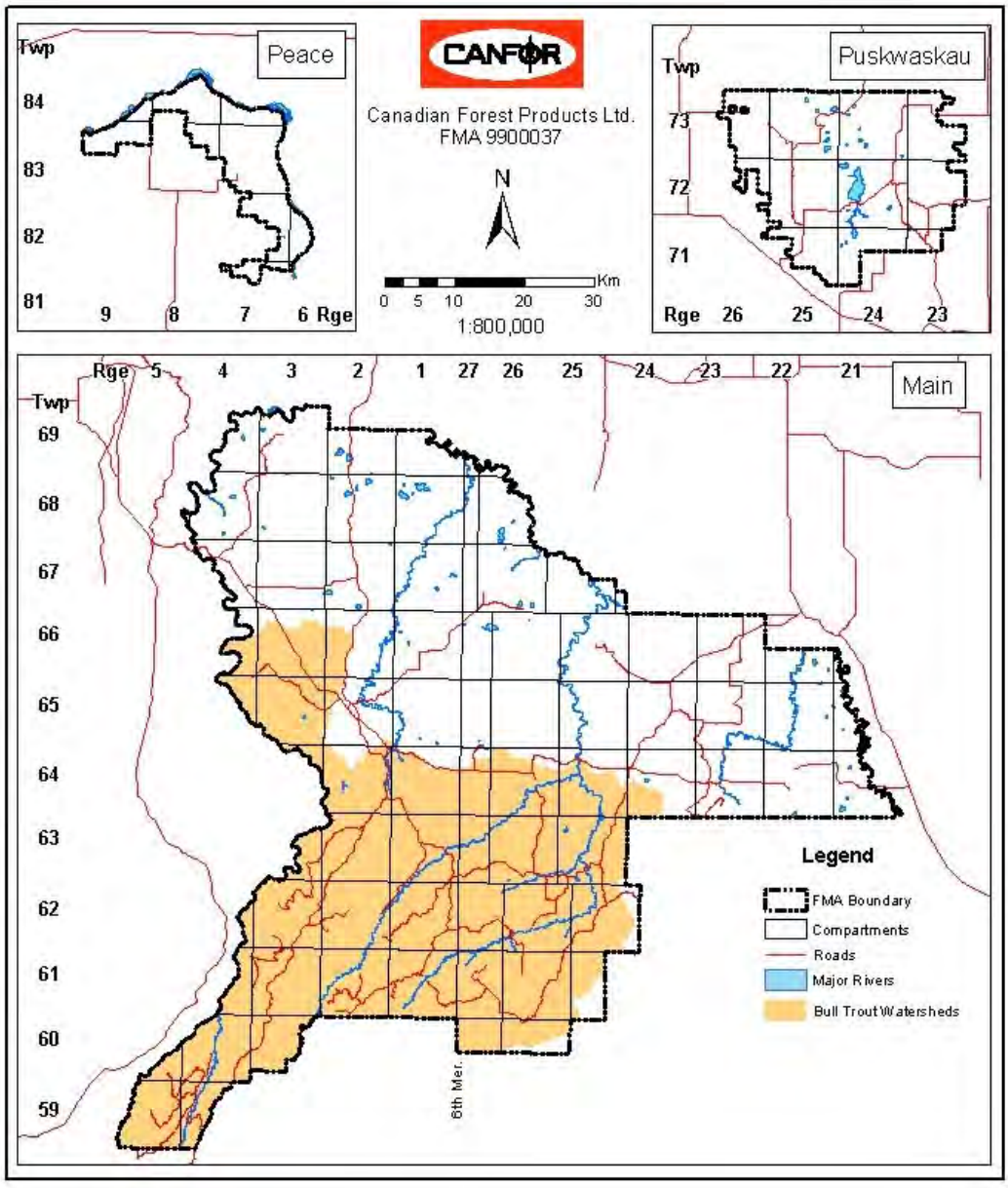
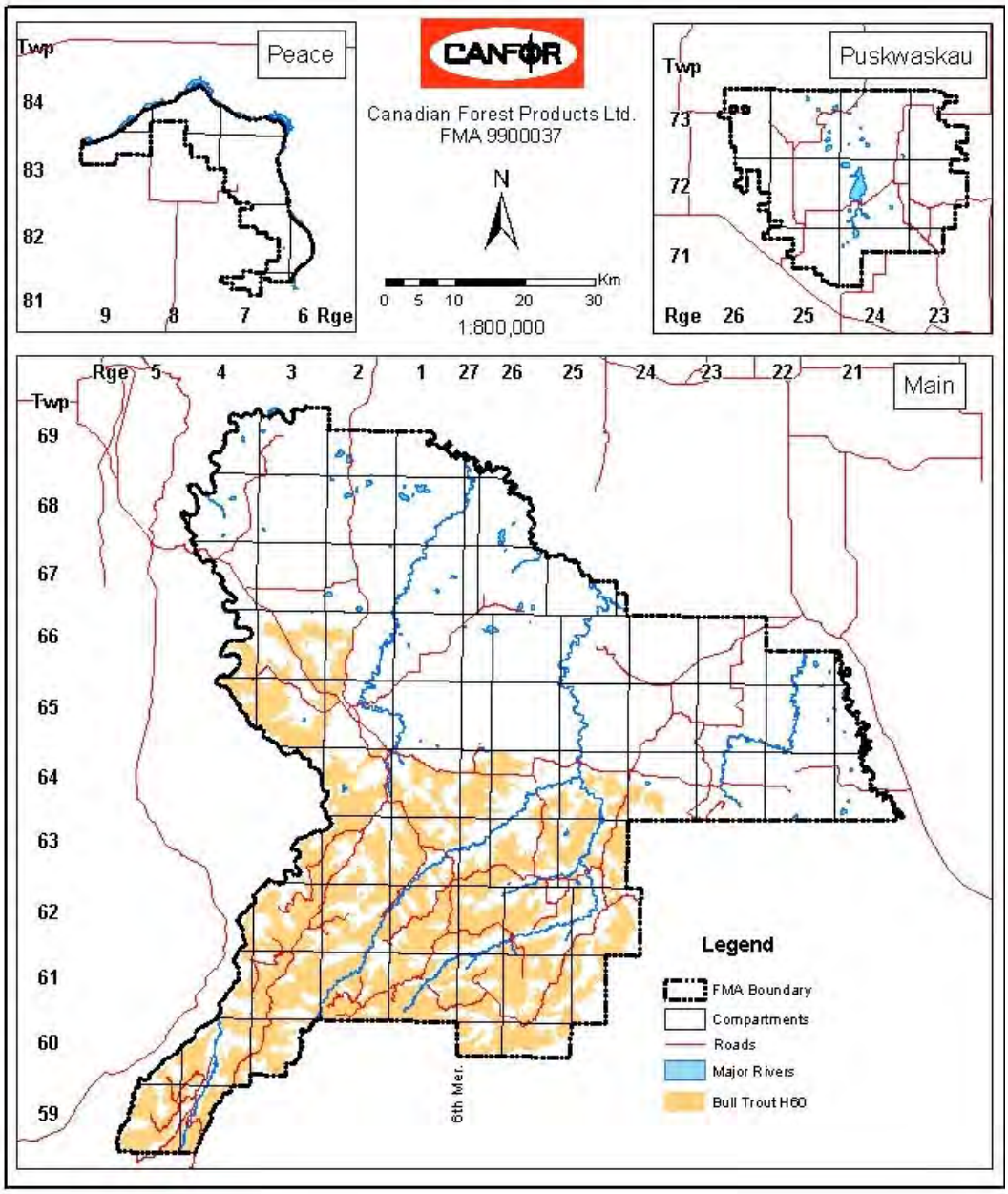


Figure 40. H60 area within the Bull trout area



- **Forest management activities**
  ECA values have been calculated and the data utilized to prepare the 2005 AOP.
- **Strategy and implementation schedule**
  The strategy is to continue to utilize ECA % as a method to evaluate the extent of forest harvesting in bull trout watersheds.
- **Monitoring procedure (monitoring results against forecasts)**
  Each year prior to AOP submission, ECA values will be recalculated and watersheds with ECA above the H60 elevation of greater than 35% flagged for review. The resultant data will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  All new harvesting plans will follow the strategic direction as outlined in the approved DFMP and the Operating Ground Rules (ASRD, 2004a).

(1.2) 1a.3 Indicator
Percentage of habitat for endangered[11] or threatened[12] vertebrate species over time

Only two vertebrate wildlife species within the FMA area are classified as 'endangered' or 'threatened' (Canfor, 2004b). The ranges of woodland caribou (*Rangifer tarandus caribou*) and trumpeter swan (*Cygnus buccinator*) encompass portions of the FMA area. Woodland caribou are currently listed as '*at risk*[13]' in Alberta and '*threatened*' under the *Alberta Wildlife Act* and the federal *Species at Risk Act* (SARA). Trumpeter swan are classified as 'threatened' under the *Alberta Wildlife Act* and considered *"not at risk"* overall in Canada under SARA.

The purpose of the federal and provincial Acts is to prevent Canadian indigenous species, subspecies, and distinct populations from becoming extirpated or extinct, to provide for the recovery of endangered or threatened species, and encourage the management of other species to prevent them from becoming at risk.

Species protected by SARA are determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) comprised of an independent body of experts responsible for assessing and identifying species at risk. COSEWIC assesses and classifies a wildlife species as extinct; extirpated; endangered; threatened; special concern; data deficient or not at risk. COSEWIC provides its report to the Minister of the Environment and the Canadian Endangered Species Conservation Council, and a copy is included in the Public Registry. The Federal Minister of the Environment must respond to a COSEWIC assessment within 90 days. Within nine months, the government makes a decision about whether or not to add the species to the List of Wildlife Species at Risk in SARA. When a species is on or added to the List of Wildlife Species at Risk, extirpated, endangered or threatened species and their residences have:

- Immediate protection on federal lands (except for those species in the territories that go through the safety net process described below);
- Immediate protection if they are an aquatic species;
- Immediate protection if they are a migratory bird; and
- Protection through a safety net process if they are any species in a province or territory.

Recovery strategies and action plans, which must include the identification of critical habitat for the species and management plans, are published in the Public Registry.

At the provincial level, the evaluation of the status of species at risk in Alberta relies upon the activities of the Endangered Species Conservation Committee (ESCC) and its scientific arm, the Scientific Subcommittee, both created under the auspices of the *Wildlife Act* in 1998. Using information contained in detailed status reports, the Scientific Subcommittee of the ESCC assesses what the risk of extinction or extirpation is for Alberta species that have been identified as potentially at risk through the General Status process. The Scientific

[11] 'Endangered' - any species facing imminent extirpation or extinction.

[12] 'Threatened' - any species likely to become endangered if limiting factors are not reversed.

[13] 'At Risk' - any species known to be 'At Risk' after formal detailed status assessment and designation as 'Endangered' or 'Threatened'.

Subcommittee evaluation is presented to the ESCC, which then decides what recommendations to make to the Minister of Sustainable Resource Development concerning the legal designation (e.g. 'endangered' or 'threatened'), as well as management and recovery of a species.

http://www3.gov.ab.ca/srd/fw/speciesatrisk/legaldesignation.html

(1.2) 1a.3.1 Target

Woodland caribou: no more than 20% of the area in pioneer or young seral condition and at least 20% of the area in old seral condition at key points in time

Trumpeter swan: to buffer 100% of identified trumpeter swan lakes with a 200 m no harvest buffer (reported annually)

- **Acceptable variance**

  Woodland Caribou

  To achieve the 2019 projections, the acceptable variance in 2009 for pioneer/ young seral condition will be ≤ 18% of the area and for old seral condition will be ≥ 11% of the area.

  For 2019 and beyond, the acceptable variance for the pioneer/ young seral condition will be no more than 25% of the area. The acceptable variance for the old seral condition will be no less than 15% of the area.

  Trumpeter Swan

  The acceptable variance is zero

- **Current status**

  Woodland Caribou

  There are 2 woodland caribou (Figure 41) herds partially within the FMA area including the A La Peche and the Little Smoky. Their total range is 466,127 ha with 70,228 ha being located in the Caribou Area within the FMA area (Figure 42). The ranges within the FMA area represent 15% of their total ranges and 10.8% of the total FMA area.

  Table 18 represents the current status projected status for pioneer/ young and old seral stages as of May 1st, 2005 and the projected distribution to 2099. The present age class structure (2005) does not meet the 15% old seral condition however over time the forest will continue to age and the target will be achieved in 2019.

Figure 41. Woodland Caribou

Woodland caribou ranges comprise approximately 70,000 ha. within the FMA area.

Source: Photo by C. Rohner

Table 18. Percentage of Pioneer/ Young and Old Seral Stages in the Caribou Area

SFMP Table Master.xls
Table 20

Year	Pioneer/Young (%)	Old (%)
1999	13	10
2005	15	10
2009	18	11
2019	22	15
2049	24	32
2099	24	38
2199	25	42

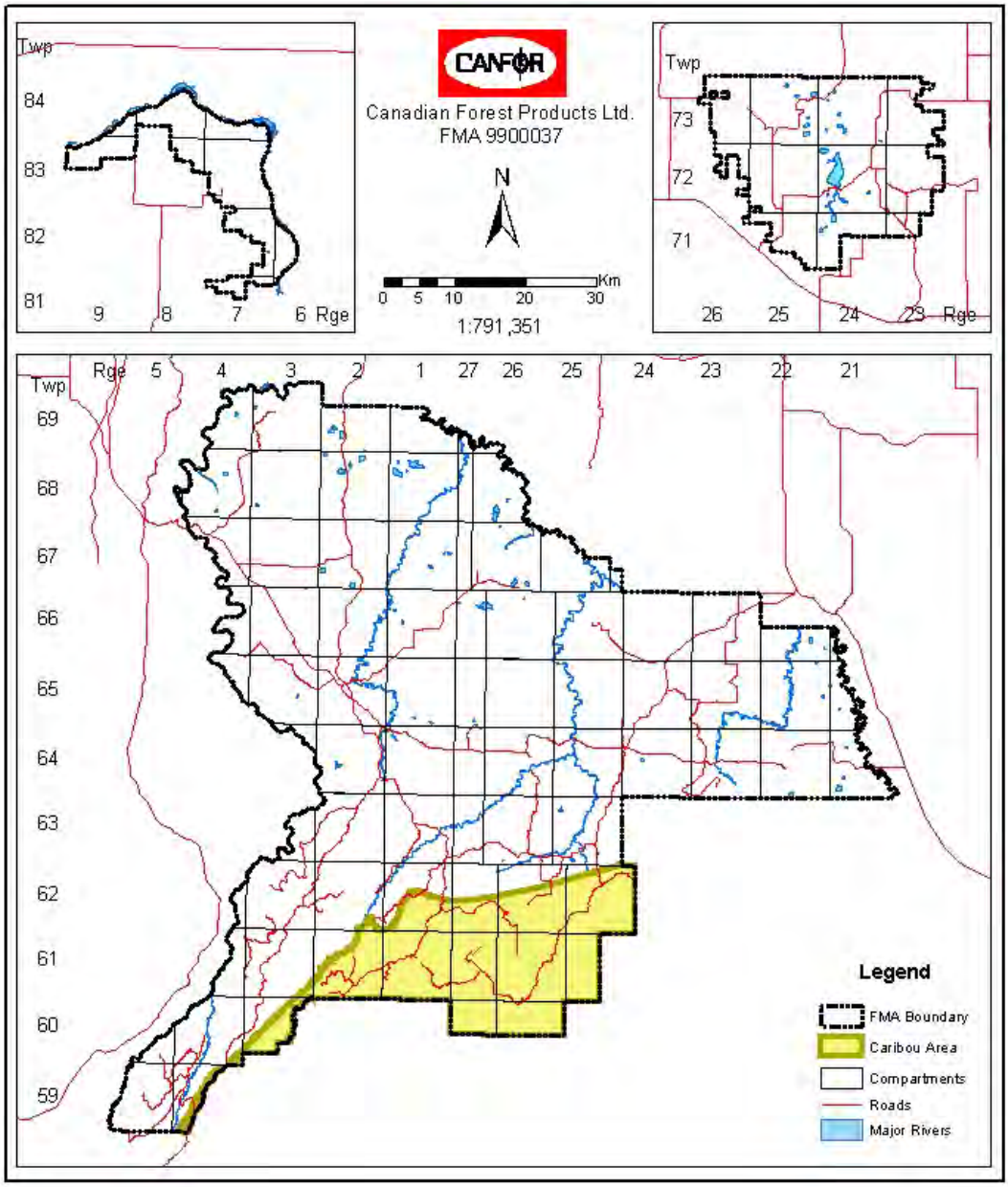
Source: ORM 2001 compiled data, DW caribou_age.xls

Canfor will not establish additional caribou targets until the government has endorsed recommended objectives and strategies through the process established in the *Alberta Woodland Caribou Recovery Plan 2004/ 05 - 2013/ 14* (ASRD, 2004b). The Company will however, continue to be an active member of the Caribou Landscape Management Association (CLMA) comprised of members from the forest industry, oil and gas sector and one Aboriginal group. The goal of the CLMA is to develop and implement plans that will ensure the long-term conservation of the Little Smoky and A La Peche caribou herds. The plan will focus on four areas:

- Reduce the future ecological footprint on the home ranges of the two herds;
- Restore the existing footprint to improve caribou habitat;
- Improve funding for caribou monitoring and research; and

- Work with the Alberta government to recover caribou populations.

Figure 42. Woodland Caribou Ranges within the FMA area



Trumpeter Swan

Trumpeter swans (Figure 43) are sensitive to human disturbance, and human activity in breeding areas may decrease survival of eggs or cygnets. Trumpeter swans that are disturbed may not nest or may abandon an existing nest. Therefore, the breeding population continues to be dependant on current management practices and habitat protection.

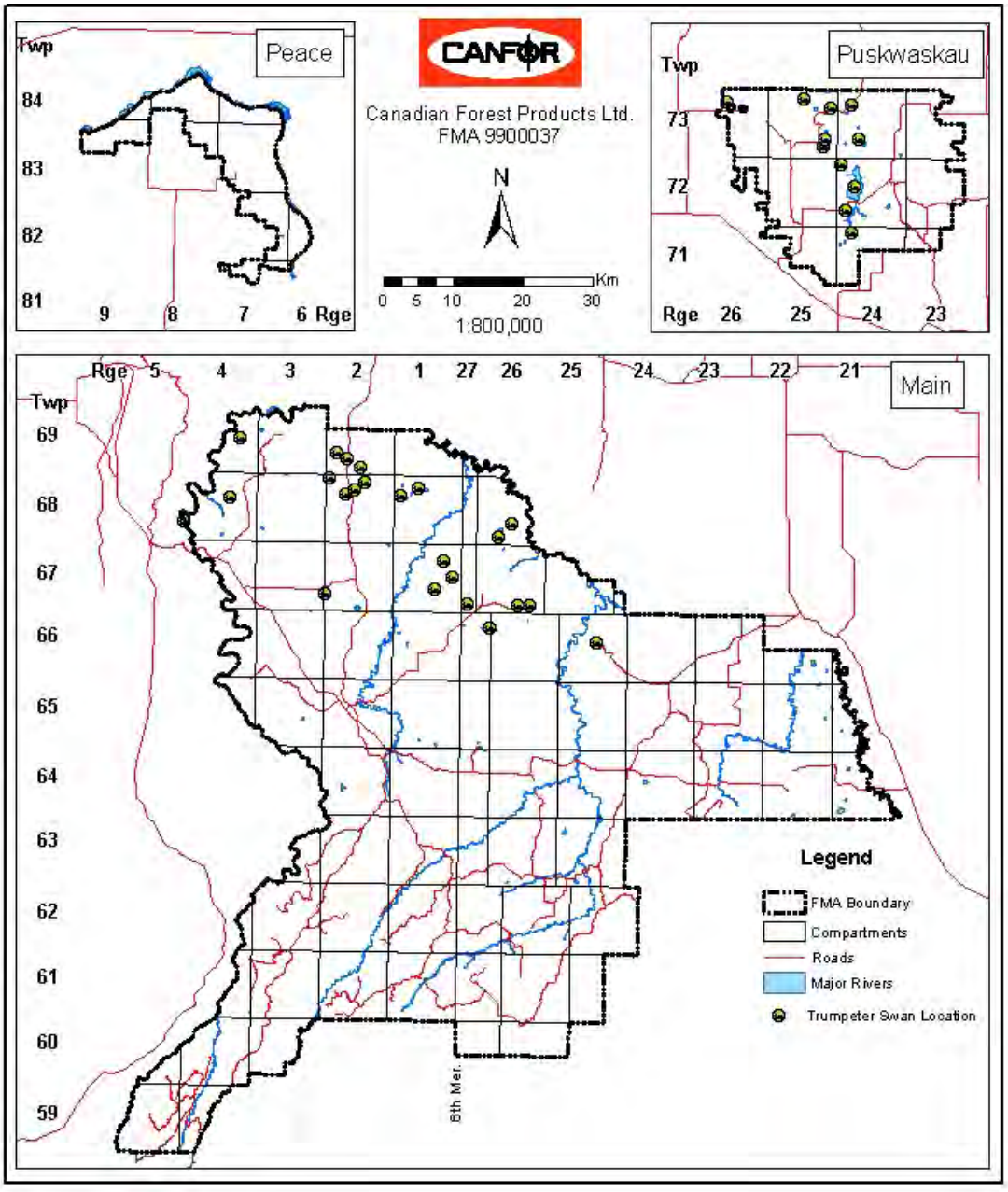
The Operating Ground Rules (ASRD, 2004a) and *The Recommended Land Use Guidelines for Trumpeter Swan Habitat in Alberta* (ASRD, Draft 2001), provides background, intent, and specific direction for managing industrial work near trumpeter swan breeding wetlands www3.gov.ab.ca.srd/fw/landuse/index.html.

Figure 43. Trumpeter Swan

The number of sites identified as lakes occupied by breeding birds (i.e. pairs with young) will vary over the years depending on climatic conditions and condition of the wetland or lake.

Locations of breeding wetlands are depicted on the provincial land use referral maps. Alberta Sustainable Resource Development (ASRD) is presently updating the NW1 Smoky Land Management Referral Map (October 2002), which indicates trumpeter swan nesting sites. ASRD advises that the process will be completed by the end of the year 2005 (per. comm.). ASRD identified 34 areas within the FMA area (Figure 44).

Figure 44. Trumpeter Swan Buffer Area



- **Forecasting assumptions and analytical methods**

  Woodland Caribou

  The constraints indicated in the target were used in the *Resource and Timber Supply Analysis* (Canfor, 2003) and the results indicate that habitat conditions for woodland caribou are not adversely impacted by Canfor's operations.

  Forecasting assumptions and analytical methods will be conducted in accordance with the Caribou Landscape Management Association (CLMA) and the Caribou Recovery Plan recommendations(ASRD, 2004b).

  Trumpeter Swan

  Buffer areas will be maintained, unless changes are recommended or approved by Alberta Sustainable Resource Development.

- **Forest management activities**

  Woodland Caribou

  Canfor will continue to be an active member of the CLMA and support recommended research programs. In accordance with the *Caribou Habitat Management Commitments* (Appendix 7, Canfor, 2005b), commencing the 2005 timber year Canfor has deferred harvesting and road construction activities in the Caribou Area for two years.

  Trumpeter Swan

  Two hundred meters of "no harvest" buffers are maintained around identified trumpeter swan areas to protect nesting sites, unless changes are recommended or approved by the ASRD.

- **Strategy and implementation schedule**

  Woodland Caribou

  The strategy is as follows:

  - Adhere to the *Caribou Habitat Management Commitments* (Appendix 7, Canfor, 2005b)
  - Continue to implement the cover constraints in the Annual Operating Plan (AOP);
  - Continue an adaptive approach to caribou habitat management. As more information becomes available incorporate it into the planning process;
  - Continue to actively work with oil and gas companies that are operating within the caribou herd areas to reduce impacts on caribou habitat;
  - Data resulting from the Caribou Landscape Management Association and West Central Alberta Caribou Standing Committee research programs will be evaluated and, if appropriate, be used to enhance forest management within the Caribou Area; and
  - Canfor will participate in projects endorsed by the Caribou Landscape Management Association that apply to areas within the FMA area.

  Trumpeter Swan

  Canfor will not conduct harvesting activities near known sites. Protection of identified nesting sites has been implemented and will be maintained.

- **Monitoring procedure (monitoring results against forecasts)**
  Woodland Caribou
  Canfor will monitor the DFMP cover constraints against all submitted harvest plans within the Caribou Area.

  The progress made in achieving the 2009 projections will be evaluated and presented in the 2009 *Annual Performance Monitoring Report*.

  Trumpeter Swan
  Each year, the presence of nest sites will be verified and included in the annual operating plan. Any new nest sites will be incorporated into future plans.

- **Linkages to DFMP and Annual Operating Plan**
  All new harvesting plans will follow the strategic direction as outlined in this SFMP and the approved DFMP.

(1.2) 1a.4 Indicator
Percentage of Canfor forestry staff trained to identify rare plants

A rare plant is one that either occurs in a limited area or in small numbers over a large area. On a provincial basis, a rare plant species is one that has a small overall population or is highly restricted to specific habitats and which is susceptible to human changes to the environment (Harms *et al,* 1992). The Alberta Natural Heritage Information Centre (ANHIC) defines rare plants as those that are ranked S1, S2 and, occasionally, S3 (Gould, 1999).

(1.2) 1a.4.1 Target
100% of Canfor forestry staff receive training to identify and report rare plants (reported annually)

Canfor staff continually conduct field activities within the FMA area, which provides them with the opportunity to detect and report the presence of rare plants.

- **Acceptable variance**
  The acceptable variance is 90% of the forestry staff receives training to identify and report rare plants.

- **Current status**
  According to Canfor's Training Needs Matrix, permanent and temporary woodlands forestry staff must receive rare plant identification and reporting training at least once, or have been deemed competent by their supervisor. Summer students receive training annually. The *Rare Vascular Plants of Alberta* (Alberta Native Plant Council, 2001) is utilized as reference material.

  Planning field staff that conduct harvest area layout and pre-harvest assessments (PHA) are normally the first crews into areas proposed for activity and they are tasked to field verify areas with very high, high and medium potential of rare plant occurrence. If layout and PHA activities are outsourced, the contractor and its employees performing the activity must also be trained in rare plant identification and reporting.

  Rare plants may occur within successional stages other than mature forest where layout and PHA crews normally conduct their activities (e.g. rare pioneer

species). As a result, all forestry staff receive training to identify and report rare plants as they conduct field work (Table 19).

Table 19. Staff Trained in Rare Plant Identification and Reporting (2005)

SFMP Table Master.xls
Table 41

Forestry Employee	Date Trained
Full Time Forestry Employees	
Woodlands Manager	
Woodlands Superintendent #1	12-Jun-01
Woodlands Superintendent #2	
Forest Planner	12-Jun-01
Planning Superintendent	
Silviculture Forester	
Operations Forester	
Forestry Supervisor	12-Jun-01
Operations Supervisor (Harvesting #1)	12-Jun-01
Operations Supervisor (Harvesting #2)	
Operations Supervisor (Harvesting #3)	12-Jun-01
Operations Supervisor (Planning)	12-Jun-01
Operations Supervisor (Log Haul)	
Operations Supervisor (Roads)	
Operations Supervisor (Silviculture #1)	12-Jun-01
Operations Supervisor (Silviculture #2)	12-Jun-01
Landuse Coordinator	
Temporary Forestry Employees	
Temp. Forestry Supervisor #1	8-Jun-04
Temp. Forestry Supervisor #2	
Temp. Forestry Supervisor #3	15-Jun-05
Summer Student Employees	
GPS Student #1	15-Jun-05
Layout Student #1	15-Jun-05
Layout Student #2	15-Jun-05
Silvculture Student #1	3-May-05
Silvculture Student #1	3-May-05
Layout/ PHA Contractors	
TDS #1	8-Jun-04
TDS #2	28-Jul-05
Total Forestry Personnel Trained	**63%**

Source: Canfor Training Tracking Database

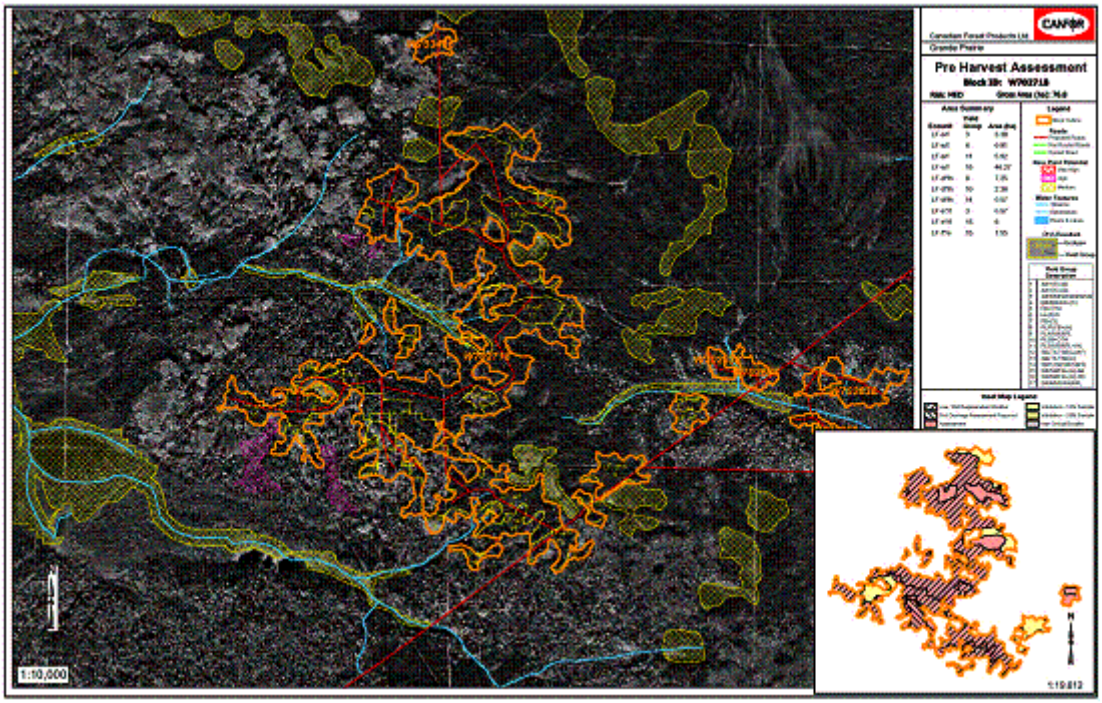
Currently 63% of the forestry staff is trained in rare plant identification and reporting procedures. In 2005, four staff who previously did not work in the FMA area became Grande Prairie Division employees. These individuals have not received training but are included in the calculations.

- **Forecasting assumptions and analytical methods**
  No forecasting or analysis is required.

- **Forest management activities**
  Geographic Dynamics Corp. (GDC) produced a predictive occurrence model (Canfor, 2001a) that provides GIS (Geographic Information System) coverage which is incorporated into maps used by the harvest area layout and pre-harvest

assessment (PHA) forestry personnel (Figure 45). The maps indicate areas that have very high, high or medium potential of rare plant occurrence. The staff utilizes the maps to provide focus on where rare plants may occur in the field. If a rare plant is discovered a *Rare Native Plant Reporting Form* is completed and forwarded to the Alberta Natural Heritage Information Center.

Figure 45. Sample of Rare Plant Occurrence Field Map (areas of cross hatch indicate the likelihood of rare plant occurrence)



Source: Canfor compiled data

If a rare plant is found within an area for which forestry activities are planned, the activity will be deferred until an expert can be retained to provide management recommendations. The recommendations will be evaluated and implemented based on the specifics of the case.

- **Strategy and implementation schedule**
  Training of permanent staff, summer students and harvest area layout and PHA contractors will continue as per the Training Needs Matrix. A course will be scheduled to train the remaining staff in 2005.

- **Monitoring procedure (monitoring results against forecasts)**
  Training records are maintained in the Training Tracking Database and the resultant data will be reported in the *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  The target assists to fulfill commitments in the DFMP to identify and report rare plants.

(1.2) 1a.5 Indicator
Number of biodiversity monitoring programs in which Canfor actively participates

Each of Canada's major forest regions is inhabited by a distinct group of species whose diversity is primarily affected by ecosystem productivity and is influenced by geography, history, soil nutrients, mean temperature, growing season and moisture levels (CCFM, 1997). In Alberta, resource development has modified the landscape and sound management is required to ensure that the effects of current and future developments do not adversely affect the province's biodiversity http://www.abmp.arc.ab.ca/Overview.htm.

(1.2) 1a.5.1 Target
Participate in one or more biodiversity monitoring program(s) annually

Biodiversity monitoring acts as an early warning system and helps to initiate improvements to current management practices. Until the establishment of the Alberta Biodiversity Monitoring Program (ABMP) in 2001, no comprehensive and scientifically credible monitoring system existed in Alberta to detect biodiversity changes. The goal of the ABMP is to monitor the status and trends of biodiversity.

- **Acceptable variance**
  The acceptable variance is zero.

- **Current status**
  The Alberta Biodiversity Monitoring Program (ABMP) involves government, research institutions, academia and industry. Canfor has been involved with the ABMP since 2002. The program is occurring in three phases:

  - Phase I - Technical design (1998 – 2002);
  - Phase II - Pilot project to test and refine the protocols (2002 – 2006); and
  - Phase III - Implementation (2007 – ongoing).

  Under the program, biodiversity will be sampled in terrestrial upland, standing water, and stream habitats. Protocols have been established and divided into 6 suites of field protocols to aid implementation; fall site preparation, spring terrestrial, summer terrestrial, standing water, winter terrestrial, and flowing water. Both biotic and selected habitat components will be quantified through the data collection process (Shank *et al*, 2002).

  The program has been designed to make all data freely available to collaborators and the public. More information can be found on the ABMP site http://www.abmp.arc.ab.ca/.

- **Forecasting assumptions and analytical methods**
  Canfor does not conduct forecasting for the target. The ABMP will be reporting on biodiversity status and trends on a province-wide basis. Canfor will have access to all ABMP reports.
- **Forest management activities**
  The Phase II pilot project to field test and refine sampling protocols is scheduled for completion in 2006, whereupon the finalized versions will be implemented on an operational scale (Phase III). Within a few years, the program will begin to provide biodiversity status and trend information that resource managers can evaluate to assess the degree to which it can be used to meet social and regulatory requirements and to make effective decisions about managing biodiversity.
- **Strategy and implementation schedule**
  Canfor will continue to be a funding sponsor for the project to assist the program to become fully functional. Canfor will also provide guidance to the program through its close association with the ABMP Board of Directors.

  When sufficient data becomes available, it will be evaluated to determine its efficacy for improving forest management decisions.
- **Monitoring procedure (monitoring results against forecasts)**
  Canfor receives all progress, technical and financial reports for the program to evaluate its status and the success in meeting its primary goal. Canfor's participation in biodiversity programs will be reported in the *Annual Performance Monitoring Report.*
- **Linkages to DFMP and Annual Operating Plan**
  The target assists in monitoring biodiversity at regional and landscape scales. A wide range of plant and animal species will be monitored including amphibians, which are identified in the DFMP as an important group to monitor.

(1.2) 1a.6 Indicator
Percentage (volume/ ha) of coarse woody debris (CWD) on harvested areas

Coarse woody debris (CWD) is composed of non-merchantable sound or rotting logs, stumps, or large branches that have fallen or been harvested and left in the woods. It also includes trees and branches that are dead but remain standing or leaning (Dunster and Dunster, 1996). The trees may have excessive rot or other defect factors that make them unsuitable for milling, they may be windfalls that are too old to utilize, or they may be snags that have to be felled for operational or safety reasons. CWD provides centers of biological interaction and energy exchange, symbolizing in many ways the complexity of forest ecosystems. Long-term management of this resource is vital to maintain ecosystem integrity (ORM, 2001).

Harvesting activities can potentially reduce CWD volume through the removal of large living trees that would otherwise die and fall to the forest floor. Harvesting can also alter the size and decay class distributions of CWD through the short-term addition of smaller diameter,

non-decayed pieces (logging slash) and the mechanical fragmentation of larger pieces in advanced states of decay. For these reasons, when previously unmanaged stands are brought under management, changes can be expected in the pool of CWD (Fraver *et al*. 2002). A preliminary step in managing for CWD is therefore to compare characteristics of CWD in unharvested fire-origin stands to stands resulted from harvesting activities (Morice and Lakes IFPA 2002). This is the main reason why post-harvest CWD levels are compared to pre-harvest levels.

The relationship of post-harvest CWD to post-fire CWD levels is extremely difficult to establish, without initiating a controlled experiment. The effect of fire (treatment effect) can only be quantified if the stand conditions prior to the disturbance are known. Without this knowledge, there is no assurance that observed differences between post-fire versus post-harvest CWD levels are due to fire and not due to different stand history, stand type, ecological and site characteristics. Fire intensities must also be accounted for but are extremely difficult to determine (J.S. Thrower, per. comm.).

(1.2) 1a.6.1 Target

100% of pre-harvest volume per hectare of coarse woody debris will be retained on harvest areas annually

Conformance to this target will be confirmed in conjunction with the waste and residue survey carried out on the areas harvested the year immediately prior to the survey, which is conducted every second year.

- **Acceptable variance**
  The acceptable variance for this target is >90% of the pre-harvest CWD volume per hectare.

- **Current status**
  A method to measure coarse woody debris (CWD) was first implemented in the summer of 2001 (for the 2000 timber year). Data was collected during the waste and residue survey. It was determined later that surveyors incorrectly used CWD classes that did not correlate with the pre-harvest data collected. The CWD survey was conducted again in the summer of 2002 for the 2001 timber year, using the appropriate protocols. Because this survey occurs in conjunction with the waste and residue survey, data collection now occurs every second year and commenced in 2002.

  During the summer of 2004, coarse woody debris was measured in conjunction with the waste and residue survey (for the 2003 timber year). A report (J.S. Thrower, 2005a) was submitted to Canfor indicating the results (Table 20). The volume of CWD retained was 214% of pre-harvest levels.

Table 20. Coarse Woody Debris Survey Results

SFMP Table Master.xls
Table 22

Description	Target Result (m^3/ ha)	Actual Result (m^3/ ha)	Percentage of Pre-Harvest Levels
Pre and Post-Harvest Coarse Woody Debris	96.4	206.8	214

Source J. S Thrower, 2005

The next survey is planned for the summer of 2006. The planned survey for that year will be examined in light of the 2004 results to determine if the survey methodology needs modification.

- **Forecasting assumptions and analytical methods**
  Existing methodology for calculating coarse woody debris (ORM, 2001) will be used.
- **Forest management activities**
  The full range of forest management activities influences this target. For instance:
  - Harvesting activities may determine whether or not vertical structures such as snags remain standing or on the ground;
  - The use of herbicide may create deciduous snags for future CWD recruitment; and
  - The design of the harvest area may drive how much CWD is present.
- **Strategy and implementation schedule**
  No operational procedures relating to the retention or creation of CWD have been implemented. Operational procedures for the retention, creation or limitation of CWD will be developed by September 01, 2006.
- **Monitoring procedure (monitoring results against forecasts)**
  CWD surveys are conducted every two years in conjunction with waste and residue surveys. The next survey is scheduled for June 2006, the results will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  This target supports achievment of CWD objectives as presented in the DFMP and contributes to the maintenance of biodiversity on the site.

(1.2) 1a.7 Indicator
Percentage of area in watercourse buffers

Forest cover adjacent to watercourses is reserved from harvest in order to minimize any adverse effects of timber harvesting on water quality and riparian habitat.

(1.2) 1a.7.1 Target

The actual area in watercourse buffers is a minimum of 100% of the planned (DFMP) area (ha) annually

- **Acceptable variance**
  The acceptable variance is zero.

- **Current status**
  During development of the Detailed Forest Management Plan (Canfor, 2003), 37,716 ha was assigned to watercourse buffers. These buffers were based on the Operating Ground Rules in force at that time (Canfor, 1988) and they were excluded from the landbase as part of the net-down process for the calculation of the AAC.

  Since that time, an additional 4,289 ha of buffers has been established on the FMA area, which is 111% of the planned buffer area. This increase is in part attributable to the number of watercourses that were unmapped at the time the DFMP was developed but now must be buffered in accordance with the Operating Ground Rules (OGR) (ASRD, 2004a).

- **Forecasting assumptions and analytical methods**
  Not applicable

- **Forest management activities**
  The practice of establishing buffers adjacent to watercourses will continue in accordance with the Operating Ground Rules.

  In November 2004, Canfor signed 'new' Operating Ground Rules (ASRD, 2004a) for its FMA area. The guidelines make provisions for buffers as follows:

  - Large permanent watercourses – channel width exceeds 5 m - no disturbance or removal of merchantable timber within 60 m of the high water mark, unless approved by a forest officer in writing;
  - Small permanent watercourses – channel width 0.7 to 5 m - no disturbance or removal of merchantable timber within 30 m of the high water mark, unless approved by a forest officer in writing;
  - Transitional streams – channel width between 0.4 and 0.7 m - no disturbance or removal of merchantable timber within 10 m of the high water mark or to the top of the break in slope, whichever is further.
  - Intermittent watercourses – channel width less than 0.4 m require no buffers unless requested by a forest officer in writing;
  - Lakes (with little or no recreational value) must be greater than 4 ha - no disturbance or removal of merchantable timber within 100 m of the high water mark, unless approved by a forest officer in writing;
  - Lakes (with recreational value) greater than 4 ha - no disturbance or removal of merchantable timber within 100 m of the high water mark, unless approved

by forest officer in writing. For lakes less than 4 ha - removal of timber prohibited within 30 m of high water mark and any removal within 100 m requires approval by a forest officer in writing;

- Water source area - area subject to seasonal flooding, saturated soils, surface flow or seepages – treed riparian management zone of at least 20 m - no removal of merchantable trees or altering of buffer width unless approved in the annual operating plan (AOP); and
- Oxbow lake – operational buffer of brush and lesser vegetation to be left undisturbed along the channel.

- **Strategy and implementation schedule**
  Watercourses are buffered in accordance with the OGR.
- **Monitoring procedure (monitoring results against forecasts)**
  Watercourse buffers will be evaluated during layout monitoring checks as well as during harvest operations to ensure they meet the current ground rule requirements. The amount of the timber harvest landbase area that is in watercourse buffers will be compiled annually and compared to the original DFMP allocation. The results will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  Watercourse buffers are managed to meet the Operational Ground Rules. Any deviations require approval from Alberta Sustainable Resource Development.

(1.2) 1a.8 Indicator
Percent of the area harvested across the FMA area with structure retention

Although many types of natural disturbance (i.e. fire, floods, avalanches, wind events, insects and disease infestations, and slumps) occur within Alberta's forests, fire is the most common. Virtually all trees are killed in intense forest fires, but in low and moderate-intensity fires many individual trees survive. In addition, within all fire types, fire "skips" or "islands" result in residual patches of live trees remaining within larger burned areas. Following other types of natural disturbances, even higher densities of live trees, and patches of live trees, are present. Approximately 30% of the birds and mammals living in Alberta's forests nest, forage or find shelter within live trees that have a basal diameter greater than 20 cm. Many of these species are able to use single large live trees and residual patches of large live trees that remain after natural disturbances.

The retention of single live trees and patches of large live trees in harvest areas creates habitat in the harvested areas that is similar to that found in burned and other naturally disturbed areas. In addition, residual live trees may provide old forest attributes in young regenerating harvest areas.

Many of the birds, mammals, insects, beetles, fungi and nonvascular plant species that live in recently disturbed forests require large snags for food and shelter. This unique biotic community changes rapidly as the snags fall and the downed logs are incorporated into the

forest floor. Some biota become rare within ten years following a fire, and many of the early colonizing species have disappeared by the time the stand is twenty years old.

Retaining some large snags within harvest areas creates habitat for some biota associated with naturally disturbed habitat. Additional large snags may be created, by retaining large live trees, as some of these trees will die throughout the rotation. To a large extent, however, it will be necessary to rely on natural disturbances to create abundant large snags for biota that depend on this dead woody material (ASRD, 2004a).

Current information suggests that ecological benefits are directly proportional to the amount of structure retention; ecological benefits increase with greater levels of structure retention. Larger patches of residual structure generally provide more benefits than smaller patches (lower blowdown probability, interior forest characteristics, hiding and thermal cover) and patches generally provide more benefits than individual stems (ASRD, 2004a).

(1.2) 1a.8.1 Target

A minimum of 25% of the area harvested across the FMA area will contain structure retention accumulated annually beginning in 2002

Following harvest, varying levels of structure retention can be retained within individual harvest areas depending on the availability of the types of structure (i.e. merchantable trees, understory, snags, etc.) and operational issues (i.e. safety concerns, size of harvest area, etc.).

Generally, the larger the harvest area, the more important the need is to retain a number of individual trees, snags and residual tree patches distributed across the harvest area. Residual tree patches should be located such that natural features, riparian areas, wildlife features, stand structure and composition, and proximity to standing forests are taken into account to maximize their utility for the biotic community.

- **Acceptable variance**
  The acceptable variance is a minimum of 20% of the area harvested across the FMA area will contain structure retention accumulated annually.

- **Current status**
  The following forms of structure retention have historically been retained on harvested areas across the FMA area:

  - Incidental merchantable deciduous timber that was not required by the deciduous companies at the time – left in patches or single trees;
  - No harvest zones (NHZ) designed to protect wildlife features, sensitive sites or immature timber;
  - Understory protection;
  - Riparian buffers; and
  - Machine free zones (MFZ).

  Riparian buffers, machine free zones and no harvest zones are typically delineated from the harvest area with flagging. For incidental merchantable deciduous and understory, Canfor operations supervisors and equipment

operators generally decide where and how structure is to be left on the harvest area (Figure 46).

Photos of harvested areas (2002 and 2003 timber years) were analysed using "*softcopy*" technology[14] and it was determined that approximately 27% contained structure retention (Table 21).

Table 21. Area (ha) and Percentage of Structure Retention across the FMA area

SFMP Tables Master.xls
Table 51

		Disturbance Class					Snags		
Timber Year	Clearcut	76 - 94 %	51 - 75 %	26 - 50 %	1 - 25 %	No Harvest	>6/ ha	Total Retention	Total
2002	2,215	50	51	84	28	34	494	741	2,956
2003	2,028	130	100	18	23	77	482	829	2,857
Total	4,243	180	151	102	51	111	976	1,570	5,813
Percent Retention	**73%**							**27%**	

Source: Canfor compiled data

Figure 46. Structure Retention Deep Valley South

- **Forecasting assumptions and analytical methods**
  Not applicable

- **Forest management activities**
  The Final Harvest Plan (FHP) will identify the planned amount of structure to be retained on each harvest area. During harvest operations the harvesting

[14] **"**Softcopy" technology is based on the use of digital imagery, which have been ortho rectified and placed in stereo models. The interpreter, with the use of special glasses is able to interpret the imagery similar to that used in a more conventional method, except that it is in a electronic environment.

operations supervisors and the operators will be responsible for meeting structure retention commitments in the FHP.

- **Strategy and implementation schedule**
  By October 2006, structural retention targets will be developed for landscape areas that take into account the specifice values and characteristics of the area.

  Post-harvest aerial photos will be undertaken and softcopy technology utilized to determine the area (%) on which structure is retained.

- **Monitoring procedure (monitoring results against forecasts)**
  The percentage of structure retained on harvested areas will be reported in the *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  The target supports commitments to implement a structure retention strategy made in the approved DFMP and contributes to biodiversity objectives.

(1.3) Critical Element

Genetic Diversity

Conserve genetic diversity by maintaining the variation of genes within species.

Genetic diversity is the basis for the variety of species and ecosystems. It enables organisms to respond to environmental change and shape the ecosystems in which they live. Distribution of genes is dynamic as individuals and populations respond to such factors as weather, food availability and predators (CCFM, 1997).

(1.3) 1 Value

Respect the natural genetic diversity

Conserving genetic diversity is key to ensuring that species retain their capacity to evolve and adapt to change.

(1.3) 1a Objective

Genetic diversity will be maintained on the landscape

Maintenance of landscape structure will help manage the distribution and abundance of wildlife species and thereby it is anticipated to maintain genetic diversity. The spatial properties or "structure" of landscapes can be used as a surrogate measure of landscape level biodiversity values. To maintain the biodiversity of an area, land managers are challenged with managing landscapes to emulate the patterns and dynamics of natural landscape mosaics. Thus, the quantitative basis for measuring the structure of landscapes is a prerequisite for ecosystem-based forest management. Quantitative measures are required to establish objectives for landscape structure and evaluate the effects of management options on ecosystem values.

Quantifying landscape structure with the use of landscape metrics has the advantage that change in pattern can be documented and trends can be established.

At the landscape level, there are a number of important factors relating to the conservation of genetic diversity of wildlife species:

- Landscape structure is defined by landscape composition and spatial configuration;
- Landscape composition is generally described by seral stage distribution (habitat type) and patch size distribution (habitat size); and
- Configuration is represented by fragmentation, connectivity and patch shape.

For detailed discussion around the distribution of seral stages please refer to the "Indicator (1.1) 1a.1". Fragmentation is measured by mean patch size (MPS). Connectivity is quantified using the mean nearest neighbour distance (MNND). MNND describes the spatial context of a habitat patch in relation to its neighbours by increasing with increasing distance between patches. Patch shape is measured by the area-weighted mean shape index (AWMSI). AWMSI measures the perimeter-to-area ratio for a patch type or landscape

using comparisons of patches to a standard shape. The distribution of patch sizes is reported by size classes: 0 - 100 ha, 100 - 500 ha and 500+ ha.

Mean Patch Size (MPS) and patch size distribution, Mean Nearest Neighbour Distance (MNND) and Area Weighted Mean Shape Index (AWMSI) have been selected as the means of quantifying the relative change in the level of fragmentation, connectivity and shape complexity in the FMA area. These quantitative measures cannot be looked at in isolation, they must be evaluated together to decide if landscape level biodiversity will be adversely affected or not.

(1.3) 1a.1 Indicator
Mean patch size (MPS) (ha)

Mean patch size (MPS) together with patch size distribution in various seral stage classes provide an insight into the level of fragmentation of the forest land. Forest patches are created by natural disturbance (wind, fire, pests etc.) and through harvesting activities. Over an entire rotation, forest management activities can alter the distribution and size of patches by fragmenting the landscape beyond the limits of natural variability. Many of the landscape level bird studies report mean patch size to be an effective indicator of incidence and reproductive output (Edenius and Sjoberg 1997; Roberts and Norment 1999).

Mean patch size (MPS) must not be evaluated in isolation but with careful examination of other landscape fragmentation metrics currently documented in the Landscape Structure Report Cards (J.S. Thrower, 2005b).

The FMA area has a relatively short history of harvesting, therefore the majority of the forested landbase is still in fire-origin (natural) stands. Fire suppression since the 1950's in Alberta also limited the number and size of natural disturbances. As the increase of harvesting activities will continually create new early (young) seral patches, it is important that fragmentation be closely monitored.

(1.3) 1a.1.1 Target
The MPS (ha) for 2009 will not fall below the MPS forecast for each reporting unit

In the DFMP (Canfor, 2003), MPS was forecasted for the FMA area and each parcel at key points in time (2009, 2019, 2049, 2099 and 2199). Comparing the 2005 MPS data to the 2009 projection provides an indication of how well harvest plans are achieving the 2009 forecast. The assumption is that if the 2009 forecast is achieved it is likely that all the forecasts at key points in time will also be achieved (Figure 47).

- **Acceptable variance**
  Mean Patch Sizes will not fall below 15% of the area of the 2009 MPS forecast for the FMA area and the Peace, Puskwaskau and Main parcels as indicated by the solid lines in Figure 47.

- **Current status**
  Figure 47 presents the MPS at key points in time for the FMA area and the Peace, Puskwaskau and Main parcels.

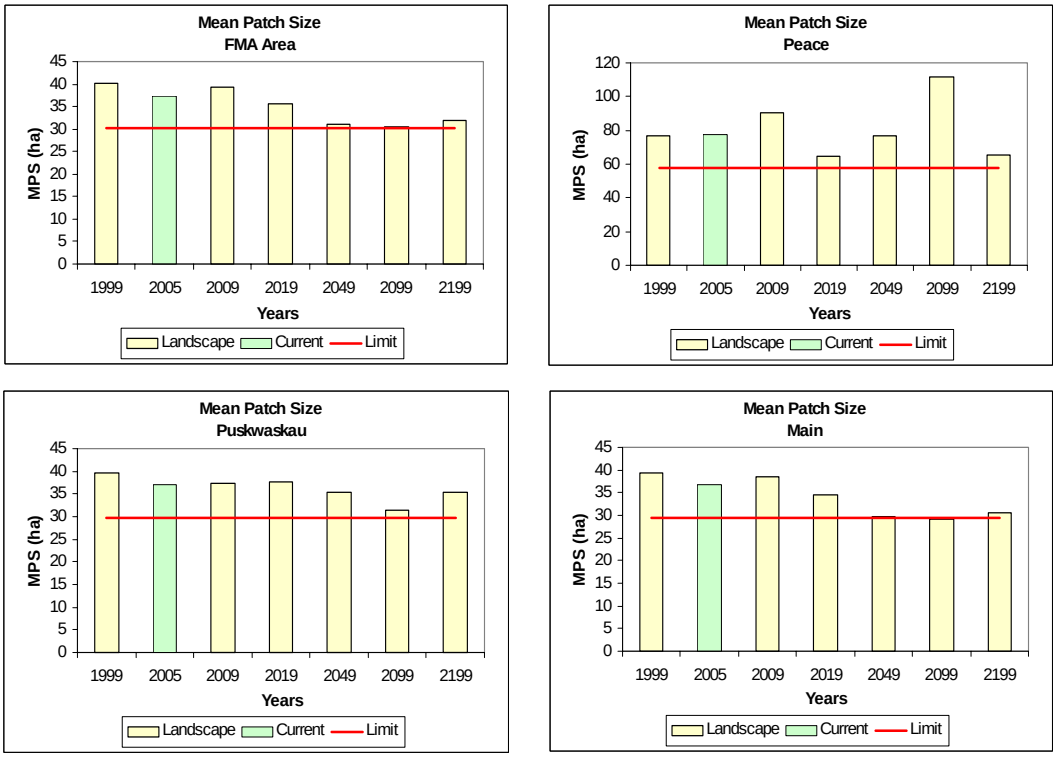
  MPS (mean patch size) at the landscape level is approximately 35 ha for all reported units with the exception of Peace parcel, where MPS is approximately

80 ha. This is attributed to the smaller size of the area, which has large patches of mature forest.

- **Forecasting assumptions and analytical methods**
  As mentioned in the Indicator, MPS was selected as a measure of fragmentation. Harvest area sizes and harvest area aggregation strategies influence the MPS. Figure 47 shows that the MPS decreases to the calculated limit over time for the FMA area and always meets or exceeds the target over all time periods.
- **Forest management activities**
  Future spatial planning at the landscape level will be used to make adjustments to the harvesting plans to ensure the desired level of landscape structure is maintained at key points in time.
- **Strategy and implementation schedule**
  All new harvesting plans will follow the strategic direction as outlined in the DFMP and be adjusted as required to meet the desired MPS over time.
- **Monitoring procedure (monitoring results against forecasts)**
  MPS will be monitored against the 2009 projections as provided in the approved DFMP.

  All new harvesting plans will follow the strategic direction as outlined in the DFMP and Operating Ground Rules (ASRD, 2004a).

Figure 47. Mean Patch Size for FMA area and the Peace, Puskwaskau and Main Parcels



Source: ORM 2001 and JST 2005 Analysis

(1.3) 1a.2 Indicator
Mean nearest neighbour distance (MNND) (m)

Mean Nearest Neighbour Distance (MNND) describes the proximity of forest patches thus providing a quantitative measure of connectivity (Schumaker 1996; With 1999). Connectivity is a complementary measure of the degree to which forest patches can be considered joined together on the basis of a minimum acceptable separation distance. The connectivity (distance) of habitat patches is extremely important for large animals like moose and caribou, two of the indicator species in the FMA area.

MNND must not be evaluated in isolation but with careful examination of other landscape fragmentation metrics currently documented in the Landscape Structure Report Cards (J.S. Thrower, 2005b).

(1.3) 1a.2.1 Target
The mean nearest neighbour distance (MNND) for 2009 will not exceed the MNND forecast

In the DFMP (Canfor, 2003), MNND was forcasted for the FMA area and each parcel at key points in time (2009, 2019, 2049, 2099 and 2199). Comparing the 2005 MPS data to the 2009 projection provides an indication of how well harvest plans are achieving the 2009 forecast. The assumption is that if the 2009 forecast is achieved it is likely that all the forecasts at key points in time will also be achieved (Figure 48).

- **Acceptable variance**
  MNND (mean nearest neighbour distance) will not exceed +15% of the 2009 forecast for the FMA area and the Peace, Puskwaskau and Main parcels as indicated in Figure 48.

- **Current status**
  Current status refers to the conditions observed for the year 2005. Figure 48 presents the MNND for the FMA area and the Peace, Puskwaskau and Main parcels.

  MNND at the landscape level is approximately 200 metres for all reported parcels with the exception of Peace parcel where the MNND varies between 300 and 375 metres over time. This is attributed to the smaller size of this parcel and its mean patch size and fragmentation.

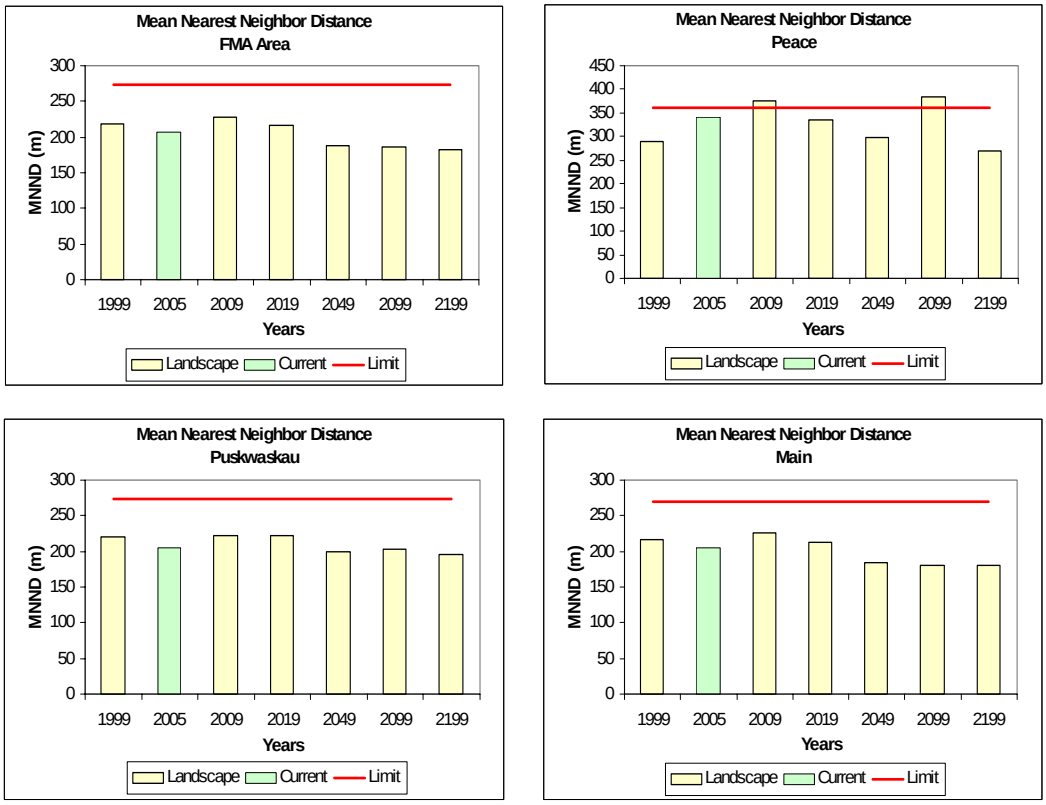
- **Forecasting assumptions and analytical methods**
  The extent of the landscape affects the calculation of MNND because it only considers patches within the specified search radius of the focal patch that are also within the landscape boundary. The severity of this problem can be reduced if the landscape is increased relative to the average patch size and/ or the search radius is decreased. More critically, the worthiness of the MNND is limited by the definition of the search radius.

  Figure 48 presents the MNND at key points in time for the entire FMA area and the Peace, Puskwaskau and Main parcels.

  The MNND is below the established target for the FMA area at all times. However, in 2009 and 2099 MNND for the Peace parcel exceeds the established upper limit. This is likely related to the relatively small size of the Peace parcel.

- **Forest management activities**
  Future spatial planning at the landscape level will be used to make adjustments to the harvesting plans to ensure the desired level of landscape structure is maintained at key points in time.
- **Strategy and implementation schedule**
  All new harvesting plans will follow the strategic direction as outlined in the DFMP and be adjusted as required to meet the desired MNND over time.
- **Monitoring procedure (monitoring results against forecasts)**
  Mean nearest neighbour distance (MNND) will be calculated annually using forest cover updates and reported in the 2009 *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  All new harvesting plans will follow the strategic direction as outlined in the DFMP and Operating Ground Rules (ASRD, 2004a).

Figure 48. Mean Nearest Neighbour Distance for FMA Area and the Peace, Puskwaskau, and Main Parcels



Source: ORM 2001 and JST 2005 Analysis

(1.3) 1a.3 Indicator
Area weighted mean shape index (AWMSI)

Area-Weighted Mean Shape Index (AWMSI) provides a measure of patch shape complexity based on the perimeter-to-area ratio. The complexity of patch shapes in combination with the area of the shapes can influence many ecological processes. Small mammal migration, woody plant colonization and animal foraging strategies are influenced by patch shape. Many ecological effects attributed to the complexity of shape are actually related to "edge effects"[15]. In addition, shape influences the operability and economics of forest harvesting. For example, elongated harvest areas require more road construction than compact harvest areas and thus are more costly. Mapped cutblocks are generally simple in shape and usually somewhat rectangular. Where this is the case, the lack of measured complexity can be compensated operationally by feathering edges, variable retention and harvest area design and layout to create more edges relative to area.

AWMSI must not be evaluated in isolation but with careful examination of other landscape fragmentation metrics currently documented in the Landscape Structure Report Cards (J.S. Thrower, 2005b).

(1.3) 1a.3.1 Target
The AWMSI for 2009 will not fall below the AWMSI forecast

In the DFMP (Canfor, 2003), AWMSI was forcasted for the FMA area and each parcel at key points in time (2009, 2019, 2049, 2099 and 2199). Comparing the 2005 MPS data to the 2009 projection provides an indication of how well harvest plans are achieving the 2009 forecast. The assumption is that if the 2009 forecast is achieved it is likely that all the forecasts at key points in time will also be achieved (Figure 49).

- **Acceptable variance**
  AWMSI (area-weighted mean shape index) will not decrease by –15% of the 2009 forecast for the FMA area and the Peace, Puskwaskau and Main parcels as indicated in Figure 49.

- **Current status**
  Current status refers to the conditions observed for the year 2005. Figure 49 presents the AWMSI at key points in time for the FMA area and the Peace, Puskwaskau and Main parcels.

  The AWMSI decreases from approximately 11 to 6 over time for the FMA area. However, it varies considerably between the different parcels with the index increasing over time in Peace parcel, variable in Puskwaskau and decreasing over time in Main.

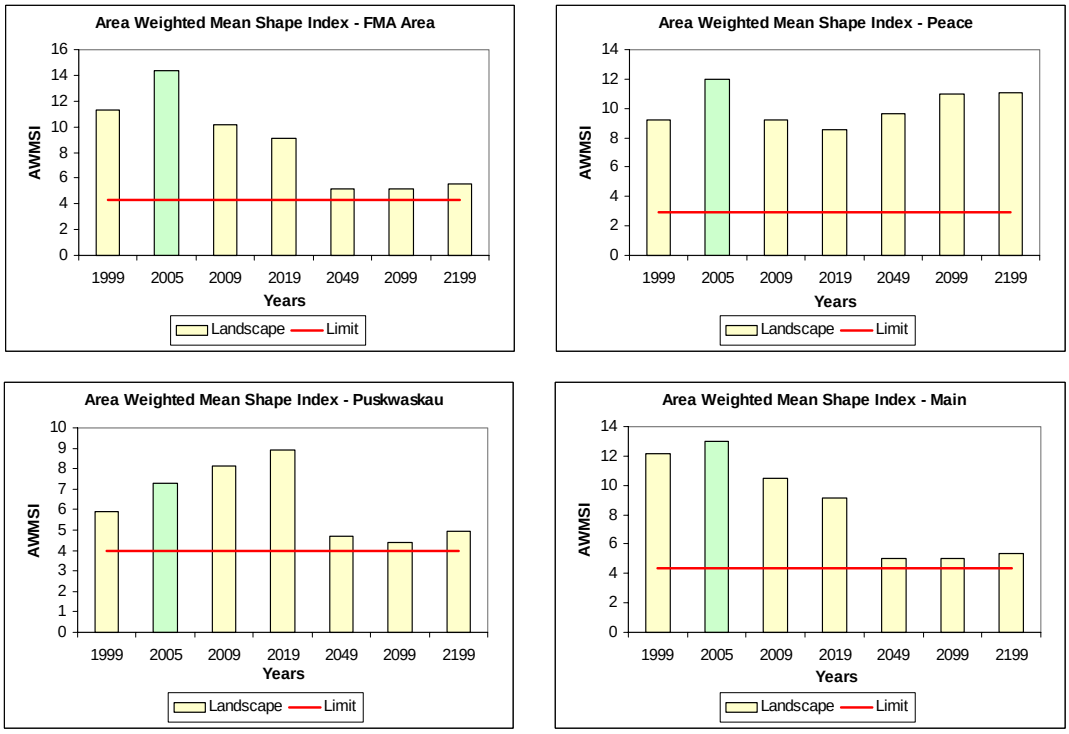
- **Forecasting assumptions and analytical methods**
  The observed trend in Figure 49 suggests that landscape level shape complexity decreases over time to around 5 in the first 50 years and then remains steady at

[15] Edges between forests of dramatically different structure or composition often have different microclimatic environments than interior habitats. These microclimatic differences, such as changes in wind and light intensity alter disturbance rates and vegetation composition and structure can alter habitats and the dynamics of species that are dependent on these habitats. Some species prefer edge habitats; others are indifferent while still others are adversely affected by edges.

this level thereafter. However, the projected shape complexity remains above the minimum lower limit throughout the entire planning period and for all harvest areas.

- **Forest management activities**
  Future spatial planning at the landscape level will be used to make adjustments to the harvesting plans to ensure the desired level of landscape structure is maintained at key points in time.
- **Strategy and implementation schedule**
  All new harvesting plans will follow the strategic direction as outlined in the DFMP.
- **Monitoring procedure (monitoring results against forecasts)**
  The area-weighted mean shape index (AWMSI) will be calculated annually using forest cover updates and reported in the 2009 *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  All new harvesting plans will follow the strategic direction as outlined in the DFMP and the Operating Ground Rules (ASRD, 2004a).

Figure 49. Area-Weighted Mean Shape Index for FMA area and the Peace, Puskwaskau and Main Parcels



Source: ORM 2001 and JST 2005 Analysis

(1.3) 1a.4 Indicator
Percentage of total area by patch size class

The distribution of patch sizes is reported by 0 - 100 ha, 100 - 500 ha and 500+ hectare classes. These classes were defined based on extensive literature review and the maximum 500-hectare aggregation rule.

Patch size distribution must not be evaluated in isolation but with careful examination of other landscape fragmentation metrics currently documented in the Landscape Structure Report Cards (J.S. Thrower, 2005b).

(1.3) 1a.4.1 Target
100% of the total area by patch size class will meet the 2009 forecast

Target patch size distributions were derived for the Boreal Forest and Foothills Natural regions based on theoretical fire-return intervals (ORM, 2000). Targets for the Boreal Forest Natural region were derived from measured patch size classes of four 20-year periods of unmanaged forests (Delong and Tanner, 1996); while targets for the Foothills Natural region were based on the distribution of patch sizes in historical pre-suppression air photos of the Foothills Model Forest in Hinton, Alberta (Andison, 1997). The targets for the reporting units (FMA area and the Peace, Puskwaskau and Main parcels) are weighted based on the proportion of areas in the Boreal Forest and Foothills Natural regions (Table 22).

Table 22. Theoretical Fire-Return Interval Patch Size (Area %)

SFMP Table Master.xls
Table 29

Reporting Units	1–100 ha		100–500 ha		500+ ha	
	LL	UL	LL	UL	LL	UL
FMA Area	10	16	14	25	53	82
Peace	14	23	13	25	52	73
Puskwaskau	14	23	13	25	52	73
Main	9	15	14	25	53	83
Notes: LL= Lower Limit; UL= Upper Limit						

Source: ORM compiled data

- **Acceptable variance**
  The acceptable variance is to be within ±10% of the 2009 forecast.

- **Current status**
  Figures 50 - 53 present the distribution of patch sizes at key points in time (2009, 2019, 2049, 2099 and 2199) for the FMA area and the Peace, Puskwaskau and Main parcels, including the most current data (2005).

  Except for Peace parcel, smaller patch sizes (0 - 100 ha) at both the FMA area and parcel levels are greater than the historical range for the entire planning horizon. Peace is within or close to the historical range for smaller patch sizes for all planning periods; however it has a shortage of mid-size (100 - 500 ha) patches. The other parcels have mid-size (100 - 500 ha) patch area percentages that are within or close to historical ranges. The Peace parcel has almost 80% of

the area in patch sizes that are greater than 500 ha, which is within the calculated historical range.

The other parcels, on the other hand, have 500+ ha area percentages that are less than the historical range. The main reason for this is the application of a 500 ha harvest area aggregation rule within the AAC analysis (Canfor, 2003). The number of large patches will decrease over time due to the harvesting that limits the aggregated harvest area size at 500 ha.

Canfor is committed to submitting information regarding the definitions and spatial distribution of patches on the landscape to assist the Company and ASRD to evaluate the ecological implications of the DFMP. The Company and ASRD will work co-operatively to review information, identify issues and determine the appropriate courses of action.

- **Forecasting assumptions and analytical methods**
  The evaluation of the landscape structure will help determine the present land condition and understand and evaluate any future landscape changes resultant from the proposed management decisions. A brief summary of the methodology for determining the landscape values follows and a full description is contained within the ORM report (2001a). The landscape structure values were developed in a two-phase process:
  - GIS processing to create coverages and grids for the spatial files; and
  - GIS Output processing and *FRAGSTATS*[16] calculations.

  The final phase is to produce landscape reports containing the information discussed within this section (refer to Figures 50 - 53).

- **Forest management activities**
  Analysis of the results shows that it is difficult to achieve the distribution of patch sizes as defined based on the theoretical fire-return intervals when this objective is considered secondary to other constraints in the *Resource And Timber Supply Analysis* (Canfor, 2003). More specifically, adjacency/ green-up rules and the maximum harvest area aggregation of 500 hectares (1,000 ha in the Caribou Area) will likely constrain achievement of the target distribution of patch sizes.

  The general trend is that the proportion of mid-size (100 - 500 ha) patches increases and the proportion of large (500+ ha) patches decreases, while the proportion of small patches remains relatively stable (approximately 32%).

  Figures 50 - 53 present the distribution of patch sizes at key points in time for the FMA area and its parcels.

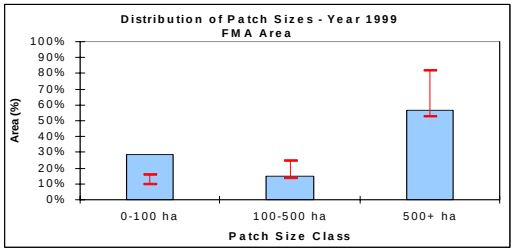
- **Strategy and implementation schedule**
  All new harvesting plans will follow the strategic direction as outlined in the DFMP and be adjusted as required to meet the desired patch size distribution over time.

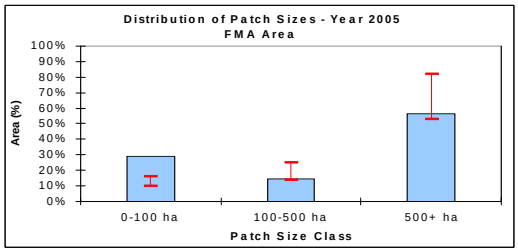
[16] *FRAGSTATS* is a landscape pattern analysis program developed at the Oregon State University

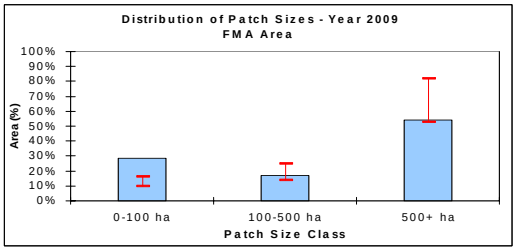
- **Monitoring procedure (monitoring results against forecasts)**
  The distribution of patch sizes will be calculated annually using forest cover updates and reported in the 2009 *Annual Performance Monitoring Report*.

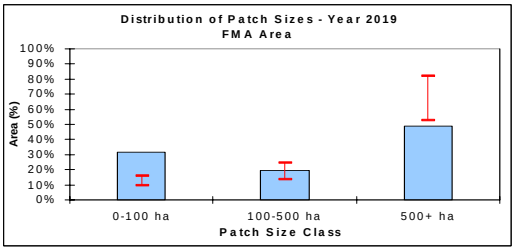
- **Linkages to DFMP and Annual Operating Plan**
  All new harvesting plans will follow the strategic direction as outlined in the approved DFMP and the Operating Ground Rules (ASRD, 2004a).

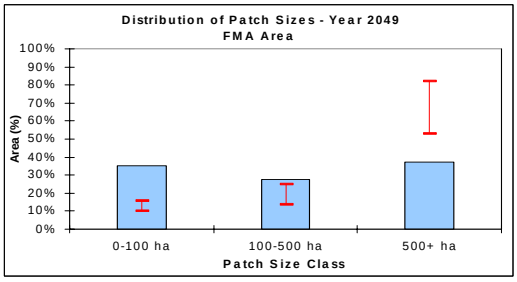
Figure 50. FMA area Distribution of Patch Size

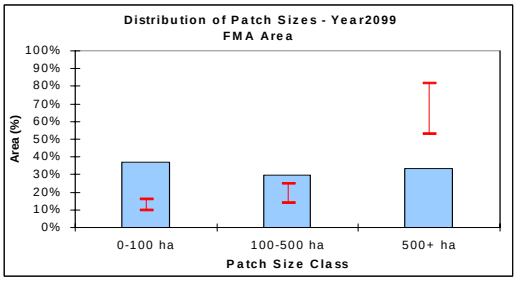


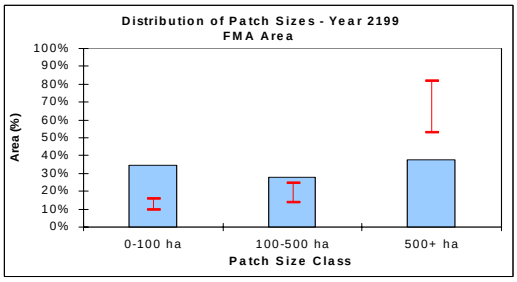






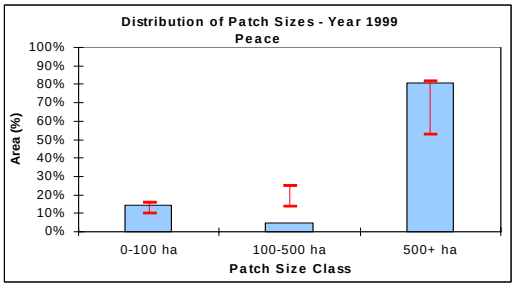


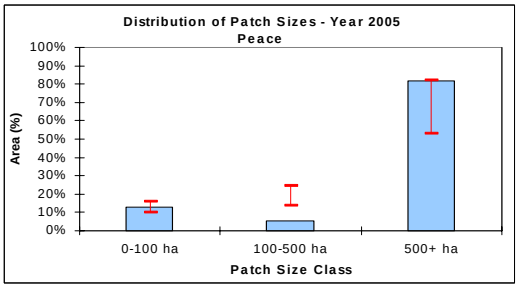


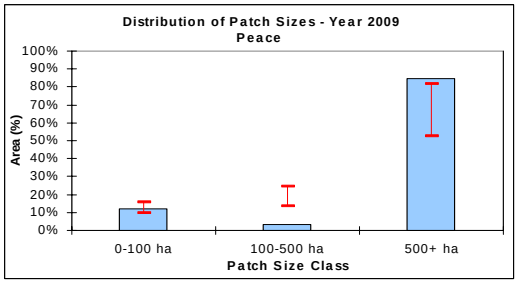


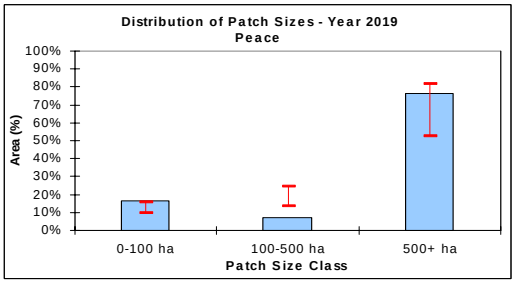
Source: ORM 2001 and JST 2005 compiled data

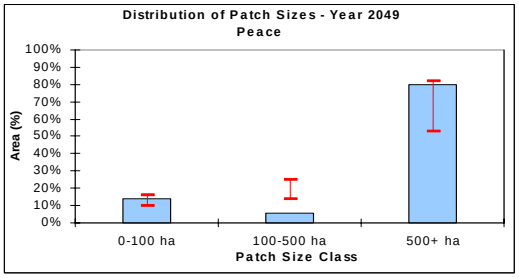
Figure 51. Peace Parcel Distribution of Patch Size

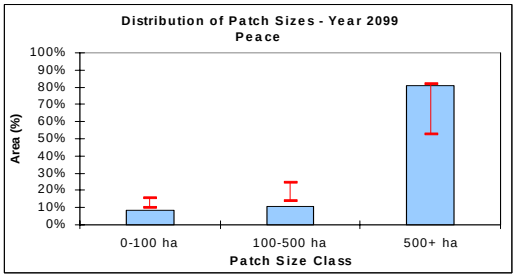


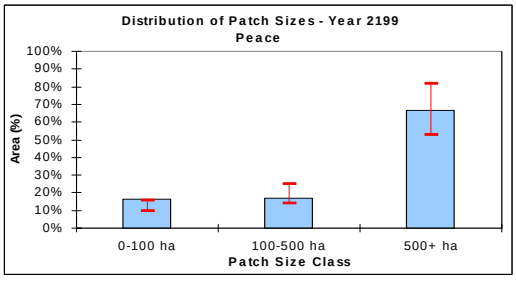






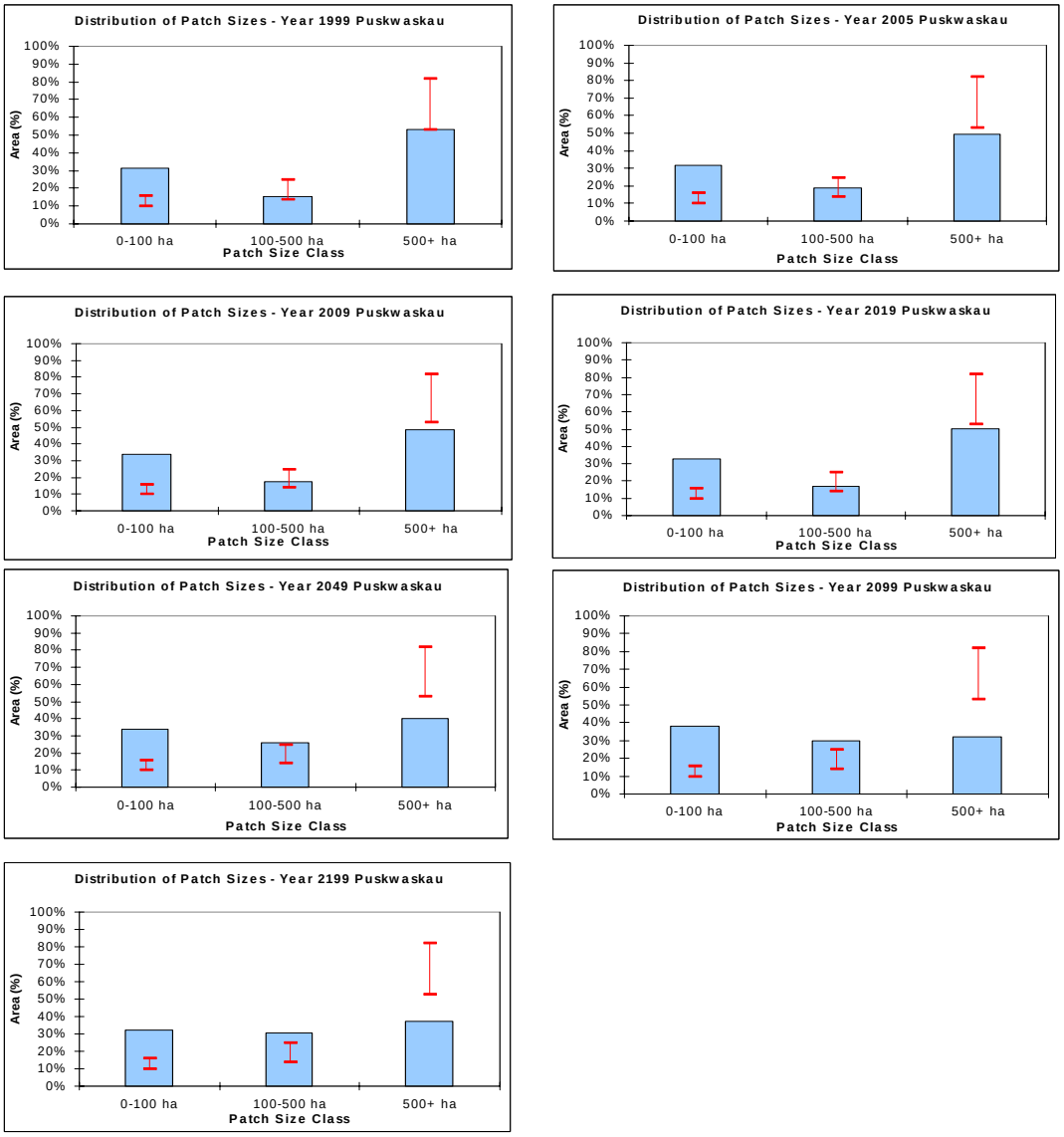






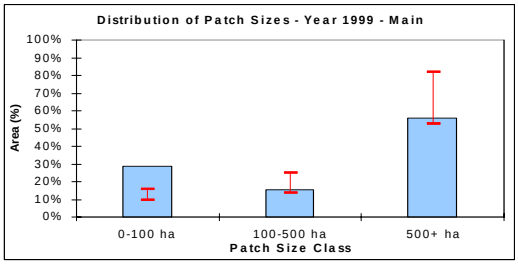
Source: ORM 2001 and JST 2005 compiled data

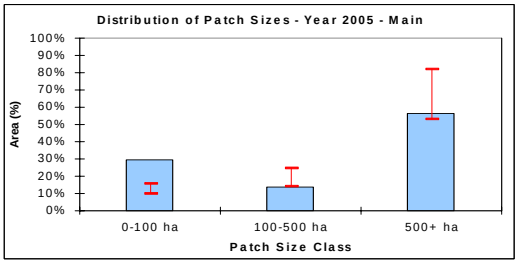
Figure 52. Puskwaskau Parcel Distribution of Patch Size

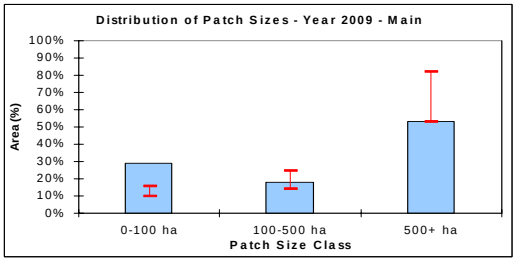


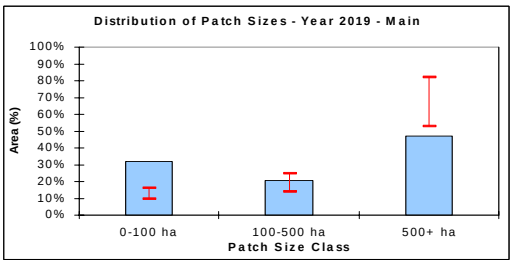
Source: ORM 2001 and JST 2005 compiled data

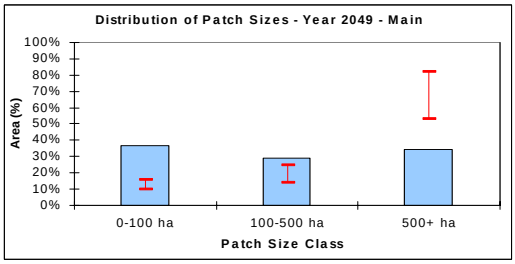
Figure 53. Main Parcel Distribution of Patch Size

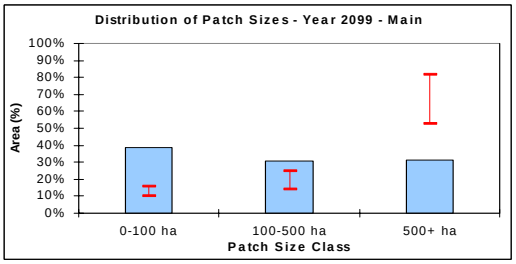


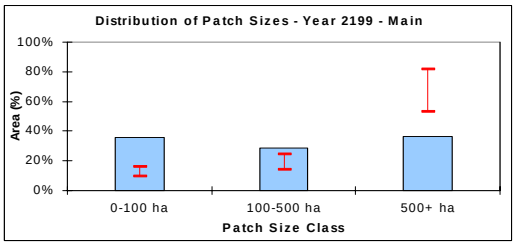












Source: ORM 2001 and JST 2005 compiled data

(1.3) 1a.5 Indicator

Percentage of area planted with genetically improved stock

Genetically improved stock is obtained by collecting cones from superior trees growing in the wild and using the extracted seed to growing seedlings. Canfor's genetically improved stock program is not a genetically modified organism (GMO) program. GMO refers to an organism that, through human intervention in a laboratory, has had its genome, or genetic code, deliberately altered through the mechanical insertion of a specific identified sequence of genetic coding material (DNA) that has been either manufactured or physically excised from the genome of another organism (ASRD, 2005).

(1.3) 1a.5.1 Target

A maximum of 70% of area is planted with genetically improved stock accumulated annually

Currently, the majority of the seedlings planted in the FMA area originate from seed collected from natural stands throughout the FMA area (i.e. bulk seed).

The utilization of bulk seed helps to maintain the natural level of genetic variability that has evolved over time within the FMA area. Natural ingress also plays a role in genetic diversity. Most plantations include seedlings that have generated naturally from cones left on site after harvest, seedlings generated from seed from neighbouring stands and residual trees and seedlings from the pre-harvest forest (refer to "Target (1.3) 1b.1.1" for more information).

Canfor participates in lodgepole pine and white spruce breeding programs to develop genetically improved stock for its reforestation program. The goal of the breeding programs is to provide a secure source of genetically improved seed that produce trees with good growth characteristics, general health, form, and wood quality. The lodgepole pine and white spruce breeding programs generally involve the grafting of twigs from parent trees exhibiting superior growth and yield characteristics onto root stock seedlings in the orchard. However, one orchard (the low elevation pine (Phase 1) is comprised of seedlings grown from cones collected from selected parent trees. In addition to the lodgepole pine and white spruce orchards, there is a black spruce orchard. This orchard was established to produce a secure seed source and not specifically for genetic improvement.

- **Acceptable variance**
  The acceptable variance is zero.

- **Current status**
  Presently this target applies to coniferous planted stock only. Genetically improved deciduous stock is not currently being planted on the FMA area.

  The use of genetically improved stock has varied in quantity during the period 2002 to 2004 in relation to the availability of seed at the time of sowing (Table 23).

Table 23. Use of Genetically Improved Stock By Year

SFMP Tables Master.xls
Table 10

Seed Origin	Stock Type	% Useage By Year		
		2002	2003	2004
Bulk Seed	Lodgepole Pine	76.4	77.3	84.2
	White Spruce	100.0	100.0	55.6
	Black Spruce	100.0	100.0	100.0
Genetically Improved	Lodgepole Pine	23.6	22.7	15.8
	White Spruce	0.0	0.0	44.4
	Black Spruce	0.0	0.0	0.0

Source: Canfor compiled data - CKQ2005seed orchard table_graphs.xls

- **Forecasting assumptions and analytical methods**
  Not applicable
- **Forest management activities**
  Activities to ensure that an adequate supply of genetically improved seed is available from the breeding programs will continue.
- **Strategy and implementation schedule**
  Genetically improved stock will be planted in accordance with the established target.
- **Monitoring procedure (monitoring results against forecasts)**
  The area (%) planted with seedlings derived from the bulk seed collections and the area planted with stock grown from seed from the breeding programs will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  The target supports commitments in the DFMP to maintain genetic diversity of tree species while enhancing growth and yield on the FMA area. Silviculture prescriptions will follow the strategic direction outlined in the DFMP.

(1.3) 1a.6 Indicator
Percentage of grass seed mix that contains restricted and noxious weeds

To control erosion of soils from a site, it is sometimes necessary to use an erosion control mixture of grasses and other plants. While these mixtures are generally free of restricted and noxious weeds, there is a potential for contamination of the seed.

The Alberta *Weed Control Act* specifies which weeds are restricted and identifies noxious weeds. It is a legal requirement for restricted weeds to be destroyed and for noxious weeds to be controlled.

(1.3) 1a.6.1 Target

100% of utilized grass seed mix will not contain restricted or noxious weeds as identified in the *Weed Control Act* annually

When grass seed is purchased, the supplier must provide a "*Certificate of Seed Analysis*" that indicates the percentage of various weeds seeds that are present in the mix.

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  Canfor will not use seed for which the certificate indicates the presence of restricted or noxious weeds. All grass seed utilized since May 2004 is certified and copies of the Certificate of Seed Analysis are retained on file.
- **Forecasting assumptions and analytical methods**
  Not applicable
- **Forest management activities**
  This target applies to grass seeding for the purposes of erosion control including road construction, maintenance, reclamation and other purposes.
- **Strategy and implementation schedule**
  Canfor will continue to utilize only certified grass seed.
- **Monitoring procedure (monitoring results against forecasts)**
  Copies of "Certificate of Seed Analysis" will be retained for all grass seed utilized on the FMA area. The conformance to the target will be confirmed and reported in *the Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  Utilizing certified seed is an operational practice and has a direct link to the Annual Operating Plan.

(1.3) 1b Objective

Conditions that support genetic diversity of species will be maintained

(1.3) 1b.1 Indicator

Percentage of seeds collected and seedlings planted in accordance with the "*Standards for Tree Improvement in Alberta*"

The *Standards for Tree Improvement in Alberta* has been developed through extensive consultation with scientific, forestry and geneticist professionals. The forest genetic resources of Alberta are important to the people of Alberta, to sustainable forest management and to the economic and ecological stability of the province (ASRD, 2005).

Both the government and the forest industry have roles to play in:

- Ensuring the adaptability, diversity and health of wild and managed populations, and to conserve the genetic integrity of wild populations of trees on the landscape, and
- Recognizing the value of genetic tree improvement in enhancing the productivity of the forest landbase and generating economic benefit.

(1.3) 1b.1.1 Target

100% of seeds collected and seedlings planted annually will be in accordance with the "*Standards for Tree Improvement in Alberta*"

Canfor utilizes tree seed from three sources to regenerate coniferous harvested areas, namely:

- Authorized seed zones from natural (or regenerated) stands of native species,
- Breeding programs (i.e. Huallen Seed Orchard Company (HASOC)[17] orchard seed) for trees grown from cones collected from "superior" trees found in natural stands; and
- Natural ingress.

Regardless of the seed source, a diversity of genotypes are represented in reforested areas.

Currently, the majority of the seedlings planted in the FMA area are grown from seed collected from natural stands within authorized seed zones located throughout the FMA area (Figure 54). The utilization of seed from natural stands helps maintain the natural level of genetic variability that has evolved over time. As the breeding programs in which Canfor is involved produce more seed, more seedlings derived from genetically improved seed will increase. The target is to increase the planting of genetically improved stock on not more than 70% of the FMA area, with the remaining 30% area being reforested with seed collected from natural stands (refer to "Target (1.3) 1a.5.1").

- **Acceptable variance**
  The acceptable level of variance is zero.
- **Current status**
  Canfor's coniferous seed collection and seedling planting operations have been in full compliance with the *Standards for Tree Improvement in Alberta*.

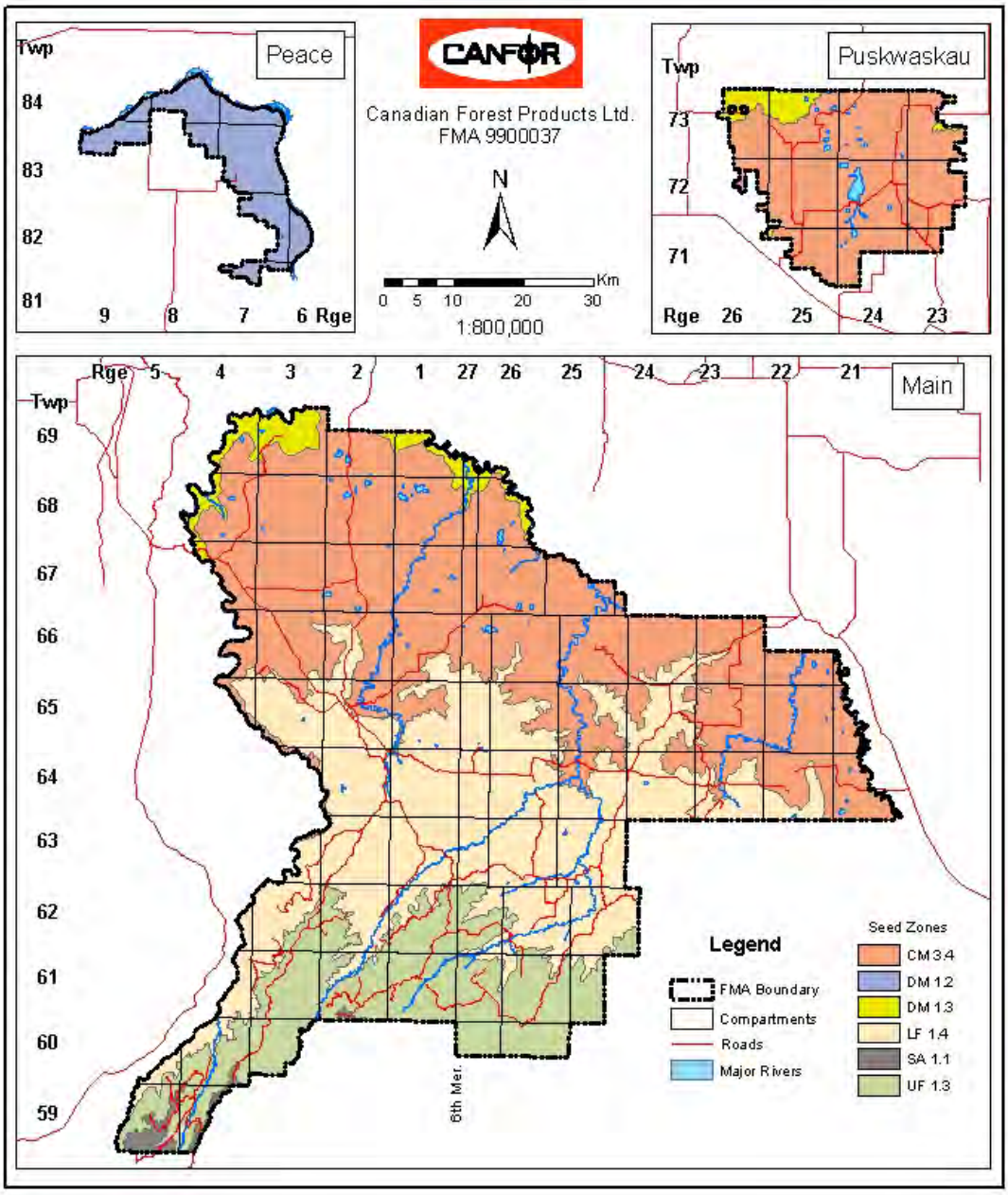
  Seed is collected from approved seed zones, registered and stored as seedlots at the Alberta Tree Improvement and Seed Centre at Smoky Lake, Alberta.

  As of July 2005, Alberta Sustainable Resource Development (ASRD) revised the number of seed zones within the FMA area downward from ten to seven. A digital coverage of the newly revised seed zones (Figure 54) has recently been received from ASRD. Seed zones identifiers are based on natural subregion nomenclature.

[17] Canfor, Weyerhaeuser, West Fraser, Millar Western and Alberta Newsprint manage the Huallen Seed Orchard Company (HASOC). The consortium maintains a half-section agricultural site located near Beaverlodge, Alberta for seed production. HASOC was formed in January 1995 in order to facilitate cost sharing, improve efficiency and realize economies of scale among companies within shared breeding regions.

- **Forecasting assumptions and analytical methods**
  Not applicable
- **Forest management activities**
  Seed zones have changed since 2003 and the seedlots in storage and nursery seedlings will be relabelled with appropriate seed zone identifiers. All harvested areas planned for reforestation in 2006 and beyond will be assigned seedlots and seedlings appropriate to the new seed zones.
- **Strategy and implementation schedule**
  The *Standards for Tree Improvement in Alberta* came into effect May 1, 2003, with new seed zones revised in July 2005. Canfor is aware of all requirements related to the standard and has developed and implemented a seed collection and planting program in compliance with those requirements. The new seed zones will be used for the 2006 planting program.
- **Monitoring procedure (monitoring results against forecasts)**
  Due to the volume of seed in inventory, seed collection is not required every year. Any 'new' collection of seed will be compared to the new seed zone boundaries and reported after any collections. Since the seed zones were revised in July of 2005, reporting of this target does not come into effect until the 2006 planting season; with results being available for the 2006 *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  Adherence to the *Standards for Tree Improvement in Alberta* is an operational function and seedlot specific planting prescriptions are submitted to the government in the Annual Operating Plan.

Figure 54. Seed Zones within the FMA area



(1.4) Critical Element

Protected Areas and Sites of Special Biological Significance

Respect protected areas identified through government processes. Identify sites of special biological significance within the DFA and implement management strategies appropriate to their long-term maintenance.

In Alberta protected areas include: provincial parks, wildland parks, heritage rangelands, provincial recreation areas, natural areas, ecological reserves, wilderness areas and special places. These lands are administered under the *Provincial Parks Act*, the *Wilderness Areas, Ecological Reserves, Natural Areas Act and Heritage Rangelands Act* and the *Willmore Wilderness Park Act*. Alberta's parks and protected areas network includes a spectrum of sites ranging from intensively developed recreation areas to pristine wilderness. These areas preserve natural landscapes, ecological processes and biological diversity. They also provide opportunities for heritage appreciation, outdoor recreation and heritage tourism. They are special places where Albertans and visitors can experience, learn about, understand and enjoy our natural heritage
http://www.cd.gov.ab.ca/preserving/parks/managing/spectrumsites.asp.

Alberta's Special Places program, an initiative to complete a network of protected areas to preserve the province's environmental diversity, was completed in 2001 comprising a total of 81 new and 13 expanded sites which added 2 million hectares to Alberta's protected areas landbase.

In addition to protected areas designated by the Alberta government, Canfor has established other sites of special biological significance that are defined in terms of rarity, fragility, ecological importance, scientific value and uniqueness.

(1.4) 1 Value
Identified protected areas and sites that have special biological significance

Dunvegan West Wildland is a provincially protected area within the FMA area. The designated areas of special biological significance include the parabolic sand dunes, watercourse buffers[18]. wildlife mineral licks, trumpeter swan buffers[19] and historic resources[20]. These areas have unique values that require special forest management. In addition to their protective qualities, they are useful for maintaining habitats for plant and animal species and if sufficiently large, they may allow evolutionary and adaptive processes to continue (Jukes *et al*, 2004).

[18] Watercourse buffers are discussed in Target (1.2) 1a.7.1

[19] Trumpeter swan buffers are discussed in Target (1.2) 1a.3.1

[20] Historic resources are discussed in Target (6.2) 1b.1.1

(1.4) 1a Objective

The natural states and processes to maintain protected areas and sites that have special biological significance will be conserved

Protected areas and sites that have special biological significance are included in analyses to reflect the broad natural disturbance patterns and specific management strategies that have been tailored to address the values in these areas.

(1.4) 1a.1 Indicator

Percentage of significant wildlife mineral licks conserved

Significant wildlife mineral licks are areas that tend to be relatively wet and have a concentration of mineral salts that provide nutrition to various wildlife species. In order to be significant, licks must be used by wildlife on a regular basis.

(1.4) 1a.1.1 Target

100% of significant wildlife mineral licks will be conserved annually

- **Acceptable variance**
  The acceptable variance is zero.

- **Current status**
  As of December 31, 2004, approximately 76 wildlife mineral licks have been conserved within the FMA area representing approximately 240 ha of buffers (0.04% of the entire FMA area).

- **Forecasting assumptions and analytical methods**
  No forecasting or analysis is required.

- **Forest management activities**
  Management activities include identification, verification and buffering of significant wildlife mineral licks. Field staff is trained in the identification of wildlife mineral licks. Information on identifying wildlife licks as well as other wildlife areas are summarized on the *Block Layout Cheat Sheet* provided to all field layout staff and summer students. An electronic version is located on Canfor's Forest Management System.

  Significant wildlife mineral licks are identified operationally during pre-harvest assessments and harvest area layout. Licks are protected with a 100 metre "no harvest" buffer. They are not explicitly identified on maps in accordance with an ASRD request.

- **Strategy and implementation schedule**
  Conserving significant wildlife mineral licks occurs concurrently with operational planning and associated fieldwork. All identified significant wildlife mineral licks are recorded in the Net Loss Coverage database and reported in the *Annual Performance Monitoring Report*.

- **Strategy and implementation schedule**
  The management strategy is to provide a degree of conservation by not harvesting in designated areas of special biological significance.

- **Monitoring procedure (monitoring results against forecasts)**
  A minimum of 10% of recently identified wildlife mineral licks is randomly chosen for verification by the operations supervisor annually and documented on the inspection form. Conformance in achieving the target will be compiled and reported in the *Annual Performance Monitoring Report*. Canfor staff occasionally accompany ASRD staff during field visits to verify the accuracy of Canfor's mineral lick identification process.

- **Linkages to DFMP and Annual Operating Plan**
  The target supports achievement of commitments made in the DFMP to protect significant wildlife mineral licks.

(1.4) 1a.2 Indicator

Percentage of identified protected areas and special biologically significant sites that are conserved

Sites of special biological significance may be defined in terms of rarity, fragility, ecological importance, scientific value and uniqueness. Conservation of these sites is important.

(1.4) 1a.2.1 Target

100% of identified protected areas and special biologically significant sites will be conserved annually

- **Acceptable variance**
  The acceptable level of variance is zero with respect to Canfor impinging on the integrity of protected areas and areas of special biological significance.

- **Current status**
  Protected areas and areas of special biological significance comprise approximately 53,000 ha (8.2%) of the FMA area and include the Dunvegan West Wildland, parabolic sand dunes, watercourse buffers, wildlife mineral licks, trumpeter swan buffers and historic resources (Table 24).

  Figure 57 illustrates portions of Dunvegan West Wildland and the parabolic sand dunes within the FMA area. Watercourse and trumpeter swan buffers are discussed under Targets (1.2) 1a.6.1 and (1.2) 1a.2.1 respectively. Wildlife mineral licks and historic resources are discussed under Targets (1.4) 1a.1.1 and (6.2) 1b.1.1 respectively, however the location of these areas is not divulged due to their sensitive nature.

  The Dunvegan West Wildland, which is a provincially protected area, comprises 20,968 hectares of which 4,471 hectares are located within the FMA area (Figure 55). Canfor was a leader in promoting the area as an Alberta Special Place. The Wildland is an area of significant biological significance containing south-facing slopes that support typical parkland vegetation, with clones of aspen, shrubs, and grassland communities. Cacti are found on some of the drier sites. The valleys provide key year-round habitat for deer and elk.

Fossil beds are common in the bedrock exposures. The bedrock cliffs are nesting sites for bald and golden eagles. Wandering (*Thamnophis elegans*) and red-sided garter snake (*Thamnophis sirtalis*) hibernacula occur along the river.

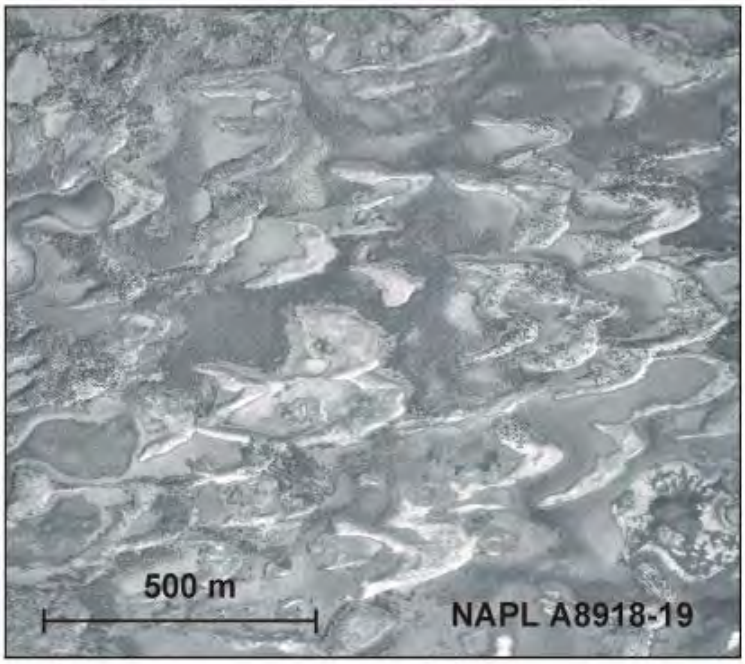
http://www.cd.gov.ab.ca/preserving/parks/managing/spectrumsites.asp#wildland

Figure 55. Dunvegan West Wildland Park

Dunvegan West Wildland Park is an area of special biological significance containing grasslands, cacti, hoodoos and fossil beds. Source: http://www.cd.gov.ab.ca/preserving/parks/managing/spectrumsites.asp#wildland

Parabolic sand dunes (Figure 56) comprise 6,141 hectares within the FMA area. The dunes are crescent-shaped, with their long axis transverse to the dominant wind direction. They form when scattered vegetation stabilizes sediments and a U-shaped pattern of sand develops between clumps of plants. This uncommon landform is often stabilized by lodgepole pine stands. Drainage between the dunes is poor, which has allowed black spruce to establish on the fens.

Figure 56. Parabolic Sand Dunes



Stabilized sand dunes in the Peace River lowlands, southeast of Grande Prairie, Alberta.

Source:
http://sts.gsc.nrcan.gc.ca/sanddune/past.asp

Figure 57. Location of Dunvegan West Wildland and Parabolic Sand Dunes

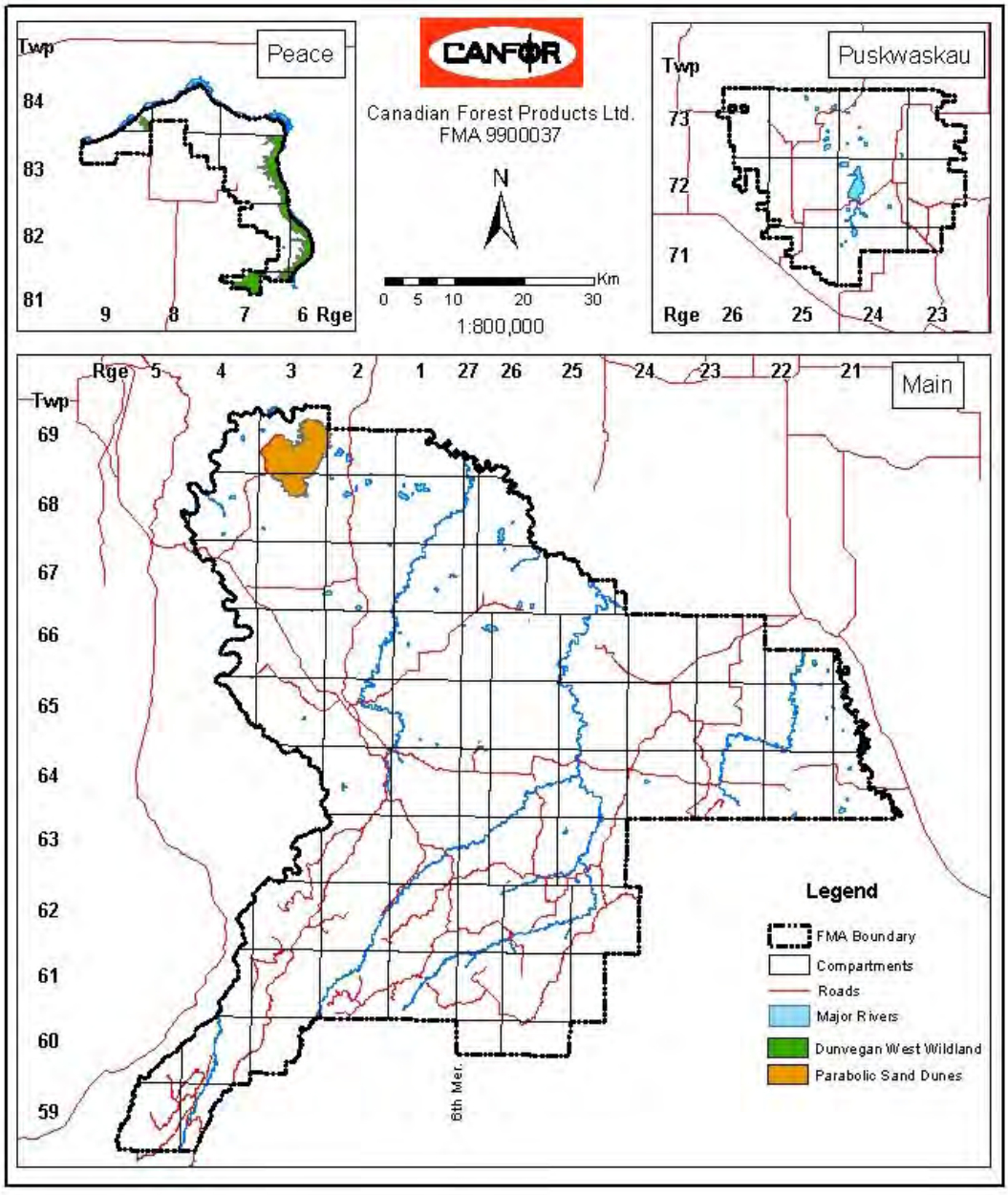


Table 24. Protected Areas and Sites of Special Biological Significance as a Percent of FMA area Landbase

SFMP Table Master.xls
Table 4

Classification	Identifier	Area (ha)	% FMA area [1]
Protected areas	Dunvegan West Wildland Park	4,471	0.7
Areas of Special Biological Significance	Parabolic sand dunes	6,141	0.9
	Watercourse buffers	42,005	6.5
	Wildlife mineral licks	240	0.0
	Trumpeter swan buffers	427	0.1
	Historical resources [2]	0	0.0
	subtotal	48,813	7.5
	Total	**53,284**	**8.2**
Notes:			
1. FMA area is 649,160 ha			
2. All sites will be mapped and 'protected' as prescribed by a certified archaeologist. To date no buffers have been prescribed because 'protection' of identified sites has been via other methods e.g. winter logging.			

Source: Canfor compiled data

- **Forecasting assumptions and analytical methods**
  Not applicable

- **Forest management activities**
  Protected areas and areas of special biological significance contribute to ecological values within the FMA area (i.e. protection of important wildlife habitat, watercourse protection, seral stages, grasslands). Permanent sample plots (PSP) have been located in some of the areas. Measurement of these plots will continue into the future.

- **Strategy and implementation schedule**
  Canfor will not undertake intrusive forestry activities within provincially protected areas. All protection initiatives for areas of special biological significance, as required by legislation, regulation, operating ground rule or company policy will be implemented and maintained.

- **Monitoring procedure (monitoring results against forecasts)**
  Dunvegan West Wildland and the parabolic sand dunes will be monitored annually to confirm the integrity of the areas by overlaying the final harvest plans onto the base maps.

  Monitoring procedures for wildlife mineral licks, watercourse buffers, trumpeter swan and historical resources can be found under Targets (1.4) 1a.1.1, (1.2) 1a.7.1, (1.2) 1a.3.1 and (6.2) 1b.1.1 respectively.

  Conformance to the target will be compiled and reported in the *Annual Performance Monitoring Report.*

- **Linkages to DFMP and Annual Operating Plan**
  The target supports achievement of commitments to conserve protected areas and sites of special biologically significance as indicated in the DFMP.

2. Criterion

Maintenance and Enhancement of Forest Ecosystem Condition and Productivity

Conserve forest ecosystem condition and productivity by maintaining the health, vitality, and rates of biological production.

Forests encompass approximately 417.6 million hectares of Canada's land area. Thus, the health and management of Canada's forests contribute to maintaining a viable global environment. Biological elements that strongly influence forest sustainability and conservation include levels of disturbance and stress, ecosystem resilience and extant[21] biomass (biota) (CCFM, 1997).

(2.1) Critical Element

Forest Ecosystem Resilience

Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem conditions.

Evolution has provided forest ecosystems with elaborate mechanisms for recovery from disturbances. The capacity for recovery may be described in terms of resilience (return time) and is a measure of the ability of ecosystems to maintain their integrity despite perturbations[22] (CCFM, 1997).

(2.1) 1 Value

Healthy forest ecosystem

In a living system, normal functioning implies appropriate levels of health, vitality and productivity of the various components (CCFM, 1997). Maintaining a healthy forest ecosystem enhances its ability to remain productive (resilient). A resilient ecosystem has the capacity to withstand many events and, if damaged, to recover. Ecosystems with low resilience are vulnerable to the effects of disturbance and therefore may suffer a permanent reduction in species diversity and distribution (Swedish Environmental Advisory Council, Undated) http://www.resalliance.org/download/resilience_brochure.pdf.

(2.1) 1a Objective

Factors that lead to forest ecosystem health will be identified and maintained

Insects and disease at endemic levels are a natural part of the forest. Some insects, may migrate into the FMA area. Others exist permanently on the landscape but favourable conditions may allow them to flourish. Forests are renewed over time as a result of these

[21] Existing

[22] Trouble

agents. Low infestations of insects and/ or disease cause minor damage and are not a management problem. When there is a significant increase in the occurrence of harmful insects or disease to epidemic levels, management strategies and tactics may be used to reverse the population trend, or mitigate effects of the occurrence.

(2.1) 1a.1 Indicator

Percentage of identified insect and disease areas scheduled for treatment

Identified insect and disease areas are those areas confirmed by Alberta Sustainable Resource Development (ASRD) where a high incidence of insects and disease is compromising, or has the potential to compromise, forest management objectives.

(2.1) 1a.1.1 Target

100% of the identified insect and disease areas will be scheduled for treatment annually

- **Acceptable variance**
  The acceptable variance is zero, provided that ASRD provides the necessary approvals for any insect and/ or disease treatment.
- **Current status**
  Currently there are no identified insect and disease areas within the FMA area. Canfor staff have reported minor instances of tree damage caused by insect and disease agents.
- **Forecasting assumptions and analytical methods**
  The spatial harvest sequence specifies the orderly harvest of stands on the FMA area. Any insect and/ or disease that has caused or could cause significant loss of timber may prompt changes to the spatial harvest sequence. Alberta Sustainable Resource Development must confirm identified insect and disease areas and approve changes to the spatial harvest sequence or prescribed treatments before they can be implemented.
- **Forest management activities**
  In the event that an identified insect and/ or disease area is discovered, all forest management activities may be impacted, such as sequencing of stands for harvest, access strategies for roads and harvesting and reforestation of impacted stands.
- **Strategy and implementation schedule**
  The *Forest Protection Plan* (Canfor, 2005) provides instructions on the reporting of insects and disease. Once an area becomes an identified insect and/ or disease area, as confirmed by ASRD, Canfor's Forest Protection Coordinator schedules and obtains approvals for treatment, as required. ASRD and Canfor then coordinates treatment of the identified insect and/ or disease areas.

- **Monitoring procedure (monitoring results against forecasts)**
  Staff report on potential insect and/ or disease areas as they are discovered according to the Forest Protection Plan. Once an area has been identifed as an insect and/ or disease area and it expands in scope, Canfor will increase the sophistication of the monitoring. Canfor will also utilize expertise from ASRD and others in developing monitoring procedures. Insect and disease areas that are scheduled for treatment will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  If a treatment to an insect and/ or disease issue is required, the Annual Operating Plan and 5 Year General Development Plan will be the venue to obtain the necessary approvals to proceed.

(2.1) 2 Value
Ecosystem Resilience

Maintaining the health and productivity of forest ecosystems are vital components to responsible stewardship and sustainable development of forested lands. It is important that harvested stands be treated properly and promptly in order to maintain the resilience and long-term use of forested land (CCFM, 1997).

(2.1) 2a Objective
Processes that promote ecosystem resilience will be identified and maintained

(2.1) 2a.1 Indicator
Percentage of harvest areas meeting the regeneration standards as confirmed by the completion of an establishment survey

In Alberta, reforestation of public lands harvested under most forest tenures is a legal requirement. (*Forest Act* and *Timber Management Regulation*). Reforestation to acceptable standards must be confirmed within specified periods of time by completion of one or more surveys. Establishment surveys include an assessment of the stocking, density and growth of regenerated trees and the approximate locations of satisfactorily restocked (SR) and not satisfactorily restocked (NSR) areas. Prompt treatment will reduce the lag time between harvest and successful regeneration, which will restore overall ecosystem productivity and resilience more rapidly.

(2.1) 2a.1.1 Target
100% of harvest areas meet the required regeneration standards as confirmed by completion of establishment surveys, measured on a 5-year rolling average

The Timber Management Regulation (Alberta Regulation 60/ 73) indicates the following:

Section 141.6 - "In respect of an area that is to be reforested to coniferous or mixed wood standards, the holder of the timber disposition for the area shall submit to the Minister an establishment survey for the area that is acceptable to the Minister no sooner than 4 years and no later than 8 years after the end of the year of cut of the area."

Section 141.8 - "In respect of an area that is to be reforested to deciduous standards, the holder of the timber disposition for the area shall submit to the Minister a deciduous establishment survey for the area that is acceptable to the Minister no sooner than 3 years and no later than 5 years after the end of the year of cut of the area."

- **Acceptable variance**
  The acceptable variance is that a minimum of 90% of the harvested areas will meet the regeneration standards on a 5-year rolling average.

- **Current status**
  Based on the regeneration standards described in the Alberta Regeneration Survey Manual, July 2003, the 5-year rolling average of satisfactorily restocked (SR) harvested areas (ha) as confirmed by establishment surveys is 92% (Table 25).

Table 25. Establishment Survey Results

SFMP Tables Master.xls
Table 49

Establishment Surveys[1]		
Stocking Status	Area of Surveys (ha)	% SR
CSR[2]	57	
NSR[3]	1,442	
SR[4]	17,492	92%
Grand Total	18,991	

[1] **Establishment surveys** -for the purpose of this report, data is combined for all establishment surveys done on the FMA area (coniferous, mixedwood and deciduous)

[2] **CSR** - conditionally satisfactorily restocked - applies only to deciduous establishment surveys. The survey is deemed CSR if it meets one of three conditions as outlined in Section 2.4.2.1 Alberta regeneration manual (July 2003). If CSR, a deciduous performance survey is required (see Target (2.1) 2a.2.1).

[3] **NSR** - not satisfactorily restocked - harvested area surveyed did not meet the requirements of the establishment survey.

[4] **SR** - Satisfactorily Restocked - meets all requirements of the establishment survey.

Source: Compiled data (May 1, 2000 to Apr 30, 2005) from the Silviculture Module of the Canfor forestry system and Tolko compiled data.

- **Forecasting assumptions and analytical methods**
  Not applicable.

- **Forest management activities**
  Establishment surveys are scheduled in the Silviculture Module of Canfor's forestry system under a "regime[23]" after a skid clearance date is assigned. Prior to the regulated deadline, a survey must be conducted to assess the stocking status and determine if additional treatments are required to meet the required standard.

- **Strategy and Implementation schedule**
  As of 2004, the strategy is, at year 2, to aerially assess stocking and competition status and determine if further treatments are required on coniferous and mixedwood harvest areas. Establishment surveys are scheduled by year 5 in order to allow any required additional treatments to be scheduled and completed prior to year 8. This strategy will continue to increase establishment survey success rates.

  Deciduous harvest areas are surveyed in accordance with the regeneration survey standards.

- **Monitoring procedure (monitoring results against forecasts)**
  The percent of harvest areas that are SR as confirmed by completion of a establishment survey will be compiled on a 5-year rolling average and reported in the *Annual Performance Monitoring Report*. Areas that are NSR that have another establishment survey planned within the required 8-year period will be excluded from the 5-year rolling average until it is resurveyed.

- **Linkages to DFMP and Annual Operating Plan**
  All reforestation tactics and strategies will conform to the strategic direction outlined in the DFMP.

(2.1) 2a.2 Indicator

Percentage of harvest areas meeting the regeneration standards as confirmed by completion of a performance survey

Regeneration of forest lands following harvest is a good indication of the sustained productivity of forest ecosystems (CCFM, 1997).

Performance surveys include an assessment of the stocking, density and growth of regenerated trees, the approximate locations of satisfactorily restocked (SR) and not satisfactorily restocked areas (NSR), and an assessment of competition.

[23] A regime is a series of activities and dates that are applied to a group of blocks.

[24] Skid clearance – once a harvested area is inspected by either the company or a forest officer to ensure all merchantable pieces have been skidded to roadside, it is given a skid clearance date if approved. This date also triggers when site prep activities can begin.

(2.1) 2a.2.1 Target

100% of harvest areas meet the required regeneration standards as confirmed by completion of performance surveys, measured on a 5-year rolling average.

Paragraph 141.7 (1) of the Timber Management Regulation (Alberta Regulation 60/ 73) states, “In respect of an area that is to be reforested to coniferous or mixed wood standards, if the holder of the timber disposition of the area has completed an acceptable establishment survey under section 141.6, he shall submit to the Minister a performance survey for the area that is acceptable to the Minister no sooner than 8 years and no later than 14 years after the end of the year of cut of the area.” and

Alberta Regeneration Survey Manual, July 2003 Paragraph 3.4.1 states, "For areas satisfactorily restocked in the establishment survey there is no performance survey required to meet the deciduous performance standard. Conditionally restocked areas, however, are subject to a deciduous performance survey that must be carried out no sooner than 10 years and no later than 14 years after harvesting is completed."

- **Acceptable variance**

  In 2003, Alberta Sustainable Resource Development revised the regeneration standards (ASRD, 2003) and implemented them retroactively for areas harvested since March 1, 1991. Silviculture tactics for the period 1991 to 2001 evolved in response to reforestation requirements, but were tempered by public concerns to restrict the use of chemicals and mechanical site treatment for vegetation control and seedling growth enhancement.

  Two acceptable variances were developed for this target:

  - In order to reflect past practices accurately, for harvest areas obtaining skid clearance between March 1, 1991 and April 30, 2001, the acceptable variance for harvest areas passing performance surveys is a minimum of 85%;
  - For harvest areas obtaining skid clearance after April 30, 2001, the acceptable variance for harvest areas passing performance surveys is a minimum of 95%.

- **Current status**

  All harvest areas in the FMA area with skid clearance dates after March 1, 1991 have performance surveys scheduled in the Silviculture Module of Canfor’s forestry system to meet the required timelines. Areas with skid clearance dates prior to March 1, 1991 do not require performance surveys.

  To date, only two years of coniferous performance surveys have been conducted on the FMA area. Based on the performance standards described in the Alberta Regeneration Survey Manual, July 2003 the 2-year average of successfully restocked harvest areas is 84% (Table 26). The 5-year period would encompass surveys conducted after May 1, 2003 and until April 30, 2008; therefore, this target cannot be fully reported until after that date.

  Deciduous harvested areas only require performance surveys if they were conditionally satisfactorily restocked (CSR) on the establishment survey. From

"Target (2.1) 2a.1", the results of the establishment surveys showed one survey result as being CSR; therefore, a performance survey is due as per paragraph 3.4.1 of the Alberta Regeneration Survey Manual.

Table 26. Coniferous Performance Survey Results

SFMP Tables Master.xls
Table 50

Coniferous Performance Surveys[1]		
Stocking Status	**Area of Surveys (ha)**	**%SR**
SR [2]	2,115	84%
NSR [3]	388	
Grand Total	2,503	

[1] **Coniferous Performance Surveys** - For this report only 2 years of harvest areas were due for survey (1991 harvest blocks due at year 14 = 2003 survey year and 1992 harvest year due at year 14 = 2004 survey year). Additional blocks were surveyed from various harvest years (year 10 - 13) and only the SR blocks and those NSR blocks at year 13 were accepted as valid surveys for this analysis; Sufficient time is still available to treat and survey those NSR blocks (yrs 10 - 12) to achieve performance standards.

[2] **SR** - Satisfactory restocked - has met all performance survey requirements including Free to Grow (FTG).

[3] **NSR** - not satisfactorily restocked - harvested area surveyed did not meet the requirements of the performance survey.

Source: Compiled data (May 1, 2003 to Apr 30, 2005) from the Silviculture Module of the Canfor forestry system.

- **Forecasting assumptions and analytical methods**
  Not applicable.

- **Forest management activities**
  Performance surveys are scheduled in the Silviculture Module of Canfor's forestry system under a regime[25] following assignment of skid clearance dates. Canfor continues to improve silviculture practices to more effectively meet reforestation performance requirements in a timely and sustainable manner.

- **Strategy and implementation schedule**
  Silviculture strategies, as defined in the operational silviculture management systems, will be implemented.

  To improve performance survey results, as of 2004 the revised strategy for coniferous and mixedwood harvest areas is to:

  - Conduct earlier stand tending treatments at years 2 or 3 to control competition; and

[25] A regime is a series of activities and dates that are applied to a group of blocks.

- Conduct aerial assessment monitoring at approximately year 8 to determine if additional treatments are required to meet performance standards. This may involve a second tending treatment on mixedwood sites.

To address the 16% NSR, retreatments will be scheduled in the Silviculture Module of Canfor's forestry system by May 2006, with work to be completed within the next 2 seasons to:

- Address those areas that are inadequately stocked; and
- Reduce competition on those areas having higher levels of stocking.

In addition, in a letter dated April 8, 2004, ASRD has allowed companies to submit proposals for the development of alternative regeneration standards[26] (ARS) that are specific to companies' yield curves. Canfor has submitted a letter of intent and a terms of reference, in partnership with other companies, for approval by ASRD. Any annual allowable cut adjustments for failed performance surveys, implemented in accordance with ASRD Policy Directive 2005-01, will not be assessed until after the Company's alternate standard is submitted and approved. Only companies that have submitted letters of intent are eligible for this postponement.

Canfor will continue to survey to the provincial standards until regeneration standards specific to Canfor's yield groups are developed and approved by ASRD.

- **Monitoring procedure (monitoring results against forecasts)**
  The percent of harvest areas that are SR as confirmed by completion of a performance survey will be compiled on a 5-year rolling average and reported in the *Annual Performance Monitoring Report*. Areas that are NSR that have another performance survey planned within the required 14-year period will be excluded from the 5-year rolling average until it is resurveyed.

- **Linkages to DFMP and Annual Operating Plan**
  All reforestation tactics and strategies will conform to the strategic direction outlined in the DFMP.

[26] Alternative regeneration standards involves development of a yield group specific standard that is credible, statistically quantified and provides for relationships between early stand characteristics and final yield by yield group in a Detailed Forest Management Plan. Currently, the reforestation standard is the same across all yield groups and across Alberta.

(2.2) Critical Element

Forest Ecosystem Productivity
Conserve ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.

(2.2) 1 Value
Sustained forest ecosystem productivity

(2.2) 1a Objective
Ecosystem conditions that sustain productivity will be identified and maintained

(2.2) 1a.1 Indicator
Percentage of productive areas, adjacent to proposed harvest boundaries, impacted by windfall that receive a silviculture prescription annually

A certain amount of windfall occurs naturally in all forested areas. Canfor monitors endemic[27] windfall through re-measurement of permanent sample plots (PSPs), but there is no attempt made to salvage minor amounts of isolated windfall. In fact, as a natural occurrence in the forest, minor amounts of windfall serve a useful purpose as coarse woody debris.

The sole purpose of this indicator is for windfall areas, located on productive forest land, to remain productive by ensuring these areas are adequately regenerated.

(2.2) 1a.1.1 Target
100% of the productive areas, adjacent to proposed harvest area boundaries, impacted by windfall receive a silviculture prescription[28]

The target refers only to existing windfall present at the time of harvest area layout. Should windfall occur during the harvest operations, it shall be considered fresh windfall and be addressed during operations.

- **Acceptable variance**
  The acceptable variance is zero.

[27] Endemic applied to populations of plants, animals or viruses that are at their normal, balanced level, in contrast to epidemic.

[28] Silviculture prescription refers to written directions for specific treatment(s) to be applied to an area (e.g.. pile and burn followed by planting 2+0 stock)

- **Current status**
  During the planning stage windfall is addressed if there are merchantable trees and it is economical to salvage. If any other windfall is encountered during aerial assessment flights it is noted and determined if salvageable.
- **Forecasting assumptions and analytical methods**
  Not applicable.
- **Forest management activities**
  All windfall adjacent to harvest areas will be addressed during the development of the Final Harvest Plan, including a silviculture prescription.
- **Strategy and implementation schedule**
  This target will be implemented as of January 1, 2006. Some of the factors to consider when assessing windfall areas include:
  - Merchantable recoverable volume;
  - Site suitability for growing trees; and
  - Existence of adequately advanced regeneration.
- **Monitoring procedure (monitoring results against forecasts)**
  All silviculture prescriptions are recorded and tracked in the Silviculture Module of Canfor's forestry system. The percentage of areas receiving a prescription and the actual area treated will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  If left unaddressed, windfall may affect the productivity of forested landbase thereby impacting the AAC. Windfall is addressed operationally during development of the Final Harvest Plan.

(2.2) 1a.2 Indicator
Percentage of reforestation of "in block" temporary roads used for extraction of timber

(2.2) 1a.2 Indicator
Percentage of reforestation of temporary "in block" roads used for extraction of timber

Harvest areas require that temporary "in block" roads[29] be constructed for hauling timber. Upon completion of harvest activities, these roads are reclaimed by spreading soil strippings and debris back over the bared surface.

Canfor's Operating Ground Rules (ASRD, 2004a), paragraph 9.0.3 state that, "Non-productive landbase created by timber harvesting operations shall not exceed five percent

[29] "In block" roads: are those roads constructed wholly within a harvest area and used on a temporary basis (generally less than one year) for timber extraction purposes. These roads are reforested the year following harvesting.

of each harvest area without prior approval of Alberta[30]. Non-productive landbase is created by temporary roads, rutting, bared landing areas, displaced soil, and debris piles." Because roads may occupy a significant portion of the harvested area, it is important to establish trees on these roads and debris piles in order to maintain the productivity of the forested landbase. Canfor has committed to quantify the extent of, and monitor the growth of trees on reclaimed roads and other former disturbed sites within the FMA area (ASRD letter, May 3, 2004).

(2.2) 1a.2.1 Target

100% of temporary "in block" roads used for extraction of timber will be reforested within 18 months after the end of the timber year of harvest

Canfor's Operating Ground Rules, paragraph 7.7.1.6, states, "Roads shall be built no sooner than one year prior to harvesting operations. Temporary roads shall be re-contoured and reclaimed (and potentially reforested) within 18 months of completion of harvesting and hauling operations, unless otherwise agreed to in the operating schedule."

- **Acceptable variance**
  The acceptable variance regarding the percentage of roads reforested is zero. The acceptable variance regarding the timing of reforestation is +6 months. This allows for those instances in which debris piles do not burn completely causing postponement of the reforestation of roads and debris piles for up to two years.
- **Current status**
  Prior to 2004, temporary "in block" roads were considered part of the harvest area and they were not tracked separately on a consistent basis. In 2004, Canfor began scheduling and tracking reforestation of temporary "in block" roads and debris piles using the Silviculture Module of Canfor's forestry system.
- **Forecasting assumptions and analytical methods**
  Not applicable
- **Forest management activities**
  Commencing in 2005, reforestation of temporary "in block" roads and debris piles will be conducted in the year following harvest, except for those instances where the piles do not burn sufficiently and re-burning is required the following winter, or when inventory is left in the harvested areas due to weather constraints. In such cases, planting cannot occur until the second year after harvest.
- **Strategy and implementation schedule**
  Reforestation of temporary "in block" roads will continue, thereby assisting in the achievement of growth and yield objectives.
- **Monitoring procedure (monitoring results against forecasts)**
  Commencing in 2006, the percentage of temporary "in block" roads that are reforested will be reported in the *Annual Performance Monitoring Report*.

[30] Canfor reforests all temporary roads, rutting, bared landing areas, displaced soil, and debris piles therefore these items do not increase the amount of non-productive land within the FMA area.

- **Linkages to DFMP and Annual Operating Plan**
  Planting is an operational function and planting activities are reported in the Annual Operating Plan. There is a linkage between reforestation of temporary "in block" roads and Canfor's Growth and Yield Program.

(2.2) 1a.3 Indicator
Percentage of tasks outlined in the approved Growth and Yield Monitoring Plan completed on schedule

(2.2) 1a.3.1 Target
100% of tasks outlined in the approved Growth and Yield Monitoring Plan completed on schedule

Approval Condition #1 for the Detailed Forest Management Plan (Canfor, 2003) requires the development and implementation of a growth and yield monitoring plan (GYMP) designed to validate the yield assumptions used in the approved *Resource and Timber Supply Analysis*. J.S. Thrower and Associates Ltd., in consultation with Canfor, finalized the plan in April 2004.

- **Acceptable variance**
  A variance of + 6 months is acceptable on the implementation of the schedule of tasks outlined in the approved growth and yield monitoring plan (GYMP) (J.S. Thrower, 2004).

- **Current status**
  The GYMP received Alberta Sustainable Resource Development approval May 3, 2004.

- **Forecasting assumptions and analytical methods**
  The GYMP is designed to monitor the critical G&Y models and assumptions contained within the approved DFMP. The analytical methods focus on identifying differences between observed growth and yield and predicted growth and yield. Graphical analysis will include plotting actual versus predicted values and plotting differences (actual-predicted) versus stand age or any other chosen variable to examine trends. The statistical analysis includes the average differences and associated confidence intervals. The graphical and statistical analyses are intended to examine overall trends of over or under prediction in the data. If the analyses suggest over or under prediction, then possible sources of the differences will be identified. The main objective of the monitoring program is to detect differences in growth.

- **Forest management activities**
  If the analysis results of the GYMP indicate that critical G&Y models or assumptions contained within the DFMP are inaccurate, then additional studies will be undertaken to determine the cause of the differences to allow for corrections to be made in the G&Y models or assumptions.

- **Strategy and implementation schedule**
  The strategy and implementation schedule identified in the GYMP and associated documents are as follows:

  For fire origin stands:

  - Continue to re-measure existing 723 PSPs in fire-origin stands according to the current PSP program schedule. The existing fire-origin PSPs are being re-measured according to the current program schedule;
  - Establish five additional PSPs in pine-black spruce leading stands (yield group #10) to increase the number of PSPs to a minimum of 15. The existing PSPs well represent the area distribution of the major yield groups. Softwood and hardwood merchantable volumes are reasonably well represented. The five additional PSPs will be established by the end of 2006;
  - Use stem analysis data from PSPs to develop localized taper and height-age equations for white birch, black spruce and larch (by natural subregion, if possible). This work will be completed by the end of 2006;
  - Use stem analysis data to calculate years to breast height information for all major species and compare the values to DFMP assumptions. This work will be completed by the end of 2006;
  - Establish a temporary sample plot (TSP) program in black spruce leading fire-origin stands (yield group #12). Additional analyses and discussions with ASRD in the fall of 2004 resulted in this sub-program being deemed unnecessary. A short report documenting the rationale for this decision was submitted to ASRD in May 2005 (J.S. Thrower, 2005); and
  - Complete graphical and statistical analysis of the G&Y monitoring data to coincide with the November 2008 *Five Year Forest Stewardship Report.*

  For post-harvest regenerated (PHR) stands:

  - Continue to re-measure 91 PSPs in PHR stands as per the PSP program schedule. The re-measurement of the 91 PSPs in PHR stands is continuing as per the PSP program schedule. Continue to establish new PSPs in place of harvested fire-origin PSPs. As existing fire origin PSPs are harvested, new post-harvest regenerated PSPs are being established;
  - Record crop tree origin (planted or ingress) during the regeneration surveys in all harvest areas. This will help assess the rate of natural ingress and the change in stocking proportion by genetically improved stock;
  - In conjunction with regeneration surveys, establish 282 new G&Y monitoring plots on a systematic grid by November 2008. The data will provide information for yield group (stratum) and forest-level assessment of G&Y performance in the FMA area. Some of these monitoring plots will be converted to PSPs during a mid-rotation survey 25 - 35 years after harvest;
  - Use the PSP stem analysis data to develop localized growth-intercept equations for lodgepole pine and white spruce to establish better site index estimates in early stand development. This work will be completed by November 2007;

- Meet the requirements of the *Standards for Tree Improvement in Alberta* (ASRD, 2005). In all new G&Y monitoring plots established in recently planted stands, all genetically improved trees are being tagged, numbered and recorded as being genetically improved trees. This will allow analysis and comparison of the growth of wild and improved stock; and
- Incorporate relevant findings of on-going growth and yield (G&Y) research studies by organizations such as the Foothills Growth and Yield Association (FGYA), Western Boreal Growth and Yield (WESBOGY) and Northern Interior Vegetation Management Association. Canfor is an active member of the FGYA and WESBOGY and it uses the data and information available to improve G&Y modeling and silviculture practices.

♦ **Monitoring procedure (monitoring results against forecasts)**
The implementation of the GYMP will be monitored annually with reference to the implementation schedule outlined in the GYMP and the results reported in the *Annual Performance Monitoring Report*.

♦ **Linkages to DFMP and Annual Operating Plan**
The target supports compliance to Approval Condition #1 of the approved DFMP.

3. Criterion

Conservation of Soil and Water Resources

Conserve soil and water resources by maintaining their quantity and quality in forest ecosystems.

Man has influenced soil and water by harvesting and by clearing land for settlements, agriculture and other uses, such as recreational activities. In recent decades, researchers have gained a better understanding of the important interrelationships between soil and water in forest ecosystems. This knowledge has enabled the provinces and territories to improve forest practice codes and guidelines to promote the conservation of these two components (CCFM, 1997).

(3.1) Critical Element

Soil Quality and Quantity

Conserve soil resources by maintaining soil quality and quantity.

The maintenance of appropriate levels of soil oxygen, nutrients, moisture and organic matter is key to the long-term productivity and resilience of forest ecosystems (CCFM, 1997).

(3.1) 1 Value
Soil productivity

Soil productivity in boreal forests is primarily dependent on the presence of an adequate physical rooting environment for vascular plants (trees), the capacity of the soil to store water, and the provision of an adequate nutrient supply (Dempster, 1998). Conservation of soil productivity can be measured by indicators of forest (site) productivity such as site index, which is the predicted height for a specific tree species at a given breast height age (usually 50 years) (Beckingham *et al*, 1996).

Site Index is a physical measure of the growth of trees in a stand at a particular point in time; it provides a good method to evaluate if the productive capacity of the forest is being maintained. Site Index is also a relative measure of forest site quality as it is very sensitive to changes in ecological site conditions (e.g. soil nutrients, soil moisture).

(3.1) 1a Objective
Soil productivity will be maintained or enhanced

(3.1) 1a.1 Indicator
Site Index[31]

Site index is a common measure of the overall productivity of forested ecosystems (inferred through tree growth). The measurement of tree growth is directly related to the productivity of the site. Consequently, tree growth is a general indication of the overall site productivity (Beckingham *et al*, 1996).

(3.1) 1a.1.1 Target
Average accumulated post-harvest site index will not be less than the average pre-harvest site index (with reporting commencing in 2008)

- **Acceptable variance**
  The acceptable variance is that the 90% confidence interval on the average difference between pre and post-harvest site indices must include zero or indicate that the post-harvest site indices are significantly greater than the pre-harvest site indices.

- **Current status**
  Tree growth (site index) can be used as a surrogate to measure soil productivity (site quality). Canfor has developed site indices (growth and yield tables) for defined yield groups (Canfor, 1999e) that play an important role in the prediction of future forest growth. Within each yield group it is recognized that there is variation in site index and that harvesting is not random within a yield group.

- **Forecasting assumptions and analytical methods**
  Site index values were calculated using temporary and permanent sample plot data (TSP and PSP, respectively) (Canfor, 1999e). The site index models were subsequently evaluated using PSP data to ensure the models accurately predict growth and yield values. Statistical and graphical validation of actual PSP height growth trajectories versus tree-based height growth was carried out to evaluate the models.

  The difference between the pre and post-harvest site index will be calculated for a representative sample of harvested areas. The average difference and its 90% confidence interval will then calculated. If this confidence interval includes zero, there is no significant difference between the pre and post-harvest site indices. If, however, the confidence interval does not include zero, it is concluded there is a significant difference between pre and post-harvest site indices.

- **Forest management activities**
  Harvest and silviculture operational plans will be developed in order to achieve the growth and yield projections and maintain soil productivity.

- **Strategy and implementation schedule**
  The strategy and implementation schedule identified in the GYMP (J.S. Thrower, 2004) will be followed: A portion of the existing 723 fire origin

[31] Site Index - A measure of forest site productivity expressed as the average height of the tallest trees in the stand at a defined index age, usually 50 years.

permanent sample plots (PSP) will be converted to post-harvest regenerated (PHR) stand PSPs following harvest. This will provide valuable information on pre and post-harvest site indices. In addition, new GYMP plots are being established on a 1.67 km grid (one plot every 280 ha) in existing PHR and future PHR stands. PHR stands must reach a breast height age of 20 years (25 - 30 years total age) before reliable estimates of site index can be obtained with height - age equations. Each year all re-measured plot data that has suitable pre and post-harvest site index estimates will be used to calculate average differences and associated confidence intervals. The sites represented in the sample will limit the interpretation of the results.

- **Monitoring procedure (monitoring results against forecasts)**
  Average post-harvest site index will be compared to pre-harvest site index annually and the resultant data reported in the *Annual Performance Monitoring Report,* commencing in 2008 and the 2008 *Five Year Forest Stewardship Report*.
- **Linkages to DFMP and Annual Operating Plan**
  The target supports achievement of commitments made in the DFMP.

(3.1) 2 Value
Soil quantity

Physical disturbances affect forest sustainability by decreasing the land area suitable for forest growth and by reducing the potential productivity of forest soils and adjacent aquatic systems (CCFM, 1997). The physical removal of soil through erosion will ultimately have an impact on soil productivity. In the case of slumps, site productivity is affected as a result of the soil being displaced down slope.

(3.1) 2a Objective
Soil erosion will be minimized

(3.1) 2a.1 Indicator
Number of slumping events caused by road construction

Slumping denotes a type of mass wasting resulting in the down-slope movement of rock fragments and/ or soil (Mayhew and Penny 1992). Water is an important trigger because it lubricates clay rich strata that often serve as a sliding plane.

Slumping is classified as either road grade cut or fill failures, or minor or major slumps, according to the following criteria:

- Road cut or fill failures[32]: associated with roads or other structures with disturbed surface area less than or equal to 100 m^2,
- Minor slumps: disturbed surface area greater than 100 m^2 but less than or equal to 2,500 m^2; and

[32]A road cut failure generally occurs on the upper side of the road and a road fill failure on the lower side of the road.

- Major slumps: disturbed surface area greater than 2,500 m^2 or directly impact watercourse water quality.

(3.1) 2a.1.1 Target

Zero major slumping events annually caused by road construction

Canfor has made a commitment (ASRD Final Matrix May 23, 2003) to retain an appropriately qualified professional if the disturbed area caused by slumping is greater than 2,500 m^2. For slumps less than 2,500 m^2, Canfor will undertake actions to prevent further mass wasting and mitigate effects of the event. However if mass wasting continues, a professional may be retained to provide recommendations.

- **Acceptable variance**
  The acceptable variance is zero.

- **Current status**
  Annual road inspections were conducted in the summer of 2004. The results indicate there were no major slumps caused by road construction since the last inspection (Table 27).

Table 27. 2004 Road Inspection Results

SFMP Table Master.xls
Table 27

Road ID	Approximate Station	Area of Slumps (m^2)
Canfor Mainline (2000 Road)	83+373	80
Canfor Mainline (2000 Road)	43+150	70
Lower Smoky Road	3+251	25
Lower Smoky Road	8+152	30
Lower Smoky Road	12+354	35
Lower Smoky Road	32+755	80
Lower Smoky Road	34+929	40
Lower Smoky Road	36+556	90
Camp 1 Road (7000 Rd)	0+452	20
Camp 1 Road (7000 Rd)	0+907	25
Camp 1 Road (7000 Rd)	5+044	50
Camp 1 Road (7000 Rd)	5+270	50
Norris Road	5+709	30
Norris Road	6+403	10
Norris Road	15+430	200
Norris Road	14+444	250
Norris Road	14+468	50
Ridge Road	5+470	50
Ridge Road	5+808	80
Ridge Road	6+353	90
Ridge Road	6+653	60
Ridge Road	7+659	300
Bolton Mainline	3+815	20

Source: Canfor compiled data

- **Forecasting assumptions and analytical methods**
  Not Applicable

- **Forest management activities**
  The Roads Module of Canfor's forestry system contains inspection records for *licence of occupation* roads. Annual inspections are conducted on these roads. Any deficiencies, including slumps, identified in the inspection are scheduled for repair.

  Most newly constructed roads on the FMA area are temporary roads, which are built and reclaimed within the year of construction. The Harvesting Supervisor conducts a final inspection of the harvest area and associated roads. If there are any deficiencies, such as slumps, mitigating actions must be undertaken before the final inspection is complete.

  Temporary roads that will be needed after the winter's harvest are designated in the Annual Operating Plan. Reclaimed roads and any roads that are left open after the winter's harvest are inspected aerially, in the fall after harvest.

  Harvesting supervisors retain responsibility for all permanent roads and for temporary roads until Final Clearance of the harvest area and associated roads is obtained from Alberta Sustainable Resource Development (ASRD). This is generally 2 years after initial harvest.

  When slumps are identified, the appropriate mitigation action is undertaken (Figure 58).

Figure 58. Repaired Road Grade Fill Failure

A number of management systems and database controls are in place, namely:

- The Harvesting and Roads Management System (Canfor FMS);
- The Road Maintenance Management System (Canfor FMS); and
- The Roads Module of Canfor's forestry system.

- **Strategy and implementation schedule**
  The strategy is to utilize the existing management systems and data base controls to identify, evaluate and remediate slumping events.
- **Monitoring procedure (monitoring results against forecasts)**
  All identified slumps will be recorded in the Roads Module of Canfor's forestry system or the Issue Tracking System and preventative and corrective action will be implemented. Results of inspections and maintenance activities will be reported in the *Annual Performance Monitoring Report.*
- **Linkages to DFMP and Annual Operating Plan**
  The target assists to achieve commitments made in the DFMP to minimize sedimentation and maintain soil productivity. The Road Maintenance Plan is a component of the Annual Operating Plan, and is subject to ASRD approval.

(3.1) 2a.2 Indicator
Number of slumping events due to harvesting activities

Canfor undertakes measures to prevent slumping due to harvesting activities. It is critical that the location of harvest areas avoid sites that are at a high risk of slumping. Examples of high-risk areas include:

- Areas with steep slopes;
- Areas with incised gullies; and
- Areas with high soil moisture.

(3.1) 2a.2.1 Target
Zero slumping events annually due to harvesting activities

- **Acceptable variance**
  Although Canfor utilizes techniques to prevent slumping, due to the nature of soils in the FMA some slumps may still occur. The acceptable variance is one slump ≤ 100 m^2 annually.
- **Current status**
  There were zero slumping events due to harvesting activities observed during inspections in 2004.
- **Forecasting assumptions and analytical methods**
  Not Applicable
- **Forest management activities**
  During harvesting, timing of activities is critical. In high-risk areas, operations during wet periods must be avoided. The design of skid trails must consider natural drainage patterns, as well as the impact of skid trails on slope drainage. After skidding, any skid trails that have sustained grades must be promptly deactivated to restore the natural contour and original drainage.

  All identified slumps, must be documented in the Issue Tracking System (ITS) database. Immediate preventative and corrective actions must be scheduled in

ITS. Depending on the site-specific impact, Canfor will consider retaining a qualified professional to make recommendations regarding the appropriate mitigation measures for mass wasting events.

- **Strategy and implementation schedule**
  The strategy is to undertake measures to prevent slumping due to harvesting activities as defined in the Harvesting and Roads Management System.
- **Monitoring procedure (monitoring results against forecasts)**
  Monitoring and inspection requirements that are in place include:
  - Inspections during harvesting;
  - Inspections immediately following harvesting or within 12 months during site preparation (on ~40% of harvested areas);
  - Inspections the summer after harvest for planting;
  - Aerial inspections the fall after harvest to monitor harvesting debris disposal;
  - Final clearance inspections three years after harvest, usually with a representative of Alberta Sustainable Resource Development; and
  - Stand tending and vegetation management inspections, and regeneration surveys, conducted periodically up to 14 years after harvest.

  The Issue Tracking System is used to record slumps within harvested areas and related mitigative actions. The resultant data will be reported in the *Annual Performance Monitoring Report.*
- **Linkages to DFMP and Annual Operating Plan**
  The practice of identification and mitigation of slumping is primarily an operational function, although strategic and operational plans are prepared in consideration of the risk of soil erosion, including slumping.

(3.1) 2a.3 Indicator
Number of significant surface erosion[33] events related to silviculture, harvesting and road activities

Erosion events have the potential to effect water and land resources when sediment enters streams or the productivity of land is reduced. The three main sources of sedimentation in streams are from (surface) soil erosion, mass erosion and stream bank erosion (Hetherington, 1987). Canfor utilizes natural or engineered controls (i.e. buffers, erosion control structures) and implements procedures to prevent sedimentation from being transported directly into watercourses.

Silviculture and harvesting activities have potential to cause soil erosion due to their propensity to alter drainage patterns and disrupt surface soil.

[33] Significant erosion events include those where sediment is transported directly into a watercourse.

(3.1) 2a.3.1 Target
Zero significant erosion events related to silviculture, harvesting and road activities annually

- **Acceptable variance**
  The acceptable variance is to have no more than five events per year. However, mitigation measures would have to occur on any erosion event discovered.
- **Current status**
  Although operational controls have been in place for a number of years to prevent soil erosion, the number of significant erosion events that occurred has not been systematically quantified over the entire FMA area.
- **Forecasting assumptions and analytical methods**
  Not applicable.
- **Forest management activities**
  Monitoring of harvested areas for occurrence of, or the potential for, significant erosion events will be conducted in the operational planning phase and during regular inspections during harvesting and post-harvest phases:
  - Harvest areas are checked prior to harvest for existing erosion events. In addition, areas prone to erosion are noted during layout and excluded from the harvest area and designated as either an inoperable no harvest zone (NHZ) on the sketch map, or as an expanded buffer area along a stream bank;
  - Harvest supervisors inspect harvest areas during harvest operations as well as 2 - 3 years after harvest;
  - Silviculture supervisors inspect areas during mechanical site preparation operations (historically, 40% of harvested areas undergo mechanical site preparation);
  - Silviculture supervisors inspect areas during tree planting operations (currently, 100% of harvested conifer areas are planted); and
  - Silviculture supervisors inspect areas during stand-tending operations (currently, most areas planned for coniferous regeneration undergo stand tending) and during regeneration surveys.
- **Strategy and implementation schedule**
  The strategy is to conduct silviculture, harvesting and road activities to prevent significant erosion events by adhering to the Operating Ground Rules (ASRD, 2004a).
- **Monitoring procedure (monitoring results against forecasts)**
  Supervisors will inspect sites and commencing in January 2006, will report any significant erosion events through Canfor's Forestry Management System (FMS) reporting procedures. Mitigation measures will be scheduled and follow up conducted as per FMS procedures. The resultant data will be reported in the *Annual Performance Monitoring Report.*

- **Linkages to DFMP and Annual Operating Plan**
  The monitoring erosion events are primarily an operational function. Soil productivity and water quality are components of the DFMP and as such, monitoring for significant erosion events relates directly to DFMP commitments.

(3.1) 2a.4 Indicator
Prompt road deactivation

The FMA area contains fine textured soils, which are susceptible to erosion. During road construction soils are exposed and natural drainage patterns may be affected. Constructing and reclaiming temporary roads in the season of harvest mitigates the risk.

Temporary roads that are not reclaimed must have temporary erosion control measures in place during periods when the road is not being used.

(3.1) 2a.4.1 Target
100% of temporary roads[34] will be permanently deactivated within 6 months after usage is complete

Temporary roads are active for a maximum of 2 years and any road that will be active for longer than 2 years requires a Licence of Occupation. Canfor identifies temporary roads as 'R' roads.

For the purposes of this target, permanently deactivated means all drainage structures have been removed, natural drainage patterns have been restored and the road prism has been re-contoured to its natural form and re-vegetated, either with trees or with other vegetation.

The Annual Operating Plan (AOP) defines which roads will be permanently deactivated immediately after harvest. Roads that are needed for silviculture access or for accessing harvest areas in the next season are identified in the AOP.

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  Prompt deactivation is a standard practice however since this target is 'new', no results have been compiled.
- **Forecasting assumptions and analytical methods**
  Not Applicable
- **Forest management activities**
  The deactivation of temporary roads is the responsibility of the Canfor's supervisors who utilize the guidebook, titled "*Canfor Erosion Control*" (Canfor, 1992, revised in 2000) to obtain information and standards.

  Thus far, the dates of temporary road deactivation have not been formally tracked.

[34] Temporary roads are used to access timber from harvest areas and are external to the harvest area boundary. They do not include temporary 'in block' roads.

- **Strategy and implementation schedule**
  The strategy is to :
  - By September 01, 2006, *Canfor Erosion Control* guidebook will be upgraded to include such things as:
    - Reflect the requirements in the Operating Ground Rules (ASRD, 2004a);
    - Reflect the standards imbedded in the Stream Quality Crossing Index methodology;
    - Provide clear standards for the deactivation of permanent and temporary roads, in addition to the other areas that the booklet covers;
    - Provide clear standards for the maintenance of permanent and temporary roads;
    - Serve as either a stand alone document or as a schedule in a contract; and
    - Act as a training tool for operators.
  - For the 2005 timber year, all 'new' temporary roads will be tracked in the Roads Module of Canfor's forestry system. The procedure will ensure that roads are deactivated on a scheduled basis after the last usage so the target can be achieved.
- **Monitoring procedure (monitoring results against forecasts)**
  The percentage of deactivation of 'new' temporary roads will be compiled and reported in the *Annual Performance Monitoring Report.*
- **Linkages to DFMP and Annual Operating Plan**
  The Annual Operating Plan indicates the roads that are to be deactivated, as well as those that will be remain open for either silviculture or other activities.

(3.1) 2b Objective
Soil will be conserved on site

Soil conservation may be affected by soil disturbace from temporary roads, rutting, bared landing areas and displaced soil.

(3.1) 2b.1 Indicator
Percentage of prescriptions that conform to Section 9.0.3 of the Operating Ground Rules

Section 9.0.3 of the Operating Ground Rules (OGR) (ASRD, 2004a) requires:

"Non-productive landbase created by timber harvesting operations shall not exceed five percent of each harvest area without prior approval of Alberta. Non-productive landbase is created by temporary roads, rutting, bared landing areas, displaced soil, and debris piles."

Canfor makes prescriptions to ensure conformance to these requirements.

The purpose of this indicator is to ensure all harvest areas have a prescription that meets the OGR. The intent of this OGR is to have no more than 5% soil disturbance.

(3.1) 2b.1.1 Target

100% of prescriptions created throughout the year conform to Section 9.0 3 of the Operating Ground Rules

The Final Harvest Plan (FHP), which is approved by Alberta Sustainable Resource Development (ASRD), identifies the amount of road that is required to access harvest areas and specifies the timing related to sensitive soils and debris disposal techniques. If the amount of road exceeds the limit specified in Operating Ground Rule 9.0.3, approval from Alberta Sustainable resource Development is required. Authorization is provided within the context of the Annual Operating Plan (AOP) approval process.

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  Prescriptions were not prepared prior to the development of this indicator and target.
- **Forecasting assumptions and analytical methods**
  Existing database methodology is already present for planning and reporting on this target.
- **Forest management activities**
  At the planning stage, all harvest areas submitted in the FHP will indicate the planned percentage of soil disturbance.
- **Strategy and implementation schedule**
  For all harvested areas in the 2005 timber year, the strategy is to utilize existing systems to prepare prescriptions for the amount of soil disturbance.
- **Monitoring procedure (monitoring results against forecasts)**
  The prescriptions made in the FHP will be evaluated regarding conformance to the Operating Ground Rules (OGR) and the resultant data (%) will be summarized and reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  The activities to achieve the target are primarily operational and a component of the annual operating plan (AOP). The target supports achievment of DFMP objectives for percentage of roads in a harvest area.

(3.1) 2b.2 Indicator

Percentage of harvest areas that do not exceed the soil disturbance prescriptions

This indicator compares what happens on the ground to what was initially prescribed in the Final Harvest Plan (“Indicator (3.1) 2b.1”).

(3.1) 2b.2.1 Target

100% of harvest areas do not exceed the soil disturbance prescriptions annually

- **Acceptable variance**
  The acceptable variance is ≥90% of the harvest areas do not exceed the soil disturbance prescriptions.
- **Current status**
  A Harvest Management System was developed and implemented in 2004 in order to improve operational performance with respect to conformance with prescriptions. The defined indicator and target will enable the operation to measure and track performance history.
- **Forecasting assumptions and analytical methods**
  Not applicable.
- **Forest management activities**
  This target focuses on operational aspects of implementing the FHP.

  Existing database methodology is already present for planning and reporting on this target.
- **Strategy and implementation schedule**
  The strategy is to improve prescriptions so that, at the implementation stage, soil disturbance is minimized.
- **Monitoring procedure (monitoring results against forecasts)**
  After harvest, the area of soil disturbance on harvested areas will be geo-referenced or interpreted from aerial photos and compared to the prescription. The percentage conformance to prescriptions will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  Final Harvest Plans show the details for harvesting an area. All activities and locations proposed in the AOP and FHP must be consistent with objectives and strategies approved in the DFMP.

(3.2) Critical Element

Water Quality and Quantity

Conserve water resources by maintaining water quality and quantity.

Forests play an important role in intercepting and cleaning fresh water supplies that are essential to human and wildlife populations. Natural fluctuations in the quality and quantity of water occur as a result of annual and seasonal variations in precipitation and temperature. Fires, insects and disease can naturally impact the chemical composition and flow rates within watersheds. Man has influenced soil and water by harvesting and by clearing land for settlements, agriculture and oil and gas.

(3.2) 1 Value
Water quality

In boreal forests sedimentation associated from erosion from roads, especially stream crossings, has been consistently identified as the largest single source of timber harvesting impact affecting fish populations (Dempster, 1998). Canfor conducts its operations in accordance with all the legal requirements for minimizing sedimentation. Roads and watercourse crossing are inspected annually to monitor environmental impact.

(3.2) 1a Objective
Water quality will be conserved

Water quality and quantity are important. Fish live in it, plants and wildlife drink it, landforms are shaped by it, people and industry use it.

In an excerpt from a document entitled "*Cumulative Effects of Watershed Disturbances on Stream Fish Communities in the Kakwa and Simonette River Basins, Alberta*", the Alberta Conservation Association and the Alberta Research Council state that,

"The expansion of Alberta's forest industry since the mid-1980's combined with conversion of forest lands to agriculture and increased oil and gas activities has raised concerns about the ability of ecological sustainability of stream fish communities in northern Alberta. These industrial activities have the potential to affect stream fish communities by influencing the quantity and quality of habitat for stream fishes. Our results showed that current levels of industrial activity have detectable cumulative effects on stream fish communities in the Kakwa and Simonette River basins. Such effects were linked with forest harvesting and linear disturbances that intercept streams."

http://www.ab-conservation.com/about_us/reports_publications/NWP/NWP REPORT 3.pdf

(3.2) 1a.1 Indicator

The percentage of surveyed stream crossings identified with 'High' and 'Very 'High' WQCR (water quality concern rating) on forestry roads for which the participants are responsible

Since 2002, Canfor has been investigating and participating in studies conducted by Pierre Beaudry and Associates Ltd. (PBA). PBA developed the Stream Crossing Quality Index (SCQI), which is an indicator that systematically evaluates how well erosion and sediment control (ESC) measures are being implemented in the vicinity of stream crossings and assumes that good ESC will provide good protection to water quality. Data to determine the index is obtained from field surveys, which document the extent, and location of road related sediment sources that have the potential to deliver sediment to the stream network at road crossings. The SCQI identifies the magnitude of the hazard associated with erosion and delivery of fine sediment to the aquatic environment. It is used to develop a Water Quality Concern Rating (WCQR) as indicated in Table 28.

The erosion potential of each crossing is determined by the:

- Size of the sediment source;
- Soil texture of the source;
- Slope gradient of the source;
- Percentage of non-erodible cover;
- Level of road use (for road surface); and
- Shape of the ditch (for ditch elements).

Table 28. Relationship Between SCQI and WQCR

SFMP Tables Master.xls
Table 43

SCQI Score	Water Quality Concern Rating
0	None
0 < score < 0.4	Low
0.4 ? score ? 0.7	Moderate
0.8 <score ? 1.6	High
> 1.7	Very High

Source: PBA, 2004

(3.2) 1a.1.1 Target

Less then 10% of surveyed stream crossings on forestry roads will have a 'High' and Very 'High' WQCR annually

- **Acceptable variance**
  The acceptable variance is to show steady improvement in the WQCR rating for the operational units in the FMA area (Figure 5). The target will take 10 years to

achieve. The timeline below indicates the level of performance that has to be achieved in each operational unit by the year specified:

- 2007 – <20% in the 'High' or 'Very High' category;
- 2009 – <17.5% in the 'High' or 'Very High' category;
- 2011 – <15% in the 'High' or 'Very High' category;
- 2013 – <12.5% in the 'High' or 'Very High' category; and
- 2015 – <10% in the 'High' or 'Very High' category;

- **Current status**

This target represents a challenge to the operation. Data for all of the operational units (Figure 5) exceeds the target at this time.

In 2003, Canfor selected three general landscape areas for a pilot project to evaluate SCQI. That year, 306 crossings were sampled with an additional 291 sites sampled in 2004. Table 29 summarizes the results and indicates that 23% of crossings were ''High'' and 'Very 'High'' WQCR (15% 'High' WQCR and 8% 'Very High').

Table 29. Summary of 2003/ 2004 WQCR Results in the FMA area

SFMP Table Master.xls
Table 42

Operatinal Unit	# of Crossings Surveyed	None		Low		Moderate		High		Very High		Combined High and Very High
		#	%	#	%	#	%	#	%	#	%	%
E8	92	20	22	32	35	9	10	29	32	2	2	34%
Deep North	179	45	25	92	51	14	8	23	13	5	3	16%
Simonette	35	10	29	17	49	4	11	3	9	1	3	12%
2003 Results	**306**	**75**	**24%**	**141**	**46%**	**27**	**9%**	**55**	**18%**	**8**	**3%**	**21%**
Smoky	183	55	30	62	34	28	15	15	8	23	13	21%
Deep South	44	15	34	15	34	5	7	7	16	2	5	21%
Latornell	64	10	16	13	20	14	13	13	20	14	22	42%
2004 Results	**291**	**80**	**27%**	**90**	**31%**	**47**	**16%**	**35**	**12%**	**39**	**13%**	**25%**
Cumulative Results	**597**	**154.9**	**26%**	**231**	**39%**	**74**	**12%**	**90**	**15%**	**47**	**8%**	**23%**

Source: PBA, 2003 and 2004

In 2004, from some of the results of the survey, Canfor started reducing the overall impact of some of the crossings in the E8 operational unit by deactivating 6.5 km of Licence of Occupation road that was no longer needed. This work will be reviewed in 2005 to determine the impact on the WQCR.

- **Forecasting assumptions and analytical methods**

Not applicable.

- **Forest management activities**

The SCQI methodology has been developed over the last 5 years and is used throughout interior and northern British Columbia. Since it is a relatively new tool, it is expected to undergo fine-tuning over the next 5 to 10 years.

This target has implications throughout the full range of forest management activities. Roads and their impacts on the land and waterscape drive a lot of the issues that Canfor is managing.

New roads and crossings, as well as related road maintenance activities, will be designed using the concepts in SCQI. During construction, maintenance and reclamation, these same concepts will be applied.

Canfor will continue to utilize SCQI as a sediment source hazard assessment procedure to evaluate how well erosion and sediment control (ESC) measures are being implemented in the vicinity of stream crossings.

- **Strategy and implementation schedule**
  Canfor will undertake the following initiatives to achieve the target:
  - By September 30, 2005, inspect the deactivation work that was completed in E8 in 2004. Sample the crossings that were removed using the SCQI methodology to determine the impact on the WQCR for this area;
  - By September 30, 2005, prepare a 10 year program to achieve the target and include Year 1 in the Business Plan;
  - By December 31, 2006, in conjunction with the Forest Engineering Institute of Canada, update the erosion control procedures booklet for new crossing construction and deactivation standards;
  - By October 31, 2005, complete the SCQI improvement projects identified in the *Road Maintenance Plan*;
  - By December 31, 2005, complete the 2005 SCQI Monitoring and Surveying program;
  - By May 01, 2006, in conjunction with PBA, develop a training plan for Canfor employees or contractors so they can conduct SCQI surveys at sites that receive remedial work; and
  - By May 01, 2006, develop a method to monitor the results of the work in the field compared to the SCQI baseline. Since the SCQI baseline is a snapshot of the current situation and natural processes will alter the dynamics of individual crossings, the baseline will have to be sampled periodically to determine if it is still valid to measure against.
- **Monitoring procedure (monitoring results against forecasts)**
  All new and repaired crossings will be sureveyed to determine the present WCQR. The percentage of stream crossings identified with 'High' and 'Very High' WCQR will be compiled and reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  Actual roadwork is planned and approved by Alberta Sustainable Resource Development through the Road Maintenance Plan portion of the Annual Operating Plan.

(3.2) 1a.2 Indicator

The percentage of crossings that receive the required remedial action

A *2005 Road Maintenance Plan* (Canfor, 2005a) is produced as part of the Annual Operating Plan. It covers the following:

- A review of the previous year's activities;
- For the upcoming year:
  - Scheduled road inspections;
  - Structures that require maintenance or replacement;
  - Planned surface maintenance on roads;
  - Roads that will be deactivated; and
  - Other road related initiatives.

(3.2) 1a.2.1 Target

100% of crossings receive remedial action as identified in the Road Maintenance Plan annually

Remedial actions may include either repair, replacement or removal of crossing.

- **Acceptable variance**
  The acceptable variance is a minimum of 90% of crossings receive remedial action.
- **Current status**
  During 2004, road and crossing inspections were completed and results entered into the Roads Module of Canfor's forestry system. This data was used in the preparation of the *2005 Road Maintenance Plan* (Canfor, 2005), which provides a schedule for remedial action. In 2005, maintenance is planned for 63 crossings.
- **Forecasting assumptions and analytical methods**
  Not applicable
- **Forest management activities**
  Forest management activities include inspecting, prescribing, designing and conducting the appropriate repair, replacement or removal of crossings.
- **Strategy and implementation schedule**
  The strategy is to implement the *2005 Road Maintenance Plan* commencing immediately.

  For the 2006 Road Maintenance Plan, all crossings that require remedial action will be prioritized by utilizing the following:

  - WQCR dataset;

- Alberta Conservation Association dataset (ACA, 2004) (i.e. fish presence/ absence and those crossing structures requiring remedial action);
- Annual crossing inspections; and
- Access considerations.

- **Monitoring procedure (monitoring results against forecasts)**
  Canfor's Forest Management System defines the specifications for monitoring and inspections. The Road Module of Canfor's forestry system will be used to track planned maintenance vs. actual work completed and the resultant data (%) will be reported in the *Annual Performance Monitoring Report.*
- **Linkages to DFMP and Annual Operating Plan**
  The *Road Maintenance Plan* is an integral part of the Annual Operating Plan.

(3.2) 1a.3 Indicator
The number of non-compliance incidents related to riparian zone standards

A non-compliance incident is one where a government representative has formally (e.g. in writing) determined that a legal requirement (i.e. legislation, regulation, operating ground rule) has been contravened. All non-compliances related to riparian areas, water source areas or water quality are applicable to this indicator. Riparian areas and water source areas are as defined in Tables 1 & 2 and Appendix 4 of the *Canfor FMA 9900037 Operating Ground Rules* (ASRD, 2004a).

(3.2) 1a.3.1 Target
Zero non-compliance incidents related to riparian zone standards annually

Riparian areas adjacent to watercourses and water source areas regulate stream flows (storage and release of surface and groundwater), reduce sheet, rill and gully erosion, moderate stream temperature, provide bank stability and cover, provide sources for in-stream debris to create aquatic habitat, provide habitats supporting a high diversity of wildlife species and other biota, and help establish landscape corridors or habitat connections (ASRD, 2004a).

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  There were zero non-compliances for the period 2004 to the present. There was one incident in which a feller buncher crossed an ephemeral draw. One set of tracks was made across the draw (no water present), which was reclaimed. The incident was reported to ASRD, but no determination of non-compliance was made.
- **Forecasting assumptions and analytical methods**
  Not applicable.

- **Forest management activities**
  Canfor maintains a digital coverage of watercourses, which are used in the planning stage. As harvest areas are laid out, the location of watercourses are verified in the field and the appropriate protection (i.e. buffers) are established as per the Operating Ground Rules (OGR) (ASRD, 2004a). Any deviations from the OGR are noted in the Final Harvest Plan and must be approved by Alberta Sustainable Resource Development (ASRD). Buffer integrity is maintained throughout the harvesting and silviculture phases (Figure 59).

Figure 59. Watercourse Buffers

Riparian areas are conserved by establishing buffers like this one adjacent to a small lake.
Source:
\\Grande\WOODS\Admin\Photos\Planning\lakebuffer.doc

- **Strategy and implementation schedule**
  The strategy is to conserve water quality by establishing buffers and preventing activities that reduce their integrity. All environmental incidents involving riparian areas are recorded in the Issue Tracking System (ITS) and are reported to ASRD.

- **Monitoring procedure (monitoring results against forecasts)**
  If ASRD determines an incident is a non-compliance, it will be recorded in the ITS. The system is reviewed annually to compile non-compliance incidents and the resultant data is reported in the *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  The target assists to fulfill commitments in the DFMP to protect riparian habitats and water quality and to have zero herbicide excursions in water. All non-compliances related to the target are reported in the annual operating plan (AOP) the year after an occurrence.

(3.2) 2 Value
Water quantity

Stream flow is usually discussed in terms of water yield, which includes both quantity and timing. It is a key determinant of the energy available for erosion, transport, and deposition of sediment within channels. It is also a key component in determining the morphology of channels, with implications for the quality and quantity of fish habitat. Finally, it is an important component in determining the availability and suitability of water for beneficial uses.

(3.2) 2a Objective
Water quantity will be maintained

(3.2) 2a.1 Indicator
Percentage of sampled watersheds that are in conformance with the average water yield increase limit indicated in the Operating Ground Rules

The Operating Ground Rules (ORG) (ASRD, 2004a) paragraph 6.02 recommends that predicted water yields do not exceed 15%.

Water yield refers to streamflow quantity and timing. Water yield can be altered by compaction or disturbance of the ground surface, as with roads and skid trails or by vegetation growth or removal. It generally increases after timber harvest through a reduction in transpiration and precipitation interception losses. Removal of forest canopy also affects snow accumulation and melt processes, often resulting in an increase in snowpack accumulation and melt rates, thereby increasing runoff rate and volume. As the forest regenerates, the forest canopy develops, re-establishing the interception and transpiration processes (hydrological recovery).

(3.2) 2a.1.1 Target
100% of sampled watersheds are in conformance with the average water yield increase limit of 15% as indicated in the Operating Ground Rules (reported annually)

- **Acceptable variance**
  Total forest cover removal within a defined watershed will not cause an increase in annual average water yield of greater than 20% for a minimum of 10 of the highest equivalent clearcut area (ECA) watersheds in the FMA area.
- **Current status**
  Canfor adheres to Section 4.1 of the Operating Ground Rules (ASRD, 2004a) regarding percent removal of merchantable timber. The ground rules are

designed to minimize the impact of harvesting on watersheds, wildlife, aesthetics and site productivity.

ECA calculations for the approved DFMP (Canfor, 2003) were made using a stand height-based hydrological recovery model. Individual stands were assumed to have achieved full hydrological recovery[35] when they reached five metres in height. Harvesting is restricted to ensure that the ECA doe not exceed 40% for the portion of each watershed above the H60 line[36]. A limit of 35% was used for those watersheds supporting bull trout populations. Direct estimation of water yields is not part of this approach.

The Forest Management Advisory Committee (FMAC) identified a need to determine the affect of forest cover removal on water yield and the above-mentioned target was developed. As a result, Canfor will be adhering to this target by continuing to model ECA as a surrogate for water yield. In addition, Canfor is committed to remaining informed of new research being conducted for this topic.

- **Forecasting assumptions and analytical methods**

  The Alberta-ECA Model[37], developed by Dr Uldis Silins at the University of Alberta, evaluates the effect of past disturbances on stream flow in a watershed and projects cumulative effect (net combined effect) of past harvesting and natural disturbances. The potential impacts of proposed future harvesting can be determined by using the output from the forest estate models as input to the Alberta-ECA model. Water yield increases over a specific baseline (long-term averages) are calculated based on the input variables described below. Results for each watershed are determined in individual computer runs.

  Inputs:

  - Mean annual precipitation levels (mm). Long-term values for each watershed were obtained from Alberta Environment's Map of Mean Annual Precipitation with data based on 1971 - 2000 climate data from Environment Canada, Alberta Environment and the U.S. National Climate Data Center http://www.climate.weatheroffice.ec.gc.ca/climate_normals/index_e.html.
  - Long-term mean average annual water yield (mm) for each watershed was obtained from the Water Survey of Canada, Atmospheric Services of Environment Canada who maintains a database (HYDAT) of archived hydrometric data obtained from 1,200 monitoring stations situated across Canada. Two stations within the vicinity of the Forest Management Agreement area were selected to represent the potential differing streamflow conditions found within the FMA area (Table 30):

[35] Hydrological recovery takes into account the initial percentage of crown removal and the recovery through re-growth of vegetation since the initial disturbance.

[36] H60 is the elevation above which 60% of the watershed lies (the watershed area above the H60 is considered as the source area for the major snowmelt peak flows).

[37] http:www.cefm.rr.ualberta.ca/Research_Notes/Research%20Note%2007-03

Table 30. Monitoring Stations

SFMP Tables Master.xls
Table 36

Station Name	Station No.
Deep Valley Ck. near Valleyview, AB.	07GF008
Simonette River near Goodwin, AB.	07GF001

Source: Timberline 2005 complied data

Historical data that was missing was eliminated for this exercise so that approximately 10 years of data was used for each station. Also one of the stations had only seasonal data (May – October) so readings were extrapolated for the missing months. Sample data had to be converted from m^3/ s into mm for the model.

Assumptions:
The Alberta-ECA model bases the hydrologic recovery of forest stands on volume. The age at maximum volume growth rate is assumed to represent age at full hydrologic utilization. All forest growth information built into the model is based on Alberta Phase III provincial average growth and yield data for unmanaged (fire-origin) stands.

Results:
Table 31 indicates there are 3 watersheds that exceed the 15% target and no watersheds that exceed the acceptable variance of 20% water yield.

Table 31. Average Water Yield Increase (%) for 10 Sampled Watersheds

SFMP Tables Master.xls
Table 35

Sampled Watershed	Alberta-ECA Method	
	ECA(%)	Average Water Yield Increase (%)
10003	37.4%	17.4%
1775	32.0%	15.1%
6306	28.3%	15.6%
1846	27.0%	10.8%
2057	26.4%	10.1%
299	22.7%	5.1%
6397	19.5%	7.4%
5340	19.5%	7.7%
5642	18.6%	4.9%
4846	15.1%	4.7%
4826	11.0%	2.6%

Source: Timberline 2005 complied data

- **Forest management activities**
  Any new harvest plans will be evaluated using the Alberta-ECA model to evaluate water yield increases. A sample of 10 watersheds with the highest ECAs, as computed using the DFMP methodology (Canfor, 2003), will be run through the Alberta-ECA model to determine water yield increase.

  To meet the approved DFMP requirements, ECA is routinely checked as part of the annual operating plan (AOP) process. This is done to ensure that watershed rates of harvest do not exceed the limits specified in the approved DFMP. AOP harvest areas are modified or deleted to ensure ECA limits are respected.

  A second process will be implemented immediately to ensure future AOPs do not result in increased water yields of more than 20%. Any watersheds for which harvesting is proposed in the AOP will be checked using the Alberta-ECA model. If more that 10% of basins show water yield increases greater than 20%, the AOP will be modified accordingly.

- **Strategy and implementation schedule**
  The Alberta-ECA model will be used to determine the rate of harvest limits within watersheds the next time it is necessary to recompile the DFMP harvest sequencing. At that time, the ECA level that results in water yield increases of >20% for each of the 10 highest ECA will be determined.

- **Monitoring procedure (monitoring results against forecasts)**
  The harvest sequence and any associated changes will continue to be monitored yearly in order to evaluate hydrological effects of forest cover removal by using the modeling procedure previously discussed. As better data and new research concerning hydrological recovery become available, it will be incorporated into the water yield modelling procedure.

The percentage of the sampled watersheds that are in conformance with the annual average water yield target will be complied and reported in the *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  The target supports water quality, watershed protection and Bull trout habitat objectives in the DFMP.

4 Criterion

Forest Ecosystem Contributions to Global Ecological Cycles

Maintain forest conditions and management activities that contribute to the health of global ecological cycles.

Forests play a major role in the functioning of the Earth's biosphere, and they contribute to and regulate global biological cycles related to carbon (CCFM, 1997). They represent large accumulations of stored carbon that can be affected by natural disturbances, such as fires, insects and diseases, or harvesting and other human activities.

(4.1) Critical Element

Carbon Uptake and Storage

Maintain the processes that take carbon from the atmosphere and store it in forest ecosystems.

In a process referred to as the 'carbon cycle', forests exchange large amounts of carbon dioxide with the atmosphere as they grow (through photosynthesis and respiration) and die (through decomposition) (CCFM, 1997).

(4.1) 1 Value

Local contribution of carbon uptake and storage

Carbon in the form of standing biomass is a measure of the timber volume available. Assuming no change in forest structure, a constant or increasing volume of standing biomass shows that the forest can sustain wood supply indefinitely at current levels of use (CCFM, 1997).

(4.1) 1a Objective

Carbon uptake and storage (i.e. carbon balance) will be maintained

The age of a forest has a significant influence on carbon sequestering. Young, fast growing trees absorb more carbon (CCFM, 1997). Therefore, reforesting all harvested areas in a prompt manner ensures that carbon storage commences in a timely manner.

(4.1) 1a.1 Indicator

Percentage of harvested areas reforested

It is widely understood that forests and forest soils represent large reservoirs of carbon that have accumulated over hundreds and thousands of years. Thus, altering the area of land that is forested has a notable impact on the global carbon cycle. It is important that lands that have historically been forested continue to be occupied by forests. Reforestation refers to the establishment of a crop of new trees, either through artificial (i.e. planting or seeding) or natural means.

(4.1) 1a.1.1 Target

100% of harvest areas are reforested within 18 months after the end of the timber year[38] in which it was harvested

Section 141.1(1) of the Timber Management Regulation (Alberta Regulation 60/ 73) states, "Except where this Part otherwise provides or unless otherwise authorized by the Minister pursuant to this Part, the holder of a timber disposition shall, within 2 years after the end of the year of cut of each area of public land cut, carry out such reforestation as, in the opinion of the Minister, will be needed to ensure that the reforestation standards will be met in respect of the area cut."

- **Acceptable variance**
  The acceptable level of variance is +3 months.

- **Current status**
  As of the 2000 timber year 100% of harvested areas in the FMA area were treated within 18 months after the end of the timber year as indicated in Tables 32 and 33.

  Coniferious and mixedwood harvest areas are typically reforested by planting. Reforestation of deciduous harvest areas is typically accomplished without human intervention usually by vegetative propagation.

Table 32. Conifer and Mixedwood Harvested Areas Reforested Within 18 months

SFMP Table Master.xls
Table 15

Timber Year	# of Harvest Areas	# of Harvested Areas Planted Within 18 Months	Percentage Reforested Within 18 Months
2000/2001	130	130	100
2001/2002	136	136	100
2002/2003	127	127	100
2003/2004	114	114	100

Source: Canfor compiled data

[38] The timber year is defined in the *Timber Management Regulation* (Alberta Regulation 60/ 73) as the period May 1 to April 30.

Table 33. Deciduous Harvested Areas Reforested Within 18 months

SFMP Table Master.xls
Table 47

Timber Year	# of Deciduous Harvest Areas Left For Natural	Percentage Reforested Within 18 Months
2000 /2001	16	100
2001/ 2002	0	N/A
2002/ 2003	6	100
2003/ 2004	0	N/A

Source: Canfor compiled data

- **Forecasting assumptions and analytical methods**
  Not applicable.
- **Forest management activities**
  Silviculture prescriptions are prepared for proposed harvest areas in order to plan silviculture activities in a timely manner to meet the stated target. Currently, the majority of coniferous and mixedwood harvest areas on the FMA area are planted during the spring or summer following harvest. If log inventory is left on the harvest area, and not enough plantable spots are available or if site preparation could not be completed that winter, the area is scheduled for planting the following summer; which is still within the 18 month period.

  Deciduous harvest areas are currently all prescribed for "leave for natural" through vegetative propagation.
- **Strategy and implementation schedule**
  The strategy was implemented commencing in the 2000 timber year.
- **Monitoring procedure (monitoring results against forecasts)**
  All harvested sites will be tracked using the Silviculture Module of Canfor's forestry system and monitored to ensure that reforestation occurs within 18 months from the end of the timber year in which the harvest area was harvested. The resultant data (% compliance) will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  All site treatment strategies follow the strategic direction as outlined in the DFMP.

(4.1) 1a.2 Indicator
Percentage of productive areas >4 hectares impacted by fire that are regenerated

Productive forested areas that have been burned should be returned to productive status. This ensures that the area of forest landbase contributing to the annual allowable cut is not reduced.

Burned sites will be monitored to ensure the level of stand management required to bring the stand into productive status is determined and that they are satisfactorily regenerated.

(4.1) 1a.2.1 Target
Reforest 100% of the productive areas >4 ha impacted by fire within 24 months

- **Acceptable variance**
  The acceptable level of variance is to reforest at least 90% of productive areas >4 hectares impacted by fire within 24 months.

- **Current status**
  Alberta Sustainable Resource Development (ASRD) provides information on burned areas in the FMA area to Canfor upon request. As reported in the *Forest Protection Plan* (Canfor, 2005), there have been 230 fires in the FMA area during the previous 19 years (1986 - 2004 inclusive), impacting a total of 258 hectares of land of which 153 hectares was productive.

  A total of 137 hectares of the burned area has been reforested, of which 59 hectares were within existing harvested areas and required immediate reforestation in order to meet legal requirements. An additional 16 hectares of productive area was burned in the aforementioned time frame, but the fires were all less than 4 hectares therefore were not reforested.

- **Forecasting assumptions and analytical methods**
  Not applicable

- **Forest management activities**
  Burned areas >4 hectares will have all activities scheduled and tracked in the Silviculture Module of Canfor's forestry system to ensure they are reforested and monitored as part of Canfor's regular reforestation program.

- **Strategy and implementation schedule**
  Continue to reforest all burned areas >4 hectares in accordance with established protocols.

- **Monitoring procedure (monitoring results against forecasts)**
  Canfor will annually acquire records of all burned areas on the FMA area during the previous year from ASRD. All burned areas >4 hectares will be identified as candidates for reforestation to ensure that the forested landbase does not suffer from sustained deforestation.

  Reports will be generated from the Silviculture Module of Canfor's forestry system to ensure that the burned sites (>4 ha) scheduled for reforestation are actually planted and the resulatant data (%) is reported in the *Annual Performance Monitoring Report.*

- **Linkages to DFMP and Annual Operating Plan**
  The target supports maintenance of carbon uptake and storage.

(4.2) Critical Element

Forest Land Conversion

Protect forest lands from deforestation or conversion to non-forests

In Canada, forest lands are being permanently converted to purposes that serve the growing population – residential areas, agriculture, roads, pipelines, hydroelectric lines, etc. The issue of conversion is important to the sustainability of forests because if forest lands are permanently lost, the amount of wood that can be extracted for social uses will decline. It will also affect the ability of the forest to provide environmental, social, cultural and recreational benefits to society (CCFM, 1997).

(4.2) 1 Value

Sustainable yield of timber

The area of productive land designated for timber production is an important indicator of sustainability (Dempster, 1998). When a natural range of forest yield groups can be maintained on that productive land, it ensures the sustainability of a range of values including cultural, timber, wildlife and recreation.

(4.2) 1a Objective

A natural range of tree species will reforest every hectare that is harvested

(4.2) 1a.1 Indicator

Percentage of the harvested area sufficiently restocked by yield group

Successful regeneration of harvested sites is fundamental to sustainable forest ecosystems and continued productivity. It is therefore essential that harvested sites are successfully regenerated and are as productive as predicted in the timber supply analysis.

(4.2) 1a.1.1 Target

100% of the harvested area sufficiently restocked by yield group accumulated annually beginning in 2000

- **Acceptable variance**
  The acceptable variance is +/-10% of harvested areas (accumulated annually) will be sufficiently restocked by yield group.
- **Current status**
  The FMA area was stratified into 17 yield groups using Alberta Vegetation Inventory (AVI) stand attributes of species composition, density and height and timber productivity. The selection of yield groups was based on practical considerations, the importance of certain timber types in the FMA area and the

geographic significance of ecologically important strata (Canfor, 1999b). A regeneration strategy was developed using 14 regenerated yield groups (Table 35) based on the species to be planted by Natural Subregion.

A comparison of the regenerated yield groups[39] versus treated regenerated yield groups[40] over the past five years (2000 – 2004 inclusive) has been compiled (Table 34). Nine yield groups are reported. Several groups have been combined based on species similarities or they are a non-harvested yield group, namely:

- Yield group 2 was combined with groups 4 and 7;
- Yield group 16 was combined with groups 5 and 15; and
- Yield group 13 is a non-harvested yield group.

Table 34. Balancing Yield Groups within FMA area

SFMP Table Master.xls
Table 40

Item	Coniferous Yield Group (ha)									
	2	3	8	9	11	12	14	16	17	Total
Regenerated Yield Group (AVI)	1,549	879	3,615	272	737	887	667	4,387	1,672	14,664
Treated Regenerated Yield Group	1,522	690	3,818	199	823	928	637	4,477	1,570	14,664
Percent Difference	-2%	-22%	6%	27%	12%	5%	-4%	-2%	-6%	

Source: Canfor compiled data

Of the nine yield groups indicated in Table 34, all except 3, 9, and 11 are within the acceptable variance.

Silviculture staff continue to evaluate yield group variances and make adjustments to reforestation plans to meet the approved DFMP regeneration strategy and balance the yield groups.

- **Forecasting assumptions and analytical methods**

The following are the key assumptions for the regeneration strategy, all of which have been shown in the past to be reasonably accurate:

- Early crop establishment (within 18 months) will achieve projected breast height ages within the stated times;
- Current silviculture treatments (effective mechanical site preparation, early stand tending) successfully put the harvested stand on the growth and yield trajectory of the regenerated yield group;
- Allowances for plantation failures, regeneration delay and understory protection are accurate; and

[39] Regenerated Yield group is the original DFMP regeneration strategy linked to the Alberta Vegetation Inventory (AVI).

[40] Treated Regenerated Yield group is the actual yield group that was planted or left for natural, based on tree species, density and species group

- Tree improvement multipliers represent the actual improvement that will occur.

- **Forest management activities**
  Harvested areas are regenerated using the approved DFMP regeneration tactics developed for each yield group (Table 35).

  Silviculture prescriptions are determined in accordance with the *Pre-harvest Ecological Assessment Program*, which incorporates these regeneration tactics.

- **Strategy and implementation schedule**
  Since 2000, Silviculture AOPs have incorporated the DFMP approved regeneration tactics for all harvested areas. This means that harvested sites are treated using the appropriate techniques for a particular ecosite to ensure that the regenerating stand is on the growth and yield trajectory of the regenerated yield group.

- **Monitoring procedure (monitoring results against forecasts)**
  Each year prior to commencement of the silviculture program, the area of each treated regenerated yield group from 2000 to present will be accumulated and compared to the regenerated yield groups derived from the DFMP and the resultant data reported in the *Annual Performance Monitoring Report*.

  The resultant data will indicate which yield groups do not achieve the acceptable variance thereby providing sufficient time to review the next season's plan and make the necessary adjustments.

- **Linkages to DFMP and Annual Operating Plan**
  All regeneration strategies, plans and activities follow the strategic direction outlined in the approved DFMP.

Table 35. Regeneration Strategy – Implementation Guidelines

SFMP Table Master.xls
Table 45

Yield Group	Description	Regenerated Yield Group	Natural Subregions	Species To Plant	Reforestation Tactics
1 & 2	1 -AW+(S)-AB 2-AW+(S)-CD	1 & 2	All	SW	Suckering and natural seeding will be used for establishing deciduous regeneration. Maintaining the coniferous incidental volumes will be achieved by a combination of understory protection and/or planting 0 - 200 seedlings per ha. Depending on the condition of the conifer understory, 40 to 200 stems per ha will be required. No site preparation or vegetation management will be done unless there are voids in the deciduous regeneration.
3	AWSW/PBSW/BWSW	3	CMW, DMW, LFH, PRP	SW	Plant 1,100 per ha provided 512A container stock is used. Plant 1,500 per ha; 70% of area to be planted with stock from bulk seed collections from natural stands. Site preparation as necessary; vegetation management as necessary (see vegetation field guide).
3	AWSW/PBSW/BWSW	3	UFH, SAL	SW	Plant 1,100 per ha provided 512A container stock is used. If smaller stock is used, plant 1,500 per ha all stock will be from bulk seed collection from natural stands. Site preparation as necessary; vegetation management as necessary (see vegetation field guide).
4	BW/BWAW+(S)	4	All	SW	Suckering and natural seeding will be used for establishing deciduous regeneration. Maintaining the coniferous incidental volumes will be achieved by a combination of understory protection and/or planting 0 - 200 seedlings per ha. Depending on the condition of the conifer understory, 40 to 200 stems per ha will be required. No site preparation or vegetation management will be done unless there are voids in the deciduous regeneration.
5	FB+OTH	16	CMW, DMW, PRP	SW	Plant 1,800 per ha; 70% of the area to be planted with seed orchard seed stock, 30% of area to be planted with stock from bulk seed collections from natural stands. Site preparation as necessary. Vegetation management as necessary. See vegetation field guide; possibly PCT & CT.
5	FB+OTH	5	LFH, UFH, SAL	SW	Protect FB/SW understory; plant hole. All stock will be from bulk seed collections from natural stands. Site preparation as required; vegetation management as required. See vegetation field guide; possibly PCT.
6	H+(S)/S	17	CMW, DMW, LFH, PRP	SW	Protect conifer understory; fill in plant holes with seed orchard stock, (require 1,500 stems per ha). PCT if required. Vegetation management as required (see vegetation field guide).
7	PB+(S)	7	All	SW	Suckering and natural seeding will be used for establishing deciduous regeneration. Maintaining the coniferous incidental volumes will be achieved by a combination of understory protection and/or planting 0 - 200 seedlings per ha. Depending on the condition of the conifer understory, 40 to 200 stems per ha will be required. No site preparation or vegetation management will be done unless there are voids in the deciduous regeneration.
8	PL/PLFB+(H)	8	CMW, DMW, LFH, PRP	PL	Plant 2,000 per ha; 70% of the area to be planted with seed orchard stock, 30% of the area to be planted with stock from bulk seed collections from natural stands. Vegetation management as required. See vegetation field guide; possibly PCT & CT.
8	PL/PLFB+(H)	8	UFH, SA	PL	Plant 2,000 per ha; all stock will be from bulk collection seed from natural stands. Site preparation as required. Vegetation management to be done as per the vegetation field guide; PCT & CT.
9	PLAW/AWPL	9	CMW, DMW, LFH	PL	Plant 1,500 per ha; 70% of the area will be planted with seed orchard seed stock, 30% of the area to be plant with bulk collection seed from natural stands. Site preparation as required. Vegetation management to done as per the vegetation field guide.
9	PLAW/AWPL	8	UFH, SAL	PL	Plant 1,500 per ha; use bulk collection seed from natural stands for planting stock. Site preparation as required. Vegetation management to be done as per the vegetation field guide; PCT & CT.
10	PLSB+OTH	8	CMW, DMW, LFH	PL	Plant 2,000 per ha; 70% of the area will be planted with seed orchard seed stock, 30% of the area will be planted with stock from bulk seed collection from natural stands. Site preparation as required. Vegetation management to be done as per the vegetation field guide; PCT & CT.
10	PLSB+OTH	8	UFH, SAL	PL	Plant 2,000 per ha all stock will be from bulk collection seed from natural stands. Site prep as required. Vegetation management to be done as per the vegetation field guide; PCT & CT.

Source: Canfor compiled data

Table 35 con't

Yield Group	Description	Regenerated Yield Group	Natural Subregions	Species to Plant	Reforestation Tactics
11	PLSW/SWPL+(H)	11	CMW, DMW, LFH	PL & SW	Plant 2,000 per ha; 70% of the area will be planted with seed orchard seed stock, 30% of the area will be planted with stock from bulk seed collection from natural stands. Site preparation as required. Vegetation management to be done as per the vegetation field guide; PCT & CT.
11	PLSW/SWPL+(H)	8	UFH, SAL	PL	Plant 2,000 per ha; planting stock will come from bulk seed collections from natural stands. Site preparation as required. Vegetation management to be done as per the vegetation field guide; PCT & CT.
12	SBLT/LTSB(G,M,F)	12	All	SB	Plant 1,200 to 1,500 per ha; use seed from the SB seed production orchard if available, otherwise use bulk collection seed from natural stands.
13	SBLT/LTSB(U)	13	All	SB	Leave for natural or plant 1,200 per ha; use seed from the SB seed production orchard if available, otherwise use seed from bulk seed collection from natural stands.
14	SBPL/SBSW/SBFB	14	CMW, DMW, LFH	SB or SW	Plant 1,500 per ha; use seed from the SB seed production orchard if available, otherwise use seed from bulk seed collection from natural stands. Site Preparation as required.
14	SBPL/SBSW/SBFB	14	UFH, SAL	SB or SW	Plant 1,500 per ha; use seed from the SB seed production orchard if available, otherwise use seed from bulk seed collection from natural stands. Site Preparation as required.
15	SW/SWFB+(H)-AB	15	DMW, PRP	SW	Plant 1,000 per ha; use bulk collection seed from natural stands for planting stock. Scarify as required.
15	SW/SWFB+(H)-AB	16	CMW, LFH	SW	Plant 2,000 per ha; 70% of area to be planted with seed orchard seed, 30% of area to be planted with bulk seed from natural stands. Site preparation if required. Vegetation management as necessary. See vegetation field guide; possible PCT & CT.
15	SW/SWFB+(H)-AB	16	UFH, SAL	SW	Plant 2,000 per ha; all of the area to be planted with bulk seed from natural stands. Site preparation if required. Vegetation management as necessary. See vegetation field guide; possible PCT & CT.
16	SW/SWFB+(H)-CD	16	CMW, DMW, LFH, PRP	SW	Plant 2,000 per ha; 70% of area to be planted with seed orchard seed, 30% of area to be planted with bulk seed from natural stands. Site preparation if required. Vegetation management as necessary. See vegetation field guide; possible PCT & CT.
16	SW/SWFB+(H)-CD	16	UFH, SAL	SW	Plant 2,000 per ha; all of the area is to be planted with bulk seed collections from natural stands. Site preparation if required. Vegetation management as necessary. See vegetation field guide; possible PCT & CT.
17	SWAW/SWAWPL	17	CMW, DMW, LFH, PRP	SW	Plant 1,200 per ha provided 512A container stock is used. If smaller stock is used, plant 1,500 per ha; 70% of area to be planted with seed orchard seed, 30% of area to be planted with bulk seed collections from natural stands. Site preparation if necessary. Vegetation management as necessary (see vegetation field guide).
17	SWAW/SWAWPL	16	UFH, SAL	SW	Plant 2,000 per ha; all of the area is to be planted with bulk seed collections from natural stands. Site preparation if required. Vegetation management as necessary. See vegetation field guide; possible PCT & CT.

Notes on abbreviations:

Species: PL = Lodgepole pine; SW = White spruce; SB = Black spruce; FB = Balsam fir; LT = Tamarack larch; AW = White aspen (Aspen); BW = White birch; H = Generic for any deciduoud species (aspen, birch); S = Generic for any coniferous species (pine, spruce, etc.) OTH = includes other unidentified species when FB or PLSB are identified as the main leading species

Species descriptors: AB = refers to A and B stand densities (A being lower stems per ha than B); CD = refers to C and D stand densities (D being the highest stems per ha therefore the most dense type of stand); G,M,F = Timber productivity rating (site index) - "good, medium, fair"; U = timber productivity rating - uncommercial stand type

Natural Subregions: CMW = Central Mixedwood; DMW = Dry Mixedwood; LFH = Lower Foothills; UFH = Upper Foothills; PRP = Peace River Parkland; SAL = Sub-Alpine

Other: PCT = Pre-commercial Thin; CT = Commercial Thin

Source: Canfor compiled data

(4.2) 1b.1 Indicator
Percentage of harvested merchantable wood (conifer and deciduous) left on site

The Operating Ground Rules (ASRD, 2004a) define merchantable wood as:

- Coniferous utilization standards:
  - 15/ 10 Utilization:
    - Merchantable Tree: one that has a minimum diameter of 15 cm outside bark at stump height (30 cm) and a merchantable length of 4.88 m to a 10 cm diameter (inside bark); and
    - Merchantable Piece: one that is 2.44 m with a 10 cm (inside bark) small end, where rot content or form does not render it unusable.
- Deciduous Utilization Standards:
  - 15/ 10 Utilization:
    - Merchantable Tree: one that has a minimum stump diameter of 15 cm outside bark and a merchantable length of 4.88 m or greater to a 10 cm top diameter (inside bark), or to the point where the stem is unusable or there is no central stem due to heavy branching; and
    - Merchantable Piece: one that is 2.44 m or longer to a 10 cm (inside bark) small end, where rot content or form does not render it unusable.

(4.2) 1b.1.1 Target
To leave less than 1% conifer and 1% deciduous harvested merchantable wood on site annually

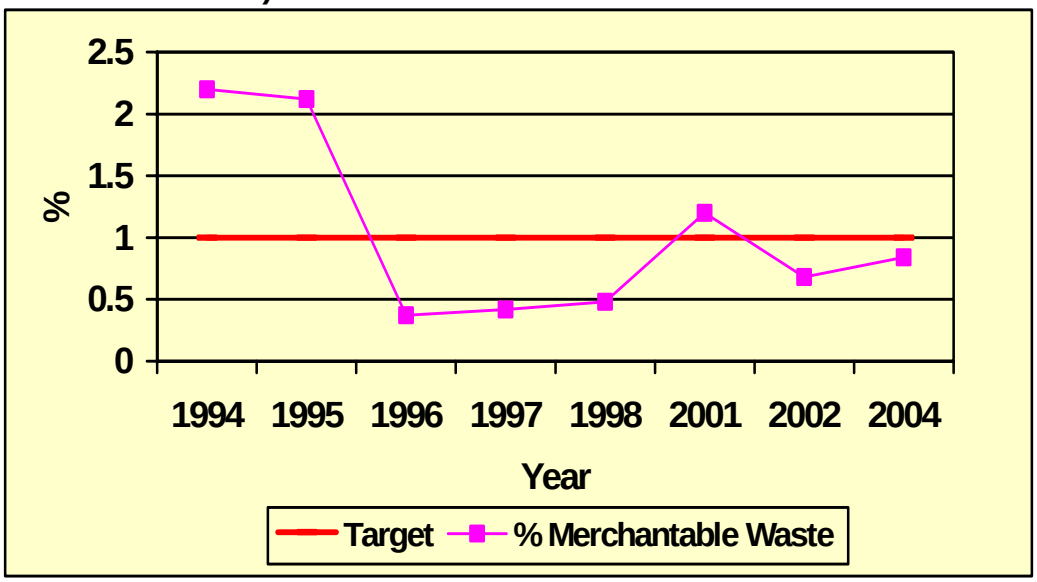
The objective of this target is to minimize the amount of merchantable wood left on the harvest area. The regulatory definition of merchantable wood is defined above. For the purpose of this target, merchantable wood includes only those stems that are cut down. There may be standing merchantable stems that have been left for other reasons (refer to "Target (1.2) 1a.8" for information regarding structure retention). The target also refers to the aggregate total. Individual harvest areas may exceed the target but the overall average must be less than 1%.

- **Acceptable variance**
  The acceptable variance is zero. The target refers to the aggregate total. Individual harvest areas may exceed the target but the overall average must be less than 1%.
- **Current status**
  Waste surveys are conducted every second year using the British Columbia waste survey protocols[41]. The results for 2004 indicate the average merchantable waste was 0.84% for coniferous (Figure 60) and 0.75% for deciduous. The range for coniferous merchantable waste on harvest areas was 0.36% to 1.44% while deciduous ranged from 0.12% to 2.60%.

[41] http://www.for.gov.bc.ca/hva/manuals/rwprocedures/pdf.htm

The next waste survey is scheduled for 2006.

Figure 60. Coniferous Merchantable Waste Survey Results (1994 to Present)



- **Forecasting assumptions and analytical methods**
  Not Applicable.

- **Forest management activities**
  Waste surveys will be conducted within the FMA area to measure merchantable wood left on site. If the results show that waste exceeds the overall target, then an evaluation of the logging practices will be conducted and corrective action implemented.

- **Strategy and implementation schedule**
  Waste surveys will continue to be conducted every 2 years. If waste survey results exceed the target, another survey will be conducted the year following to verify that corrective actions have been effective.

- **Monitoring procedure (monitoring results against forecasts)**
  Canfor's Forest Management System dictates the amount of monitoring and inspections that are required in a harvest area. The Canfor *Log Quality Specifications* (Canfor, 2003a) and the Tolko *Log Quality Standards* (Tolko, Undated) document the requirements for producing logs for each respective mill. The Canfor *Log Quality Performance Management System* (Canfor, 2003b) defines the key performance indicators and business processes for the harvesting contractor, the Canfor supervisor and the mill.

  The percentage of harvested merchantable wood left on site will be compiled and the results reported in the *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  The approved DFMP net down process accounts for 1% merchantable wood left on site.

  This target measures the actual performance against the assumptions in the DFMP and the regulatory requirements in the Operating Ground Rules (ASRD, 2004a).

(4.2) 1b.2 Indicator
Percentage of dispositions where merchantable industrial salvage is utilized on an annual basis

Industrial salvage wood is merchantable coniferous and deciduous wood removed from various dispositions as described below. In accordance with Forest Management Agreement 9900037, Canfor has first right of refusal to purchase coniferous salvage wood. Tolko and Ainsworth have first rights of refusal to purchase deciduous salvage wood by virtue of their Deciduous Timber Allocations.

It is important that all accessible and economical merchantable wood from within the FMA area is salvaged and utilized. Salvaged wood assists Canfor and other forest tenure holders to offset the loss of timber and forest landbase resulting from the activities of other industries.

(4.2) 1b.2.1 Target
100% of the dispositions where merchantable industrial salvage wood from permanent land withdrawals is utilized on an annual basis

Roads, wellsites, powerlines, pipelines, recreational sites, campsites and gravel pits are all examples of dispositions that are withdrawn from the landbase by either the forest industry, the oil and gas industry or utility companies. Many are withdrawn for 10 - 20 years; therefore, they are considered permanent deletions.

- **Acceptable variance**
  The acceptable variance is to salvage at least 90% of dispositions where merchantable volume is harvested as result of permanent land withdrawals. Because it may not be possible to determine if 100% of merchantable coniferous and deciduous wood has been salvaged, it is desirable to utilize all wood that is accessible and known to Canfor.

- **Current status**
  All requests for land withdrawals from the FMA area are referred to the FMA Holder for consent, at which time the applicant submits an *Environmental Field Report* (EFR) (ASRD, 2004c) indicating the location and potential number of loads of salvage wood. Under present procedures, if the merchantable wood is deciduous the EFR is forwarded to the appropriate deciduous company and Canfor assumes no responsibility for the salvage. At present, Canfor does not track the volume of deciduous salvage.

For coniferous salvage, Canfor has established procedures for confirming the accessibility, quality and volume (m^3) of the salvage. Records are maintained to track the salvage delivered to the mill and a *Salvage Wood Report* is generated to determine the percentage of coniferous salvage wood that has been utilized.

Procuring 100% of salvage wood is problematic given the high number of industrials sites, their wide geographic dispersion and the variable and dynamic work plans implemented by energy sector companies.

Some examples of the complexity of the salvage wood process are:

- Salvaged wood may be used by the disposition holder during site construction;
- Salvage wood from dispositions may be minimal making it uneconomical to haul long distances;
- Deciduous forest companies may refuse to utilize the salvage wood;
- Salvage wood may be impossible to access by truck;
- Salvaged wood from one or more adjacent dispositions may be decked in one location and improperly labelled as to disposition; and
- Lack of notice from disposition holders as to if and when the site is constructed and salvage becomes available.

Table 36 indicates that the over the last 3 years the acceptable variance has not been met for the reasons stated above.

Table 36. Merchantable Coniferous Wood Salvaged from the FMA area

SFMP Table Master.xls
Table 24

Year	Disposition Year of Consent		
	2002	2003	2004
# of Dispositions Indicating Coniferous Salvage	32	115	136
# of Dispositions Coniferous was Salvaged	17	61	48
Amount of Coniferous Salvage Wood (m^3)	4,340	11,803	10,764
Percent of # Dispositions Salvaged	**53%**	**53%**	**35%**

Source: Canfor compiled data

The percentage of dispositions (Table 36) from which coniferous salvage was obtained indicates the process for confirming the availability of salvage wood requires improvement. Further, deciduous salvage is not monitored nor reported. Steps will be undertaken to address all of these deficiencies as described in the following sections.

- **Forecasting assumptions and analytical methods**
  Not applicale

- **Forest management activities**
  The system for confirming the availability, accessibility, quality and volume (m^3) of coniferous and deciduous salvage requires modification to increase the percentage of salvage utilized.

  As part of that process, Canfor will continue to cooperate with other industries to improve salvaged wood usage by communicating the importance of salvaging all merchantable timber and requesting that salvaged timber be accessible.

- **Strategy and implementation schedule**
  Commencing fall 2005, Canfor will improve the salvage procurement system for both coniferous and deciduous species by initiating follow up with the disposition holders to determine the status of salvage.

- **Monitoring procedure (monitoring results against forecasts)**
  The volume (m^3) and percentage of coniferous salvage wood utilized by the Company is tracked via the Logs Production Module of Canfor's forestry system and transferred to its land use database. For deciduous salvage volumes, the records will be obtained from deciduous companies and the volumes entered into Canfor's database.

  The resultant data (%) will be reported in the *Annual Performance Monitoring Report.*

- **Linkages to DFMP and Annual Operating Plan**
  Coniferous and deciduous salvage volumes are not a direct reduction to the corresponding annual allowable cuts (AAC) but each AAC is reduced yearly by the average volume/ ha multiplied by the amount of area withdrawn.

(4.2) 2 Value
Forests on the landbase

(4.2) 2a Objective
Forests will be maintained on the landbase

(4.2) 2a.1 Indicator
Density (lineal km/ km^2) of open (non-reclaimed) roads

One way to gauge the wilderness quality of an area is to measure the number of roads. Road density is an indication of the influence of human activity on an area, and the state of its wildlife populations and natural processes (http://www.growingtogether.ca/pubs/bcfgs/page20.htm)

Roads provide access for urban and industrial development and to previously inaccessible forest areas. Their presence can alter local hydrology, fragment habitat, increase road kill, increase legal and illegal fishing and hunting, and create disturbance from both traffic and off-road vehicles.

Regular road maintenance, access management and integrated land management with energy sector companies, including road deactivation and access restriction, can mitigate some of the negative impacts of roads.

(4.2) 2a.1.2 Target

To have no more than 0.6 lineal km/ km^2 in open (non-reclaimed) roads over a 5-year period, for each FMA parcel (Peace, Puskwaskau and Main)

Some wildlife species will avoid roads, resulting in isolated wild populations and a disruption in seasonal movements and genetic interchange. Both the Draft *Alberta Grizzly Bear Recovery Plan 2005 - 2010* (ASRD, 2004d) and the *Recovery Plan For Grizzly Bears In The North Cascades of British Columbia* (NCGBRT, 2004) indicate that 0.6 km/ km^2 is a threshold above which it has been observed that grizzly use is lower (http://wlapwww.gov.bc.ca/wld/grzz/). Grizzly bears are critical components of predator-prey relationships and as such, are often considered a "keystone" indicator of overall ecosystem health.

- **Acceptable variance**
  The acceptable variance is maximum of 0.7 km/ km^2 for the Peace, Puskwaskau and Main parcels.

- **Current status**
  Open roads are those held under Licences of Occupation (LOC), oil and gas roads held under mineral surface leases (MSL), and non-reclaimed forestry roads, including all temporary roads that have not received final clearance[42]. Only the Peace parcel exceeds the acceptable variance (Table 37), which is the result of road construction by industries other than forestry.

Table 37. Road Densities within the FMA area

SFMP Tables Master.xls
Table 23

Parcel	Road (km)	Area (km^2)	Density (km/ km^2)
Main	2,341	5,514	0.42
Peace	174	281	0.62
Puskwaskau	234	697	0.34
FMA area	2,749	6,492	0.42

Source: Canfor compiled data

- **Forecasting assumptions and analytical methods**
  Not applicable.

[42] These roads are used to access timber but are not required for permanent access. They are reclaimed after the initial silviculture treatment is completed or if they are not required for silviculture access the road is reclaimed immediately after hauling is completed. When harvest areas receive final clearance, reclaimed roads within or tributary to the blocks, will not be included in the calculation.

- **Forest management activities**
  Canfor works cooperatively with the energy sector to minimize road densities. To date, Canfor has developed draft Integrated Land Management Memoranda of Understanding (MOU) with four energy companies operating on the FMA area.
- **Strategy and implementation schedule**
  Canfor will increase its efforts to minimize road densities by communicating road density targets to other resource industries.
- **Monitoring procedure (monitoring results against forecasts)**
  Two activities will be monitored to achieve the target:
  - The amount of open road (km/ km^2) in a given year; and
  - The number of Integrated Land Management Memoranda of Understanding completed.

  The Roads Module of Canfor's forestry system and the non-routed road GIS coverage will be utilized to produce the required report. The road database will be updated annually. Canfor's Land Use Coordinator will report all cancelled LOCs to the Woodlands Information Management group, who then will generate the required reports.

  The resultant data (km/ km^2) will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  This is a new indicator and it is not presently a component of the approved DFMP, however it relates to minimizing the loss of area by working with other parties.

(4.2) 2b Objective
Productive lands will be restored to productive status wherever possible

(4.2) 2b.1 Indicator
Percentage of withdrawn areas restored to productive forest land

Previously withdrawn areas from the FMA area that are brought back into forest production may include abandoned well sites, roads, pipelines, campsites and/ or gravel pits.

Once these areas are no longer required under a non-forestry disposition, they may be reclaimed and included in the FMA area. The concern with most of these areas is that they are usually reclaimed with grass or other vegetative cover, which conflicts with seedling establishment. From a forestry perspective, it is more logical and appropriate to bring these lands back into productive status in a manner that allows for successful seedling establishment.

(4.2) 2b.1.1 Target

100% of previously withdrawn areas that are suitable candidates for reforestation are restored to productive forest land annually within 24 months

All areas that meet the applicable criteria as suitable candidates for reforestation will be reforested.

- **Acceptable variance**
  The acceptable variance is to have no less than 90% of suitable candidates reforested within 24 months of when the site is ready for planting.

- **Current status**
  Since 1999, Canfor has reforested selected well sites. As of April 2005, these sites are tracked in the Silviculture Module of Canfor's forestry system, but with a unique designation to differentiate them from Canfor's harvested areas.

  Table 38 shows Canfor's historical data on previously withdrawn areas that have been reforested. In 2003, only 1 site of 8 that were available was planted because insufficient seedlings were available. The balance of the sites (7) were carried over to 2004 and again to 2005. Two additional sites were added in 2005 as possible candidates. Those that are suitable will be reforested this year.

Table 38. Planting of Previously Withdrawn Areas

SFMP Tables Master.xls
Table 46

Year	Number of withdrawn areas Available	Number of withdrawn areas Planted	Percent of withdrawn areas Planted
2001	7	7	100%
2002	27	27	100%
2003	8	1	13%
2004	7	0	0%
2005	9	Scheduled	Scheduled

Source: Silviculture Module of Canfor's forestry system (compiled data)

- **Forecasting assumptions and analytical methods**
  Not applicable.

- **Forest management activities**
  All dispositions for which Canfor receives cancellation notification are evaluated for suitability as candidates for planting. Suitable sites are incorporated in the Silviculture Module of Canfor's forestry system. Procedures for the establishment and tending of reforested areas under this program are the same as those carried out on other harvested areas, except that Canfor does not assume legal liability regarding performance of the plantations.

  Commencing in fall 2005, all new dispositions that were primarily on productive land will be recorded in Canfor's landuse database. If the disposition holder no longer requires these sites and the sites are suitable for reforestation, Canfor will

work with the disposition holder to utilize reforestation as part of their reclamation process.

- **Strategy and implementation schedule**
  Canfor is continuing dialog with specific energy sector companies regarding integrated land management (ILM) within the FMA area. This initiative will enable integration of planning, improved communication and initiation of specific collaborative resource management projects, such as the reforestation of well sites. In addition to the aforementioned process, Canfor works cooperatively with Alberta Sustainable Resource Development to determine appropriate sites for planting.

- **Monitoring procedure (monitoring results against forecasts)**
  All withdrawn areas will be recorded and those satisfactory for planting will be identified and scheduled for planting. All planted areas will be tracked in the Silviculture Module of Canfor's forestry system.

  The resultant data (%) will be reported in the *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  Tracking and reforestation of withdrawn areas are primarily operational functions; however once the lands are successfully regenerated they will contribute to the annual allowable cut.

5. Criterion

Multiple Benefits to Society

Sustain flows of forest benefits for current and future generations by providing multiple goods and services.

Forests provide us with a multitude of benefits. Maintaining a flow of economic and other benefits [from forests] is an important dimension of sustainable development (CCFM, 1997).

(5.1) Critical Element

Timber and Non-Timber Benefits

Manage the forest to produce an acceptable and feasible mix of both timber and non-timber benefits.

Forests are a finite resource. Therefore, choices must be made regarding how forests will be managed and utilized, how future consumption demands will be met, and which benefits (and in what proportion) will best satisfy the needs and desires of Canadians. The mix of benefits provided by forests is determined by markets and governments (CCFM, 1997).

(5.1) 1 Value

Sustainable yield of timber

Ensuring a sustainable flow of timber provides social, economic and environmental benefits to industry, communities and individuals. The harvest rate for timber on Alberta public lands is determined by annual allowable cuts (AAC), which dictate the maximum volume of timber that can be harvested annually from an area over a period of time.

(5.1) 1a Objective

Sustainable harvest levels on the FMA area will be maintained

(5.1) 1a.1 Indicator

Long-term harvest level vs. actual extraction rates (m^3)

The production and delivery of forest products add to the economy via the payment of wages, taxes, profits and other fees such as stumpage (CCFM, 1997). Maintaining the capacity of the forested landbase is necessary, so a continual flow of timber and non-timber benefits is available for current and future generations.

(5.1) 1a.1.1 Target

Actual harvest rates (m^3) are less than or equal to the long-term harvest level (m^3) at the end of the 1999 - 2008 period

- **Acceptable variance**
  The acceptable variance is zero.

- **Current status**
  Tables 39 and 40 provide a comparison of projected harvest levels (m^3) vs. the long-term harvest level (m^3) for the period 1999 - 2008. The results show that both the coniferous and deciduous harvest levels do not exceed the long-term harvest level.

  In the respective tables, the coniferous harvest level is equal to the annual allowable cut (AAC) multiplied by 10 and the deciduous harvest level is equal to the total deciduous allocations for the period.

Table 39. Coniferous Harvest Levels

SFMP Tables Master.xls
Table 19

Period	Projected Harvest Level (m^3)	Harvest Level (1999 - 2008)[1]	Variance (m^3)	Variance (%)
1999-2008	6,361,561	6,400,000	38,439	0.6
Notes:				
1. The approved coniferous harvest level (AAC) is 630,400 m^3 as established by the approved DFMP (Canfor, 2003), However, that volume assumed a 9,600 m^3 salvage drain per year using predicted values. The cut control calculation used in the General Development Plan dated June 1, 2005 used audited timber production values (actuals) rather than predicted values. The AAC of the FMA area (including the salvage) is therefore 640,000 m^3.				

Source: 2005 General Development Plan Table 4

Table 40. Deciduous Harvest Levels

SFMP Tables Master.xls
Table 19

Period	Projected Harvest Level (m^3)	Harvest Level (1999 - 2008)[1]	Variance (m^3)	Variance (%)
1999-2008	2,943,119	2,943,119	0	0
Notes:				
1. The approved deciduous harvest level				

Source: 2005 General Development Plan Table 6

- **Forecasting assumptions and analytical methods**
  Not applicable.

- **Forest management activities**
  The projected harvest levels are monitored to ensure harvested volumes do not exceed the the long-term harvest level. Actual coniferous and deciduous volumes delivered from the FMA area are tracked in the Logs Production Module of Canfor's forestry system or the deciduous companies databases.

- **Strategy and implementation schedule**
  Canfor will continue to record actual volumes harvested.

- **Monitoring procedure (monitoring results against forecasts)**
  The harvested volume (m^3) will be compared to the long-term harvest level (m^3) and the resultant data (m^3) will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  The target is consistent with the strategic direction outlined in the approved DFMP. Annual harvest volumes are reported in the AOP.

(5.1) Value
Ongoing non-timber benefits

Forests provide a wide variety of benefits including timber, firewood, food, pelts, game, fish, botanical medicines, crafts, cultural activities and recreation. As human populations grow, demand for outdoor experiences is expected to increase. Therefore indicators of forest recreation and the level of participation are important aspects of reporting on sustainable development (CCFM, 1997).

(5.1) 2a Objective
Long-term availability of identified non-timber benefits will be maintained

Forests provide many non-timber benefits for society. The importance of any individual benefit may change over time. Society may determine that new and/ or different non-timber benefits need to be managed. Canfor seeks input into which non-timber benefits have priority using a variety of venues and processes:

- The Forest Management Advisory Committee;
- Open houses at which the Annual Operating Plan/ 5 Year General Development Plan is presented;
- Consultation with trappers;
- Consultation with Aboriginal groups;
- Participation in National Forest Week; and
- Sponsorship of a Forest Educator.

(5.1) 2a.1 Indicator
Number of recreation areas maintained by Canfor

Canfor recognizes that the FMA areas contain important recreation and tourism values.

(5.1) 2a.1.1 Target
Canfor will maintain a minimum of 5 recreation areas for use by the public annually

- **Acceptable variance**
  The acceptable variance is zero.

- **Current status**
  Canfor maintains 5 recreational areas in and near the FMA area (MacLeod Flats, Economy Lake, Frying Pan Creek, Westview and Swan Lake (Figure 61).

  In 2003, Canfor initiated a 5-year study to define the adequacy of the facilities and recommendations for improvement of the sites (Table 41).

Table 41. Ratings of Site and Facility Quality

SFMP Table Master.xls
Table 25

Recreation Area	Site Rating				
	Poor	Fair	Good	Excellent	Total (%)
Macleod Flats	0	0	15	85	
Economy Lake	0	0	14	86	
Frying Pan Creek	0	0	60	40	
Westview	0 [a]	0 [a]	0 [a]	0 [a]	
Swan Lake	0	0	85	15	
Overall	**0**	**0**	**48**	**52**	**100**
Notes:					
a. Surveys were conducted but no people were available for interviews.					

Source: Canfor compiled data

Figure 61. Swan Lake Recreational Area

Swan Lake Recreation Area provides a year-round fishing opportunity. Canfor maintains the site and provides funds to aerate the lake to prevent fish winterkill.

- **Forecasting assumptions and analytical methods**
  Not applicable

- **Forest management activities**
  Contractors are retained to perform duties which include: maintenance and repair of campsites, buildings, signage and chattels, garbage collection and removal,

stocking of supplies at sanitary facilities, road maintenance, sanitation pump out, firewood supply and delivery, snag removal and access barrier installation

To promote its recreation sites, Canfor prepared a brochure that is available at the following locations: Canfor Office, Grande Prairie Tourism Center, Rotary city bus tour (during summer months), Muskoseepi Park, Valleyview Tourism Center, High Prairie Tourism and Dunvegan Visitor Center.

Recreational surveys will be conducted annually until 2006 and the finalized results will be included in a study that is planned for 2008 to define recreational potential within the balance of the FMA area.

- **Strategy and implementation schedule**
  The strategy is to provide benefit to the public by maintaining recreational areas. The sites are within easy access to many areas where Canfor operates and provides a 'jump off' point from which visitors can observe forestry activities in which Canfor is engaged.
- **Monitoring procedure (monitoring results against forecasts)**
  No special monitoring procedures are required. The recreational use survey provides a measure of the level of use and public perception regarding how well the campsites are being maintained. Opportunities for enhancing or expanding facilities will be reviewed periodically based on input from interested stakeholders. The number of recreational areas that Canfor maintains will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  This target assists to achieve recreation related targets presented in the DFMP. It also provides the public an opportunity to enhance knowledge of the forest and the activities conducted there. As a result, the public may provide more informed input regarding forest management.

(5.1) 2a.2 Indicator

Percentage of registered trappers contacted that are directly impacted by operations (harvesting, silviculture and reclamation)

In 2001, Canfor developed a *Trappers Notification Program* in consultation with the Alberta Trappers Association and Sturgeon Lake Cree Nation. This program was reviewed with the Forest Management Advisory Committee (FMAC). The program was updated in 2004 to differentiate between the consultation and notification processes. The new document is called the *Trappers Consultation and Notification Program* (Canfor, 2004).

(5.1) 2a.2.1 Target

100% of registered trappers directly impacted by harvesting, silviculture and reclamation operations are contacted as specified in the *Trappers Consultation and Notification Program* annually

- **Acceptable variance**
  The acceptable variance is zero, provided that Canfor and registered trappers make reasonable provisions that allow effective consultation and/ or notification. Examples of reasonable provisions include:
  - Both parties are willing to fully disclose their interests in the landbase;
  - Both parties are willing to discuss respective issues and, if possible, agree on solutions; and
  - Both parties are willing to find the time and location to discuss the issues.

  The *Trappers Consultation and Notification Program* indicates the steps to take in the event that consultation and/ or notification of the trapper cannot be undertaken.

- **Current status**
  Fifty nine registered traplines are found within the FMA area (Figure 8). Canfor regularly obtains a list of all registered trappers within the FMA area from Alberta Sustainable Resource Development.

  The *Trappers Consultation and Notification Program* was implemented in March 2004. The objective of the program is to ensure all principal trappers affected by Canfor's Annual Operating Plan (AOP)/ 5 Year General Development Plan are consulted and notified of all harvesting, silviculture and reclamation activities planned within their registered trapline area. It specifies personal contacts to be made with the trappers concerning:
  - Potential impacts on cabins, traplines and important wildlife areas;
  - When and where harvesting, road building, log hauling and silviculture activities will occur; and
  - Exact locations of proposed harvest areas and logging roads.

  A review of the Issue Tracking System (ITS) indicates that:
  - In 2003, 8 trapper comments were received and one trapper was not notified. The missed trapper incident prompted a review of Canfor's procedures. Activities were created in the Blocks Module of Canfor's forestry system so that reports can be created that identify who needs to be notified and who was notified;
  - In 2004, 4 trapper comments were received and all trappers were notified as required.

- **Forecasting assumptions and analytical methods**
  Not applicable

- **Forest management activities**
  Consultation and notification is implemented as per the *Trappers Consultation and Notification Program*.

  Consultation with the affected trapper starts two to four years prior to operations. At that stage, the trapper is advised of the Canfor operations that may affect his/ her trapline. Attempts are made to reconcile any disputes that may develop between the registered trapper and Canfor. A dispute resolution process is

included in the *Trappers Consultation and Notification Program* in the event that there are serious issues that cannot be resolved.

For silviculture activities that are not specific to harvest areas, the Silviculture Forester advises the registered trapper of the activity that will be taking place and the potential impact on the trapline. Attempts are made to reconcile any disputes that may develop between the registered trapper and Canfor. Currently the results of these consultations are filed in the vault.

After the consultation phase, trappers are notified of Canfor's operations. Canfor requires that the senior partner of the trapline be notified a minimum of one month prior to the start of operations.

- **Strategy and implementation schedule**
  The *Trappers Consultation and Notification Program* is currently in use and will be formally reviewed bi-annually. The next review is scheduled for March 2006. At this review, the following will be added:
  - A table showing the full range of potential forest operations that could occur on the site; and
  - Linkages to government expectations regarding consultation.
- **Monitoring procedure (monitoring results against forecasts)**
  Records pertaining to registered trapper consultation and notification with respect to harvesting are maintained in the Blocks Module of Canfor's forestry system. A database query is utilized to determine whether or not the prescribed and/ or required interactions have taken place. For silviculture activities, trapper consultation and notification is tracked separately. Canfor's Issue Tracking System is utilized to record trapper comments and information related to associated non-conformance issues.

  The percentage of registered trappers contacted that are directly impacted by operations will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  Consultation and notification of trappers is an operational function.

(5.1) 2a.3 Indicator

Percentage of outfitters potentially affected by operations within the FMA area are informed of the 5-year harvest sequence

(5.1) 2a.3.1 Target

100% of outfitters potentially affected by operations within the FMA area will be supplied a 5 Year General Development Plan map annually

- **Acceptable variance**
  Zero variance in respect to contacting potentially affected outfitters.

- **Current status**
  In September 2000, Canfor obtained a list of outfitters from the Alberta Professional Outfitters Society indicating there were 29 Professional Outfitters operating in the FMA area (http://www.apos.ab.ca/index.htm).

  In 2004, Canfor's proposed operations potentially affected 21 outfitters. Each year Canfor sends each potentially affected outfitter a letter and the 5 Year General Development Plan (GDP) map.

  To date, Canfor has not received any concerns from outfitters; however some general comments were received indicating the outfitters appreciate being sent maps and knowing where forest operations are proposed.

- **Forecasting assumptions and analytical methods**
  Not applicable.

- **Forest management activities**
  Input received from outfitters is considered during the preparation of harvest plans.

- **Strategy and implementation schedule**
  Contact with the outfitters is made annually.

- **Monitoring procedure (monitoring results against forecasts)**
  Canfor will maintain records of all letters forwarded to outfitters and responses received by Canfor will be documented in its Issue Tracking System (ITS).

  The percentage of potentially affected outfitters that are contacted will be reported in the *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  Consultation and notification of outfitters is an operational function.

(5.2) Critical Element

Communities and Sustainability

Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and to participate in their use and management.

The sustainable development of forest resources has as much to do with people as it does with trees, soil, water and other ecological components of forest ecosystems (CCFM, 1997).

(5.2) 1 Value

A range of benefits to local communities

It is evident that more and more people believe that exploitation of natural resources in their local area should accrue benefits for local communities. Such benefits may include economic benefits such as employment, contracts and provision of services, but also a wide range of social and cultural benefits.

(5.2) 1a Objective

Local communities and contractors will have the opportunity to share in benefits such as jobs, contracts and services

Canfor strives to hire local service providers if they are available, and they:

- Have the appropriate level of skill and knowledge;
- Have proper equipment;
- Meet applicable legal requirements, including occupational health and safety requirements;
- Have the ability to meet and maintain the Company's health, safety and environmental requirements;
- Have the ability to meet and maintain the Company's performance requirements;
- Deliver services at competitive prices; and
- Provide the required overall service.

All contractors hired by Canfor must submit a "*Contractor Application Form*" and be approved to work for the Company before they can perform any activity on the FMA area. This is not a requirement for contractors hired to work in the Company's manufacturing facilities.

It is Canfor's overall strategy to form long-term partnerships with suppliers and contractors to better service the needs of both parties.

(5.2) 1a.1 Indicator
Percentage of dollars paid for local vs. non-local contract services

Local contractors are those whose base of operations is within or in the vicinity of a local community[43].

(5.2) 1a.1.1 Target
Over a rolling 5-year period, a minimum of 75% of dollars paid for contract services will be expended locally

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  Table 42 indicates the estimated local versus non-local dollars expended since 1999 by fiscal year. Canfor's accounting ledger does not distinguish between local and non-local contractors, but an estimate has been provided. Expenditures include FMA-based woodlands and Grande Prairie manufacturing facility costs.

Table 42. Local versus Non-local Dollars by Fiscal Year

SFMP Table Master.xls
Table 11

Contribution	1999	2000	2001	2002	2003	2004
Local Contract Services ($ millions)	26.8	24.8	25.3	29.0	34.6	36.9
Non-Local Contract Services ($ millions)	2.3	6.9	7.0	7.2	8.6	8.1
subtotal	29.1	31.7	32.3	36.2	43.2	45.0
% Local Contractors (5 year rolling avg.)					**81.4%**	**79.9%**

Source: Canfor compiled data - J Ashley (5.2) 1.xls

- **Forecasting assumptions and analytical methods**
  Not applicable.
- **Forest management activities**
  Eligible expenditures include contract service costs incurred for all forest management activities on the FMA area, for contract service costs incurred for operating Canfor's Grande Prairie manufacturing facilities and contract service costs incurred for completion of capital projects.
- **Strategy and implementation schedule**
  Canfor plans to revise the accounting procedures to more accurately track local versus non-local expenditures for inclusion in the 2006 business plan.

[43] Local communities have been defined by the FMAC as those adjacent to the FMA area i.e., Valleyview, DeBolt, Fox Creek, Spirit River, Fairview, Grande Cache, and Grande Prairie. Municipal District (MD) of Greenview No. 16, MD of Spirit River No. 20 and County of Grande Prairie No. 1 are also deemed to be local communities.

- **Monitoring procedure (monitoring results against forecasts)**
  Local versus non-local expenditures will be compared using the improved accounting procedures and the resultant data will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  The target supports achievement of commitments made in the DFMP to provide a variety of economic and social benefits at the local level.

(5.2) 1b Objective
The forests will be accessible to the public for social and cultural benefits

The public derives many social and cultural benefits from the forest. Increasingly, the public has indicated that forest lands should be managed to ensure a wide range of benefits is maintained and that access to the forest is not restricted.

(5.2) 1b.1 Indicator
Percentage of identified social and cultural benefits that occur in the FMA area

Social and cultural benefits that occur within the FMA area are listed in Table 43. Canfor created the list based on information gathered from recreational site surveys and consultation with FMAC and the public.

(5.2) 1b.1.1 Target
Maintain 100% of identified social and cultural benefits that occur on the FMA area annually

Canfor believes that maintaining the historic range of seral stages on the landscape will provide a full range of forest ecosystems from which the public can obtain social and cultural benefits. Protection of water and soil resources through the application of procedures contained in the Company's forest management system will also help to maintain social and cultural opportunities on the FMA area.

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  Canfor has confirmed that the social and cultural benefits indicated in Table 43 are available and accessible to the public. Canfor does not restrict public access within the FMA area with the exception of areas where Alberta Sustainable Resource Development (ASRD) applies legal restrictions e.g. ASRD restricts public access on some roads by requiring the installation and maintenance of gates as a means of protecting caribou populations.

Table 43. Social and Cultural Benefits Identified in the FMA area

SFMP Table Master.xls
Table 13

Benefit	Availability of Benefit 2004
Recreational	
Hunting/fishing	√
Camping/picnicking/social gathering	√
ATV'ing/snowmobiling	√
Walking/hiking/jogging/mountain biking/skiing	√
Horseback/trail riding	√
Boating/canoeing/kayaking/rafting	√
Sight seeing/wildlife watching/nature watching	√
Nature photography/painting	√
Berry picking/plant collecting	√
Firewood/poles/other wood collecting	√
Non-recreational	
Trapping/outfitting/guiding	√
Working	√
Studying/researching	√
Cultural (includes Aboriginal)	
Traditional hunting/fishing/trapping/gathering	√
Traditional plants	√
Spiritual gatherings/activities	√
Teepee poles	√
Percent Available	**100%**

Source: Canfor compiled data

- **Forecasting assumptions and analytical methods**
  Not applicable.

- **Forest management activities**
  Observed or potential 'new' social and cultural benefits will be included in the list (Table 43), providing they are compatible with overall management objectives and do not contravene applicable laws. The Forest Management Advisory Committee will also be canvassed, by December 2005, to garner input.

- **Strategy and implementation schedule**
  The strategy is to maintain the social and cultural benefits located within the FMA area.

- **Monitoring procedure (monitoring results against forecasts)**
  Each year, Canfor will reconfirm the availability of social and cultural benefits and record the results. Public comments regarding benefits will be tracked in the Issue Tracking System (ITS) and the results reported in the *Annual Performance Monitoring Report.*

- **Linkages to DFMP and Annual Operating Plan**
  The target supports achievement of commitments made in the DFMP to maintain social and cultural benefits within FMA area.

(5.3) Critical Element

Fair Distribution of Benefits and Costs
Promote the fair distribution of timber and non-timber benefits and costs.

Many communities are dependent on nearby forest resources for the provision of domestic goods and services, as well as exports. Therefore indicators related to community sustainability contribute to the overall understanding of the sustainable management of our forests (CCFM, 1997).

(5.3) 1 Value
Fair distribution of benefits across communities

Local communities have been defined by the Forest Management Advisory Committee (FMAC) as those adjacent to the FMA area i.e. Valleyview, DeBolt, Fox Creek, Spirit River, Fairview, Grande Cache, and Grande Prairie. Municipal District (MD) of Greenview No. 16, MD of Spirit River No. 20 and County of Grande Prairie No. 1 are also deemed to be local communities.

Members of the FMAC believe that local communities should benefit from the existence of the FMA area and the activities of the companies operating there.

(5.3) 1a Objective
A fair distribution of benefits and costs will be ensured across all communities in the local area

The forestry, agriculture and petroleum industries play a crucial role in the economic stability of north western Alberta by providing jobs, paying taxes and completing social projects and initiatives. Canfor assists in maintaining this stability by continuing its economic contributions to the local communities.

(5.3) 1a.1 Indicator
Percentage of economic contribution to local communities

The economic contributions that Canfor makes to the local communities include wages and benefits, property taxes, purchases of goods and services and community support.

(5.3) 1a.1.1 Target
Annual economic contributions to local communities will be a minimum of 80% of the 5-year rolling average

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  Table 44 indicates the estimated key economic contributions to local communities since 1999 (by fiscal year). With respect to the target, Canfor's economic contribution to local communities in 2004 was 126% of the 5-year rolling average for the period 1999 - 2003.

Table 44. Contributions to Local Communities

SFMP Table Master.xls
Table 14

Contribution (millions $)	1999	2000	2001	2002	2003	2004
Wages and Benefits	11.6	11.6	12	13.5	14.6	14.7
Property Taxes	0.6	0.7	0.8	0.8	0.8	0.9
Local Contract Services	26.8	24.8	25.3	29	34.6	36.9
Supplies	4.6	5	5.6	4.4	5.5	6
Community Donations	0.1	0.1	0.1	0.1	0.1	0.1
Miscellaneous (advertising, etc.) [1]	-	-	-	-	-	-
Total	43.7	42.2	43.8	47.8	55.6	58.6
Local Contribution (5-Year Rolling Average)					46.6	
% Within the 5-Year Rolling Average						**126%**
Notes:						
1. Miscellaneous is an additional category that has not previously been reported						

Source: Canfor compiled data

- **Forecasting assumptions and analytical methods**
  Not applicable
- **Forest management activities**
  In 2005, Canfor plans to revise the accounting procedures to more accurately track local versus non-local contractor and supplies expenditures.
- **Strategy and implementation schedule**
  The above activities will be implemented for the 2006 business plan.
- **Monitoring procedure (monitoring results against forecasts)**
  Local contributions, the 5-year rolling average and the current years contribution in comparison to the 5-year rolling average will be tallied and reported in the *Annual Performance Monitoring Report.*
- **Linkages to DFMP and Annual Operating Plan**
  The target supports commitments in the DFMP to maintain economic contributions to local communities.

(5.3) 1a.2 Indicator

Percentage of coniferous timber available for local use

Forest Management Agreement 9900037 (OC 198/ 99) contains provisions for the amount of conifer volume to be made available for local use and for local residents.

(5.3) 1a.2.1 Target

0.5% of the conifer AAC is made available for local use and for local residents as per Forest Management Agreement (FMA) 9900037 annually

As stated in Forest Management Agreement 9900037, the following volumes are made available for local use:

"8. (2) The minister also reserves the following rights to the timber on the forest management area: (d) the right, after consulting with the Company, to issue coniferous timber dispositions from within the forest management area to provide timber for local use in construction and maintenance of public works by any local authority, municipality, county, the Crown in the right of Alberta or Canada and for local residents provided, however, that the total volume of timber cut under authority of such timber dispositions does not exceed 0.5% of the Company's approved annual allowable cut."

- **Acceptable variance**
  The acceptable variance is not to exceed the annual allocation of 0.5% of the approved coniferous AAC (640,000 m^3) over a 10-year cut control period (1999 – 2008), which equates to 3,152 m^3/ year or 31,520 m^3 for the 10 year period.

- **Current status**
  Historically, the demand for local timber has primarily been from residents of the Valleyview area and, for the most part, the demand has been met by the issuance of timber dispositions on lands located outside the FMA area. Alberta Sustainable Resource Development is responsible for overseeing the allocation of timber and is obligated to work cooperatively with Canfor regarding any volume requested from the FMA area. Since 1999, there have been 18 permits allocated for timber located within the FMA area, for a total volume of 7,424 m^3, with the predominance of the volume (98%) coming from the Puskwaskau Operational Unit. The remaining 2% was issued for the procurement of building logs by trappers or local builders. Refer to Table 45 for the volume allocation by operating unit.

  Commencing in 2004, Canfor assumed responsibility for the allocation of the 3,152 m^3 via approval of the Annual Operating Plan.

Table 45. Local Use Conifer Volume Allocation by Operational Unit

SFMP Table Master.xls
Table 6

Operational Unit	10 Year Period (1999 - 2008)										
	99/ 00 (m^3)	00/ 01 (m^3)	01/02 (m^3)	02/ 03 (m^3)	03/ 04 (m^3)	04/ 05 (m^3)	05/ 06 (m^3)	06/ 07 (m^3)	07/ 08 (m^3)	08/ 09 (m^3)	Subtotal
Deep North					40						40
Deep South					100						100
E8											
Economy North	50										50
Economy South											
Latornell											
Peace											
Puskwaskau	100		80		3,752	3,152					7,084
Simonette	150										150
Smoky											
Total/ Year	**300**	**0**	**80**	**0**	**3,892**	**3,152**					**7,424**

Source: 2005 General Development Plan

- **Forecasting assumptions and analytical methods**
  Not applicable

- **Forest management activities**
  The volume allocation is planned and laid out by Canfor personnel. Maps and volume estimates are provided to ASRD in the Annual Operating Plan.

  ASRD allocates the volume to local residents under provisions of the *Forest Act* and the *Timber Management Regulation.*

- **Strategy and implementation schedule**
  As of 2004, Canfor has assumed responsibility for providing the required volume as part of the proposed harvest in the Annual Operating Plan. Each year, two to three years of harvest volume will be identified to indicate its geographic location within the Puskwaskau Operational Unit, thereby assisting local loggers to conduct their planning.

- **Monitoring procedure (monitoring results against forecasts)**
  The volume of coniferous timber made available and harvested under this program is recorded in the cut control tables and reported to ASRD in the AOP/ 5 Year General Development Plan each year on June 1st.

- **Linkages to DFMP and Annual Operating Plan**
  The timber required is made available as part of Canfor's operational plans.

(5.3) 1a.3.1 Target
10,000 m^3 of the conifer AAC is made available annually for Community Timber Use Program

As stated in the Forest Management Agreement 9900037, the following volume of coniferous timber is available for a Community Timber Use Program:

"8.(2) The Minister also reserves the following rights to the timber on the forest managemnent area e) the right, after consulting with the Company, to issue coniferous timber dispositions from within the forest management area to provide timber for a Community Timber Use Program for up to 10,000 cubic metres of coniferous timber annually."

- **Acceptable variance**
  The acceptable variance is not to exceed the total annual allocation of 10,000 m^3 in any given timber season.
- **Current status**
  In 2004, ASRD requested Canfor to make that volume available in its Annual Operating Plan. Due to the large volume required, Canfor made a decision that this volume must be representative of its harvest profile therefore, making provisions for the volume to be generated from anywhere within the FMA area. For 2004, Canfor allocated four harvest areas along the Forestry Trunk Road in the Economy Operational Unit.
- **Forecasting assumptions and analytical methods**
  Not applicable.
- **Forest management activities**
  The volume allocation is planned and laid out by Canfor personnel. Maps and volume estimates are provided to ASRD in the Annual Operating Plan.
- **Strategy and implementation schedule**
  If ASRD does not award the volume in a given year, there are no carry-over provisions for unallocated volume. Successful applicants for the volume may choose to harvest and haul it over a 2 to 3 year period providing necessary approvals are maintained with the government.
- **Monitoring procedure (monitoring results against forecasts)**
  The amount of coniferous timber made available and harvested under this program is recorded in the cut control tables and reported to ASRD in the AOP/ 5 Year General Development Plan each year on June 1st.
- **Linkages to DFMP and Annual Operating Plan**
  The required timber will be made available within Canfor's operational plans.

6 Criterion

Accepting Society's Responsibility for Sustainable Development

Society's responsibility for sustainable forest management requires that fair, equitable, and effective forest management decisions are made.

"…. fairness is defined in terms of inclusiveness, while an effective decision is one that incorporates and mediates the broad spectrum of concerns on a given issue." (CCFM, 1997)

(6.1) Critical Element

Aboriginal and Treaty Rights

Understand and respect Aboriginal and treaty rights

(6.1) 1 Value
Understand and respect Aboriginal and treaty rights

(6.1) 1a Objective
Infringement of Aboriginal and treaty rights will be avoided

(6.1) 1a.1 Indicator
Percent conformance to SFM elements pertinent to the protection of aboriginal and treaty rights

Under Section 35 of the *Constitution Act, 1982*, existing Aboriginal and treaty rights of the Aboriginal peoples of Canada are recognized and affirmed. Alberta has the constitutional mandate to manage public lands and the development of natural resources in the province for the benefit of all Albertans (Government of Alberta, 2005).

The Forest Management Agreement between Alberta and Canfor provides the Company rights and obligations to establish, grow and harvest timber on a sustained yield basis, according to a management plan approved by the Minister. The Minister retains the authority to evaluate all plans pertaining to the management of the FMA area, including an assessment of the potential for the plans or activities proposed or carried out by the company to infringe on Aboriginal or treaty rights. The Sustainable Forest Management Plan 2005 prepared by Canfor includes commitments to manage forest resources that are

essential to the continued existence of healthy forest ecosystems. Access to the forest, and its wildlife resources, is a fundamental Aboriginal and treaty right. Successful management of key Sustainable Forest Management (SFM) elements, will, by default, protect those forest resources that have traditionally sustained Aboriginal people and their way of life.

(6.1) 1a.1.1 Target
100% conformance to SFMP Targets of Critical Element (1.2) Species Diversity and Element (3.2) Water Quality and Quantity

The SFMP 2005 contains seventeen elements, of which two relate directly to the conservation of forest resources that are essential to the protection of Aboriginal and treaty rights. Element 1.2 Species Diversity, commits the company to "Conserve species diversity by ensuring that habitats for the native species found on the FMA area are maintained". Eight targets support the Species Diversity element. Element 3.2 Water Quality and Quantity, commits the company to "Conserve water resources by maintaining water quality and quantity". Four targets support the Water Quality and Quantity element.

- **Acceptable variance**
  The acceptable variance is 80% conformance to the acceptable variances of SFMP targets related to species diversity, and water quality and quantity.

- **Current status**
  Following are the targets for Critical Elements 1.2 and 3.2.

  - Critical Element (1.2) Species Diversity:
    - Target (1.2) 1a.1.1 - Maintain the 1997 habitat suitability rating for each ecosection group for the period 1997-2017 at the 1997 level;
    - Target (1.2) 1a.1.2 – Annually, zero bull trout inhabited watersheds with ≥ 35% Equivalent Clearcut Area (ECA) above the H60 elevation;
    - Target (1.2) 1a.1.3 - For woodland caribou, no more than 20% of the Caribou Area in pioneer or young seral condition and at least 20% of the Caribou Area in old seral condition at key points in time;

      For trumpeter swan, to buffer 100% of identified trumpeter swan lakes with a 200 metre no harvest zone buffer (reported annually);
    - Target (1.2) 1a.1.4 - 100% of Canfor forestry staff members receive training to identify and report rare plants (reported annually);
    - Target (1.2) 1a.1.5 - Participate in one or more biodiversity monitoring program(s) annually;
    - Target (1.2) 1a.1.6 - 100% of the pre-harvest volume per hectare of coarse woody debris will be retained on harvest areas annually;
    - Target (1.2) 1a.1.7 - The actual area in watercourse buffers is a minimum of 100% of the planned (DFMP) area annually;
    - Target (1.2) 1a.1.8 – A minimum of 25% of the area harvested across the FMA area will contain structure retention accumulated annually beginning in 2002.
  - Critical Element (3.2) Water Quality and Quantity

- Target (3.2) 1a.1.1 - Less than 10% of surveyed stream crossings on forestry roads will have a “High” and “Very High” Water Quality Concern Rating annually;
- Target (3.2) 1a.2.1 - 100% of crossings receive remedial action as identified in the Road Maintenance Plan annually;
- Target (3.2) 1a.3.1 - Zero non-compliance incidents related to riparian zones standards annually;
- Target (3.2) 2a.1.1 - 100% of sampled watersheds are in conformance with the annual average water yield increase limit of 15% as indicated in the Operating Ground Rules.

The aforementioned targets have been initiated in the SFMP 2005 and therefore, no specific results for the purposes of this indicator (i.e. protection of Aboriginal and treaty rights) have been reported to date.

- **Forecasting assumptions and analytical methods**
  Not applicable
- **Forest management activities**
  Refer to the forest management activities for each of the targets indicated above.
- **Strategy and implementation schedule**
  All activities related to the targets that support this indicator are either underway, or will commence in accordance with the strategies indicated for each target.
- **Monitoring procedure (monitoring results against forecasts)**
  Results for each associated target will be recorded in accordance with the procedures indicted for each target. A summation of the results as they pertain to the protection of Aboriginal and treaty rights will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  This indicator directly relates to all indicators and targets associated with Elements (1.2) and (3.2) of the SFMP 2005. The Annual Operating Plan contains information related to operational results and proposed activities, including those related to the conservation of species diversity and water resources.

(6.2) Critical Element

Respect for Aboriginal Forest Values, Knowledge and Uses

Respect traditional Aboriginal forest values and uses identified through the Aboriginal consultation process.

The Royal Proclamation of 1763 required the consent of Aboriginal peoples before their land was occupied and gave the Crown sole authority to negotiate land settlements. From that Proclamation flowed treaties that outlined the Crown's responsibilities to protect Aboriginal peoples' way of life, including hunting, trapping, fishing and gathering (CCFM, 1997).

On May 16, 2005, *The Government of Alberta's First Nations Consultation Policy on Land Management and Resource Development* was introduced. The policy states that "Those who propose natural resource developments are expected to consult with and consider the views of First Nations who could be affected by their developments."

(6.2) 1 Value

Understand and respect Aboriginal special needs

There is a growing awareness of the need for sustainable forest management to recognize Aboriginal peoples' rights and protect their traditional way of life. Aboriginal use of the land, be it subsistence or otherwise, affects forest management and thus, forest management planning (CCFM, 1997).

(6.2) 1a Objective

Early and effective consultation with Aboriginal peoples will be provided

(6.2) 1a.1 Indicator

Number of opportunities for early and effective consultation with Aboriginal peoples

(6.2) 1a.1.1 Target

To annually provide a range[44] of opportunities for early and effective consultation with Aboriginal peoples who have indicated interest in activities on the FMA area.

[44]A range of opportunities includes participation on the FMAC, meetings with Canfor staff, signed agreements or letters of understanding, attendance at open houses or information sessions, and contact through the Trappers Consultation and Notification program.

- **Acceptable variance**
  Opportunity for meaningful consultation on General Development plans must be provided to members of the Sturgeon Lake Cree Nation, Zone 6 Métis Nation of Alberta and the Aseniwuche Winewak Nation (AWN) of Canada annually.

- **Current status**
  The earliest opportunity for Canfor to consult with Aboriginal people on forestry plans is provided through membership on the Forest Management Advisory Committee (FMAC). Invitations to participate on the FMAC have been extended to each of the three Aboriginal groups with interest in the FMA area. Currently, the Sturgeon Lake Cree Nation and the Zone 6 Metis Nation are participating. The Aseniwuche Winewak Nation of Canada (AWN) have declined to participate as members of FMAC because their participation as advisors to the Foothills Model Forest utilizes the time and resources available to them (person comm.).

  The FMAC is actively engaged in providing input for the development of values, objectives, indicators and targets for the SFMP component of the DFMP and in monitoring Canfor's progress on implementation of strategic and operational plans and other commitments.

  Opportunity for consultation on an annual basis is provided through invitation to Aboriginal groups and other stakeholders to review General Development Plans. Opportunities include open houses held in local communities, including Aboriginal communities. Aboriginal groups are also contacted directly and are invited to meet with Canfor planning staff to review General Development Plans and operational plans. Canfor staff addresses all subsequent requests for information, comments or concerns and the results of consultation are documented.

- **Forecasting assumptions and analytical methods**
  The only Aboriginal groups who have expressed formal traditional or existing interest in lands within the FMA are the Sturgeon Lake Cree Nation, the Aseniwuche Winewak Nation of Canada and the Métis Nation of Canada, Zone 6.

  - The Sturgeon Lake Cree Nation are signatories of Treaty 8 and documented evidence indicates that descendants of the Sturgeon Lake peoples have used and continue to use portions of the FMA for traditional, and treaty-protected activities. The band has expressed interest in conducting a Traditional Use Study, and Canfor has agreed to partially fund the study, but no specific plans have yet been established;
  - The AWN recently filed a claim with the Federal Government with respect to the assertion of Aboriginal title. Canfor contributed to an AWN Traditional Use Study that indicated evidence of historic use by AWN descendants within parts of the FMA area; and
  - The Métis people have certain established Aboriginal rights, but do not posses rights to lands within the FMA area.

- **Forest management activities**
  Forest management strategic and operational plans will be developed such that infringement of Aboriginal and treaty rights will not occur as a result of forest

management activities. Aboriginal people are being encouraged to participate in forest management activities in order that they may accrue economic benefits derived from the forest.

- **Strategy and implementation schedule**
  The following strategies will be implemented:
  - Maintain opportunities for representatives of the Sturgeon Lake Cree Nation and Métis Nation of Canada Zone 6 to participate on the FMAC;
  - Sign memoranda of understanding prior to the end of 2006 with Sturgeon Lake Cree Nation and Aseniwuche Winewak Nation of Canada that include specified consultation processes in which Canfor and the Aboriginal parties will engage;
  - Conduct open houses in Sturgeon Lake, Grande Cache and Grande Prairie in 2006; post notices of the open houses in the offices of the three Aboriginal groups; and
  - Maintain procedures identified in the *Trappers Consultation and Notification Program*.
- **Monitoring procedure (monitoring results against forecasts)**
  Monitoring will comprise the following initiatives:
  - Maintain records of FMAC attendance, discussion and actions;
  - Maintain records of public comments received and Canfor's response to them in the Incident Tracking System database;
  - Maintain records of open houses held, including date and time, location, materials provided, attendance and Canfor responses to comments and requests;
  - Maintain records of contacts made with, and notifications sent to, registered trapper and other known trappers in the area of proposed harvesting and road development; and
  - Report a summary of consultation opportunities provided to Aboriginal peoples in the *Annual Performance Monitoring Report* and related consultation trends in the *Five Year Forest Stewardship Report*.
- **Linkages to DFMP and Annual Operating Plan**
  The Operating Ground Rules (ASRD, 2004a) require that operations be integrated with activities carried out by other users of the forest. Stakeholders (including Aboriginal people) must be consulted and/ or be made aware of Canfor's planned operations in order that stakeholder interests and rights can be accommodated appropriately. Canfor's *Environment Policy* and *Forestry Principles* commit the Company to provide opportunities for the public, including Aboriginal people specifically, to be involved in strategic and operational forest management planning.

(6.2) 1b Objective
Special cultural and historic sites will be respected

Special cultural and historic sites fall within the scope of the definition for historic resources identified within the *Alberta Historical Resources Act*. Historic resources means any work of nature or of man that is primarily of value for its palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or aesthetic interest including, but not limited to, a palaeontological, archaeological, prehistoric, historic or natural site, structure or object.

(6.2) 1b.1 Indicator
Percentage of historical resources that are protected

Under the provisions of the *Alberta Historical Resources Act*, it is the government's responsibility to manage historical resources. Developers who create impacts on the landscape are required to undertake historical resource overview impact assessments and implement mitigation measures in order that recorded and unrecorded historical resources are properly identified, evaluated and managed.

(6.2) 1b.1.1 Target
100% conformance to the prescriptions for historical resources prepared by a certified archaeologist annually

- **Acceptable variance**
  The acceptable variance is zero with regards to conforming to an archaeologist's prescription(s).

- **Current status**
  Since March 2002, Canfor has conducted historical resources overview assessments on all harvest areas, roads and other clearings prior to commencement of forestry activities. The process involves the use of a heritage potential model developed by Alberta Western Heritage Inc. and approved by Alberta Community Development. The model combines layers of quantifiable environmental and geographic information[45], and compares them statistically using a geographic information system (GIS). The primary outcome of the model is heritage potential i.e. the probability of finding a site in a particular location.

  The heritage potential and other data (type of activity, season of activity, proximity to existing sites and trails etc.) are entered into the cultural resources impact classification system (CRICS) calculator, which defines a prescription for the area. Possible prescriptions include either field verification (pre-impact assessment or post-impact audit) or no field verification required. A certified archaeologist reviews and confirms the prescriptions and conducts any required field verifications. If historical resources are located, the archaeologist prescribes measures to protect the resource in accordance with the Alberta *Historic Resources Act*. These measures may include:

[45] Historical resource database, distance to water, digital elevation model, slope, aspect, wet/ dry land classification, etc.

- Excluding the site from any activity;
- Buffering a portion of the site from any activity; and/ or
- Prescribing lower impact activities.

Canfor maintains records of all overview assessments; pre-impact assessments / post-impact audits and archaeologist prescriptions in the Blocks Module of the Canfor forestry system.

Since 2002, 19 sites have been identified within the FMA area. During 2004, one (1) incident occurred when a harvested area was not fully evaluated under the overview assessment process prior to commencement of harvest activities. The archaeologist was immediately contacted and it was determined that field verification was not required. The incident was recorded in Canfor's Incident Tracking System (ITS) as a non-conformance to procedures.

- **Forecasting assumptions and analytical methods**
  Not applicable
- **Forest management activities**
  Two Canfor woodlands staff members have received training in the use of the model.
- **Strategy and implementation schedule**
  Operational procedures may be modified from this process depending on the site and the corresponding recommendations from the archaeologist.
- **Monitoring procedure (monitoring results against forecasts)**
  The heritage potential model is continually being calibrated and improved as new sites are discovered within the FMA area. Canfor maintains records for all sites; however in order to maintain confidentiality and protection of the sites, the records are not released to the public.

  The percent conformance to prescriptions by a certified archaeologist will be compiled and reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  All harvest areas, roads and other clearings identified within the annual operating plan are assessed to determine the probability that historical resources are present. Steps to protect known sites are implemented in accordance with DFMP commitments.

(6.2) 1b.2 Indicator
Percentage of known local historical resources that are respected

Known local historical resources are those which local Aboriginal people have made known to Canfor but are not recorded within the provincial Archaeological Site, Significant Site and Historic Site Inventory databases, nor do they fall under the requirements of the *Historical Resources Act* at this time. The sites tend to be current or traditional use areas.

Canfor becomes informed of local historical resources through meetings with Aboriginal elders, public review of the Annual Operating Plan (AOP) and discussions with trappers, etc. Once this knowledge has been received, Canfor respects the wishes of Aboriginal people.

(6.2) 1b.2.1 Target
100% of known local historical resources are respected annually

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  Canfor is currently not aware of any local historical resources outside those contained in the provincial Archaeological Site, Significant Site and Historic Site Inventory databases.
- **Forecasting assumptions and analytical methods**
  Not applicable
- **Forest management activities**
  Forest management activities must not impact known local historical resources. Any understandings or prescriptions to which Aboriginal people and Canfor agree will be strictly adhered to.
- **Strategy and implementation schedule**
  When Canfor is notified of a “local historical resource” by Aboriginal people and the resource does not fall under the requirements of the *Historical Resources Act*, Canfor will agree on “prescriptions” for the site. Precriptions may vary from maintaining the availability of the site (e.g. berry picking areas), to no activity at all (e.g. grave site) or to any other presciption that both parties deem necessary to protect the resource. A precription may also involve keeping knowledge of the historical resource confidential.

  Known local historical resources will be geo-referenced for use in annual overview assessments.
- **Monitoring procedure (monitoring results against forecasts)**
  When annual overview assessments of proposed harvest areas, roads and other clearings are conducted, Canfor personnel confirm that proposed activities will not affect known local historical resouces. If an activity is planned for an area in which a local historic resource is located, the precriptions must be followed.

  Any non-conformances to the prescriptions will be documented in the Issue Tracking System. The percent conformance of known local historical resources

that are respected will be compiled and reported in the *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  The annual operating plan is prepared in conformance with the processes identified above to ensure that know local historic resources are respected.

(6.3) Critical Element

Public Participation

Demonstrate that the public participation process is designed and functioning to the satisfaction of the participants.

Public involvement is linked to sustainable development because of the goods and services that Canadians demand from their forests. If all of the stakeholders advocating varying uses of the forest are included in the decision-making process, it is more likely that forest management will be carried out on a sustainable basis to maintain a flow of these goods and services (CCFM, 1997).

(6.3) 1 Value

Inclusive public process

Public participation is key to the development of a successful ecologically-based Detailed Forest Management Plan (DFMP). In August 1995 Canfor actively sought public participation through the formation of a Forest Management Advisory Committee (FMAC). The Committee consists of local stakeholder groups[46] who are directly affected by or have an interest in the management of the forest resource. The Committee first met in September 1995 and has provided valuable input into the development of the DFMP by reviewing various documents and identifying issues of concern. These issues were documented in an "*Issues List*" for incorporation into the DFMP.

In 2000, FMAC provided local values, goals, indicators and objectives for Canfor's Sustainable Forest Management Plan (SFMP) (Canfor, 2000) which subsequently were incorporated directly into the Detailed Forest Management Plan (Canfor, 2003). The FMAC is currently assisting Canfor to certify its SFMP to CSA Z809-02 standards.

The Forest Management Advisory Committee (FMAC) and Canfor feel strongly that the public must be included in the forest management decision-making process.

(6.3) 1a Objective

Affected and locally interested parties will be involved in the development of the decision-making process through an open, transparent and accountable process

In its Terms of Reference (TOR) (Appendix 3), the FMAC aims, "to help ensure that sustainable forest management decisions are made as a result of informed, inclusive and fair consultation with local people who are directly affected or have an interest in sustainable forest management" (FMAC, 2004).

[46] FMAC Membership: Alberta Trappers Association, Canadian Association of Petroleum Producers, City of Grande Prairie, Grande Prairie Chamber of Commerce, County of Grande Prairie, Defined Forest Area (DFA) Related Worker, Grande Prairie Regional College, Grande Prairie Regional Tourism Association, Municipal District of Greenview No. 16, Public Member at Large, South Peace Environmentalist Association, Sturgeon Lake Cree Nation, Town of Valleyview, Valleyview Fish and Game Association and Zone 6 Métis Nation.

(6.3) 1a.1 Indicator
Percentage conformance to the Forest Management Advisory Committee's (FMAC) Terms of Reference

Canfor undertakes specific roles and responsibilities as defined in the following sections of FMAC's TOR:

- Defined Goals;
- Operating Rules;
- Communication and Information;
- Roles and Responsibilities; and
- Review of and Revisions to the Terms of Reference.

(6.3) 1a.1.1 Target
100% conformance to the FMAC's Terms of Reference annually

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  The TOR was last reviewed and approved on October 20th, 2004. In accordance with the TOR, Canfor has currently completed all activities for which it has responsibility.
- **Forecasting assumptions and analytical methods**
  Not applicable.
- **Forest management activities**
  Not applicable.
- **Strategy and implementation schedule**
  All Canfor activities identified in the TOR will be scheduled and performed accordingly.
- **Monitoring procedure (monitoring results against forecasts)**
  The activities that Canfor is responsible for will be reviewed annually, to ensure they conform to the TOR and the results will be reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  The target assists to fulfill commitments in the DFMP to conduct activities in accordance with FMAC's TOR.

(6.3) 1a.2 Indicator
Number of opportunities for public participation

The *Public Involvement Program* (Canfor, 2001) makes provision for a wide range of opportunities for public involvement/ input into forest management planning.

(6.3) 1a.2.1 Target
To provide a minimum of 4 types of opportunities for public participation annually

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  The following are the opportunities for public participation that are occurring or have occurred since 2004:
  - An active Forest Management Advisory Committee convened 4 times per year;
  - Annual trapper consultation and notification regarding harvest (summer 2004) and silviculture plans occurred throughout the year;
  - Annual outfitter notification of harvesting plans occurred in June 2004;
  - Letters and telephone calls to Canfor received response and are tracked in Canfor's Issue Tracking System (refer to "Target (6.3) 1a.3.1" for additional information);
  - Open houses:
    - February 2004 - Vegetation Management Plan open house at Valleyview; and
    - November 2004 - Annual Operating Plan (AOP) open house at Sturgeon Lake, Grande Prairie and Grande Cache.
  - Ecosystem Management Emulating Natural Disturbance (EMEND) field tour for FMAC members and Grande Prairie Regional College students occurred in April 2005; and
  - June 2005 - Provincial Association of Alberta Public Advisory Committees (AAPAC) general meeting occurred in June 2005.
- **Forecasting assumptions and analytical methods**
  Not applicable.
- **Forest management activities**
  Not applicable.
- **Strategy and implementation schedule**
  Canfor will continue to offer at least four different types of opportunities for public participation.
- **Monitoring procedure (monitoring results against forecasts)**
  The number of public involvement opportunities that Canfor provides is reported in the *Annual Performance Monitoring Report.*

- **Linkages to DFMP and Annual Operating Plan**
  The *Public Involvement Program* is a commitment in the DFMP therefore operational plans must make provisions for public input.

(6.3) 1a.3 Indicator
Percentage of public inquiries that receive an initial contact

Pubic enquiries are generally received via telephone, email, letters and occasionally via fax or in person. Whatever the method of the inquiry, it is important that Canfor deals with it adequately and in a timely manner.

(6.3) 1a.3.1 Target
To make initial contact to 100% of public inquiries within one month of receipt

In some cases, a public inquiry may require significant time to complete research, investigations and planning of actions to adequately deal with the inquiry. To ensure the public member knows the inquiry is being addressed, Canfor will, within one month, undertake initial contact by acknowledging an inquiry has been received and informing the inquirer that it is in the process of either addressing the inquiry or has developed plans to deal with the inquiry.

- **Acceptable variance**
  The acceptable variance is for Canfor, on an annual basis, to make initial contact with a minimum of 90% of the public inquiries within one month to account for inquiries with extraordinary circumstances. Extraordinary circumstances are those that may delay response and are beyond Canfor's control i.e. a telephone message or emailed public inquiry sent to a Canfor employee who is on an extended leave or holidays or if Canfor attempts to contact a public member multiple times but no response is received.

- **Current status**
  Canfor records all public inquiries in its Issue Tracking System (ITS) but until recently did not have a specified timeframe in which to make initial contact. Previously, contact was dependent on the subject matter and the timing of initial contact was made on a case-by-case basis.

  In 2004, 22 inquiries were received, with 19 (86%) of them receiving initial contact within I month (Table 46).

Table 46. Response to Inquiries

SFMP Table Master.xls
Table 16

Public Inquiry (ITS #)	Date of Inquiry	Method of Inquiry	Date of Initial Contact	Initial Contact Within 1 Month
ITS-GP2004-OP0005	2004/01/22	Telephone	2004/01/22	Yes
ITS-GP2004-OP0022	2004/02/26	Telephone	2004/02/26	Yes
ITS-GP2004-OP0035	2004/03/07	In Person	2004/03/07	Yes
ITS-GP2004-OP0037	2004/03/12	Fax	2004/03/15	Yes
ITS-GP2004-OP0040	2004/03/22	Telephone	2004/03/31	Yes
ITS-GP2004-OP0041	2004/02/24	Open House	2004/02/24	Yes
ITS-HC2004-OP0015	2004/12/03	Various	2004/12/03	Yes
ITS-GP2004-OP0043	2004/04/29	In Person	2004/04/29	Yes
ITS-GP2004-OP0044	2004/05/12	Telephone	2004/05/15	Yes
ITS-GP2004-OP0046	2004/05/25	Telephone	2004/05/25	Yes
ITS-GP2004-OP0006	2004/01/22	Telephone	2004/01/22	Yes
ITS-GP2004-OP0118	2004/06/04	Telephone	2004/06/04	Yes
ITS-GP2004-OP0128	2004/06/15	Telephone	2004/06/16	Yes
ITS-HC2004-OP0007	2004/04/27	Telephone	2004/06/30	Yes
ITS-GP2004-OP0128	2004/07/05	Letter	2004/08/20	No
ITS-HC2004-OP0005	2004/03/30	In Person	2004/03/30	Yes
ITS-HC2004-OP0004	2004/03/10	Telephone	2004/03/10	Yes
ITS-GP2004-OP0148	2004/07/23	Telephone	2004/07/23	Yes
ITS-GP2004-OP0173	2004/08/12	Letter	2004/09/22	No
ITS-GP2004-OP0174	2004/07/21	Letter	2004/09/28	No
ITS-GP2004-OP0024	2004/02/13	Telephone	2004/02/13	Yes
ITS-GP2004-OP0045	2004/05/17	Telephone	2004/05/17	Yes

Source: Canfor compiled data - J Ashley (6.3) 1.xls

- **Forecasting assumptions and analytical methods**
  Not applicable.

- **Forest management activities**
  As per the Canfor's Forest Management System, all public inquiries are recorded in the Issue Tracking System (ITS). The system is utilized to record mandatory information including the date of inquiry, issue source, contact person and the Canfor employee responsible for dealing with the issue. Action plans and the progress in completing action plans are also tracked.

- **Strategy and implementation schedule**
  The above strategy is current practice. Canfor staff were notified on June 14th, 2005 regarding the requirement to make initial contact within one month.

- **Monitoring procedure (monitoring results against forecasts)**
  The ITS database will be reviewed annually and the resultant data reported in the *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  The target assists in fulfillment of commitments made in the *Public Involvement Program* (Canfor, 2001) "to record information and concerns provided by the public, and provide feedback to the public on resolution of these concerns". The *Public Involvement Program* directly links to the DFMP.

(6.4) Critical Element

Information for Decision-Making

Provide relevant information to interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems.

All society must work in partnership and employ the best and most current information available to make the right choices, and to maximize the societal benefits of forests without compromising their ability to provide those benefits (CCFM, 1997).

(6.4) 1 Value

Current scientific, local and traditional knowledge

People can make better decisions if they know more about ecological processes, and professional foresters and policy makers can make better management decisions if they know more about the public's concerns. Therefore, mutual learning – a rational and reasonable exchange of information in the spirit of partnership – is another indicator of sustainable forestry (CCFM, 1997).

(6.4) 1a Objective

Forest management decisions will be based on scientific, local and traditional knowledge

Forest management occurs with FMAC input, therefore it is important that Canfor provide opportunities to enhance the members' knowledge in this regard. As well, it is important to provide opportunities to enhance stakeholder, Aboriginal, and the general publics' knowledge of forest management.

(6.4) 1a.1 Indicator

Number of opportunities to enhance scientific, local and traditional knowledge

Canfor provides information about forest management and the status of forestry planning and operations to FMAC, stakeholders, Aboriginal groups and the general public in a variety of ways as noted in *Current status*.

(6.4) 1a.1.1 Target

To provide a minimum of 8 different opportunities to enhance knowledge annually

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  From 2004 to the present, Canfor provided the following opportunities (Figure 62) to enhance knowledge:

- The 2004 *Annual Performance Monitoring Report* was made available to the FMAC and general public. The report indicates progress toward achievement of sustainable forest management targets;
- The 2004 *Annual Public Report* was made available to the FMAC and the general public. The report provides a general overview of Canfor's activities within Alberta (volume harvested, wood sources, harvesting and planning activities, log haul, reforestation and certification;
- The approved 2004 Annual Operating Plan/ 5 Year General Development Plan was made available for the general public to review;
- The approved Detailed Forest Management Plan (DFMP) was made available for the public to review;
- Financial and technical support for the Grande Prairie and Area Forest Educator who makes presentations to classrooms (approximately 140 classes/ year), as well as conducts forest hikes for students to experience hands on learning;
- Support for the "Envirothon" for high school students who learn about forestry, soils, water, oil and gas and wildlife;
- Sponsorship of National Forestry Week "Walk Thru the Forest" where students learn about various forestry topics;
- Sponsorship of National Forestry Week "Arbour Day" where students learn about the importance of trees;
- Open Houses:
  - Annual Operating Plan (AOP) open houses were held in Sturgeon Lake, Grande Prairie and Grande Cache in November 2004; and
  - Vegetation Management Plan open house was held in Valleyview in February 2004;
- Ecosystem Management Emulating Natural Disturbance (EMEND) field tour for FMAC members and Grande Prairie Regional College (GPRC) students was conducted in April 2005; and
- Sponsorship and participation in the Provincial Association of Alberta Public Advisory Committees (AAPAC) in June 2005.

Figure 62. Opportunities for Enhancing Public Knowledge

The 'Walk Thru the Forest' is an event where Canfor staff teach grade 4 - 6 students about various forestry topics.

Source:
\\Grande\WOODS\Admin\Photos\Public & Forest Education\Walk Tru the Forest 2005\P5040028.JPG

The EMEND tour allowed the FMAC and GPRC forestry students to view the research sites first hand.

Source
\\Grande\WOODS\Admin\Photos\Public & Forest Education\EMEND_apr2005\P4010011.JPG

The Provincial AAPAC Conference provides the forest advisory committees throughout the province to share ideas and bring in guest lecturers to discuss provincial issues.

Source:
\\Grande\WOODS\Admin\Photos\Public & Forest Education\Prov'l AAFPAC\P6040007.JPG

- **Forecasting assumptions and analytical methods**
  Not applicable
- **Forest management activities**
  Not Applicable

- **Strategy and implementation schedule**
  The strategy is to continue to provide opportunities to enhance knowledge.
- **Monitoring procedure (monitoring results against forecasts)**
  Each year, the number of opportunities provided by Canfor to enhance public knowledge is compiled and the resultant data reported in the *Annual Performance Monitoring Report*.
- **Linkages to DFMP and Annual Operating Plan**
  The target assists to fulfill commitments in the DFMP to provide an annual report to the public, to provide public access to copies of the DFMP, AOP/ 5 Year GDP, to participate in a range of educational opportunities and to use experts to increase public knowledge of forestry and forest management.

(6.4) 1a.2 Indicator
Number of active research projects

Canfor strives to improve its understanding of the ecological processes that have produced natural forests and incorporate this knowledge into its daily operations. Social, economic and environmental values are addressed within a framework of ecological processes and science to deliver the desired future forest condition. The Company participates in relevant research to gain knowledge to continually improve forest management (*Canfor's Forestry Principles*, 1999).

Canfor also recognizes the need for ongoing research in forest engineering, forest products development and forest products manufacturing and considers its participation and support of these fields of study to be essential.

(6.4) 1a.2.1 Target
To be involved in a minimum of 10 active research projects annually

Research plays an important role in forest management by providing answers to questions with respect to ecological processes. Research is also an influential component of successful forestry operations (i.e. timber harvesting, road construction and maintenance, silviculture, etc.) and forest products manufacturing.

Canfor is involved in research in a variety of ways. Each year, Canfor allocates significant resources to support forest research, forestry education, and projects that enhance the general publics' forestry knowledge. The Company also maintains representation on several associations, committees or groups that initiate or support research.

- **Acceptable variance**
  The acceptable variance is zero.
- **Current status**
  Each year, Canfor participates in an average of 20 research projects, a sample of which is provided below.

  Ecological Management Emulating Natural Disturbance (EMEND)
  In the broadest sense, the EMEND project integrates the efforts of biologists, economists, sociologists, and modelers to determine how harvest and regeneration of upland, mixedwood forest can best approximate natural

disturbance regimes in north western Alberta. The project is designed to test predictions about benefits of alternative approaches to forest management. At the EMEND site researchers study the ecological and production implications of harvest patterns that leave various amounts of residual structure after harvest. EMEND is an award winning project of world-class status that is recognized as the largest multi-jurisdictional project in the world. More information can be found on the EMEND site at http://www.biology.ualberta.ca/old_site/emend//index.htm

Caribou Research

Canfor collaborated with three other forest companies to assess the impact of their operations on woodland caribou habitat. In 2004, an initial review of caribou habitat quality, and an assessment of the current influence of habitat on caribou population growth within the Little Smoky/ A La Peche caribou range was initiated using forest cover, harvest areas, and base features (primarily road, pipeline, well site and seismic activity). The data from the project assists land managers to improve management of caribou habitat.

Canfor also participates in the Caribou Range Restoration Project (CCRP), which is a multidisciplinary initiative to mitigate some of the impacts caused by linear corridors by undertaking activities that assist in restoration of specific linear corridors, or portions of corridors, within its Forest Management Agreement (FMA) area. More information can be found on the CRRP site http://www.deer.rr.ualberta.ca/caribou/crrp.htm.

Canfor provides funds to the University of Alberta and West Central Caribou Standing Committee (WCACSC) to conduct caribou and wolf research. The West-central Alberta Caribou Standing Committee (WCACSC) is an umbrella organization bringing together all stakeholders involved (industry and government) with the purpose of facilitating a self-regulatory process that integrates caribou conservation and resource development in west central Alberta. More information can be found on the WCACSC site - http://www.rr2.ualberta.ca/Research/Caribou/publications.htm.

Grizzly Bear Research

Canfor has participated in the Foothills Model Forest (FMF) Grizzly Bear Program since 1999. The program was created to provide knowledge and planning tools to land and resource managers to ensure the long-term conservation of grizzly bears in Alberta. Key to its efforts is sound scientific field research, practical results, and a large-scale or "landscape level" approach toward grizzly bear conservation.

The primary focus of the program is grizzly bear management. As a result, the program is assessing bear populations and evaluating bear responses to human activities and habitat conditions. Significant research findings for both land and wildlife management and the development of important land management tools were developed during the programs first five years of research. More information can be found on the FMF site http://www.fmf.ca/pa_GB.html.

Fish Inventories

Effective resource management depends on the availability of timely and accurate information. Canfor conducted fish inventories of all the major watersheds in its FMA area in cooperation with the Alberta Conservation

Association (ACA). The objective is to enhance the fisheries knowledge base to minimize the ecological footprint of past and future developments on fish populations and aquatic habitats. An extensive database of all fish species occurring within the FMA area has been compiled.

Western Boreal Growth & Yield (WESBOGY) Association
The purpose of the WESBOGY Association is to conduct research projects that contribute to the development and dissemination of growth and yield modeling technology for both natural and regenerated stands growing in the boreal mixedwood region, primarily aspen and spruce. Canfor has been a participant in the Association since 1999. As part of its commitment, the Company has established test plots within the FMA area that are measured annually. The objective is to evaluate the effect of spruce and aspen density levels on the development of plantations from establishment to final harvest. More information can be found on the WESBOGY site http://www.wesbogy.rr.ualberta.ca/mission-goals.asp.

- **Forecasting assumptions and analytical methods**
  Not applicable for the projects listed.

- **Forest management activities**
  Wherever possible, Canfor strives to use information obtained from research projects and apply it to strategic and operational planning. The specific use depends on the project, but it may take the form of resource inventory data, which provide the range for specific fish species, resource selection models to determine grizzly bear habitat, assessments to quantify caribou habitat and data for forecasting regenerated yield groups.

- **Strategy and implementation schedule**
  Canfor will participate in research projects that provide:
  - Data and information to enhance strategic and operational planning;
  - Information to achieve DFMP and SFMP commitments, or significant public commitments;
  - Innovative operational forestry advancements; and
  - New forest products or innovative forest product manufacturing advancements.

- **Monitoring procedure (monitoring results against forecasts)**
  Canfor maintains a list of all active forestry research projects. The list is updated twice per year and is included in reports submitted to the Project Funding Committee. Involvement by Canfor in research initiatives is reported in the *Annual Performance Monitoring Report*.

- **Linkages to DFMP and Annual Operating Plan**
  The target supports achievement of commitments made within the DFMP to conduct on-going research to increase understanding of ecological processes.

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6. Glossary

Aboriginal
Aboriginal peoples of Canada' [which] includes Indian, Inuit, and Métis peoples of Canada (Constitution Act, 1982, Subsection 35 (2).

AAC
The acronym for "annual allowable cut". It is the volume of wood (m^3) that can be harvested in one year from any area of forest under a sustained yield management regime. It is a calculation based on the potential fertility of the site, the state and potential of the stands currently growing in the forest, and assumptions about how existing or anticipated future stands will continue to grow, the risks of loss, and constraints on operability.

Adaptive management
A learning approach to management that recognizes substantial uncertainties in managing forests and incorporates into decisions experience gained from the results of previous actions.

Alberta Vegetation Inventory (AVI)
A system for describing the quantity and quality of vegetation present. It involves the stratification and mapping of the vegetation to create digital data according to the AVI Standards Manual and associated volume tables.

Alternative Regeneration Standards
Involves development of a yield group specific standard that is credible, statistically quantified and provides for relationships between early stand characteristics and final yield by yield group in a Detailed Forest Management Plan. Currently, the reforestation standard is the same across all yield groups and across Alberta.

ANHIC
The acronym for "Alberta Natural Heritage Information Centre".

Anthropogenic
Made or induced by humans.

AOP
This is the acronym for "annual operating plan". A plan prepared and submitted annually by timber operators describing how, where and when to develop roads and harvest timber. It describes 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 sites.

ASRD
The acronym for "Alberta Sustainable Resource Development"

At Risk
Any species known to be 'At Risk' after formal detailed status assessment and designation as 'Endangered' or 'Threatened'.

AWMSI
The acronym for "area-weighted mean shape index". Patch shape is measured by the area-weighted mean shape index (AWMSI). AWMSI measures the perimeter-to-area ratio for a patch type or landscape using comparisons of patches to a standard shape. It is a means of quantifying the relative change in the level of fragmentation, connectivity and shape complexity.

Carbon dioxide (CO_2)
Carbon dioxide is a molecule formed from one atom of carbon and two of oxygen. It is a greenhouse gas of major concern in the study of global warming.

Coarse woody debris (CWD)
Sound or rotting logs, stumps, or large branches that have fallen or been cut and left in the woods. It also includes trees and branches that are dead but remain standing or leaning.

Compartment
A Canfor designation for a township i.e. Compartment G9 is Twp 68 Rng 3 W6M.

Compliance
The conduct or results of activities in accordance with legal requirements (CSAI, 2002).

Conformance
Meeting non-legal requirements such as policies, work instructions, or standards (including CSA-Z809-02).

Conserve
To keep in a safe or sound state (Webster's Dictionary)

Criterion
A distinguishable characteristic of sustainable forest management; a value that must be considered in setting objectives and in assessing performance.

DFA
This is the acronym for "Defined Forest Area", a specified area of forest, land, and water delineated for the purpose of registration of a Sustainable Forest Management system. The DFA may or may not consist of one or more contiguous blocks or parcels (CSAI, 2002).

Deciduous Timber Allocation (DTA)
A quota of deciduous timber (see Quota).

ECA
The acronym for "equivalent clearcut area".

Ecosection
Ecosections are defined by recurring patterns of landform, topography, soils, soil drainage, parent materials, slopes, stream order, valley and channel morphology, and stream gradient.

Ecosection Group
For summarizing habitat at a coarser scale, stand attributes are reported by ecosection groups, which exhibit similar dominant parent materials, dominant tree canopy species, and vegetation types.

Ecosite
An ecological unit where the vegetative cover develops under similar environmental influences (climate, moisture, regime, and nutrient regime). It is based on the combined interaction of biophysical factors.

Edge effect
Edge metrics are not spatially explicit and yet still represent a form of landscape configuration. Researchers have shown that edges are important to many ecological phenomena. Edges between forests of dramatically different structure or composition often have different microclimatic environments than interior habitats. These microclimatic

differences, such as changes in wind and light intensity alter disturbance rates and vegetation composition and structure, and thus alter habitats and the dynamics of species that are dependent on these habitats. Some species prefer edge habitats; others are indifferent while still others are adversely affected by edges.

Endangered
A species facing imminent extirpation or extinction.

Environmental Field Report (EFR)
A document (ASRD Form ERF01 01/10/2004) that is submitted to ASRD by an applicant when applying for a disposition, which contains information used to authorize use of Public Land. The information is required in accordance with the Public Lands Act and is protected by the provisions of the Freedom of Information and Protection of Privacy Act.

EMS
The acronym for "environmental management system". Canfor's system is registered under ISO 14001 and comprises systems to manage the environment.

Endemic
Applied to populations of plants, animals or viruses that are at their normal, balanced level, in contrast to epidemic.

Enhanced forest management
Activities undertaken to increase the productivity of stands above that of unmanaged stands or stands managed to meet basic forest management standards. Usually involves silviculture activities that increase the growth of stands, such as juvenile or commercial thinning, introducing and managing exotic species, tree improvement, and fertilization

Epidemic
Applied to populations of plants, animals or viruses that build up, often rapidly, to highly abnormal and generally injurious levels.

Final Harvest Plan (FHP)
A map and associated report describing the laid out harvest plan as required by the Operating Ground Rules (ASRD, 2004a)

FMA
The acronym for "forest management agreement", a legal agreement signed between the Company and the Province of Alberta. It defines the rights, responsibilities, and constraints that apply to a specified area of forest for the purpose of removing timber for commercial purposes. The forested area to which the agreement applies is called the "FMA area." Canfor's FMA area is identified as FMU G15 (see below).

Forest Management Unit (FMU)
The acronym for "forest management unit", an area of forest managed as a unit for fibre production.

Genotypes
The genetic make up of an organism, this being the sum total of all the genetic information in the organism.

H60
The elevation above which 60% of the watershed lies (the watershed area above the H60 is considered as the source area for the major snowmelt peak flows).

Habitat suitability index (HSI)
A measure, estimated by modelling, of the value of habitat for wildlife species by relating a species' needs for food and cover to structural and spatial attributes of vegetation types within a defined area. (Beck et al, 1996)

Historical resource
Any work of nature or of man that is primarily of value for its palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or aesthetic interest including, but not limited to, a palaeontological, archaeological, prehistoric, historic or natural site, structure or object.

Historic site
Any site which includes or is comprised of an historical resource of an immovable nature or which cannot be disassociated from its context without destroying some or all of its value as an historical resource and includes a prehistoric, historic or natural site or structure.

Hydrological recovery
Hydrological recovery takes into account the initial percentage of crown removal and the recovery through re-growth of vegetation since the initial disturbance.

Indicator
A variable that measures or describes the state or condition of a value (CSAI, 2002)

LOC
The acronym for "License of Occupation".

Local communities
Local communities have been defined by the FMAC as those adjacent to the FMA area i.e., Valleyview, DeBolt, Fox Creek, Spirit River, Fairview, Grande Cache, and Grande Prairie. Municipal District (MD) of Greenview No. 16, MD of Spirit River No. 20 and County of Grande Prairie No. 1 are also deemed to be local communities.

Machine free zone (MFZ)
The area protected from machinery that would cause soil damage.

MNND
The acronym for "mean nearest neighbour distance". Connectivity within a landscape is quantified using the mean nearest neighbour distance. MNND describes the spatial context of a habitat patch in relation to its neighbours by increasing with increasing distance between patches.

MPS
The acronym for "mean patch size". MPS is a landscape metric that, together with patch size distribution, provides an insight into the level of fragmentation of forest lands.

Net down (procedure)
The process of identifying the net landbase, which is the number of hectares of forest land that actually contribute to the allowable annual cut. Areas and/ or volumes are sequentially deleted or reduced from the gross landbase for a number of considerations, including private ownership, non-forest or non-productive, environmentally sensitive, unmerchantable, and inaccessible. (PBC, MF 2000)

Objective
A broad statement describing a desired future state or condition for a value. (CSA, 2002)

Oxbow
A U-shaped bend in a river

Oxbow lake
A large water collection area formed when an oxbow is cut off from the main river channel – often vegetated

Patch
A specific area wherein relatively homogeneous environmental conditions occur. Boundaries are defined by measurable changes in one or several environmental variables.

PHA
The acronym for "pre-harvest assessment", a survey carried out on a stand prior to logging to collect specific information on the silviculture conditions such as planting survival, free-growing status, stocking, etc. (PBC, MF 2000)

PSP
The acronym for "permanent sample plots".

Quota
The right to harvest a share (as a percentage) of the coniferous AAC within a forest management unit (FMU) or the right to harvest deciduous timber within a defined area of a FMU.

Salvage wood
Timber available for harvest in connection with or incidental to development, geological or geophysical exploration, or acts of nature (i.e. fire, blowdown, see also windthrow, windfall).

Seral stage
The series of plant community conditions that develop during ecological succession from bare ground (or major disturbances) to the potential plant community capable of existing on a site where stand replacement begins and the secondary successional process starts again.

Significant erosion event(s)
Includes those events that directly impact water quality or are greater than 2,500 m^2 in area, thus affecting productivity of the land.

Silviculture prescriptions
A site-specific operational plan that prescribes the nature and extent of any timber harvesting and silviculture activities that are designed to achieve required forest management objectives, including reforestation of a free-growing stand to specified standards.

Site index
A measure of forest site productivity expressed as the average height of the tallest trees in the stand at a defined index age. Common index ages are 40, 50, 70, 75, and 100 years. This is usually expressed as the predicted height for a specific tree species at a given breast height age.

Skid clearance date
The date used to record the time at which harvesting was completed and approved by ASRD.

Sustainable Forest Management System (SFMS)
The structure, responsibilities, practices, procedures, processes, and timeframes set by a registration applicant for implementing, maintaining, and improving sustainable forest management. (CSAI, 1996)

Sustained yield of timber
A forest management regime that involves more or less continuous harvesting, balanced by growth, over managed forest units

Target
A specific statement describing a desired future state or condition of an indicator. Targets should be clearly defined, time limited and quantified if possible (CSAI, 2002)

Timber year
May 1 to April 30.

Threatened
Any species likely to become endangered if limiting factors are not reversed.

TSP
The acronym for “temporary sample plot”.

Utilization standards
Standards establishing the minimum merchantable stand size (volume per hectare) and tree size (stump and top diameters).

Value
A DFA characteristic, component or quality considered by an interested party to be important in relation to a CSA SFM Element or other locally identified element. (CSAI, 2002)

WCACSC
The acronym for “West-Central Alberta Caribou Standing Committee”.

WQCR
The acronym for “water quality concern rating” which is a ranking system developed by P Beaudry & Associates Ltd. based on the concept that the impact of stream crossings on water quality can be reduced through effective erosion and sediment control practices, and that this can be evaluated and scored using a field-based assessment. There are 5 concern classes - none, low, moderate, high and very high.

Appendices

Appendix 1. Canfor's Environment Policy

Environment Policy

We are committed to responsible stewardship of the environment throughout our operations.

We will:

- Comply with or exceed legal requirements.
- Comply with other environmental requirements to which the company is committed.
- Achieve and maintain sustainable forest management.
- Set and review objectives and targets to prevent pollution and to continually improve our sustainable forest management and environmental performance.
- Provide opportunities for interested parties to have input into our sustainable forest management planning activities.
- Promote environmental awareness throughout our operations.
- Conduct regular audits of our forest and environmental management systems.
- Communicate our sustainable forest management and environmental performance to our Board of Directors, shareholders, employees, customers and other interested parties.

Jim Shepherd
President and Chief Executive Officer

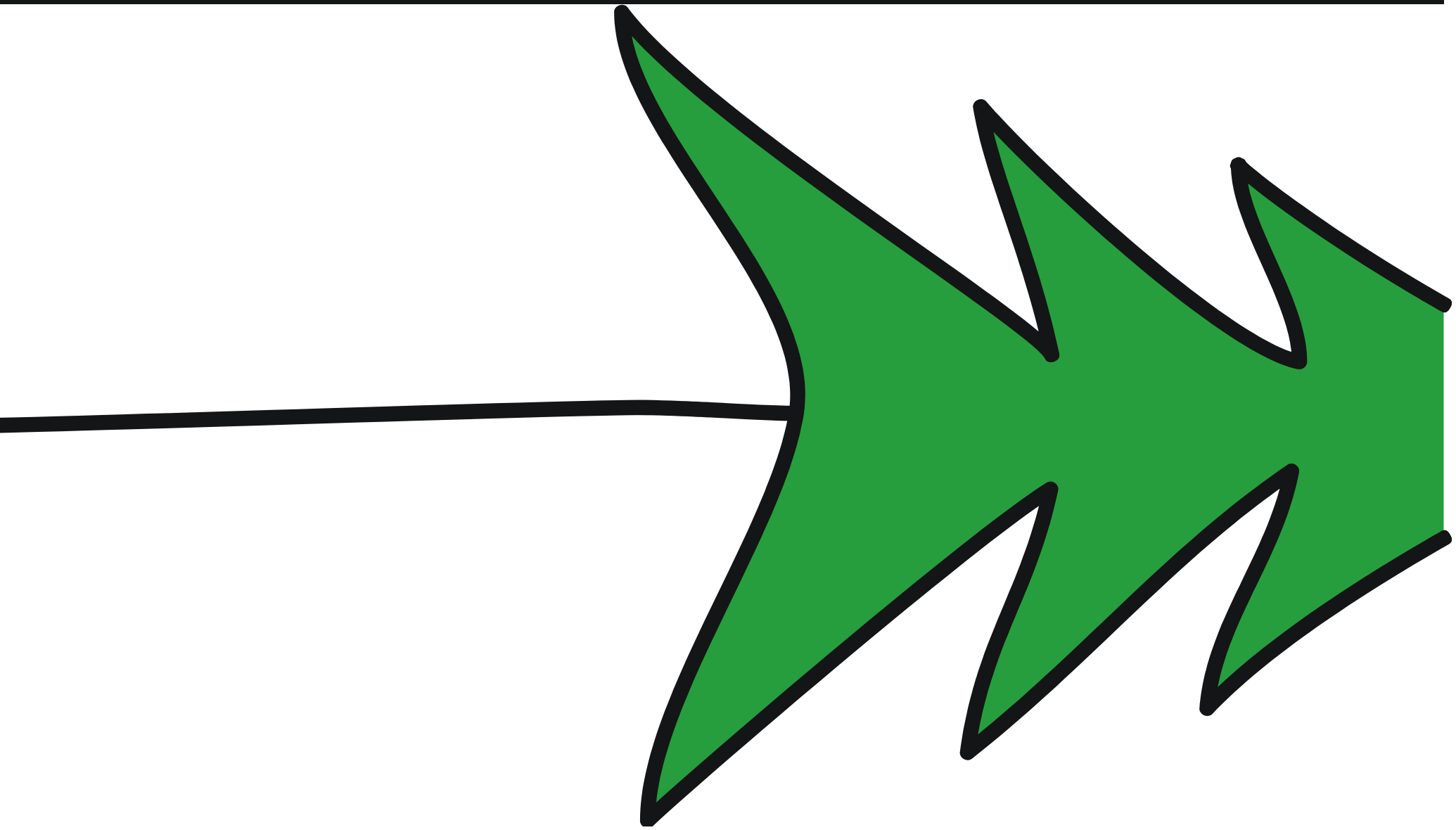
P.J.G. Bentley
Chairman

February 2005

CANFOR

Appendix 2. Canfor's Forestry Principles

CANFOR'S FORESTRY PRINCIPLES



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Letter from the President

Canfor has a long history of good forest stewardship. From the early days on Vancouver Island and the planting of the first seedlings in Englewood, to the challenges of practicing forestry in the boreal and sub-boreal forests of northern Alberta and British Columbia (BC), Canfor has been a leader in forest management.

But circumstances continue to change. What has been done in the past may not be appropriate for the future.

The public is concerned about the forests and they're asking many questions. They want to know if there will be forests for their children and grandchildren. They want to know if streams and lakes are being protected, and if there will always be places for wildlife to live in the forests. Many people whose livelihood depends on the forests want to know if there will be rewarding job opportunities in the future. Our customers have also heard the concerns of their customers, and want to know how Canfor plans to address them.

In the fall of 1998, I asked that a special task force be formed to develop principles for Canfor that would guide the management of our forests into the next century. The task force was mandated to ignore the hype and rhetoric so prevalent in the media, and to develop forestry principles based on ecosystem management. They were asked to use the best science available and to balance environmental, social and economic considerations in their recommended approach.

For the past eight months, the task force has toured Canfor forestry operations and those of other companies that are recognized leaders. They have had many discussions with experts from the scientific, academic and environmental communities and they have produced a number of drafts outlining possible directions the company could take. The final product of their work is entitled *Canfor's Forestry Principles*, which I am now pleased to present to you.

These principles will provide the foundation for forest management strategies, policies and operating procedures in all our operations.

The real challenge will be to carry out commercial forestry within the context of good science and broadly based ecosystem management. It is an expensive proposition, and one that will only succeed if unnecessary costs and duplication by all parties involved in forest management are eliminated.

This will require new arrangements with our landlords. Ultimately, we must move from administrative, regulator-driven forestry to a results-based approach. Our foresters must be liberated to apply their professional skills, knowledge and creativity to achieve high standards of forest and environmental management in the most technologically advanced and efficient way.

Inevitably, at Canfor we will have to become more directly accountable for our forest management practices and outcomes. Accordingly, we shall pursue certification and validation by a credible outside body of our forest practices and approach to forest management.

Why are we taking this dramatic step? Because we believe a strong commitment to sustainable forestry and ecosystem management is important to our customers and the public, and therefore to our ability to successfully

compete in the market. We also believe that an external validation process is an important discipline for us, as well as a valuable way for the public to gain confidence in our performance.

The principles are just the start. The true test will be their implementation and how we are judged in the years to come. It will not happen overnight and it can not be done by just a few people in Canfor. These principles have to become part of our day to day thinking and be embraced by all. Staff at all levels and in all areas will have a role to play and must be dedicated to these principles.

A challenge? Yes, very much so. A worthwhile endeavour? Absolutely, not only worthwhile, but also critical to Canfor's success in a very competitive world.
I welcome this challenge and ask you to join me in making it work.

Jim Shepherd
President and Chief Executive Officer

April 2004

Introduction

Canfor is a Canadian integrated forest products company with manufacturing facilities in British Columbia, Alberta and the USA. Our forestry operations in British Columbia and Alberta are located almost exclusively on public land. Therefore, public acceptance of our forestry practices is imperative for us to remain in business. We willingly accept the accountability that accompanies this public ownership and strive to manage our business in the best interests of both ourselves and the public.

We are privileged to manage some of the most diverse forest landscapes on earth. This diversity of ecosystems and tree species allows us to produce forest products, some with unique properties, which are in high demand in the global market-place. Capturing value from this renewable resource is essential for the economic viability of our company and is critical to the economy of many communities. However, the forests where we operate are valued by society for more than just the products they produce, and we therefore recognize the need to manage them to provide a number of forest values. Forests in a natural state are becoming increasingly rare throughout the world. We support the creation of conservation areas which are representative of natural forests.

For several decades, the forests of British Columbia and Alberta have been managed under a policy of sustained yield of timber. Forest tenures were designed to yield a continuous harvest of timber in perpetuity through the practice of sustained yield forestry. This approach has enabled the development of a globally significant integrated forest products industry.

Society's attitude towards the value of forests and the approach to forest management has evolved. In response, there has been a shift in policy from managing for a sustained yield of timber to managing for a sustained yield of timber with an increasing number of constraints. These constraints were introduced to conserve or protect a range of non-timber values through a prescriptive set of regulations designed to limit the impact of timber management. Many constraints have been applied in response to specific environmental concerns and are justified. However, some constraints have been motivated by economic or political reasons and have no scientific basis. Some of these constraints will clearly not achieve the intended ecological objectives and our forests may not be able to provide the range of values that are expected. We need results-based management rather than constraints. We need a new ecologically-based forest management paradigm.

While forest management policies have evolved, there has been no concurrent or significant change in the tenure or stumpage systems in British Columbia and Alberta. Forest companies holding tenures today have very little economic incentive or administrative opportunity to thoroughly manage for a wide range of public forest values. In British Columbia, the evolution of public policy has resulted in unacceptably high operating costs for the forest industry and forest practices that often do not meet stakeholder expectations. Our foresters, customers and shareholders justifiably question whether this approach is desirable or sustainable, either ecologically or economically. We need changes to both the tenure system and the stumpage system to provide the incentive for long-term forest management that is both environmentally sound and economically viable.

At Canfor, we will improve our understanding of the ecological processes that have produced our natural forests and will incorporate this knowledge into our daily operations. Social, economic and environmental values will be addressed within a framework of ecological processes and science to deliver desirable future forest conditions. We

will include measurable ecological targets to help gauge our performance, and submit ourselves to independent audits to verify our progress.

Canfor wants and needs the trust of the public, both at home and abroad. We know that society expects professional foresters and forest companies to take greater care of the forests, and the public is asking us to show leadership in this regard. We have been leaders in many areas. We believe our new approach will help us maintain and enhance this trust and provide an expanded leadership role within the industry. It will enable Canfor to start the next century with a clear vision of a truly sustainable future. It is in our interest, as well as those of local communities, our employees and shareholders, to do so.

Challenges and Opportunities

As the Forestry Principles Task Force developed its draft set of principles, many challenges and opportunities were identified. These include:

ECOLOGICAL

Challenges

- BC and Alberta have a wide range of forest ecosystems, from coastal temperate rainforest, through sub-boreal to true boreal. Canfor operates in many of these ecosystems and will need ecosystem-specific solutions to implement our vision.

- Identifying and maintaining 'ecological integrity' across Canfor's diverse landscapes will require that we understand the ecological processes and manage for them. Specific research and monitoring is needed to achieve this.

Opportunities

- We have the opportunity to increase our knowledge of the ecosystems in which we operate and to move from administrative forestry to ecologically-based forestry.

- An ecological approach will enable Canfor to address a greater range of values.

TECHNOLOGICAL

Challenges

Our forest management strategies have always tried to respect the different ecosystem conditions, but we have often been constrained by factors of technology and knowledge such as:

- The lack of inventory information about timber and other forest values.

- The inadequacy of modeling and forecasting tools to predict future forest conditions.

Opportunities

- We have the opportunity to work with research and academic institutions and to participate in research and development projects to improve existing modeling tools, to adapt them to fit our local conditions and to help develop new tools. Funding sources are available to enhance our own financial resources.

ADMINISTRATIVE/REGULATORY

Challenges

- The public process of land use planning and landscape unit planning is inadequate and incomplete.
- The tenure system (particularly volume-based) has limited our ability to plan and manage forest ecosystems for the long-term and at the broader landscape level.
- A number of current regulations limit innovative approaches to forest management because of governments' focus on management processes rather than on short and long-term results.

Opportunities

- Conditions within industry and government are at a point where major changes to the regulatory environment are necessary and desirable, i.e. tenure reform and the move towards results-based regulations.
- We have the opportunity to reduce the bureaucratic workload for both Canfor and government by taking on more of the workload and applying efficiencies.

TIMBER SUPPLY

Challenges

- Implementation of forest ecosystem management may result in reduced timber harvest levels in some areas.

Opportunities

- The desired tenure changes could provide a more secure and longer-term timber supply for the company.
- Some form of zoning will allow us to enhance our timber growing capability on some lands while accommodating non-timber resources more effectively on other land.
- Improving public trust through our actions will enhance our access to present and future timber supply.

COSTS

Challenges

- The majority of Canfor's tenured timber volume is in British Columbia, the province with some of the highest fibre costs in North America. The overall cost of managing and harvesting the forest resource must decline if Canfor is to be profitable and successful in achieving our goals.

Opportunities

- The required reductions in bureaucratic processes will save time, money and personnel resources, e.g. administration
of the Forest Practices Code in BC.

MARKETS

Challenges

- The current strategy and focus of some environmental organizations is to target forest products customers in high-profile international markets to influence forest policy.

Opportunities

- We have the opportunity to implement certification initiatives that will maintain our access to markets.

- We will be better able to respond to public concerns and questions with enhanced information on ecological processes and improved ability to forecast the ecological consequences of management.

PEOPLE/COMMUNITIES

Challenges

- Canfor's key stakeholders have different expectations and needs from the forest. For example, it will be difficult to meet the needs of Canfor's customers who want increased product volume while meeting the public's demand for more non-timber resources from the forest, such as wildlife and old growth.

Opportunities

- Foresters and others will have an opportunity to use their expertise in innovative ways, which will improve professional satisfaction, professional credibility and development. We will get our foresters back on the ground developing management solutions.

- We have the opportunity for improved relations with Aboriginal people.

- Canfor will build stronger relationships with communities and environmental organizations.

Forestry Goals

OUR GOALS

- Canfor will be a global leader in the profitable production of forest products from sustainably managed forests.
- Canfor is committed to the conservation of soil, water and biodiversity and to the maintenance of ecosystem productivity in the forest areas where we operate.
- Canfor will use forest ecosystem management that encompasses entire forest landscapes and that forecasts the future condition of forests for 100 years or more.

Rationale

Canfor is a Canadian integrated forest products company that sells into the global marketplace. We are acknowledged as a leader in many areas, including many of our forestry activities. We intend to identify where our approaches are weak and to strengthen them. We will build on our strengths and leadership and leverage them to become a truly sustainable forest products business. We believe this is necessary if we are to expect broad support for our activities, both now and in the future. Only if we are globally competitive and profitable will we accomplish our goals of environmental leadership and sustainability. This is necessary if we are to provide security of employment to our employees, support for local communities and adequate returns to our shareholders.

We recognize that we are stewards of public forest land and therefore accept that we have a public responsibility. We intend to use the resource wisely, without compromising its value for future generations.

Canfor operates within extremely large forest regions and landscapes. Our activities, and those of other forest users, can have impacts at all scales — from the stand to the landscape through to the forest level — over long periods of time. We believe that we must identify and forecast the benefits that the forest is expected to provide both spatially and temporally.

Future Forest Condition

An important component of forest ecosystem management is the need to forecast or predict future forest conditions. Forecasts should be made for one hundred years or more. By integrating our current understanding of ecosystems and natural disturbance patterns with human uses and values, an array of future forest conditions can be modeled and projected. The outcomes can be tested against an ecological baseline of what could occur naturally to ensure that our influence on the ecosystem through our management practices falls within the range of natural variability. This must be an ongoing process that will continually input new data and will adapt or adjust to changes in the ecosystem and to changing human values and uses. If successful, the result will be a future forest condition that will best meet the needs and wants of interested or involved communities while maintaining ecosystem structure, flows and benefits.

The pathway to forecasting future forest conditions includes:

- An understanding of the ecological processes and the natural historic and current disturbance patterns for each ecosystem.
- The establishment of an ecological baseline and a range of natural variation that could occur without human intervention.
- Recognition and incorporation of human values and uses.
- Identification of communities of interest, and providing these communities with information and an opportunity for involvement.
- Projection of possible outcomes or future forest conditions within the range of natural variability.
- Ongoing measurement and monitoring of key environmental, social and economic indicators.
- Ongoing research to validate assumptions and to test new theories.
- Ongoing checking to ensure the process is still on course, and if not, making changes to management strategies or practices as required.

Forestry Principles

ECOSYSTEM MANAGEMENT

We will use the best available science to develop an understanding of ecological responses to natural and human-caused disturbances. We will incorporate this knowledge into higher level and operational plans by applying ecosystem management principles to achieve desired future forest conditions.

Rationale

An understanding of ecological responses will allow us to plan and develop stand, landscape and forest-specific approaches while moving towards our goal of using ecosystem management to achieve desired future forest conditions. Ecosystem management will enable us to emulate natural disturbances to manage forests for a range of values. We need data and modeling tools to assist in forecasting a range of management options and their ecological consequences. The feedback from these predictive tools will facilitate the adjustment of our actions through the process of adaptive management. Our long-term intent is to practice sustainable forest management.

All elements in nature vary in size, shape and spatial relationship according to some frequency distribution. Successful ecosystem management will incorporate a wide range of variability. It is important not to implement similar forest practices everywhere.

This also means that ecosystem management may include a range of management systems at varying intensities, i.e. some type of zoning. Depending upon other values and uses, management strategies could range from harvesting with natural reforestation and no follow-up treatments, to more enhanced forest management by planting with genetically superior seedlings and with a number of stand tending activities. However, all of these systems or strategies of forest management would ensure the protection of the soil and water at the stand level and the maintenance of biodiversity and ecosystem productivity at the landscape level.

SCALE

We will define objectives over a variety of time intervals (temporal scales), and at spatial scales of stand, landscape and forest.

Rationale

Natural variability occurs as a dynamic process over a range of time intervals (temporal scales), from short-term to extended-rotation time periods, and at spatial scales of stand, landscape and forest. It is the variability within and between these scales which produces ecological diversity and allows for the management of a range of conditions, from early successional to old growth.

Variability may occur in the form of:

- opening (patch) size,
- shape, residual amount and composition of,
  - understory
  - overstory
- landscape pattern,
- age class distribution, and
- rate, type and severity of disturbance.

ADAPTIVE MANAGEMENT

We will use adaptive management to continually improve forest ecosystem management. This will require the development and implementation of collaborative research and monitoring programs.

Rationale

The scientific understanding of non-timber values of forest ecosystems is currently limited. However, there is a growing body of scientific information that describes natural variability and the relationships between natural and human-caused disturbances. In order to meet the long-term challenges of ecosystem management, research is necessary to establish a baseline for natural variability and also to measure and compare responses between forest management practices and natural disturbances.

Currently, there is no adequate monitoring program that can assess ecologically-based forest management at a variety of scales. Monitoring, including the measurement of variables and responses, is essential to the adaptive management process. Furthermore, research and monitoring are expensive and require a broad range of scientific expertise.

Canfor has strategically used adaptive management on an informal basis. We will formalize our adaptive management strategy and will actively seek collaborative research that is directed toward understanding natural ecological systems. We are currently engaged in practical research projects with the Forest Engineering Research Institute of Canada (FERIC), Forintek, the Northern Interior Vegetation Management Association (NIVMA) and members of the research community on the Ecosystem Management by Emulating Natural Disturbance (EMEND) project. Other potential research partnerships include the University of Northern British Columbia, the Network of Centres of Excellence (NCE) at the University of Alberta and the University of British Columbia, where some excellent forecast models are being developed.

OLD GROWTH

We will include old growth and old growth attributes as part of our management strategies and philosophy in the forests where we operate.

Rationale

Old growth stands or stands that contain old growth attributes provide biodiversity and habitat for a range of species. The natural variability of forests normally includes some old growth. The age and condition of old growth or the attributes that make up old growth vary from region to region or by forest type. However, they typically include some of the following characteristics:

- multilayered canopy with a variety of species,
- low to moderate canopy closure,
- several age classes,
- some large, dominant trees in an overstory,
- snags and green trees with broken tops,
- high incidence of decay,
- susceptibility to insect attack, and
- downed woody debris.

Forest management strategies that maximize timber yield often replace old growth stands with younger age classes and create normalized forests, i.e. an even distribution of age classes. Some stands are maintained as primary forests in buffers, riparian areas, on unstable slopes and in other permanent reserves including protected areas. However, this alone may not guarantee the maintenance of old growth attributes. Therefore, it is important to manage for old growth attributes at various levels; stand, landscape and forest. Strategies to manage for old growth attributes may include lengthening rotations and creating old growth from younger forests managed specifically for that purpose.

TIMBER RESOURCE

Canfor will ensure a continuous supply of affordable timber in order to carry out its business of harvesting, manufacturing and marketing forest products. Canfor will strive to maximize the net value of the fibre extracted for sustained economic benefits for employees, communities and shareholders.

Rationale

Canfor is a significant market pulp and kraft paper producer, and is one of the largest lumber producers in the world. Each year, the company requires a substantial, uninterrupted supply of affordable wood fibre for its core manufacturing facilities. While Canfor's core manufacturing facilities may change, substantial volumes of timber will continue to be required annually.

Canfor is committed to continually improving upon the value of the raw material it sources from the forest. We recognize that our wood fibre supply has special properties. We will constantly strive to develop suitable markets and to manufacture products that provide higher economic margins to the use of the fibre. In addition, we will work on utilizing the whole log and will reduce the amount of fibre and bark burned as waste from our manufacturing processes.

FOREST LAND BASE

We advocate the maintenance of the forest landbase as an asset for the future.

Rationale

The governments of British Columbia and Alberta have designated areas as provincial forests. These forests are intended to be managed as a renewable resource for the benefit of present and future generations. They may include protected and unallocated forest areas as well as industrially managed forests. If these areas are permanently converted to non-forest for uses such as housing developments, highways and hydro reservoirs, society's future options on these lands will be compromised. Sustainability of forest values as promoted by Canfor in its Ecosystem Management principle is inherently linked to security of the forest landbase, both public and private.

HEALTH AND SAFETY

We will operate in a manner that protects human health and safety.

Rationale

Canfor has a long-standing tradition of promoting health and safety for our employees. We will not compromise this tradition as we implement these forestry principles.

ABORIGINAL PEOPLE

We will pursue business partnerships and cooperative working arrangements with Aboriginal people to provide mutual social, cultural and economic benefits and to address mutual interests.

Rationale

Canfor wants to be a leader in establishing business relations with Aboriginal people. Our approach will be based on sound business practices and decisions while working together to address the issues and needs of both parties. Canfor will be open to the development of partnerships and working arrangements with Aboriginal people that are mutually beneficial and increase value to our shareholders.

Cooperative management of the forest will require a variety of approaches, depending upon the interests and capacity of Aboriginal people and Canfor in each location. It may mean consulting with Aboriginal people to gain information about their traditional knowledge of an area and to seek input into our planned operations. It may involve Canfor and Aboriginal people working together to develop forestry plans that address the needs of both parties. It might result in Aboriginal people providing contracted services to Canfor. At a higher level, cooperative management could result in business partnerships between Canfor and Aboriginal people to manage the forest under some tenure arrangement.

Canfor believes that the development of cooperative working relationships with Aboriginal people will help provide certainty of timber supply for our manufacturing facilities. This, in turn, will help provide the stable business climate needed to attract investment, which ultimately is needed to sustain our business and the communities where we operate. Again, all of these arrangements must be based on good, sound business practices and must be mutually beneficial to both Aboriginal people and Canfor.

COMMUNITIES

We will engage members of the public, communities and other stakeholders in the delivery of the Forestry Principles. The process will be open, transparent and accountable.

Rationale

Canfor operates on publicly owned forest land in British Columbia and Alberta under a number of tenure agreements. These tenure agreements, and the legislation and regulations which authorize them, reflect the public ownership of the forest resource and provide considerable opportunity for the public to be involved. Existing land use planning processes also require extensive public input. As well, public input is sought on individual forest management plans at each operation.

The forest sector is crucially important to the communities where we operate. In addition, the public has a right to make its wishes known regarding the social, economic and environmental benefits it wants to derive from public forests. Yet, in spite of these opportunities for public involvement it is not always as effective as it might be. While the reasons for this are many and complex, we believe that the process of public involvement is very important and we are committed to finding ways to improve it. This will require an open, transparent and accountable process. Canfor is committed to developing this, and we accept the challenge it represents.

ACCOUNTABILITY

We will be accountable to the public for managing forests to achieve present and future values. We will use credible, internationally recognized, third party verification of our forestry operations as one way of demonstrating our performance.

Rationale

Canfor operates primarily on public land and is therefore accountable to the public and public agencies (i.e. government) for forest stewardship. Some members of the public remain skeptical about the ability of companies and government to conduct environmental audits free of prejudice or bias. Similar concerns are being expressed by our customers and in turn by their customers. As the concerns of society about environmental issues heighten, earning and maintaining the trust of the public will become even more important. Similarly, maintaining the confidence of customers will be increasingly important.

Verification of our forestry practices by an independent auditor is an effective way to demonstrate the validity of our practices and to alleviate these concerns. A number of certification initiatives have emerged for conducting such audits, each of which has different attributes. We are committed to implementing one or more of these certification initiatives and will submit our operations to external audits.

Glossary of Terms

ADAPTIVE MANAGEMENT

A learning approach to management that incorporates the experience gained from the results of previous actions into decisions. It is a continuous process requiring constant monitoring and analysis of the results of past actions which are used to update current plans and strategies.

ADMINISTRATIVE FORESTRY

Institution of legal and political mechanism to regulate the rate and pattern of forest exploitation to ensure future supplies of forest products and other values. Usually based on legislation and regulation rather than on a knowledge of how forests grow, how they respond to management, and how ecosystems function.

AUDIT

A planned, independent and documented assessment to determine whether agreed upon requirements are being met.

BIODIVERSITY (BIOLOGICAL DIVERSITY)

Diversity of plants, animals and other living organisms in all their forms and levels of organization, including genes, species and ecosystems, and the evolutionary and functional processes that link them.

CERTIFICATION

A system of rules or procedures acknowledging conformance to a standard.

COMMUNITY

A group of people living in the same locality and under the same government; a group of people having similar or common interests.

CONSERVATION

The controlled use and systematic maintenance, enhancement, restoration and/or protection of natural resources, such as forests, soil, and water systems for present and future generations.

CONSERVE

To protect from permanent loss or irreparable harm; preserve; to use carefully or sparingly.

CONSTRAINT

A restriction which limits or regulates the ability or flexibility to perform a prescribed course of action or inaction.

COOPERATIVE

A willingness and ability to work with others.

DATA

Factual information, especially information organized for analysis or used to reason or make decisions; values derived from scientific experiments.

DISTURBANCE

A discrete force that causes significant change in structure and/or composition through natural events such as fire, flood, wind or earthquake; mortality caused by insect or disease outbreaks or by human-caused events such as the harvest of the forest. Disturbances can occur at very small scales or large scales.

ECOLOGICAL INTEGRITY

The quality of a natural, unmanaged or managed ecosystem in which the natural ecological processes are sustained with genetic, species and ecosystem diversity assured for the future.

ECOSYSTEM

A complex system of living organisms (plants, animals, fungi, and micro-organisms), together with their abiotic environment (soil, water, and nutrients) that function together to circulate nutrients and create a flow of energy which creates biomass, a trophic structure (feeding relationships) in the living community, and a change in ecosystem form and function over time.

ECOSYSTEM MANAGEMENT

A management system which recognizes and incorporates the natural variability of an ecosystem and attempts to emulate these responses with man-made disturbances while managing forests for a range of values.

ECOSYSTEM PRODUCTIVITY

The health, vitality and rates of biological production in forest ecosystems.

ENGAGE

Actively involve in a meaningful way.

FOREST STAND

An area of forest that is distinct from the surrounding forest by reason of some combination of topography, species composition, age or other feature; basic management unit in silviculture.

INTEGRATED FOREST PRODUCTS COMPANY

A company which has facilities or capabilities to harvest and process logs into a range of marketable products such as lumber and pulp, and including by-products such as chips.

LANDSCAPE

A large area encompassing a wide diversity of adjacent landforms, land cover, habitats and ecosystems.

MODELING TOOLS

An ideal representation of reality developed to describe, analyze or understand its behaviour or functions; a mathematical representation of this relationship or behavior used to predict various outcomes.

MONITORING

The process of checking, observing and measuring outcomes for key variables or specific ecological phenomena against a predefined quantitative objective or standard.

NET VALUE

A 'before tax' value or profit margin remaining after all operating and administrative expenses of a particular activity or operation have been deducted. Usually expressed as a percentage of sales revenue.

NORMALIZED FOREST

A conceptual idea of a forest condition in which all age classes are equally represented.

OVERSTOREY

The uppermost layer of foliage in a forest having more than one horizontal layer of foliage. This layer of the forest is instrumental in determining the amount of light able to reach the forest floor and the understory.

PARADIGM SHIFT

A significant change in thought and action.

PRIMARY FOREST/ NATURAL FOREST

A forest area that has developed free from influence of industrial human use. The primary/natural forest may include, but is not necessarily equivalent to, an old-growth forest.

RANGE OF NATURAL VARIABILITY

The spectrum of conditions possible in ecosystem composition, structure, and function that may occur naturally considering both temporal and spatial factors.

RIPARIAN AREAS

Those terrestrial areas where the vegetation and soil conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables, and soils that exhibit some wetness characteristics. Normally includes rivers, streams, lakes, ponds, springs, marshes, bogs and wet meadows.

ROTATION

Broadly, the time needed from regeneration of a crop of trees through to harvestable timber. Can be classified under financial, technical, biological or ecological parameters.

SCALE

Defined on the basis of elements such as size, shape and distribution of ecosystem components.

SILVICULTURE

The art, science and practice of controlling the establishment, composition, health, quality and growth of vegetation of forest stands.

SILVICULTURE PRESCRIPTION

A site-specific operational plan that prescribes the nature and extent of any timber harvesting and silviculture activities that are designed to achieve required forest management objectives, including reforestation of a free-growing stand to specified standards.

SPATIAL

Pertaining to the physical size, location, pattern and distribution.

STAKEHOLDER

Individual, organization or other entity concerned with or by management activities on a given forest area.

STUMPAGE

Price charged for the right to harvest timber from publicly owned forest land.

SUSTAINABILITY

The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.

SUSTAINED YIELD OF TIMBER

A forest management regime that involves more or less continuous harvesting, balanced by growth, over managed forest units.

SUSTAINABLE FOREST MANAGEMENT

Management to maintain and enhance the long-term health of forest ecosystems, while providing ecological, economic, social and cultural opportunities for the benefit of present and future generations.

TEMPORAL

Pertaining to time.

TENURE

The condition, specified in terms of time and a defined forest area, by which a forest manager or owner holds rights to use, harvest or manage one or more forest resources.

UNDERSTOREY

The trees and other woody species growing under the canopies of larger adjacent trees and other woody growth.

ZONING

A process of designating areas in which forest management can occur at varying intensities.

Appendix 3. Forest Management Advisory Committee Terms of Reference

Canadian Forest Products Ltd.
Grande Prairie

Forest Management Advisory Committee
For CSA Certification

TERMS OF REFERENCE
Approved: October 20, 2004

BACKGROUND

In July of 1999 Canfor formally announced its commitment to seek sustainable forest management certification of the company's forestry operations under the Canadian Standards Association Sustainable Forest Management (SFM) standard.

As a preparatory step to sustainable forest management certification, Canfor developed an environmental management system (EMS) for the company's woodlands operations. In December 1999, this environmental management system was certified to the ISO 14001 standard developed by the International Organization for Standardization. The Company's EMS provides a platform on which to build the sustainable forest management elements required to meet the CSA SFM standard.

The management of Canfor has set out a number of commitments that define the mission, vision, policies and guiding principles for the company. These include the Canfor Mission, Environment Policy and Forestry Principles. These commitments have been used to enable and guide the development of this Sustainable Forest Management Plan, and also commit us to the continual improvement of our performance in implementing the plan under the principle of adaptive management.

Canfor's Environment Policy includes a commitment to "create opportunities for interested parties to have input to our forest planning activities". The CSA SFM standard requires that sustainable forest management planning be carried out in consultation with those directly affected by or interested in forest management on the defined forest area (DFA). Canfor's Environment Policy commitment has been interpreted and extended to include the involvement of the public in the setting of local values, objectives, indicators and targets for the purpose of developing a plan to achieve and maintain sustainable forest management on the DFA. The Environment Policy and Canfor's Forestry Principles also include the opportunity for participation by Aboriginal peoples with respect to their rights and interests in SFM on the DFA.

In Grande Prairie, the FMA area encompasses a small area north and west of Spirit River, an area north and east of DeBolt and an area south of Grande Prairie and east of the Smoky River. The main neighboring communities include DeBolt, Valleyview and Grande Prairie. For certification with CSA, this FMA will serve as the Defined Forest Area (DFA). The attached map (Appendix 1) shows the area covered.

In 1995, the Forest Management Advisory Committee (FMAC) was initiated to provide public input into preparing a long-term Detailed Forest Management Plan. Initially this Committee met monthly to identify key issues and concerns to be addressed.

In December 1999 Canfor and the Forest Management Advisory Committee (FMAC) have agreed to work on the development and revision on the SFM plan for the Grande Prairie FMA area. The terms of reference presented here include the goals, operating rules, timelines and so on for this task, and have been developed and adopted by the FMAC members.

A. Defined Goals

The Forest Management Advisory Committee (FMAC) aims to help ensure that sustainable forest management decisions are made as a result of informed, inclusive, and fair consultation with local people who are directly affected by or have an interest in sustainable forest management. The FMAC consists of members who represent a broad range of interested parties, including DFA workers as related to this Forest Management Agreement area (FMA area). The FMAC will work with Canfor Grande Prairie to:

1) Identify and select values, objectives, indicators and targets, based on the CSA SFM elements and any other elements of relevance to the DFA;
2) Develop alternative strategies to be assessed;
3) Assess alternative strategies and select the preferred one;
4) Review the SFM plan;
5) Design monitoring programs, evaluate results and recommend improvement; and
6) Discuss and resolve any issues relevant to SFM in the DFA.

Canfor and the FMAC shall ensure that the values, objectives, indicators and targets are consistent with relevant government legislation, regulations and policies.

In addition, the FMAC will continue to:
1) Provide input regarding Forest Ecosystem Management Objectives; and
2) In partnership with Canfor, will review, refine and implement the Public Involvement Program.

B. Operating Rules

1) Ground rules/ conduct
   The FMAC and its members agree to work by the following ground rules:
   a) All members will be given the opportunity to voice their perspectives;
   b) All members will listen to the range of perspectives;
   c) Meetings will be well-structured and facilitated to enable efficient progress; and
   d) Refreshments and food will be provided for the meetings.

2) Meeting agenda and dates
   a) Meeting agendas:
      i) Will address, where possible, both the needs of the Detailed Forest Management Plan and CSA Certification;
      ii) Input on upcoming meeting agendas will be obtained during each FMAC meeting; and
      iii) Canfor will finalize the meeting agenda.
   b) Bi-monthly meetings will be held unless additional meetings are required.

   c) Meeting dates:
      i) Will be confirmed jointly between Canfor and the FMAC.

   d) Meeting notices:
      i) At least two weeks advance notice of meeting dates will be given; and
      ii) Generally, the next meeting date will be confirmed at each FMAC meeting.
   e) Meeting Location:

i) Meetings will be held at a time and place most suitable to the members of the group, and may vary time or place to satisfy members requirements; and
ii) Suggested meeting location(s) are:
- Senior Citizens Hall in DeBolt; and
- GP Inn in Grande Prairie.

f) Material, if available, will be provided for review in advance of meetings.
g) Name:
The name is: Canfor's Forest Management Advisory Committee (FMAC).

C. Timelines

The Detailed Forest Management Plan, including the SFMP was submitted July 31, 2001. Final approval was received from government Nov 3, 2003. In addition, the CSA standard was revised in December 2002 and as a result, a complete review and revision of the SFMP was required. The following summarizes some key dates over the next few years:

1) Begin review and revision of SFMP — Sept 2003
2) Complete FMAC input for Draft SFMP — Dec 2004
3) Targeted completion date for SFMP to the revised standard — June 2005
4) Ongoing implementation, monitoring and auditing

D. Communication and Information

1) Internal to FMAC:
a) Canfor will ensure meeting minutes are distributed following each meeting;
b) Canfor will provide the FMAC with information as it applies to the function and business of the FMAC. Confidential business information such as financial or human resource information may be deemed to be sensitive and proprietary and may not be released; and
c) Canfor will provide access to information about the DFA and the SFM requirements.

2) External:
a) An annual update will be included in the Annual Report, which is distributed beyond Canfor and the Advisory Committee;
b) Canfor will provide information to a broader public about the progress being made in the implementation of the CSA Standard;
c) Only authorized members of the advisory committee are to speak on behalf of the FMAC as agreed to by the group and Canfor;
d) When communicating with the media, interest groups or the public at large, specific comments will not be attributed to any individual FMAC member without his/her prior consent; and
e) If a FMAC member wishes to respond to the media, they are to speak on behalf of the interest group they represent only and:
i) Will be respectful of other members and other interest groups; and
ii) Will not characterize the suggestions or positions of other members or interest groups in their discussions with the public or media.

3) Internal to Canfor:
a) Recommendations from the FMAC will be reported at Woodlands meetings; and
b) Implementation reports and updates will report quarterly to the Regional Environmental Management System (EMS) meetings.

E. Meeting Expenses and Logistics

1) Meeting Expenses
   a) On request, members are eligible for $50 per ½ day meetings for expenses (full day meetings to be covered at $100);
   b) Additional travel costs to meetings will be reimbursed at $0.35/km;
   c) If required, accommodation for members who must travel in excess of 1 hour for meetings will be covered; and
   d) Expense forms for the above need to be submitted to Canfor for reimbursement.

F. Roles and Responsibilities

1. FMAC Structure:

Structure could include representatives from any of the following:

- Alberta Fish and Game Association
- Alberta Professional Guides and Outfitters Association

Alberta Trappers Association

- Canadian Association of Petroleum Producers (Canadian National Resources Ltd.)
- City of Grande Prairie
- DFA Related Worker
- Grande Prairie Chamber of Commerce
- Grande Prairie #1, County of
- Grande Prairie Regional College
- M.D. of Greenview No. 16
- Metis Nation Zone 6
- Public member at large
- South Peace Environmental Association
- Sturgeon Lake Cree Nation
- Travel Alberta North, Tourist Destination Region
- Valleyview, Town of

a) The following groups have been invited to participate by the current FMAC members;

- Federation of Alberta Naturalists *(no response to date)*
- Alberta Wilderness Association *(no response to date)*
- Peace Parkland Naturalists (declined – observed one meeting)
- Valleyview Local Timber Advisory Committee (declined)

In addition the FMAC members requested that all those who were on the original FMAC invite list be re-invited due to the change in scope of the work:

Canadian Communication, Energy and Paperwork's Union *(no response to date)*
Grande Prairie Public School Board *(no response to date)*
Northern Gateway School Division *(no response to date)*
Peace Parkland Naturalist *(declined – observed one meeting)*
Peace Wapiti School Board *(no response to date)*
South Peace Environmental Association *(accepted – listed as a current member)*

*note: some groups in i) and ii) are the same, however only one invitation was issued.

b) In addition to the above members, advisors from the following will assist the group:

- Canfor;
- Alberta Sustainable Resource Development;
- Tolko Industries; and
- Ainsworth Lumber.

2. FMAC Member's Role:

To provide input as related to the Defined Goals (Section A) as related to the DFMP and CSA planning processes;

The voting members are responsible for consensus reaching and decision making for the FMAC;

To act as a liaison between FMAC and the organization they are representing;

To attend meetings regularly;

Members will be appointed by each of the member organizations;

Members can be replaced if more than 2 consecutive meetings are missed without a valid reason;

To replace a member, the member organization will be asked, by either the current member or by the Canfor representative, to reappoint a new member;

Canfor will confirm appointment;

Existing members, who no longer represent their original organization, may choose to remain on as members-at-large as this will provide ongoing continuity; and

Use of Alternates:

i. an organization may appoint an alternate to act as an interim replacement for the member; and
ii. alternates are also guided by the Terms of Reference.

Conflict of Interest:

If an FMAC member (or alternate) has a perceived or real conflict of interest regarding their input related to the Goals for the FMAC (Section A), this must be declared. The FMAC and Canfor will then decide at the meeting what actions are then needed. Potential actions could lead to:

- Restricted involvement in the FMAC including asking the member:
  - To serve as an observer for the relevant specific issue(s) and recommendation(s);
  - To take a leave from the FMAC;
- Other actions as created by FMAC and Canfor.

3. Observers Role:
   a) Public members are welcome to observe the FMAC meetings, but will not receive print materials;
   b) Observers may participate in discussions or make presentations only with agreement by the group, chair or facilitator;
   c) Forestry students are encouraged to attend as observers; and
   d) Will not take part in reaching consensus or decision-making of the FMAC.

4. Canfor's Role:

To review and consider the recommendations from the FMAC;

To make decisions regarding sustainable forest management and certification;
To report to FMAC on how input was considered and that responses are provided;
To demonstrate that there is ongoing public communication about the DFA, including the public communication process;
To provide the necessary human, physical, financial, and technological resources to the FMAC as necessary and reasonable; and
Will not take part in reaching consensus or decision-making of the FMAC except in areas of conflict of interests as stated in 2(k)

5. Advisor's Role:

To actively provide background or technical information, participate in discussions and provide support to the FMAC group;
To clarify technical information for the FMAC group; and
Will not take part in reaching consensus or decision-making of the FMAC.

6. Facilitator's Role:

To ensure that meetings address agenda topics;
To ensure that all members have an equitable opportunity to participate in the meeting;
To provide support in summarizing and clarifying issues, recommendations, etc.; and
Will not take part in reaching consensus or decision-making of the FMAC.

G. Decision Making and Methodology

1. The group agrees to work by consensus defined as:
   a) Every effort shall be made to achieve consensus;
   b) Consensus is defined as no member having substantial disagreement on an issue;
   c) Consensus may consist of agreement on a summary of the different perspectives on an issue;
   d) Decisions on specific issues will be considered interim consensus, unless agreed otherwise, until there is consensus on the full set of recommendations;
   e) All decisions and recommendations will require involvement of at least 4 members; and
   f) A member who is absent from a meeting where a decision was made, may request to have the decision reviewed at a future meeting. The chair or facilitator would identity when this would occur.

H. Dispute Resolution Mechanism

1. Process Issues:
   The facilitator will resolve process issues.

2. Technical Issues:
   a) The members will work to identify the underlying issues and work towards a solution in a positive friendly environment;
   b) The members will seek compromise, alternatives and clarification of information needed;
   c) The members will commit to arriving at the best solution possible; and
   d) If no consensus solution can be reached, then the outstanding issues will be summarized and forwarded to Canfor for their consideration. Canfor will be informed of the level of support and dissention with the issue.

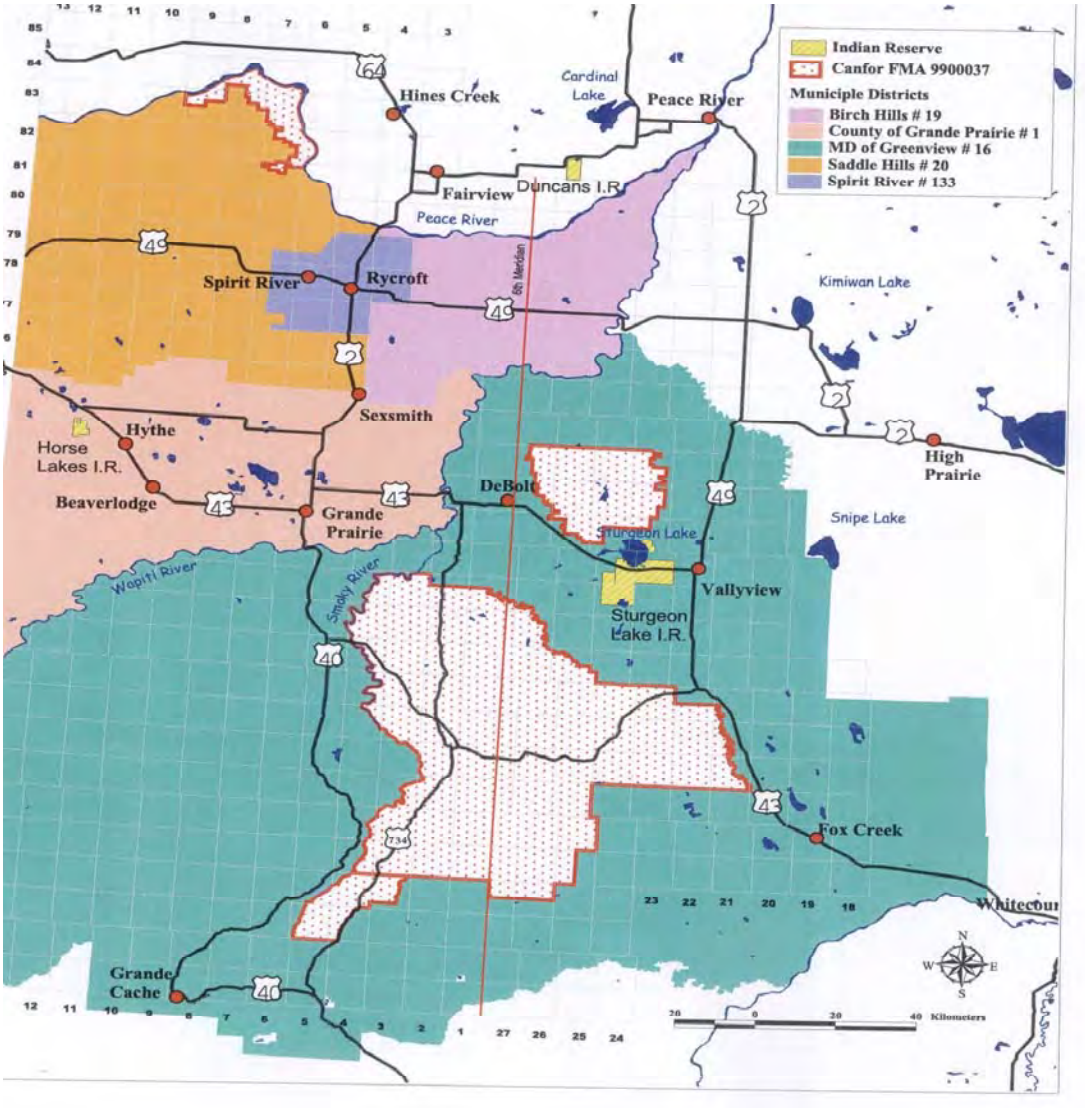
I. Review of and Revisions to Terms of Reference

The Terms of Reference will be reviewed every 2 years at a minimum or earlier based on consensus of the group.

The revision of the Terms of Reference requires the approval of the FMAC and Canfor.

APPENDIX 1

Map of Defined Forest Area
(FMA 9900037)



Appendix 4. Forest Management Advisory Committee Membership List

Forest Management Advisory Committee (2005)

Canfor Coordinator	Jill Ashley, RPF
Recorder	Debbie Isley (Canfor)
Facilitator	Gail Wallin (Management Plus Communications Ltd.)
Alberta Sustainable Resource Development Advisor:	Craig Brown, RPF
Alberta Environment Fish & Wildlife Advisor	Dave Stepnisky
Canfor Advisors	Dwight Weeks, RPFT
	Brad Engel, RPF
	Brian Martell, RPFT
Other Industry Advisors	Dan Branter, RPF (Tolko)
	Noel Roberts, RPF (Ainsworth)

Member Affiliations

Alberta Trappers Association

Canadian Association of Petroleum Producers:

City of Grande Prairie

County of Grande Prairie #1

Defined Forest Area (DFA) Related Worker

Grande Prairie Chamber of Commerce

Grande Prairie Regional College

Grande Prairie Regional Tourism Association

Metis Nation Zone 6

Municipal District of Greenview No. 16

Public Member at Large

South Peace Environmentalist Association

Sturgeon Lake Cree Nation

Town of Valleyview

Valleyview Fish and Game Association

Appendix 5. CSA Matrix

6.0 The SFM Performance Requirements: CCFM Criteria and CSA SFM Elements The organization, in conformance with the public participation process requirements set out in Section 5, will identify DFA-specific values, objectives, indicators and targets for each of the CSA SFM Elements described in Clauses 6.1-6.6, as well as any other values associated with the DFA.	**Value** - a DFA characteristic, component or quality considered by an interested party to be important in relation to a CSA SFM Element or other locally identified element.	**Objective** - a broad statement describing a desired future state or condition for a value.	**Indicator** – a variable that measures or describes the state or condition of a value	**Target** – a specific statement describing a desired future state or condition of an indicator. Targets should be clearly defined, time limited and quantified if possible
CCFM Criterion 1 – Conservation of Biological Diversity **Conserve biological diversity by maintaining integrity, function and diversity of living organisms and the complexes of which they are part.**				
Element (1.1) Ecosystem Diversity Conserve ecosystem diversity at the landscape level by maintaining the variety of communities and ecosystems that naturally occur on the DFA	(1.1) 1 All natural ecosystems are important on the landscape	(1.1) 1a All current ecosystems are represented on the landscape at natural levels	(1.1).1a.1 Area (%) in each seral stage[1]	(1.1) 1a.1.1 100% of the seral stages will meet the 2009 projections
Element (1.2) Species Diversity Conserve species diversity by ensuring that habitats for the native species found on the DFA are maintained through time	(1.2) 1 Through time all current habitats are represented	(1.2) 1a Current species diversity is maintained on the landscape	(1.2) 1a.1 Habitat suitability rating	(1.2) 1a.1.1 To maintain the habitat suitability rating for each ecosection group for the period 1997 - 2017 at the 1997 level
			(1.2) 1a.2 Number of bull trout watersheds with ≥35% Equivalent Clearcut Area (ECA) above the H60 elevation	(1.2) 1a.2 .1 Annually, zero bull trout watersheds with ≥35% equivalent clearcut area (ECA) above the H60 elevation.
			(1.2) 1a.3 Percentage of habitat for endangered[2] or threatened[3] vertebrate species over time	(1.2) 1a.3.1 Woodland caribou: no more than 20% of the area in pioneer or young seral condition and at least 20% of the area in old seral condition at key points in time Trumpeter swan: to buffer 100% of identified trumpeter swan lakes with a 200 m no harvest buffer (reported annually)
			(1.2) 1a.4 Percentage of Canfor forestry staff trained to identify rare plants	(1.2) 1a.4.1 100% of the Canfor forestry staff receives training to identify and report rare plants (reported annually)
			(1.2) 1a.5 Number of biodiversity monitoring programs in which Canfor actively participates	(1.2) 1a.5.1 Participate in one or more biodiversity monitoring program(s) annually
			(1.2) 1a.6 Percentage (volume/ha) of coarse woody debris (CWD) on harvested areas	(1.2) 1a.6.1 100% of the pre-harvest volume per hectare CWD will be retained on harvest areas annually
			(1.2) 1a.7 Percentage of area (ha) in watercourse buffers	(1.2) 1a.7.1 The actual area in watercourse buffers is a minimum of 100% of the planned (DFMP) area annually
			(1.2) 1a.8 Percent of the area harvested across the FMA area with structure retention	(1.2) 1a.8.1 A minimum of 25% of the area harvested across the FMA area will contain structure retention accumulated annually beginning in 2002
Element (1.3) Genetic Diversity Conserve genetic diversity by maintaining the variation of genes within species	(1.3) 1 Respect the natural genetic diversity	(1.3) 1a Genetic diversity will be maintained on the landscape	(1.3) 1a.1 Mean patch size[4] (MPS) (ha)	(1.3) 1a.1.1 MPS (ha) for 2009 will not fall below the MPS forecasts
			(1.3) 1a.2 Mean nearest neighbour distance[5] (MNND) (m)	(1.3) 1a.2.1 The MNND for 2009 will not exceed the MNND forecasts
			(1.3) 1a.3 Area weighted mean shape index[6] (AWMSI)	(1.3) 1a.3.1 The AWMSI for 2009 will not fall below the AWMSI forecasts
			(1.3) 1a.4 Percentage of total area by patch size class	(1.3) 1a.4.1 100% of the total area by patch size class will meet the 2009 projections

6.0 The SFM Performance Requirements: CCFM Criteria and CSA SFM Elements The organization, in conformance with the public participation process requirements set out in Section 5, will identify DFA-specific values, objectives, indicators and targets for each of the CSA SFM Elements described in Clauses 6.1-6.6, as well as any other values associated with the DFA.	**Value** - a DFA characteristic, component or quality considered by an interested party to be important in relation to a CSA SFM Element or other locally identified element.	**Objective** - a broad statement describing a desired future state or condition for a value.	**Indicator** – a variable that measures or describes the state or condition of a value.	**Target** – a specific statement describing a desired future state or condition of an indicator. Targets should be clearly defined, time limited and quantified if possible
			(1.3) 1a.5 Percentage of area planted with genetically improved stock	(1.3) 1a.5.1 A maximum of 70% of area is planted with genetically improved stock accumulated annually
			(1.3) 1a.6 Percentage of grass seed mix that contains restricted and noxious weeds	(1.3) 1a.6.1 100% of utilized grass seed mix will not contain restricted or noxious weeds as identified in the Weed Control Act annually
		(1.3) 1b Conditions that support genetic diversity of species will be maintained	(1.3) 1b.1 Percentage of seeds collected and seedlings planted in accordance with the "Standards for Tree Improvement in Alberta"	(1.3) 1b.1.1 100% of seeds collected and seedlings planted annually will be in accordance with the "Standards for Tree Improvement in Alberta"
Element (1.4) Protected Areas & Sites of Special Biological Significance Respect protected areas identified through government processes. Identify sites of special biological significance within the DFA and implement management strategies appropriate to their long term maintenance	(1.4) 1 Identified protected areas and sites that have special biological significance	(1.4) 1a The natural states and processes to maintain protected areas and sites that have special biological significance will be conserved	(1.4) 1a.1 Percentage of significant wildlife mineral licks conserved	(1.4) 1a.1.1 100% of significant wildlife mineral licks will be conserved annually
			(1.4) 1a.2 Percentage of identified protected areas and special biologically significant sites that are conserved	(1.4) 1a.2.1 100% of identified protected areas and special biologically significant sites will be conserved annually
CCFM Criterion 2 – Maintenance and Enhancement of Forest Ecosystem Condition and Productivity **Conserve forest ecosystem condition and productivity by maintaining the health, vitality, and rates of biological production.**				
Element (2.1) Forest Ecosystem Resilience Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem conditions	(2.1).1 Healthy forest ecosystem	(2.1).1a Factors that lead to forest ecosystem health will be identified and maintained	(2.1) 1a.1 Percentage of identified insect and disease areas scheduled for treatment	(2.1).1a.1.1 100% of the identified insect and disease treatments will be scheduled for treatment annually
	(2.1).2 Ecosystem resilience	(2.1).2a Processes that promote ecosystem resilience will be identified and maintained	(2.1) 2a.1 Percentage of harvest areas meeting the regeneration standards as confirmed by the completion of an establishment survey[7]	(2.1).2a.1.1 100% of harvest areas meet the required regeneration standards as confirmed by completion of establishment surveys, measured on a 5-yr. rolling average
			(2.1) 2a.2 Percentage of harvest areas meeting the regeneration standards as confirmed by completion of a performance survey[8]	(2.1).2a.2.1 100% of harvest areas meet the required regeneration standards as confirmed by completion of performance surveys, measured on a 5 year rolling average
Element (2.2) Forest Ecosystem Productivity Conserve ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species	(2.2).1 Sustained forest ecosystem productivity	(2.2).1a Ecosystem conditions that sustain productivity will be identified and maintained.	(2.2) 1a.1 Percentage of productive areas, adjacent to proposed harvest boundaries, impacted by windfall that receive a silviculture prescription	(2.2).1a.1.1 100% of the productive areas, adjacent to proposed harvest area boundaries, impacted by windfall receive a silviculture prescription annually
			(2.2) 1a.2 Percentage of reforestation of temporary "in block" roads used for extraction of timber	(2.2).1a.2.1 100% of temporary "in block" roads used for extraction of timber will be reforested within 18 months after the end of the timber year[9] of harvest

6.0 The SFM Performance Requirements: CCFM Criteria and CSA SFM Elements The organization, in conformance with the public participation process requirements set out in Section 5, will identify DFA-specific values, objectives, indicators and targets for each of the CSA SFM Elements described in Clauses 6.1-6.6, as well as any other values associated with the DFA.	**Value** - a DFA characteristic, component or quality considered by an interested party to be important in relation to a CSA SFM Element or other locally identified element.	**Objective** - a broad statement describing a desired future state or condition for a value.	**Indicator** – a variable that measures or describes the state or condition of a value	**Target** – a specific statement describing a desired future state or condition of an indicator. Targets should be clearly defined, time limited and quantified if possible
			(2.2) 1a.3 Percentage of tasks outlined in the approved Growth and Yield Monitoring Plan completed on schedule	(2.2).1a.3.1 100% of tasks outlined in the approved Growth and Yield Monitoring Plan are completed on schedule
CCFM Criterion 3 – Conservation of Soil and Water Resources **Conserve soil and water resources by maintaining their quantity and quality in forest ecosystems**				
Element (3.1) Soil Quality and Quantity Conserve soil resources by maintaining soil quality and quantity	(3.1) 1 Soil productivity	(3.1) 1a Soil productivity will be maintained or enhanced	(3.1) 1a.1 Site Index[10]	(3.1) 1a.1.1 Average accumulated post harvest site index will not be less than average pre harvest site index (with reporting commencing in 2008)
	(3.1) 2 Soil quantity	(3.1) 2a Soil erosion will be minimized	(3.1) 2a.1 Number of slumping events caused by road construction	(3.1) 2a.1 Zero major slumping events annually caused by road construction
			(3.1) 2a.2 Number of slumping events due to harvesting activities	(3.1) 2a.2.1 Zero slumping events annually due to harvesting activities
			(3.1) 2a.3 Number of significant erosion events related to silviculture, harvesting and road activities	(3.1) 2a.3.1 Zero significant erosion events related to silviculture, harvesting and road activities annually
			(3.1) 2a.4 Prompt road deactivation	(3.1) 2a.4.1 100% of temporary roads will be deactivated within 6 months after usage is complete
		(3.1) 2b Soil will be conserved[11] on site	(3.1) 2b.1 Percentage of soil disturbance prescriptions that conform to Section 9.0.3 of the Operating Ground Rules	(3.1) 2b.1.1 100% of soil disturbance prescriptions created throughout the year conform to Section 9.0.3 of the Operating Ground Rules
			(3.1) 2b.2 Percentage of harvest areas that do not exceed the soil disturbance prescriptions	(3.1) 2b.2.1 100% of harvest areas do not exceed the soil disturbance prescriptions annually
Element (3.2) Water Quality and Quantity Conserve water resources by maintaining water quality and quantity	(3.2) 1 Water quality	(3.2) 1a Water quality will be conserved	(3.2) 1a.1 The percentage of surveyed stream crossings identified with High and "Very High" WQCR[12] (water quality concern rating) on forestry roads to which the participants are responsible	(3.2) 1a.1.1 Less then 10% of surveyed stream crossings on forestry roads will have a "High" and "Very High" WQCR annually
			(3.2) 1a.2 The percentage of crossings that receive the required remedial action	(3.2) 1a.2.1 100% of crossings receive remedial action as identified in the Road Maintenance Plan annually
			(3.2) 1a.3 The number of non-compliance incidents related to riparian zone standards	(3.2) 1a.3.1 Zero non-compliance incidents related to riparian zone standards annually
	(3.2) 2 Water quantity	(3.2) 2a Water quantity will be maintained	(3.2) 2a.1 Percentage of sampled watersheds that are in conformance with the average water yield increase limit indicated in the Operating Ground Rules	(3.2) 2a.1.1 100% of sampled watersheds are in conformance with the annual average water yield increase limit of 15% as indicated in the Operating Ground Rules
CCFM Criterion 4 – Forest Ecosystem Contributions to Global Ecological Cycles **Maintain forest conditions and management activities that contribute to the health of global ecological cycles**				

6.0 The SFM Performance Requirements: CCFM Criteria and CSA SFM Elements The organization, in conformance with the public participation process requirements set out in Section 5, will identify DFA-specific values, objectives, indicators and targets for each of the CSA SFM Elements described in Clauses 6.1-6.6, as well as any other values associated with the DFA.	**Value** - a DFA characteristic, component or quality considered by an interested party to be important in relation to a CSA SFM Element or other locally identified element.	**Objective** - a broad statement describing a desired future state or condition for a value.	**Indicator** – a variable that measures or describes the state or condition of a value	**Target** – a specific statement describing a desired future state or condition of an indicator. Targets should be clearly defined, time limited and quantified if possible
Element (4.1) Carbon Uptake and Storage Maintain the processes that take carbon from the atmosphere and store it in forest ecosystems	(4.1) 1 Local contribution of carbon uptake and storage	(4.1) 1a Carbon uptake and storage (i.e. carbon balance) will be maintained	(4.1) 1a.1 Percentage of harvested areas reforested	(4.1) 1a.1.1 100% of harvest areas are reforested within 18 months after the end of the timber year in which it was harvested
			(4.1) 1a.2 Percentage of productive areas >4 hectares impacted by fire that are regenerated	(4.1) 1a.2.1 Reforest 100% of the productive areas >4 ha impacted by fire within 24 months
Element (4.2) Forest Land Conversion Protect forest lands from deforestation or conversion to non-forests	(4.2) 1 Sustainable yield of timber	(4.2) 1a A natural range of tree species will reforest every hectare that is harvested	(4.2) 1a.1 Percentage of the harvested area sufficiently restocked by yield group	(4.2) 1a.1.1 100% of the harvested area sufficiently restocked by yield group accumulated annually beginning in 2000
		(4.2) 1b The utilization of merchantable wood will be maximized	(4.2) 1b.1 Percentage of harvested merchantable wood (conifer and deciduous) left on site	(4.2) 1b.1.1 To leave less than 1% conifer and 1% deciduous harvested merchantable wood on site annually
			(4.2) 1b.2 Percentage of dispositions where merchantable industrial salvage (m^3) is utilized on an annual basis	(4.2) 1b.2.1 100% of the dispositions where merchantable industrial salvage wood from permanent land withdrawals is utilized on an annual basis
	(4.2) 2 Forests on the landbase	(4.2) 2a Forests will be maintained on the landbase	(4.2) 2a.1 Density (lineal km/km2) of open (non-reclaimed) roads	(4.2) 2a.1.1 To have no more than 0.6 lineal km/km2 in open (non-reclaimed) roads over a 5-year period, for each FMA parcel (Peace, Puskwaskau and Main)
		(4.2) 2b Productive lands will be restored to productive status wherever possible	(4.2) 2b.1 Percentage of withdrawn areas restored to productive forestland	(4.2) 2b.1.1 100% of previously withdrawn areas that are suitable candidates for reforestation are restored to productive forestland within 24 months
CCFM Criterion 5 – Multiple Benefits to Society **Sustain flows of forest benefits for current and future generations by providing multiple goods and services**				
Element (5.1) Timber and Non-Timber Benefits Manage the forest to produce an acceptable and feasible mix of both timber and non-timber benefits	(5.1) 1 Sustainable yield of timber	(5.1) 1a Sustainable harvest levels on the FMA area will be maintained	(5.1) 1a.1 Long-term harvest level vs. actual extraction rates (m^3)	(5.1) 1a.1.1 Actual extraction rates (m3) are less than or equal to the long-term harvest level (m3) at the end of the 1999-2008 period
	(5.1) 2 Ongoing non-timber benefits	(5.1) 2a Long-term availability of identified non-timber benefits will be maintained	(5.1) 2a.1 Number of recreation areas maintained by Canfor	(5.1) 2a.1.1 Canfor will maintain a minimum of 5 recreation areas for use by the public annually
			(5.1) 2a.2 Percentage of registered trappers contacted that are directly impacted by operations (harvesting, silviculture and reclamation)	(5.1) 2a.2.1 100% of registered trappers directly impacted by harvesting, silviculture and reclamation operations are contacted as specified in the *Trapper Consultation and Notification Program* annually
			(5.1) 2a.3 Percentage of outfitters potentially affected by operations within the FMA area are informed of the 5-year harvest sequence	(5.1) 2a.3.1 100% of outfitters potentially affected by operations within the FMA area will be supplied a 5 year General Development Plan map annually

6.0 The SFM Performance Requirements: CCFM Criteria and CSA SFM Elements The organization, in conformance with the public participation process requirements set out in Section 5, will identify DFA-specific values, objectives, indicators and targets for each of the CSA SFM Elements described in Clauses 6.1-6.6, as well as any other values associated with the DFA.	**Value** - a DFA characteristic, component or quality considered by an interested party to be important in relation to a CSA SFM Element or other locally identified element.	**Objective** - a broad statement describing a desired future state or condition for a value.	**Indicator** – a variable that measures or describes the state or condition of a value	**Target** – a specific statement describing a desired future state or condition of an indicator. Targets should be clearly defined, time limited and quantified if possible
Element (5.2) Communities and Sustainability Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and to participate in their use and management	(5.2) 1 A range of benefits to local communities	(5.2) 1a Local[13] communities and contractors will have the opportunity to share in benefits such as jobs, contracts and services	(5.2) 1a.1 Percentage of dollars paid for local vs. non-local contract services	(5.2) 1a.1.1 Over a rolling 5-year period, a minimum of 75% of dollars paid for contract services will be expended locally
		(5.2) 1b The forests will be accessible to the public for social and cultural benefits	(5.2) 1b.1 Percentage of identified social and cultural benefits that occur in the FMA area	(5.2) 1b.1.1 Maintain 100% of identified social and cultural benefits that occur on the FMA area annually
Element (5.3) Fair Distribution of Benefits and Costs Promote the fair distribution of timber and non-timber benefits and costs	(5.3) 1 Fair distribution of benefits across communities	(5.3) 1a A fair distribution of benefits and costs will be ensured across all communities and contractors in the local area	(5.3) 1a.1 Percentage of economic contributions to local communities[13]	(5.3) 1a.1.1 Annual economic contributions to local communities will be a minimum of 80% of the 5 year rolling average
			(5.3) 1a.2 Percentage of coniferous timber available for local use	(5.3) 1a.2.1 0.5% of the coniferous AAC is made available for local use and for local residents as per Forest Management Agreement (FMA) 9900037 annually
			(5.3) 1a.3 Volume of coniferous timber made available for local use	(5.3) 1a.3.1 10,000 m^3 of the coniferous AAC is made available annually for Community Timber Use (CTU) program
CCFM Criterion 6 – Accepting Society's Responsibility for Sustainable Development **Society's responsibility for sustainable forest management requires that fair, equitable, and effective forest management decisions are made**				
Element (6.1) Aboriginal and Treaty Rights Recognize and respect Aboriginal and treaty rights	(6.1) 1 Understand and respect Aboriginal and treaty rights	(6.1) 1a Infringement of Aboriginal and treaty rights will be avoided	(6.1) 1a.1 Percent conformance to SFM elements pertinent to the protection of Aboriginal and treaty rights	(6.1) 1a.1.1 100% conformance to SFMP targets of Element (1.2) Species Diversity and Element (3.2) Water Quality and Quantity annually
Element (6.2) Respect for Aboriginal Forest Values, Knowledge and Uses Respect traditional Aboriginal forest values and uses identified through the Aboriginal input process	(6.2) 1 Understand and respect Aboriginal special needs	(6.2) 1a Early and effective consultation with aboriginals peoples will be provided	(6.2) 1a.1 Number of opportunities for early and effective consultation with Aboriginal peoples	(6.2) 1a.1.1 To annually provide a range of opportunities for early and effective consultation with Aboriginal peoples who have indicated interest in activities on the FMA area
		(6.2) 1b Special cultural and historic sites will be respected	(6.2) 1b.1 Percentage of historic resources that are protected	(6.2) 1b.1.1 100% conformance to the prescriptions for historical resources prepared by a certified archaeologist annually
			(6.2) 1b.2 Percentage of known local historical resources that are respected	(6.2) 1b.2.1 100% of known local historical resources are respected annually
Element (6.3) Public Participation Demonstrate that the public participation process is designed and functioning to the satisfaction of the participants	(6.3) 1 Inclusive public process	(6.3) 1a Affected and locally interested parties will be involved in the development of the decision-making process through an open, transparent and	(6.3) 1a.1 Percentage conformance to the Forest Management Advisory Committee's (FMAC) Terms of Reference	(6.3) 1a.1.1 100%conformance to the FMAC's Terms of Reference (TOR) annually
			(6.3) 1a.2 Number of opportunities for public participation	(6.3) 1a.2.1 To provide a minimum of 4 types of opportunities for public participation annually

6.0 The SFM Performance Requirements: CCFM Criteria and CSA SFM Elements The organization, in conformance with the public participation process requirements set out in Section 5, will identify DFA-specific values, objectives, indicators and targets for each of the CSA SFM Elements described in Clauses 6.1-6.6, as well as any other values associated with the DFA.	**Value** - a DFA characteristic, component or quality considered by an interested party to be important in relation to a CSA SFM Element or other locally identified element.	**Objective** - a broad statement describing a desired future state or condition for a value.	**Indicator** – a variable that measures or describes the state or condition of a value	**Target** – a specific statement describing a desired future state or condition of an indicator. Targets should be clearly defined, time limited and quantified if possible
		accountable process	(6.3) 1a.3 Percentage of public inquires that receive an initial contact	(6.3) 1a.3.1 To make initial contact to 100% of public inquires within one month of receipt
Element (6.4) Information for Decision-Making Provide relevant information to interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems	(6.4) 1 Current scientific, local and traditional knowledge	(6.4) 1a Forest management decisions will be based on scientific, local and traditional knowledge	(6.4) 1a.1 Number of opportunities to enhance scientific, local and traditional knowledge	(6.4) 1a.1.1 To provide a minimum of 8 different opportunities to enhance knowledge annually
			(6.4) 1a.2 Number of active research projects	(6.4) 1a.2.1 To be involved in a minimum of 10 active research projects annually

Definitions:

1. Seral Stage: The series of plant community conditions that develop during ecological succession from bare ground (or major disturbances) to the potential plant community capable of existing on a site where stand replacement begins
2. Endangered: Any species facing imminent extirpation or extinction. Extirpation - a species no longer existing in the wild in Alberta but occurring elsewhere in the wild. Extinct - a species that no longer exists.
3. Threatened: Any species likely to become endangered if limiting factors are not reversed.
4. Mean Patch Size (MPS): Is a measure of fragmentation. Fragmentation metrics quantify the degree of isolation of elements within a landscape
5. Mean Nearest Neighbour Distance (MNND): MNND describes the spatial context of a habitat patch in relation to its neighbours by increasing with increasing distance between patches.
6. Area Weighted Mean Shape Index (AWMSI): AWMSI measures the perimeter-to-area ratio for a patch type or landscape using comparisons of patches to a standard shape. As AWMSI increases block shape becomes more complex (providing greater edge effect).
7. Establishment survey: Required by the Regeneration Standards for Alberta. Completed 4 to 8 years (C, CD and DC) after harvesting, measures: stocking (%), density (stems/ha) and early growth (height and diameter) of regenerating trees
8. Performance survey: Required by the Regeneration Standards for Alberta. Completed 8 to 14 years (C, CD, DC) after harvesting, measures: stocking (%), density (stems/ha), early growth (height and diameter) and approximate location of satisfactorily restocked (SR) and non-satisfactorily restocked (NSR) areas
9. Timber year: is based in a logging season from May 1 to April 30.
10. Site Index: A measure of forest site productivity expressed as the average height of the tallest trees in the stand at a defined index age. Common index ages are 40, 50, 70, 75, and 100 years. This is usually expressed as the predicted height for a specific tree species at a given breast height age.
11. Conserve: To keep in a safe or sound state (Webster)
12. WQCR (water quality concern rating): The WQCR is a 4 class hazard rating which indicates the magnitude of the erosion problem and potential impacts on water quality. A rating of none, low, medium or high based on the individual crossing score is assigned to each crossing. The WQCR identifies areas where a road surface erosion and sediment delivery is actively occurring (or has the potential to occur), but also documents areas where the effective erosion and sediment control is practiced (P. Beaudry)
13. Local (Local Communities): Have been defined by FMAC as those adjacent to the FMA area i.e. Valleyview, DeBolt, Fox Creek, Spirit River, Fairview, Grande Cache and Grande Prairie. MD Greenview No. 16, MD of Spirit River No. 20 and County and Grande Prairie No. 1 are also deemed to be local communities.
14. Identified insect and disease areas are those areas confirmed by Alberta Sustainable Resource Development (ASRD) where a high incidence of insects and disease is compromising, or has the potential to compromise, forest management objectives.

Appendix 6. Bull trout ECA % Values

Bull trout Area ECA % Values

Year 2007		> 35% 30-35% 25-30%						SFMP Tables Master.xls Table 48		
		Area Above H60 line (ha)								
Watershed ID	All Watershed Area (ha)	Forested	Non-Forest Vegetated	Non-Vegetated	Harvested	Roads	ECA Area (Harvested)	Overall ECA Area (Harvested+ Road)	ECA %	Bull Trout?
1	22421.3	12452.03	726.3	325.5	417.5	0.9	165.1	166.0	1.3	Y
397	3391.1	1855.589	44.8	52.9	333.4	0.0	245.8	245.8	12.9	Y
406	920.4	493.415	25.7	27.4	40.3	0.0	29.8	29.8	5.7	Y
438	872.3	506.404	31.6	9.9	39.1	0.0	28.9	28.9	5.4	Y
461	1907.6	1128.182	33.4	20.9	94.2	0.0	69.2	69.2	6.0	Y
462	539.9	312.85	0.5	6.9	105.6	0.0	77.9	77.9	24.9	Y
472	679.6	374.751	20.1	12.5	53.7	0.0	39.5	39.5	10.0	Y
480	1002.4	548.414	27.6	8.3	54.6	2.4	25.4	27.8	4.8	Y
498	752.5	405.842	20.7	20.7	102.4	0.0	53.8	53.8	12.6	Y
515	535.3	330.3	3.6	6.6	0.0	0.2	0.0	0.2	0.1	Y
527	510.0	303.335	13.5	5.1	63.5	0.4	22.1	22.5	7.1	Y
533	1277.4	754.527	8.1	4.7	0.0	1.1	0.0	1.1	0.1	Y
534	1384.8	763.436	29.1	28.0	108.1	0.6	38.6	39.2	4.9	Y
539	2962.6	1764.353	30.7	8.0	0.0	0.0	0.0	0.0	0.0	Y
583	753.4	442.035	1.8	1.5	0.0	0.0	0.0	0.0	0.0	Y
586	1035.9	569.348	20.2	22.0	16.8	0.0	7.0	7.0	1.2	Y
595	1408.5	838.419	9.0	31.9	3.2	0.0	1.1	1.1	0.1	Y
670	661.6	388.065	13.9	27.7	7.9	0.4	3.2	3.6	0.9	Y
696	1048.5	540.925	7.6	24.6	0.0	0.0	0.0	0.0	0.0	Y
807	639.7	341.692	30.9	9.4	0.0	0.0	0.0	0.0	0.0	Y
855	1227.0	682.108	35.1	7.6	27.9	0.0	14.0	14.0	2.0	Y
913	605.3	354.033	15.3	6.0	16.8	2.2	9.6	11.8	3.2	Y
915	2003.4	1078.055	86.8	36.2	104.8	9.0	51.5	60.5	5.2	Y
965	1669.3	981.14	18.8	8.5	186.7	0.3	74.8	75.2	7.5	Y
1035	5187.9	2979.666	102.4	21.8	368.4	16.4	218.8	235.2	7.6	Y
1101	695.2	364.01	42.1	6.5	13.4	0.0	5.1	5.1	1.3	Y
1120	882.0	491.707	26.6	10.6	18.4	4.1	7.3	11.5	2.2	Y
1137	1450.8	788.754	53.2	31.1	59.0	8.0	27.5	35.5	4.2	Y
1261	1187.8	636.913	51.1	31.7	130.4	3.3	51.4	54.6	7.9	Y
1289	566.7	297.38	30.1	7.1	134.5	0.0	47.0	47.0	14.4	Y
1310	579.6	309.239	24.4	14.1	119.6	0.0	53.2	53.2	16.0	Y
1320	882.2	530.796	13.9	12.9	56.1	0.0	24.5	24.5	4.5	Y
1378	2165.2	1295.485	19.3	23.0	113.2	2.0	77.9	80.0	6.1	Y
1426	527.6	310.839	8.9	0.0	0.0	0.0	0.0	0.0	0.0	Y
1466	1164.6	712.055	0.2	7.2	9.9	0.0	6.8	6.8	1.0	Y
1496	622.9	365.024	4.1	8.1	0.0	0.0	0.0	0.0	0.0	Y
1500	808.1	461.27	8.4	25.2	0.0	0.0	0.0	0.0	0.0	Y
1563	5782.2	3369.742	39.2	40.4	867.1	23.4	572.3	595.7	17.4	Y
1589	1267.4	736.408	3.2	13.7	84.2	0.0	62.3	62.3	8.4	Y
1692	1298.3	794.187	2.4	0.9	261.0	0.0	193.1	193.1	24.2	Y
1704	769.8	443.578	10.5	2.4	0.0	1.4	0.0	1.4	0.3	Y
1775	617.4	364.679	3.3	5.0	162.4	0.0	120.2	120.2	32.7	Y
1846	1369.7	786.062	4.4	19.0	297.3	14.3	218.6	232.9	28.9	Y
1863	877.3	509.676	4.0	12.4	167.1	0.0	123.5	123.5	24.0	Y
1938	1145.1	684.789	0.5	4.3	129.6	0.0	93.1	93.1	13.6	Y
1943	835.5	498.226	0.2	0.0	104.0	0.0	71.5	71.5	14.4	Y
2057	609.4	369.641	0.0	0.0	219.4	1.5	147.3	148.7	40.1	Y
2380	26574.0	15515.44	349.0	163.3	2236.4	23.0	1208.2	1231.2	7.7	Y
2382	29849.6	16051.6	1295.7	378.2	1095.0	18.8	597.3	616.1	3.5	Y
3937	4188.9	2405.622	40.1	18.4	329.5	0.0	72.4	72.4	3.0	Y

Year 2007		> 35% 30-35% 25-30%						SFMP Tables Master.xls Table 48		
		Area Above H60 line (ha)								
Watershed ID	All Watershed Area (ha)	Forested	Non-Forest Vegetated	Non-Vegetated	Harvested	Roads	ECA Area (Harvested)	Overall ECA Area (Harvested+ Road)	ECA %	Bull Trout?
3957	3532.9	2020.122	69.5	48.7	542.3	0.5	294.1	294.6	14.1	Y
4042	513.6	315.961	1.5	1.1	34.5	0.0	13.1	13.1	4.1	Y
4098	862.6	479.151	7.4	17.9	17.7	0.5	1.0	1.5	0.3	Y
4108	1454.9	786.794	18.0	12.0	114.4	1.6	28.7	30.3	3.8	Y
4111	17481.1	9921.628	312.2	316.1	1605.9	31.1	882.6	913.7	8.9	Y
4117	2819.7	1699.836	17.3	2.7	264.6	0.0	171.0	171.0	10.0	Y
4120	1377.2	823.133	4.4	17.0	208.0	0.0	67.8	67.8	8.2	Y
4174	511.7	282.904	1.5	7.1	56.8	0.0	25.3	25.3	8.9	Y
4186	579.8	325.126	1.6	8.8	81.7	0.0	22.2	22.2	6.8	Y
4203	706.9	411.999	2.0	0.7	130.8	0.0	28.7	28.7	6.9	Y
4237	588.6	356.986	3.0	0.5	84.2	0.0	27.5	27.5	7.6	Y
4257	620.0	350.616	5.8	5.3	229.2	0.0	67.0	67.0	18.8	Y
4265	526.1	291.536	13.5	13.7	131.7	0.0	60.8	60.8	19.9	Y
4311	1285.0	763.152	22.7	2.6	152.8	0.2	26.8	27.0	3.4	Y
4316	1062.0	625.785	12.9	1.9	46.6	0.0	4.6	4.6	0.7	Y
4318	907.6	536.363	8.4	2.6	53.2	0.0	16.0	16.0	2.9	Y
4319	614.1	352.583	3.0	0.0	4.7	0.0	0.0	0.0	0.0	Y
4374	1365.5	779.633	48.5	23.4	70.5	0.0	34.6	34.6	4.2	Y
4378	4146.9	2262.727	215.0	31.4	510.9	8.5	306.3	314.8	12.7	Y
4382	1024.7	621.916	8.3	1.0	7.4	0.0	5.4	5.4	0.9	Y
4414	2903.2	1649.76	68.7	42.6	102.7	0.0	47.7	47.7	2.8	Y
4484	875.3	500.904	23.3	0.8	36.5	0.0	16.3	16.3	3.1	Y
4492	1878.1	1104.783	11.7	19.1	15.7	0.0	3.2	3.2	0.3	Y
4502	1372.7	749.806	25.8	16.5	245.9	0.0	87.2	87.2	11.2	Y
4509	2370.6	1382.005	8.0	21.8	432.4	5.5	253.4	258.9	18.6	Y
4539	986.4	545.606	40.9	11.2	12.4	0.0	7.6	7.6	1.3	Y
4557	1661.3	901.016	95.0	10.6	53.8	0.0	39.7	39.7	4.0	Y
4687	542.7	313.573	12.2	0.0	14.0	0.0	10.1	10.1	3.1	Y
4702	508.5	300.741	5.0	6.2	61.5	3.5	27.0	30.5	9.9	Y
4743	1468.3	795.147	61.7	6.1	248.6	2.6	149.7	152.3	17.7	Y
4773	1353.6	783.218	25.7	11.4	153.2	0.5	83.1	83.6	10.3	Y
4776	811.5	462.535	28.3	2.7	0.0	0.0	0.0	0.0	0.0	Y
4826	1063.2	632.343	10.0	0.3	255.2	4.1	160.8	164.9	25.5	Y
4846	681.8	386.909	21.7	1.1	165.2	0.6	104.6	105.2	25.7	Y
4864	729.7	385.236	34.6	14.8	0.0	0.0	0.0	0.0	0.0	Y
4868	1177.8	628.366	46.6	32.8	60.4	0.0	26.9	26.9	4.0	Y
4877	1079.0	641.289	9.5	2.1	197.6	0.7	145.6	146.2	22.4	Y
4908	1778.0	1033.667	34.9	0.2	243.2	3.6	172.4	176.0	16.4	Y
4909	716.5	403.917	23.2	0.0	89.5	0.0	65.3	65.3	15.3	Y
4955	959.7	542.068	27.6	10.3	10.8	0.1	2.2	2.3	0.4	Y
4995	814.2	352.438	31.9	46.0	47.5	0.2	34.4	34.5	9.0	Y
5006	9710.2	5608.345	144.0	33.6	456.3	6.0	311.1	317.2	5.5	Y
5060	677.3	409.816	0.0	0.0	11.2	0.7	8.3	8.9	2.2	Y
5087	707.7	384.239	15.5	26.0	2.1	0.0	0.3	0.3	0.1	Y
5099	974.1	593.419	33.8	1.7	47.2	0.1	34.2	34.3	5.5	Y
5123	641.8	356.267	30.3	1.4	155.3	3.6	88.8	92.4	23.7	Y
5125	1882.4	1095.301	20.8	0.0	472.2	6.4	240.8	247.3	22.0	Y
5197	7033.0	3979.26	134.9	3.8	946.7	16.2	510.7	526.9	12.8	Y
5227	803.7	476.181	17.6	6.7	20.9	0.2	12.0	12.1	2.5	Y
5274	1159.3	611.593	8.9	49.6	72.7	0.0	48.0	48.0	7.7	Y

Year 2007		> 35% 30-35% 25-30%						SFMP Tables Master.xls Table 48		
		Area Above H60 line (ha)								
Watershed ID	All Watershed Area (ha)	Forested	Non-Forest Vegetated	Non-Vegetated	Harvested	Roads	ECA Area (Harvested)	Overall ECA Area (Harvested+ Road)	ECA %	Bull Trout?
5340	1062.3	622.452	10.1	12.9	356.1	5.4	164.6	170.0	26.6	Y
5382	797.0	409.842	2.3	8.2	89.5	3.5	63.7	67.2	16.2	Y
5392	1594.9	897.811	59.3	11.4	232.3	0.5	158.1	158.6	16.6	Y
5397	798.5	417.085	5.9	54.8	65.3	0.4	47.3	47.7	11.3	Y
5578	723.8	432.753	2.2	0.0	180.1	2.6	98.5	101.1	23.1	Y
5599	625.7	343.98	20.5	0.0	140.2	1.5	48.8	50.3	13.7	Y
5642	1303.8	791.607	7.0	0.8	358.3	9.4	248.6	258.0	31.9	Y
5654	1713.3	973.251	28.2	12.1	0.0	0.2	0.0	0.2	0.0	Y
5676	1176.4	666.81	8.3	31.9	162.3	5.9	116.7	122.5	18.0	Y
5703	539.9	305.099	12.8	3.0	61.5	6.2	44.5	50.7	15.6	Y
5729	1451.2	847.065	9.7	24.5	388.2	1.0	196.6	197.5	23.0	Y
5783	743.6	429.826	2.3	0.0	84.5	3.8	46.5	50.2	11.5	Y
5803	609.3	363.333	10.9	3.5	27.5	1.5	20.4	21.9	5.8	Y
5844	790.6	458.1	13.4	0.4	61.5	4.2	45.5	49.7	10.5	Y
5907	1465.9	879.662	2.9	8.9	149.6	1.0	110.5	111.5	12.6	Y
6006	905.6	510.055	7.7	0.0	51.2	1.3	37.9	39.2	7.5	Y
6181	1002.3	589.628	6.6	0.0	104.0	0.3	76.8	77.0	12.9	Y
6182	547.1	343.988	8.3	0.0	96.6	0.8	44.2	45.1	12.8	Y
6306	606.0	362.91	0.0	0.0	138.8	0.0	101.3	101.3	27.9	Y
6397	2128.2	1220.44	41.4	0.4	462.0	4.1	322.8	327.0	25.8	Y
6408	2202.0	1311.998	13.2	21.6	158.3	1.0	115.8	116.8	8.8	Y
6432	519.7	279.91	4.6	14.6	19.1	0.0	14.1	14.1	5.0	Y
6482	671.3	349.457	17.0	12.8	30.1	4.9	22.2	27.1	7.3	Y
6483	7311.3	4216.525	121.9	59.4	726.4	9.8	471.8	481.6	11.1	Y
6524	750.3	503.612	6.5	13.1	200.1	1.2	122.8	124.1	24.3	Y
6558	828.5	498.056	11.3	0.0	83.8	1.3	62.0	63.4	12.4	Y
6632	1304.0	744.845	23.3	0.0	254.3	0.0	186.2	186.2	24.2	Y
6637	521.1	287.362	6.5	0.0	74.8	0.0	46.0	46.0	15.7	Y
6674	2847.5	1642.857	39.9	11.9	258.9	1.3	179.7	181.0	10.8	Y
6703	545.1	316.959	0.5	5.9	97.4	1.1	50.9	52.0	16.3	Y
6751	553.9	355.138	10.8	0.0	112.0	0.0	62.5	62.5	17.1	Y
6803	530.9	321.591	3.8	0.0	83.2	2.4	40.5	42.9	13.1	Y
6806	3415.7	2055.11	25.9	6.4	0.0	0.0	0.0	0.0	0.0	Y
6819	1126.9	672.499	18.9	0.0	7.3	0.0	5.3	5.3	0.8	Y
6833	528.1	324.287	3.4	0.0	32.5	0.0	24.0	24.0	7.3	Y
6865	541.8	324.264	1.8	0.0	109.2	0.0	78.8	78.8	24.2	Y
6979	557.5	313.704	1.5	0.8	0.0	0.0	0.0	0.0	0.0	Y
7092	704.8	350.759	24.6	22.3	75.6	0.2	48.4	48.7	13.0	Y
7157	718.4	388.187	14.5	2.6	53.3	1.8	35.8	37.6	9.3	Y
7179	1116.3	656.053	10.0	4.8	80.2	0.0	57.6	57.6	8.7	Y
7214	604.8	354.915	19.1	5.2	0.0	0.0	0.0	0.0	0.0	Y
7216	1015.5	520.729	76.5	7.1	0.0	0.0	0.0	0.0	0.0	Y
7218	737.3	435.611	11.7	0.2	0.0	0.0	0.0	0.0	0.0	Y
7232	1581.5	957.478	13.7	0.0	0.0	0.0	0.0	0.0	0.0	Y
7259	841.7	473.714	26.7	0.8	97.5	0.1	72.2	72.3	14.4	Y
7262	592.8	335.901	14.3	0.0	114.5	0.0	84.7	84.7	24.2	Y
7420	1013.8	592.194	22.1	9.7	81.2	0.0	53.2	53.2	8.7	Y
7443	582.7	321.761	4.0	4.0	0.0	0.0	0.0	0.0	0.0	Y
7509	846.4	487.162	9.8	10.8	0.0	0.0	0.0	0.0	0.0	Y
7532	1721.2	981.949	13.2	35.5	0.0	0.0	0.0	0.0	0.0	Y

Year 2007		> 35% 30-35% 25-30%						SFMP Tables Master.xls Table 48		
		Area Above H60 line (ha)								
Watershed ID	All Watershed Area (ha)	Forested	Non-Forest Vegetated	Non-Vegetated	Harvested	Roads	ECA Area (Harvested)	Overall ECA Area (Harvested+ Road)	ECA %	Bull Trout?
7555	531.3	304.849	6.9	0.3	42.5	0.0	31.4	31.4	10.1	Y
7576	588.2	305.496	29.2	4.3	0.0	0.0	0.0	0.0	0.0	Y
7592	1643.5	989.1	2.7	2.2	0.0	0.0	0.0	0.0	0.0	Y
7615	927.8	536.314	17.0	0.0	0.0	0.0	0.0	0.0	0.0	Y
7658	1730.6	965.368	25.9	24.4	219.6	0.3	159.0	159.3	16.1	Y
7659	2329.3	1183.601	8.2	211.9	0.0	0.1	0.0	0.1	0.0	Y
7816	1503.0	859.062	15.2	31.6	0.0	1.2	0.0	1.2	0.1	Y
7855	775.1	421.157	6.6	20.8	0.0	0.0	0.0	0.0	0.0	Y
7964	840.7	489.609	0.0	23.8	0.0	0.0	0.0	0.0	0.0	Y
8027	1157.8	687.94	11.7	13.3	0.0	0.0	0.0	0.0	0.0	Y
8324	549.6	308.295	6.3	11.8	2.9	0.0	1.4	1.4	0.4	Y
8351	1118.9	663.799	0.2	11.7	0.0	0.0	0.0	0.0	0.0	Y
10773	1249.7	736.681	0.4	0.1	56.5	0.0	41.8	41.8	5.7	Y

Appendix 7. Caribou Habitat Management Commitments

CARIBOU HABITAT MANAGEMENT COMMITMENTS

Temporary Harvesting Deferral

On February 11, 2005 Canfor Alberta Woodlands Operations committed in a letter addressed to the Canadian Parks and Wilderness Society to defer timber harvesting in the range area of the Little Smoky caribou herd for two years. Ref: Canfor Response to Jan 10 Letter.doc

- The deferral period commences May 1, 2005 and ends April 31, 2007.
- During the deferral period, Canfor will not conduct any timber harvesting or new road construction within the Little Smoky caribou herd range area.
- The caribou area is that area identified as the range of the Little Smoky Herd in Figure 1 of the report entitled "Management of Woodland Caribou (*Rangifer tarandus caribou*) Habitat Within Canfor Grande Prairie's FMA area: A Timeline". Ref: Caribou Timeline May 2004.pdf
- The deferral does not prevent Canfor from conducting silviculture, forest monitoring and inventory or road maintenance and road restoration activities within the caribou area.
- During the deferral period, the harvest sequence that was approved in Canfor's Detailed Forest Management Plan on November 3, 2003 will be amended by shifting harvesting from the Deep South Operational Unit to the Deep North Operational Unit.
- Modifications to the approved harvest sequence, and resulting impacts on forest values and management commitments must be evaluated through a Compartment Assessment prepared by Canfor, the results of which are subject to approval by Alberta Sustainable Resource Development.
- The Compartment Assessment will be included as a component of the June 1, 2005 Annual Operating Plan.

Commitments to Maintain Caribou Habitat

The Detailed Forest Management Plan for FMA 9900037 includes a commitment to maintain woodland caribou habitat within the FMA area. The following strategic planning constraints have been adopted.

- No more than 20% of the caribou area will be in pioneer or young seral condition.
- No less than 20% of the caribou area will be in old seral condition.
- The maximum opening size in the caribou area is 1000 hectares.
- Stands adjacent to new openings in the caribou area must be at least 30 years old.
- Seismic lines and road corridors within cutblocks will be reforested concurrently with cutblock reforestation.

Ref: DFMP F Section (subsections 1 to 10)

Ref: DFMP G to J Sections

Commitments to Minimize Caribou Disturbance

Research indicates that human disturbances may cause direct mortality of caribou, particularly young calves, human developments may cause displacement of caribou or act as barriers to movement, and human activity may increase the incidence of caribou harassment. Disturbance is especially damaging to caribou during the spring calving season, and for the period immediately following. As a result, Canfor has committed to minimize intrusions into the caribou area and adopt the following principles.

- No scheduled activities will be conducted in the caribou area during the calving season, May 1st to June 30th
- Timber harvesting in the caribou area (notwithstanding the 2005-07 deferral) will be restricted to the period November 1st to February 28th.
- All roads constructed by Canfor (post 1999) in the caribou area will be constructed to a Class V Standard (winter use).
- Existing seismic lines will be used for access within the caribou area whenever feasible.
- Roads that are constructed and/or utilized for timber harvesting or other winter activities in the caribou area will be seasonally or permanently deactivated prior to March 15th of the year in which the activities have occurred.
- Gates will be erected and maintained on all Canfor roads into the caribou area that are held under Licences of Occupation, providing the restriction of public access is authorized by government.
- If required for winter access into the caribou area, Canfor's bridge on Deep Valley Creek (NE7-62-26-W5M) will not be installed prior to November 1st and will be removed prior to March 15th.

Ref: DFMP F Section (subsections 1 to 10)

Canadian Forest Products Ltd.
9401 - 108 Street
Postal Bag 100
Grande Prairie, Alberta
Canada T8V 3A3
Phone; (780) 538-7749
Fax: (780) 538-7800
www.canfor.com