Healthy Pine Strategy

An Amendment to the Detailed Forest Management Plan (2003) for Canfor FMA 9900037 to Incorporate Strategies for Mountain Pine Beetle Control

Canadian Forest Products Ltd.
Grande Prairie Division

April 30, 2009

Approved: _____

Title page graphics/ photos:

Mountain Pine Beetle

http://images.google.ca/imgres?imgurl=http://images.theglobeandmail.com/archives/RTGAM/images/20080325/wbeetle26/_done_0325beetle188.jpg&imgrefurl=http://www.theglobeandmail.com

MPB Killed tree
Mike Hudson

Log infested with MPB

http://images.google.ca/imgres?imgurl=http://media.canada.com/45f711ce-15a3-4c83-a99b-8f22ad9399d7/pinebeetle0424.jpg&imgrefurl=http://www.canada.com/vancouver Sun/

Blue stain lumber

http://images.google.ca/imgres?imgurl=http://www.nrcan.gc.ca/com/images/elements/issues/08/ponderosae.jpg&imgrefurl=http://www.nrcan.gc.ca/

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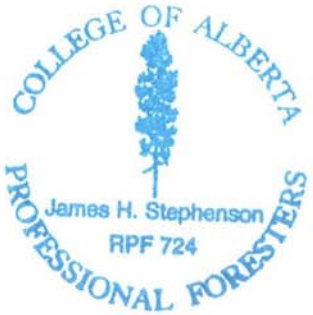

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Woodlands Manager

ACKNOWLEDGEMENTS

Canfor wishes to express appreciation to all the individual members of the Forest Management Advisory Committee, Tolko Industries Ltd., Ainsworth Engineered Canada Ltd. and Alberta Sustainable Resource Development for the time, effort and expertise contributed towards the development of this Healthy Pine Strategy.

Canfor would also like to thank the many individuals, too numerous to mention, 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 Public, Grande Prairie Regional College, Spirit River, DeBolt Public, Grande Cache Municipal, and Valleyview Municipal.

More information can be obtained by attending open houses and town hall meetings, which are held periodically in the South Peace area. Watch for advertisements in local newspapers for times and dates or contact Canfor at:

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Executive Summary

Flights of mountain pine beetle (MPB) (*Dendroctonus ponderosae* Hopkins*)* infected a large area of lodgepole pine stands in northwestern Alberta in the summer of 2006, including Canadian Forest Products Ltd. (Canfor) FMA area 9900037 and its quota tenures in the Hines Creek area. Approximately twenty percent of the species within the Canfor FMA area is lodgepole pine, which is now under threat.

In September 2006, Alberta Sustainable Resource Development (ASRD) released the *Mountain Pine Beetle Action Plan for Alberta* and the *Interpretive Bulletin: Planning Mountain Pine Beetle Response Operations*. In response, Canfor prepared its Healthy Pine Strategy amendment to its approved 2003 Detailed Forest Management Plan. The Healthy Pine Strategy is an integral part of that plan, but it is contained within its own separate binding[1]. It provides information directly relevant to MPB planning and management and bridges the gap between the approved 2003 DFMP and its scheduled revision.

The Healthy Pine Strategy reports on the impact of MPB on long-term fibre supply, habitat considerations for species of special concern (woodland caribou, grizzly bear and trumpeter swan) and water yield. Canfor has also evaluated and reported on four CSA values contained within its Sustainable Forest Management Plan (Canfor, 2005).

Canfor retained Timberline Natural Resources Group Ltd. to conduct a Resource and Timber Supply Analysis (RTSA) wherein three different management scenarios were modeled using ASRD's *Interpretive Bulletin: Planning Mountain Pine Beetle Response Operations ver. 2.6* as a guide. The modeling approach utilized for the RTSA is similar in all respects to that presented in the 2003 DFMP (i.e., input spatial data was amended to reflect changes that have occurred on the landbase, but the basic forest cover, yield curves, and other model parameters were essentially unchanged). Any changes to input data followed the guidance of Annex 1 of the *Alberta Forest Management Planning Standard*. The results from the RTSA are provided as Appendix 3 within the Healthy Pine Strategy.

The following management alternatives were considered:

- **Status Quo: MPB1** - The preferred management scenario from the 2003 DFMP, updated to reflect harvesting up to 2007. A sensitivity analysis was also completed to estimate the impact that widespread MPB mortality would have on coniferous harvest levels if no effort is made in the short-term to reduce risk by preferentially harvesting stands that are susceptible to MBP attack;
- **Healthy Pine: MPB2** - Focused harvest in pine stands for fifteen years in order to reduce the risk and level of pine mortality in the event of an MPB outbreak. However, no pine mortality is assumed. The original 2003 DFMP cover constraints were not enforced for the first fifteen-years (2007 – 2021), but no harvesting was permitted within the caribou primary intactness area for that period. For the balance

[1] *The text of the 2003 DFMP will not be revised.*

of the 200-year planning horizon (2022 – 2206), the original 2003 DFMP cover constraints were enforced; and

- **Disaster: MPB3** - Focused harvesting in pine stands for fifteen years in order to reduce the risk and level of pine mortality in the event of an MPB outbreak. ASRD pine mortality assumptions were applied at year fifteen of the simulation. The original 2003 DFMP cover constraints were not enforced for the first fifteen years, but no harvesting within the caribou primary intactness area was permitted for that period. For the balance of the 200-year planning horizon (2022 – 2206), the original 2003 DFMP cover constraints were enforced.

Canfor utilized the results from the RTSA to conduct a comparative analysis, and based on the results, selected the Healthy Pine Scenario (MPB2) as the preferred forest management alternative (PFMA). The PFMA balances social, environmental and economic values, recognizing that tradeoffs are necessary between MPB management objectives, legal requirements and commitments to maintain other resource values.

The Healthy Pine Strategy was selected because it:

- Significantly reduces the area of MPB-susceptible pine, which is primary objective of the ASRD *Mountain Pine Beetle Action Plan*. It focuses on pine harvest and creates a younger forest that is more resistant to MPB outbreaks;
- Achieves and sustains the long-term coniferous harvest level identified within the 2003 DFMP (670,000 m^3/ year) for the entire 200-year planning horizon.
- Maintains deciduous timber allocations of 452,529 m^3/ year for the entire 200-year planning horizon and the non-sustainable deciduous carryover volume of 63,665 m^3 for Tolko Industries Ltd. and 226,776 m^3 for Ainsworth Engineered Canada Ltd.;
- Conserves watershed resources throughout the 200-year planning horizon at levels similar to those presented in the 2003 DFMP;
- Achieves the objectives for non-timber resources such as species of management concern (woodland caribou, trumpeter swan and grizzly bear), and
- Achieves the objectives for CSA values to a high degree, while countering the effects of the MPB outbreak.

Spatial harvest sequences were developed for both coniferous and deciduous species and they are presented in the Healthy Pine Strategy. Tolko Industries Ltd. and Ainsworth Engineered Canada Ltd. played a leading role in establishing priority areas for harvest.

The Healthy Pine Strategy will be implemented through an adaptive management framework, which includes provisions for changes to forest management plans based on a process of scientific evaluation, monitoring, assessment and feedback. Operational activities will be conducted in accordance with the *Canfor FMA 9900037 Operating Ground Rules – FMU G15* and *Canfor Ground Rules Addendum – Mountain Pine Beetle Operations.*

Monitoring and forest stewardship reporting are important components of the Healthy Pine Strategy. A matrix describing monitoring, stewardship reports and mitigation options is provided within the Healthy Pine Strategy.

Public involvement is a primary principle used in development of the Healthy Pine Strategy and the Forest Management Advisory Committee is an integral part of the planning process.

Validation Letter

Canadian Forest Products Ltd.

Grande Prairie Division

April 28, 2009

Mr. Robert Stokes
Executive Director
Forest Management Branch
Sustainable Resource Development
7th Floor
Great West Life Building
9920 – 108 Street
Edmonton, Alberta T5K 2M4

Dear Mr. Stokes:

Re: FMA 9900037 Detailed Forest Management Plan (DFMP) Amendment – Healthy Pine Strategy

I attest that the components of the above noted plan have been prepared with due diligence and have been assessed for accuracy to a reasonable level. In accordance with Annex 2 of the Alberta Forest Management Planning Standard version 4.1, I am also hereby confirming that the amendment has been prepared in adherence to the following checklist.

- √ Yield projections and all associated data and analysis (note: the amendment incorporated data and analysis from the approved 2003 DFMP);
- √ Vegetation inventory data (note: the amendment incorporated data from the approved 2003 DFMP);
- √ Landbase assessment (note: the amendment incorporated updated information that has been made available since approval of the 2003 DFMP);
- √ Silviculture strategies (note: the amendment incorporates the same silviculture strategies as the approved 2003 DFMP);
- √ Forecasting (resource and timber supply analysis);
- √ Harvest planning (spatial harvest sequence); and
- √ Monitoring reports (note: Annual Performance Monitoring Reports have been submitted by Canfor to the department for each of the 2003 to 2008 periods).

Forecasting for purposes of resource and timber supply analysis, and preparation of the spatial harvest sequence and associated scenario modelling has been completed by Timberline Natural Resources Group Ltd. Work performed by that organization, under agreement with Canfor, has been validated by the appropriate registered professional under separate cover.

We trust this meets with your approval.

Yours truly,

James Stephenson, RPF 724
Woodlands Manager

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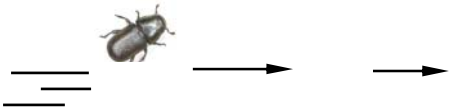


A. PREAMBLE

1. Introduction

Flights of mountain pine beetle (*Dendroctonus ponderosae Hopkins)* infected a large area of lodgepole pine stands in northwestern Alberta in 2006, including Canadian Forest Products Ltd. (Canfor) FMA area 9900037 and its quota tenures in the Hines Creek area. Approximately twenty percent of the species within the Canfor FMA area is lodgepole pine (Figure 5), which is now under threat.

According to the Government of Alberta (GoA) website:

"The mountain pine beetle is the most destructive pest of mature lodgepole pine forests in North America. It is a small bark beetle (4.0 - 7.5 mm in length) that introduces blue-stain fungi when attacking the tree. Its larvae feed in the phloem of the tree. The action of blue-stain fungi and larval feeding can kill the tree within one month of the attack. Periodic outbreaks of this insect destroy millions of hectares of pine forest in British Columbia (B.C.) and western U.S.A.

The normal range of mountain pine beetle distribution ends along the Rocky Mountains therefore most of the lodgepole pine forest in Alberta has evolved without the presence of mountain pine beetle. If the beetles are not managed while the populations are relatively low, severe damage to pine stands will result. Under the right conditions, outbreaks can destroy thousands of hectares of mature pine forest in a single year". http://srd.alberta.ca/forests/health/pestalerts/mountainpinebeetles.aspx. "

Source: ASRD

In September 2006, Alberta Sustainable Resource Development (ASRD) released the *Mountain Pine Beetle Action Plan for Alberta* (ASRD, 2006) and the *Interpretive Bulletin: Planning Mountain Pine Beetle Response Operations ver. 2.6* (ASRD, 2006a) (Appendix 1). In response, Canfor prepared the current document, *An Amendment to the Detailed Forest Management Plan (2003) for Canfor's FMA 9900037 to Incorporate Management Strategies for Mountain Pine Beetle Control*. From this point in the document, the title of that document will be referred to as the "Healthy Pine Strategy".

The purpose of the Healthy Pine Strategy is to present Canfor's pine management strategy, which

- Achieves ASRD guidelines for risk reduction of MPB-susceptible pine stands;
- Selects a revised preferred forest management alternative (PFMA) that minimizes the impact on:
  - Short and long-term coniferous and deciduous timber supply;
  - Species of management concern as measured by woodland caribou seral stages, trumpeter swan sites and grizzly bear open road densities;
  - Watershed conservation as measured by equivalent clearcut area (ECA%);
  - Conservation of CSA Values, as follows:
    - Ecosystem diversity as measured by seral stages;

- Genetic diversity as measured by landscape metrics i.e., mean patch size, mean nearest neighbor distance, area-weighted mean shape index and distribution of patch size classes;
- Species diversity as measured by bull trout ECA% above the H60; and
- Water quality and quantity as measured by water yield.

♦ Develops revised spatial timber harvesting sequences for coniferous and deciduous species.

2. Relationship Between the 2003 DFMP and Healthy Pine Strategy

Canfor's approved 2003 DFMP was prepared in accordance with paragraph 10 of the Forest Management Agreement 9900037 and received approval from Alberta Sustainable Resource Development (ASRD) in November 2003. At that time, the plan contained Canfor's Sustainable Forest Management Plan (2001), developed and approved in fulfillment of the requirements for certification under the Canadian Standards Association (CSA) Sustainable Forest Management System Standard CAN/ CSA-Z809-96. In 2005, Canfor's SFMP was certified to the CAN/ CSA-Z809-02 standard and using an integration matrix, it was incorporated (Appendix 2) into the 2003 DFMP as a replacement of the previous version.

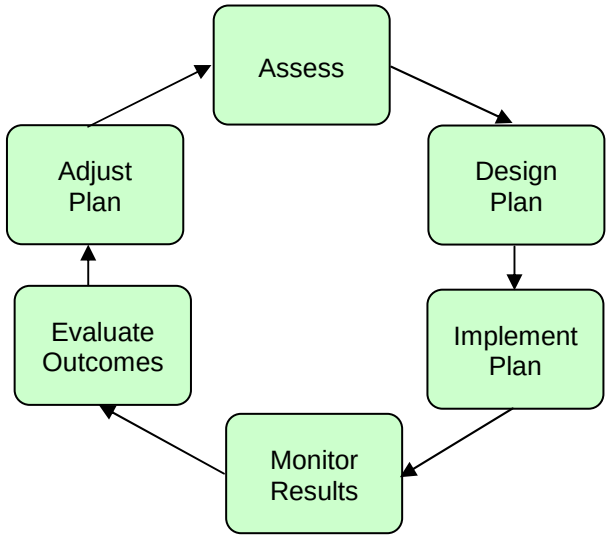
The Healthy Pine Strategy is an addendum to the 2003 DFMP and is an integral part of that plan, but contained within its own separate binding. It is not meant as a complete revision of the 2003 DFMP and provides information directly relevant to MPB planning and management. Within its text, the reader will be referred from time to time to the 2003 DFMP for additional details, information or clarification. The text of the 2003 DFMP will not be revised.

The Healthy Pine Strategy bridges the gap between the approved 2003 DFMP and its scheduled revision. Due to the MPB infestation and the need to develop the Healthy Pine Strategy, rescheduling of the next DFMP to a future date may be necessary.

3. Healthy Pine Strategy Development and Implementation Framework

Scope: The Healthy Pine Strategy applies to the resources within Canfor's FMA 9900037 (Figure 2). The approved 2003 Detailed Forest Management Plan (Canfor, 2003) forms the basis for the amendment.

Figure 1. Adaptive Management Process



Modeling Approach: The modeling approach undertaken for this analysis is the same as that used for the 2003 DFMP. The spatial data set created for the 2003 DFMP was the starting point for this analysis. Input data was updated to 2007, but modeling parameters remained the same except in instances where they were specifically modified to deal with MPB and related harvest scheduling issues. The following were utilized from the 2003 DFMP:

- The same yield curves and all stands maintained their yield curve assignments unless they had been harvested since the last analysis (in which case they were moved to their assigned regenerating yield curve);
- In the short-term (fifteen-year plan 2007 – 2021), model limits designed to safeguard other SFMP 2005 objectives were relaxed to allow for focused harvesting in pine to reduce MPB risk.
- For the balance of the 200-year planning horizon (2022 – 2206), it is assumed that MPB risk reduction is achieved and the model cover constraints for other resource values are once again enforced, as follows.
  - Adjacency rules based on either green-up height (for most coniferous and deciduous blocks) or age (30 years between blocks in the caribou habitat area) were applied between adjacent blocks;
  - Seral stage distributions were applied at the FMA area and Main, Puskwaskau and Peace parcel levels by applying cover constraints;

- Cover constraints were applied to limit the rate of harvest in caribou habitat by managing the seral stage distribution; and
- Cover constraints applied to the H60 portion of watersheds in an effort to limit water yield increases.

Public Participation: Canfor adopted public participation as an essential element in development of the Healthy Pine Strategy and will continue to be accountable to the public and will verify, by independent audit, that forestry operations are achieving present and future objectives.

Forest Management Advisory Committee (FMAC) comprised of local stakeholder groups and individuals possessing an interest in the management of the forest resource[2], provided input into the Healthy Pine Strategy.

Supporting Documents: Canfor previously submitted several documents to ASRD in support of the Healthy Pine Strategy, namely:

- Terms of Reference for the Healthy Pine Strategy (Canfor, 2007); and
- Canfor's revised Public Involvement Plan (Canfor, 2008).

[2] *The Committee is currently (2007) comprised of members from Alberta Conservation Association, Alberta Professional Guides and Outfitters Association, Alberta Trappers Association, Canadian Association of Petroleum Producers, Canadian Natural Resources Ltd., City of Grande Prairie, DFA Related Worker, Ducks Unlimited, Grande Prairie and Area Forest Educator, County of Grande Prairie #1, Grande Prairie Regional College, M.D. of Greenview No. 16, Métis Nation Zone 6, Peace Wapiti School Division No 76, Public member(s) at large, South Peace Environmental Association, Sturgeon Lake Cree Nation, Travel Alberta North, Tourist Destination Region and Town of Valleyview.*

B. BACKGROUND INFORMATION

1. Canfor Corp and Grande Prairie Division

Canfor Corporation is a leading Canadian integrated forest products company based in Vancouver, B.C. with interests in over 32 facilities in British Columbia, Alberta and Quebec. The main operating company is Canadian Forest Products Ltd., from which the name Canfor is derived.

Canfor's Grande Prairie Division history in the region started in 1953 (sidebar) and continues to the present.

Canfor's modern sawmill complex is located within the City of Grande Prairie. Logs for the mill are provided under Forest Management Agreement (FMA) 9900037 with the Province of Alberta. The original twenty-year agreement was signed on May 26, 1964, with renewals signed in 1978 and again in May 1999. The current agreement (1999) expires on April 30, 2019.

The agreement grants Canfor the rights to manage, grow, harvest and reforest coniferous timber, and to maintain and/ or increase the coniferous annual allowable cut within a FMA area (Figure 2), comprised of 649,160 hectares. The FMA area is comprised of three separate parcels – Peace, Puskwaskau and Main.

Abbreviated History of Canfor Grande Prairie Division

1953	Northern Plywoods Ltd. constructs a plywood mill on the outskirts of Grande Prairie to utilize balsam poplar.
1961	North Canadian Forest Industries Limited (NCFI) is incorporated upon amalgamation of Grande Prairie Lumber Co. and Northern Plywoods Ltd. The Company successfully pioneers the use of lodgepole pine for plywood production.
1964	NCFI acquires timber holdings by signing a Forest Management Agreement (FMA) encompassing approximately 287,863 ha.
1965	NCFI closes its bush mills and centralizes the sawing, drying and planing operations in Grande Prairie. It becomes the first sawmill in Alberta to chip slabs and edging. The chips are sent to Prince George by rail.
1969	NCFI purchases several small quotas near Fairview and develops a studmill at Hines Creek, Alberta. Further acquisitions of quota results in an expansion in 1972.
1974	NCFI acquires Imperial Lumber Company Ltd.
1981	NCFI becomes a division of Canadian Forest Products Ltd. of Vancouver, B.C. The name is changed to Canadian Forest Products Ltd., Alberta Operations (Canfor).
1985	Grande Praire fingerjoint plant commences operations.
1988	Fingerjoint plant ceases operations.
1989	Grande Prairie studmill converts to a dimension sawmill utilizing narrow kerf and optimizing technology to increase recovery.
1991	Plywood plant ceases operation.
1995	Hines Creek mill modernized with $20 million investment.
1996	Grande Praire fingerjoint plant re-opens.
1999	$22 million capital modernization of the Grande Prairie lumber mill.
2001	$18 million capital modernization of the planer and sawmill at Grande Praire lumber mill.
2005	Hines Creek mill ceases operations due to timber shortages. Canadian Gas & Electric Inc. commences operations of its Grande Prairie EcoPower Centre using wood residues from the Grande Prairie sawmill.
2006	Grande Praire fingerjoint plant ceases operations.

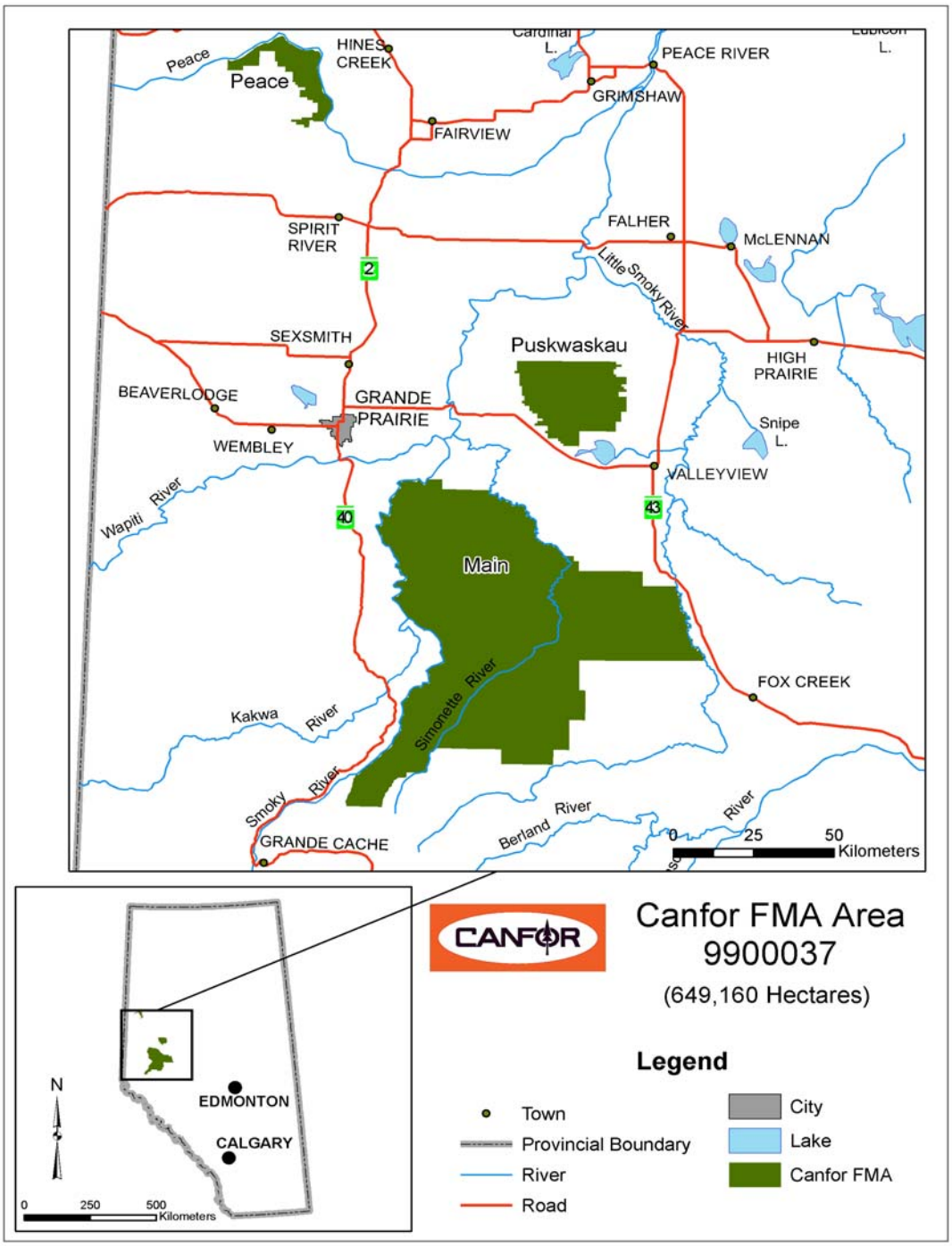
Source: HPS Tables & Graphs Master.xls

2. Manufacturing Facilities

The Grande Prairie sawmill complex was built in 1989 with modernization occurring in 1999 and 2001. The mill is designed to maximize flexibility and manufacture metric and specialty lumber products, as well as North American sizes.

Figure 2. Canfor FMA area 9900037

HPS Maps
Map 1



3. Sawmill Annual Coniferous Log Requirement and Sources

In 2007, the log requirement for the Grande Prairie facilities was approximately 719,000 m^3/ year. With the AAC uplift established by the RTSA (65,000 m^3/ year), it is anticipated that log requirements for the immediate future will be approximately 850,000 m^3/ year. Canfor plans to utilize the coniferous AAC uplift as indicated in Section 4 following.

The majority of the logs required by the sawmill are obtained from FMA 9900037 and from coniferous quota tenures held by Canfor and 946013 Alberta Ltd.[3] in the Hines Creek area.

The balance of the coniferous log requirement is obtained from salvage, private and Crown purchases and Industry purchase agreements, as indicated in Table 1.

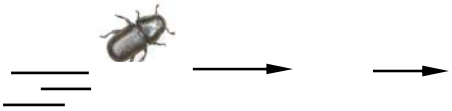
Table 1. Current (2007) and Projected Annual Log Deliveries, Sales and Log Agreements

HPS Tables & Graphs Master.xls
Table 1

Source	2007 Annual Coniferous (m^3)			Projected Annual Coniferous (m^3)			
	Deliveries to Canfor Mill	Sales to Others	Totals	Deliveries to Canfor Mill	Sales to Others	CTP and LTP	Total
FMA area (includes slavage)	465,729	46,673	512,402	628,515	72,910 [1]	13,575	715,000
Private and Crown Purchase	36,968		36,968	25,000			25,000
Salvage (Outside FMA area)	14,264		14,264	4,600			4,600
Quotas (Canfor and 946013 Alberta Ltd.)	133,259	32,230	165,489	191,885 [2]	20,000 [3]		211,885
Industry Purchase	77,236		77,236				
Total	**727,456**	**78,903**	**806,359**	**850,000**	**92,910**		**942,910**
Mill Consumption	**719,000**			**850,000**			
Notes:							
1. Potential sales to Weyerhaeuser Company Ltd. and Foothills Forest Products Ltd.							
2. It is assumed the Hines Creek quotas will be re-issued under a new quota (P17).							
3. Potential sales to Daishowa-Marubeni International Ltd.							

Source: Canfor compiled data

[3] *946013 Alberta Ltd. is a company incorporated by Canfor to purchase coniferous logs from eight independent companies in the Hines Creek area.*



4. Utilization of Additional Volume

Despite the unprecedented collapse of forest products markets that has occurred since mid 2005, and the resultant decline in both demand and price for commodity products, Canfor plans to utilize the uplift in timber identified within the current RTSA (an average of 65,000 m^3/ year for the fifteen year plan (2007 – 2021). To accomplish this, Canfor has developed a fibre strategy for the company's Grande Prairie manufacturing facility that includes, among other initiatives, a comprehensive chain-of-custody model and a series of fibre supply agreements with other forest companies. The overarching tenet of the Grande Prairie Division fibre strategy is to maximize product quality so that the highest net return for those products can be realized. This strategy utilizes the division's inherent advantage provided by its Alberta timber holdings, which are of a distinctly higher quality than many other jurisdictions. In particular, Canfor's fibre supply in British Columbia continues to deteriorate, in terms of both quality and accessibility, as the effects of the mountain pine beetle infestation increase. Over the past decade, Canfor has established long term relationships with a number of select customers for its lumber products who have specified that the lumber they purchase must be of premium quality. In order to maintain sufficient supply for these customers, and in consideration of declining lumber quality at Canfor's B.C. operations, the Grande Prairie will need to provide a larger proportion of products to those markets. This not only helps secure the ongoing viability of the Grande Prairie operation, but also drives the need to increase the percentage of premium products that are produced in the facility.

The single largest factor in the production of consistent, high quality primary forest products is the provision of high quality logs to the manufacturing facility. In order to optimize the overall quality of products produced at Canfor's Grande Prairie sawmill, the division is undertaking a number of initiatives aimed at improving the overall quality of logs delivered to the mill. The indicated uplift in AAC that may be available due to the RTSA provides the opportunity for Canfor to develop mutually beneficial fibre supply trades or sales with other companies that will improve Canfor's delivered log profile. Multi-year fiber supply agreements with the following companies are already in effect or may be negotiated:

- Weyerhaeuser Canada Limited for the sale of FMA area pulp logs;
- Foothills Forest Products Ltd. (FFP) for the sale of small diameter FMA area saw logs;
- Zavisha Sawmill Ltd. for the sale or trade of quota sawlogs;
- 946013 Alberta Ltd. for the purchase of sawlogs; and
- Daishowa-Marubeni International Ltd. (DMI) for the sale of pulp logs.

The fibre supply agreements between Canfor and the above noted companies will not only secure a log profile that is more conducive for Canfor's manufacturing strategy, but will enable the pursuit of additional value added market opportunities by FFP and Zavisha, and help secure coniferous chip supplies by Weyerhaeuser and DMI.

Canfor will continue to evaluate and implement opportunities to improve performance of the Grande Prairie sawmill; including capital investments to support increased fibre utilization and prime product grade out turn percentages. Opportunities to increase lumber production are limited at this time because of the continuing weak demand for lumber products and constraints on access to the United States market imposed under the Canada – US Softwood Lumber Agreement. However, Canfor is continuing to seek opportunities in non-traditional markets, which if realized, may increase the demand for products from the Grande Prairie facility. Successful implementation of Canfor's proposed Healthy Pine Strategy will that to occur.

5. Grande Prairie EcoPower Centre

On June 21, 2005 Canadian Gas & Electric Inc. (CG&E) commenced operations of its Grande Prairie EcoPower Centre and began generating electrical through the combustion of residual wood fibre. The facility is located adjacent to Canfor's Grande Prairie sawmill site.

Under an agreement with CG&E, Canfor is responsible for supply of raw material for the plant in return for electricity and steam. Sixty percent of the co-generation plant fibre requirements are satisfied by the Canfor sawmill, however the remainder must be transported from other sources. Currently, Canfor is acquiring a modest volume of fibre that has been produced from grinding infested trees that were harvested under Level I MPB containment activities.

6. CSA Certification

Canfor's SFMP 2005 was certified to CAN/ CSA Z809-02 standard using a process of public participation. To ensure local relevance, the Forest Management Advisory Committee provided values, objectives, indicators, and targets (VOITs) for 6 Canadian Council of Forest Ministers (CCFM) Criteria and 17 CSA SFM Critical Elements (Table 2).

Table 2. CCFM Criteria and Critical Elements

HPS Tables & Graphs Master.xls
Table 2

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: Canfor SFMP 2005 Tables Master.xls

In October 2006, the SFMP 2005 was incorporated into the 2003 DFMP using an integration matrix (Appendix 2). The matrix provides the indicators and objectives contained in the approved 2003 DFMP and, via a side-by-side comparison, directly links them to the indicators and targets from the SFMP 2005. The matrix was submitted for approval to ASRD on October 25, 2006.

Within the Healthy Pine Strategy, the results for four SFMP 2005 targets were compiled based on the results from the current RTSA and the results are discussed in Section F 3 and the RTSA (Appendix 3).

7. Process to Adjust Canfor's Healthy Pine Strategy

The Healthy Pine Strategy was developed using the most up to date data and information. As new information becomes available, it will be evaluated and using an adaptive approach, a determination will be made regarding the course of action to be undertaken.

Canfor will continue to monitor progress toward achievement of the CSA targets described within its SFMP 2005 (Canfor, 2005) and the current RTSA (Appendix 3).

The progress in achieving objectives will be reported within its Annual Performance Monitoring Report (APMR) or Five Year Stewardship Report. If existing CSA targets cannot be sustained due to the impact of MPB, Canfor will work with the Forest Management Advisory Committee to develop new or revised indicators, targets, and acceptable variance, as required. At the April 20, 2009 FMAC meeting, the Committee developed and ratified one new and two revised indicators, targets, and acceptable variances as indicated in Table 3. They will replace those in the SFMP 2005 and will be implemented and reported commencing in the 2009 APMR.

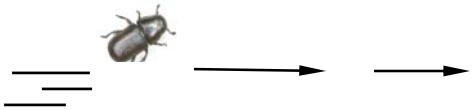


Table 3. New and Revised CSA Indicators, Targets and Acceptable Variances

HPS Tables & Graphs Master.xls
Table 3

SFMP 2005 VOITs					New and Revised VOITs (as approved by FMAC Apr. 15, 2009)			
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	**Current Status**	**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	**Acceptible Variance**
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.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	Revised	Same as SFMP 2005	(1.2) 1a.8.1: A minimum of 10% of the area harvested across the FMA area will contain structure retention accumulated annually beginning in 2008 timber year.	Minimum of 5% of the area harvested across the FMA area will contain structure retention accumulated annually.
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	N/A	N/A	New	(2.1) 1a.2: Percent of annual harvest area within Mountain Pine Beetle (MPB) pine susceptible stands as defined in the Detailed Forest Management Plan, Healthy Pine Strategy amendment.	(2.1) 1a.2.1: 90% of the annual harvest area is within MPB pine susceptible stands beginning in 2009.	80% of the annual harvest area is within MPB pine susceptible stands, beginning in 2009.
Element (3.1) Soil Quality and Quantity Conserve soil resources by maintaining soil quality and quantity	(3.1) 2 Soil quantity	(3.1) 2a Soil erosion will be minimized	(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	Revised	(3.1) 2a.4: The number of blocks that require prompt road deactivation.	(3.1) 2a.4.1: 100% of the blocks that have temporary roads will be permanently deactivated within 6 months after usage is complete.	Zero

Source: Canfor compiled data

C. DESCRIPTION OF FMA 9900037

1. Introduction

The FMA area consists of 649,160 ha of forested land contained in three separate parcels within forest management unit (FMU) G15 (Figure 2). For administrative purposes the parcels are identified as the Peace, Puskwaskau and Main.

The FMA area encompasses portions of four natural regions including the Boreal Forest, Parkland, Foothills and Rocky Mountain. Fire played a prominent role in the age structure and composition of the FMA area forest. Over time, repeated fires have created a patchwork of timber stands comprised of various proportions of coniferous and deciduous species, depending on the location. Well-drained and upland sites generally contain white spruce (*Picea glauca* [Moench] Voss*)*, lodgepole pine (*Pinus contorta var. latifolia*), balsam fir (*Abies balsamea* [L.] Mill*.)*, subalpine fir (*Abies lasiocarpa* [Hook] Nutt.), and trembling aspen (*Populus tremuloides* Michx.).

Imperfectly drained local areas commonly contain combinations of black spruce (*Pices mariana* [Mill.] B.S.P.), balsam poplar (*Populus balsamifera* L.), white spruce and sometimes white birch (*Betula papyifera* Marsh.). Poorly drained depression areas often contain tamarack (*Larix laricina* [Du Roi] K. Koch), and black spruce.

2. Timber Resources

Canfor manages and harvests commercial coniferous species including white spruce, lodgepole pine, balsam fir and black spruce. Other coniferous tree species, including larch (*Larix laricina* [Du Roi] K. Koch), jack pine (*Pinus banksiana* Lamb) and Engelman spruce (*Picea engelemannii),* are found within the FMA area but at this time they have minor commercial importance.

Tolko Industries Ltd. have rights to utilize trembling aspen, balsam poplar and white birch and Ainsworth Engineered Canada Ltd. have rights to utilize trembling aspen and balsam poplar from deciduous timber allocations (DTA) located within the FMA area (Table 5).

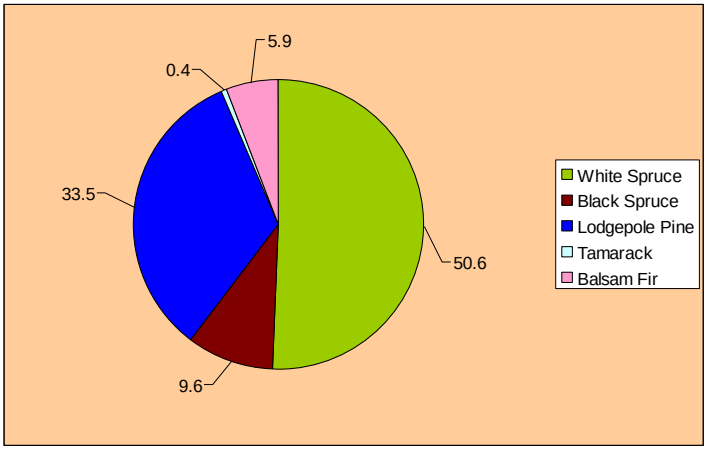
2.1 Species Mix

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

Table 4 provides a summary of the components of the coniferous timber harvesting landbase, as of June 2007.

Figure 3. Coniferous Species Percentage

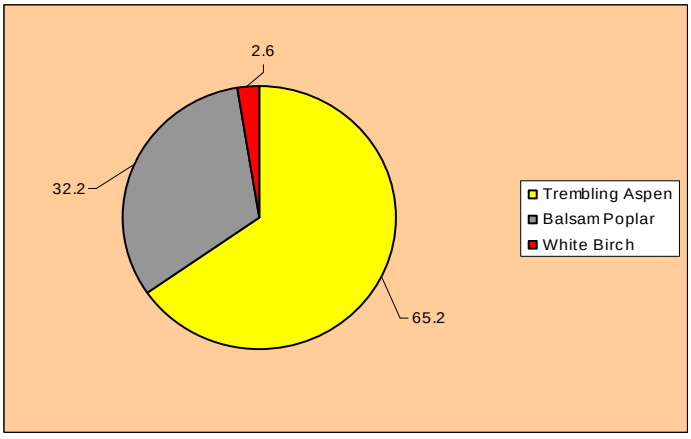
HPS Tables & Graphs Master.xls
Figure 3



Source: Canfor compiled data

Figure 4. Deciduous Species Percentage

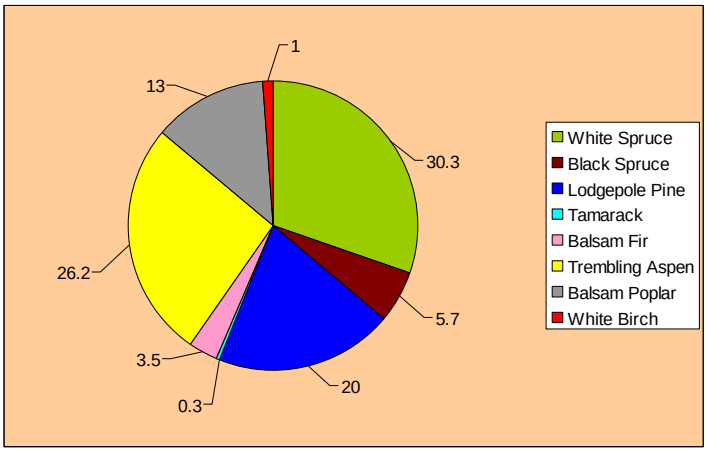
HPS Tables & Graphs Master.xls
Figure 4



Source: Canfor compiled data

Figure 5. All Species Percentage

HPS Tables & Graphs Master.xls
Figure 5



Source: Canfor compiled data

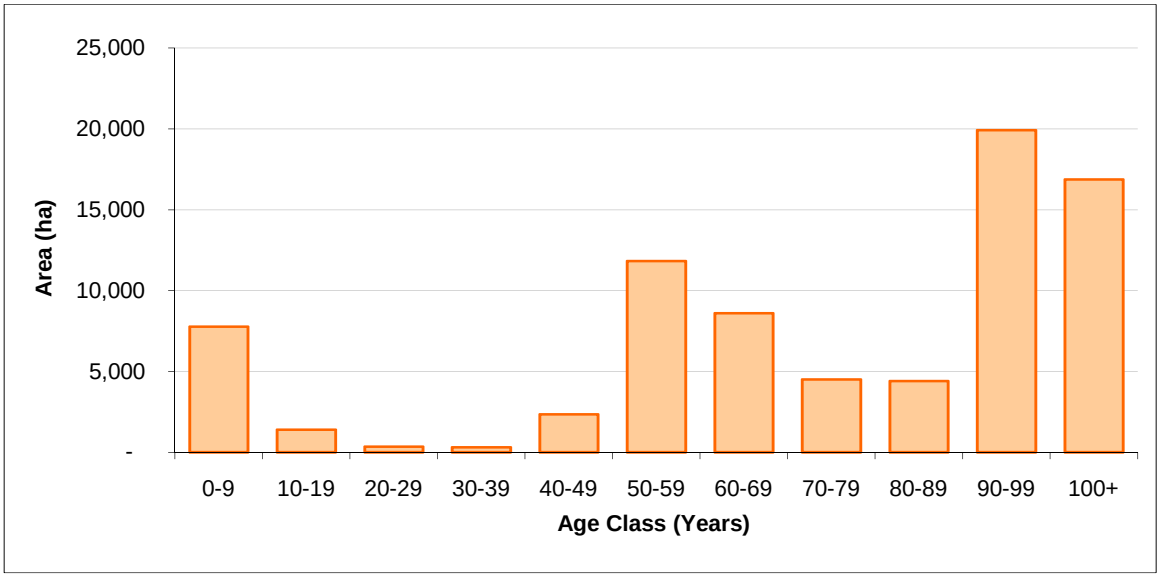
2.2 Pine Age Class Distribution

Mountain pine beetle seldom infests young, small diameter pine stands and generally prefers stands > 80 years. Age class distribution can therefore provide a general indication of a pine stand's susceptibility to MPB attack. Figure 6 shows pine distribution on the timber harvesting landbase within the FMA area, based on pine yield groups[4]. Pine yield groups comprise approximately 95,000 hectares within the FMA area. Surveys conducted in 2006/ 07 indicate that mountain pine beetle has infested many of these pine stands (Figure 7).

[4] *Yld Grp 8 (Pl/PlFb+(H), Yld Grp 9 (PlAw/AwPl), Yld Grp 10 (PlLSb+Others), Yld Grp 11 (PlSw/SwPl+(H)) and Yld Grp 14 (SbPl/SbSw/SbFb).*

Figure 6. Pine Yield Groups Age Class Distribution

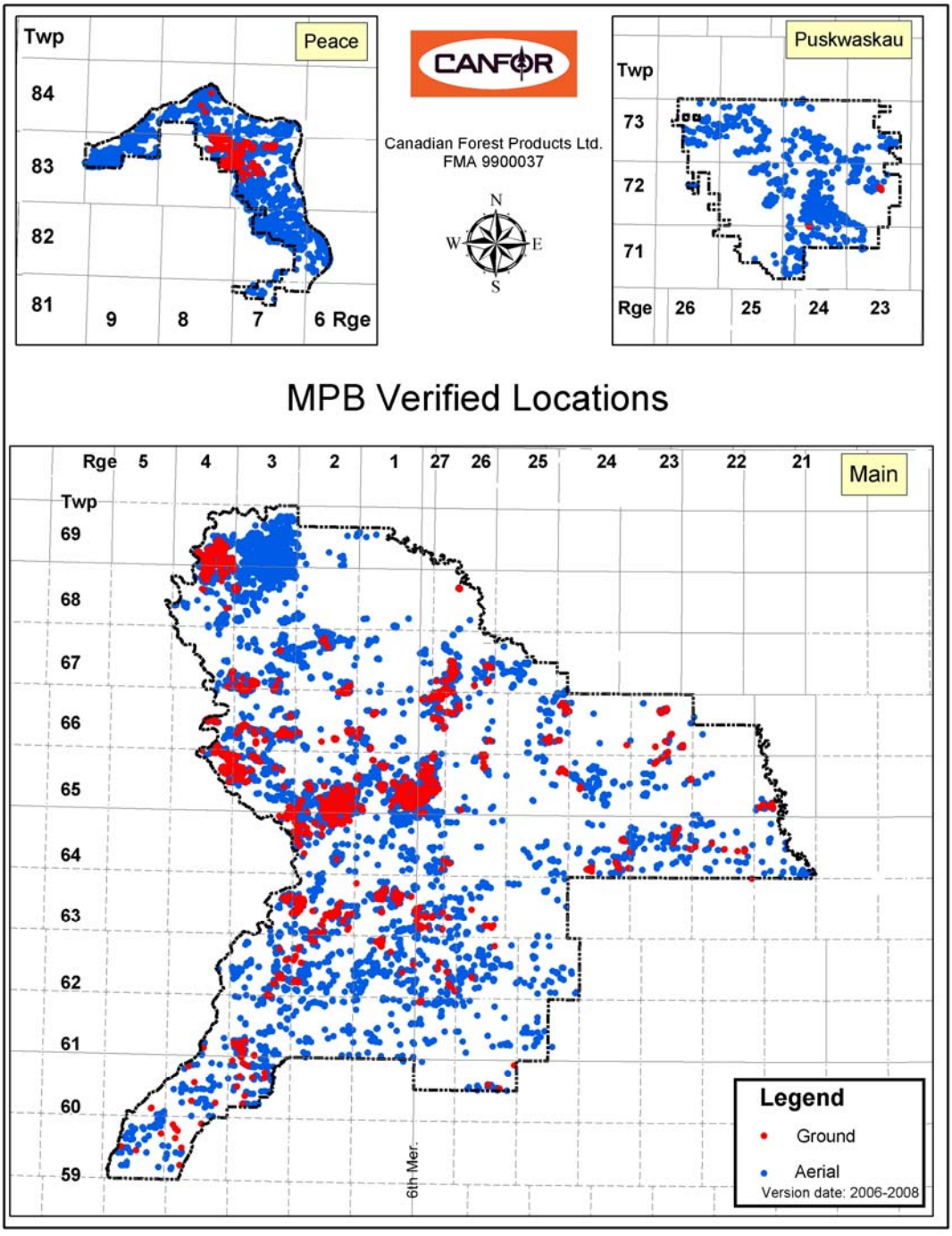
TNGR ComparativeAnalysis30Mar.xls
Pine Age Class



Source: Timberline compiled data

Figure 7. Mountain Pine Beetle Distribution Within the FMA area (confirmed MPB survey points)

HPS Maps
Map 2



3. Landscape Assessment

The FMA area covers a total area of 649,160 hectares. A stepwise netdown procedure was used to determine the timber harvesting landbase (THLB) i.e., the net landbase available for timber harvesting. Deductions were made for various landbase classifications, resulting in a THLB of 486,730 hectares (Table 4). This represents an increase in the THLB area of 12,537 hectares as compared to the 2003 DFMP, which is due, in part, to changes in the spatial data and in part to changes in the netdown procedure. In the 2003 RTSA, areas of non-allocated deciduous and birch was excluded, but they have been retained for this analysis.

Table 4. Timber Harvesting Landbase

TNRG-RSTASourceData27Mar-2.xls
T001

Classification	Area (ha)	Area (ha)	% of Total Area	% of Forested Area
Total landbase		**649,160.0**	**100%**	
Reductions for non-forest				
Natural Non-vegetated	12,960.0		2.0%	
Anthropogenic Non-vegetated	4,937.0		0.8%	
Anthropogenic Vegetated	4,945.7		0.8%	
Non-forest Vegetated	32,799.9		5.1%	
Roads not in AVI	5,584.9		0.9%	
Total non-forest reductions	61,227.6	61,227.6	9.4%	
Total Forested Landbase		**587,932.4**	**90.6%**	**100%**
Reductions to forested landbase				
Forested Steep Slope	10,514.7		1.6%	1.8%
Forested Slump	42.5		0.0%	0.0%
Gravesites	5.2		0.0%	0.0%
DRS	317.7		0.0%	0.1%
Rare Physical Environments	6,164.5		0.9%	1.0%
Trumpeter Swan Sites	1,915.3		0.3%	0.3%
Watercourse Buffers	36,735.7		5.7%	6.2%
Low Productive –Yield Group 13	25,829.4		4.0%	4.4%
Height/ Age Yield Group 12	17,759.2		2.7%	3.0%
Height/ Age Other Conifer	649.2		0.1%	0.1%
AOP Reserve Areas	1,269.1		0.2%	0.2%
Total reductions to forested landbase	101,202.4	101,202.4	15.6%	17.2%
Timber Harvesting Landbase		**486,730.0**	**75.0%**	**82.8%**

Source: Timberline compiled data

3.1 Allocation of Deciduous Timber Within the FMA area

Tolko Industries Ltd. have rights to utilize trembling aspen, balsam poplar and white birch and Ainsworth Engineered Canada Ltd. have rights to utilize trembling aspen and balsam poplar from deciduous timber allocations (DTA) located within the FMA area (Table 5).

ASRD provided direction (Henderson, 2007) to ensure incidental deciduous volumes are fully utilized by DTA holders and has assigned operating areas for utilization of deciduous from pure stands (Figure 8). These operating areas are in place until May 1, 2015 or Companies agree to modifications for the 2012 Forest Management Plan.

Table 5. Deciduous Allocations Within Canfor's FMA area

HPS Tables & Graphs Master.xls
Table 5

Company	Disposition Number	Issue Date	Deciduous Volume (m^3)	
			Non-Sustainable AAC Reconciliation Volume (m^3)	Deciduous Timber Allocation AAC (m^3/year) (1)
Tolko	DTAG15001	1-May-03	63,665 (2)	114,712
	DTAG15002	1-May-04	0	167,817
Ainsworth	DTAG15003	1-May-05	226,776 (3)	170,000
		Total	290,441	452,529
Notes:				
1. Based on DTA certificates				
2. Tolko had approved reconciliation volume of 318,326 m^3 for quadrant of May 1, 2003 - April 30, 2008 or 63,665 m^3/year. For quadrant 2007-2022 only one year of reconciliation volume is available.				
3. Ainsworth has approved reconciliation volume of 302,369 m^3 for period of May 1, 2005 - April 30, 2013 or 37,796 m^3/year. For quadrant 2007-2022 only 6 years of the original 8 years is available.				

Source: Canfor compiled data

3.1.1 Updated Deciduous Volume Allocations

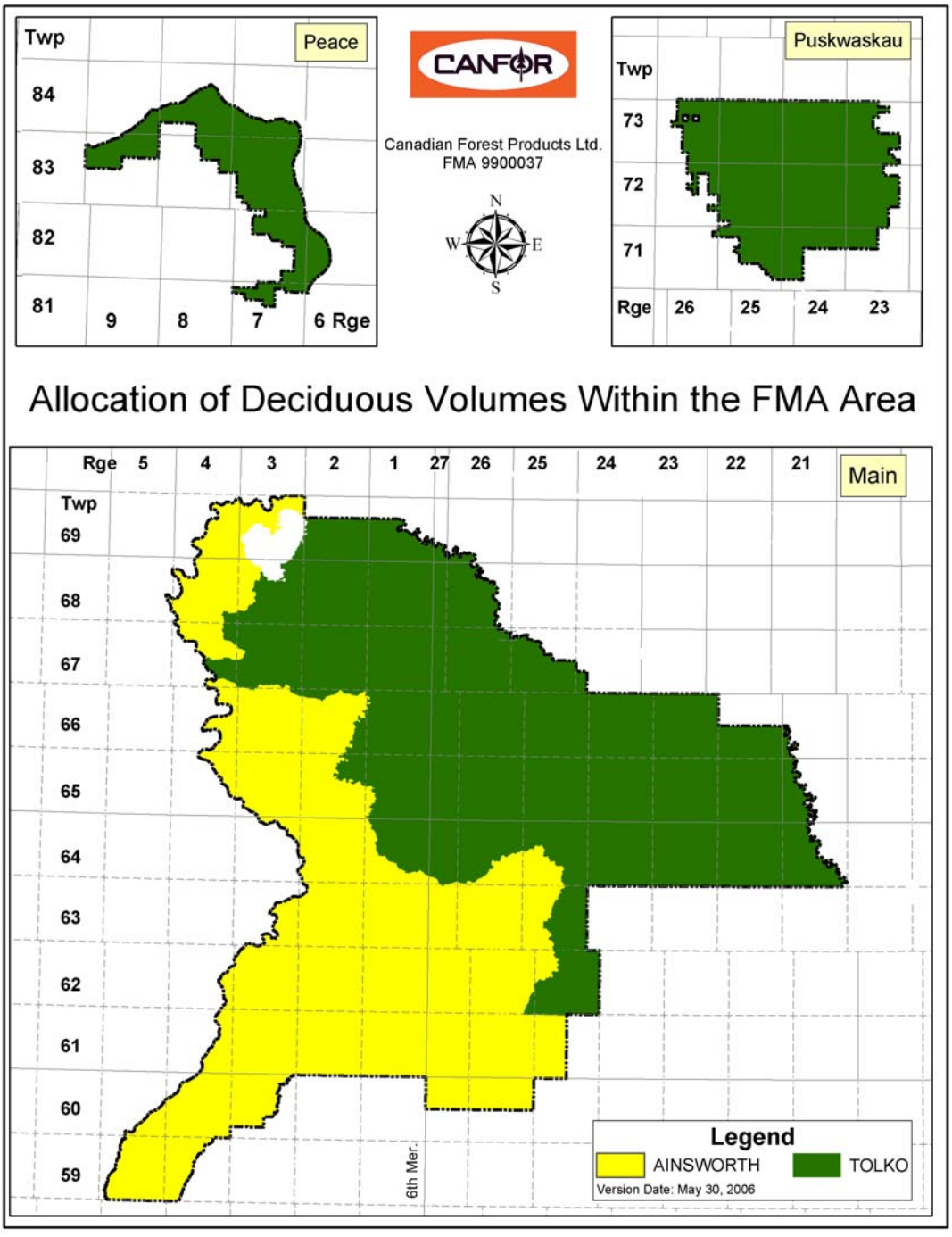
Although the focus of the Healthy Pine Strategy is primarily on pine, an opportunity to update deciduous allocations to current status arose. Deciduous allocations have changed since the approval of the 2003 DFMP (November 2003) due to deciduous harvest anomalies, as follows:

- Some deciduous stands, scheduled for harvest in the 2003 DFMP, were not utilized by deciduous companies thereby invalidating the spatial harvest sequence; and

- The actual harvest of deciduous was lower resulting in ASRD recalculating and re-issuing carryovers of deciduous allocations to deciduous companies as indicated in Table 5 above.

Figure 8. Allocation of Deciduous Timber Within the FMA area

HPS Maps
Map 3



3.2 Seral Stages

Maintaining representation of a full range of ecosystem types is a widely accepted strategy for landscapes managed for forest values (Wells *et al*, 2003). Seral stage is a surrogate measurement, which reflects the status of the forest resource regarding ecosystem diversity. A 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. It enables timber harvests to be planned to maintain a full range of successional habitats for wildlife and ecosystem types over the long-term. For this document, seral stages are defined by the age of the stand at breast height for different yield groups (Table 6).

Table 6. Breast Height Age Ranges for Seral Stages

TNRG-RSTASourceData27Mar-2.xls
T920

Yield Group	Description	Pioneer	Young	Mature	Over mature	Old	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+OTH	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+OTH	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, 2003

3.3 Woodland Caribou Habitat

There are two woodland caribou (*Rangifer tarandus caribou)* ranges within and adjacent to Canfor's FMA area: A La Peche and Little Smoky (Figure 9). Their total combined range is 466,127 hectares including 70,228 hectares located within the FMA area.

In 2007, members of the Foothills Landscape Management Forum and ASRD developed the 'caribou primary intactness area' (CPIA) (Figure 9) to assist in conservation of woodland caribou habitat. The CPIA comprises approximately 12,838 hectares located in the southern portion of the FMA area.

In general terms, it distinguishes between the broader caribou habitat area, and the portion that will remain 'intact' for various lengths of time depending on the forest company involved. The 'intactness' principle was incorporated into the West Central Alberta Caribou Landscape Planning Team report (WCACLPT, 2008) submitted to the Alberta Caribou Committee Governance Board, who in turn included it in its July 10, 2008 recommendations to the Minister (ACCGB, 2008).

As an active member of the Foothills Landscape Management Forum (FLMF), Canfor assisted to develop a single, integrated industrial access plan (IIAP) for use by all companies developing access into the ranges of the Little Smoky and A La Peche caribou herds. In June 2006, the Government of Alberta endorsed the IIAP as a guiding document for access development. In July 2008, the *FLMF Berland Smoky Access Plan* was officially approved and Information Letter 2008-05 (ASRD, 2008) was issued; wherein it stipulates that all primary access must comply with the plan (Appendix 4).

As described in Appendix 7, the Company has been active in caribou habitat management and research since 1991 (Engel, 2008), including:

- Adherence to the *1996/ 97 Operating Guidelines for Industrial Activity on Caribou Ranges* (WCACSC, 1996);
- Defining caribou ranges within the FMA area (Engel, 1999);
- Caribou, wolf and alternative prey research (Engel, 1999);
- Reforestation of seismic lines (Engel, 2002);
- Research to test the effects of site preparation techniques on limiting the use of linear disturbance areas by caribou predators and alternate prey species (CRRP, 2004);
- Multi- forest company caribou habitat assessment (Forestry Corp, 2004);
- Assessment of caribou habitat within the FMA area (Timberline, 2005);
- Contributions to the *Little Smoky Caribou Calf Survival Enhancement Project* (Suncor and Conoco Philips, 2005); and
- *Little Smoky Caribou Habitat Restoration Pilot Project – 2005/ 06 Work Plan* (Suncor and Conoco Philips, 2006);

3.4 Trumpeter Swan Sites

Trumpeter swans 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.

Canfor's Operating Ground Rules (ASRD, 2008a) and *The Recommended Land Use Guidelines for Trumpeter Swan Habitat in Alberta* (ASRD, 2001), provide background, intent, and specific direction for managing industrial work near trumpeter swan breeding wetlands.

Each year ASRD provides swan data, which is used by Canfor to plan and implement forestry operations. The data is also utilized in the RTSA landbase netdown process, wherein a 200-metre buffer around any water body containing nesting sites is

considered unavailable for harvest. The current trumpeter swan sites are shown in (Figure 10).

Management practices and habitat protection for trumpeter swan have assisted in maintaining their continued presence within the FMA area.

3.5 Bull Trout Habitat

During 1994 – 1997, Canfor participated in the Cooperative Fisheries program, involving both the federal and provincial governments and industry, to assist in improving the fisheries inventory within the Peace River region (including portions of Canfor's FMA area). Later in 2000 – 2005, Canfor cooperated with Alberta Conservation Association (ACA) to complete the fisheries inventory in the FMA area. The data is retained by ACA, with full access provided to Canfor. Canfor uses the data for operational planning and watercourse crossing mitigation initiatives. Strategically, the data is used to define bull trout habitat (Figure 11).

3.6 Grizzly Bear Habitat

Canfor has participated in the Foothills Research Institute (FRI) grizzly bear project since 2000. Data from the project was used by ASRD to define grizzly bear core and secondary conservation areas within Alberta (ASRD, Draft 2008b). Portions of Canfor's Main parcel falls within the secondary conservation area classification. All other Canfor parcels are not shown on the map.

Fish and Wildlife Division, Alberta Sustainable Resource Development, supervised preparation of a draft grizzly bear recovery plan prepared by a recovery team composed of a variety of stakeholders including conservation organizations, industry, landowners, resource users, universities, government agencies and others. The Minister accepted and approved the plan and it was published as a government recovery plan (ASRD, 2008c). Recovery plans include three main sections: background information that highlights the species' biology, population trends, and threats; a recovery section that outlines goals, objectives, and strategies to address the threats; and an action plan that profiles priority actions required to maintain or restore the "threatened" or "endangered" species.

4. Other Forest Users

In addition to timber, other resources in the FMA area are utilized for recreation, grazing, firewood, hunting, fishing and many other uses. A range of individuals and groups place value on the resources including trappers, outfitters, grazing disposition holders, Aboriginals, local communities and the general public. Canfor recognizes that timber harvesting may impact some users and has procedures and practices to provide opportunities for public input and participation in forest management plans.

Mineral development and geophysical activities within the FMA area take the form of license of occupation, pipeline rights-of-way, mineral surface leases and rights-of entry. Canfor works with energy companies to integrate planning and operational activities.

Figure 9. Caribou Area and Caribou Primary Intactness Area

HPS Maps
Map 4

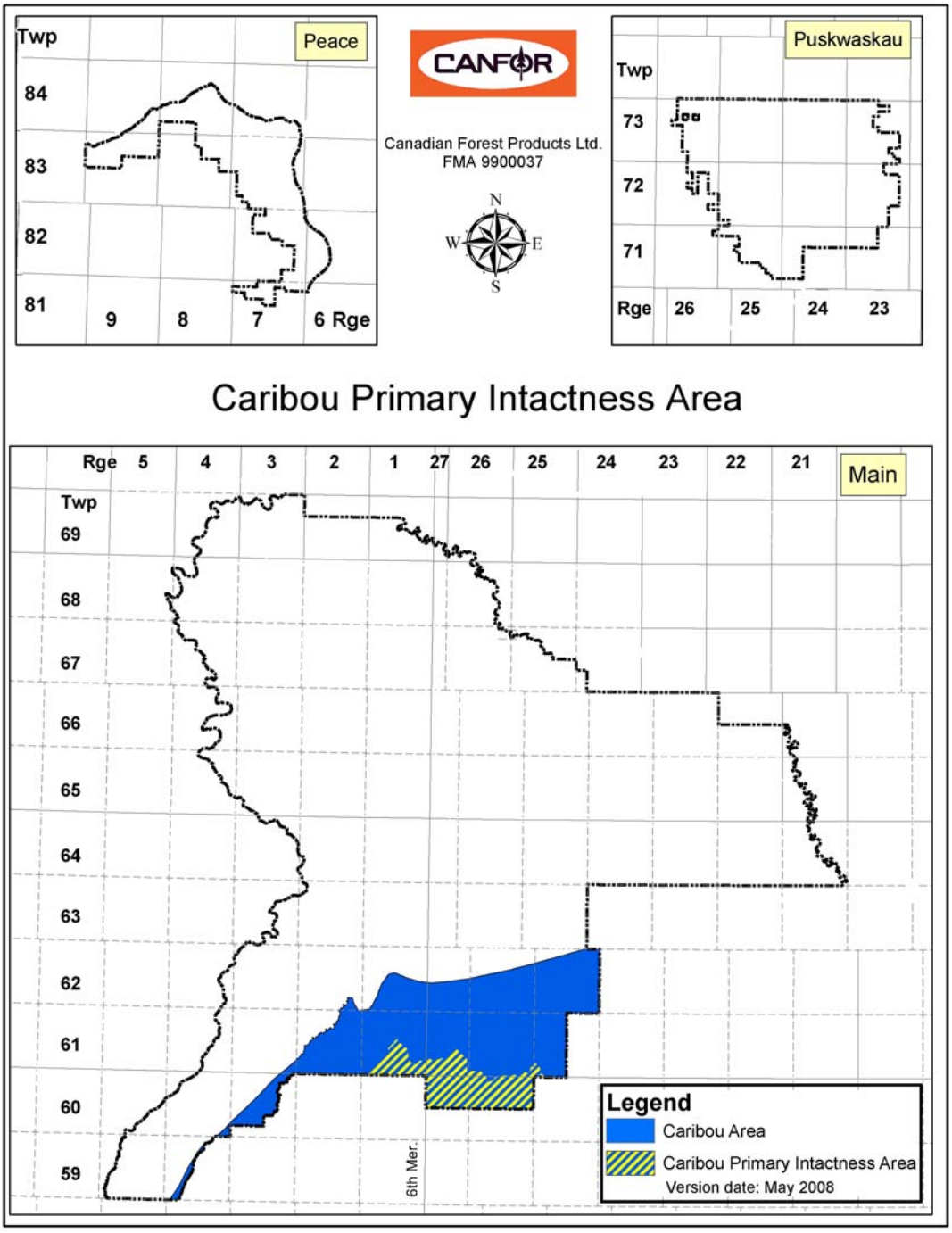


Figure 10. Trumpeter Swan Sites

HPS Maps
Map 5

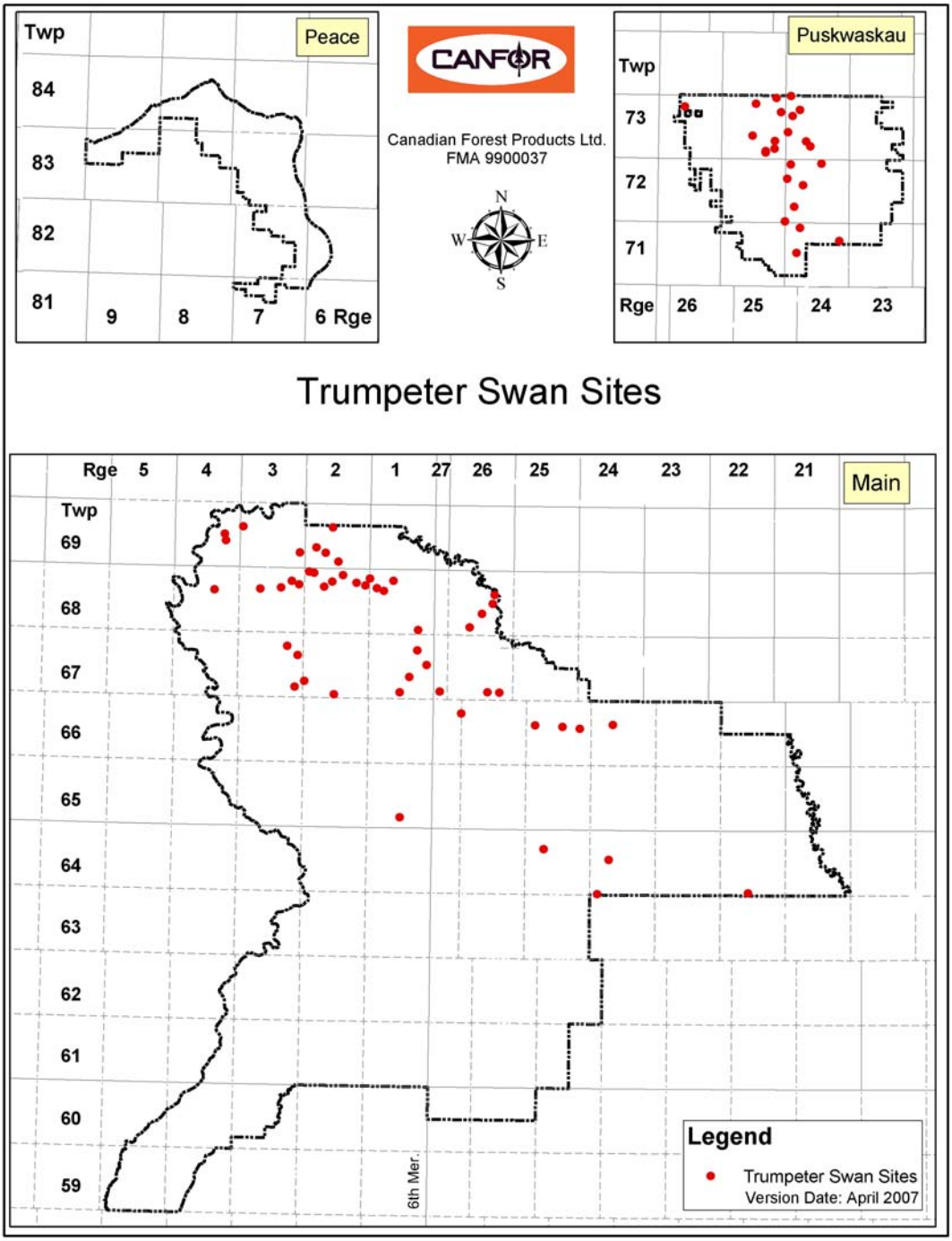
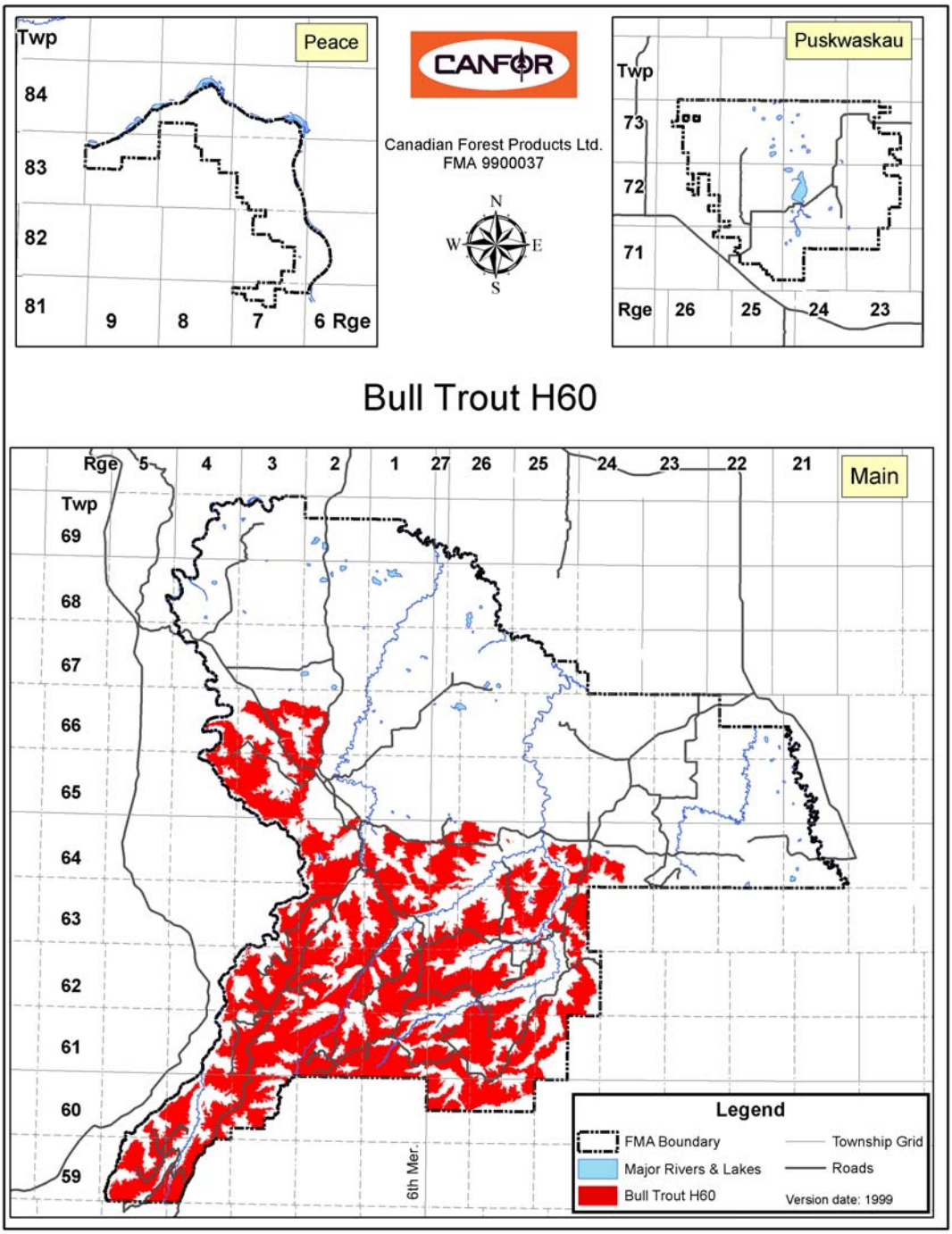


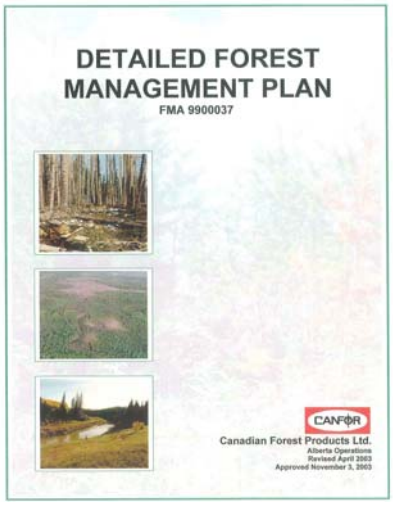
Figure 11. Bull Trout Watersheds (above the H60)

HPS Maps
Map 6



D. DEVELOPMENT OF THE HEALTHY PINE STRATEGY

1. Introduction



The approved 2003 Detailed Forest Management Plan (Canfor, 2003) forms the basis for the Healthy Pine Strategy; which conforms to an ecological approach and balances economic, environmental and social values.

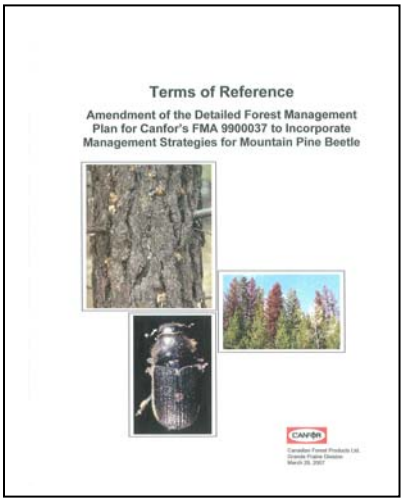
The Healthy Pine Strategy is consistent with *Canfor's Forestry Principles* (Canfor, 2004); which outline a broad approach to the sustainability of the forests in which Canfor operates and it's *Environment Policy;* (Canfor, 2005) which confirms a long-standing commitment to responsible stewardship of the environment.

Canfor has adopted public participation as an essential element in development of the amendment and will continue to be accountable to the public and will verify, by independent audit, that forestry operations are achieving present and future objectives.

The modeling approach undertaken for this analysis is the same as that used for the 2003 DFMP. The spatial data set created for the 2003 DFMP was the starting point for the current analysis. Input data was updated to 2007, but modeling parameters remained the same except in instances where they were specifically modified to deal with MPB and related harvest scheduling issues. Modified annual allowable cuts (AAC) and spatial harvest sequences to implement pine management strategies were generated. Three forest management scenarios were evaluated by a series of COMPLAN runs. Sensitivity analyses were completed to determine the level of risk implicit in the modeled solution (Refer to Section E and Appendix 3). After evaluating numerous sensitivity analyses, the preferred forest management alternative was selected (Refer to Section F).

2. Terms of Reference

Canfor's Terms of Reference (Appendix 5) for the Healthy Pine Strategy was submitted to ASRD on March 28, 2007 (Canfor, 2007). It describes the processes and timelines for development and submission of the MPB amendment.



3. Public Participation In Plan Development

The Healthy Pine Strategy was developed in accordance with the *Interpretive Bulletin: Planning Mountain Pine Beetle Response Operations* (ASRD, 2006a) and the *Alberta Forest Management Planning Standard ver. 4.1* (ASRD, 2006b). Meaningful opportunities for participation were provided to the public and deciduous operators during its development.

3.1 Roles and Responsibilities

A number of organizations and individuals participated in the development of the Healthy Pine Strategy including ASRD staff, Canfor staff, Forest Management Advisory Committee members, deciduous forest company representatives and forestry consultants.

3.1.1 Alberta Sustainable Resource Development (ASRD)

The Alberta Forest Management Planning Standard (ASRD, 2006b) and its annexes, and updates provide the standard for preparing and implementing higher-level forest plans in Alberta. A review committee made up of senior Alberta staff will be convened to evaluate the amendment and provide recommendations for consideration and final approval.

3.1.2 Canfor

Canfor is the principal planner regarding development of the RTSA; however the process is a cooperative effort between the public, other timber resource users, other stakeholders, government, and consultants.

The Healthy Pine Strategy was developed and reviewed by Canfor's planning team, under the leadership of its Strategic Planning Superintendent. Canfor's Woodlands Manager approves the plan prior to submission to ASRD.

3.1.2.1 Canfor's Public Involvement Plan (PIP)

Canfor recognizes the value of public involvement and through its Public Involvement Plan (Canfor, 2008) provides opportunities to inform the public and solicit input regarding forest resource management within the FMA area. The plan was recently revised (Appendix 6) to meet ASRD requirements and to reflect the changing social, environmental and economic times. It received ASRD approval September 2, 2008.

The PIP contains a conflict-resolution mechanism to assist in addressing competing land use conflicts and provides a mechanism for individuals, groups and the general public to obtain information on how their concerns will be addressed. In the case of unresolved disputes, Government will arbitrate, and provide decisions that will be binding on all parties. It also provides information regarding the process for internal and external communication.

3.1.3 Forest Management Advisory Committee (FMAC)

Canfor adopted public participation as an essential element in its forest management strategy. FMAC, comprised of local stakeholder groups and individuals possessing an interest in the management of the forest resource[5], was initially organized August 1995 to provide valuable input into the development of the 2003 DFMP by reviewing various documents and identifying issues of concern. When Canfor recertified its SFMP 2005 (Canfor, 2005a) to CAN/CSA Z809-02 standards, FMAC provided local values, objectives, indicators and targets to in support of the plan.

FMAC continues its participation in plan development by providing input into the Healthy Pine Strategy. An important component that contributes to the success of the FMAC is its terms of reference (FMAC, 2008); which clearly state the goals, operating rules, methodology of making decisions, and dispute resolution mechanisms by which the Committee provides input to Canfor.

Aboriginal groups, including Sturgeon Lake First Nation and Métis Nation Zone 6 are members of FMAC and have opportunities to provide input to forest management decisions via regular FMAC meetings.

3.1.4 Deciduous Companies on the FMA area

Ainsworth Engineered Canada Ltd. (Ainsworth) and Tolko Industries Ltd. (Tolko) have deciduous timber allocations on the FMA area and act as industry advisors to FMAC.

Both companies also provided input to the RTSA by providing statistics on deciduous timber availability by timber supply compartment, and reviewing the deciduous fifteen-year harvest sequence. Their feedback was incorporated into the final version of the deciduous harvest sequence. The RTSA could not have been successfully completed without direct consultation with and input from both of these companies.

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[5] *The Committee is currently (2007) comprised of members from Alberta Conservation Association, Alberta Professional Guides and Outfitters Association, Alberta Trappers Association, Canadian Association of Petroleum Producers, Canadian Natural Resources Ltd., City of Grande Prairie, DFA Related Worker, Ducks Unlimited, Grande Prairie and Area Forest Educator, County of Grande Prairie #1, Grande Prairie Regional College, M.D. of Greenview No. 16, Métis Nation Zone 6, Peace Wapiti School Division No 76, Public member(s) at large, South Peace Environmental Association, Sturgeon Lake Cree Nation, Travel Alberta North, Tourist Destination Region and Town of Valleyview.*

3.1.5 Forestry Consultants

Forestry consultants provide services with respect to the RSTA including technical input and preparation of documents related to the plan.

4. Consultation

The process for development of Canfor's Healthy Pine Strategy is open and transparent. A range of groups, individuals, government, organizations and Aboriginals will be consulted both prior to and following approval of the Healthy Pine Strategy, including:

- Local municipal governments;
- Aboriginal
  - Canfor makes provision for Aboriginal input using processes that are in conformance with the *Government of Alberta's First Nations Consultation Guidelines on Land Management and Resource Development* (GoA, 2007).
  - Aboriginal involvement is ensured in two ways:
    - Aboriginal groups, Including Sturgeon Lake First Nation and Métis Nation Zone 6, are members of the Forest Management Advisory Committee; and
    - Via direct consultation with Sturgeon Lake First Nation and the Aseniwuche Winewak First Nation of Canada.
- Commercial Timber Permit/ Miscellaneous Timber Permit holders located directly adjacent to the FMA area boundary;
- Non-governmental organizations; and
- KPMG (SFMP third party auditors).

5. Conflicts of Interest

As part of the amendment planning process, Canfor implemented a policy to prevent conflicts of interest:

"Members of Canfor's planning team and any other person(s) involved with development of the Healthy Pine Strategy, either internal or external to Canfor, are expected to announce if they have a conflict of interest and to remove themselves from any decision making process".

6. Access to Information

To ensure accessibility, copies of the approved Healthy Pine Strategy will be:

- Disseminated to local libraries;
- Available for review at open houses and town hall meetings;
- Forwarded to interested parties (digital format) on request; and
- Available on ASRD's website.

E. RESOURCE AND TIMBER SUPPLY ANALYSIS

1. Introduction

Canfor initiated an amended Resource and Timber Supply Analysis (RSTA) in response to ASRD's, *Mountain Pine Beetle Action Plan for Alberta* (ASRD, 2006) in support of the strategy and to guide its own operations.

Timberline Natural Resources Group Ltd. (TNRG) was retained to model forest management alternatives via an iterative series of computer runs utilizing the forest estate model (COMPLAN[6]) and, in accordance with ASRD requirements, to report on the following results:

- Short and long-term fibre supply for coniferous and deciduous species;
- Species of management concern as measured by woodland caribou seral stages trumpeter swan sites, and grizzly bear open road densities; and
- Watershed conservation as measured by area-weighted ECA% above the H60.

Canfor also directed TNRG to report on the impact of MPB management strategies on specific CSA values, as follows:

- Conservation of ecosystem diversity as measured by seral stages;
- Conservation of genetic diversity as measured by landscape metrics i.e., mean patch size, mean nearest neighbor distance, area-weighted mean shape index and distribution of patch size classes;
- Conservation of species diversity as measured by bull trout ECA% above the H60; and
- Conservation of water quantity and timing of run-off as measured by water yield.

2. Management Alternatives Considered

Three different management scenarios were considered (Table 7).

The approach to forest estate modeling undertaken for the RTSA (Appendix 3) is similar in all respects to the approach followed for the 2003 DFMP. Input spatial data was amended to reflect changes that have occurred on the landbase since that time, but the basic forest cover, yield curves, and other model parameters are essentially unchanged.

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[6] *COMPLAN is a spatially based forest simulation model that has been used for timber supply analyses since 1994. COMPLAN uses an iterative approach to establish periodic harvest levels that can vary over time. Users are able to set harvest levels that the model will try to reach within the constraints established. COMPLAN schedules harvests at the individual cut block or stand level subject to adjacency (green-up) and non-timber resource constraints (cover constraints). COMPLAN uses a hierarchical data structure that takes advantage of a compartmental management approach to spatial data organization.*

Any changes to input data has followed the guidance of Annex 1 of the Alberta Forest Management Planning Standard (ASRD, 2006b).

Table 7. Management Alternatives Considered

TNRG-RSTASourceData27Mar-1.xls
T005

Scenario Name	Scenario Reference	Description
Status Quo	MPB1	The preferred management scenario from the 2003 DFMP, updated to reflect harvesting up to 2007. A sensitivity analysis was also completed to estimate the impact that widespread MPB mortality would have on coniferous harvest levels if no effort is made in the short term to reduce risk by preferentially harvesting stands that are susceptible to MBP attack.
Healthy Pine	MPB2	Focused harvest in pine stands for 15 years in order to reduce the risk and level of pine mortality in the event of an MPB outbreak. However, no pine mortality is assumed. Original 2003 DFMP cover constraints were not enforced for the first 15 years, but no harvesting was permitted within caribou primary intactness area for that period. Original 2003 DFMP cover constraints are enforced from that point onward.
Disaster	MPB3	Focused harvesting in pine stands for 15 years in order to reduce the risk and level of pine mortality in the event of an MPB outbreak. ASRD pine mortality assumptions applied at year 15 of the simulation. Original 2003 DFMP cover constraints were not enforced for the first 15 years, but no harvesting within caribou primary intactness area was permitted for that period. Original 2003 DFMP cover constraints are enforced from that point onward.

Source: Timberline compiled data

3. Results and Data

The RTSA (Appendix 3) provides the results and data for the values previously listed in Section 1.

As described in the next section (Section F), Canfor used the RTSA results/ data to conduct a comparative analysis to assist with selection of the preferred forest management alternative (PFMA), and to establish long-term fibre supply for both coniferous and deciduous species and to present their associated spatial harvest sequences.

F. SELECTION OF THE PREFERRED FOREST MANAGEMENT ALTERNATIVE

1. Introduction

Three forest management scenarios were modeled (Table 7) and the results presented in the RTSA (Appendix 3). The scenarios were presented (Engel, 2008a) to the Forest Management Advisory Committee and discussed by the committee members at the November 19, 2008 meeting (FMAC Nov. 19, 2008 minutes).

Canfor conducted a comparative analysis based on the RTSA results and data, previously described in Section E, to assist with selection of the preferred forest management alternative (PFMA). The analysis is an evaluation of the potential for alternative timber harvesting scenarios to achieve forest management objectives.

2. Comparative Analysis

The purpose of the analysis is to choose a scenario that achieves the ASRD objective to reduce susceptible pine stand susceptibility, while minimizing the impact on long-term coniferous timber supply, maintaining deciduous volume allocations and specific environmental objectives presented in the SFMP 2005.

Results from the RTSA were compared to assist in determination of the PFMA. Wherever possible results were compared graphically; however where the data is too complex to graph, text is provided as an alternative.

2.1 Reduction of Pine Stand Susceptibility

The primary objective is to choose a management scenario that reduces the volume and area of MPB susceptible pine stands.

By focusing harvest in pine stands, the Healthy Pine Scenario achieves the ASRD susceptibility targets in terms of reducing the amount of susceptible pine in the growing stock (as measured in hectares). As indicated in Table 8, under the Status Quo Scenario approximately half (24,874 hectares of 50,962 hectares total) of the susceptible pine stands are in the two highest harvest priority ranking[7] categories (i.e., 9 and 10). The Healthy Pine Scenario schedules 77% of that area for harvest.

[7] *Susceptibility for a given stand is based on four variables: relative proportion of susceptible pine basal area in the stand, age of dominant and co-dominant live pine, density of the stand, and the climatic suitability of the stand. This resulted in a stand susceptibility index (SSI) of between 0 and 100. A harvest priority ranking was assigned to each stand based on its SSI, yield group and height i.e., Harvest Priority Ranking = stand susceptibility index (SSI) + yield group index + stand height index. Harvest ranking ranges from 0 to 10, with 10 having the highest priority. Highest priority stands within a timber supply compartment are harvested first.*

Table 8. Pine Risk Reduction (as of 2022)

TNRG-RSTASourceData27Mar-1.xls
T027

Harvest Priority at Least:	Susecptible Area at 2022 Per Status Quo Scenario (ha)	Susceptible Area Reduced by Healthy Pine Scenario (ha)	% Area Reduction
10	14,771	13,151	89%
9	24,874	19,232	77%
8	37,211	27,617	74%
7	40,877	29,113	71%
6	45,678	30,144	66%
5	50,640	33,643	66%
4	50,962	33,761	66%

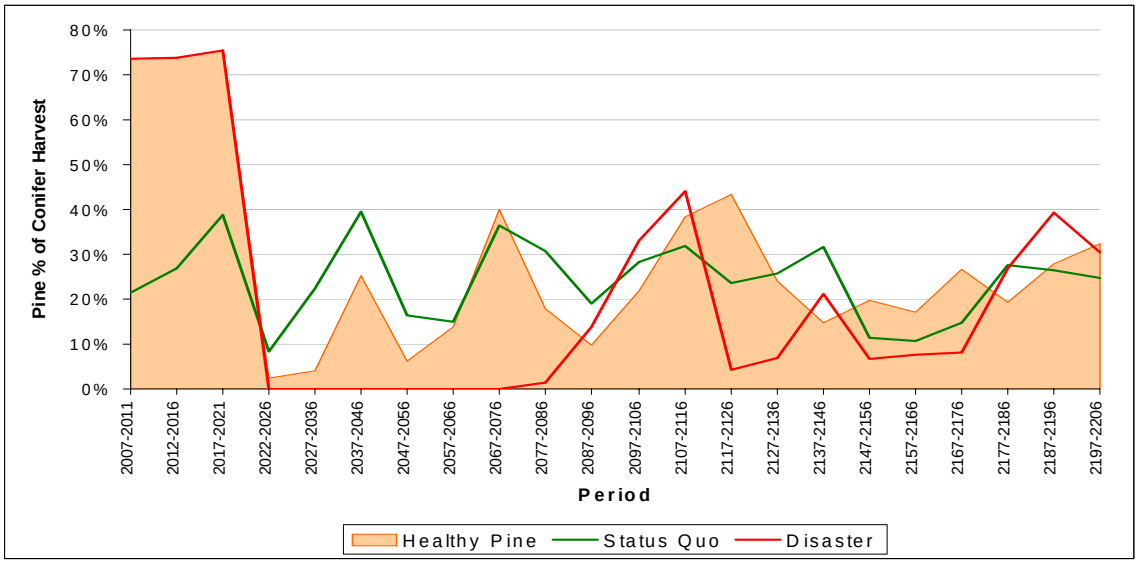
Notes:

The areas given in the table for each scenario are cumulative beginning from the top of the table. The Status Quo column shows the amount of pine area at or above the Harvest Priority listed in the leftmost column. The Healthy Pine column show the amount of susceptible area that is reduced by this strategy.

Source: Timberline compiled data

Figure 12. Reduction of Pine Stand Susceptibility

TNGR ComparativeAnalysis30Mar.xls
Pine Reduction Percent



Source: Timberline compiled data

2.2 Sustainability of Long-Term Fiber Supply

2.2.1 Coniferous

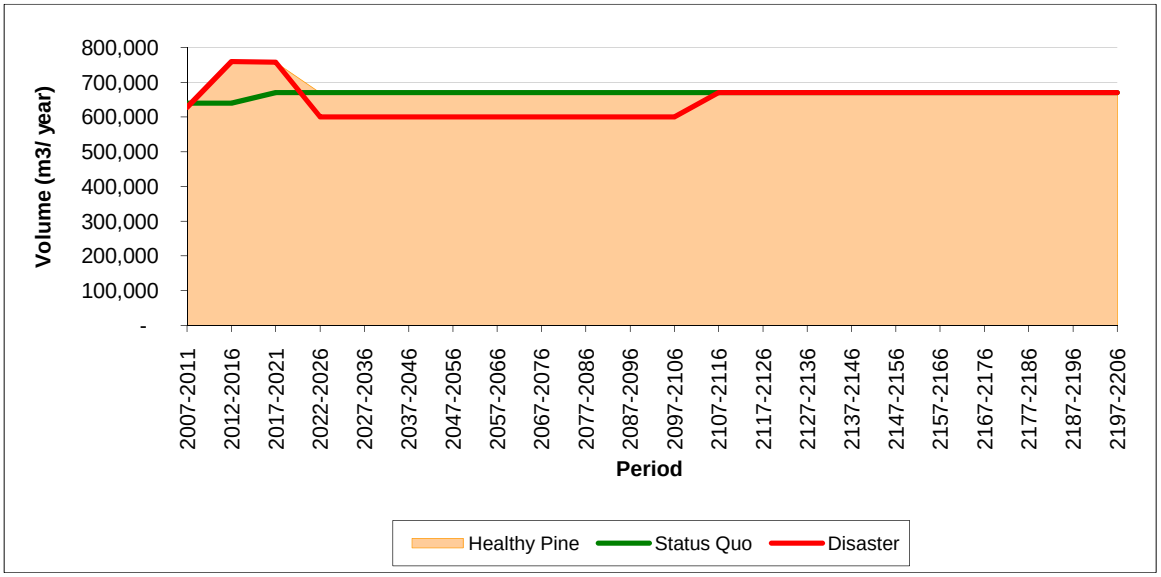
The long-term wood flow objective is to reduce susceptible pine volume and area to a level that is 75% of the level identified in the 2003 DFMP and to choose a management scenario that has minimal impact on long-term coniferous timber supply.

The Healthy Pine Scenario maintains harvest levels established in the 2003 DFMP and only a moderate increase in short-term harvest levels (i.e., fifteen-year plan) is needed to achieve a significant reduction in risk. Further, compared to the Disaster Scenario, no mid-term reduction in coniferous AAC is needed to compensate for the higher initial harvest levels implemented to reduce the area of MPB susceptible pine stands.

The average coniferous harvest level for the Healthy Pine Scenario fifteen-year plan is 715,000 m^3/ year. This represents a coniferous harvest uplift of approximately 65,000 m^3/ year (ten percent), as compared to the average of 650,000 m^3/ year presented in the 2003 DFMP (i.e., 640,000 m^3/ year initially, rising to 670,000 m^3/ year in 2019).

Figure 13. Coniferous Long-Term Fiber Supply

TNGR ComparativeAnalysis30Mar.xls
Harvest Volume Coniferous



Source: Timberline compiled data

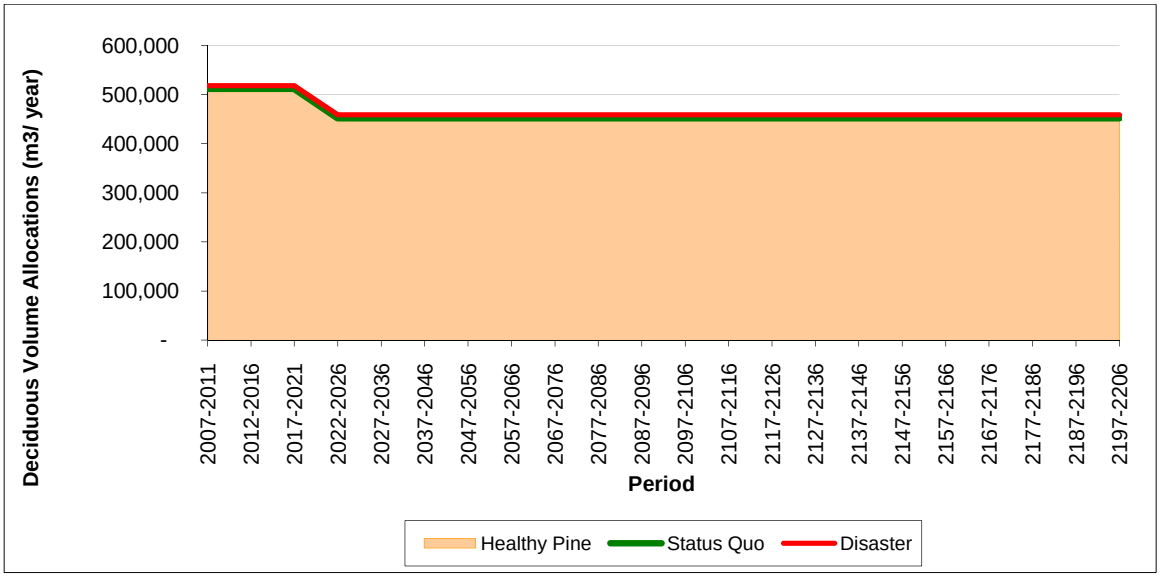
2.2.2 Deciduous

The long-term wood flow objective for deciduous is to choose a management scenario that provides volume allocations to deciduous operators over the entire 200-year planning horizon.

All three scenarios maintain deciduous timber allocations of 452,529 m^3/ year for the entire 200-year planning horizon and the non-sustainable deciduous carryover volume of 63,665 m^3 for Tolko Industries Ltd. and 226,776 m^3 for Ainsworth Engineered Canada Ltd.

Figure 14. Deciduous Volume Allocations

TNGR ComparativeAnalysis30Mar.xls
Deciduous Volume Allocations



Source: Timberline compiled data

2.3 Watershed Resources

The objective is to choose a management scenario that conserves water quantity.

Water yield is a function of both water quantity and timing of runoff. Removal of forest cover may cause changes in the volume and intensity of runoff, which in turn may increase erosion potential. Water yield increases can be directly modeled, however equivalent clearcut area (ECA[8]) is often used as a surrogate.

Under the Status Quo Scenario, protection of watershed resources remains effective throughout the 200-year planning horizon at levels similar to those presented in the 2003 DFMP (Figure 15). The area-weighted ECA% for the FMA area exhibits only minor variation over the long-term, averaging approximately ten percent.

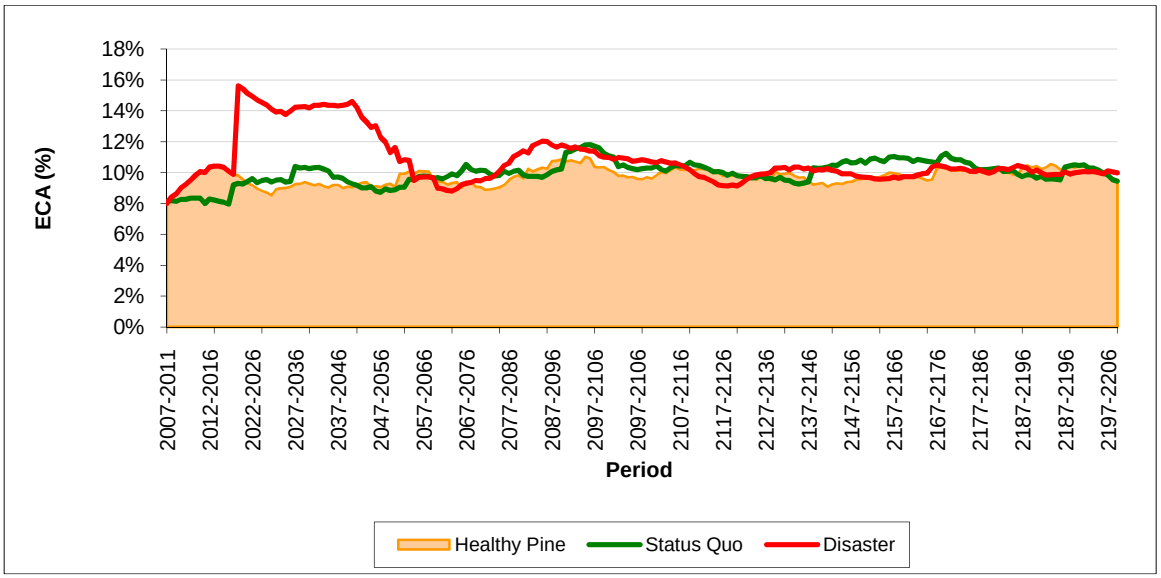
The results for the Healthy Pine Scenario closely emulate that of the Status Quo Scenario over the long-term, with only minor increases during the fifteen-year plan.

[8] *Equivalent clearcut area (ECA) refers to an area that has been harvested, cleared or burned. The ECA index, expressed as a percentage, describes an area of regenerated growth in terms of its hydrological equivalence to a clearcut. As the area regenerates and growth develops, the hydrological impact is reduced. ECA is a primary factor considered in an evaluation of the potential effect of past and proposed forest harvesting on water yield. ECA is expressed as a percent of watershed area.*

Under the Disaster Scenario, the combined impact of harvesting and assumed MPB mortality on watershed resources is significantly higher than under either the Status Quo or Healthy Pine scenarios for the period 2022 to 2057.

Figure 15. Area-Weighted ECA% above the H60

TNGR ComparativeAnalysis30Mar.xls
ECA%



Source: Timberline compiled data

2.4 Wildlife Habitat

The objective is to choose a management scenario that conserves species diversity by maintaining woodland caribou and trumpeter swan habitat.

2.4.1 Woodland Caribou Habitat

Under the Status Quo Scenario the original 2003 DFMP seral stage cover constraints were applied for the entire 200-year planning horizon to limit the rate of harvest in the Caribou Area (Figure 9) in order to maintain sufficient habitat, as follows:

- No more than 20% will be in pioneer/ young seral condition;
- No less than 20% will be in old seral condition;
- The maximum opening size in the Caribou Area is 1,000 hectares; and
- Stands adjacent to new openings in the Caribou Area must be at least 30 years old.

Under the Healthy Pine Scenario, these constraints were not enforced during the fifteen-year plan (2007 – 2021) to allow focused harvest in pine stands in order to reduce the risk and level of pine infestation. No harvesting was allowed in the caribou primary intactness area) during that same period. After the fifteen-year plan, the original 2003

DFMP seral stage cover constraints were enforced and no ASRD pine mortality assumptions were applied.

Under the Disaster Scenario, the same cover constraints were applied as the Healthy Pine Scenario; however after the fifteen-year plan ASRD pine mortality assumptions were applied.

2.4.1.1 Caribou Habitat Pioneer/ Young Seral Stages

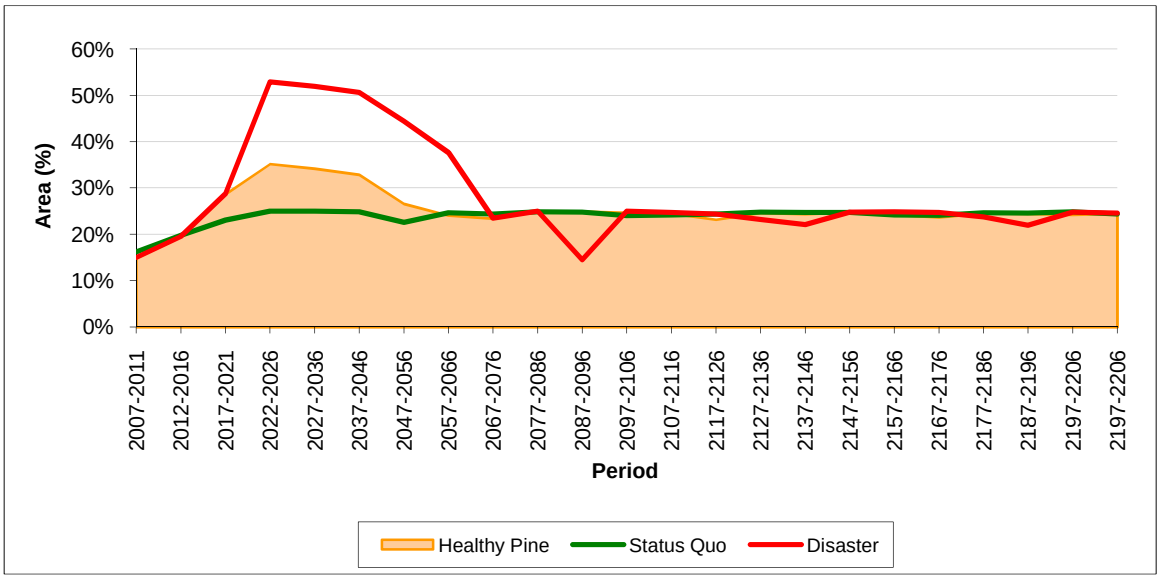
Under the Status Quo Scenario, the pioneer/ young seral target is first met at about 2022, as was the case in the 2003 DFMP analysis (Figure 16) and it is not constraining in the long-term i.e., the target is never surpassed over the long-term.

Under the Healthy Pine Scenario, the pioneer/ young seral target is exceeded during the term of the fifteen-year plan because caribou seral stage cover constraints are not enforced during the fifteen - year plan so that pine stands can be harvested. Beginning in 2022 the cover constraints are turned back on and the situation immediately begins to improve. By 2037 the area in pioneer/ young seral is again within prescribed limits.

Compared to the Healthy Pine Scenario, the Disaster Scenario exceeds the target to a significantly greater degree and it takes much longer to achieve the target.

Figure 16. Caribou Habitat Pioneer/ Young Seral Stage

TNGR ComparativeAnalysis30Mar.xls
Caribou Seral



Source: Timberline compiled data

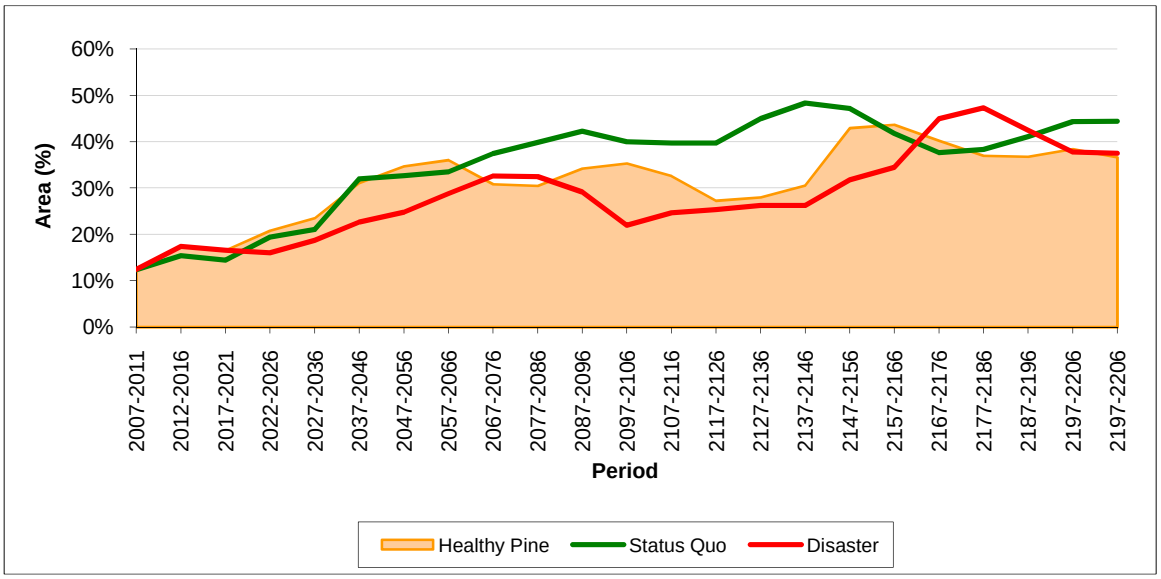
2.4.1.2 Caribou Habitat Old Seral Stage

All three scenarios exceed the old seral target until about 2027 (Figure 17) at which time old seral stages increase significantly to the end of the 200-year planning horizon. After 2027, the Status Quo Scenario achieves the target to slightly greater degree than the Healthy Pine Scenario. Focusing on pine harvest does not have the expected negative impact on old seral in the short term, because no blocks are scheduled for harvest in the caribou primary intactness area until after the fifteen-year plan (2007 - 2021).

Results for the Disaster Scenario indicate that it takes longer to attain the old seral target and due to pine mortality, fewer old seral stages are recruited over the long-term.

Figure 17. Caribou Habitat Old Seral Stage

TNGR ComparativeAnalysis30Mar.xls
Caribou Seral



Source: Timberline compiled data

2.5 Trumpeter Swan

Each year ASRD provides swan data, which is used by Canfor to plan and implement forestry operations. A 200-metre buffer is established in the field as operational planning and activities progress. The data is also utilized in the RTSA landbase netdown process, wherein a 200-metre buffer around any water body containing nesting sites is considered unavailable for harvest (Figure 10). As a result, all three management scenarios protect trumpeter swan sites to the same degree.

3. Selection of the Preferred Forest Management Alternative

Canfor utilized the results from the RTSA to conduct a comparative analysis, and based on the results, selected the Healthy Pine Scenario (MPB2) as the preferred forest management alternative (PFMA). The PFMA balances social, environmental and economic values, recognizing that tradeoffs are necessary between MPB management objectives, legal requirements and commitments to maintain other resource values. To the greatest extent possible, the PFMA balances social, environmental and economic values, recognizing that tradeoffs are necessary between MPB management objectives and legal requirements, or Canfor commitments to maintain other resource values.

The Healthy Pine Strategy was selected because it:

- Significantly reduces the area of MPB-susceptible pine, which is primary objective of the ASRD *Interpretive Bulletin* (ASRD, 2006a). It focuses on pine harvest and creates a younger forest that is more resistant to MPB outbreaks;
- Achieves and sustains the long-term coniferous harvest level identified within the 2003 DFMP (670,000 m^3/ year) for the entire 200-year planning horizon.
- Maintains deciduous timber allocations of 452,529 m^3/ year for the entire 200-year planning horizon and the non-sustainable deciduous carryover volume of 63,665 m^3 for Tolko Industries Ltd. and 226,776 m^3 for Ainsworth Engineered Canada Ltd.;
- Conserves watershed resources throughout the 200-year planning horizon at levels similar to those presented in the 2003 DFMP;
- Achieves the objectives for non-timber resources such as species of management concern (woodland caribou, trumpeter swan and grizzly bear), and
- Achieves the objectives for CSA values to a very high degree, while countering the effects of the MPB outbreak.

3.1 The PFMA and Achievement of CSA Values

Four CSA values were updated based on the results of the current RTSA and achievement of those targets supports selection of the Health Pine Scenario as the PFMA.

3.1.1 Seral Stages

Seral stage distribution is important for the conservation of ecosystem diversity because it enables timber harvests to be planned to maintain a full range of successional habitats for wildlife and ecosystem types over the long-term (CCFM, 1997). For this document, seral stages are defined by the age of the stand at breast height for different yield groups (Table 6).

Canfor monitors seral stage distribution and reports results for the FMA area and the Main, Peace and Puskwaskau parcels in its Annual Performance Monitoring Report. At

last report, all areas meet the acceptable variance with the exception of overmature seral stage in the Puskwaskau Parcel[9] and pioneer seral stage in the Peace Parcel.

3.1.2 Bull Trout ECA% Above the H60

The total bull trout area within the FMA area (Figure 11) is approximately 242,828 hectares and contains 163 watersheds. 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. It is assumed that streamflow maxima will not adversely impact ecosystems if no more than 20% - 40% of the total vegetated cover is removed from the H60 area within a defined watershed. As a result, if watersheds exceed ECA 35%, Canfor 'flags' them for evaluation to determine if any mitigation options can be implemented to reduce the immediate impacts. Since tracking began in 1999, only watershed 2057 continues to exceed the target (Table 9). Watersheds 4257 and 5642 have both recovered sufficiently and are no longer monitored.

Table 9. Bull Trout Watersheds Exceeding ECA 35% Above the H60

TNRG-RSTASourceData27Mar-1.xls
T036

Watershed ID	1999 ECA %	2007 ECA %
2057	48	39
4257	36	20
5642	37	34

Source: Timberline compiled data

3.1.3 Landscape Metrics

Maintenance of landscape structure may help manage the distribution and abundance of wildlife species; thereby it may assist with maintenance of genetic diversity. The spatial properties or "structure" of landscapes can be used as a surrogate measure of landscape genetic diversity 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, a number of important factors relate to the conservation of genetic diversity of wildlife species, namely:

- Landscape structure (landscape composition and spatial configuration);

[9] *There is comparatively less pine in the Puskwaskau Parcel; so to address the MPB infestation harvesting was shifted to the Peace Parcel, where only limited harvesting was forecasted for 1999 to 2009. As a consequence of that shift, more pioneer seral stage resulted in the Peace Parcel and an excess of overmature seral stage resulted in the Puskwaskau Parcel (Figure 20).*

- Landscape composition (represented by seral stages (habitat type), patch size class distribution (habitat size) and patch shape (habitat shape); and
- Configuration (fragmentation, connectivity and patch shape).

Within its SFMP 2005, Canfor uses four landscape metrics to evaluate genetic diversity, as follows:

- Fragmentation as measured by mean patch size (MPS). The acceptable variance is MPS will not fall below 15% of the area of the 2009 MPS forecast for the FMA area;
- Connectivity as measured by mean nearest neighbor distance (MNND)[10]. The acceptable variance is MNND will not exceed +15% of the 2009 forecast for the FMA area;
- Patch shape as measured by the area-weighted mean shape index (AWMSI)[11]. The acceptable variance is AWMSI will not decrease by –15% of the 2009 forecast for the FMA area; and
- Habitat size as measured by patch size class distribution. The acceptable variance is to be within ±10% of the 2009 forecast for the FMA area.

Note: Seral stage distribution can also be utilized as a landscape metric (habitat type) for genetic diversity, however to reduce duplication within its SFMP 2005, Canfor opted to use that value for evaluation of ecosystem diversity. Those results are presented in Section F 3.1.1.

The latest results indicate that the MPS, MNN and AWMSI meet the above-mentioned acceptable variances (Figure 18). For patch size class distribution, both the 100 – 500 and 500+ hectare classes meet the acceptable variance. Only the 0 – 100 hectare class is over represented.

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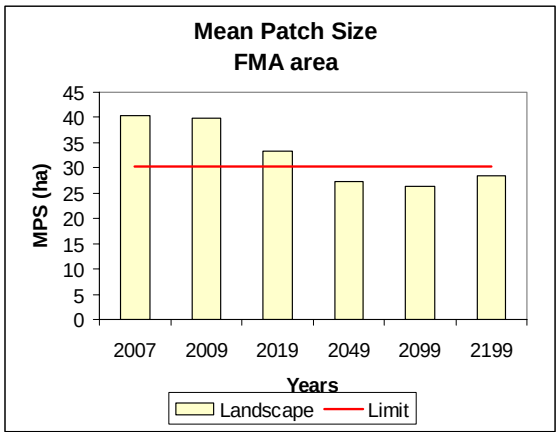
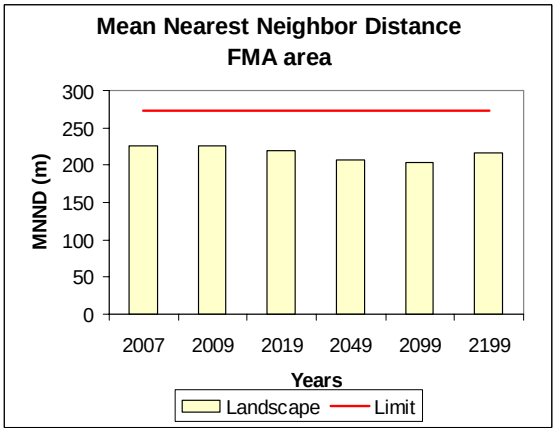
[10] *MNND describes the spatial context of a habitat patch in relation to its neighbors by increasing with increasing distance between patches.*

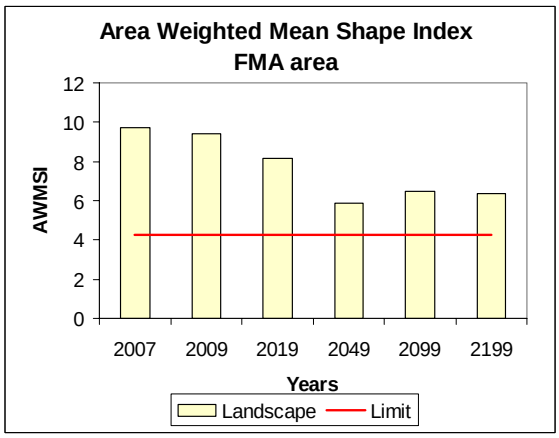
[11] *AWMSI measures the perimeter-to-area ratio for a patch type or landscape using comparisons of patches to a standard shape.*

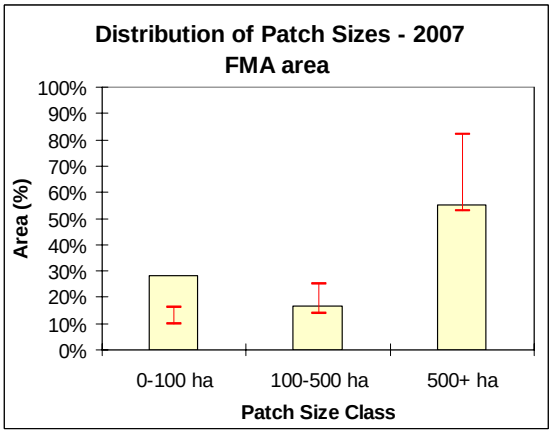
Figure 18. Landscape Metrics

HPS Tables and Figure Master.xls
Fig 6.









Source: Timberline Compiled data

3.1.4 Average Annual Water Yield

Water yield refers to streamflow quantity and timing, which is a key determinant of the energy available for erosion, transport and deposition of sediment within channels.

According to the operating ground rules an increase of water yield greater than 15% is potentially problematic depending on the watershed. Canfor evaluates water yield increases by utilizing ECA-Alberta model developed by Uldis Silins at the University of Alberta. The model provides a framework for evaluation of hydrological effects of forest practices with modest input data requirements. The ten watersheds that exhibit the greatest increase in ECA% at the end of the fifteen-year plan (2022) were modeled and the results presented in RTSA and in Table 10. Only watershed 8027 exceeds the target to a significant degree.

Table 10. Average Water Yield Increase for 10 Sampled Watersheds (at 2022)

TNRG-RSTASourceData27Mar-1.xls
T040

Sampled Watershed	ECA (%)	Water Yield Increase (%)
8027	55.6%	22.7%
7214	40.7%	16.4%
7179	38.7%	17.5%
7232	37.6%	9.2%
8351	37.2%	15.1%
7816	34.3%	6.2%
1589	34.2%	12.2%
7509	30.4%	14.8%
2670	30.1%	11.1%
7443	18.1%	8.2%

Source: Timberline compiled data

3.2 Preferred Forest Management Strategy and Targets for Other Values

Grizzly bear habitat was not modeled within the RTSA and it is not a component of the SFMP 2005 CSA values previously discussed. It is provided in compliance with ASRD requirements to report on grizzly bear habitat.

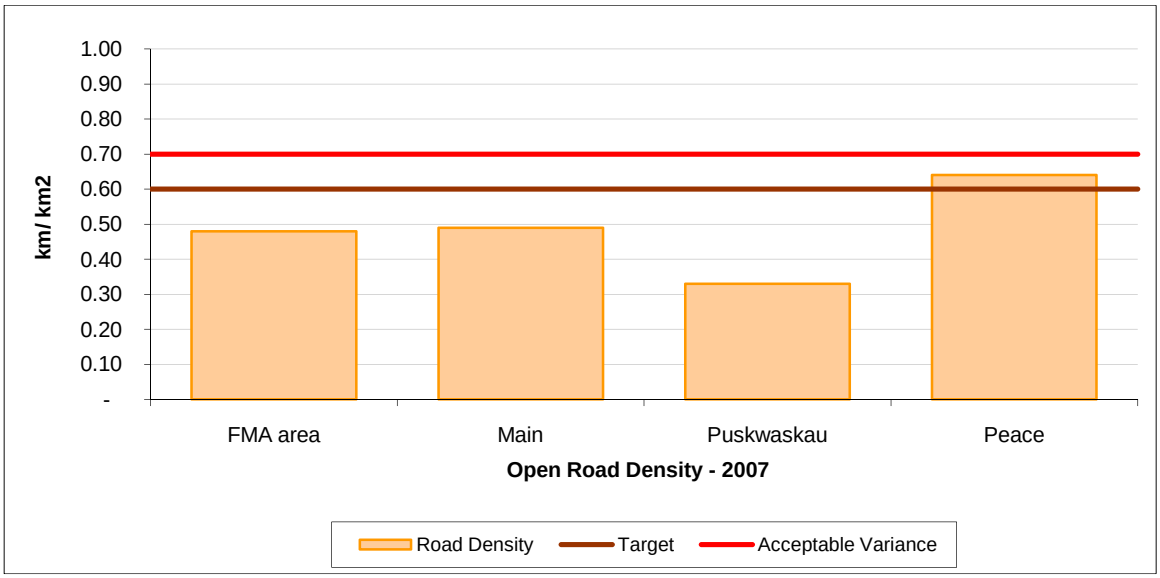
3.2.1 Grizzly Bear Habitat

Canfor developed a grizzly bear habitat target using open road densities as a surrogate and will report the results in its Annual Performance Monitoring Report.

Both the *Alberta Grizzly Bear Recovery Plan 2008 - 2013* (ASRD, 2008c) 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 grizzly bear use is lower. Current results (Figure 19) indicate the FMA area and the Main, Peace and Puskwaskau parcels, all meet the acceptable variance (0.7 km/ km^2) for 2007. Canfor will strive to maintain open road densities at or below current levels.

Figure 19. Grizzly Bear Open Road Densities

TNRG Comparative Analysis 30Mar.xls
Grizzly Bear



Source: Canfor compiled data

3.3 Coniferous and Deciduous Long-Term Timber Supply

Annual harvest levels were generated for both deciduous and coniferous species, as follows:

- Average coniferous harvest level for the fifteen-year plan (2007 – 2021) is 715,000 m^3/ year[12]. The sustainable AAC for the balance of the 200-year planning horizon (2022 – 2206) is 670,000 m^3/ year, which is comparable to that presented in the 2003 DFMP.
- Maintains deciduous timber allocations of 452,529 m3/ year for the entire 200-year planning horizon and the non-sustainable deciduous carryover volume of 63,665 m3 for Tolko Industries Ltd. and 226,776 m3 for Ainsworth Engineered Canada Ltd.

3.4 Coniferous and Deciduous Spatial Harvest Sequence (SHS)

Figures 20, 21 and 22 provide the coniferous, deciduous and combined spatial harvest sequences respectively.

[12] *This represents a coniferous harvest uplift of approximately 65,000 m^3/ year (ten percent), when compared to the average of 650,000 m^3/ year presented in the 2003 DFMP (640,000 m^3/ year initially, rising to 670,000 m^3/ year in 2019).*

Figure 20. Coniferous Spatial Harvest Sequence

HPS Maps
Map 7

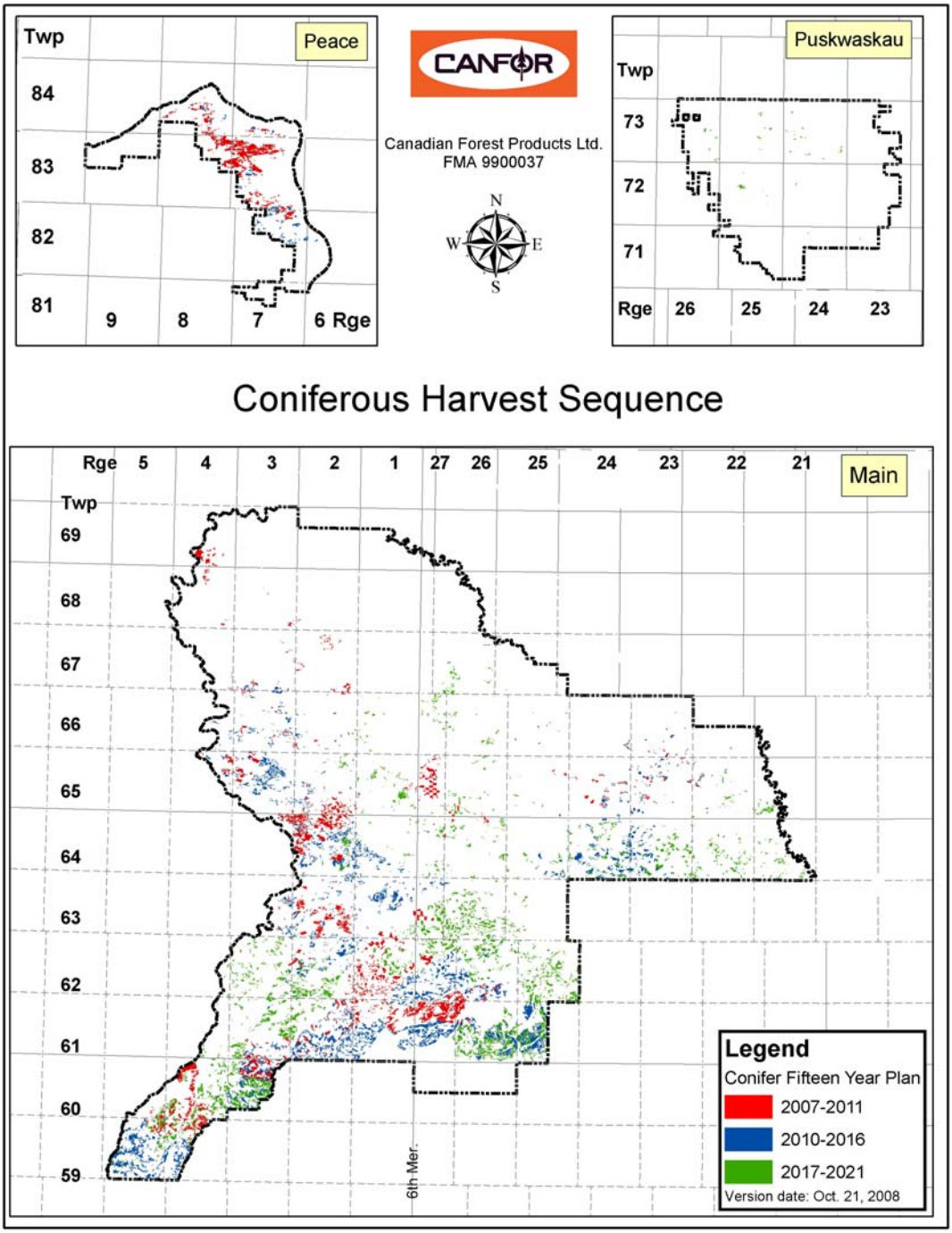


Figure 21. Deciduous Spatial Harvest Sequence

HPS Maps
Map 8

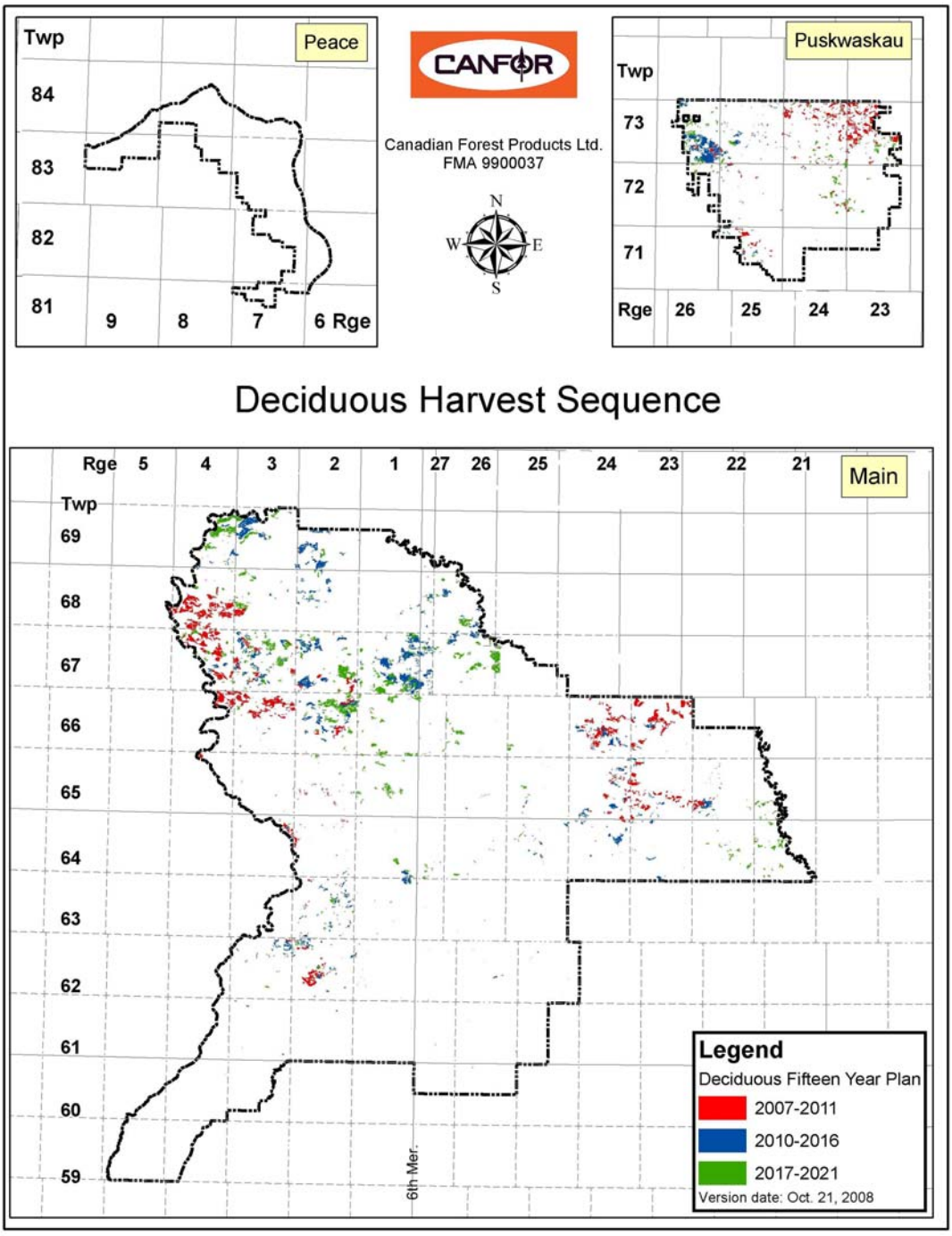
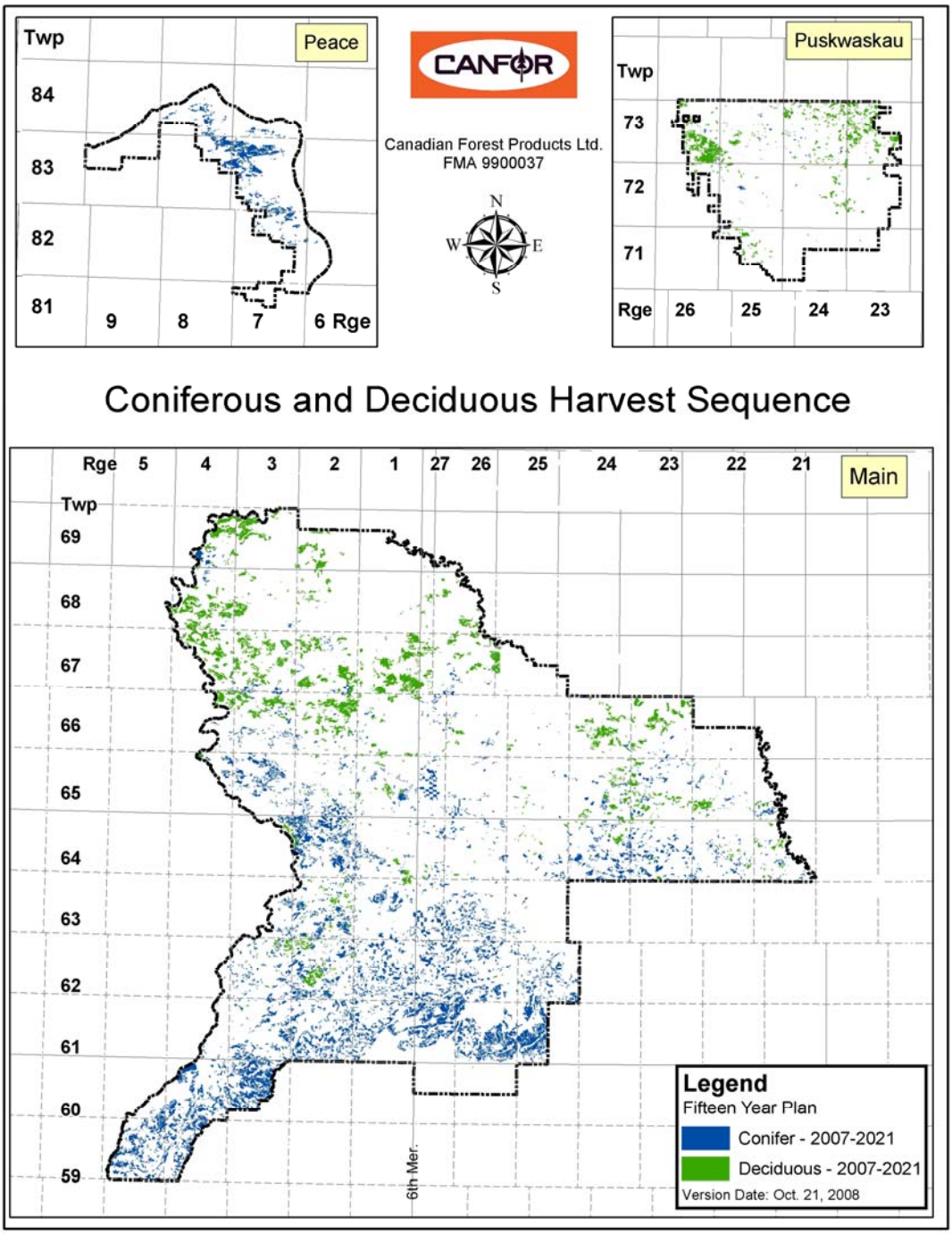


Figure 22. Combined Spatial Harvest Sequence

HPS Maps
Map 9



3.5 Fifteen-Year Plan Harvest Volume Table

The amended 2003 DFMP provides guidance to operational planning and forestry activities. To assist operations, the coniferous and deciduous harvest volumes generated by the spatial harvest sequences are summarized by timber supply compartment (Table 11).

Table 11. Fifteen-Year Plan Harvest Volume

TNRG-RSTASourceData06Nov-2.xls
T915

	Coniferous Volume Harvested (m^3)			Deciduous Volume Harvested (m^3)		
Timber Supply Compartment	Pure	Incidental	Total	Pure	Incidental	Total
DN-1-Heniger	69,968	39	70,007	341	6,894	7,236
DN-2-4-CA	310,993	14	311,007	264	31,780	32,044
DN-2-NE	320,947	54	321,000	568	58,868	59,437
DN-3-NE	213,556	338	213,893	1,533	29,157	30,690
DN-3-SW	274,992	50	275,042	771	30,316	31,088
DN-4-5-Split	262,962	203	263,165	2,029	36,467	38,496
DN-5-SE	215,248		215,248		10,522	10,522
DN-5-SW	355,556	58	355,613	1,105	23,037	24,142
DS-1-North		10	10	200		200
DS-1-South	237,032	31	237,062	292	20,953	21,245
DS-2-Caribou						
DS-2-North	877,408	76	877,484	886	42,883	43,769
DS-2-North-Int						
DS-2-NW	134,866	20	134,886	304	10,684	10,988
DS-3-North	386,256	17	386,272	226	36,565	36,791
DS-3-South	255,445	27	255,472	386	13,909	14,296
DS-3-South-Int						
E8-1-East	138,111		138,111		10,361	10,361
E8-1-West	246,004		246,004		16,980	16,980
E8-2-JimBob	93,356		93,356		6,055	6,055
E8-2-South	181,144		181,144		11,225	11,225
E8-3-A	429,948		429,948		24,762	24,762
E8-4-NE	46,949		46,949		2,650	2,650
E8-4-Norris	111,960		111,960		8,192	8,192
E8-4-NW	168,493		168,493		10,785	10,785
E8-4-SE	46,383		46,383		3,000	3,000
E8-5-Bolton	65,771		65,771		4,274	4,274
E8-5-Elevator	100,191		100,191		3,998	3,998
EN-1-North	63,039	16,024	79,063	657,239	10,722	667,961
EN-1-South		26,587	26,587	681,581		681,581
EN-2-Dunes						
EN-3-East						
EN-3-West		6,554	6,554	274,440		274,440
EN-4-A	37,072	15,518	52,590	343,986	14,322	358,308
EN-5-A	15,645	13,673	29,317	395,260	2,107	397,367

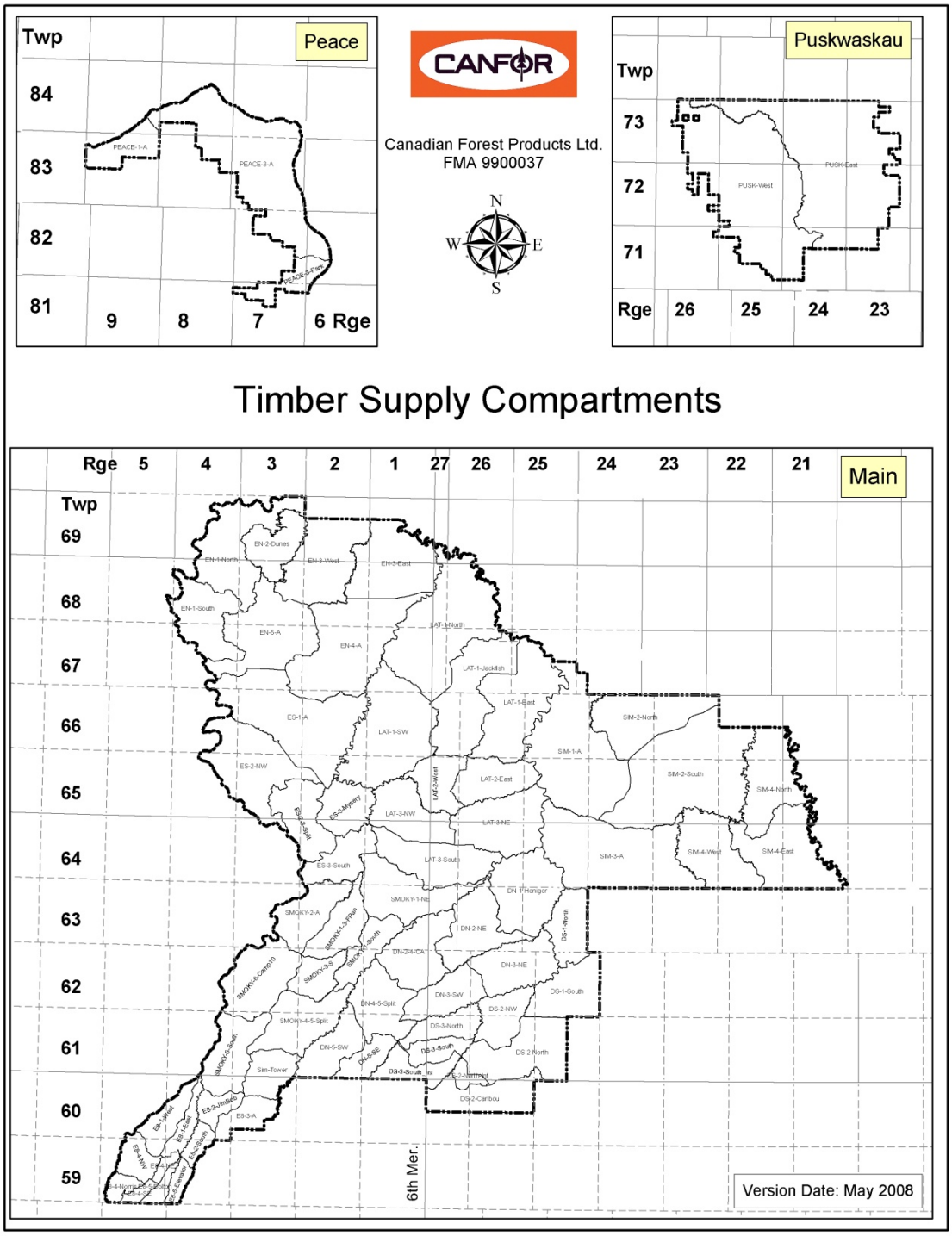
Source: Timberline compiled data

Table 11 continued

	Coniferous Volume Harvested (m^3)			Deciduous Volume Harvested (m^3)		
Timber Supply Compartment	Pure	Incidental	Total	Pure	Incidental	Total
ES-1-A	112,145	33,230	145,375	791,761	22,220	813,981
ES-2-3-Split	328,397	2,564	330,961	55,518	36,396	91,914
ES-2-NW	255,171	788	255,959	11,021	67,901	78,922
ES-3-Mysery	187,716	906	188,622	26,298	19,808	46,106
ES-3-South	214,328	252	214,580	5,562	12,133	17,695
LAT-1-East	16,507	164	16,671	3,942	2,273	6,215
LAT-1-Jackfish	72,275	7,640	79,915	212,849	11,356	224,206
LAT-1-North		28,818	28,818	667,023		667,023
LAT-1-SW	45,450	9,738	55,188	202,950	14,832	217,782
LAT-2-East	12,261	7	12,267	70	4,757	4,827
LAT-2-West	131,256	1	131,257	39	12,832	12,871
LAT-3-NE	111,420	993	112,413	16,698	4,113	20,811
LAT-3-NW	72,531	2,058	74,588	44,857	9,165	54,022
LAT-3-South	35,816	1,845	37,661	43,004	1,497	44,501
PEACE-1-A						
PEACE-3-A	451,129		451,129		53,028	53,028
PEACE-3-Park						
PUSK-East	13,464	41,591	55,055	596,385	1,135	597,521
PUSK-West	23,750	29,687	53,437	489,394	3,883	493,277
SIM-1-A	30,512	37	30,549	588	5,369	5,957
SIM-2-North	167	17,765	17,931	371,618	101	371,719
SIM-2-South	172,420	22,917	195,337	270,947	29,082	300,029
SIM-3-A	503,234	7,544	510,778	68,852	46,946	115,799
SIM-4-East	124,201	6,531	130,731	110,762	9,452	120,213
SIM-4-North	15,054	43	15,097	115	4,340	4,455
SIM-4-West	145,212	26	145,238	255	11,250	11,505
Sim-Tower	323,565	95	323,660	1,364	21,546	22,910
SMOKY-1-3-FPan	170,685	5,791	176,476	93,648	29,178	122,826
SMOKY-1-NE	213,887	2,207	216,094	45,289	14,654	59,943
SMOKY-1-South	73,769	602	74,371	10,791	10,153	20,944
SMOKY-2-A	117,016	1,442	118,459	28,006	14,782	42,788
SMOKY-3-S	117,506	7,808	125,314	109,601	11,351	120,952
SMOKY-4-5-Split	380,317	346	380,662	1,306	38,867	40,173
SMOKY-6-Camp10	135,804	3,370	139,173	53,261	6,257	59,518
SMOKY-6-South	141,947	19	141,966	238	9,363	9,602

Figure 23. Timber Supply Compartments

HPS Maps
Map 9



G. FOREST STEWARDSHIP

1. Introduction

The approved 2003 Detailed Forest Management Plan (Canfor, 2003) forms the basis for the Healthy Pine Strategy; which conforms to an ecological approach and balances economic, environmental and social values.

The Healthy Pine Strategy is consistent with *Canfor's Forestry Principles* (Canfor, 2004); which outlines a broad approach to the sustainability of the forests in which Canfor operates and it's *Environment Policy* (Canfor, 2005)*;* which confirms to a long-standing commitment to responsible stewardship of the environment.

Canfor has adopted public participation as an essential element in development of the Healthy Pine Strategy and will continue to be accountable to the public and will verify, by independent audit, that forestry operations are achieving present and future objectives.

The Healthy Pine Strategy provides information that is important for effective forest stewardship, including monitoring and stewardship reporting. It also provides mitigation options that minimize the impact of MPB management strategies on specific forest values.

2. Monitoring, Forest Stewardship Reporting and Mitigation Options

Table 12 provides monitoring and stewardship reporting information for the range of forest values identified in Canfor's Healthy Pine Strategy. A range of mitigation options for reducing impacts on these values is also provided in the table.

Table 12. Monitoring, Forest Stewardship Reporting and Mitigation Options

HPS Tables and Figure Master.xls
Table 5

Forest Value	Measurement Metric	Reporting [1]	Mitigation Options
Conservation of Ecosystem Diversity	Seral stages (all)	3, 4	> Conduct cause analysis and develop corrective strategies to meet the acceptable variance for those areas not currently achieving the target.
Conservation of Species Diversity	Caribou habitat (pioneer/ young and old seral stages)	1, 3, 4	> Prompt reforestation; > During modelling, apply seral stage cover constraints to conserve caribou habitat; > Adherence to operating guidelines in caribou habitat (WCACSC, 1996) > Continued participation in the Foothills Landscape Management Forum (FLMF) initiatives; and > Implement adaptive management when 'new' data/ information becomes available.
	Grizzly bear habitat (open road densities)	3, 4	> Continued involvement in FLMF initiatives; > Adherence to FLMF Berland Smoky Access Plan; > Limit access by ASRD direction; > Communicate with other industry users; and > Increase the number of memoranda of understanding (MoU) signed with energy sector companies.
	Trumpeter swan sites (no harvest buffer)	1, 3	> Annual consultation with ASRD to maintain a current swan site database.
	Bull trout habitat (ECA% above the H60)	1, 3	> Prompt deactivation; > Prompt reforestation; > Evaluation and management of water quality concern rating (WQCR); and > Delay vegetation management activities.
Conservation of Genetic Diversity	Mean Patch Size (fragmentation)	3	> Evaluate the results for each metric during modelling for the next scheduled DFMP.
	Mean Nearest Neighbour Distance (connectivity)	3	
	Area-Weighted Mean Shape Index (habitat shape)	3	
	Habitat Size (patch size class distribution)	3	
Conservation of Ecosystem Productivity	Growth & Yield Program	3, 4	> Continue implementation of the program objectives.
Conservation of Water Resources	Area-Weighted ECA % above the H60	4	> Prompt deactivation; > Prompt reforestation; > Evaluation and management of water quality concern rating (WQCR); and > Delay vegetation management activities.
	Water yield (as projected at 2022)	1, 3	
Conservation of timber and non-timber benefits	Cut control (sustainable yield of timber)	1, 3, 4	> Annual monitoring and, if required, reduce or increase the harvested volume.
Operational delivery of Healthy Pine Strategy	Results from DFMP/ AOP Validation process [2]	1, 2	> Monitor and adjust operational delivery via the GDP/ AOP process (as per the operating ground rules).
Other SFMP Values	Achievement of all other SFMP 2005 targets/ acceptable variances (and as revised)	3, 4	> Follow protocols identified in the SFMP 2005 and Annual Performance Monitoring Report.

Notes:
1. General Development Plan =1, Annual Operating Plan = 2, Annual Performance Monitoring Report = 3 and 5 Year Forest Stewardship Report = 4.
2. Refer to Section I 3.1.1.1 for a description of the process.

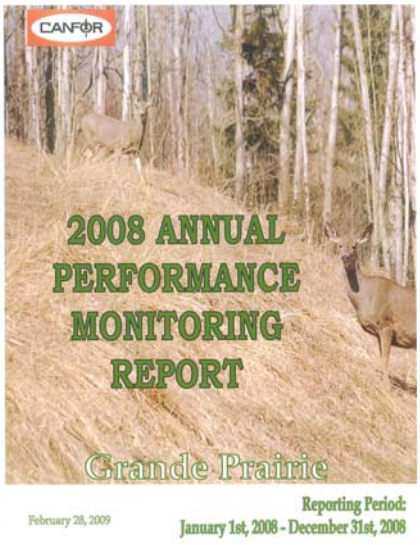
Source: Canfor compiled data

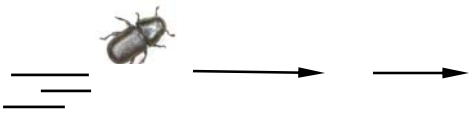
3. Forest Stewardship Reports

Canfor will report on the achievement of specific MPB strategies and CSA targets in two documents: Annual Performance Monitoring Report or the Five Year Forest Stewardship report.

The Annual Performance Monitoring Report is prepared in accordance with the CSA-Z809-02 standard (CSA, 2002). The report (sidebar) summarizes the progress and performance that Canfor Grande Prairie Division has achieved in meeting and maintaining the Sustainable Forest Management standard requirements. The 2008 report provides information on 60 targets.

The Five Year Forest Stewardship Report will be a compendium of all the Annual Performance Monitoring reports published to date.





H. FOREST MANAGEMENT IMPLICATIONS OF THE HEALTHY PINE STRATEGY

1. Introduction

The following sections provide information regarding how the Healthy Pine Strategy will affect specific values or components of forest management and operations.

2. Long-Term Access

Access development and management is an important function of sustainable forest management and an essential component in implementing the spatial harvest sequences. Much of Canfor's FMA area has a network of existing access constructed by Canfor and other industrial users. Canfor utilizes these existing routes wherever feasible.

The long-term access plan (LTAP) was submitted to ASRD in accordance with Approval Condition 7 of the 2003 DFMP and it received ASRD approval February 18, 2005. The LTAP is still relevant and the Healthy Pine Strategy has not impacted it to any significant degree. Any 'new' roads required supporting MPB strategies will be identified in the general development plan (GDP), AOP and final harvest plans. Upon ASRD plan approval, application for a license of occupation will be made if the term of the road is longer than five years.

3. Riparian Areas

Canfor maintains a digital coverage of watercourse buffers, which is used during strategic and operational plan development. Buffer widths correspond to the operating ground rules (OGR). Watercourse buffers are part of the netdown process in the RTSA and are removed from the timber harvesting landbase (Table 4). Areas within these buffers are considered as unavailable for harvest.

As harvest areas are laid out, any additional watercourse buffers are established according to the OGR[13] and recorded for future use. Buffer integrity is maintained throughout the harvesting and silviculture phases.

Riparian areas impacted by MPB are addressed operationally as per *Canfor's Ground Rules Addendum Mountain Pine Beetle Operations* (ASRD, 2006c) and any deviations will be identified within the annual operating plan. Although MPB management within riparian areas is an ASRD responsibility, Canfor will assist to address MPB infestations when consulted.

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[13] *Watercourse buffers tend to follow terrain features, which depending on the features, can result in an increase or decrease of buffer widths. A decrease in buffer width can only be established if it does not negatively affect the riparian area. As per the OGR, such deviations require ASRD approval.*

Watercourse buffers are established to conserve water quality and quantity and woodlands activities that reduce their integrity may decrease their effectiveness. Canfor monitors non-compliance incidents within riparian areas and records contraventions in its issue tracking system. All incidents are reported to ASRD.

4. Incidental Deciduous Timber From Coniferous Stands

The RTSA (Appendix 3) identifies that for the period (2007 – 2026), relatively minor volumes of incidental deciduous timber become available from harvested coniferous stands and those volumes increase significantly for the 200-year planning horizon (Figure 23). All deciduous incidental volume will be available to deciduous companies. An opportunity will arise during development of the next scheduled DFMP to address incidental deciduous timber with deciduous companies.

Figure 24. Incidental Deciduous Timber From Coniferous Stands

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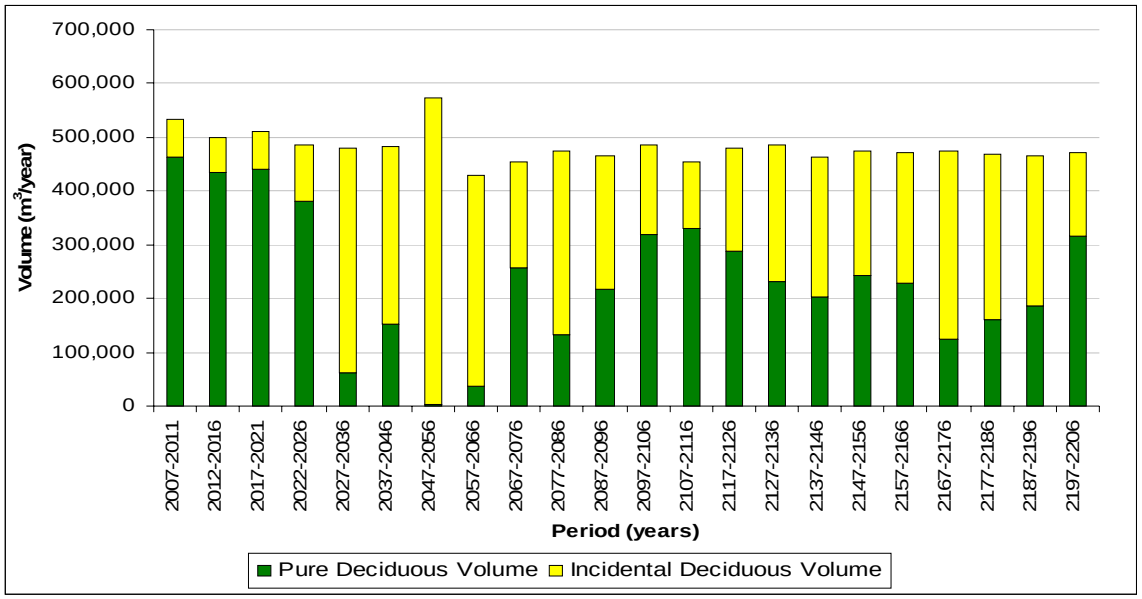
F027



Source: Timberline compiled data

5. Infrastructure and Transportation

Transportation of logs currently accounts for approximately twenty-five percent of the Grande Prairie Division total log cost. Since the majority of the MPB susceptible pine stands in the Canfor FMA area are located in the southern reaches of the FMA area, full implementation of the Healthy Pine Strategy will create a significant increase in log haul distance for the division. In anticipation of this, Canfor has begun to implement strategies to mitigate the adverse financial impacts of the increased haul distance. These include upgrading roads to enable extension of the winter haul season and upgrading roads and bridges to enable safe hauling of heavier off highway loads. The log sale agreement between Canfor and Foothills Forest Products Ltd. will also help Canfor mitigate the overall potential increase in log haul costs by re-directing a proportion of logs harvested from the southwest portion of the FMA area to Foothill's Grande Cache mill.

Transportation of lumber also represents a significant cost for the Grande Prairie Division because of the relatively long distance those products must travel to markets. Enhancing product value by optimizing the percentage of prime grade products enables a higher net return on sales, thereby partially mitigating the financial impact of high transportation costs.

Canfor has a long-term business arrangement with Canadian Hydro Developers whereby Canfor supplies residual wood fibre for the operation of the Grande Prairie EcoPower Centre located adjacent to the Grande Prairie sawmill. Sixty percent of the co-generation plant fibre requirements are satisfied by the Canfor mill, however the remainder must be transported from other sources. Currently, Canfor is acquiring fibre that has been produced from the grinding of infested trees that were harvested under Level 1 MPB containment activities. It is unlikely that the volume of residual fibre that can be economically sourced from woodlands operations will increase under the Healthy Pine Strategy, in part because of the inherent high transportation costs from the FMA area.

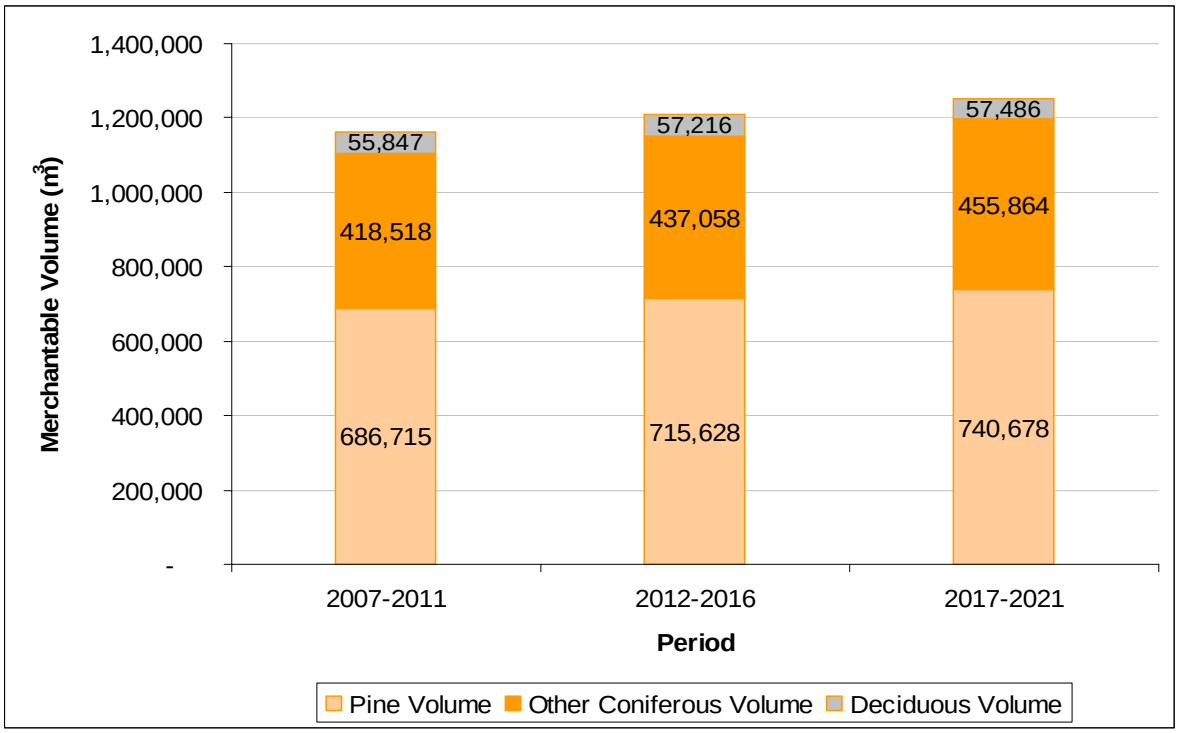
6. Timber Harvesting Deferral in the Caribou Primary Intactness Area

Canfor continues a precautionary approach to management of caribou habitat by making a commitment to defer harvesting in the caribou primary intactness area (Figure 9) for fifteen years (2007 – 2021). The CPIA comprises approximately 12,838 hectares located in the southern portion of the FMA area. During the RTSA process, no harvesting was assigned within this area for that period. Consequently, the standing inventory volume in this area increases steadily during the period. The deferral strategy was modeled and reported in the RTSA (Appendix 3).

The deferral affects the long-term coniferous timber supply by making approximately 740,678 m^3 of pine[14] and 455,864 m^3 of other coniferous timber (combined approx. 1.2 million m^3) unavailable for harvest at the end of the deferral period (2021) (Figure 24). Deferred deciduous volumes at the end of the deferral period are approximately 57,486 m^3.

Figure 25. Timber Harvesting Deferral and Coniferous Growing Stock

TNRG Vol Deferred CPIA Apr 27 2009.xls
Fig 2



Source: Timberline compiled data

It also postpones implementation of an aggressive healthy pine strategy in the caribou primary intactness area (CPIA) until 2021, which increases the risk that MPB populations located there may increase resulting in significant pine mortality. Further, flights of MPB from the CPIA may add to the infestation that already exists in adjacent and distant pine stands.

[14] *Yld Grp 8 (Pl/PlFb+(H), Yld Grp 9 (PlAw/AwPl), Yld Grp 10 (PlLSb+Others), Yld Grp 11 (PlSw/SwPl+(H)) and Yld Grp 14 (SbPl/SbSw/SbFb)*

I. MPB MANAGEMENT

1. Introduction

Alberta's forested lands consist of private lands, provincial Crown lands, federal Crown lands and municipalities managed by a number of different parties. Each land manager has different management objectives and different ways of achieving those objectives. Alberta's response to the MPB infestation requires close partnerships and cooperation between all parties (ASRD, 2006).

2. MPB Management in Alberta

In September 2006, the Alberta government released the *Mountain Pine Beetle Action Plan for Alberta* (ASRD, 2006), which identified its goal:

"*To mitigate the effects of mountain pine beetle on the social, environmental and economic values of Alberta's forests. This will be achieved through aggressive control of infested trees, a reduction in the overall susceptibility of Alberta's forests and, in the case of a major outbreak, recovery of dead and dying trees before fiber is lost.*"

The *Interpretive Bulletin: Planning Mountain Pine Beetle Response Operations* (ASRD, 2006b) was issued concurrently and outlined three strategies for addressing MPB:

- Control (beetle) strategy – focuses on the treatment of infested trees;
- Prevention (beetle) strategy – addresses the need to reduce the overall susceptibility of the pine forest; and
- Salvage strategy – Mitigates impacts if a large-scale outbreak occurs.

In December 2007, ASRD released the *Mountain Pine Beetle Management Strategy* (ASRD, 2007a) to update and expand its 2006 strategy (ASRD, 2006). It incorporated recent science-based information and beetle infestation and spread models and identifies two prime provincial objectives:

- Contain infestations and minimize the spread of MPB north and south along the eastern slopes of Alberta; and
- Prevent the spread of MPB eastward into the boreal forest of lodgepole-jack pine hybrid and jack pine.

ASRD is responsible for establishing management standards for the MPB on Crown lands. When the infestation involves multiple land managers, ASRD coordinates joint efforts and operations (ASRD, 2007b). The document also identifies other ASRD MPB responsibilities, as follows:

- Coordination of monitoring (pheromones monitoring plots) and ground and aerial detection surveys;
- Level I[15] treatment of infested trees;
- ASRD is responsible for all MPB monitoring and control within the caribou primary intactness area (Figure 9), however Canfor will assist ASRD after consultation. On January 14, 2009, Canfor submitted a MPB proposal to ASRD and FRIAA itemizing work to be conducted, including Level I treatments within the area (Canfor, 2009).
- Prescribed burn treatments on Crown lands; and
- On non-FMA lands, responsible for all planning activities related to MPB.

3. MPB Management Conducted By Canfor

FMA holders have the responsibility to cooperate with ASRD to control MPB infestations (ASRD, 2007b) by:

- Developing and implementing management plans that address MPB infestation on FMA lands;
- Level II treatments[16] on the FMA area. Key strategies are:
  - Harvest entire stands;
  - Utilized timber will be AAC chargeable;
  - Surveys are required to determine the extent of the infestation;
  - Treatments should be completed before adult MPB fly; and
  - All pheromone use must be approved by ASRD.
- Pine retention will be implemented in accordance with the *Canfor's Ground Rules Addendum Mountain Pine Beetle Operations* (ASRD, 2006c). Canfor will implement a structural retention target and acceptable variance, as follows:
  - Target - A minimum of ten percent of the area harvested across the FMA area will contain structural retention accumulated annually, beginning in the 2008 timber year; and
  - Acceptable variance - A minimum of five percent of the area harvested across the FMA area will contain structural retention accumulated annually.
- Processing, transporting, transferring and storing lodgepole pine logs and pine residues will be in accordance with ASRD *Directive 2008-02*, *Mountain Pine Beetle Log Management* dated July 15, 2008 and all relevant updates.

[15] *Single tree treatments*

[16] *Stand level treatments*

3.1 Canfor's MPB Operational Planning and Woodlands Initiatives

Implementation of the Healthy Pine Strategy includes a range of activities and initiatives, as described in the following sections.

3.1.1 Implementation of the Healthy Pine Strategy

The Healthy Pine Strategy will be implemented through adaptive management processes, which include provisions for changes to forest management plans based on a process of scientific evaluation, monitoring, assessment and feedback. Canfor will plan and harvest susceptible pine stands in accordance with the Healthy Pine Strategy. Harvest blocks will be identified in the relevant AOP.

Operational planning and field operations will be conducted in accordance with *Canfor FMA 9900037 Operating Ground Rules – FMU G15* (ASRD, 2008a) and *Canfor's Ground Rules Addendum Mountain Pine Beetle Operations* (ASRD, 2006c). Canfor and deciduous companies integrate operational plans (GDP/ AOP) and forest operations. The ASRD final harvest plan checklist (FORM 013 rev 0.1) is utilized to validate that all parties have indicated their agreement with the plan by signing the form.

3.1.1.1 DFMP/ AOP Validation Process

When approved, the Healthy Pine Strategy directives, objectives and strategies, will guide annual operating plan (AOP) development. Since it is difficult to capture all of the nuances of the natural world, it is likely that changes will occur to operational plans. Using the DFMP/ AOP validation process, the annual operating plans will be compared to the Healthy Pine Strategy to confirm that objectives are achieved. The process is summarized below:

- DFMP resultant data is used as the initiation point;
- Static resultant is created;
- AOP is inputted;
- COMPLAN is run;
- Outputs are generated; and
- Reports are developed to validate DFMP objectives.

3.1.2 MPB Initiatives Under Forest Resource Improvement Program (FRIP)

In 2004, prior to the major MPB flight into Alberta, Canfor and Weyerhaeuser Company Ltd. collaborated to provide significant funding[17] to support the B.C. government and forest industry efforts to monitor and control MPB within B.C. lands located adjacent to the BC/ AB. border. The objective was to limit the beetle's expansion into Alberta.

[17] *Funding was provided via FRIAA project Canfor 01-63 (Canfor, 2004a)*

Although MPB eventually arrived in Alberta, the project provided much needed experience regarding MPB management.

Prior to the establishment of ASRD MPB programs in 2006, Canfor initiated a project[18] to proactively monitor, detect and map MPB infestation within its FMA area and quota tenures, with the overall intent of minimizing the spread of the beetle. Activities included:

- Helicopter surveys to determine and map the extent of infestations on the broad landscape (single tress/ small clumps were mapped using GPS);
- Crews were trained to conduct detection surveys;
- Preliminary ground surveys were conducted to assist prioritization of the full-scale ground surveys and follow up treatments;
- Full-scale ground surveys to ground truth aerial observations and determine the location and number of attacked trees;
- Establishment and maintenance of databases;
- MPB susceptibility modeling[19]; and
- Public consultation/ notification.

3.1.3 Initiatives Under the Mountain Pine Beetle Program Grant Agreement

In July 2007, Alberta Sustainable Resource Development (ASRD) entered into the *Mountain Pine Beetle Program Grant Agreement* with the Forest Resource Improvement Association of Alberta (FRIAA) to provide a framework for dispersing the requisite funding to engage forest sector operators in beetle control and monitoring activities beyond tenured obligations. Canfor submitted proposals (Canfor, 2007a, 2008a and 2009) to ASRD under that program and received approval for implementation. The following activities were conducted under the programs, as described below:

- **Training** - Survey crew members received training;
- **Ground surveys** - Surveys to detect beetle presence/ absence and determine the extent of beetle flights were conducted throughout the FMA area and quota tenures except in the Peace Parcel[20] and Caribou Area[21]. Canfor and ASRD worked

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[18] *Funding was provided via FRIAA project Canfor 01-77 (Canfor, 2006)*

[19] *Canfor utilized the Alberta Stand Susceptibility Index Application (ASSI) to determine the stand susceptibility index (SSI) for lodgepole pine stands within its FMA area. SSI is a measure of a stand's capacity to produce beetles (i.e. new populations of MPB in the next year) in the event it is attacked, however it does not serve as an indicator of the probability that the stand will be attacked. The susceptibility index for a given stand is based on four variables: relative abundance of susceptible pine basal area in the stand, age of dominant and co-dominant live pine, density of the stand, and the climatic suitability of the stand.*

[20] *Peace Parcel - Townships 81 to 84, Ranges 6 to 10, W6M.*

cooperatively to determine areas to survey. The two organizations also identified areas for full-scale surveys, which were conducted during the winter 2007/ 08. Survey data was compiled and submitted to ASRD.

- **Aerial surveys** – Canfor's program consists of annual systematic flight lines established across the FMA area and quota tenures on 400 m line spacing. Two helicopters, each containing a contract observer and recorder, located and GPS'd all newly infected trees (red and/ or faders). Survey data was compiled and submitted to ASRD;
- **Log yard management**: - In 2007, Canfor implemented its program for three log storage sites - Grande Prairie mill site, the former Hines Creek mill site and the satellite yard east of the Smoky River. The objectives were to monitor beetle flight times and capture beetles before they infested adjacent lodgepole pine surrounding the mill sites/ storage sites. Lindgren funnel traps were set 50m apart and 50m away from the outside perimeter of the log decks to facilitate capture of beetles. Trap contents were gathered once per week until the beetle flight started, at which time the traps were checked twice per week until catches diminished. The results from the program are contained in a report (Duthie-Holt, 2007) submitted to ASRD. Canfor's logyard management program continued in 2008 and 2009.
- **Pheromone baiting** – Canfor's program was approved by ASRD for implementation commencing in the 2007/ 08 harvesting season. Synthetic aggregation pheromone baits were used to concentrate MPB in stands that were scheduled for harvest in 2007/ 08. Six hundred hectares in selected harvest areas were baited with *trans*-Verbenol (bubble cap) or *exo*-Brevicomin (flexlure);
- **Protection of genetic field trials, seed orchards and research plots** - Canfor participates in a collaborative FRIAA project (Edwards, 2007) to treat Huallen Seed Orchard Company (HASOC)[22] seed orchards and related lodgepole pine progeny sites by installing verbenone pheromone pouches on 10m X 10m spacing, as per ASRD protocols. The program commenced 2007 and will continue on an annual basis;
- **Level I treatments -** ASRD requested (December 2008) Canfor to assist with Level I treatments within the FMA area. Canfor complied and offered assistance for 2009. On January 28, 2009, Canfor received ASRD approval for its proposal to include Level I treatments (Canfor, 2009) for 2009.

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[21] *Caribou Area - Townships 60, 61 Range 1 W6M and Ranges 25, 26, 27 W5M.*

[22] *Huallen Seed Orchard Company Ltd. is a joint venture company formed by five forest companies with facilities located within Alberta. The cooperating companies are: Weyerhaeuser Company Ltd., Canadian Forest Products Ltd.,, Alberta Newsprint Company Ltd., Hinton Wood Products Ltd. (a division of West Fraser Mills) and Millar Western Forest Products. The purpose of the joint venture company is to produce improved orchard seed for reforestation purposes for the cooperating companies.*

4. Transition From 2003 DFMP to Healthy Pine Strategy

Since January 2006, Canfor prepared GDP/ AOP using the *Mountain Pine Beetle Action Plan for Alberta* (ASRD, 2006) for guidance. Level II treatments were initiated to reduce the area of highly susceptible pine stands in accordance with the Control (Beetle) Strategy[23]. Operational activities were implemented as described in the Draft *Mountain Pine Beetle Log Management Directive. O*perations were modified accordingly as 'new' ASRD directives (Directive 2006-05 and Directive 2008-02) and the *Interpretive Bulletin: Planning Mountain Pine Beetle Response Operations* (ASRD, 2006a) were issued.

Upon approval by ASRD, the Healthy Pine Strategy will guide operational planning and forestry operations.

[23] *The strategy is identified by ASRD as Highly Important and Highly Urgent. When MPB infestations are detected, the goal is 100% control before the mature adults fly.*

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K. GLOSSARY

Adaptive Management
An iterative and deliberate process of applying principles of scientific investigation to design and implementation in order to better understand the ecosystem and reduce the key uncertainties and as a basis for continuously refining the program/ project design and operation.

Age Class
The classification of different stands in a forest, or trees in a stand, into a series of ages (e.g., 1 to 20 years might be Age Class 1, 21 to 40 might be Age Class 2, and so on).

Alberta Vegetation Inventory (AVI) Update
The maintenance of an approved AVI coverage by mapping the changes that occur to the AVI as a result of anthropogenic (e.g. timber harvesting, or land use activities) or natural disturbance, re-vegetation by planting or natural means, or the growth and/or succession of stands of trees or other vegetation, using approved AVI classification and mapping standards.

Alternative Regeneration Standards
Requirements to be achieved for the reestablishment of forests on Crown land that may apply to a FMA area or a larger regional area. These requirements, when approved by Alberta replace those established by the *Alberta Regeneration Survey Manual*.

Annual Allowable Cut (AAC)
The volume of timber that can be harvested under sustained-yield management in any one year, as stipulated in the pertinent approved forest management pan. In Alberta it is the quadrant cut divided by the number of years in the quadrant, usually five. AAC is the acronym for “annual allowable cut”.

Annual Operating Plan (AOP)
A plan prepared and submitted by the forest operator each year. An AOP approved by Alberta provide the authorization to harvest. The AOP is a requirement of the Timber Management Regulation.

Archaeological Resource
Means a work of man that is primarily of value for its prehistoric, historic, cultural or scientific significance, and is or was buried or partially buried in land in Alberta or submerged beneath the surface of any watercourse or permanent body of water in Alberta, and includes those works of man or classes of works of man designated by the regulations as archaeological resources.

Buffers (or buffer zone)
An area or edge of a protected area that has land-use controls that only allows activities compatible with the objectives of the protected area. The objective of the buffer zone is to provide added protection for the core reserve area.

Compartment
A subsection of a FMA for which strategic or operational plans are developed. See also Timber Supply Compartment relating to MPB management.

COMPLAN
COMPLAN is a spatially based forest simulation model, developed by Olympic Resource Management that has been used for timber supply analyses since 1994. COMPLAN uses an iterative approach to establish periodic harvest levels that can vary over time. Users are able to set harvest levels that the model will try to reach within the constraints established. COMPLAN schedules harvests at the individual block or stand level subject to adjacency (green-up) and non-timber resource constraints (cover constraints). COMPLAN uses a hierarchical data structure that takes advantage of a compartmental management approach to spatial data organization.

Coniferous
Cone bearing trees with needle or scale-like leaves belonging to the botanical group Gymnospermae.

Connectivity
A measure of how well different areas (patches or a landscape) are connected by linkages, such as harvest patches, single or multiple corridors, or "stepping stones" of like vegetation.

Constraints or Cover Constraints
The restriction, limiting, or regulation of an activity, quality or state of being to predetermined or prescribed course of action or inaction. Constraints can be a result of policies or political will; management direction, attitudes and perceptions; or budget, time personnel and data availability limitations; or more typically, a complex interaction of all these factors.

Cut Control Period
A period of five (5) consecutive forest management operating years or other period agreed to by the Minister.

Deciduous
Trees belonging to the botanical group *Angiospermae* with broad leaves, usually these trees shed their leaves annually.

Deciduous Timber Allocation (DTA)
Means a quota (specified area or volume) of deciduous timber.

Defined Forest Area (DFA)
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).

Detailed Forest Management Plan (DFMP)
A long-term plan used to outline higher-level management objectives, sustainability and timber production assumptions for a Forest Management Agreement.

DFMP/ AOP Validation

When approved, the Healthy Pine Strategy strategies, directives and objectives will guide annual operating plan (AOP) development. Since it is difficult to capture all of the nuances of the natural world, it is likely that changes will occur to operational plans. Using the DFMP/ AOP validation process, the annual operating plans will be compared to the Healthy Pine Strategy to confirm that objectives are achieved. The process is summarized below:

- DFMP resultant data is used as the initiation point;
- Static resultant is created;
- AOP is inputted;
- COMPLAN is run;
- Outputs are generated; and
- Reports are developed to validate DFMP objectives.

Ecosystem Management

Uses an ecosystem-based approach to resource management in order to address the myriad challenges that arise from fragmented landscapes and diverse management strategies. An ecosystem management approach has 5 key elements:

- Requires consideration of geographic areas defined by ecological boundaries and the perspectives provided by different spatial scales and longer time frames;
- Requires managers to take into account the complexity of natural processes and social systems and to use that understanding to craft management approaches that take advantage of these processes rather than work against them;
- Incorporates explicit definition of biological and social goals at both the national and local scales and elevates maintenance and restoration of ecological sustainability and ecosystem integrity as important goals;
- Emphasizes collaborative decision making to deal with a landscape owned by many individuals and organizations with different values, interests and capabilities; and
- Uses a process of adaptive management to account for the uncertainty inherent in the Company's understanding and the future, and employs a wide range of strategies and policy tools.

Equivalent Clearcut Area (ECA)

This refers to an area that has been harvested, cleared or burned. The ECA index, expressed as a percentage, describes an area of regenerated growth in terms of its hydrological equivalence to a clearcut. As the area regenerates and growth develops, the hydrological impact is reduced. ECA is a primary factor considered in an evaluation of the potential effect of past and proposed forest harvesting on water yield. ECA is expressed as a percent of watershed area.

Enhanced Forest Management

Improvements in forest growth resulting from thinning, fertilizing, tree improvement or drainage.

Fifteen-Year Plan
The fifteen-year plan prepared for the Healthy Pine Strategy is the spatially explicit harvest sequence that is output by COMPLAN for the first fifteen years of the planning horizon from 2007 to 2021. It was generated using through a combination of quotas and block-level harvest priorities that were provided by Canfor planners.

FMA
This is 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."

Forest Management Advisory Committee (FMAC)
A committee comprised of local stakeholder groups who are directly affected by or who have an interest in the management of the forest resources. This Committee has been formed to review Canfor's strategic plans and to identify issues of concern.

Forest Management Unit (FMU)
An administrative unit of forest land designated by the Minister, as authorized under Section 14(1) of *Forest Act*.

Green-up Period
The time needed to re-establish vegetation after a disturbance. Specific green-up periods may be established to satisfy visual objectives or hydrological requirements, or as a means of ensuring re-establishment of vegetation (for silviculture, wildlife habitat or hydrological reasons) before adjacent stands can be harvested.

Growing Stock
The sum (by number, basal area or volume) of trees in a forest or a specified part of it.

H60
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).

Harvest Area
A specified land area with defined boundaries where timber harvesting is scheduled, or has occurred. Commonly referred to as a cut block.

Harvest Level
A volume or area of timber determined through timber supply analysis available for harvest on an annual sustainable basis within a Defined Forest Area (DFA). A harvest level is not an annual allowable cut (AAC) unless approved by the Minister.

Historical Resources
Any work of nature or man that is primarily of value for its paleontology, archeological, prehistoric, historic, cultural, natural, scientific, or aesthetic interest, including, but not limited to, the structure or object and its surrounding site.

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. See also H60.

Inoperable
Classification of a forest site based on the potential to harvest timber on that site, as affected by the physiographic characteristics, moisture regime and harvesting equipment/ technology.

Interested Parties
Aboriginal forest users and communities are classified as *interested parties*. Alberta's consultation policy for first nations on land management and resource development applies. Organizations will provide meaningful consultation to Aboriginal forest users and communities concerning forest management on the Defined Forest Area (DFA).

Interpretive Bulletin
Document issued from time to time by Alberta describing protocols, standards, methods or other applicable to forest management planning.

Level I Treatments
Relates to MPB single tree treatment implemented by ASRD.

Level II Treatments
Relates to MPB stand level treatment implemented by the forest industry.

License Of Occupation (LOC)
A disposition issued by Alberta authorizing occupation of a linear corridor, often for an access road.

LOC
This is the acronym for "License of Occupation". It refers to permanent road classes I to IV.

Mean Annual Increment (MAI)
The average increase in volume of individual trees or stands up to the specified point in time. The MAI changes with different growth phases in a tree's life, being highest in the middle years and then slowly decreasing with age. The point at which the MAI peaks is commonly used to identify the biological maturity of the stand and its readiness for harvesting.

Meaningful Consultation
Requires consulting in good faith, with honest communication and an open exchange of relevant information before decisions are made. The mechanisms for this shall be outlined in the *Terms of Reference* for the forest management plan (Alberta Forest Planning Standard ver. 4.1).

Metadata
Data that describes the content, quality, conditions, use limitations and other characteristics of a dataset and which also documents bibliographic information including but not limited to dataset such as who collected the data, when it was collected, how it was collected, pre-processed and converted, its resolution and who presently holds the data. In summary, metadata is information about a thing, apart from the thing itself.

Minimum Harvest Age (MHA)
The youngest age at which a stand is available for harvest. These ages vary by yield curve and by natural subregion, and can be found in Table 14 of Appendix 3 of the 2003 DFMP.

Monitoring
The continued checking of output of a system to detect shortcomings of the model. "Growth and yield monitoring" is the process of comparing the observed to the predicted growth and yield for a stand or forest area.

Mountain Pine Beetle (MPB)
The mountain pine beetle, *Dendroctonus ponderosae Hopkins*, is a species of bark beetle native to the forests of western North America. It has a hard black shell and measures about 5 millimetres, about the size of a grain of rice. They are a pest of Lodgepole Pine, which they kill by boring through the bark into the phloem layer on which they feed and in which eggs are laid.

MPS
This is the acronym for "mean patch size". It is used as a measure of forest fragmentation.

Netdown Procedure
The process of identifying the net land base, which is the number of hectares of forestland that actually contribute to the allowable annual cut. Areas and/or volumes are sequentially deleted or reduced from the gross land base for a number of considerations, including private ownership, non-forest or non-productive, environmentally sensitive, un-merchantable, and inaccessible.

Old Seral Stage
Old seral stage is defined by the age of the stand at breast height for each yield group. For Canfor's classification refer to Table 1 below.

Open Roads
Open roads are those held under Licenses 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.

Over Mature Seral Stage
Seral stage is defined by the age of the stand at breast height for each yield group. For Canfor's classification refer to Table 1 below.

Patch
A specific area wherein relatively homogeneous environmental conditions occur. Boundaries are defined by measurable changes in one or several environmental variables.

Planning Horizon
The length of time over which a series of defined management actions occurs. For the purposes of modeling -200 years.

Preferred Forest Management Alternative (PFMA)
The timber supply scenario and associated cover constraints and schedules that best meet the objectives of Canfor and ASRD for the FMA area.

Prevention Strategy
The objective of the Prevention Strategy is to decrease MPB spread and outbreak potential by reducing the area of MPB susceptible pine stands.

Permanent Sample Plots
A fixed or variable area plot established for (forest) sampling and measurement purposed, and designed for re-measurement.

Pine Harvest Priority Ranking
Pine Harvest Priority Ranking is calculated based on SSI, Yield Group and stand height. The calculation results in a priority ranking between 0 and 10. This ranking is the primary consideration in scheduling blocks for harvest in the fifteen-year plan.

Planning Horizon
The length of time over which a series of defined management actions occurs. For the purposes of modeling -200 years.

Quota
The timber quota is a share of the allowable cut of timber within a forest management unit. Quotas are also a mechanism used in COMPLAN to focus harvesting in particular geographic areas or forest types.

Rank 1
Rank 1 stands are the highest priority for susceptibility reduction. These stands provide the best habitat for MPB to produce brood and spread MPB to other stands.

Rank 2
Rank 2 stands are also important, but because of their lower pine content, lower suitability and/ or greater distance from existing MPB populations, they are a lower priority.

Regulated Forestry Professional
Registered Professional Forester (RPF) on the Registered Professional Foresters Registers of the College of Alberta Professional Foresters (CAPF) or a Registered Professional Forest Technologist (RFPT) in the Registered Professional Forest Technologists Register of the College of Alberta Professional Forest Technologists (CAPFT).

Resource and Timber Supply Analysis (RTSA)
Calculations/ computer models with built-in assumptions regarding forest growth patterns, used to determine the annual allowable cut.

Rotation
The period of years required to establish and grown even-aged timber crops to a specified condition of maturity.

Sensitivity Analysis
An analytical procedure in which the value of one or more parameters is varied; the changes that this produces are analyzed in a series of iterative evaluations. If a small change in a parameter results in a proportionately larger change in the results, the results are said to be sensitive to the parameter.

Seral Stages
A stage in forest succession. A series of plant community conditions that develop during ecological succession from a major disturbance to the climax stage. Most common characteristics/ classifications include tree species and age. For Canfor's classification refer to Table 1 below.

Table 1. Seral Stages

DFMP_Tables.xls
Table 1

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	AW SW/PBSW/BW SW	0	1–40	41–80	81–120	120+	SW	15
4	BW/BW AW+(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/AW PL	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/SW PL + (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/SW FB + (H)-AB	0	1–40	41–90	91–120	120+	SW	15
16	SW/SW FB +(H)-CD	0	1–40	41–90	91–120	120+	SW	15
17	SW AW/SW AW PL	0	1–40	41–90	91–120	120+	SW	15

Note: Ages are breast height age
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

Source: ORM compiled data

Spatial Harvest Sequence (SHS)
A stand level map depicting forest stands scheduled for timber harvesting that are feasible to be operated by the organization. A SHS is generally prepared for a 20 year period.

Species of Management Concern
Species within the forest management planning area that have an identified value (social, economic, ecological) and are managed to ensure their continued protection and/or use. This includes species that are hunted or trapped, as well as those that are endangered or threatened.

Stand Susceptibility Index (SSI)
SSI is a measure of a stand's capacity to produce beetles (i.e. new populations of MPB in the next year) in the event it is attached, however it does not serve as an indicator of the probability that the stand will be attached. The index is use to set priorities for MPB control and prevention activities. The Alberta Stand Susceptibility Index (ASSI) is a model used to rank susceptible stands. ASRD has directed that Rank 1 and Rank 2 stands be reduced by 75%. Refer to Rank 1 and Rank 2 definitions.

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.

Timber Harvest Planning and Operating Ground Rules
Standards for operational planning and field practices that must be measurable and auditable and based forest management plan objectives.

Timber Supply Compartment
A subsection of an FMA area for which MPB strategic and operational plans are developed. See also Compartment.

Understory
The trees and other woody species growing under the canopies of larger adjacent trees and other woody growth.

Utilization
The portion of the stand or individual tree used for manufacture of wood products, defined in terms of piece length and diameter at each end. Minimum standards for utilization are defined in the timber disposition.

Variance-Spatial Harvest Sequence

- Operators shall delete no more than 20% of the area (ha) of the scheduled stands in approved spatial harvest sequence.
- Operators may replace up to an equivalent area (ha) deleted from unsequenced stands in the net land base.
- Operators may harvest no more than 100% of the total area (ha) sequenced in the spatial harvest sequence.
- Items above must be met by compartment per decade.

Water Quality Concern Rating (WQCR)
WQCR is a rating system based on the stream crossing quality index (SCQI) approach developed and validated by Pierre Beaudry and Associates (BC). The Index utilizes a field based assessment to index the level of erosion and sediment delivery to the stream

channel that actually (or could potentially) occur at a stream crossing and assigns that individual crossing a score of zero "<0.1" to ">1.6". That score is then related to its respective Water Quality Concern Rating (WQCR) Hazard Class of None (<0.1), Low (0.1 to 0.3), Medium (0.4 to 0.7), High (0.8 to 1.5) or Very High (>1.6). Watercourses can then be prioritized for remedial action based on the WQCR.

Watershed
An area of land, which may or may not be under forest cover, that drains water, organic matter, dissolved nutrients and sediments into a lake or stream.

Water Yield
A drainage basin's total yield of liquid water during some period of time.

WCACSC
This is the acronym for "West Central Alberta Caribou Standing Committee". This Committee has established *Operating Guidelines for Industrial Activity within the Caribou Ranges of West Central Alberta* (WCACSC 1996) and was involved with caribou research initiatives.

Yield
In timber management, the volume of wood available for harvest at the end of a rotation period, usually measured as unit volume per unit area (e.g., cubic metres per hectare) or the amount of output actually harvested and usable (e.g., volume of timber extracted).

Yield Table
In its simplest form, a plot of expected fibre yield in terms of volume per unit area against stand age. The basic plot produces a normal yield table that assumes the site is fully stocked or has a normal stand density.

Yield Curve
Graphical representation of a yield table.

APPENDICES

Appendix 1.
Interpretive Bulletin: Planning Mountain Pine Beetle Response Operations
version 4.6 (September 2006)

Appendix 2.
2003 DFMP and SFMP 2005 Integration Matrix

Appendix 3.
Resource and Timber Supply Analysis

Appendix 4.
Foothills Landscape Management Forum
Berland Smoky Access Plan Area

Appendix 5.
Canfor's Terms of Reference for the Healthy Pine Strategy

Appendix 6.
Canfor's Public Involvement Plan

Appendix 7.
Canfor Caribou Timeline