


Mackenzie SFMP



A SUSTAINABLE FOREST MANAGEMENT PLAN FOR THE MACKENZIE DEFINED FOREST AREA

Published: February 2012
Revised: June 2018

Sustainable forest management is "maintaining and enhancing the long-term health of forest ecosystems, while providing ecological, economic, social and cultural opportunities for the benefit of present and future generations." Natural Resources Canada 2001-2002

EXECUTIVE SUMMARY

The Sustainable Forest Management Plan (SFMP) for the Mackenzie Defined Forest Area (DFA) was developed to document the plan under which the Mackenzie Operations of Canadian Forest Products Ltd. (Canfor) and the portion of Mackenzie Fibre Management Corporation (Mackenzie Fibre) managed by Canfor (hereinafter referred to as "the signatory") intend to achieve certification to Canadian Standards Association (CSA) Z809-16 Sustainable Forest Management Standard. This standard and subsequent updates may be viewed at the following website: www.ShopCSA.ca.

Responsibilities and commitments of Canfor to the SFMP focus on achieving the goal of sustainable forest management (SFM) which in turn will satisfy the performance requirements for certification.

Canfor believes in conducting business in a fashion that protects the environment while ensuring sustainable development of forests. Canfor's commitment to continual improvement in management actions and realized outcomes with respect to environmental performance and stewardship will be fostered through adherence to the following principles:

- develop and maintain a scientifically credible, structured, yet flexible plan for SFM within the Mackenzie DFA that incorporates strategic-, tactical-, and operational-level requirements;
- manage all operations such that they comply with or exceed legal requirements;
- provide opportunities for First Nations, communities, environmental groups, and scientists to participate in planning and implementation in ways that reflects their interests and concerns efficiently in both time and cost and in ways that are effective for both stakeholders and resource managers;
- identify, evaluate and control potential environmental risks and implement appropriate preventative measures;
- communicate, inform, and promote awareness regarding environmental activities with employees, First Nations, and stakeholders;
- develop and maintain a monitoring and evaluation program that supports management decisions through evaluations, feedback, and reports on the sustainability of ecological, economic, and social values;
- use adaptive management to guide knowledge acquisition, monitoring protocols and the incorporation of advances in SFM science and technology such that management plans and practices continually adapt and move towards concurrent sustainability of ecological, economic, and social values;
- commit to evolving processes that ensure work-site health and safety standards provide conditions and safeguards for the health and safety of employees and the public; and
- conduct timely audits of environmental management systems and SFM parameters and implement corrective measures as required.

Within the SFMP, Canfor outlines commitments to sustainable forest management by providing:

- a comprehensive description of the Mackenzie DFA and its current conditions;
- a summary of the most recently implemented forest management plan, current practices, resultant outcomes, and conclusions derived from a management review;
- the identification of one or more appropriate forest value(s)/objective(s) and statements of criteria and indicator for each value;

- the targets and target variance for each indicator and clear time frames for achievement of the target;
- an account for each indicator which includes: 1) what the indicator is and why it is important, 2) how targets for the indicator were established, 2) current condition of the indicator, 4) forecasts of the probable trend for the indicator, and 5) a description of the monitoring and reporting which will accompany inventory of the indicator; and
- clear linkages between short-term operational plans and the SFMP.

Achievement of SFM on the Mackenzie DFA requires the strong commitment of Canfor, public stakeholders, and managing agencies to embrace innovative methods and technology. Novel and innovative approaches are being employed to obtain meaningful public input and participation, and to examine how a diversity of potentially competing values can be accommodated and effectively managed to meet the goal of SFM. This SFMP is a document that will evolve through time in response not just to changes in technology and knowledge but also to changes in socio-economic needs and values, changes in government policy, and to stochastic natural factors such as wildfire and insect infestation. Successive iterations of the SFMP will emphasize the continual improvement of management practices and resultant outcomes on the land base, such that the concurrent sustainability of the social, ecological, and economic values that collectively defines SFM is achieved.

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SIGNATORIES

The following have committed to implement and maintain on a continuous improvement basis, the Mackenzie Sustainable Forest Management Plan.

June 30, 2018

Carmen Augustine, RPF, Forestry Superintendent — Date
Canadian Forest Products Ltd.
Forest Management Group East – Mackenzie

June 30, 2018

Peter Baird, RPF. Planning Manager — Date
Canadian Forest Products Ltd.
Forest Management Group

June 30, 2018

Brian Quick, General Manager — Date
Mackenzie Fibre Management Corporation

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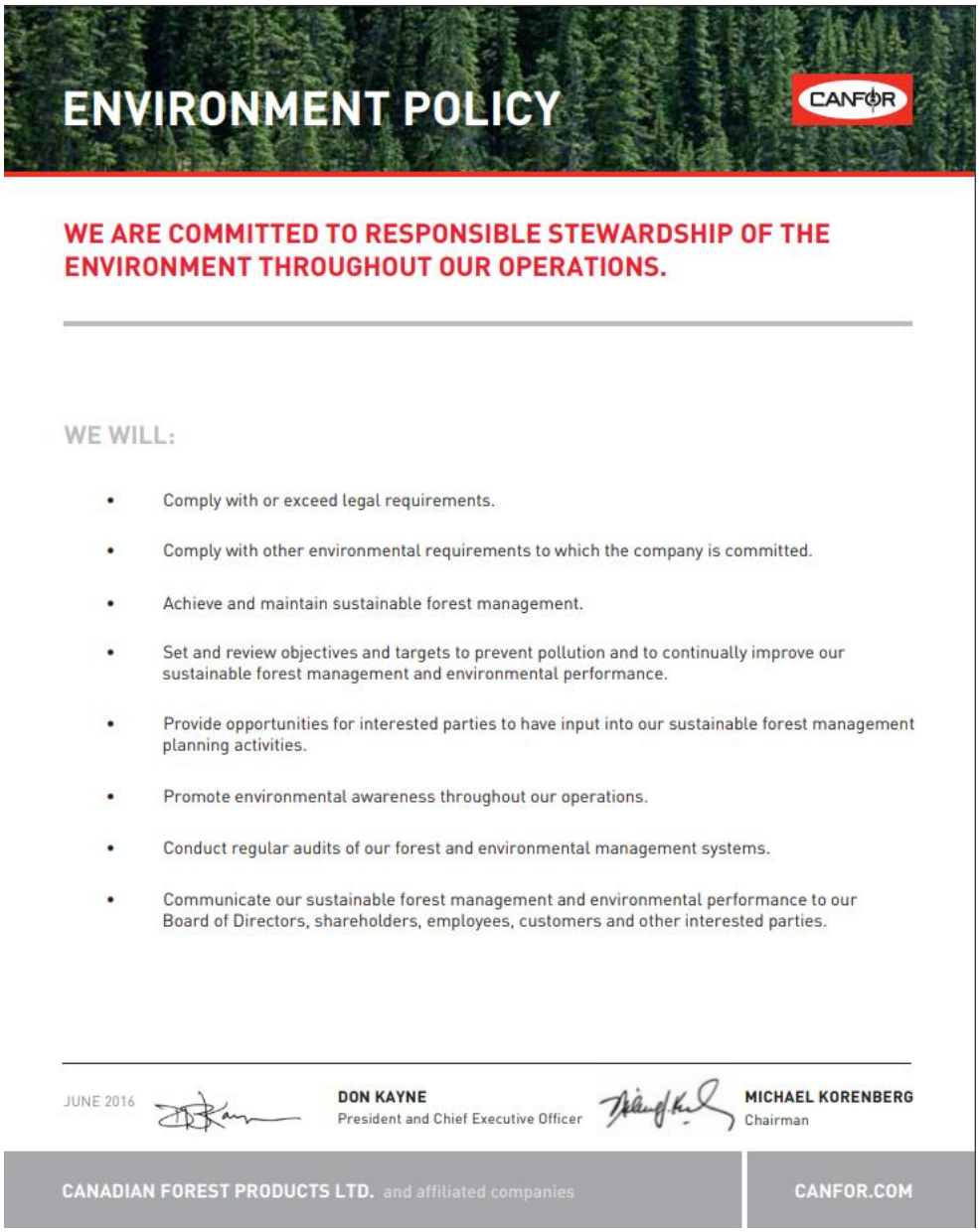
COMMITMENTS TO SUSTAINABLE FOREST MANAGEMENT

Canadian Forest Products Ltd. (Canfor) believes in conducting its business in a manner that protects the environment and ensures sustainable forest development. The following Environmental Policy and Sustainable Forest Management (SFM) Commitments will detail the commitments to SFM for the Fort St. James Defined Forest Area (DFA). These commitments are available and communicated publicly.



ENVIRONMENT POLICY

CANFOR

WE ARE COMMITTED TO RESPONSIBLE STEWARDSHIP OF THE ENVIRONMENT THROUGHOUT OUR OPERATIONS.

WE WILL:

- Comply with or exceed legal requirements.
- Comply with other environmental requirements to which the company is committed.
- Achieve and maintain sustainable forest management.
- Set and review objectives and targets to prevent pollution and to continually improve our sustainable forest management and environmental performance.
- Provide opportunities for interested parties to have input into our sustainable forest management planning activities.
- Promote environmental awareness throughout our operations.
- Conduct regular audits of our forest and environmental management systems.
- Communicate our sustainable forest management and environmental performance to our Board of Directors, shareholders, employees, customers and other interested parties.

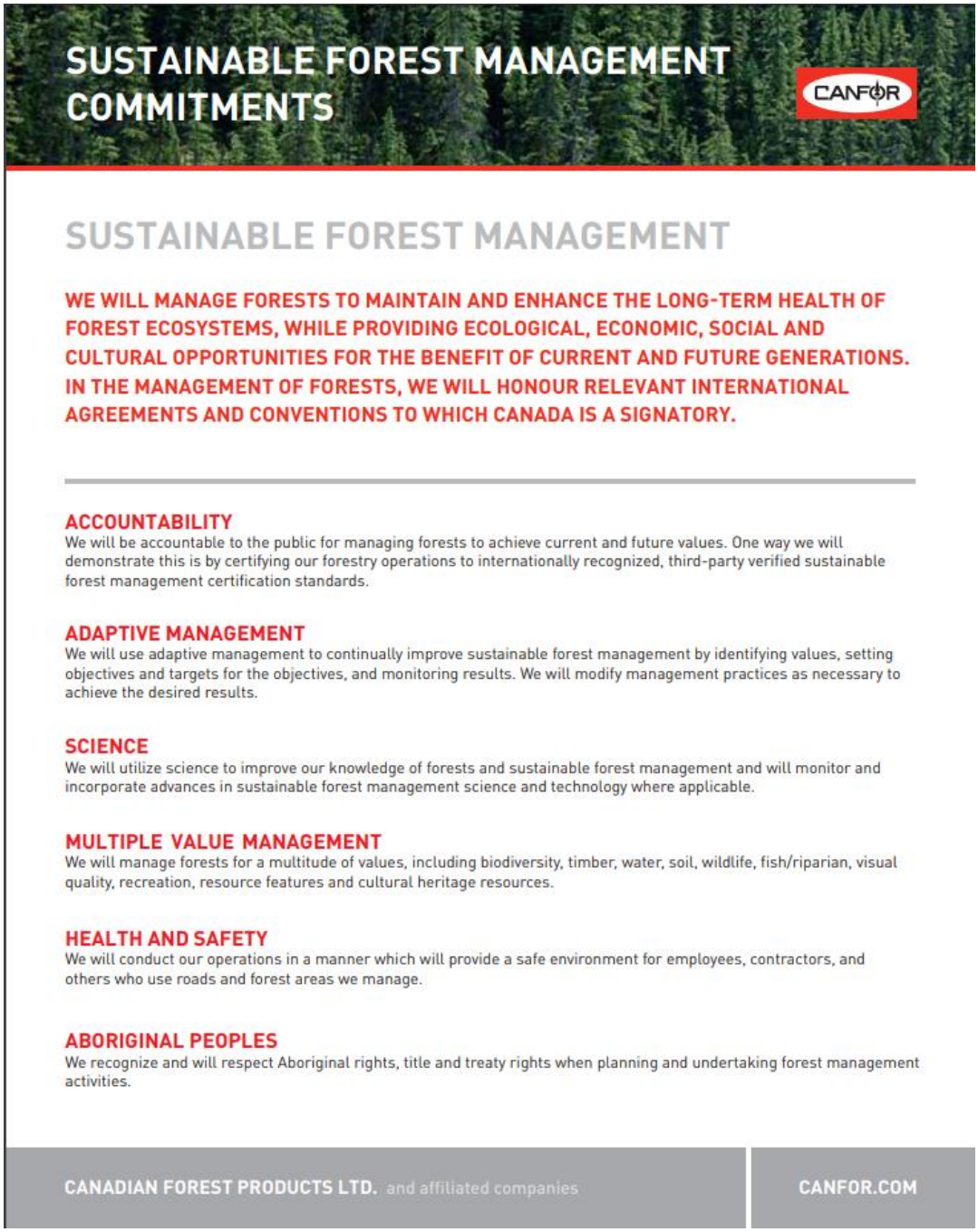
JUNE 2016

DON KAYNE
President and Chief Executive Officer

MICHAEL KORENBERG
Chairman

CANADIAN FOREST PRODUCTS LTD. and affiliated companies

CANFOR.COM



SUSTAINABLE FOREST MANAGEMENT COMMITMENTS

CANFOR

SUSTAINABLE FOREST MANAGEMENT

WE WILL MANAGE FORESTS TO MAINTAIN AND ENHANCE THE LONG-TERM HEALTH OF FOREST ECOSYSTEMS, WHILE PROVIDING ECOLOGICAL, ECONOMIC, SOCIAL AND CULTURAL OPPORTUNITIES FOR THE BENEFIT OF CURRENT AND FUTURE GENERATIONS. IN THE MANAGEMENT OF FORESTS, WE WILL HONOUR RELEVANT INTERNATIONAL AGREEMENTS AND CONVENTIONS TO WHICH CANADA IS A SIGNATORY.

ACCOUNTABILITY
We will be accountable to the public for managing forests to achieve current and future values. One way we will demonstrate this is by certifying our forestry operations to internationally recognized, third-party verified sustainable forest management certification standards.

ADAPTIVE MANAGEMENT
We will use adaptive management to continually improve sustainable forest management by identifying values, setting objectives and targets for the objectives, and monitoring results. We will modify management practices as necessary to achieve the desired results.

SCIENCE
We will utilize science to improve our knowledge of forests and sustainable forest management and will monitor and incorporate advances in sustainable forest management science and technology where applicable.

MULTIPLE VALUE MANAGEMENT
We will manage forests for a multitude of values, including biodiversity, timber, water, soil, wildlife, fish/riparian, visual quality, recreation, resource features and cultural heritage resources.

HEALTH AND SAFETY
We will conduct our operations in a manner which will provide a safe environment for employees, contractors, and others who use roads and forest areas we manage.

ABORIGINAL PEOPLES
We recognize and will respect Aboriginal rights, title and treaty rights when planning and undertaking forest management activities.

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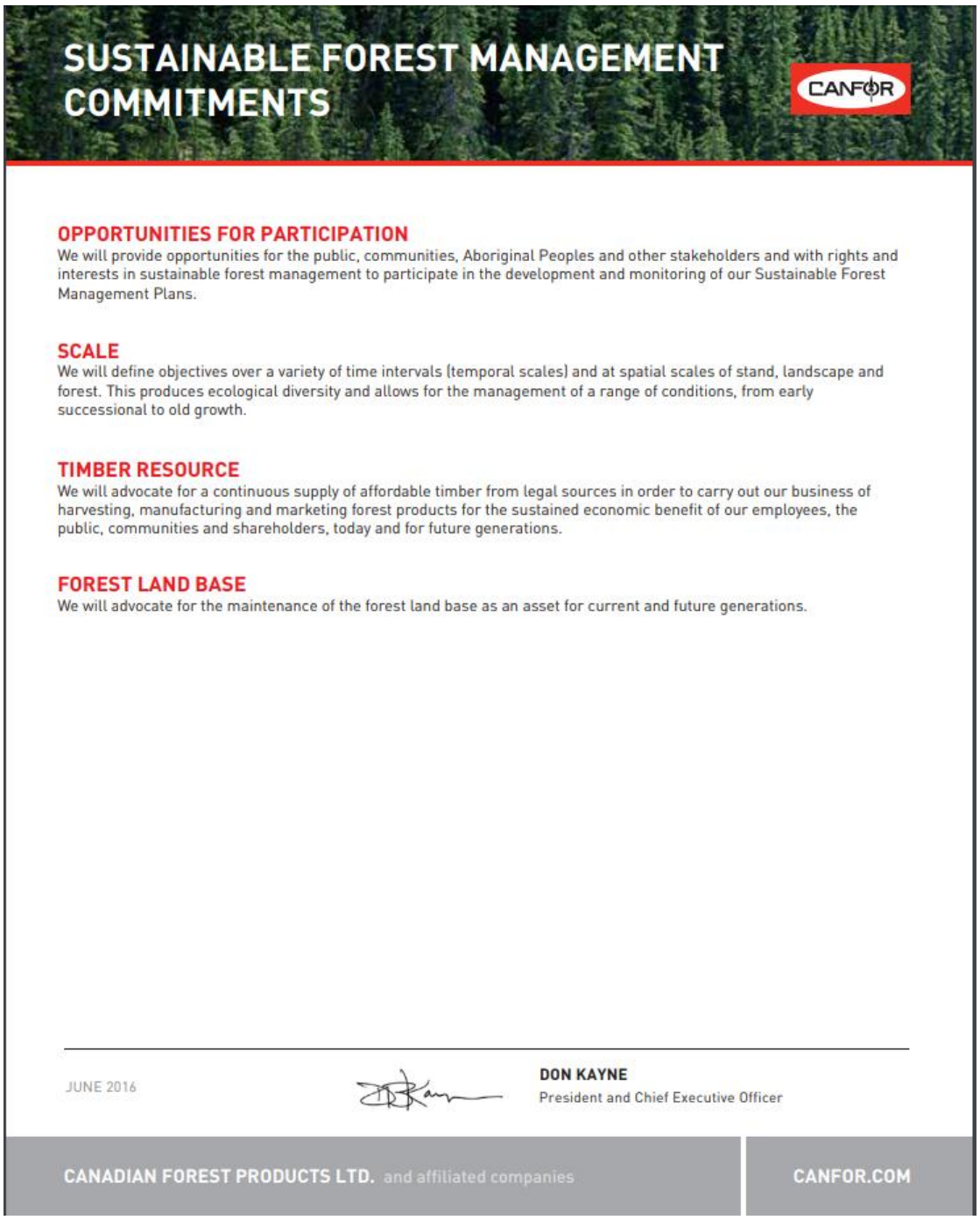

SUSTAINABLE FOREST MANAGEMENT COMMITMENTS

CANFOR

OPPORTUNITIES FOR PARTICIPATION

We will provide opportunities for the public, communities, Aboriginal Peoples and other stakeholders and with rights and interests in sustainable forest management to participate in the development and monitoring of our Sustainable Forest Management Plans.

SCALE

We will define objectives over a variety of time intervals (temporal scales) and at spatial scales of stand, landscape and forest. This produces ecological diversity and allows for the management of a range of conditions, from early successional to old growth.

TIMBER RESOURCE

We will advocate for a continuous supply of affordable timber from legal sources in order to carry out our business of harvesting, manufacturing and marketing forest products for the sustained economic benefit of our employees, the public, communities and shareholders, today and for future generations.

FOREST LAND BASE

We will advocate for the maintenance of the forest land base as an asset for current and future generations.

JUNE 2016

DON KAYNE
President and Chief Executive Officer

CANADIAN FOREST PRODUCTS LTD. and affiliated companies

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ACKNOWLEDGEMENTS

The development of this plan could not have happened without the dedicated efforts and hard work of the people and organizations listed below.

- Mackenzie Defined Forest Area Public Advisory Group:

  Representatives: Cinnamon Neumeyer, Vi Lambie, Jim Besherse, Janet Besherse, Stephanie Killam, Lawrence Napier, Dave Forshaw, George Desjarlais, Alec Chingee, Cornelia Thomi, Lyle Mortenson, John Stokmans, Pat Crook, Bruce Bennett, and Ron Crosby.

  Alternates: Peter Weeber, Sadie Jarvis, Chief Harley Davis, Ryan Bichon, and Don Jarvis.

- Canadian Forest Products Ltd. – Mackenzie Division

  Jason Neumeyer, RPF

  Sarah Curtis, FIT

- Facilitator and Support
  Alan Wiensczyk, R.P.F. Trout Creek Collaborative Solutions
  Loni Spletzer, Scribing services

All past signatories, employees as well as PAG members and alternates.

1.0 INTRODUCTION & OVERVIEW

Forests have been valued as a source of natural resources throughout human history. In the past century, forests of British Columbia (BC) have been chiefly valued for the economic potential of timber. Society, however, has become increasingly aware that forests provide a wider set of economic, social, and environmental values. Stakeholders within the forest industry have recognized that management of this broader range of values can occur without detriment to the economic potential of timber. Forest development in this context has become known as sustainable forest management (SFM).

> *Sustainable Forest Management has been defined as: "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" (Natural Resources Canada 2001-2002).*

SFM requires that all resource values be considered in making decisions about, and managing, forest development. One way to accomplish this is through forest management decisions that are transparent, systematic, predictable, and that include processes for public participation and continual improvement.

Evidence of the importance of SFM comes from consumers of forest products who are increasingly demanding that forests be managed on a sustainable basis. This demand has resulted in the emergence of forest certification as policy in the forest industry. Many forest certification programs work toward assuring the public that forest management is guided by standards considered critical to sustaining multiple forest values. The forest industry of BC is a part of a much larger global forest products marketplace and stakeholders of this industry have increasingly become aware of the importance of certification in maintaining their position in this marketplace. The Sustainable Forest Management Plan (SFMP) for the Mackenzie Defined Forest Area (DFA) was developed to achieve certification to Canadian Standards Association (CSA) Standard Z809 and thereby to provide forest managers in the Mackenzie area with a management system enabling sustainable forestry.

Benefits and efficiencies for government, licensees and the public may also be generated by linking the SFMP and operational plans. Licensees may benefit by adopting measures and targets developed through the SFMP process to operational plans; government may benefit by knowing that measures and targets legally established in operational plans have been developed in an open, reasoned, and scientific manner reflective of local values; the public will benefit by having a transparent process by which licensees report annually on their performance and their ability to meet established targets. The result is an increase in public confidence in multi-value forest management. The plan will continue to evolve and expand as forestry practices and values change over time. This evolution of the SFMP is to be expected in a management system predicated upon continual improvement of management activities and forest stewardship.

1.1 Signatories to the SFMP

Each party signatory to the SFMP is committed to the development, implementation, and maintenance of SFM in the Mackenzie DFA. The signatory to this SFMP is:

- Canfor – Mackenzie Division

1.1.1 Signatory Background

Based in Vancouver, BC, Canfor is one of the largest producers of softwood lumber and among the largest producers of northern softwood kraft pulp in Canada. The company also produces additional forest products such as oriented strand board, paper and remanufactured lumber products. Canfor's Mackenzie Division operates one sawmill with a capacity of approximately 3,300,000 m3/year and is an important employer and contributor to economic activity for the nearby town of Mackenzie. The annual allowable cut (AAC) for Canfor's Mackenzie Division is approximately 1.08 million m^3/yr.

Agreement with Mackenzie Fibre Management Corporation (MFMC)

Mackenzie Fibre Management Corporation's woodland operations are situated on Crown lands near Mackenzie, British Columbia, Canada within the Mcleod Lake Indian Band and hold the Forest License To Cut (FLTC) A87345 in the Mackenzie timber supply area. This license has a total five-year allowable cut of 4,000,000 cubic meters, with no annual allowable cut restriction. In July 2015 Canfor signed a Forest Management and Log Sale Agreement with MFMC that, among other provisions, gives Canfor the authority of manage the FLTC A87345 held by MFMC. Thisincludes activities such as forest planning, permitting, road building, harvesting, delivery of volume, silviculture, and any deactivation and/or road maintenance.

1.1.2 Commitments to SFM by Canfor

As a preparatory step to CSA SFM certification Canfor has adopted a forest management system (FMS) certified to the International Organization for Standardization (ISO) 14001 standard for its forest operations. Serving as a vehicle to ensure that public participation and performance requirements are met in a predictable and systematic fashion, a certified FMS is essential to ensure the fulfillment of all CSA SFM requirements. This same standard will be applied to the activities conducted by Canfor on behalf of MFMC while managing FLTC A87345.

Other Canfor commitments:

- develop and maintain a scientifically credible, structured, yet flexible plan for SFM within the Mackenzie DFA that incorporates strategic level requirements;
- manage all operations such that they comply with or exceed all legal requirements;
- encourage and provide opportunities for local First Nations to become involved in the development of the SFMP and resulting operations, while respecting their rights and interests;
- provide opportunities for communities, environmental groups and scientists to participate in planning and implementation in ways that reflect their interests and concerns efficiently in both time and cost and in ways that are effective for both stakeholders and resource managers;
- identify, evaluate and control potential environmental risks and implement appropriate preventative measures;
- communicate, inform, and promote awareness regarding environmental activities with employees, First Nations, and stakeholders;
- develop and maintain a monitoring and evaluation program that supports decision making through evaluations, feedback and reports on the sustainability of social, ecological and economic values;

- use adaptive management to guide knowledge acquisition, monitoring protocols and the incorporation of advances in SFM science and technology such that management plans and practices continually adapt and move towards concurrent sustainability of social, ecological and economic values;
- commit to evolving processes that ensure work site health and safety standards and provide conditions and safeguards for the health and safety of employees and the public; and
- conduct timely audits of environmental management systems and SFM parameters, and implement corrective measures as required.

Canfor's commitments to SFM and Environmental policy are made publicly available at: https://www.canfor.com/our-company/policies-and-documents

2.0 THE DEFINED FOREST AREA

2.1 General Area Description

The Mackenzie DFA is situated in the northeast interior of BC wholly within the Mackenzie TSA. Spanning approximately 6.41 million hectares, the Mackenzie TSA is among the largest TSAs in the province. The TSA lies within the Northern Interior Forest Region and is under the administration of the Mackenzie Forest District Office. Adjacent TSAs include the Cassiar and Fort Nelson TSAs to the north, the Fort St. John and Dawson Creek TSAs to the east and the Prince George TSA to the south and west (Figure 1).

The dominant natural features of the Mackenzie TSA are the Rocky Mountains and the Rocky Mountain Trench. Oriented northwest/southeast through the center of the TSA, the Trench is bordered by the rugged Rocky Mountains to the east and the gentler Omineca Mountains to the west. Construction of the WAC Bennett Dam in the 1960s flooded the lower reaches of the Trench within the southern half of the TSA to create the narrow, 360 km long Williston Reservoir covering approximately 177,000 ha.

A variety of parks, ecological reserves and protected areas occur in whole, or in part, within the TSA. The most notable in size are the provincial parks and associated protected areas: Omineca, Tatlatui, Kwadacha Wilderness, Chase, Finlay-Russel and Dune Za Keyih.

2.2 Biophysical Description

Most of the TSA is characterized by diverse mountainous terrain although the southernmost portion is distinguished by relatively flat terrain or low rounded hills, broad valleys and numerous lakes and wetlands. The climate is Continental-Temperate to Sub-Boreal with average daily temperatures below freezing for half the year. Approximately three-quarters of the annual precipitation fall as snow.

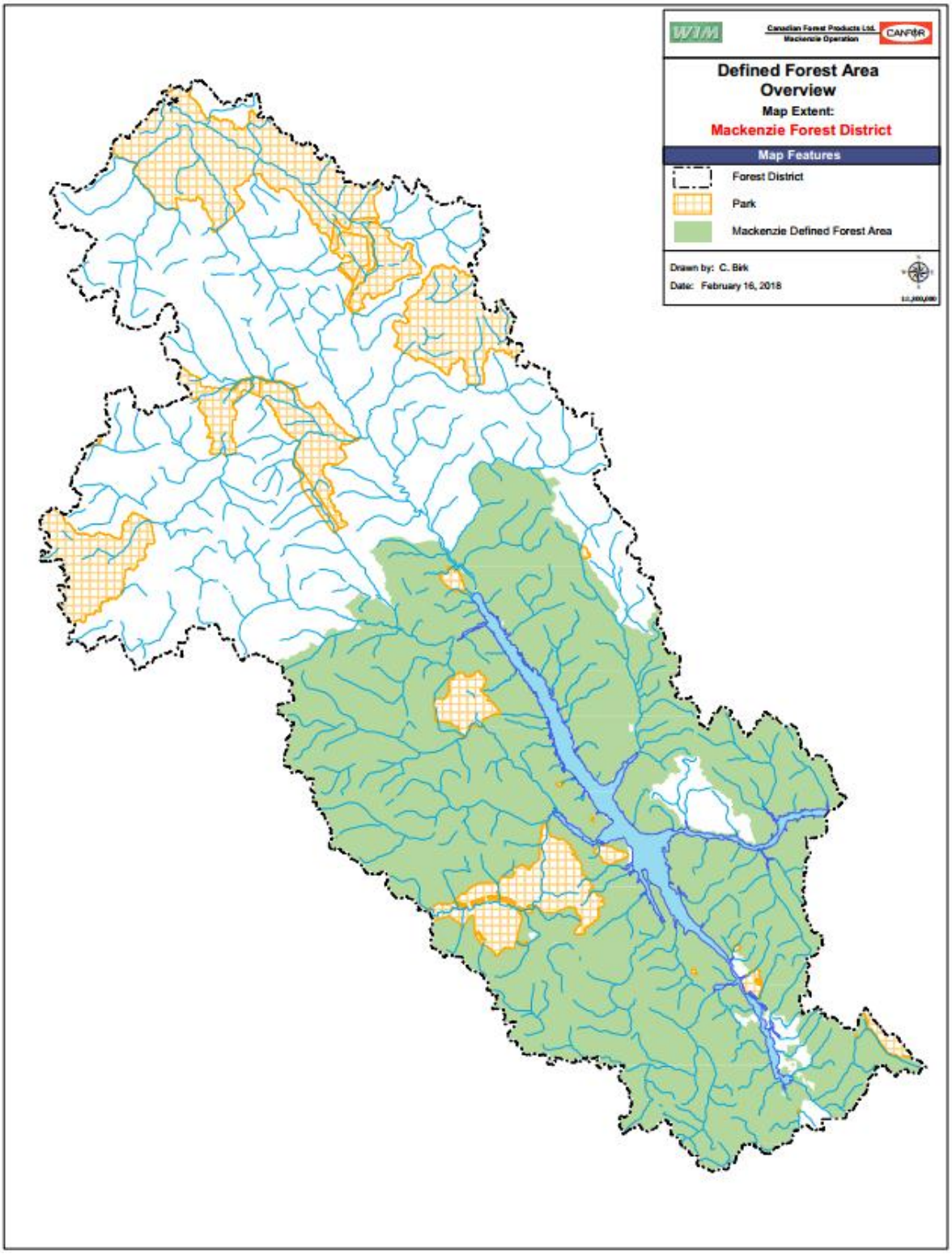


Figure 1. Areas over which Canadian Forest Products Ltd. conduct forest development operations within the Mackenzie Defined Forest Area in north-central British Columbia.

Forests are primarily mixed stands with the predominant commercial species being Engelmann spruce (*Picea engelmannii*), white spruce (*Picea gluaca*) [1], lodgepole pine (*Pinus contorta*) and subalpine fir (*Abies lasiocarpa*) [2]. Several deciduous species such as birch and aspen are also present; however, commercial utilization is on a small scale.

Five biogeoclimatic (BEC) zones, which reflect broadly homogenous climatic regimes, occur on the Mackenzie TSA. These BEC zones can be generally described as follows:

- Alpine Tundra (AT) is the uppermost BEC zone. It is essentially void of trees except for dwarf forms that occur in the zone's lower elevations. At upper elevations rock, ice and snow dominate with vegetation limited to shrubs, herbs, mosses and lichens. The climatic is cold and harsh with a short brief growing season.
- Engelmann Spruce – Subalpine Fir (ESSF) is a forested subalpine zone occurring below the AT. Forests are continuous at lower elevations but give way to parkland at upper elevations. Engelmann spruce and subalpine fir are the dominant species although lodgepole pine occurs on drier sites. The climate is severe with cool short growing seasons and long cold winters.
- Spruce Willow Birch (SWB) is the most northerly subalpine zone in BC and occurs in the northern part of the TSA above the BWBS. Lower elevations of the SWB support open forests of predominantly white spruce and subalpine fir. At higher elevations subalpine fir and deciduous shrubs dominate. The climate is severe with cool brief growing seasons and long cold winters.
- Sub-Boreal Spruce (SBS) zone occurs at lower elevations typically on gently rolling plateaus and valley bottoms in the southern portion of the TSA. Forests are predominantly hybrid white spruce and subalpine fir. Extensive stands of lodgepole pine occur on drier sites due to frequent fires. The climate is characterized by relatively warm, moist but short growing seasons and severe winters with abundant snowfall.
- Boreal White and Black Spruce (BWBS) zone is found in the lower elevations of valleys primarily in the northern and western portions of the TSA. Frequent fires have resulted in extensive successional forests of lodgepole pine and trembling aspen. On gentle terrain stands of white spruce and trembling aspen are interspersed with black spruce bogs. The climate features short growing seasons and long cold winters.

Fish and wildlife are significant features with 319 species of terrestrial and aquatic vertebrates (24 species of fish, 7 reptile species, 55 mammal species, and 233 bird species) occurring on the TSA. Most large carnivore and ungulate species native to BC are present, notably wolves, grizzly bears, black bears, wolverines, fishers, cougars, mountain goats, Stone's sheep, elk, moose and caribou.

2.3 Communities and Socio-Economic Description

The Mackenzie TSA is sparsely populated with approximately 95% of the total estimated population situated in the community of Mackenzie; 4539 residents (BC Gov 2006). The remaining population is located in small communities including Germansen Landing, Manson Creek, Fort Ware, Tsay Keh and a few other dispersed rural settlements.

[1] Spruce in the DFA may be white spruce, Engelmann spruce, or a hybrid of the two. Due to difficulties in distinguishing the two species and the hybrids, the term "spruce" is generally used to describe all three.

[2] Although the fir in the DFA is subalpine fir, it is commonly referred to as "balsam", but it is not balsam fir (*Abies balsamea*). .

The town of Mackenzie is approximately 180 km north of Prince George and is located on the southeast end of Williston Lake. The town offers a variety of professional and retail services, a hospital, access to college and university courses, a recreation facility, accommodation and meeting facilities. The forest sector accounts for approximately 65% of the employment on the TSA and is the main driver of population change for the town. Additional economic activities on the TSA include placer mining operations, tourism and recreation, trapping, the Kemess South Mine, the Mt. Milligan Mine, and exploration activities for the mining and oil & gas industries.

Several First Nations have communities, claim traditional territories or have social and economic interests within the TSA. These include the Tsay Keh Dene (formerly the Ingenika Band), the Kwadacha Nation (formerly the Fort Ware Band), the Takla Lake Band, the Nak'azdli First Nation, the McLeod Lake Band, the Gitxsan Nation, the Fort Nelson First Nation, the Prophet River First Nations, the Tahltan Central Government, the Blueberry River First Nation, the Doig River First Nation, the Yekooche First Nation, the Wet'suwet'en Nation, the West Moberly First Nations, the Saulteau First Nations, and the Halfway River First Nation. The Kwadacha Nation and the Tsay Keh Dene have communities within the TSA (Fort Ware and Tsay Keh, respectively). The Takla Lake Band has members of the Noostel Keyoh residing within the TSA.

Effective Nov 14, 2014 the AAC for the TSA is approximately 4,500,000 m^3/yr, of which a maximum of 950,000m^3/yr is attributable to non-pine leading coniferous stands. Of this partition, no more than 300,000 cubic metres is attributable to non-pine leading coniferous stands from the southwest portion of the TSA, west of Williston Lake and south of Omineca Provincial Park and Omineca Arm. With regards to the unpartitioned ACC, the volume should be harvested from pine-leading stands. Further information is outlined in the Mackenzie Timber Supply Area – Rationale for Allowable Annual Cut (AAC) Determination, amended January 6th, 2015. The AAC is apportioned to Canfor and Conifex in the form of renewable forest licenses, Mackenzie Fibre Management Corporation and several of the local First Nations as non-renewable forest licenses, as well as the BCTS apportionment to be sold on the open market.

Table 1: Employment and Income within the DFA

Employment Sector	Number Employed	Percent	Total Income (millions)	Percent
Forestry	1821	70%	$103	74%
Mining and processing	0	0%	$0	0%
Fishing and Trapping	0	0%	$0	0%
Agriculture and Food	11	0%	$0	0%
Tourism	197	8%	$4	3%
High Tech.	6	0%	$0	0%
Public Sector	461	18%	$18	13%
Construction	32	1%	$1	1%
Other	75	3%	$1	0%
Non-basic	266			
TOTAL	2869		$127	

Source: BC Stats, 2006

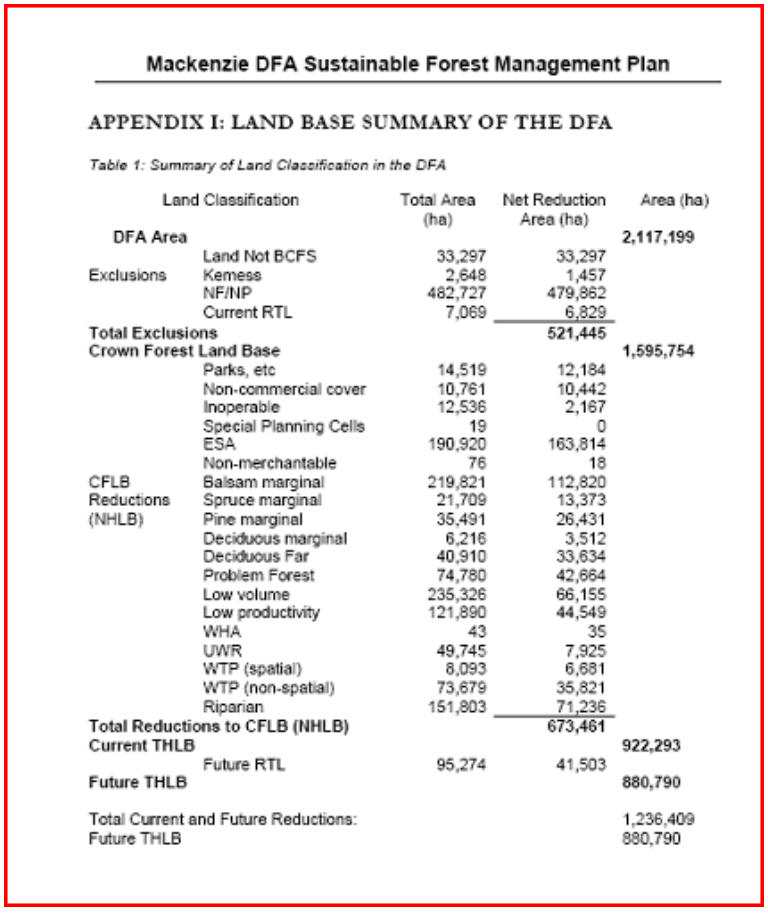
Note: The remaining income estimates not represented in this table are in the form of transfer payments and other non-employment income.

Although the forest industry cannot directly control the diversity of the economy for the community in which it operates, understanding the impact of that diversity is an important component of SFM. If the community is not economically diverse, it will not be resilient to economic shocks. Services could decline and thus skilled workers and their families may move to more stable areas. As an important economic player, Canfor can potentially influence local policies that would encourage economic diversity in their communities.

2.4 The Mackenzie DFA

The Mackenzie DFA occupies the southwest, central west and east central portions of the Mackenzie TSA and covers approximately 2.1 million ha. The landscape is dominated by the Williston Reservoir with the rugged terrain of the Rocky Mountains to the east and gentler terrain of the Omineca Mountains transitioning to the Omineca Plateau to the west. Although the DFA covers 2.1 million hectares, the Crown Forest Land Base (CFLB) is 1.60 million hectares. Of this, only 922,293 hectares, or 41.9%, is in the Timber Harvesting Land Base (THLB) (Table 2).

Table 2: A summary of land classification in the Mackenzie DFA[3]



Mackenzie DFA Sustainable Forest Management Plan

APPENDIX I: LAND BASE SUMMARY OF THE DFA

Table 1: Summary of Land Classification in the DFA

Land Classification		Total Area (ha)	Net Reduction Area (ha)	Area (ha)
DFA Area				**2,117,199**
	Land Not BCFS	33,297	33,297	
Exclusions	Kemess	2,648	1,457	
	NF/NP	482,727	479,862	
	Current RTL	7,069	6,829	
Total Exclusions			521,445	
Crown Forest Land Base				**1,595,754**
	Parks, etc	14,519	12,184	
	Non-commercial cover	10,761	10,442	
	Inoperable	12,536	2,167	
	Special Planning Cells	19	0	
	ESA	190,920	163,814	
	Non-merchantable	76	18	
CFLB	Balsam marginal	219,821	112,820	
Reductions	Spruce marginal	21,709	13,373	
(NHLB)	Pine marginal	35,491	26,431	
	Deciduous marginal	6,216	3,512	
	Deciduous Far	40,910	33,634	
	Problem Forest	74,780	42,664	
	Low volume	235,326	66,155	
	Low productivity	121,890	44,549	
	WHA	43	35	
	UWR	49,745	7,925	
	WTP (spatial)	8,093	6,681	
	WTP (non-spatial)	73,679	35,821	
	Riparian	151,803	71,236	
Total Reductions to CFLB (NHLB)			673,461	
Current THLB				**922,293**
	Future RTL	95,274	41,503	
Future THLB				**880,790**
Total Current and Future Reductions:				1,236,409
Future THLB				880,790

[3] Based on data used for forest modelling exercise, DFA boundary adjustments were finalized later

Forested areas are dominated by coniferous species, mainly lodgepole pine and spruce, but also a significant component of subalpine fir. Minor amounts of black spruce (*Picea mariana*) and deciduous species – trembling aspen (*Populus tremuloides*), poplar[4] (*Populus balsamifera ssp.),* and white birch (*Betula papyrifera*) are also present. Figure 2 show the species distribution in the THLB in the DFA.

Because of the size of the area and relatively short history of resource development in the DFA, and the TSA in general, there are many areas, particularly the north and west portions of the DFA, that are remote and inaccessible. As a result, there is an abundance of forests that are classified as "old"[5] in the DFA. In excess of 700,000 hectares of forests are considered old, of which about 385,000 hectares are in the THLB. Figure 3 shows the age class distribution in the NHLB and THLB on the DFA.

Other ecological features such as wildlife and fisheries, and socio-economic features such First Nations, communities, population characteristics, and economic activity in the DFA mirrors that found in the TSA in general.

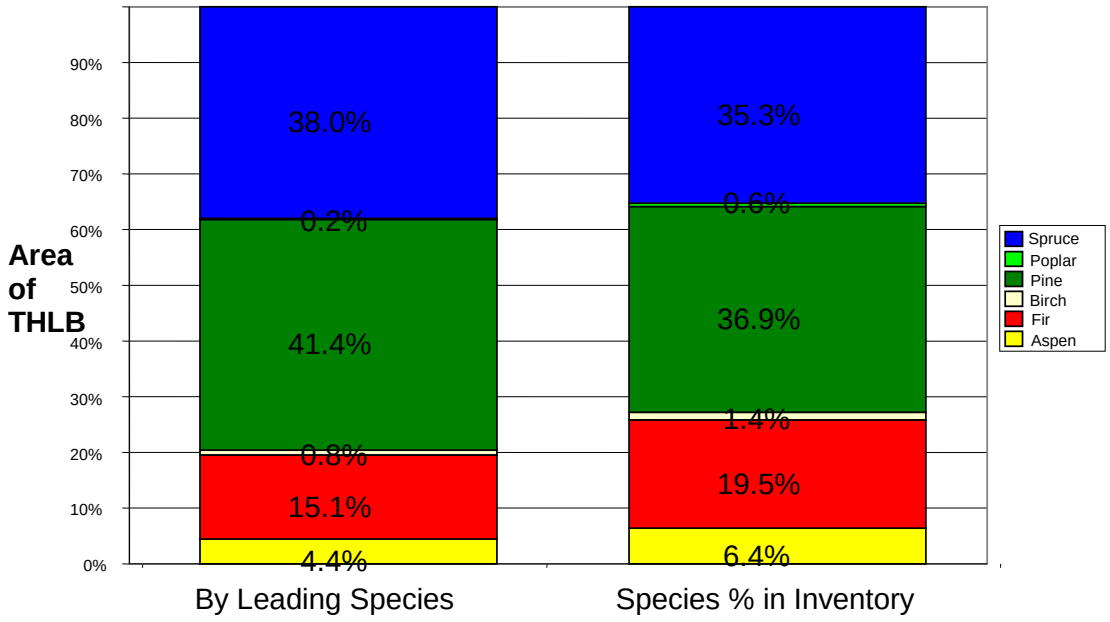


Figure 2. Species distribution in the timber harvesting land base in the Mackenzie DFA.

The DFA encompasses several Landscape Units which, for the most part, correspond to their Resource Management Zone (RMZ) designation as outlined in the Mackenzie LRMP. The Mackenzie LRMP designates each RMZ under one of six categories:

[4] Both balsam poplar (*Populas balsamifera ssp. balsamifera*) and black cottonwood *(Populus balsamifera ssp. trichocarpa*) occur in the DFA and the terms "poplar" and "cottonwood" are often used interchangeably. We will refer to both as "poplar"

[5] Old is defined as per the "Biodiversity Guidebook" and the Mackenzie LRMP

- Protected Areas – areas to be protected for their natural, cultural heritage, and/or recreational values. Resource development is prohibited in these areas.
- Settlement – areas reflecting existing community boundaries
- Enhanced – areas managed with an emphasis is on resource development
- General – areas managed for a balance of extractive and non-extractive uses/values
- Special – areas managed with an emphasis on non-extractive values with restricted resource development
- Special: Wildland – areas managed with an emphasis on conservation to the exclusion of timber harvesting

In addition to general objectives that are applicable to all RMZs, each RMZ has specific objectives associated with them. These objectives reflect the various social, economic, and ecological values placed upon the RMZ. To the extent possible, this plan is meant to be consistent with the intent of the Mackenzie LRMP. Table 3 lists the Ecosections, BEC Zones, and RMZs that fall within the DFA and their respective RMZ category.

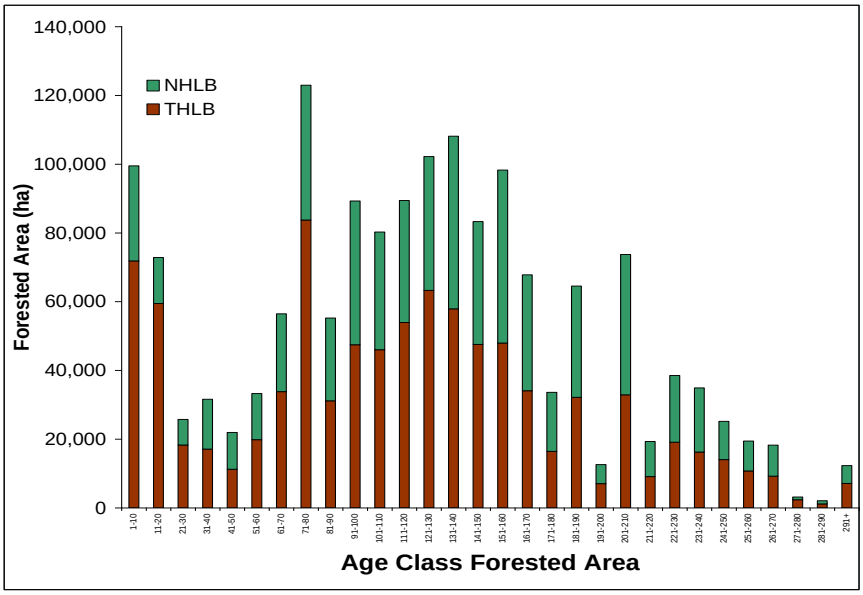


Figure 3. Age class distribution in the non-harvestable and timber harvesting land base in the Mackenzie DFA.

Table 3. A summary of operating areas within the Mackenzie DFA.

Ecosection	BEC Zone	LRMP RMZ		Designation
Manson Plateau Southern Omineca Mountains Parsnip Trench	BWBS ESSF SBS AT	30	Germansen Mountain	Enhanced
		33	Manson River/Eklund	Enhanced
		35	Gaffney	Enhanced
		37	Blackwater	Enhanced
		29	Twenty Mile Creek	General
		34	Klawli	General

Eastern Skeena Mountains		31	South Germansen / Upper Manson	General / Special
		32	Jackfish	Special
		22	Mesilinka	General/Special/ Enhanced
		23	Osilinka	Enhanced
Western Muskwa Ranges	ESSF BWBS SWB AT	11	Buffalohead*	Enhanced
		12	Lower Akie*	Enhanced
		21	Collins – Davis	Enhanced
		15	Akie River	Enhanced
		14	Pesika	General
Misinchinka Ranges Peace Foothills	ESSF SBS SWB AT	21	Collins – Davis	Enhanced
		18	Lower Ospika	General
		24	Nabesche	General
		26	Schooler	General
		38	Parsnip*	General
		39	Clearwater	General
		17	Upper Ospika	Special
		36	Selwyn	Special
Babine Upland Parsnip Trench Nechako Lowland	ESSF SBS AT	42	Philip	Enhanced / General
		37	Blackwater	Enhanced
		35	Gaffney	Enhanced
		41	Nation River	Special
McGregor Plateau Northern Hart Ranges Parsnip Trench	ESSF SBS AT	40	Misinchinka	Enhanced / Special

*Many of these are split amongst licensees as the salvage of dead pine continues.

2.5 Existing Processes within the Mackenzie DFA

2.5.1 Public Processes

An SFMP is not a stand-alone initiative, isolated and insulated from other planning processes. Rather, the SFMP is based on, and extends other existing strategic planning processes such as the Mackenzie Land and Resource Management Plan (LRMP; BC Gov 2000) and more operational plans such as Canfor's and Mackenzie Fibre's Forest Stewardship Plans.

The LRMP, while not Government policy, is an integrated resource plan with the objective to provide a publicly approved vision for the use and management of provincial lands and resources in the Mackenzie TSA. Development of the LRMP required the involvement of local stakeholders, representing a wide range of interests and values. Interests and priorities represented by participants included conservation of wildlife including rare or endangered species, economic development, recreation, tourism, hunting, commercial and recreational fishing, guide outfitting, community stability, cultural heritage, agriculture, exploration/mining and forestry. Respect and

recognition of different viewpoints were key operating principles which led to consensus among the LRMP participants and eventual approval of the document by Government.

The Mackenzie LRMP provided seminal work towards the SFMP as follows:

- broad zones, defined on digital maps, within which management emphasis was designated as protected (i.e., a de-emphasis of resource development), settlements, enhanced management, general management, special management, and special wild land;
- objectives that guide management of natural resources in each zone;
- strategies for achieving the objectives; and
- a socio-economic and environmental assessment of the plan.

The LRMP Monitoring Committee is no longer an active group in Mackenzie.

In keeping with legal requirements, Canfor Mackenzie Division's and Mackenzie Fibre's Forest Stewardship Plans (FSP) were available for public review and comment prior to approval. Canfor and Mackenzie Fibre also regularly contact and interact with individual stakeholders that may be affected by their respective operations.

2.5.2 Other Planning Processes

In addition to the LRMP, there are several other planning processes for the Mackenzie TSA (Table 4). These are generally inter-organizational processes that bring together managing professionals and affected stakeholders to develop broad strategies for particular aspects of the forest resource.

Table 4. Active planning processes on-going in the Mackenzie TSA.

Planning Process	Objective	Status
Landscape Objective Working Group	Development of strategies to achieve landscape-level objectives as they pertain to spatial and temporal retention such as OGMAs, old, old interior and patch size management.	The working group is functional and includes all major licensee and most of the non-renewable licensees as partners. Annually the licensees share their future and historic harvest, road and wildlife retention data. A master set is built and analysis for old growth, interior old and patch size are completed using all data.
Northern Caribou Recovery Implementation Group	Development of a Recovery Plan for northern caribou herds. This process will allow the province to meet its obligations as a signatory of the National Accord for the Protection of Species at Risk in Canada.	A finalized Recovery Action Plan is to be submitted for economic and social impact assessment in fiscal 2006/07 – nothing has come out of this process as of yet. The Group has not been active for a few years to date (Jan 2012).

Mountain Goat Management Team	Development of a habitat supply model and management strategies for Mountain Goats in the Mackenzie TSA.	Project is in the second phase of an adaptive management trial to determine goat disturbance by resource development. Habitat modeling is on-going. The group has not been active for a few years to date (Jan 2012).
Pine Stem Rust Working Group	Development of management strategies to reduce or mitigate the effect of pine stem rusts on regenerating forests.	Draft management strategies have been developed and implemented. Monitoring for efficacy is on-going. The Working Group is not currently active (Jan 2012).
Silviculture Strategy (Type I and II)	Development of silviculture regimes to address critical issues in timber supply.	A Type I Silviculture Strategy was completed on the TSA in March, 2001. A Type II Strategy was completed in October, 2003. The next TSR is scheduled for release in 2014 and new information may be available at that time.
Ungulate Winter Range	Development of management strategies for areas identified as critical winter range for selected ungulates.	UWRs for stone sheep, elk, mountain goat, and caribou have been designated within the DFA. Additional UWRs for caribou have been identified and are being developed through the MLNRO's ecosystem specialists regionally.
Mid-term Timber Supply Working Group	Group's objective is to mitigate the falldown in mid-term timber supply due to the MPB epidemic	Work is on-going with potential strategies being identified, analyzed, prioritized, and implemented. The next TSR is scheduled for release in 2014 and new information may be available at that time.

2.6 First Nations

Of the 10 First Nations with interests within the Mackenzie TSA, 8 have asserted traditional territory within the Mackenzie DFA. Traditional values of First Nations found within the DFA include;

- Sites of historical or cultural significance,
- Camp sites or cabin sites,
- Trails and travel corridors,
- Hunting, fishing, and trapping areas,
- Important wildlife habitat area,
- Berries and other food plants,
- Herbs and medicinal plants.

Forestry is the main sources of employment for most First Nations within the TSA, trapping fishing and guiding are also important activities. First Nations within the DFA depend heavily on hunting, fishing and gathering natural foods for sustenance.

2.6.1 Tsay Keh Dene

Tsay Keh Dene's traditional territory spans north to Mt. Trace, west to South Pass Peak, south to the Nation River, and east to Mount Laurier, encompassing a large portion of the central area of the TSA. The Tsay Keh Dene has four reserves in the TSA totaling 201 hectares.

With approximately 380 members, the focus of the Tsay Keh Dene is largely around Tsay Keh, a community of approximately 200 located at the north end of Williston Lake. The community was established in 1968 when the Tsay Keh Dene were displaced by the flooding of the Williston Reservoir. Access to the community is primarily through small-plane air travel, or via an all-weather logging road.

Tsay Keh Dene is currently at Stage 4 of the six-stage treaty negotiation process; however they have been so since 1996.

2.6.2 Kwadacha Nation

The Kwadacha Nation traditional territory occupies the northern portion of the TSA from the Akie river northward with 387 ha. of reserve land. The main community is Fort Ware where many of the bands 442 members reside.

Fort Ware lies at the confluence of the Fox, Kwadacha, and Finlay rivers in the Rocky Mountain Trench and is one of the most remote communities in British Columbia. Access to the community is predominantly through small-plane air travel, or via an all-weather logging road.

The Kwadacha Nation are members of the Kaska Dena Council and are currently at Stage 4 of their treaty negotiations. Negotiations were suspended in 2003 and resumed in late 2008 with several Agreement in Principle chapters tabled and discussed. In November 2008, the Kwadacha joined the Province and BC Hydro to sign the Kwadacha First Nations Final Agreement whereby historic damages from the creation and operation of the W.A.C. Bennett Dam and Williston Reservoir were awarded.

2.6.3 McLeod Lake Indian Band

Encompassing an area from near Takla Lake in the west, north to the Peace Arm of Williston Lake, south to Summit lake, and east to the Alberta border, The McLeod Lake Indian Band traditional territory covers the southern portion of the Mackenzie TSA.

The community of McLeod Lake is located on Highway 97 just south of the TSA boundary. Established as Trout Lake Fort in 1805 by explorer Simon Fraser, McLeod Lake is home to about 200 residents and is known as the first fur-trading post west of the Rockies.

On March 27, 2000, the approximately 450-member band signed the McLeod Lake Indian Band Treaty No. 8 Adhesion and Settlement Agreement. McLeod Lake is pursuing a self government agreement under the BC treaty process and is currently at Stage 2 of that process.

2.6.4 Takla Lake Band

The Takla Lake Band traditional territory in the TSA covers the area surrounding Germansen Landing including the Duckling creek, Nina creek, Jackfish creek, and Twenty Mile creek watersheds. The Noostel Keyoh of the Takla Lake Band reside in the area around Germansen Landing and Manson Creek.

The Takla Lake Band is a member of the Carrier Sekani Tribal Council and is currently in stage 4 of the treaty negotiation process. The main community for this 587-member band is on North Takla Lake Indian Reserve near Takla Landing.

2.6.5 Nak'azdli First Nations

Covering the southwest portion of the TSA, the Nak'azdli First Nations traditional territory spans from Blue Lake in the northwest to the southern-most point of the TSA. Based largely out of the Nak'azdli Indian Reserve adjacent to Fort St. James, the 1560 members of the Nak'azdli First Nations are part of the Carrier Sekani Tribal Council. As with the Takla Lake Band, the Nak'azdli First Nations is also at stage 4 of the treaty negotiation process.

2.6.6 Halfway River First Nation

The Halfway River First Nation, along with the McLeod Lake Indian Band, West Moberly First Nations and Saulteau First Nations, are members of the Treaty 8 Tribal Council. Their traditional territory in the Mackenzie TSA lies to the north of the Peace Arm of Williston Lake following the east side of the Ospika River northward. The main community of the Halfway River First Nation is located on a reserve on the Halfway River, approximately 100 km northwest of Fort St. John.

2.6.7 West Moberly First Nations

From the Akie River in the north, south along the Rocky Mountain trench, then west along the Omineca River, the West Moberly First Nations traditional territory covers the southern and east-central portions of the TSA. The main community is located at the west end of Moberly Lake, approximately 90 km southwest of Fort St. John. West Moberly First Nations are members of the Treaty 8 Tribal Council.

2.6.8 Saulteau First Nations

The Saulteau First Nations traditional territory within the Mackenzie TSA mirrors that of the West Moberly First Nation. Similarly, the Saulteau First Nation is also based out of Moberly Lake. The reserve and community is located at the east end of Moberly Lake about 100 km southwest of Fort St. John on Highway #29. Saulteau First Nations are members of the Treaty 8 Tribal Council.

2.6.9 Treaty 8

Treaty 8 was originally a treaty settlement negotiated between the Government of Canada and First Nations in northern Alberta, northwest Saskatchewan and the southern Northwest Territories. In 1899, the treaty was extended into British Columbia to include eight First Nations bands in the northeast corner of the province.

All bands, with the exception of McLeod Lake, are in discussions with BC and Canada outside the treaty process. Five of these seven bands (Blueberry River, Doig River, Halfway River, Prophet River and Saulteau) are part of the Treaty 8 Tribal Association tribal council. The other two bands (Fort Nelson and West Moberly) are unaffiliated, although non-tribal council member West Moberly is a member the T8TA political body, which is registered under the B.C. Societies Act.

McLeod Lake Indian Band, which did not originally adhere to Treaty 8, signed onto the treaty in 2000. It is now negotiating a self-government agreement independently within the BC Treaty Commission six stage treaty process.

There are issues that were set aside when BC and Treaty 8 First Nations signed a memorandum of understanding in 1998 on oil and gas development and the protection of treaty and Aboriginal rights. In addition to these "set aside" issues, BC and the Treaty 8 First Nations are currently negotiating revenue-sharing arrangements.

In addition, Canada has accepted the Treaty Land Entitlement claim of the Halfway River and West Moberly First Nations and the Blueberry River and Doig River First Nations respecting alleged shortfall in their original Treaty 8 land entitlement. Canada subsequently sought the involvement of B.C. in the negotiations to resolve the claims. B.C. agreed to participate in February 2003.

In 2017, a B.C. Supreme Court ruling declared the treaty's western boundary as the "height of land along the continental divide between the Arctic and Pacific watersheds". This extended the traditional territory of the Treaty 8 signatories further west into the Mackenzie DFA.

3.0 THE PLANNING PROCESS

3.1 Purpose and Context

Canada's forests represent a significant national and international resource. Recognition of the essential contribution of forests to social, economic, and environmental well being at local, national, and international scales has resulted in a commitment by Canada to maintain forest health and to manage forests in a sustainable fashion. In 1995, and subsequently updated in 2003 and 2008, the Canadian Council of Forest Ministers (CCFM) established six criteria (i.e., broad management objectives), a list of associated elements (i.e., concepts that define the scope of a criterion), and indicators to gauge SFM at the national level. To provide a local context to SFM, the CSA adopted the six CCFM criteria but revised the CCFM elements to support their application at the level of a Defined Forest Area. These revised elements and associated values, objectives, criteria, indicators and targets support implementation sustainable forest management at the local level. The CSA set forth CSA Standard Z809-08 that defines the requirements and provides guidance for implementing SFM on a Defined Forest Area. In 2016, the CSA introduced the revised Z809-16 standards.

The SFMP provides a structure that links strategic goals and objectives to operational activities under dynamic economic, social, and environmental conditions and values. The SFMP was developed within context of current management planning requirements and legislation such as the Forest Range and Practices Act (FRPA), meets the requirements of CSA certification, and is consistent with provincial funding initiatives. It provides managers with a process to develop and implement operational strategies, measure response to those strategies, and initiate needed changes to continually improve decision-making and management practices for a wide range of forest values. .

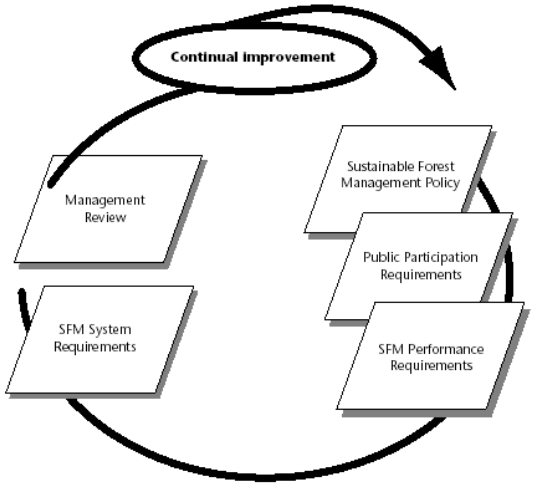


Figure 4. The continual improvement model for SFM (CSA 2008). The steps that define an adaptive management approach should be incorporated within this model.

3.2 CSA Requirements

This SFMP serves as the primary guidance document as it translates SFM commitments to management actions. It also documents the manner by which Canfor will adhere to the CSA's recommended requirements for certification. Canfor will ensure the SFMP incorporates all relevant information and is readily understandable to interested parties. The specific performance requirements recommended by the CSA standard were adhered to in construction of the SFMP, and relevant documentation was presented during the registration audit.

3.3 Structure and Responsibility for Implementing SFM

3.3.1 Public Involvement

Canada's forests are primarily owned by the public. Participation by an informed public is essential to define the multiple values of SFM desired by Canadians, to ensure that the best available information is acquired, and to promote input to, and acceptance of, the resultant goals and management activities of SFM. The CSA stresses public participation in the development of a SFMP. The participatory process includes broad public consultation during the development of the local Indicators, measures, and targets and management strategies, promotes open discussions and transparent decisions, and helps ensure that complex concepts are expressed in a fashion that is understandable by all.

The public consultation process used for the development of the Mackenzie LRMP contains many of the public participation requirements of CSA Standard Z809-16. To support the development of this SFMP, the signatories have engaged in an enhanced and thorough consultative public process for local stakeholders. Involvement of the public ensured that local perspectives were incorporated into SFM and the SFMP. Additionally, this approach allowed stakeholders the opportunity for ongoing learning and provided a forum for continual stakeholder input and influence on decisions and the resolution of contentious issues.

The consultative public process was undertaken by Canfor, BCTS and a public advisory group (PAG) consisting of members recommended by a Stakeholder Analysis[6] conducted by the SFMP Steering Committee. The PAG is referred to as the Mackenzie DFA Public Advisory Group (See Appendix A).

3.3.2 First Nations Involvement

First Nations hold a unique position in Canada and as such, have a legally protected right to participate in the development and review of resource management strategies or plans in areas they assert to be traditional territories, including Crown lands outside areas where treaties apply. Canfor respects First Nations interests in sustainable forest management, and will facilitate the involvement of First Nations in the SFMP.

As much as possible, First Nations participation was a part of the overall Public Involvement Process. First Nations participation was limited by;

- Geography – many First Nations centers are remote and require extensive travel,

[6] Stakeholder Analysis is a supporting document to the SFM Plan and is maintained by the signatories.

- Capacity – lack of capacity has repeatedly been cited by First Nations as a barrier to effective participation. With the forest, mining, and petroleum industries continuously seeking input, First Nations often lack sufficient technical staff or resources needed to provide input into the many planning processes and development proposals placed before them.

Documentation is evident in PAG Records which demonstrate efforts to encourage First Nations involvement.

3.3.3 Responsibilities

Ownership Responsibilities

Canfor's forestry operations on the Mackenzie DFA are managed under a Renewable Forest License Tenure (Forest License A15384) granted by MFLNRO&RD under authority of the Forest Act of BC. The renewable forest license signed between Canfor and the BC Government represents a legally binding contract with associated rights and responsibilities. Mackenzie Fibre's operations on the Mackenzie DFA are being conducted under a Non-Replaceable Forest Licence Tenure (Forest Licence to Cut A87341) granted by MFLNRO&RD under authority of the Forest Act of BC. The Non-Renewable forest licence signed between Mackenzie Fibre and the BC Government represents a legally binding contract with associated rights and responsibilities. Mackenzie Fibre's operations under this licence will be managed by Canfor and as such, Canfor will be responsible for ensuring that management of their own operations and those of Mackenzie Fibre are conducted within provincial forestry legislation and policy.

Table 5. Area of operations within the Mackenzie DFA[7].

Mackenzie SFMP Signatories	Signatory DFA (gross ha.)	% of Total DFA
Canfor Mackenzie Division	1,105,370	83.8%
(Non-Productive)	212,235	16.2%
Total Mackenzie DFA	1,317,606	100%

Areas excluded from the DFA include woodlot license areas parks and protected areas and private property. On publicly owned land, responsibility and accountability for adherence to provincial and federal legislation and objectives, rests with the BC Provincial Government including MFLNRO&RD and the Ministry of Environment (MOE). MFLNRO&RD, through its district office in Mackenzie, enforces all legal requirements associated with commercial forestry activities on all tenures within the forest district. MFLNRO&RD is responsible for over-seeing the stewardship of the land base, ensuring compliance with all applicable legislation and regulations and for administration of legal documents submitted by licensees in order to carry out forestry related business.

[7] Based on the final Licensee Operating area coverage produced February 2007 after negotiations completed on delineation of operating areas for BC Timber Sales

Shared Responsibilities and User Rights

Canfor, and Mackenzie Fibre as managed by Canfor, operate under volume-based tenures. An operating area agreement allows the major licensees in the TSA to operate in distinct areas of the TSA with some degree of autonomy. Canfor has no legal recourse to limit the use of the area by other licensed users. The SFMP does not include any areas developed, leased, licensed, or under permit by users other than Canfor. Other users may include:

- Conifex Mackenzie Forest Products Inc.;
- Non-renewable license holders (Tsay Keh Dene, Three Feathers Consortium, and Kwadacha First Nations);
- Woodlot license holders;
- Holders of license of occupation;
- Third party licenses to cut;
- Land leases;
- Trappers and Guides;
- Range and Grazing Tenure Holders;
- Mineral and energy tenures;
- Special use permits; and
- First Nation reserves.
- First Nations Woodland Licenses

Table 6. Mackenzie TSA Apportionment compared to projected DFA harvest.

	TSA Apportionment (m3)	**%**	**Projected DFA Harvest (m3)**	**%**
Signatories				
Canadian Forest Products Ltd.	1,082,904	24	1,082,904	24.7
Mackenzie Fibre Management Corp.	800,000	18	800,000	18
Non-Signatories				
BC Timber Sales	900,000	20	900,000	20.5
Conifex Mackenzie Forest Products Inc.	782,500	17	782,500*	18
Dunkley Lumber Ltd.	150,000	3.5	150,000*	3.5
Three Feathers Limited Partnership	88,000	2	88,000*	2
Chu Cho Industries Limited Partnership	181,924	4	80,000*	1.8
OBO Forest Management Ltd. Partnership	100,000	2	100,000*	2.2
Community Forest Agreement	5000	0.1	0	0
Forest Service Reserve	35,000	1	35,000	0.8
Forest Licenses Non Replaceable	174,672	4.5	174,672	4
First Nations Woodland Tenures	200,000	3.9	200,000	4.5
Total	**4,500,000**	**100**	**4,393,076**	**100**

* Estimation based discussion with licensees.

Regulations

Section 4 of Canfor's Forest Management System (FMS) Manual provides a summary of rights, responsibilities and regulations associated with Canfor's operations and are publicly available.

Applicable legislation and regulatory requirements primarily include the following:

- Forest Range and Practices Act (FRPA)
- Forest Stewardship Plans (FSP)
- Forest Act
- Road Permits
- Cutting Permits
- Forest Practices Code (FPC) of British Columbia Act
- Forest Development Plans (FDP)
- Silviculture Prescriptions
- Site Plans
- FPC Regulations

SFMP Steering Committee Responsibilities

The Mackenzie SFMP Steering Committee is responsible for assisting in the development, implementation and maintenance of the SFMP. The Steering Committee will provide corporate direction on the development of the MK SFMP. The Steering Committee will be actively involved in the public participation processes, gathering and evaluating data, reporting, continuously improving the plan over time, and ensuring that the MK SFMP commitments are implemented within their organizations. The Steering Committee will meet at least twice per year following the implementation of the plan to review the SFMP, continuous improvement, and any other business related to the MK SFMP.

The Steering Committee has been reduced to just Canfor as a result of the 2012 departure of BC Timber Sales.

Public Advisory Group Responsibilities

The terms of reference (TOR) for the Mackenzie DFA Public Advisory Group outlines the:

- structure of the PAG;
- organizational structure used for the development of the SFMP;
- duties of PAG members, its advisors, and the SFMP reviewers;
- schedules for development of the SFMP, including public consultation and communications;
- how PAG satisfaction is measured, and
- basic operating rules for the public involvement process.

Complete details on the responsibilities of the Mackenzie DFA Public Advisory Group are provided in the Terms of Reference document.

Manager and Employee Responsibilities

Effective implementation of the SFMP requires that Canfor's responsibilities be clearly and unequivocally stated. In addition to the responsibilities outlined in Canfor's commitments to SFM, Canfor will also commit to the roles and responsibilities for their management and staff as outlined in Table 7. Responsibilities of management and staff pertaining to individual indicators/measures are detailed in the Responsibility Matrices.

3.4 SFMP Links to Federal and Provincial Documents

Several policy, marketplace or professional forest management drivers are operative in BC. These initiatives have not been developed in unison, are not linked to a larger planning environment, and do not provide operational tools to address strategic-level forest management. The SFMP is an intensive and comprehensive planning document that integrates provincial legislative requirements, management strategies, and other forestry initiatives such that the requirements of CSA SFM certification are met. The SFMP is implemented through operational plans. Table 5 depicts the intent and purpose of the SFMP in terms of addressing the current range of legislation, strategies, initiatives and operational plans.

Legislation and Policy provide a context to develop strategies and conduct forest-harvesting practices. The SFMP follows the legal requirements and policies. These include adherence to Federal Species at Risk legislation and regulations in the Provincial Forest Act or FRPA.

Provincial Strategies provide input to SFMP in the development of management scenarios to support indicator targets. Strategic plans influence forest management in the Mackenzie DFA. Some of these strategies may also provide the mechanism to address some SFM performance requirements identified in this plan.

Supporting Documents and Initiatives provide guidelines and tools to assist in the implementation of the SFMP. Federal standards provide guidelines for implementing management systems and standards to attain SFM certification. Provincial initiatives provide and avenue to develop SFMP's and provide the financial support fundamental to applying and improving SFM.

Operational Plans are essential to the implementation of the SFMP. The SFMP typically represents a 20 – 25 year planning window. The time horizon of the SFMP precludes specific details of management activities on an annual basis. Short-term plans that prescribe specific management activities will be developed in the context of contributing to the goals and implementation schedules of the SFMP.

Table 7. Roles and responsibilities for the management and staff of the signatories to the Sustainable Forest Management Plan (SFMP) for the Mackenzie Defined Forest Area.

Senior Management – Canfor	
	develop, implement and maintain commitments to SFM
	assign appropriate level of resources to implement the SFMP
	define, document and communicate the roles, responsibilities and authority to implement and maintain the SFMP
	conduct periodic management reviews of SFM – including the SFMP, monitoring results, annual reports, and internal/external audits
	Implement appropriate changes to SFM due to the results of the management reviews
SFM Representative – Canfor	
	Coordinate the development, implementation and maintenance of an effective PAG
	Participate within the PAG following the agreed TOR
	respect the roles, responsibilities, rights and ownership of all parties, both those involved and those not actively involved
	provide/receive information to affected or interested parties concerning all aspect of SFM
	track internal and external communication concerning SFM
	develop, implement and maintain the SFMP – including participation in the development of local Indicators, measures, and targets
	develop/deliver appropriate training for staff to implement and maintain SFM
	develop/deliver appropriate training for contractors to implement and maintain SFM
	develop, implement and maintain appropriate procedures (operational controls, monitoring, checking and corrective actions) to ensure effective delivery of the SFMP
	develop, implement and maintain an effective adaptive management process to ensure continual improvement of the SFMP
Operational Staff – Canfor	
	develop operational plans that reflect the SFMP's goals and implementation schedules
	Implement operational plans
	implement inspections, monitoring and corrective actions as per the specific requirements outlined in the respective plans and operational controls
	attend applicable training session to ensure effective implementation of SFMP
	be knowledgeable about, and have access to, the SFMP and applicable supporting documents
	follow applicable operational controls and procedures to ensure effective delivery of SFMP

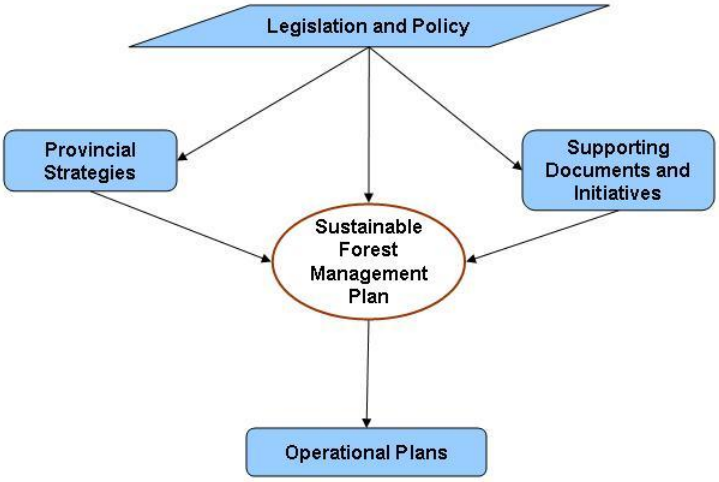


Figure 5. A schematic depiction of the linkages between the Sustainable Forest Management Plan for the Mackenzie Defined Forest Area, government led legislation, strategies, initiatives, and operational plans.

4.0 ESTABLISHING THE FOUNDATION FOR SFM PLANNING

The foundation for SFM planning was built upon the identification of stakeholders, determination of key management issues derived from stakeholder input and other planning processes, consideration of current management practices, inventory analysis, and determination of data and knowledge gaps. Ultimately, this foundation assisted in the determination of locally appropriate description of forest values, criteria for sustainability and indicators upon which to assess the criteria, specific measures for indicators, targets for indicators, forecasting approaches, and associated decision support tools.

The Mackenzie SFMP was initially established by Canfor and BCTS (the Steering Committee). In 2013 BCTS removed themselves from the Mackenzie SFMP process.

4.1 Stakeholder Analysis

Individuals and groups were selected for inclusion in the stakeholder analysis database based on their participation in past planning processes (e.g., the Mackenzie LRMP), their status as tenure holders (e.g., guiding, trapping), or through their identification as affected individuals and organizations (e.g., First Nations, property owners, government officials). A total of 326 individuals or organizations were identified during the process. Due to the relatively small population base and number of stakeholders identified, the Steering Committee determined that a formalized analysis was not required. Invitations to participate in the public planning process were delivered to all 326 identified stakeholders resulting in 16 attendees at the inaugural PAG meeting. Membership was then reviewed on the basis of specific criteria (e.g., involvement, affectedness, influence, and contact priority). As a result of this review a list of sectors (e.g., commercial tourism, forestry, government, outdoor recreation) and PAG members were identified.

The selection of stakeholder representatives through this process supports a balanced and representative mix of interests that are represented within the Mackenzie DFA's public process. The identification of stakeholders is, however, an ongoing process. New stakeholders will be identified in response to changes in values, ecological conditions, socio-economic opportunities, or management activities on the Mackenzie DFA.

A number of key forest management issues in the Mackenzie DFA were identified during other initiatives and processes such as the LRMP and from stakeholder input through the PAG. Key management issues provide a foundation for establishing measures and targets that are addressed within the SFMP.

4.2 Practices Analysis

A summary of current land management practices has yet to be completed for the Mackenzie DFA by Canfor. In the absence of such an analysis, Canfor has relied on TSR data with modifications to reflect current practices as outlined in Section 6.2.

4.3 Inventory Analysis and Knowledge Gaps

There are two components of an inventory analysis: 1) the collation or assembly of the required data available for developing an SFMP; and 2) the assessment of the quality and appropriateness of the data with respect to its end use. Over the years, a number of land base inventories or assessments have been completed on all, or portions of, the Mackenzie DFA. While not necessarily directed to indicators identified in this SFMP, these inventories collectively provide support for knowledgeable management decisions and SFM. Completed inventories and assessments are summarized in the table below.

Table 8. A summary of existing resource inventories and assessments that have been conducted on the Mackenzie Defined Forest Area.

MFLNRO&RD TSR	Canfor	Peace/Williston	Other	Known Maps
Forest Cover Timber Harvesting Land Base Merchantable Land Base	Amphibian Inventory Coarse Woody Debris Vegetation Resources Inventory Terrain stability Stream/Lake Assessments Archaeological Overview Archaeological Impact Forest Health	Amphibian Inventory Passerine Birds Raptors Inventory Fisher Project Elk Census Sheep Census Goat Census	Passerine Birds Caribou Census Moose Census Wolverine Project Goat Census	Biogeoclimatic Ecosystem Classification Natural Disturbance Types Natural Disturbance Units Riparian Management Zones Protected Areas Strategy Caribou Management Zones Caribou Habitat Goat Habitat

				Mineral Licks Ungulate Winter Ranges Grizzly Bear Habitat Moose Habitat

Given that the SFMP is a living document, it is expected that there will be changes over time. In a proficient management system, changes to the document or strategies will be consistent with the objectives of continual improvement in management activities and outcomes. Identification of current gaps in data or functional relationships, and the development of strategies to address these deficiencies is a primary step to enable improvement. The establishment of local level indicators and targets for the Mackenzie DFA supports the identification of required data and functional relationships.

4.4 Decision Support Tools

In order to effectively predict the outcome of a strategy or alternative forest practice, a variety of forecasting approaches and decision support tools are necessary. Forecasting approaches include conceptual models derived from expert judgment, quantitative models built with data, and the development of alternative future scenarios to drive spatial and temporal simulations. Decision support tools facilitate the decision making process which is often complicated by uncertainties in data, understanding and future events.

Canfor's Mackenzie Division has participated as an expert or as a stakeholder in a variety of Working Groups /Technical Committees including:

- Northern Caribou Recovery Implementation Group for North Central BC;
- Mackenzie Mountain Goat Management Team;
- Landscape Objective Working Group; and
- Pine Stem Rust Working Group.

These technical committees have conducted several modeling scenarios including:

- habitat supply models for caribou, moose, wolves, goats, and grizzly bear;
- forecasting scenarios for patch size and seral stage forest harvesting strategies;
- a riparian assessment model; and
- hazard identification and risk of forest pathogens.

5.0 INDICATORS & INDICATOR MATRICES

The PAG has identified one or more DFA specific *values* and *objectives* for each of the CSA defined elements. These values and objectives are summarized in this section. Core Indicators (included in the CSA standard) as well as local *indicators* and their respective *targets* have been developed to meet these local values and objectives. These terms, as defined by the CSA SFM Standard, are as follows:

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.
Example: When considering the CSA Element "Ecosystem Diversity", a DFA related value could be "Well balanced and functioning ecosystems that support natural processes"

Objective: A broad statement describing a desired future state or condition of a value.
Example: One objective for the value "Well balanced and functioning ecosystems that support natural processes" could be to "Maintain landscapes that support the natural diversity, variety, and pattern of ecosystems".

Indicator: A variable that measures or describes the state or condition of a value. Indicators should be quantitative where possible.
Example: Using the previous value and objective, an indicator could be "The percentage of cut blocks consistent with coarse woody debris requirements in operational plans"

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.
Example: For the coarse woody debris indicator, the target could be "100% of blocks will be consistent with coarse woody debris requirements.

One of the PAG's major roles was to select the indicators to be included in the SFMP. This involved defining what is to be measured and why it is important. During this process the PAG applied a set of quality criteria when assessing proposed indicators. This set included:

a) Measurability - targets can only be set for indicators that can be measured;
b) Predictability - indicators whose future levels can be predicted with reasonable accuracy are needed;
c) Relevance - indicators should be clearly applicable to their associated values;
d) Understandability - indicators should be simple, clear, and easy to understand;
e) Validity - indicators should be consistent with the scientific understanding of the value they measure and should be technically valid (objectively obtained, documented, comparable and reproducible); and
f) Feasible- the process of monitoring indicators should be practical, cost-effective and efficient.

SFMP indicators (core and local) and their targets are described in Section 5.7. A summary table showing all criteria and elements and associated local values, objectives, indicators and targets is provided in Appendix E.

In an SFMP, it is the indicators and targets that provide the performance measures that are to be met through on-the-ground forest management activities. This section provides a detailed description of each of the indicators and targets in the SFMP for the Mackenzie DFA. Core indicators prescribed in the latest CSA standard (Z809-16) have been integrated into the plan using the numbering system found within the standard. Indicator statements have been developed for each core indicator, and some core indicators incorporate more than one statement. These serve to put the target into context against the core indicator and make the target easily measurable. Indicators provide information about present, or future, conditions of criteria and repeated measures or simulation modeling can be used to establish the actual or predicted direction and magnitude of change in criteria over time. In this way, indicators provide a foundation for the analyses required in the assessment of SFM. Many of the previous plan indicators were very close to the set of core indicators, thus the targets used to measure these core indicators are familiar to the SFMP. Full conformance is required for many targets (i.e., there is no variance). Where full conformance may not be achievable, an acceptable level of variance is indicated for the target.

The next step is to design and evaluate strategies to achieve these targets. The process of evaluating a strategy includes what the current management practice is, and a forecast of the indicator's success in achieving the target in the future Criteria and Indicators (C&I) form the basis of a hierarchical framework developed to assist in the assessment of progress toward SFM and therefore, adherence to CSA Standard Z809-16. Criteria are essentially strategic-level management objectives intended to be applied to large areas (e.g., 100,000 to 5 million ha) over long time frames (i.e., from 100 to 300 years) and collectively they characterize the three forest values addressed by SFM: 1) ecological, 2) economic, and 3) social. Criteria are intended to be assessed through repeated, long-term measurement of their associated indicators.

Canfor monitors the achievement of targets annually. Monitoring procedures for each target in the SFMP are described below. Management strategies provide further direction to the performance measures (indicators and targets) and serve as a guide for the licensees in their annual monitoring activities.

5.1 Objectives, Indicators & Targets

The Mackenzie SFMP process has served to further refine the information and concerns of the local public. Incorporating these concerns and ideas into individual licensee operations through the established indicators and targets and ongoing monitoring ensures long-term sustainability of the forest resource. Any indicators established in this SFMP that are conducive to long-term projections are as noted below.

Section 6.2 describes the plans, policies and management strategies that support the achievement of the targets in the SFMP.

5.2 Base Line for Indicators

The primary source of base line information for indicators is the initial monitoring report subsequent to adoption of the indicator. Where existing indicators and targets were used to satisfy a core indicator, the baseline will be identified as that from the previous SFMP. In some instances, particularly in the case of newly developed indicators, a baseline might be difficult to establish and

thus be absent in the plan. In those situations, baseline information will become available through subsequent monitoring reports.

5.3 Current Status of Indicators

Current status of each indicator is as reported and updated in annual SFMP performance reporting. To obtain current information, please refer to the most recent monitoring report on the Canfor website: http://www.canfor.com/responsibility/forest-management/plans

5.4 Forecasting

Forecasts are the long-term projection of expected future indicator levels. These have been incorporated into the SFMP targets as predicted results or outcomes for each target.
Often, the target for the indicator is in itself the predicted result or outcome. The target is the predicted outcome or forecast for most of the SFMP indicators. Generally, the target is being achieved for SFMP indicators, and it is expected these targets will continue to be met. Indicator forecasts also provide predictions of future state relative to Elements, Values or Objectives.

5.5 Regional Forecasting Related to the SFMP

Mackenzie TSA Timber Supply Review

The Mackenzie Timber Supply Area Rationale for AAC Determination, November 14, 2014[8], included sensitivity analysis around the shelf life of beetle killed pine and the harvesting of non-pine stands in the short-term. The analysis was conducted using information related to the timber harvesting land base, timber volumes, and management strategies to indicate future state projected out for a period of 400 years. Prior to the Chief Forester making his determination, the public was invited to review and comment on the Timber Supply Review (TSR). Additional information on the opportunities that were provided for public input can be found in the TSR discussion paper (October 2013)[9]. Further information pertaining to assumptions and analysis can be found within the Chief Forester's Rationale for AAC Determination for the Prince George TSA (November 2014).

Ecosystem Representation Analysis

Canfor recently completed an Ecosystem Representation Analysis across their operations in BC. This analysis was used to determine the relative abundance of ecosystem groups and highlight rare or uncommon groupings that may need special management. This analysis supports the indicator and target for 1.1.1 Percent representation of ecosystem groups across the DFA. For more details on the analysis, please refer to the indicator detail sheet for 1.1.1. in Section 5.7.

5.6 Legal Requirements

Awareness of legal requirements is essential when considering suitable Objectives for an Element and determining appropriate Indicators and Targets. Canfor ensures that specific legislation related

[8] Reference: http://www.for.gov.bc.ca/hts/tsa/tsa16/
[9] Reference: http://www.for.gov.bc.ca/hts/tsa/tsa16/

to Objectives, Indicators and Targets is known and complied with by staying current with legal requirements. Subscribing to commercial services, reliance on in-house staff or industry associations, and participating in joint legislative review committees are just some of the methods used by Canfor to remain current with legislation.

5.7 Indicators in the SFMP

1.1.1 Productive Forest Representation

SFMP Indicator Statement	1.1.1 Total hectares logged in rare and uncommon ecosystems.
CSA Core Indicator(s)	1.1.1 Ecosystem area by type. 1.2.2 Degree of suitable habitat in the long term for selected focal species, including species at risk.
SFM Criterion	1. Biological Diversity
Element(s)	1.1 Ecological Diversity 1.2 Species Diversity
Value(s) and Objective(s)	*1.1 Value:* Well balanced and functioning ecosystems that support natural processes *1.1 Objective:* Maintain landscapes that support the natural diversity, variety and pattern of ecosystems 1.2 *Value:* Diversity of species throughout the DFA 1.2 *Objective:* Maintain species diversity through time, including habitats for known occurrences for species at risk.
Strategies Description	Maintaining representation of a full range of ecosystem types is a widely accepted strategy to conserve biodiversity in protected areas (e.g., Margules and Pressey 2000) and is suggested for landscapes managed for forestry (e.g., Lindenmayer and Franklin 2002). Most species, especially those for which knowledge is sparse or absent, are best sustained by ensuring that some portion of each distinct ecosystem type is represented in a relatively unmanaged state. Unmanaged stands act as a precautionary buffer against errors in efforts intended to sustain species in the managed forest. Unmanaged areas also help to sustain poorly understood ecosystem functions and provide an ecological baseline against which the effects of human activities can be compared Based on the approach developed by Huggard (2001; 2004), ecosystem representation is determined by evaluating the proportion of productive crown forest found in the non-harvested land base (NHLB), including parks and protected areas, but also including areas excluded from harvest for other reasons such as operability constraints. An evaluation of ecological representation allows managers to identify the 'management footprint' on ecological units within a forest management unit. This in turn allows managers to prioritize management objectives (such as which units to emphasize OGMA placement, Wildlife Tree Patch targets and riparian reserves) and where to focus monitoring efforts.

Means of Achieving Objective & Target	Target selected as a proactive measure to identify and conserve rare and uncommon ecological communities. Rare or uncommon ecosystem groups were identified by mapping at the BEC variant level or PEM site series level.
	The following criteria was used to select the site series that would be considered rare or uncommon:
	• The ecosystem group is present on the DFA. (area >0%),
	• The forested area is <= 10,000 ha. in the West-Central and North – East Mountains regions,
	• The representation class is:
	  o Low <20% of the area is in the NHLB.
	  o Rare/uncommon abundance is <0.1% of the forest area, and
	• < 100% of the area of the ecosystem group is in the NHLB.
	Site series in these ecosystem groups are considered rare and should not be harvested. If these site series are encountered during field layout, they will be reserved from harvest by excluding them from the harvest area or reserving them in WTP's.

Current Status, Predicted Results or Outcome	Current condition for this indicator is illustrated in the table below. Table 9. Productive Forest Ecosystem by BEC

BEC Variant	DFA Area (ha)	THLB Area (ha)	THLB Percent of DFA (%)	NHLB Area (ha)	NHLB Percent of DFA (%)	Target (%)
AT	137,420	64	0.05%	553	0.4%	0.4%
BWBS dk1	129,526	76,054	58.7%	46,110	35.6%	35.6%
BWBS mw1	10,247	3,689	36.0%	5,953	58.1%	58.1%
BWBS wk2	21,097	12,442	59.0%	7,641	36.2%	36.2%
ESSF mv2	10,880	6,205	57.0%	3,873	35.6%	35.6%
ESSF mv3	314,568	200,277	63.7%	92,126	29.3%	29.3%
ESSF mv4	330,448	113,448	34.3%	152,437	46.1%	46.1%
ESSF mvp	92,940	2,489	2.7%	18,608	20.0%	20.0%
ESSF wc3	174,961	46,040	26.3%	68,444	39.1%	39.1%
ESSF wcp	58,320	1,359	2.3%	8,187	14.0%	14.0%
ESSF wk2	111,798	62,900	56.3%	39,488	35.3%	35.3%
SBS mk1	257,289	189,083	73.5%	41,785	16.2%	16.2%
SBS mk2	175,296	115,469	65.9%	37,831	21.6%	21.6%
SBS vk	6,720	4,798	71.4%	1,819	27.1%	27.1%
SBS wk1	8,872	6,766	76.3%	1,257	14.2%	14.2%
SBS wk2	226,617	154,520	68.2%	57,015	25.2%	25.2%
SBS mk	14,672	5,105	34.8%	7,201	49.1%	49.1%

Forecast	As the target is to harvest 0 ha of these rare ecosystems it is anticipated that the amount of these rare ecosystems will remain relatively un-changed in the THLB by Canfor's practices.
Target	0 ha
Basis for the Target	Using the Ecosystem Representation Analysis conducted in 2011/2012, rare ecosystems identified. If an ecosystem is determined to be rare, a target of 0 ha is established to ensure its sustainment into the future.
Monitoring & Measurement Periodic	
Annual	Annually, all blocks harvested and roads built will be spatially overlayed with the rare ecosystems to determine compliance. The results will be presented in the annual report.

Variance	0%

1.1.2 Forest area by species composition

SFMP Indicator Statement	1.1.2 Percent composition of forest type (treed conifer, treed broad leaf, treed mixed) >20 years old across DFA.
CSA Core Indicator(s)	1.1.2: Forest area by type or species composition.
SFM Criterion	1. Biological diversity
Element(s)	1.1. Ecosystem diversity
Value(s) and Objective(s)	*Value 1.1:* Well balanced and functioning ecosystems that support natural processes *Objective 1.1:* Maintain landscapes that support the natural diversity, variety and pattern of ecosystems
Strategies Description	Tree species composition, stand age, and stand structure are important variables that affect the biological diversity of a forest ecosystem - providing structure and habitat for other organisms. Ensuring a diversity of tree species within their natural range of variation, improves ecosystem resilience and productivity and positively influences forest health. Reporting on this indicator provides high level overview information on area covered by broad forest type, forest succession and management practices that might alter species composition. Ensuring a diversity of tree species is maintained improves ecosystem resilience and productivity and positively influences forest health. Forests in Canada are classified according to an Ecosystem Classification System, which identifies the tree species that are most suited ecologically for regeneration in any particular site. This guides forest managers in maintaining the natural forest composition in an area and lends itself to long term forest health and productive forests that uptake carbon. The BC government FREP report #16 on Tree Species Composition and Diversity in British Columbia (August 2009) concluded that the amount of deciduous mixed stands at free growing in the Northern Forest Interior Region has increased significantly, from 2,811 hectares before harvest to 55,614 hectares at free growing. This is expected to continue in the short term in both BC and Alberta as recently harvested areas regenerate naturally with ingress from early successional broadleaf species. While adding to the overall diversity of the DFA, many of these forests will revert back to coniferous mixed forests over time. To remove some of this short term variation in the reporting of the indicator, forests less than 20 years of age will not be included in the reporting structure. Treed conifer forests are those where conifers dominate the species mix (at least 75% of trees are conifer), treed broad leaf forests are those where mostly deciduous trees dominate the species mix (at least 75% of trees are broad leaf) and mixed forests are those that fall within the middle range where neither conifer or broad leaf trees dominate the species mix.
Means of Achieving	Forest plans will incorporate reforestation strategies that retain the natural balance of broad forest types within the DFA. The Target addresses diversity and abundance of

Objective & Target	naturally occurring tree species on the landscape. Management control is restricted to areas of the Timber Harvesting Land Base (THLB).
Current Status, Predicted Results or Outcome	The percent distribution of forest types > 20 years of age across the DFA is 88% treed conifer, 3% treed broadleaf and 9% treed mix (2011 baseline data).
Forecast	By implementing the above strategy, it is forecast that forest composition will be within the target ranges. Current state calculations show that composition is consistent with target ranges. *Methods and Assumptions* - This indicator is forecast using data from TSR, however, it is localized and monitored at the DFA level using a standardized Canfor model utilizing VRI, Cengea Resources, Standard Unit information for WTP shapes, and a host of government-supplied layers. An indicator guidance document has been developed and is used to calculate the current state. Trends from previous TSR show the current strategy is resulting in stabilization of the forest composition; in other words, the forecast is assumed to be current state. This should be re-forecast at a minimum after every TSR data update.
Target	Maintain baseline ranges and distribution into the future (measured every 5 years) Treed Conifer: 73-93%, Treed Broadleaf: 1.5-6%, Treed Mixed: 5-15%
Basis for the Target	Targets for this indicator were established through PAG consensus. The need to maintain the biological diversity of forest ecosystems in future generation forests. Addresses diversity and abundance of naturally occurring tree species on the landscape. Management control restricted to areas of the Timber Harvesting Land Base (THLB).
Monitoring & Measurement Periodic	This indicator will be reported on a 5 year basis. The different stand types will be run using GIS analysis and VRI data. The baseline data was revised in 2011. Subsequent analysis will be done every 5 years in an effort to eliminate any bias from short term trends on the land-base, and to allow for the periodic updating of data sources. The indicator will be considered to have been met if the area for the 5 year reporting window maintains its area spread within 1 percent of baseline areas.
Annual	
Variance	+/-1%

1.1.3a Old Forests

SFMP Indicator Statement	1.1.3a: Percent of blocks that are within LU/BEC Groups that meet prescribed old-growth targets
CSA Core Indicator(s)	1.1.3a Forest area by seral state or age class (Old Forest)
SFM Criterion	1: Biological Diversity
Element(s)	1.1 Ecosystem Diversity
Value(s) and Objective(s)	*Value 1.1:* Well balanced and functioning ecosystems that support natural processes. *Objective 1.1:* Maintain landscapes that support the natural diversity, variety and pattern of ecosystems.

Strategies Description	This indicator was chosen to monitor the amount of old forest within each Landscape Unit (LU) group. It is assumed that maintenance of all seral stages across the landscape will contribute to sustainability because doing so is more likely to provide habitat for multiple species as opposed to creating landscapes of uniform seral stage. Emphasis is placed on old forest because many species use older forests and the structural elements found therein (e.g. large snags, coarse woody debris, and multilayer canopies). These structural elements are difficult to recreate in younger forests.
Means of Achieving Objective & Target	The relative amount of late seral stage or old forests have generally been mandated by Higher Level Plans or provincial orders. Where actual percent late seral is less than the legal target in a given ecological unit, harvesting the remaining late seral stands will be avoided. A recruitment strategy will be developed for these ecological units to meet the minimum requirements for late seral stands over time. The Mackenzie Landscape Objectives Working Group (MK LOWG) convenes as required to update the current and future amount of old forest, and the Licensee apportionment (update harvested blocks, newly planned blocks, aging of forest, and Licensee operating area changes). The MK LOWG assesses current and anticipated future performances of the licensees in meeting old forest targets and proposed recruitment strategies if targets cannot be met.
Current Status, Predicted Results or Outcome	Previous disturbances (i.e., both natural and manmade) have influenced the current condition of old forests to the point that the LU-BEC target cannot be immediately met everywhere. Our objective, therefore, will be to work toward the target within the context of continued harvest and natural disturbance. Canfor worked with the Integrated Land Management Bureau on a project to establish spatial OGMAs in priority landscape units south of the peace arm of Williston Lake. This project was finalized in the fall of 2009, and legally designated in October of 2010. Canfor has incorporated them into their respective forest planning for the Landscape Unit Groups represented in the OGMA order. Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Seral stage can be measured directly from standard forest cover information and can be forecasted through standard modeling techniques using a variety of tools that adjust forest age based on simulated disturbances. Over the DFA, forecasting indicates that the amount of old forest will increase in the short term as old forest is recruited from the mature seral class. Over the mid-term, the amount of old forest will decline as recruitment equals succession losses in the NHLB and forest is harvested in the THLB (Figure 6). Simulated natural disturbances in the NHLB does not significantly affect the %-old seral in the DFA because the NHLB is significantly smaller (673,461 ha) compared to the THLB (880,790 ha), and the amount of mature forest for recruitment in both the NHLB and THLB is sufficient to compensate for succession losses. However, due to natural variation and existing forest characteristics, it may not be possible to achieve targets on all LU Groups because of succession losses.

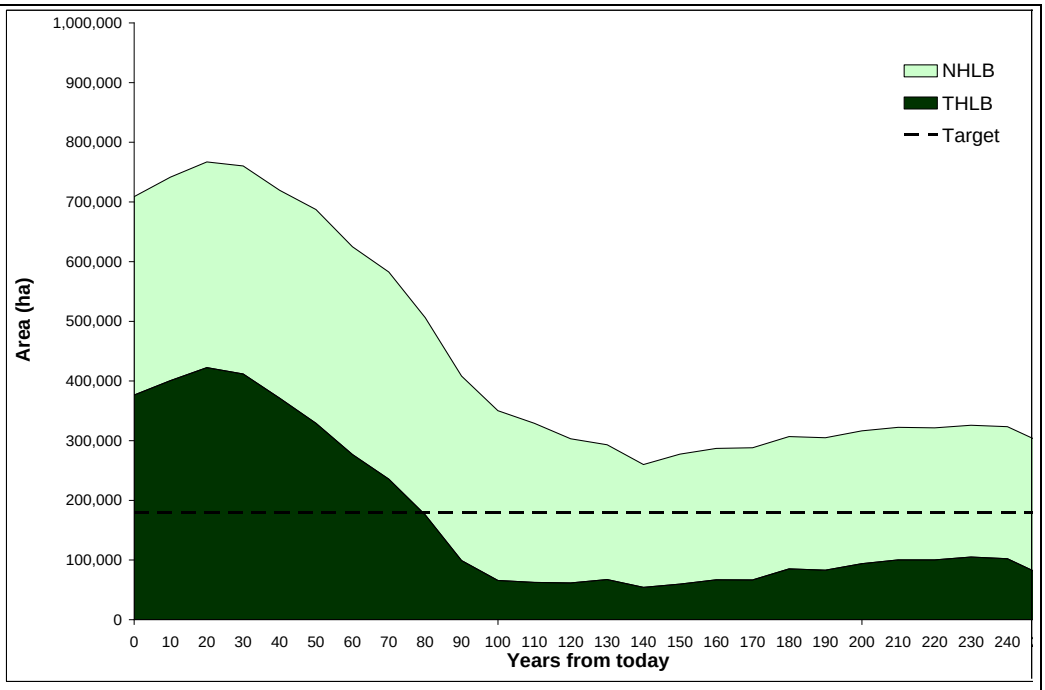
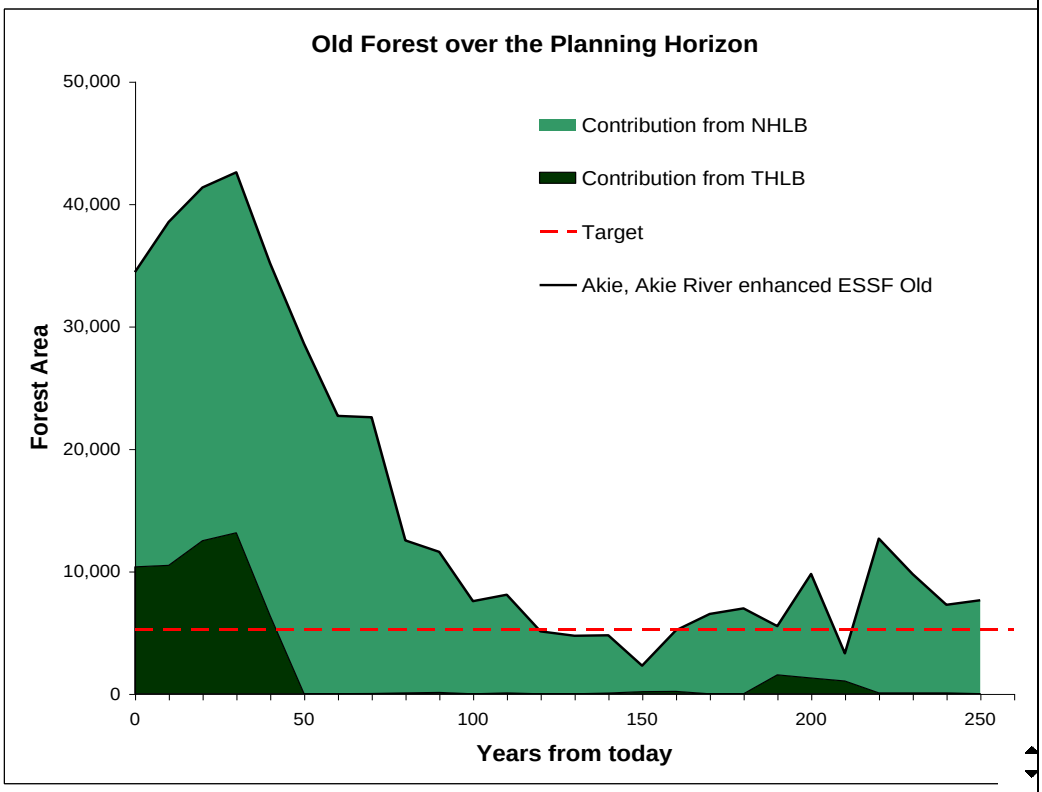


Figure 6. Old forest across the DFA versus target and relative contribution from NHLB and THLB, base case.

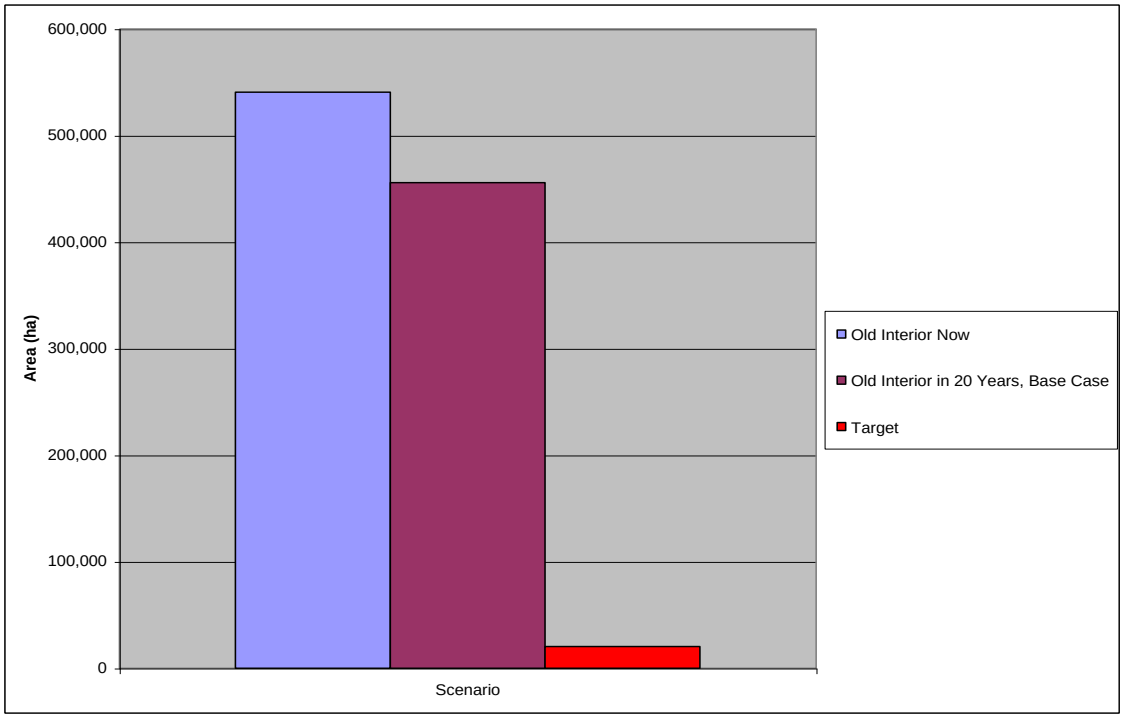
The total amount of old forest bottoms out at about 140 years and levels off over the planning horizon. Forecasting indicates that there is sufficient old forest available across the DFA to meet targets; however, as noted previously, targets may not be achieved on individual LU Groupings. Forest dynamics, such as catastrophic disturbance, and shifting priorities may also direct forest management in such a way that may preclude achievement of targets in individual LU Groupings.

Target	100%
Basis for the Target	The targets for old forest are taken from the approved Mackenzie TSA Biodiversity Order.
Monitoring & Measurement Periodic	Seral stage will be monitored by conducting seral stage analyses as required. We conduct analyses of seral stage by intersecting timber harvest schedules with standard Vegetation Resource Inventory data. Tabular and map-based results are presented for seral conditions, given the 5-year harvest projections. The information is then processed in standard formats using commonly available software capable of meeting specifications for standard data sharing agreements with Government. The position/person responsible for monitoring and reporting for this indicator is identified in the Responsibility Matrix. In the fall of 2011, Canfor approached non-signatory licensees that have current forest operations within the DFA with the intention of establishing a *Licensee Landscape Unit Working Group* for the Mackenzie Timber Supply Area. This concept was well received by the non-signatory licensees. The primary purpose of this group is to annually share depletion information (blocks, roads, WTRA's), coordinate on the completion of landscape analysis, and to use the resultant data sets for SFM and legal reporting. The result was the establishment of the Mackenzie Landscape Objectives Working Group (MK LOWG). The main objective of this group is to facilitate the collaboration of Signatories in

	meeting landscape objective targets for old forest, old interior forest, and young forest patch size distribution in the Mackenzie TSA.  Figure 7. Old forest in the Akie LU Grouping ESSF BEC zone, enhanced biodiversity emphasis option (BEO).
Annual	
Variance	0 %

1.1.3b Interior Forest

SFMP Indicator Statement	1.1.3b Percent of blocks that are within LU/BEC Groups that meet prescribed Interior Old targets.
CSA Core Indicator(s)	1.1.3 Forest area by seral stage or age class.
SFM Criterion	1. Biological Diversity
Element(s)	1.1 Ecosystem Diversity
Value(s) and Objective(s)	*Value 1.1*: Well balanced and functioning ecosystems that support natural processes *Objective 1.1:* Maintain landscapes that support the natural diversity, variety and pattern of ecosystems
Strategies Description	Interior forest conditions refer to a situation where climatic and biotic characteristics are not significantly affected by adjacent and different environmental conditions (e.g., other seral stages, other forest or non-forest types, etc.). This indicator is important because provision of habitat for old-forest dependent species) can only occur if old forests are not significantly affected by adjacent environmental conditions. Historically, natural disturbance events such as fire, insects, and wind led to diverse landscapes characterized by forests having these interior old forest conditions. Thoughtful planning of harvesting patterns can minimize "fragmentation" of the forested landscape and help create interior old forest conditions. Furthermore, the intent of this indicator is to have interior old forest conditions represented within all ecosystem types to further enhance ecosystem resilience.
Means of Achieving Objective & Target	We use a buffered distance (200 m), from edges of existing openings and younger age classes, to estimate old interior forest conditions within the Mackenzie DFA.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Due to the complexity of calculating interior old forest, forecasting results were only simulated for 20 years from present on the DFA. Results of the simulation indicated that the amount of interior old forest will remain well above target levels on the DFA (see Figure below). However, as with indicator #1, and for the same reason, it will be impossible to meet this target immediately or on all LU Groups so our objective is to trend toward the target over time. The strategy in the immediate future will be to minimize fragmentation of mid-aged (60-100 year old) forests, as these are the stands that will provide the old interior forest conditions in the future.

	 Figure 8. Old interior forest (ha) in the Mackenzie DFA at present and in 20 years versus target.
Target	100%
Basis for the Target	The targets for interior old are taken from the approved Mackenzie TSA Biodiversity Order.
Monitoring & Measurement Periodic	In the fall of 2011, Canfor approached non-signatory licensees that have current forest operations within the DFA with the intention of establishing a *Landscape Unit Working Group* for the Mackenzie Timber Supply Area. This concept was well received by the non-signatory licensees. The primary purpose of this group is to annually share depletion information (blocks and roads), coordinate on the completion of landscape analysis, and to use the resultant data sets for SFM and legal reporting. The result was the establishment of the Mackenzie Landscape Objectives Working Group (MK LOWG). The main objective of this group is to facilitate the collaboration of Signatories in meeting landscape objective targets for old forest, old interior forest, and young forest patch size distribution in the Mackenzie TSA.
Annual	This will be reported out on as needed, with an analysis being done annually in conjunction with the other Licensees who subscribe to the Landscape Objectives Working Group (LOWG).
Variance	0%

1.1.3c Biodiversity Reserve Effectiveness

SFMP Indicator Statement	1.1.3c Percentage of blocks and roads harvested that comply with orders which legally establish protected areas, ecological reserves, or OGMAs.
CSA Core Indicator(s)	1.1.3 Forest area by seral stage or age class. 1.4.2 Proportion of identified sites with implemented management strategies

SFM Criterion	1. Biological diversity
Element(s)	1.1 Ecosystem diversity 1.4 Protected Areas and sites of special biological, geological, heritage, or cultural significance
Value(s) and Objective(s)	*1.1 Value:* Well balanced and functioning ecosystems that support natural processes *1.1 Objective:* Maintain landscapes that support the natural diversity, variety and pattern of ecosystems *1.4 Value:* Unique and important sites within the DFA. *1.4 Objective:* Respect protected areas, and identify sites of special, biological, geological, heritage, or cultural significance within the DFA, and implement appropriate management strategies to their long-term maintenance.
Strategies Description	Landscape level biodiversity reserves/ Protected Areas are areas protected by legislation, regulation, or land-use policy to control the level of human occupancy or activities (Canadian Standards Association, 2003). These include legally established Old Growth Management Areas (OGMAs), parks, ecological reserves, and new protected areas. As forestry activities may occur near these areas the chance exists for unauthorized harvesting or road construction to happen within these sites. In addition to being an obvious violation of legislation, such an act would also damage sites and organisms that were set aside for protection. Such an event would be a serious failure of sustainable forest management. Tracking the number of unauthorized hectares will allow forest managers to determine if there are flaws in the planning and implementation of forestry activities.
Means of Achieving Objective & Target	Government's policy and legally established framework for the protection of biodiversity values and species at risk under provincial and federal legislation includes the establishment of parks and protected areas, as well as the protection of biodiversity, riparian and aquatic habitats, old-growth forests, ungulate winter range, specific wildlife features and the habitat for listed species at risk. The licensee manages spatial information that identifies the location of larger scale and stand level protected areas. Where applicable, this information is brought forward into operational plans to ensure roads and harvest activities do not compromise protected areas. Management strategies might include plans for road deactivation or rehabilitation, additional dispersed retention or a unique silviculture regime. Operational plans are then properly executed to provide desired results. Post harvest evaluations and other applicable post activity forms (i.e. road construction or site preparation) assess plan conformance. Specific strategies that will be employed to achieve the objective are: • Sites of Biological significance o Include training related to the identification and management of sites of biological significance with associated species at risk training provided for employees and contractors who require it. o Adherence to strategic level plans such as FSP's (results & strategies) and LRMP's that may identify local sites of biological significance o Adherence to FRPA and associated regulations (i.e. UWR's & WHMA's) o Following applicable EMS operational controls o Developing & implementing best management practices (i.e snags, overstory trees, CWD) o Harvest avoidance and/or incorporation of unique features within retention areas (i.e ecological reserves, avalanche chutes, mineral licks, denning sites). • Protected areas

	○ Pre-harvest status checks to ensure no encroachment on legal and draft protected areas or reserves. Appropriate strategies are prescribed for development activities in close proximity to protected areas (e.g. no harvest buffers, timing of harvest, road deactivation etc.) Current practice is to adhere to all legislative requirements, including the respecting of protected areas, including legally established OGMAs. Using GIS and spatial databases, operational plans are planned and reviewed to ensure no forestry activities are planned within protected areas or OGMA's. FMS checklists and active supervision of road construction and harvesting are currently used to ensure operational plans are implemented correctly in the field. It should be noted that in the Ministerial Order: Spatial Land Use Objectives for part of the Mackenzie Forest District Area, that some harvesting is accepted within OGMAs. This is to allow for OGMA boundaries to be refined on the ground when planning blocks adjacent to spatially developed OGMAs. This is for the purpose of not isolating timber and putting block boundaries in logical places. The order stipulates FLNRO must be notified if this is to happen. Canfor will not target harvesting within OGMAs and will report when any harvesting does occur in an OGMA. In OGMAs less than 50 hectares, disturbance cannot exceed 10%, and in OGMAs greater than 50 hectares, disturbance cannot exceed 5% or 40 hectares, whichever is less.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	By following the "Strategies" and "Means of Achieving Objectives and Targets" sections of this indicator detail sheet, it is anticipated that short- and long-term supply of desirable habitat for all Species of Management Concern (see Appendix 3) will be maintained.
Target	100%
Basis for the Target	A target of 100% harvesting or road construction to be in compliance with strategies for protected areas, parks, ecological reserves, and old growth management areas has been established, as there should be no tolerance for errors of this nature. Operational plans have to be prepared with the knowledge of the locations of protected areas and OGMA's, and their implementation must be supervised to ensure their objectives are met. Licensees will monitor the location of protected areas and OGMA's over time.
Monitoring & Measurement Periodic	Monitoring will occur with ongoing supervision of forestry operations, as a component of FMS inspections, and analysis of spatial coverages.
Annual	Canfor will ensure the protected areas and OGMA's coverage will be updated on an annual basis. All harvesting within OGMAs will be reported in the annual report, along with explanations of why it occurred.
Variance	0%

1.1.3d Patch Size

SFMP Indicator Statement	1.1.3d Percentage of blocks harvested that meet the prescribed patch size target ranges or are trending towards the target range.

CSA Core Indicator(s)	1.1.3 Forest area by seral stage or age class.
SFM Criterion	1. Biological Diversity
Element(s)	1.1 Ecosystem Diversity
Value(s) and Objective(s)	*Value 1.1:* Well balanced and functioning ecosystems that support natural processes *Objective 1.1:* Maintain landscapes that support the natural diversity, variety and pattern of ecosystems
Strategies Description	A patch is defined in this SFMP as combined areas of harvesting within the previous 20 years that are generally within 400 metres of each other including unharvested areas in-between – patch buffer distance is variable based on the size of each opening. Patches often consist of even aged forests because most are the result of either a natural disturbance such as fire, wind or pest outbreaks, or from harvesting timber in a block. Patches may be created through single disturbance events or through a series of events (i.e. a combination of natural disturbance and harvesting). Mature forests and younger forest patches represent a land base created from a history of disturbances, natural and otherwise. As such, forest stands and patches are often composed of a variety of species, stocking levels and ages. Currently, forest management practices have reduced the occurrence of many natural disturbance events, such as wildfire. In the absence of natural disturbance, timber harvesting is employed as a disturbance mechanism and thus influences the distribution and size ranges of forest patches in the same fashion as historical natural disturbance events. Harvesting activities serve to mimic natural disturbance events characteristic within the Mackenzie DFA. Past social constraints associated with harvesting and resulting patch size have lead to fragmentation of the landscape beyond the natural ranges of variability, which has developed over centuries from larger scale natural disturbance. In order to remain within the natural range of variability of the landscape and move toward sustainable management of the forest resource, it is important to develop and maintain patch size targets based on historical natural patterns. This indicator will monitor the consistency of harvesting patterns compared to the landscape unit group and the natural patterns of the landscape.
Means of Achieving Objective & Target	Signatories to the MK LOWG agreement are responsible for achieving and /or trending toward young forest patch size targets as defined by the results and strategies in FSP's and or indicators defined in licensee's forest certification systems (CSA/SFI). Strategies to trend towards the targets include monitoring the ages of patches so that future harvest design can trend towards the targets. This strategy must take into account other forest values such as forest health, biodiversity, wildlife, etc. Operational constraints such as access and isolating timber must also be considered in this strategy.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Early seral patch sizes were predicted using a spatially explicit timber supply model. The model was used to report on the patch size distributions achieved using a harvest schedule from the SFM Scenario.
Target	100%
Basis for the Target	The targets come directly from the Mackenzie LRMP. Certain factors will limit how effective Canfor will be at trending toward patch size targets. These include historical harvesting patterns that have fragmented portions of the DFA and natural disturbance events such as

the mountain pine beetle epidemic and associated salvage harvesting, as well as occurrences of wildfire. The table below categorizes the patch size distribution that will be applied according to the type of resource management zone and NDT.

Table 10. Patch size categories for resource management zones.

Enhanced RMZ (Section 7.1.1 LRMP)			
	<40 ha	**40-80 ha**	**80-250 ha**
NDT 1 targets	30-40%	30-40%	20-40%
NDT 2 targets	30-40%	30-40%	20-40%
	<40 ha	**40-250 ha**	**250-5000 ha**
NDT 3 targets	10-20%	10-20%	60-80%
General RMZ (Section 7.1.2 LRMP) and Special RMZ (Section 7.1.3 LRMP)			
	<40 ha	**40-80 ha**	**80-250 ha**
NDT 1 targets	30-40%	30-40%	20-40%
NDT 2 targets	30-40%	30-40%	20-40%
	<40 ha	**40-250 ha**	**250-1000 ha**
NDT 3 targets	10-20%	10-20%	60-80%
Caribou Management Strategy Areas (Section 6.8.1 LRMP)			
	<40 ha	**40-250 ha**	**250-5000 ha**
NDT 2 targets	30-40%	30-40%	20-40%
NDT 3 targets	10-20%	10-20%	60-80%

The -30% variance is in place for this indicator to allow for timber harvesting outside the prescribed target ranges or trending away from the targets due to priority Forest Health factors; for instance, the Mountain Pine Beetle or Spruce Bark Beetle. The variance is only permissible for the harvest of damaged timber resulting from forest health outbreaks.

Monitoring & Measurement

Periodic

Vegetation Resource Information (VRI) is updated every 5 years in preparation for timber supply analysis. VRI information with updates from Licensees based on harvesting activities will be analyzed periodically to ensure forest management is trending towards patch size targets.

In the fall of 2011, Canfor approached non-signatory licensees that have current forest operations within the DFA with the intention of establishing a *Licensee Landscape Unit Working Group* for the Mackenzie Timber Supply Area. This concept was well received by the non-signatory licensees. The primary purpose of this group is to annually share depletion information (blocks and roads), coordinate on the completion of landscape analysis, and to use the resultant data sets for SFM and legal reporting.

The result was the establishment of the Mackenzie Landscape Objectives Working Group (MK LOWG). The main objective of this group is to facilitate the collaboration of Signatories in meeting landscape objective targets for old forest, old interior forest, and young forest patch size distribution in the Mackenzie TSA.

Annual	
Variance	-30%

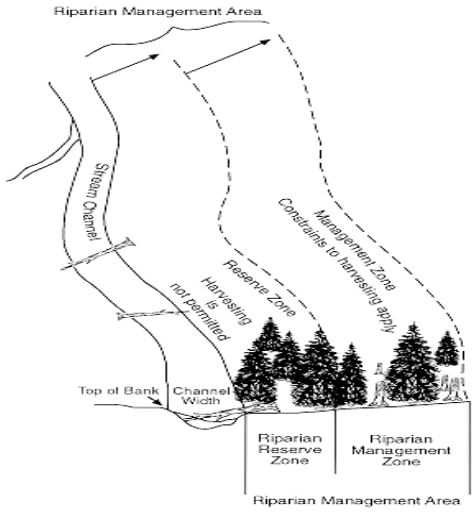
1.1.4a Wildlife Trees

SFMP Indicator Statement	1.1.4a Percentage of blocks that meet or exceed wildlife tree patch requirements.
CSA Core Indicator(s)	1.1.4 Degree of within-stand structural retention 2.1.3 Additions and deletions to the forest area
SFM Criterion	1: Biological Diversity 2: Ecosystem condition and productivity
Element(s)	1.1: Ecosystem Diversity 1.3 Genetic Diversity 2.1: Forest ecosystem condition and productivity
Value(s) and Objective(s)	*Value 1.1:* Well balanced and functioning ecosystems that support natural processes. *Objective 1.1:* Maintain landscapes that support the natural diversity, variety and pattern of ecosystems *Value 1.3:* Genetic diversity throughout the DFA *Objective 1.3:* Conserve genetic diversity by maintaining the variation of genes within species and ensuring that reforestation programs are free of genetically modified organisms. *Value 2.1:* Productive ecosystems *Objective 2.1:* Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.
Strategies Description	Stand level retention consists primarily of individual wildlife trees, and wildlife tree patches (WTPs) which may include riparian management areas. WTPs are forested patches of timber within or immediately adjacent to a harvested block. Stand retention provides a source of habitat for wildlife, to sustain local genetic diversity, or to protect important landscape or habitat features. Maintenance of habitat through stand level retention contributes to species diversity by conserving a variety of seral stages, structure and unique features at the stand level that many species rely on. These features may include coarse woody debris (CWD) for cover, shrubs for browse, and live or dead standing timber for cavity sites. Stand level retention areas may also help to conserve critical habitat components that support residual populations, aid the re-introduction of populations expatriated by disturbance, and contribute to overall ecosystem function (Bunnell et al. 1999). Stand level retention that represents natural forest stands within the prescribed area will contribute to the maintenance of the natural range of variability in ecosystem function, composition, genetics and structure. Properly planned stand level reserves can enable forestry-related disturbed sites to recover more quickly and mitigate the effects of the disturbance on local wildlife. Stand level retention in harvested stands also contributes to a landscape level pattern that attempts to recreate aspects of wildfire disturbance. As a result of a fire event, large areas may be burned and undamaged or lightly burned patches may exist in areas within the burn boundary. Residual unburned patches vary substantially in size, shape and composition. Thus it is essential to design stand level retention to maintain the variability of these characteristics.
Means of Achieving	The licensee will achieve targets through the allocation of retention patches during forest development planning. Where applicable, plans will also contain riparian area commitments.

Objective & Target	Company plans and practices support riparian management. Plans are properly executed providing desired results. Post harvest evaluations assess plan conformance.
Current Status, Predicted Results or Outcome	Stand level retention, including wildlife tree patches, is managed by Canfor in the DFA at a landscape-level by meeting site-specific targets. During the development of a cut block, retention areas are delineated based on a variety of factors. Stand level retention generally occurs along riparian features and will include non-harvestable and sensitive sites if they are present in the planning area. Stand level retention also aims to capture a representative portion of the existing stand type to contribute to ecological cycles on the land base. Retention level in each block is documented in the associated Site Plan, recorded in the signatories' respective database systems and reported out in RESULTS on an annual basis. Canfor currently assigns retention on a block-by-block basis, which may include external WTPs in order to meet landscape-level targets. These are spatially defined on the landscape although may not be delineated in the field. Canfor has also undergone a retention "top-up" wherein WTPs are spatially defined but not associated with any particular block. These "landscape level" WTPs were assigned to compensate for blocks harvested "pre-Code" that did not contain retention. Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Meeting stand-level retention requirements is a legal obligation; modeling does not apply to this indicator. Forecasting for this indicator is that, once developed, 100% of harvested blocks will meet or exceed wildlife tree patch requirements.
Target	100%
Basis for the Target	The target is a legal requirement. Overall targets are specified in the *Forest and Range Practices Act Regulation, Sec. 66* (BC Reg 14/2004) unless site specific targets are detailed in the operational plan (FSP). The target value of 100% has been established to reflect this and to ensure that wildlife tree patch retention targets continue to remain consistent with government objectives.
Monitoring & Measurement Periodic	Information for stand level retention is found in Site Plans. The results will be reported to as part of the SFMP annual report. Stand retention data will be updated as future blocks are harvested, and then reviewed to ensure targets are being achieved.
Annual	
Variance	0%

1.1.4b Riparian Area Management Effectiveness

SFMP Indicator Statement	1.1.4b The number of non-conformance where forest operations are not consistent with riparian management requirements as identified in operational plans.
CSA Core Indicator(s)	1.1.4 Degree of within-stand structural retention 3.2.1 Proportion of watershed or water management areas with recent stand-replacing disturbance. 3.2.2 Proportion of forest management activities consistent with prescriptions to protect identified water features.

SFM Criterion	1: Biological Diversity 3: Soil and Water
Element(s)	1.1: Ecosystem Diversity 3.2: Water quality and quantity
Value(s) and Objective(s)	*Value 1.1:* Well balanced and functioning ecosystems that support natural processes *Objective 1.1:* Maintain landscapes that support the natural diversity, variety and pattern of ecosystems *Value 3.2:* Healthy aquatic ecosystems *Objective 3.2*: Conserve water resources by maintaining water quality and quantity.
Strategies Description	Riparian areas are adjacent to lakes, streams, and wetlands. They encompass the area covered by continuous high moisture content and the adjacent upland vegetation. In BC, Riparian Management Areas (RMAs) consist of a Riparian Management Zone (RMZ) and, where required, a Riparian Reserve Zone (RRZ). The widths of RMAs vary with attributes of streams, wetlands, lakes, and adjacent terrestrial ecosystems and were legislated in FRPA Forest Planning and Practices Regulation (FPPR), Sections 47-49. The RRZ, if required, is immediately adjacent to the stream and is a no-harvest zone. RRZs are identified in blocks and road construction areas and continue to exist after harvest until a mature stand has been re-established. We use this indicator to ensure that post-harvest RMAs are consistent with pre-harvest prescriptions. Identifying and managing RMAs provides for the maintenance of species diversity by conserving riparian and aquatic environments, key to the survival of those species dependent on riparian conditions. In addition to providing habitat, RMAs also function to conserve water quantity and quality features by reducing risk of damage induced by forest harvesting.  Figure 9. Riparian management area showing the application of a management zone and a reserve zone along the stream channel. (http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/riparian/rmafig01.htm).
Means of Achieving	Riparian features found in the field are assessed during the block lay-out stage to determine its riparian class and associated RRZ/RMZ. Appropriate buffers are then applied, considering other factors such as operability and windfirmness. Prescribed measures, if any, to protect the integrity of the RMA are then written into the Site Plan.

Objective & Target	
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Carrying out activities specified in an Operational Plan and/or Site Plan is a legal obligation; modeling does not apply to this indicator. Forecasting for this indicator is such that once a block is developed 100% of riparian management area requirements are adhered to.
Target	0%
Basis for the Target	The target is a legal requirement. The target value of 0% non-conformance has been established to reflect this and to ensure that all riparian management practices, specifically RRZ designation and management, continue to remain consistent with the pre-harvest operational plans.
Monitoring & Measurement Periodic	RRZ and RMZ management will continue to be documented at the Site Plan stage. Final harvest inspections will continue to be performed where riparian management area (including riparian reserve) consistency with operational plan strategies will be confirmed. Areas of inconsistency will be noted during these inspections and entered into an incident tracking database.
Annual	
Variance	0%

1.1.4c Dispersed retention levels

SFMP Indicator Statement	1.1.4c Percent of blocks meeting dispersed retention levels as prescribed in the site plan/logging plans
CSA Core Indicator(s)	1.1.4: Degree of within-stand structural retention 1.2.1: Degree of habitat protection for selected focal species, including species at risk.
SFM Criterion	1. Biological diversity
Element(s)	1.2. Species diversity
Value(s) and Objective(s)	*Value 1.1:* Well balanced and functioning ecosystems that support natural processes. *Objective 1.1:* Maintain landscapes that support the natural diversity, variety and pattern of ecosystems *Value 1.2:* Diversity of species throughout the DFA *Objective 1.2:* Maintain species diversity through time, including habitats for known occurrences for species at risk.
Strategies Description	Operationally, harvest plans often include retention of dispersed trees such as snags, large live trees, deciduous trees, stub trees and understory trees. Dispersed retention provides stand level complexity and long term recruitment of coarse woody debris. Harvest value and ecological value can be optimized by selecting the variety of tree types (e.g., species, size, live

	and dead, etc.) that have high ecological value and low economic value, and through the number of trees retained.
Means of Achieving Objective & Target	Targets are established by the prescribing forester based on what is felt appropriate for the site. This indicator will report out on all within stand dispersed retention, meaning prescribed levels of scattered individual mature tree retention and/or stub tree retention.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Qualitative forecast: by implementing the above strategy, it is forecast that the percent of stand structure across the DFA will continue to meet the minimum targets across the DFA. Current status described in the Annual Report shows that more than the minumum stand structure is being retained across the DFA. This forecast trend is expected to continue with the identified strategy.
Target	100%
Basis for the Target	Percent of blocks meeting dispersed retention levels as prescribed in the site/logging plan. Target of 100 percent of blocks meeting prescribed levels (variance of 0 percent).
Monitoring & Measurement Periodic	Monitoring and reporting will be done on an annual basis for this indicator. It will be based upon results of post-harvest inspections as entered into RESOURCES.
Annual	
Variance	0%

1.2.1 Species within the DFA

SFMP Indicator Statement	1.2.1 Percent of forest management activities consistent with management strategies for Species of Management Concern.
CSA Core Indicator(s)	1.2.1 Degree of habitat protection for selected focal species, including species at risk 1.2.2 Degree of suitable habitat in the long term for selected focal species, including species at risk
SFM Criterion	1. Biological Diversity
Element(s)	1.2 Species Diversity
Value(s) and Objective(s)	*Value 1.2:* Diversity of species throughout the DFA *Objective 1.2:* Maintain species diversity through time, including habitats for known occurrences for species at risk.
Strategies Description	Species of Management Concern include, but are not limited to, species at risk, Ungulate Winter Ranges, and other local species of importance. Fundamental to the correct identification of species and habitats is the incorporation of appropriate management strategies where forest activities have the potential to impact species and habitats. Identification of those animals, invertebrates, bird species, vascular

	plants, and plant communities that have been declared to be at risk is crucial if they are to be conserved. Appropriate personnel are key staff and consultants that are directly involved in operational forest management activities. By implementing training to identify species within the DFA the potential for disturbing these species and their habitat decreases. Maintaining all populations of native flora and fauna in the DFA is vital for sustainable forest management, as all organisms are components of the larger forest ecosystem. There are various sources to draw upon when developing the comprehensive list of species that are legally protected or species of importance within the DFA. The list of species in Appendix F includes species from the following sources: 1. Species at Risk Act 2. Legally established Ungulate Winter Ranges 3. Local species of importance. Incorporation of local species of importance recognizes potential species that are not legally protected. Local species of importance can be proposed by First Nations, PAG members, the licensees, or by members of the public. Not all species of importance require management strategies. Each proposed species will be examined with the following criteria: • The extent this species exists with the DFA; • The potential impact of forestry operations on the species and its habitat; • The relative importance of this species to the DFA; • The extent of the occurrence of the species outside the DFA; • Available management strategies for the species; and, • Any other information available to assess the proposed species. The Mugaha Marsh annual and historic bird banding report will be reviewed as a reference source document for the monitoring of bird species declines local to Mackenzie. Final determination of whether a specific species is added to the list of local species of importance will be made following careful review and consideration of the criteria above, and then voted on by the PAG.
Means of Achieving Objective & Target	Government's policy and legally established framework for the protection of biodiversity values and species at risk under provincial and federal legislation includes the establishment of parks and protected areas, as well as the protection of biodiversity, riparian and aquatic habitats, old-growth forests, ungulate winter range, specific wildlife features and the habitat for listed species at risk. For some of these species, specific habitat conservation targets have been established that identify the amount, distribution and attributes of desireable habitat. For the remaining species, desirable habitat conditions have been identified for each species. Canfor manages spatial information that identifies the broad habitat types and locations for each of the Species of Management Concern. Where applicable, this information is brought forward into operational plans to manage for the desired habitat conditions. Plans are properly executed providing desired results. Post harvest evaluations and other applicable post activity forms (i.e. road construction or site preparation) assess plan conformance.
Current Status, Predicted Results or Outcome	Development and implementation of management strategies for Species at Risk requires knowledge of how many forest dependent species inhabit a managed area. While the concept of biodiversity includes all organisms of a particular region, assessing forest dependent species at all trophic levels is neither feasible nor operationally practical.

	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	All forest operations are expected to be consistent with management strategies for species as identified in operational plans, tactical plans and/or site plans. The long-term success of the objectives is difficult to predict, as weather events, climate and unique site characteristics will vary with time and space. Canfor will continue to ensure that 100% of all forest operations are consistent with management strategies for species identified in operational plans. The indicator will remain at the target of 100% if all processes and protocols are followed.
Target	100%
Basis for the Target	Most Species at Risk habitat requirements are sufficiently known to allow the development of special management areas, or prescribe activities that will not interfere with the well being of these species. The Management strategies will be based on information already in place (e.g., National Recovery Teams of Environment Canada, IWMS Management Strategy) and on recent scientific literature. Management strategies will be implemented in operational plans such as site plans to ensure the protection of species' habitats.
Monitoring & Measurement Periodic	Final harvest inspections will continue to be performed where consistency with management strategies as identified in operational plans, tactical plans and/or site plans will be confirmed. Areas of inconsistency will be noted during these inspections and will be entered into an incident tracking database. The list of species in Appendix B will be reviewed on an annual basis to ensure that it captures all legally protected species within the DFA.
Annual	
Variance	-5%

1.2.3 Proportion of genetically modified trees in reforestation efforts

SFMP Indicator Statement	1.2.3 Regeneration will be consistent with provincial regulations and standards for seed and vegetative material use
CSA Core Indicator (s)	1.2.3: Proportion of regeneration comprised of native species. There are no core indicators relating to 1.3 Genetic Diversity.
SFM Criterion	1. Biological diversity
Element(s)	1.2. Species diversity 1.3. Genetic diversity
Value(s) and Objective(s)	*Value 1.2:* Diversity of species throughout the DFA *Objective 1.2:* Maintain species diversity through time, including habitats for known occurrences for species at risk. *Value 1.3:* Well balanced and functioning ecosystems that support natural processes

	Objective 1.3: Maintain landscapes that support the natural diversity, variety and pattern of ecosystems
Strategies Description	One of the primary management objectives for sustainability is to conserve the diversity and abundance of native species and their habitats. Silviculture practices that promote regeneration of native species, either through planting or other natural programs assists in meeting these objectives. The well-being and productivity of future forests is dependent upon the structure and dynamics of their genetic foundation. Seed used in Crown land reforestation that is consistent with provincial regulations and standards ensure regenerated stands are genetically diverse, adapted, healthy and productive, now and in the future. Suitable seed and vegetative lots must also be of a high quality and available in sufficient quantities to meet the specific stocking and forest health needs of a given planting site. Tree seed used for growing seedlings to meet reforestation requirements on public lands in BC and Alberta must be registered by the province. The provinces have strict procedures pertaining to the collection, transport, testing, storage and use of registered seed. Tree seed having uniformity of species, source, quality and year of collection are referred to as a seedlot. Administrative seed zones identify what seedlot is ecologically suited for a given area. By choosing a seedlot that was suitable to the site it was to be planted in, the resulting plantation would be adapted to its site, local climate, and endemic forest health problems. Genetic diversity of seedlings used for reforestation in BC is ensured through the MFLNRO's seedlot registration and use policies and standards. Cones and seed obtained from wild forest stands must be collected from a minimum of 10 trees. As well, the MFLNRO licenses tree seed orchards to ensure their orchard seed sources maintain a recognized standard for genetic diversity. These rules are in place to ensure that the seed collected and subsequent planted forests are appropriate for local conditions and they contain sufficient genetic diversity to withstand natural disturbance events (including climate change to some degree). Transfer guidelines minimize risks of mal-adaptation or growth loss associated with moving seed or vegetative material from its source to another location. Exceeding the transfer limits may decrease productivity or increase susceptibility to frost, insects or disease. Poor survival or outright mortality may occur when seed is transferred past its ecological tolerance; however, losses in productivity can be substantial even over relatively short distances, particularly where elevation is concerned" (MLNRO Tree Improvement Branch publication). Transfer guidelines will be followed when prescribing reforestation measures in operational plans.
Means of Achieving Objective & Target	The licensee's plans will contain site information and reforestation prescriptions that ensure regeneration will be consistent with provincial regulations and standards. Planted trees will be of acceptable species and originate from seedlots that are ecologically suited to the site. Planting reports will be used to confirm proper execution of plans.
Current Status, Predicted Results or Outcome	Canfor has been in 100% compliance with this indicator. Monitoring results in the past years showed that Canfor has met targets within the allowable 5% variance of the seed transfer guidelines and that the current 100% target of the SFMP is reflective of the current situation.

Forecast	By following the "Strategies" and "Means of Achieving Objectives and Targets" sections of this indicator detail sheet, it is aniticpated that healthy, productive and genetically diverse forests that are ecologically suited to the site will be maintained.
Target	100% conformance with the standards
Basis for the Target	Regeneration will be consistent with provincial regulation and standards for seed and vegetative material use. Target - 100% conformance with the standards (0 percent variance). The Chief Forester's Standards for seed use allows for up to 5 percent of the seedlings planted in a year to be outside the seed transfer guidelines. In addition, there is an avenue in the standards to apply and receive approval for an Alternative Seed Use Policy. This built-in variance and flexibility with the standard is why there is no acceptable variance in the target of the SFMP indicator.
Monitoring & Measurement Periodic	
Annual	All reforestation activities are tracked in RESOURCES. Non-conformances to the Chief Forester's Standards for seed use are tracked in the Participants incident tracking system. Seedlots are tracked and recorded when they are ordered and again when they are planted. For the reporting period, licensees will report the number of incidents where trees were planted with species and seedlots inappropriate to the Chief Forester's Standards for seed use.
Variance	0%

1.4.1 Sites of Special Significance

SFMP Indicator Statement	1.4.1 Percentage of forest management activities that adhere to strategies for sites of biological, geological, heritage, or cultural significance, as contained in operational plans.
CSA Core Indicator(s)	1.4.1 Protection of sites of special significance. 1.2.1 Degree of habitat protection for selected focal species, including species at risk. 1.2.2 Degree of suitable habitat in the long term for selected focal species, including species at risk.
SFM Criterion	1. Biological Diversity
Element(s)	1.2 Species Diversity 1.4 Protected Areas and sites of biological, geological, heritage, or cultural significance
Value(s) and Objective(s)	*Value 1.2:* Diversity of species throughout the DFA *Objective 1.2:* Maintain species diversity through time, including habitats for known occurrences for species at risk. *Value 1.4:* Unique and important sites within the DFA.

	Objective 1.4: Respect protected areas, and identify sites of special, biological, geological, heritage or cultural significance within the DFA, and implement appropriate management strategies to their long-term maintenance.
Strategies Description	Protected areas are important for biodiversity conservation. They can help to protect and conserve species that occur within their boundaries and contribute to conservation across the broader landscape. Sites of biological, heritage or cultural significance include critical areas for wildlife habitat, sensitive sites including spiritual, heritage and cultural sites, and unusual or rare forest conditions or communities. Specific management strategies may be required to ensure that these sites are maintained within the DFA. This indicator will ensure that specific management (fine filter) strategies are developed to conserve and manage sites of special significance. Many types of sites of special significance are sufficiently known to allow the development of special management areas, or prescribe activities that will appropriately manage these areas. The management strategies will be based on information already in place (e.g., National Recovery Teams of Environment Canada, IWMS Management Strategy), legislation (provincial and national parks), Land and Resource Management Plans (LRMPs), and recent scientific literature. Management strategies will be implemented in operational plans such as site plans to ensure the protection of these sites. Training of appropriate personnel in the identification of these sites of special importance is critical to the management and protection of these sites. Appropriate personnel include key staff and consultants that are directly involved in operational forest management activities. Having appropriate personnel trained to identify sites of significance will reduce the risks of forestry activities damaging these sites. This indicator evaluates the success of implementing specific management strategies for sites of biological, geological, heritage, or cultural significance as prescribed in operational, tactical and/or site plans. Operational plans such as site plans describe the actions needed to achieve these strategies on a site specific basis. Once harvesting and other forest operations are complete, an evaluation is needed to determine how well these strategies were implemented. Developing strategies and including them in operational, tactical and/or site plans are of little use if the actions on the ground are not consistent with them. Tracking this consistency will ensure problems in implementation are identified and corrected in a timely manner. The protection of all forest components is an integral aspect of Sustainable Forest Management, which recognizes the value of all organisms to the health of the forest ecosystem. Tracking the percent of personnel trained to identify sites of special significance will allow licensees to ensure their knowledge is used appropriately to protect these sites in the DFA. The loss of biodiversity is inconsistent with sustainable forest management. In addition to a potential loss of biodiversity, there are other potential impacts to SFM. Society may suffer unquantifiable spiritual losses if it felt it was witnessing the destruction of sites of special significance. Canfor realizes the potential losses to the ecological, economic, and societal values from a failure to manage sites of specialsignificance properly could be unacceptable.

Means of Achieving Objective & Target	Government's policy and legally established framework for the protection of biodiversity values and species at risk under provincial and federal legislation includes the establishment of parks and protected areas, as well as the protection of biodiversity, riparian and aquatic habitats, old-growth forests, ungulate winter range, specific wildlife features and the habitat for listed species at risk. For some of these species, specific habitat conservation targets have been established that identify the amount, distribution and attributes of desireable habitat. For the remaining species, desirable habitat conditions have been identified for each species. Licensees manage spatial information that identifies the broad habitat types and locations for each of the Species of Management Concern. Where applicable, this information is brought forward into operational plans to manage for the desired habitat conditions. Plans are properly executed providing desired results. Post harvest evaluations and other applicable post activity forms (i.e. road construction or site preparation) assess plan conformance.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Carrying out activities specified in an Operational Plan and/or Site Plan is a legal obligation, modeling does not apply to this indicator. Forecasting for this indicator is that 100% of management strategies for sites of special significance are adhered to.
Target	100%
Basis for the Target	A target of 100% of blocks that have sites of biological, geological, heritage, or cultural significance management strategies in their operational, tactical and/or site plans should have forest operations consistent with those strategies. A variance of -10% has been set to allow for human error. As these strategies will be new there will be a period of implementation when errors may occur. Also, there may be old Site Plans that were completed prior to the strategies. Existing inspection checklists, FMS procedures, and internal audits will continue to ensure Site Plans and other operational plans are implemented to achieve prescribed management strategies. If these methods are proving ineffective in achieving desired results Canfor will implement new procedures to meet objectives.
Monitoring & Measurement Periodic	Monitoring will occur with ongoing supervision of forestry operations and as a component of FMS inspections.
Annual	
Variance	-10%

1.4.2a Heritage Conservation

SFMP Indicator Statement	1.4.2a Percentage of forest operations consistent with the Heritage Conservation Act.
CSA Core Indicator(s)	1.4.2: Proportion of identified sites with implemented management strategies; 1.4.1: Protection of sites of special significance;

	7.2.3: Level of management and/or protection of areas where culturally important practices and activities occur. 7.2.2: Evidence of understanding and use of Aboriginal knowledge through the engagement of willing Aboriginal communities, using a process that identifies and manages culturally important resources and values.
SFM Criterion	1. Biological Diversity 5. Economic and Social Benefits 7. Aboriginal Relations
Elements	1.4 Protected areas and sites of biological and cultural significance 5.1 Timber and non-timber benefits 7.2 Respect for aboriginal forest values, knowledge, and uses.
Value(s) and Objective(s)	*Value 1.4:* Unique and important sites within the DFA. *Objective 1.4:* Respect protected areas, and identify sites of special, biological, or cultural significance within the DFA, and implement appropriate management strategies to their long-term maintenance. *Value 5.1:* Timber and non-timber values within the DFA. *Objective 5.1:* Manage the forest sustainably to produce a mix of timber and non-timber benefits. Support a diversity of timber and non-timber forest products and forest-based services. *Value 7.2:* Aboriginal peoples' values, knowledge, and traditional uses *Objective 7.2:* Respect traditional aboriginal values, knowledge, and uses as identified through the aboriginal input process.
Strategies Description	The protection of cultural heritage values assures they will be identified, assessed and their record available to future generations. A cultural heritage value is a unique or significant place or feature of social, cultural or spiritual importance. It may be an archaeological site, recreation site or trail, cultural heritage site or trail, historic site or a protected area. Cultural heritage values often incorporate First Nation's heritage and spiritual sites, but they can also involve features protected and valued by non-Aboriginal people. Maintenance of cultural heritage values is an important aspect to sustainable forest management because it contributes to respecting the social and cultural needs of people who traditionally and currently use the DFA for a variety of reasons. The indicator is designed to ensure that operational plans with identified strategies to conserve cultural heritage values have those strategies implemented on the ground. Tracking the level of implementation will allow the signatories to evaluate how successful this implementation is and improve procedures if required.
Means of Achieving Objective & Target	To identify potential areas with archaeological values, Canfor currently provides training to staff and uses input from First Nations and other forest resource users at the planning stage through information sharing and referral processes. Sites with evidence of archaeological resources then undergo an Archaeological Impact Assessment (AIA) by a qualified professional to develop a prescription for the area, which is then incorporated into the Site Plan and implemented. Archaeological sources are primarily related to First Nations within the Mackenzie DFA, as they were the first inhabitants of the area. However, an AIA is not biased toward Aboriginal features. Archaeological features that relate to non-Aboriginal people may include artifacts from historical trappers and prospectors, or evidence of old trails and remnants from inhabitants of old lakeside cabins. Features such as these are also identified in AIA surveys

	and management strategies are developed where appropriate to conserve cultural heritage for both Aboriginal and non-Aboriginal interests. Conservation strategies are implemented at the site level during harvesting operations so that all identified cultural heritage values will be conserved for future generations. If a non-conformance with the operational plan occurs in the field, this information will be recorded on an activity inspection form and then entered into an incident tracking database or other similar system. Once a strategy to conserve cultural heritage values is included within an operational plan, there is a legal obligation for the licensee to implement and adhere to the strategy. Harvest and subsequent silviculture inspections ensure that these strategies are implemented as stated in the operational plan.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	This is a legal obligation, forecasting does not apply to this indicator, although It is anticipated that 100% of forest operations will be consistent with cultural heritage requirements. The exact level of success is not easily predicted as it is operational in nature and is dependent on the nature of the site, and human oversight.
Target	100%
Basis for the Target	The target for this indicator was established at 100% because the identification and conservation of cultural heritage values is paramount to First Nations and many others in the DFA. Canfor will continue to take indicators to ensure forest operations are consistent with cultural heritage requirements as identified in operational plans.
Monitoring & Measurement Periodic	The information that is required to monitor this indicator includes a summary of the number of forest management operations conducted under operational plans that are consistent with the strategies identified to conserve cultural heritage values. This information is collected during FMS checklist reviews and harvesting inspections and is stored in Canfor's databases such as RESOURCES.
Annual	
Variance	0%

1.4.2b Protection of identified sacred and culturally important sites

SFMP Indicator Statement	1.4.2b Percent of identified Aboriginal forest values, knowledge and uses accommodated in forestry planning processes.
CSA Core Indicator(s)	1.4.2. Proportion of identified sites with implemented management strategies. 7.1.2: Evidence of ongoing open and respectful communications with Aboriginal communities to foster meaningful engagement, and consideration of the information gained about their Aboriginal title and rights through this process. Where there is communicated disagreement regarding the organization's forest management activities, this evidence would include documentation of efforts towards conflict resolution.

	7.2.2: Evidence of understanding and use of Aboriginal knowledge through the engagement of willing Aboriginal communities, using a process that identifies and manages culturally important resources and values
SFM Criterion	1. Biological diversity 7. Aboriginal relations
Element(s)	1.4. Protected areas and sites of biological and cultural significance 7.1. Aboriginal and treaty rights 7.2. Respect for aboriginal forest values, knowledge, and uses
Value(s) and Objective(s)	*Value 1.4:* Unique and important sites within the DFA. *Objective 1.4:* Respect protected areas, and identify sites of special, biological, or cultural significance within the DFA, and implement appropriate management strategies to their long-term maintenance. *Value 7.1:* Aboriginal title and rights *Objective 7.1:* Recognize, respect, understand Aboriginal title and rights, and treaty rights, including compliance with legal requirements. *Value 7.2:* Aboriginal peoples values, knowledge, and traditional uses *Objective 7.2:* Respect traditional aboriginal values, knowledge, and uses as identified through the aboriginal input process.
Strategies Description	Efforts have been made to understand which First Nation traditional territories fall within the Plan area and Canfor's Defined Forest Areas. Information sharing agreements are made with willing First Nation communities to promote the use and protection of sensitive information. Meaningful relationships and open communication with local Aboriginal communities help ensure that areas of cultural importance are managed in a way that retains their traditions and values. Forest management plans are shared with Aboriginal communities. Open communication with First Nations that includes a sharing of information enables the participants to understand and incorporate traditional knowledge into forest management options is the means to achieve the objective of the indicator. The objective will be achieved as the participants become aware of culturally important, sacred and spiritual sites leading to appropriate management of and protection. This will be achieved by specifying measures in operational plans. The proper execution of plans will provide desired results of First Nations culturally important values and resources. Post-harvest evaluations and other inspections will assess plan conformance.
Means of Achieving Objective & Target	Canfor currently uses input from First Nations at the planning stage and staff training in to identify potential areas with archaeological values. Sites with evidence of archaeological resources then undergo an Archaeological Impact Assessment (AIA) by a qualified professional to develop a prescription for the area, which is then incorporated into the Site Plan and implemented. Consultation records are completed for each block and road and there is a record of the Aboriginal(s) involved, the comments received, the level of consultation carried out, and any adjustment to strategies or accommodation made as a result of this consultation. Archaeological sources are primarily related to First Nations within the Mackenzie DFA, as they were the first inhabitants of the area. However, an AIA is not biased toward Aboriginal features. Archaeological features that relate to non-Aboriginal people may include artifacts from historical trappers and prospectors, or evidence of old trails and remnants from inhabitants of old lakeside cabins. Features such as these are also identified in AIA surveys

	and management strategies are developed where appropriate to conserve cultural heritage for both Aboriginal and non-Aboriginal interests. Conservation strategies are implemented at the site level during harvesting operations so that all identified cultural heritage values will be conserved for future generations. If a non-conformance with the operational plan occurs in the field, this information will be recorded on an activity inspection form and then entered into an incident tracking database or other similar system. Once a strategy to conserve cultural heritage values is included within an operational plan, there is a legal obligation for the licensee to implement and adhere to the strategy. Harvest and subsequent silviculture inspections ensure that these strategies are implemented as stated in the operational plan.
Current Status, Predicted Results or Outcome	Canfor has dealt with the recognition and management of culturally important Aboriginal forest values and resources as identified through the information sharing/consultation process, via completion of: Archaeological Impact Assessments, Traditional use studies and various other methods. Consideration usually takes the form of enhanced protection of identified resources or values or full protection where the value at stake is of great importance.
Forecast	Building open and meaningful relationships with local Aboriginals will lead to trust in sharing sensitive information and will allow forest plans to incorporate culturally sensitive sites. These plans will contain information on how these sites will be managed or protected, while respecting the sensitive and often-times confidential nature of the shared information.
Target	100%
Basis for the Target	100% of identified Aboriginal forest values, knowledge and uses accommodated in forestry planning processes (variance of 0%). Targets for this indicator were established through PAG consensus.
Monitoring & Measurement Periodic	
Annual	This indicator will be reported out annually and will be based upon all plans (FSP, SFMP, PMP) released in the reporting year. Reporting will be based upon all plans which received input from Aboriginal communities regarding forest values and resources and whether there were any actions taken or responses to that input. Indicator will be considered to have been met for a plan where the input on an Aboriginal forest value, knowledge or use has been addressed by Canfor. This consideration may take the form of a response letter, partial or complete protection or any other modification of the plan from its original form made to accommodate the input given. Canfor will record all site specific information provided by First Nations through the information sharing and consultation process regarding cultural resources and values. Canfor will document any mitigating actions taken (revision of forest operational plans) to accommodate the cultural resources or values identified by First Nation as being important. Canfor will store the information specific to their operations in the COPI database to record all incoming and outgoing communications.
Variance	0%

2.1.1a Regeneration Delay

SFMP Indicator Statement	2.1.1a Average regeneration delay for stands established annually.
CSA Core Indicator (s)	2.1.1 Reforestation Success 2.1.3 Additions and deletions to the forest area 4.1.1 Net Carbon intake
SFM Criterion	2.Ecosystem condition and productivity 4. Role in global ecological cycles
Element(s)	2.1 Forest ecosystem condition and productivity 4.1 Carbon uptake and storage
Value(s) and Objective(s)	*Value 2.1:* Resilient ecosystems *Objective 2.1:* Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition. *Value 4.1:* Carbon cycling *Objective 4.1:* Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem.
Strategies Description	Regeneration delay is defined in this SFM plan as the time allowed in a prescription between the start of harvesting in the area and the earliest date by which the prescription requires a minimum number of acceptable, well-spaced trees per hectare to be growing in that area. There is a maximum permissible time allowed and comes from standards developed and/or approved by government. The regeneration delay period is usually within four years where planting is prescribed and seven years where the stand is expected to reforest naturally. Operationally, it is desirable to reforest as soon as possible post-harvest and the majority of blocks artificially regenerated (e.g. planted) meet regeneration delay within 2 years. Ensuring that all harvested stands meet the prescribed regeneration delay date within the specified time frame is an indication that the harvested area has maintained the ability to recover from a disturbance, thereby maintaining its resiliency and productive capacity. It also helps to ensure that a productive stand of trees is beginning to grow for use in future rotations.
Means of Achieving Objective & Target	The Licensee is legally required to declare the Net Area to be Reforested (NAR) of a cut block regenerated by a date specified in the Site Plan. The NAR is the area of a cut block that must be reforested, and does not include permanent access structures, wildlife tree patches, and natural non-productive area (i.e. rock, wetlands). Participating licensees will also specify in Site Plans tree species that are ecologically suited to the site. Silviculture treatment regimes and forward plans schedule activities consistent with established key dates contained within plans.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	This is a legal obligation; modeling does not apply to this indicator, Forecasting for this indicator is that 100% of blocks will be reforested prior to the regeneration delay date.
Target	Artificial = <4 years, Natural = <7 years

Basis for the Target	The target for this indicator is set at "less than" the timelines prescribed in the Forest Stewardship Plan. This is to ensure that all harvested areas within the DFA are reforested within or less than specified timelines. Achievement of regeneration delay is an integral part of all silviculture management activities so it is vital to beat or achieve the target.
Monitoring & Measurement Periodic	
Annual	Silviculture obligations such as regeneration delay dates for each harvested stand are recorded and maintained in Canfor's databases. Each block is surveyed a certain number of years after harvest to ensure reforestation has occurred and that the stand is fully stocked and performing successfully. The results of all surveys are also summarized and maintained in licensee databases. If a survey indicates that the stand has not regenerated successfully, corrective actions will be prescribed immediately in order to remedy the situation while still meeting regeneration delay deadlines. Despite all efforts, some areas will not meet regeneration delay targets and the Site Plan must be amended to extend the critical dates so that continued treatments can be applied to try and regenerate the area. Once regeneration delay has been achieved, the licensee must submit a report to the MFLNRO that will update the status of the block on the government database. These reports are tracked internally by licensees and this indicator can be easily tracked and monitored through government reports submitted annually.
Variance	0

2.1.1b Free Growing

SFMP Indicator Statement	2.1.1b The percent of block area that meets free growing requirements as identified in site plans.
CSA Core Indicator(s)	2.1.1 Reforestation success 2.1.3 Additions and deletions to the forest area
SFM Criterion	2. Ecosystem condition and productivity
Element(s)	2.1 Forest ecosystem condition and productivity
Value(s) and Objective(s)	*Value 2.1:* Resilient ecosystems *Objective 2.1:* Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.
Strategies Description	A free growing stand is defined in this SFM plan as a stand of healthy trees of a commercially valuable species, the growth of which is not impeded by competition from plants, shrubs or other trees (refer to glossary in Appendix L). The free growing status is somewhat dependent on the regeneration delay date of a forest stand and could be considered the next reporting phase. A free growing assessment is conducted on stands based on a time frame indicated in the Forest Development Plan. The late free growing dates are established based on the

	biogeoclimatic classification of the site and the tree species prescribed for planting after harvest. In order to fulfill mandates outlined in legislation, standards are set for establishing a crop of trees that will encourage maximum productivity of the forest resource (BC MOF 1995b). The free growing survey assesses the fulfillment of a Licensee's obligation to the Crown for reforestation and helps to ensure that the productive capacity of the forest land base to grow trees is maintained. Continued ecosystem productivity is ensured through the principle of free growing. This indicator represents the percentage of harvested blocks that meet free growing obligations across the DFA. This will help to sustain the productive capability of forest ecosystems.
Means of Achieving Objective & Target	Free growing dates and standards for each block are recorded and maintained in Canfor's database. Each cut block is surveyed prior to the free growing date to ensure the free growing standards have been met and that the stand of trees is at target heights, fully stocked, and healthy. The results of all surveys are summarized and maintained in the licensee's database. If a survey indicates that the block has not achieved free growing by the required date, corrective actions will be prescribed immediately in order to remedy the situation while still meeting the free growing deadlines. If all free growing standards are met, the Licensee will make an application to the Ministry of Forests, Land and Natural Resource Operations for the block to revert to the Crown's responsibility. It is the licensee's responsibility to monitor, track and report this indicator. Opportunities for continuous improvement could be found in the administration of silviculture activities. Currently, failure to meet free to grow objectives generally relates to database tracking, survey methodology and reporting delays. These issues will be reviewed and, if necessary, a resulting action plan will be developed and implemented to minimize future negative impacts to this indicator.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	This is a legal obligation; modeling does not apply to this indicator, Forecasting for this indicator is that 100% of blocks will be declared free growing prior to the late free growing date.
Target	100%
Basis for the Target	The target for this indicator is established at 100% in order to ensure that all harvested areas within the DFA achieve free to grow status within specified timelines. Once blocks reach the free to grow standard the area reverts to Crown land and all Licensee obligations are considered complete. A performance target of 100% is not only achievable, it is in the licensee's best interest as the finalization of silviculture obligations is an important cost benefit for the Licensee.
Monitoring & Measurement Periodic	Silviculture obligations such as free growing dates for each harvested stand are recorded and maintained in Canfor's databases. Each block is surveyed when the free growing dates approach to ensure the free growing standard has been met and that the stand is fully stocked and performing successfully. The results of all surveys are also summarized and maintained in Canfor databases. If a survey indicates that the stand has not achieved free growing by the required date, corrective actions will be prescribed immediately in order to remedy the situation while still meeting the late free growing deadlines. Despite all efforts, some areas will not meet the free growing standard by the late date and the Site Plan must

	be amended to extend the critical dates so that continued treatments can be applied to try and fulfill the free growing obligation.
Annual	Once free to grow status has been achieved, a report is submitted to the MFLNRO that updates the status of the block on the government database. All blocks with a submission will be cross-referenced with its late free growing date to determine if the late free growing date has been achieved. In accordance with accepted practice, a block is deemed free growing on the date of the survey confirming its free growing status.
Variance	0

2.1.3a Site Conversion

SFMP Indicator Statement	2.1.3a The percent of gross landbase in the DFA converted to non-forested land through forest management activities.
CSA Core Indicator(s)	2.1.3 Additions and deletions to the forest area 4.1.1 Net carbon intake 4.2.1 Additions and deletions to the forest area
Indicator Statement(s)	The percent of gross landbase in the DFA converted to non-forested land use through forest management activities.
SFM Criterion	2. Ecosystem condition and productivity 4. Role in global ecological cycles
Element(s)	2.1 Forest ecosystem condition and productivity 4.1 Carbon uptake and storage 4.2 Forest land conversion
Value(s) and Objective(s)	*Value 2.2:* Productive ecosystems *Objective 2.2:* Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species. *Value 4.1:* Carbon cycling *Objective 4.1:* Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem. *Value 4.2:* Minimize forest land conversion *Objective 4.2:* Protect forest land from deforestation or conversion to non-forests, where ecologically appropriate.
Strategies Description	In addition to maintaining the resources necessary for sustaining the resiliency of forest ecosystems, a stable land base whereby productive capability is assessed is also required. To assess the maintenance of the productive capability of the land base, this indicator specifically tracks the amount of productive land base lost to various uses. Removal of the productive land base occurs because of permanent access structures, including roads, landings and gravel pits, as well as converting forested areas to non-forest land use, such as range, seismic lines and other mineral exploration.

	Conversion of the forested to non-forest land also has implications for carbon sequestration. A permanent reduction in the forest means that the removal of carbon from the atmosphere and carbon storage will be reduced.
Means of Achieving Objective & Target	Reductions to the gross forest area due to permanent access structures resulting from forest management activities can be minimized by: • Careful total chance access planning to minimize the amount of permanent access structures; • Using proper road construction, maintenance, deactivation and rehabilitation procedures; • Minimizing the degraded width of roads necessary to safely extract timber from an area; • Specifying performance measures in operational plans which include proposed and maximum permanent access area and percent as well as degraded road widths; • Conducting pre-works with contractors to communicate road construction expectations and allowable levels of permanent access structures specified in operational plans; and • Conducting harvesting inspections to assess consistency with specifications outlined in pre-works and operational plans. Proposed reductions to the gross forest land base resulting from permanent access structures are calculated and included in operational plans (site plans and/or logging plans). Plans are executed providing desired results. Post harvest evaluations and other inspections assess plan conformance with the desired results.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	This indicator is not explicitly forecasted; however the assumption that a certain percentage of the THLB will continue to be converted to non-forest use (i.e. roads) is employed in modeling. From the forecast and scenario design process, an estimated 41,503 ha of additional roads, trails and landings are assumed to be removed from the THLB in the future. This amounts to 5.5% of the estimated future THLB, exceeding target amounts and amounts anticipated through the TSR2 process. This assumption will be monitored against the performance of the Licensee's.
Target	<5%
Basis for the Target	The target is established based on the current assumptions in TSR2 for the TSA. The SFMP accounts for a 5% reduction in the THLB allowing for future road construction.
Monitoring & Measurement Periodic	The data that is required for monitoring is the number of hectares of productive forest area lost due to conversion to a non-forest use. This data collection and analysis is essentially a GIS exercise that can be completed at 5 year intervals concurrently with the Timber Supply Review process. Forecast of future reductions will be run at that time to determine if the signatories are trending towards target levels. Records to satisfy this indicator will be stored within Canfor's office, as per their document control procedures.
Annual	
Variance	0%

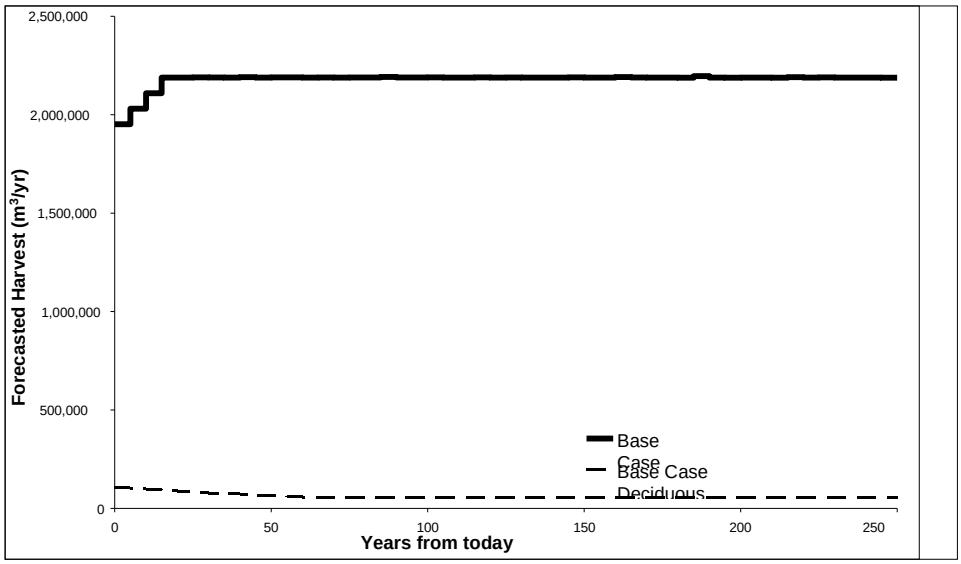
2.1.3b Permanent Access Structures

SFMP Indicator Statement	2.1.3b The percentage of gross block area occupied by total permanent access structures.
CSA Core Indicator(s)	2.1.3 Additions and deletions to the forest area 3.1.1 Level of soil disturbance 4.1.1 Net Carbon intake 4.2.1 Additions and deletions to the forest area
SFM Criterion	2. Ecosystem condition and productivity 3. Soil and Water 4. Role in global ecological cycles
Element(s)	2.1 Forest ecosystem condition and productivity 3.1 Soil quality and quantity 4.1 Carbon uptake and storage 4.2 Forest land conversion
Value(s) and Objective(s)	*Value 2.1:* Productive ecosystems *Objective 2.1:* Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species. *Value 3.1:* Healthy and abundant soil resource *Objective 3.1:* Conserve soil resources by maintaining soil quality and quantity. *Value 4.1:* Carbon cycling *Objective 4.1:* Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem. *Value 4.2:* Minimize forest land conversion *Objective 4.2:* Protect forest land from deforestation or conversion to non-forests, where ecologically appropriate.
Strategies Description	This indicator measures the amount of area developed as permanent access structures (PAS) within blocks, in relation to the area harvested during the same period. Limits are described in legislation in the Forest Planning and Practices Regulation, section 36. Permanent access structures include roads, bridges, landings, gravel pits, or other similar structures that provide access for timber harvesting. Area that is converted to non-forest because of permanent access structures and other development is removed from the productive forest land base and no longer contributes to the forest ecosystem. Roads and stream crossings may also increase risk to water resources through erosion and sedimentation. As such, minimizing the amount of land converted to roads and other structures protects the forest ecosystem. Impacts to all three aspects of SFM (ecological, economic, and social) could be expected if considerably more than 5.0% of the annual block area within the THLB was in permanent access structures. Since permanent access structures remove productive forest area from the THLB, an increase in roads would decrease the future available timber supply and forestry economic returns. While there may be greater recreational access to the DFA, wildlife populations may decrease due to increased accessibility for hunting. Water quality and quantity may also decrease as more stream crossings are constructed, which may increase sedimentation. The cumulative effects of economic and environmental deterioration could

	impact social values, as society relies on a sustainable economy and environment. However, it is important to note that it is not possible to have a forest industry without permanent access structures. Canfor is committed to achieving the identified target that, for now, is the maximum percentage.
Means of Achieving Objective & Target	Reductions to the gross forest area due to permanent access structures resulting from forest management activities can be minimized by: • Careful total chance access planning to minimize the amount of permanent access structures; • Using proper road construction, maintenance, deactivation and rehabilitation procedures; • Minimizing the degraded width of roads necessary to safely extract timber from an area; • Specifying performance measures in operational plans which include proposed and maximum permanent access area and percent as well as degraded road widths; • Conducting pre-works to communicate road construction expectations and allowable levels of permanent access structures specified in operational plans; and • Conducting harvesting inspections to assess consistency with specifications outlined in pre-works and operational plans. Proposed reductions to the gross forest land base resulting from permanent access structures are calculated and included in operational plans (site plans and/or logging plans). Plans are executed providing desired results. Post harvest evaluations and other inspections assess plan conformance with the desired results.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	The < 5% target is anticipated to be achieved by Canfor. Future achievements are not easy to quantifiably forecast because this indicator is operational in nature. However, it is important to identify what the accepted target means to SFM. The amount of area that exists as permanent access contributes to ecological, economic and social values throughout the DFA.
Target	<5%
Basis for the Target	The current target of 5% has been determined from current base line data as indicated previously. Canfor expects that current PAS will be maintained and potentially decrease in the future and have used the current status as the target for this indicator.
Monitoring & Measurement Periodic	All road planning and construction information is maintained within Canfor's databases such as RESOURCES. Each year the databases are queried to report the overall area of in-block road that has been constructed that year and presented as a percent of the area harvested within the same period. The query will be used by forest planners to ensure that the total amount of planned road, compared to the area planned for harvest is maintained within the target.
Annual	
Variance	+1%

2.1.4a Harvest Volume

SFMP Indicator Statement	2.1.4a Percent of volume harvested compared to allocated harvest levels.
CSA Core Indicator(s)	2.1.4 Proportion of the calculated long-term sustainable harvest level that is actually harvested. 5.1.1: Documentation of the diversity of timber and non-timber resources, including products and services produced in the DFA 5.2.3: Level of direct and indirect employment. 5.2.1: Level of participation and support in initiatives that contribute to community sustainability.
SFM Criterion	2. Ecosystem condition and productivity 5. Economic and social benefits
Element(s)	2.1 Ecosystem condition and productivity 5.1 Timber and non-timber benefits 5.2 Communities and sustainability
Value(s) and Objective(s)	*Value 2.1:* Productive ecosystems *Objective 2.1:* Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species. *Value 5.1:* Multiple benefits *Objective 5.1:* Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits. *Value 5.2:* Sustainable communities *Objective 5.2:* Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.
Strategies Description	To be considered sustainable, harvesting a renewable resource such as timber cannot deteriorate the resource on an ecological, economic or social basis. It is expected that certain resource values and uses will be incompatible; however, a natural resource is considered sustainable when there is a balance between the various components of sustainability. During Allowable Annual Cut (AAC) determination, various considerations are examined including the long-term sustainable harvest of the timber resource, community stability, wildlife use, recreation use, and the productivity of the DFA. The AAC is generally determined every five years by the Chief Forester of British Columbia, using several forecasts to assess the many resource values that need to be managed. On behalf of the Crown, the Chief Forester makes an independent determination of the rate of harvest that is considered sustainable for a particular Timber Supply Area (TSA). The Mackenzie DFA is part of the larger Mackenzie TSA, comprising about 49% of the TSA area. The harvest level for a TSA must be met within thresholds that are established by the Crown. By following the AAC determination, the rate of harvest is consistent with what is considered by the province to be sustainable ecologically, economically and socially within the DFA.

Means of Achieving Objective & Target	The licensee contributes to the sustainable harvest level by managing to the determined harvest level for the management unit or in some cases by adhering to their apportioned harvest volume within the TSA. Cut control regulations dictate the short-term harvest flexibility. Essentially, licensees have flexibility on harvest levels from year to year but must balance every five years or less if desired by the licensee. As stated above, the Chief Forester makes a determination of the rate of harvest for a particular TSA. The licensee then by law must achieve the AAC within the specified thresholds. Each truckload of wood is assessed and accounted for at an approved MFLNRO scale site. The MFLNRO uses this information to apply a stumpage rate to the wood, and monitors the volume of wood harvested and compares it to the AAC thresholds.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	The actual volume harvested by Canfor will be directly related to the forecasted volume over time as per the Mackenzie SFM Indicator Forecasting project. The results of the harvest levels forecasted under current Base Case assumptions are shown belowFigure 10.  Figure 10. Forecasted harvest of timber in the Mackenzie Defined Forest Area of north-central British Columbia.
Target	100%
Basis for the Target	A common method for establishing targets is to benchmark the current harvest levels and extrapolate to the next 5 to 10 years. However, the existing mountain pine beetle epidemic in the DFA and the potential for increased harvest levels make benchmarking difficult and unpredictable. The Chief Forester apportions AAC within the DFA and Canfor is committed to fulfill 100% of their timber harvesting obligations.

Monitoring & Measurement Periodic	
Annual	The volume of timber actually harvested within the DFA will be determined annually by a review of MFLNRO timber scale billing summaries for the period of January 1st to December 31st each year, on an annual basis. Canfor will report out on the volume harvested over the previous 5 year period. With each annual report, the actual reported years within the 5 year period will change as the first year drops off and the current year is added on.
Variance	+/-10%

2.1.4b Prioritizing harvest of damaged stands

SFMP Indicator Statement	2.1.4b Percentage of area (ha) harvested that are damaged or considered a high risk to stand damaging agents.
CSA Core Indicator(s)	2.1.4 Proportion of the calculated long-term sustainable harvest level that is actually harvested. 2.1.3 Additions and deletions to the forest area 4.1.1 Net Carbon intake 5.1.1 Documentation of the diversity of timber and non-timber resources, including products and services produced in the DFA.
SFM Criterion	2. Ecosystem condition and productivity 4. Role in global ecological cycles 5. Economic and social benefits
Element(s)	2.1. Forest ecosystem condition and productivity 4.1 Carbon uptake and storage 5.1 Timber and non-timber benefits
Value(s) and Objective(s)	*Value 21*: Productive ecosystems *Objective 2.1:* Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species *Value 4.1:* Carbon cycling *Objective 4.1:* Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem. *Value 5.1:* Multiple benefits *Objective 5.1:* Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.
Strategies Description	Damaging agents are considered to be biotic and abiotic factors (fire, wind, insects etc.) that reduce the net value of commercial timber. To reduce losses to timber value it is necessary to ensure that if commercially viable timber is affected by damaging agents, that the timber is recovered before its value deteriorates. At the time of this SFMP's preparation, the most serious stand damaging agent in the Mackenzie DFA is the Mountain Pine Beetle, which has killed millions of mature, commercially viable lodgepole pine. As of January 2016, the largest outbreak of Spruce Bark Beetle since the 1980's is occurring in the Omineca Region, damaging large, mature spruce trees. Prioritizing infested stands for treatment can

	contribute to sustainable forest management in several ways. Removing infested trees can slow the spread of beetles to adjacent un-infested stands and allow Licensees to utilize trees before they deteriorate. Also, once harvesting is complete the area can be replanted, turning an area that would have released carbon through the decomposition of dead trees into the carbon sink of a young plantation. Treating areas with stand damaging agents will provide other societal benefits. Burned and diseased killed stands may be aesthetically unpleasing, and their harvesting and reforestation will create a more pleasing landscape. Windthrown stands restrict recreational use and can foster the growth of insect pests such as the spruce bark beetle. Thus, prioritizing areas with stand damaging agents for treatment will help to maintain a more stable forest economy and achieve social benefits through enhanced aesthetics and recreational opportunities.
Means of Achieving Objective & Target	Each year the volume of damaged timber is assessed within the DFA by MFLNRO. Of this volume, licensees prioritize planning and harvesting activities based on levels of attack, stage of attack, wood quality and milling capacity/needs. This indicator reports out on Canfor's success in ensuring areas with stand damaging agents have been assessed and have been prioritized for harvest if required and thereby minimizing value losses.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	By targeting damaged stands, forest managers can reduce the spread of forest health agents to adjacent stands, parks, private lands, etc., utilize timber before it deteriorates, and reforest areas with healthy young plantations. In addition to economic losses, there could be ecological costs to failing to treat stands with damaging agents. As these stands die and decay, they will release carbon dioxide into the atmosphere, thereby contributing to global climate change. Prioritizing these stands for harvesting will not only improve economic values but will allow a healthy, young, carbon-sequestering plantation to become established. Other costs may come from failing to harvest damaged stands. Allowing dead and diseased stands to persist on the landscape may result in more severe wildfires that destroy or damage property in the DFA. This will negatively affect land owners and communities. Thus, achieving the indicator's target may protect societal values in addition to providing ecological and economic benefits.
Target	100%
Basis for the Target	The target for this indicator has been established at 100% to ensure that all area harvested will be in stands affected by stand damaging agents. The current Mountain Pine Beetle epidemic is, and will remain for the short-term, the focus of Canfor's stand damaging agent prioritization. Canfor will refer to the most current Forest Health Strategy for the Mackenzie TSA
Monitoring & Measurement Periodic	Each year a Forest Health Strategy is prepared for the Mackenzie TSA for use by licensees, BCTS, and other forest users to prioritize and coordinate activities to address the forest health factors impacting the forests in the TSA.
Annual	
Variance	-20%

3.1.1a Sedimentation

SFMP Indicator Statement	3.1.1a The percentage of identified unnatural sediment occurrences where mitigating actions were taken.
CSA Core Indicator(s)	3.1.1 Level of soil disturbance 3.2.1 Proportion of watershed or water management areas with recent stand-replacing disturbance 3.2.2 Proportion of forest management activities consistent with prescription to protect identified water features.
SFM Criterion	3. Soil and Water
Element(s)	3.1 Soil quality and quantity 3.2 Water quality and quantity
Value(s) and Objective(s)	*Value 3.1:* Healthy and abundant soil resource *Objective 3.1:* Conserve soil resources by maintaining soil quality and quantity. *Value 3.2:* Healthy aquatic ecosystems *Objective 3.2:* Conserve water resources by maintaining water quality and quantity.
Strategies Description	Sedimentation can damage water bodies by degrading spawning beds, increasing turbidity, and reducing water depths. Forest management activities can create unnatural inputs of sedimentation into water bodies. This may occur at stream crossings, or from roads adjacent to water bodies. In addition to the effects of roads, sedimentation may also occur from slope failures that are a result of forestry activities. Once sedimentation occurrences are detected, mitigating actions are taken to stop further damage and to rehabilitate the site. Tracking these mitigation actions contributes to sustainable forest management by evaluating where, when and how sedimentation occurs and the success of correcting it.
Means of Achieving Objective & Target	Prior to harvest commencement, field data is collected to assess slopes, soil textures, soil moisture regimes, movement through soils and organic matter content for soils within a block. This information is then used for the identification and delineation of allowable levels of soil disturbance within the block net area to reforest for harvesting and silviculture activities. Soil disturbance objectives are written into plans by committing to the maximum planned levels of soil disturbance for standard units and roadside work areas. Harvest operations are conducted in a way, and during times of the year, that ensures commitments can be achieved. Post harvest evaluations and other inspections assess compliance with soil disturbance limits identified in plans. Sedimentation occurrences are detected by forestry personnel during stream crossing inspections, road inspections, silviculture activities, and other general activities. In addition, Forestry supervisors routinely fly their operating areas annually following spring freshet to look for any such occurrences. While in some situations the sites may have stabilized so that further sedimentation does not occur, in other cases mitigating actions may have to be conducted. This may involve re-contouring slopes, installing siltation fences, re-directing ditch lines, grass seeding, or deactivating roads.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecast	Canfor is committed to achieving the stated target for the indicator and long term trends are anticipated to show that all known sedimentation events will be acted upon as required. By following the "Strategies" and "Means of Achieving Objectives and Targets" sections of this indicator detail sheet, it is aniticipated that productive forest soils with minimized losses from forest operations will be maintained. Based on the Annual Reports from previous years, the results of this indicator demonstrate a trend of prompt action on all occurrences of known sedimentation. This trend is expected to continue resulting in the achievement of this target in the future.
Target	100%
Basis for the Target	Canfor recognizes the potential damage sedimentation can inflict on water bodies and is committed to taking mitigating actions on 100% of occurrences. A variance of 5% has been established to recognize those situations where it is not operationally feasible or practical to address sedimentation incidents. Canfor will continue monitoring field operations to ensure sedimentation does not occur, and where necessary, will continue to take prompt action to mitigate its impact if it does.
Monitoring & Measurement Periodic	All field personnel are responsible for detecting sedimentation occurrences, regardless of the location in the DFA. When sedimentation is detected on a Canfor maintained crossing, road, or block, they will be notified. Canfor will then take corrective actions and document the occurrence in their FMS database. The percentage of unnatural known sedimentation occurrences will be tracked, as well as the steps taken to rehabilitate damage.
Annual	
Variance	-5%

3.1.1b Stream Crossings

SFMP Indicator Statement	3.1.1b Percentage of stream crossings appropriately designed and properly installed and/or removed.
CSA Core Indicator(s)	3.1.1. Level of soil disturbance 3.2.2 Proportion of forest management activities, consistent with prescriptions to protect identified water features.
SFM Criterion	3. Soil and Water
Element(s)	3.1 Soil quality and quantity 3.2 Water quality and quantity
Value(s) and Objective(s)	*Value 3.1:* Healthy and abundant soil resource *Objective 3.1:* Conserve soil resources by maintaining soil quality and quantity. *Value 3.2:* Healthy aquatic ecosystems *Objective 3.2:* Conserve water resources by maintaining water quality and quantity.

Strategies Description	This indicator evaluates the procedures used to ensure that stream crossings are installed, maintained, and removed properly so that sediment inputs are minimized. This process involves inspections during installation/removal and routine maintenance inspections at a predetermined frequency based on the overall risk of the area. Forestry roads can have a large impact on water quality and quantity when they intersect with streams, particularly by increasing sedimentation into water channels. Sediment is a natural part of streams and lakes as water must pass over soil in order to enter a water body, but stream crossings can dramatically increase sedimentation above normal levels. Increased sedimentation can damage spawning beds, increase turbidity, and effect downstream water users. When stream crossings are installed and removed properly, additional sedimentation may be minimized to be within the natural range of variation. Erosion control plans and procedures are used to ensure installations and removals are done properly. To calculate the success of this indicator it is important to ensure that a process is in place to monitor the quality of stream crossings, their installation, removal, and to mitigate any issues as soon as possible.
Means of Achieving Objective & Target	Streams and crossing structures are both currently identified during operational plan preparation. Pre-work forms are completed for all projects, including stream crossings, as part of FMS/Standard Operating Procedures (SOP). Stream crossing installations are planned for timeframes when conditions are favorable (i.e. fish windows). Appropriate erosion control devices are also installed during the installation process, such as silt fences.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	The indicator target is expected to be achieved, but the exact degree of success is not easy to quantifiably forecast. However, it is important to identify what the accepted target means to SFM. Stream crossings can impact overall water quality that in turn can affect the organisms that rely on that water. Sustainable forest management could be impacted in other ways by a failure to achieve the target. If sedimentation was severe enough, fish populations may decline. In addition to the ecological costs, there could be costs to the local economy from a decline in sport fishing and reduced recreational values. Downstream water users may also be negatively affected. Many people in the DFA enjoy fishing and would resent the forest industry if sedimentation reduced their fishing opportunities. Therefore, the indicator target will meet ecological, environmental, and social values of sustainable forestry.
Target	100%
Basis for the Target	The indicator was assigned a target of 100% based on an assessment of current and past management practices. The target demonstrates Canfor's commitment to sustaining water quality and quantity in the DFA. A variance of 5% has been established to allow for some human error, and to recognize that specific site conditions may prevent the plans and procedures from being implemented. Qualified professionals will assess when an erosion and sediment control plan is required, and experienced personnel will supervise during installation and removal activities.

Monitoring & Measurement Periodic	The percentage of stream crossings installed and removed consistent with design standards, contractual standards, legal requirements, and/or erosion control plans, along with inspection results and proposed mitigation measures will be tracked in Canfor's FMS databases.
Annual	
Variance	-5%

3.1.1c Road Re-vegetation

SFMP Indicator Statement	3.1.1c Percentage of road construction of deactivation projects where prescribed re-vegetation occurs within 12 months of disturbance.
CSA Core Indicator(s)	3.1.1 Level of soil disturbance
SFM Criterion	3. Soil and Water 1. Biological diversity
Element(s)	3.1 Soil quality and quantity 1.3 Genetic diversity
Value(s) and Objective(s)	*Value 3.1:* Healthy and abundant soil resource *Objective 3.1:* Conserve soil resources by maintaining soil quality and quantity. *Value 1.3:* Genetic diversity throughout the DFA *Objective 1.3:* Conserve genetic diversity by maintaining the variation of genes within species and ensuring that reforestation programs are free of genetically modified organisms.
Strategies Description	This indicator was chosen as a way to assess our ability to minimize or at least reduce the anthropogenic effect of forest roads on adjacent ecosystems. In keeping with the common assumption of coarse-and medium-resolution biodiversity, our underlying assumption with this indicator was – re-vegetating roads will reduce the potential anthropogenic effects that roads have on adjacent ecosystems by minimizing potential for silt runoff or slumps, the amount of exposed soil, the potential for invasive plants to become established, and returning at least a portion of forage and other vegetation to conditions closer to those existing prior to management.
Means of Achieving Objective & Target	Canfor currently completes revegetation on an ad hoc basis, with priorities for revegetation being determined by field staff. Areas such as bridges and stream crossings (installation and/or removal) are targeted for immediate revegetation whereas other areas are targeted based on immediate need. All revegetation is completed using appropriate seed mixtures and is tracked using the RESOURCES database.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	The target of 100% of prescribed revegetation requirements within 12 months of disturbance is expected to be met. However, in the event of unforeseen circumstances such as access or timing issues, a variance of 10% has been allowed for meeting the target. While it is expected the indicator target will be achieved, the results if it is not are difficult to predict. However, it is important to identify what the accepted target means to SFM. Completing revegetation where prescribed is important for maintaining water quality, aquatic habitat, and overall forest sustainability.

	The use of vegetation in minimizing soil erosion is a widely accepted practice throughout the world. Failure to complete prescribed revegetation requirements within 12 months of disturbance would result in prolonged exposure of mineral soil to the elements, greatly increasing the likelihood of erosion and consequently sedimentation. Increased erosion would negatively impact forest productivity, while increased sedimentation would threaten water quality, and aquatic and riparian ecosystems. To maintain these values of sustainable forest management, the signatories are committed to achieving 100% of prescribed revegetation requirements within 12 months of disturbance.
Target	100%
Basis for the Target	Targets for this indicator were established through PAG consensus. As a best practice, revegetation should occur in the first spring after harvesting a winter block, and as soon as possible after logging a summer block. This best practice should reduce run-off and potential sedimentation into running water.
Monitoring & Measurement Periodic	
Annual	The percentage of forest operations consistent with the road re-vegetation requirements will be reported in the annual SFMP report.
Variance	-10%

3.1.1d Road Environmental Risk Assessments

SFMP Indicator Statement	3.1.1d Percentage of planned roads that have an environmental risk assessment completed.
CSA Core Indicator(s)	3.1.1 Level of soil disturbance
SFM Criterion	3. Soil and Water
Element(s)	3.1 Soil quality and quantity
Value(s) and Objective(s)	*Value 3.1:* Healthy and abundant soil resource *Objective 3.1:* Conserve soil resources by maintaining soil quality and quantity.
Strategies Description	Environmental risk assessments provide a measure of "due diligence" in avoiding accidental environmental damage that has potential to occur from forest development in conditions of relatively unstable soil. Through the implementation of risk assessments, we expect to maintain soil erosion within the range that would normally occur from natural disturbance events under unmanaged conditions. Our assumption was – the more we can resemble patterns of soil erosion existing under unmanaged conditions, the more likely it will be that we do not introduce undue anthropogenic effects, from road construction, on adjacent ecosystems.
Means of Achieving Objective & Target	The completion of environmental risk assessments on roads is completed by field staff during road layout. At Canfor, assessments are also being completed on roads constructed prior to any environmental risk assessment being required. The assessments provide the basis for future road inspection requirements and highlight areas of special concern that may require professional geotechnical or design work. All assessments are completed in accordance to documented procedures.

Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	By following the "Strategies" and "Means of Achieving Objectives and Targets" sections of this indicator detail sheet, it is aniticipated that productive forest soils with minimized losses from forest operations will be maintained.
Target	100%
Basis for the Target	The target for this indicator was established through PAG consensus.
Monitoring & Measurement Periodic	Canfor's databases will be queried for roads completed during the specified time period and their associated risk rating, which is deemed to be evidence that an assessment has been completed. Any roads without an environmental risk rating will be noted.
Annual	
Variance	-10%

3.1.1e Soil Conservation

SFMP Indicator Statement	3.1.1e Percent of harvested blocks meeting soil disturbance objectives identified in plans.
CSA Core Indicator(s)	3.1.1 Level of soil disturbance
SFM Criterion	3. Soil and Water
Element(s)	3.1 Soil quality and quantity
Value(s) and Objective(s)	*Value 3.1:* Healthy and abundant soil resource *Objective 3.1:* Conserve soil resources by maintaining soil quality and quantity.
Strategies Description	Conserving soil function and nutrition is crucial for sustainable forest management. To achieve this, forest operations have limits on the amount of soil disturbance they can create. These limits are described in legislation in the Forest Planning and Practices Regulation, section 35. Soil disturbance is defined in this SFM plan as disturbance caused by a forest practice on an area, including areas occupied by excavated or bladed trails of a temporary nature, areas occupied by corduroy trails, compacted areas, and areas of dispersed disturbance. Soil disturbance is expected to some extent from timber harvesting or silviculture activities, but these activities are held to soil conservation standards in Site Plans (where they are more commonly known as "soil disturbance limits"). The Site Plan prescribes strategies for each site to achieve activities and still remain within acceptable soil disturbance limits. An objective of soil conservation standards is to ensure that site productivity is conserved and that impacts to other resource values are prevented or minimized (BC MOF 2001b). There are various soil disturbance hazards that must be considered when determining soil

	disturbance limits. Some of these include soil erosion, soil displacement, and soil compaction (BC MOF 2001b). Minimizing disturbance caused by various forestry activities conserves soil and the role it plays in the ecosystem. This indicator will calculate the success that soil conservation standards are met and that excessive soil disturbance is detected, reported, and corrected.
Means of Achieving Objective & Target	Soil information is collected as a component of site plan preparation, and soil conservation standards are established based on the soil hazards for that block. To be within those limits there are several soil conservation strategies currently used. Forest operations may be seasonally timed to minimize soil disturbance. For example, fine-textured soils such as clays and silts are often harvested when frozen to reduce excessive compaction. FMS pre-work forms require equipment operators to be aware of soil conservation indicators outlined in the site plans. Once an activity is complete the final FMS inspection form assesses the consistency with site plan guidelines. If required, temporary access structures are rehabilitated to the prescribed standards. Road construction within blocks is minimized, and low ground pressure equipment may be used where very high soil hazards exist
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Carrying out activities specified in an Operational Plan and/or Site Plan is a legal obligation, modeling does not apply to this indicator, although it is anticipated that forest productivity would be reduced if obligations are not met. If obligations are not met, a rehabilitation plan to restore productivity will be completed. Forecasting for this indicator is that 100% of soil conservation standards are adhered to.
Target	100%
Basis for the Target	The target for this indicator was set at 100% in order to maintain soil productivity.
Monitoring & Measurement Periodic	Data sources for calculating and monitoring this indicator include Site Plans and completed FMS pre-work and final harvest inspection forms. Final harvest and site prep inspections will use an ocular survey to determine if the soil conservation standards stated in the site plan were met. If the initial ocular estimate indicates that site disturbance limits may have been exceeded, a transect soil disturbance survey as defined in the Soil Conservation Survey Guidebook will be completed on the site to determine if the limits have actually been exceeded and if rehabilitation work is required. Ocular survey information (and transect survey data if required) will be tracked so that annual reports can be generated.
Annual	
Variance	0%

3.1.1f Terrain Management

SFMP Indicator Statement	3.1.1f The percentage of forest operations consistent with terrain management requirements as identified in operational plans and/or site plans.
CSA Core Indicator(s)	3.1.1 Level of soil disturbance

SFM Criterion	3. Soil and Water
Element(s)	3.1 Soil quality and quantity
Value(s) and Objective(s)	*Value 3.1:* Healthy and abundant soil resource *Objective 3.1:* Conserve soil resources by maintaining soil quality and quantity.
Strategies Description	Some areas subject to forest operations occur on slopes that warrant special terrain management requirements in operational plans (usually the site plan). These unique actions are prescribed to minimize the likelihood of landslides or mass wasting. Site specific actions may involve harvesting methods, road location, or construction. Terrain management requirements in the block Site Plan or road layout and design plan may be the results of recommendations from a terrain stability assessment (TSA). A TSA is an assessment that is carried out by a certified terrain stability specialist (usually a professional geo-scientist / engineer) on areas determined at risk from landslides. TSAs must be conducted in all areas with a moderate or high likelihood of landslide initiation after harvesting or road building. Other areas may not require TSAs, but still warrant specific actions to manage slopes. These areas' recommendations are determined by a qualified assessor and are included in the appropriate operational plan. Areas at risk from landslides are determined from information collected on site, or from aerial overview mapping carried out by a professional geo-scientist / engineer. The TSA is a detailed ground assessment that identifies the hazard, risk, and consequence of forest development activities, and provides recommendations for managing landslide hazards. Landslides and mass wasting are normal parts of the geological cycle and occur through natural processes. However, forest activities such as harvesting and road construction can accelerate these processes causing detrimental and long-term effects to soil productivity, water systems, and habitat. The TSA is intended to use professional judgment to determine levels of risk, followed by recommendations to reduce or eliminate the occurrence of slope failures as a result of forest operations. Forest operations that remain consistent with these recommendations will have fewer, if any, landslide or mass wasting events caused by harvesting or road development.
Means of Achieving Objective & Target	The entire DFA has various types of terrain stability mapping (detailed or reconnaissance) or has been GIS themed (based on TRIM II contours) to identify slopes greater than 60%. The detailed terrain stability mapping (TSM) identifies 5 to 6 terrain classes while the reconnaissance TSM identifies three categories: Stable terrain, potentially unstable terrain, and unstable. The detailed TSM terrain stability classes are: ▪ I - no stability issues ▪ II - low likelihood of landslides following timber harvesting or road construction ▪ III - minor stability problems can develop, low likelihood of landslide initiation following timber harvesting or road construction ▪ IVR - Moderate likelihood of landslide initiation following road construction but low following timber harvesting ▪ IV - moderate likelihood of landslide initiation following either road construction or timber harvest ▪ V - high likelihood of landslide following timber harvest or road construction. Terrain Stability Assessments (TSAs) are completed on any harvest or road building proposal that the TSM has identified as either unstable or potentially unstable or as terrain stability classes IVR, IV, and V. Slopes greater than 60% are used to identify areas where TSAs may be

	required in the absence of TSM. Indicators of slope instability may also be found by field crews outside of areas identified by TSM or slopes classified as greater than 60%. The TSA is usually completed with the Site Plan or road layout and design. The recommendations of the TSA are then integrated into the Site Plan or road layout and design and implemented during forest operations. Other areas that still require special slope management, but don't require a TSA have their management requirements in the appropriate operational plan. To ensure the recommendations are carried through, Canfor conducts internal checks prior to the development project (pre-work meeting), during the project (interim inspections),and after completion of the project (final inspection). Inconsistencies with requirements are reported and tracked through Canfor's FMS.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Carrying out activities specified in an Operational Plan and/or Site Plan is a legal obligation, modeling does not apply to this indicator, although it is anticipated that forest productivity would be reduced if obligations are not met. Forecasting for this indicator is that 100% of terrain management requirements are adhered to.
Target	100%
Basis for the Target	Canfor will strive for 100% of forestry activities to be consistent with the terrain management requirements in operational plans and/or site plans. This target was established to reflect Canfor's commitment to soil conservation in the DFA. The use of professional geo-scientists, engineers and other qualified personnel to conduct overview mapping and TSAs is expected to prevent future slope failure events resulting from forest operations.
Monitoring & Measurement Periodic	Several data sources will be used to calculate and monitor the indicator. These include Site Plans, TSAs, various terrain stability mapping (including slopes greater than 60%), and road layout and design documents.
Annual	
Variance	0%

3.1.2 Coarse Woody Debris

SFMP Indicator Statement	3.1.2 The percentage of blocks harvested that exceed coarse woody debris requirements as set out in Site Plans.
CSA Core Indicator(s)	3.1.2 Level of downed woody debris 4.1.1 New Carbon Uptake
SFM Criterion	3. Soil and Water 4. Role in global ecological cycles
Element(s)	3.1. Soil quality and quantity 4.1. Carbon uptake and storage

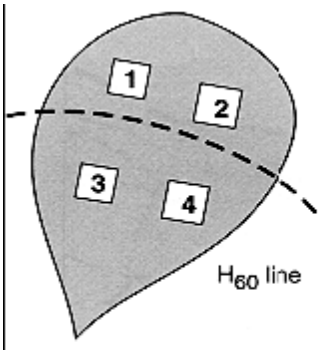
Value(s) and Objective(s)	*Value 3.1:* Healthy and abundant soil resource *Objective 3.1:* Conserve soil resources by maintaining soil quality and quantity. *Value 4.1:* Carbon cycling *Objective 4.1:* Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem.
Strategies Description	This indicator and target addresses the need to manage for Coarse Woody Debris (CWD) given it's importance as a stand attribute and component of stand-level biodiversity CWD plays numerous functional roles in natural and managed forests and aquatic ecosystems including: 1) nutrients for soil development, 2) structure in streams to maintain channel stability, 3) food and shelter for animals and invertebrates, 4) growing sites for plants and fungi, 5) carbon storage, and 6) erosion control. CWD typically includes sound or rotting logs, stumps, or large brances that have fallen or been cut and left in the woods, or trees and brances that have died but remain standing or leaning. For operational purposes, CWD is defined as material greater than 10cm in diameter, in all stages of decay. Past forestry practices have encouraged the removal of CWD from sites for a number of economic and/or safety reasons, presumably to the detriment of biological diversity, however, this is no longer the case. New guiding principles related to CWD management include: minimizing CWD accumulations on landings and roadsides; larger pieces are more valuable than smaller pieces; ecologically, it is advantageous to maintain the full range of decay and diameter classes of CWD; coniferous material lasts many times longer than deciduous material, CWD can be managed in conjunction with wildlife trees and other constrained or reserve areas; manage the composition and arrangement of CWD within acceptable levels of risk or wildfire, insect pest and forest disease outbreaks; and harmonize the retention of CWD with silviculture objectives. Potential sources of CWD in managed stands can include the following: • Logs already lying on the forest floor that are left after harvesting; • Uneconomical wood resulting from harvest operations including breakage, short pieces, and tops; • Long-term CWD recruitment may be addressed by leaving reserves and wildlife trees, possibly including cull trees; • Dispersed wildlife trees including gree trees, stubbed trees and standing dead trees; and • Retention of standing trees below utilization standards (poles and bigger) as a long-term CWD recruitment source. We use this indicator following harvesting to quantify CWD retained in blocks, wildlife tree patches, riparian areas, and in areas of un-salvaged timber. Within the NHLB we assume that natural processes will result in the maintenance of appropriate levels of CWD.
Means of Achieving Objective & Target	Canfor will achieve the objectives and targets specific to CWD through the possible application of the following procedures and controls: • Training for Canfor staff and contractors specific to CWD management and best management practices; • Adhering to legislative requirements specific to CWD;

	• Harvesting pre-works and inspections; • Conducting implementation monitoring to assess success of implementation of controls and possible opportunities for improvement; and • Conducting effectiveness monitoring to assess if controls are effective at achieving the desired results. CWD is managed on a rotation basis and, as such, strategies must address recruitment of CWD over the short and long-term. Canfor Best Management Practices for CWD include: • To retain standing deciduous trees where operationally feasible; otherwise, left where felled • To leave non-merchantable and under-utilization stems on the block; • To retain clumps of viable non-pine natural regeneration and CWD; • To retain existing CWD in wildlife tree patches and reserve areas; and • To leave stub trees to varying degrees (e.g. along riparian / Machine Free Zones) • Leave un-wanted logs in the block and as long as possible Clump logs at the base of snags, immature, stubs or deciduous trees.
Current Status, Predicted Results or Outcome	Canfor's commits to leaving a minimum of 4 logs per hectare as per Sec. 68 of the FPPR. Foresters also have the flexibility to prescribe a higher amount on a block by block basis in Site Plans. Site Plan compliance is monitored by Harvesting Supervisors during site visits and final inspections. Canfor also provides training to logging contractors on how to make the best use of CWD on the block. Refer to the most recent annual report for a table summarizing the current status for this indicator. •
Forecast	By using the implemented best management practices and monitoring compliance at the harvesting stage, it is anticipated that areas will contain a range of standing and downed CWD sizes in a range of decay classes that will deliver a supply of CWD in the short through to the long-term.
Target	100%
Basis for the Target	The current target for CWD was taken from the FRPA *Forest Planning and Practices Regulation, Sec. 68* default requirements (BC. Reg 14/2004). Although the PAG members felt that this number was inadequate to protect this element of biodiversity, they recognized that insufficient information exists to determine either the amount of CWD left behind after harvesting or the amount of CWD that occurs in natural pre-harvest stands. Even so, we expect significantly more CWD than the target is retained after harvest and have committed to developing a more comprehensive CWD strategy.
Monitoring & Measurement Periodic	Post-harvest CWD levels will be measured as a standard component of either the Final Inspection or residue and waste survey. The average amount of CWD present in blocks will be monitored annually at which time revisions to targets and/or prescribed management practices may need to be implemented in order to achieve the intent of this indicator. In addition, Canfor has identified the need for a baseline project for investigating the feasibility of surveying coarse woody debris volumes that occur naturally to assess whether or not current targets are effective. This assessment was completed in 2013 and the results are found in the report "Assessing Coarse Woody Debris Retention in Post-Harvest Scenarios in the Mackenzie Forest District".
Annual	Records to satisfy this indicator will be stored as per standard document control procedures. The most recent information/analysis of the data will be contained within the SFMP Annual Report.

Variance	0%

3.2.1 Peak Flow Index

SFMP Indicator Statement	3.2.1 Percent of watersheds containing approved or proposed development with Peak Flow Index calculations complete.
CSA Core Indicator(s)	3.2.1 Proportion of watershed or water management areas with recent stand-replacing disturbance 3.2.2 Proportion of forest management activities, consistent with prescriptions to protect identified water features.
SFM Criterion	3. Soil and Water
Element(s)	3.2 Water quality and quantity
Value(s) and Objective(s)	*Value 3.2:* Healthy aquatic ecosystems *Objective 3.2:* Conserve water resources by maintaining water quality and quantity.
Strategies Description	Peak flow is the maximum flow rate that occurs within a specified period of time, usually on an annual or event basis. The peak flow index is an indicator that indicates the potential effect of harvested areas on water flow in a particular watershed. The H60 is the elevation for which 60% of the watershed area is above.



Block no.	Area (ha)	Stand height (m)	ECA (ha)	Weight factor	Weighted ECA
1	20	4	15.0	1.5	22.5
2	30	6	15.0	1.5	22.5
3	20	1	20.0	1.0	20.0
4	30	8	7.5	1.0	7.5

Total ECA = **72.5**

Peak flow index = $\frac{72.5}{1000}$ = **0.0725**

Figure 11. Peak flow index calculations (BC Min. of Forests).

The ECA or "Equivalent Clearcut Area" is calculated from the area affected by logging and the hydrologic recovery of that area due to forest re-growth. After an area has been harvested, both winter snow accumulation and spring melt rates increase. This effect is less important at low elevations, since the snow disappears before peak flow. Harvesting at high elevations will have the greatest impact and is, therefore, of most concern. As a result, areas harvested at different elevations are weighted differently in the calculation of peak flow index.

Most hydrologic impacts occur during periods of the peak stream flow in a watershed. In the interior of British Columbia, peak flows occur as the snowpack melts in the spring.

	With regards to the conservation of water quality in the DFA, it is important to be able to maintain the watershed level conditions within natural ranges of variation to ensure that other users of water are not adversely affected. The peak flow index provides a method to forecast and evaluate the potential effects of future harvesting plans, and to ensure that these harvested areas do not contribute to the degradation of the water resource.
Means of Achieving Objective & Target	Conduct an inventory of sensitive watersheds and assign a peak flow target to each. Where peak flow targets are exceeded in a sensitive watershed (either currently or as a result of planned activity), further assessments are conducted. These assessments could include a watershed sensitivity assessment, a stream quality crossing index survey, a height performance of regenerating stands, road inspections, a channel stability assessment, or other suitable assessment as determined by the qualified professional.
Current Status, Predicted Results or Outcome	Peak flow index calculations, watershed sensitivity analysis and PFI risk ratings have been completed for all active watersheds. Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Developing PFI targets has been identified as a crucial component to ensuring water quality and quantity is properly maintained in the DFA. If peak flows are not managed based on the most current and up to date information and science then peak flows may significantly increase, resulting in excessive erosion and failures at downstream culverts and bridges. This may degrade fish habitat and impact society by restricting recreational access and reducing water quality to downstream users. By following the "Strategies" and "Means of Achieving Objectives and Targets" sections of this indicator detail sheet, it is aniticpated that there will be acceptable levels of water quality and quantity. Riparian systems will maintain existing uses and support human and ecological communities and aquatic life. Introduction of sedimentation into watercourses' is minimized.
Target	100%
Basis for the Target	With PFI calculations now complete, the watersheds will next be evaluated to establish the watershed sensitivity and thereby the PFI risk (low to high). With the PFI risk ratings established, harvesting plans will have to consider the impact harvesting will have on the watershed in which it occurs. The goal, in watersheds with a high PFI risk rating, is to either postpone harvesting, or refer to a qualified registered professional for a detailed review.
Monitoring & Measurement Periodic	With PFI risk ratings calculated for all active watersheds, Canfor will monitor future planned harvesting to ensure that proper actions are taken if a watershed rating is forecast to become high. Planners will primarily be responsible for ensuring that monitoring is completed. This may be achieved by updating watershed ECA data on an annual basis. Adjacent site information is obtained from other Licensees that share the same land base. Databases such as RESOURCES, or similar systems, will be maintained to provide up to date planning information.
Annual	
Variance	0%

5.1.1a Non-timber benefits

SFMP Indicator Statement	5.1.1a Conformance with strategies for non-timber benefits identified in plans.
Indicator	5.1.1: Documentation of the diversity of timber and non-timber resources, including products and services produced in the DFA. 1.2.1: Degree of habitat protection for selected focal species, including species at risk. 1.4.1 Protection of sites of special significance. 1.4.2: Proportion of identified sites with implemented management strategies.
SFM Criterion	1. Biological diversity 5. Economic and social benefits
Element(s)	1.2: Species Diversity 1.4: Protected Areas and sites of biological and cultural significance 5.1: Timber and non-timber benefits
Value(s) and Objective(s)	*Value 1.2:* Diversity of species throughout the DFA *Objective 1.2:* Maintain species diversity through time, including habitats for known occurrences for species at risk. *Value 1.4:* Unique and important sites within the DFA. *Objective 1.4:* Respect protected areas, and identify sites of special, biological, or cultural significance within the DFA, and implement appropriate management strategies to their long-term maintenance. *Value 5.1:* Multiple benefits *Objective 5.1:* Manage the forest sustainably to produce a mix of timber and non-timber benefits. Support a diversity of timber and non-timber forest products and forest-based services.
Strategies Description	For the purpose of this plan non-timber benefits include; resource features, range features as well as visual quality. Resource features are elements that have a unique importance because specific ecological factors exist in combination at one place and don't often occur similarly elsewhere. Examples of resource features are caves, karst, recreation sites or crown land used for research to name a few. These features are generally considered to have value to society so we assume that through conservation of these features we are contributing to social value. Range features are often used by ranchers to allow livestock to feed and thus very important to the ranching industry. Conservation of these areas will help to assure their availability in the future. Examples of such features include naturally occurring grass lands, naturally occurring barriers which contain livestock to a specific area as well as any area that a rancher has grazing or hay cutting permits on, or identified areas that may be suitable for such permits in the future. Visual quality is managed in order to maintain areas of perceived beauty within the DFA. Areas have been established as VQO's by the MFLNRO District Manager and can have one of five different classifications which relates to the management required for that VQO. ▪ 1 - Preservation – No visible timber harvesting activity. ▪ 2 - Retention – Timber harvesting activities are not visually evident. ▪ 3 - Partial Retention – Activities are visual, but remain subordinate. ▪ 4 - Modification – Activities are visually dominant, but have characteristics that appear natural.

	▪ 5 - Maximum Modification – Activities are dominant and out of scale, but appear natural in the background. The classification of the VQO will relate to how the site level plan is written to ensure compliance, in many cases resulting in timber not being harvested in these areas to ensure the VQO's are achieved. This indicator is very important to ensure that the non-timber benefits that are enjoyed by all members of society remain un-impacted by forestry operations within the DFA.
Means of Achieving Objective & Target	Canfor currently plan and design their activities and/or blocks so as to manage or adequately protect non-timber benefits when they become known. Once a non-timber benefit becomes known, means of managing or protecting the feature are either iterated in the operational plan or tactical and/or site plans. These requirements are tracked and managed through Canfor's FMS as well as by the Compliance and Enforcement branch of the MFLNRO.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	This indicator is a legal obligation under the *Forest and Range Practices Act Regulation, Sec 70(1)* (BC Reg. 14/2004), modeling does not apply to this indicator. Forecasting for this indicator is that 100% of identified resource features will be protected and/or managed.
Target	No non-conformances for site level plans.
Basis for the Target	Targets for this indicator were established through PAG consensus. The target for this indicator has been established at 100% because the maintenance of known non-timber benefits is important to various stakeholders within the Mackenzie DFA. Canfor will continue to manage or protect non-timber benefits as they become known.
Monitoring & Measurement Periodic	
Annual	The indicator will be monitored through FMS inspections and performance will be recorded in an FMS databases such as RESOURCES. The percentage will be included in the annual SFMP report for the operating period of April 1st to March 31st.
Variance	0

5.1.1b First-order Wood Products

SFMP Indicator Statement	5.1.1b The number of first order wood products produced from trees harvested from the DFA.
CSA Core Indicator(s)	5.1.1: Documentation of the diversity of timber and non-timber resources, including products and services produced in the DFA. 5.2.1 Level of participation and support in initiatives that contribute to community sustainability. 5.2.3: Level of direct and indirect employment.
SFM Criterion	5. Economic and social benefits

Element(s)	5.1 Timber and non-timber benefits 5.2 Communities and sustainability
Value(s) and Objective(s)	*Value 5.1:* Multiple benefits *Objective 5.1:* Manage the forest sustainably to produce a mix of timber and non-timber benefits. Support a diversity of timber and non-timber forest products and forest-based services. *Value 5.2:* Sustainable communities *Objective 5.2:* Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.
Strategies Description	This indicator monitors the number of first order wood products that are produced within the DFA. First order wood products are items directly produced from trees. Examples of first order wood products include: ▪ Lumber / custom cut lumber / trim blocks ▪ pulp chips / OSB chips ▪ plywood / veneer ▪ house logs ▪ Saw logs ▪ Pulp logs ▪ railway ties ▪ poles ▪ wood shavings ▪ sawdust ▪ hog fuel This indicator helps to show how forest management activities can contribute to a diversified local economy based on the range of products produced at the local level. Forest management's contribution to multiple benefits to society is evident through this indicator, as well as an indication of the level of diversification in the local economy. First order wood products are often used to supply value-added manufacturers with raw materials for production, such as pre-fabricated houses components. These provisions help to maintain the stability and sustainability of socio-economic factors within the DFA. By ensuring a large portion of the volume of timber harvested in the DFA is processed into a variety of products at local facilities, the local economy will remain stable, diverse, and resilient.
Means of Achieving Objective & Target	The participating licensee seeks and maintains active, mutually beneficial business relationships (purchases, sales, or trade arrangements) with other forest products businesses within or in the immediate vicinity of the DFA. Examples of primary products include logs, lumber, plywood, strand board, and pulp. Examples of by-products include chips, sawdust, shavings, hog fuel and trim blocks.
Current Status, Predicted Results or Outcome	Canfor currently produces a variety of forest products with different grades and sizes of dimensional lumber being the primary products. Canfor also produce specialty wood products such as Japanese select lumber, Machine Stress Rated lumber, and a variety of special order lumber products. A value-added manufacturer in the DFA purchases certain by-products from Canfor mills to produce finger-jointed lumber and an adjacent pulp mill also purchases wood chips from Canfor. Other mill by-products utilized by pulp mills in the region are wood shavings and sawdust. Hog fuel will be utilized by the on-site thermal oil heating system.

	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	This indicator is not easy to quantifiably forecast over a defined time frame as it is dependent on variables such as markets, harvesting levels and availability of raw material. The number of first order forest products produced within the DFA affects economic and social values within the DFA. In the short-term, harvesting levels will likely increase in an attempt to salvage as many timber values as possible before they are lost. Therefore, it will be important to achieve maximum utilization of this wood and maximize economic returns. Due to the significant impact this indicator could potentially have on important values of SFM, Canfor is committed to achieving 5 different first order wood products produced in the DFA.
Target	5
Basis for the Target	The target is established from a review of current practices and any reasonable expectation for growth or for fluctuations from year to year. Over the long-term, Canfor expects to produce the same number and diversity of first order forest products within the DFA. However Canfor does not have direct control over the number of forest products demanded by the value added industry, nor the market for first order products themselves. This market variability is the reason for the -2 products variance from the target of 5.
Monitoring & Measurement Periodic	In order to track and evaluate this indicator, Canfor will report on the number of first order wood products produced.
Annual	
Variance	-2

5.1.2a Written Public Enquiries

SFMP Indicator Statement	5.1.2a Percent of timely responses to written public enquiries.
CSA Core Indicator(s)	5.1.2 Evidence of open and respectful communications with forest-dependent businesses, forest users and local communities to integrate non-timber resources into forest management planning. When significant disagreement occurs, efforts towards conflict resolution are documented. 5.1.1: Documentation of the diversity of timber and non-timber resources, including products and services produced in the DFA. 6.1.2 Evidence of efforts to promote capacity development and meaningful participation in general.
SFM Criterion	5. Economic and social benefits
Element(s)	5.1 Timber and non-timber benefits 6.1 Fair and Effective Decision-Making
Value(s) and Objective(s)	*Value 5.1:* Multiple benefits

	Objective 5.1: Manage the forest sustainably to produce a mix of timber and non-timber benefits. Support a diversity of timber and non-timber forest products and forest-based services. *Value 6.1:* Fair and effective decision-making *Objective 6.1:* Demonstrate that the SFM public participation process is designed and functioning to the satisfaction of the participants and that there is general public awareness of the process and its progress.
Strategies Description	An economically and socially diverse community is often more sustainable in the long term. Support of efforts to increase diversity, the establishment of other enterprises and co-operation with other forest-dependent businesses and forest users is desirable. While there is less information on the ecological services and non-timber benefits produced in the DFA, it is important to consider their contribution to community well-being and resilience. Open communication with stakeholders and the public aid in ensuring all values and businesses are not adversely impacted. In order to maintain relationships and open communication, written public enquiries must be promptly acknowledged and addressed by the participating licensees. These enquiries include those delivered by email, fax, and post.
Means of Achieving Objective & Target	The participating licensees seek to maintain active communication with forest dependent businesses, forest users and local community members. All written enquiries will be responded to within 30 calendar days of receipt.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	The forecast for this indicator is that all public enquiries will be responded to within a timely manner. Resolution may not be achieved within the 30-day time period, however, the member of the public will have acknowledgement within 30 days that their comment or concern has been received and will be addressed.
Target	100%
Basis for the Target	The target is established from a review of current practices. The 30-day time period is a reasonable target to respond to public enquiries.
Monitoring & Measurement Periodic	Canfor documents all communications within the COPI database which will be used to track and evaluate this indicator. Licensees will report on the number of public enquiries and the percentage of those enquiries that were responded to within 30 calendar days.
Annual	
Variance	0

5.1.2b Efforts to Resolve Disagreements

SFMP Indicator Statement	5.1.2b Efforts made to resolve significant disagreement will be documented, along with outcomes.
CSA Core Indicator(s)	5.1.2 Evidence of open and respectful communications with forest-dependent businesses, forest users and local communities to integrate non-timber resources into forest management planning. When significant disagreement occurs, efforts towards conflict resolution are documented.
SFM Criterion	5. Economic and social benefits
Element(s)	5.1 Timber and non-timber benefits
Value(s) and Objective(s)	*Value 5.1:* Multiple benefits *Objective 5.1:* Manage the forest sustainably to produce a mix of timber and non-timber benefits. Support a diversity of timber and non-timber forest products and forest-based services.
Strategies Description	It is important to consider the ecological services and non-timber benefits within the DFA and how they contribute to the well-being and resilience of the community. Open communication with stakeholders and the public aid in ensuring all values and business relationships are not adversely impacted. Anonymity of parties will be preserved in reporting. "Significant" applies to any and all disagreements with non-timber tenure holders.
Means of Achieving Objective & Target	The participating licensee seeks public participation in forest planning and operations that is open, inclusive, and responsive to public concerns. When interests and/or values of other forest users and stakeholders are attained, licensees will encourage further discussion (meetings, phone, email) and attempt to incorporate those values into operational plans. Efforts will be made to resolve all significant disagreements. All communications, including disagreements and/or resolutions will be documented.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	This indicator forecast is that all communications, disagreements and resolutions will be documented. Efforts will be made to resolve all disagreements.
Target	100%
Basis for the Target	The target is established from a review of current practices and any reasonable expectation for growth or for fluctuations from year to year. Over the long-term, Canfor expects to produce the same number and diversity of first order forest products within the DFA. However Canfor does not have direct control over the number of forest products demanded by the value added industry, nor the market for first order products themselves. This market variability is the reason for the -2 products variance from the target of 5.

Monitoring & Measurement Periodic	Licensees will report on all significant disagreements that occurred during the reporting period as well as whether efforts were made to resolve 100% of the disagreements and all will be documented.
Annual	
Variance	0

5.2.1 Local Investment

SFMP Indicator Statement	5.2.1 The percent of money spent on forest operations and management in the DFA provided by local suppliers.
CSA Core Indicators	5.2.1 Level of participation and support in initiatives that contribute to community sustainability. 5.1.1: Quantity and quality of timber and non-timber benefits, products and services produced in the DFA. 5.2.3: Level of direct and indirect employment.
SFM Criterion	5. Economic and social benefits
Element(s)	5.1 Timber and non-timber benefits 5.2 Communities and sustainability
Value(s) and Objective(s)	*Value 5.1:* Multiple benefits *Objective 5.1:* Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits. *Value 5.2:* Sustainable communities *Objective 5.2:* Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.
Strategies Description	Forests provide many ecological benefits but they also provide substantial socio-economic benefits. In order to have sustainable socio-economic conditions for local communities associated with the DFA, local forest related businesses should be able to benefit from the work that is required in the management of the DFA. Furthermore, for small forestry companies to contribute to and invest in the local economy there must be assurances that there will be a consistent flow of work. In the same way that larger licensees depend on a secure flow of resources to justify investment in an area, small businesses depend on a sustained flow of opportunities to develop and invest in the local community. Local is defined in this SFMP as the communities of Mackenzie, McLeod Lake, Germanson Landing, Manson Creek, Tsay Keh Dene, and Fort Ware. The total dollar value of goods and services purchased within the local communities will be calculated relative to the total dollar value of all goods and services used. This calculation will be used to derive the percentage of money spent on forest operations and management of the DFA from local suppliers. Woodlands employee salaries are considered goods purchased where the employee lives within the local area and therefore contribute to community stability.

	Forest Operations and Management consider all money spent within the woodlands department, excluding stumpage. Harvesting and road building costs, where applicable, will be included in the total.
Means of Achieving Objective & Target	A query of the financial data stored within Canfor's accounting systems allows for an indication of the current status of this indicator and serves as a methodology to track monies spent within the DFA to benefit the local communities. Canfor does not currently have a methodology for tracking this indicator other than manual tabulation. A process has been instituted that will allow Canfor to identify local businesses with which Canfor does business.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Forecasting for this indicator will be that Canfor will report out on the amount of money spent in the local communities. Modeling is not applicable to this indicator as it is a process indicator. Support for local communities through business relationships provides employment diversification and increased local revenue.
Target	30%
Basis for the Target	The indicator will be monitored and analyzed for trends reflecting their commitment to supporting local businesses.
Monitoring & Measurement Periodic	This indicator will be monitored and reported from Canfor's accounting systems. Canfor will conduct a financial query of expenditures for suppliers and contractors within the local communities compared to the total dollars spent on woodlands operations.
Annual	
Variance	-5%

5.2.2 Investment in training and skills development

SFMP Indicator Statement	5.2.2 Training in environmental and safety procedures in compliance with company training plans.
CSA Core Indicator(s)	5.2.2: Level of participation and support in training and skills development. 6.2.1 Evidence of co-operation with DFA-related workers to improve and enhance safety standards, procedures, and outcomes in all DFA-related workplaces and affected communities.
SFM Criterion	4. Economic and social benefits 5. 6. Society's Responsibility
Element(s)	5.2. Communities and sustainability 6.2. Safety

Value(s) and Objective(s)	*Value 5.2:* Sustainable communities *Objective 5.2:* Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics. *Value 6.2:* Commitment to safety *Objective 6.2:* Demonstrate that the organization is providing and promoting safe working conditions for its employees and contractors.
Strategies Description	Sustainable Forest Management provides training and awareness opportunities for forest workers as organizations seek continual improvement in their practices. Investments in training and skill development generally pay dividends to forest organizations by way of a safer and more environmentally conscious work environment. Assessing whether forest contractors have received both safety and environmental training is a direct way of measuring this investment. Additionally, training plans should be in place for employees of the forest organizations who work in the forest. Measuring whether the training occurred in accordance with these plans will confirm an organizations commitment to training and skills development.
Means of Achieving Objective & Target	The licensee will invest in skills development by ensuring forest contractors have adequate safety and environmental training and for woodland employees (staff) by ensuring training occurs in accordance with their plans. Currently it is the policy of Canfor to ensure their employees are trained in company approved levels of forest management (FMS) and safety (SAFE company certification). These are considered to contribute to the sustainability of communities by protecting the environment in which we harvest resources and ensuring that workers continue to be able to work safely and not be sidelined by injury or industrial illness. A trained workforce is critical to safe and proper execution of plans. Canfor has developed a matrix of required safety and environmental training by position that is used as the basis for determining the training requirements by each woodlands position. This training is to be provided to the participants' woodlands staff on a periodic basis as outlined in Canfor's training matrix. The training matrix is reviewed on a periodic basis to update training needs as required. The variance allows for some discretion to account for changes in government and company policy, legislation, organizational structure and staff changes.
Current Status, Predicted Results or Outcome	In 2013, the level of training in environmental & safety procedures in compliance with company training plans was 100%.
Forecast	Forest planning and operations are conducted with a genuine focus on worker safety and environmental stewardship. Forest contractors and employees have the adequate knowledge and tools to conduct their jobs, performing well even under upset conditions.
Target	100% of company employees and contractors will have both environmental and safety training.
Basis for the Target	Company training plans define FMS and safety staff training requirements in relevant procedures. This includes a target of 100 percent of company employees and contractors will have both environmental and safety training; (variance of 5 percent).
Monitoring & Measurement Periodic	This indicator will be applied to all directly employed woodlands staff and field contractors of Canfor who require specific environmental and safety training. In the case of contracted employees, it will apply to the company that is hired and to those contracted employees actually working for Canfor only and not every employee of the company.

Annual	This target will be reported out annually with the information being stored in Canfor's training plans. Reporting will be based on the information supplied by company records.
Variance	-5%

5.2.3 Level of direct and indirect employment

SFMP Indicator Statement	5.2.3 Maintain the level of direct and indirect employment.
CSA Core Indicator(s)	5.2.3: Level of direct and indirect employment.
SFM Criterion	5. Economic and social benefits
Element(s)	5.2 Communities and sustainability
Value(s) and Objective(s)	*Value 5.2:* Sustainable communities *Objective 5.2:* Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.
Strategies Description	Forests represent not only a return on investment (measured, for example, in dollar value, person-days, donations, etc.) for the organization but also a source of income and non-financial benefits for DFA-related workers, local communities and governments. Organizations that harvest at sustainable harvest levels in relation to the allocated supply levels determined by government authorities continue to provide direct and indirect employment opportunities. The harvest level is set using a rigorous process that considers social, economic and biological criteria.
Means of Achieving Objective & Target	Organizations contribute to direct and indirect employment within the region and to sustainable harvesting by adhering to their apportioned harvest volume within each respective TSA. Cut control regulations dictate the short-term harvest flexibility.
Current Status, Predicted Results or Outcome	Currently Canfor is operating 1 sawmill on a 2 shift basis. Canfor also employs many contractors for maintenance and upgrades in the sawmill, timber harvesting, silviculture and road maintenance divisions to name a few. Although Canfor is operating at near capacity, the lumber and timber industry is still in a fragile state with the current US financial crisis. Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Although difficult to see into the future, it is probable to achieve this indicator in the coming years. Beyond that there is the potential to surpass the current levels if the lumber markets see some recovery and mill capacities are increased.
Target	265 direct +53 indirect
Basis for the Target	Targets for this indicator are based on 2010 baseline data of actual direct employment levels for Canfor. Direct employment includes all staff and contractors paid directly by Canfor. Indirect employment levels are generated using the employment multiplier from the 2000 Timber Supply Review. Indirect employment is difficult to calculate therefore the multiplier

	is used, and is based on the number of direct jobs. Targets for this indicator were established through PAG consensus.
Monitoring & Measurement Periodic	Canfor will report the best data that is available for full-time employment at reporting time for the operating year; April 1st to March 31st. If Canfor is meeting the full-time employment targets it will be assumed that they are also meeting the indirect employment targets.
Annual	
Variance	-5%

6.1.1 Satisfaction (PAG)

SFMP Indicator Statement	6.1.1 The average overall percent of the PAG's satisfaction with PAG meeting process.
CSA Core Indicator(s)	6.1.1: Level of participant satisfaction with the public participation process. 6.1.2: Evidence of efforts to promote capacity development and meaningful participation in general.
SFM Criterion	6. Society's responsibility
Element(s)	6.1 Fair and effective decision making.
Value(s) and Objective(s)	*Value 6.1:* Fair and effective decision-making *Objective 6.1:* Demonstrate that the SFM public participation process is designed and functioning to the satisfaction of the participants and that there is general public awareness of the process and its progress.
Strategies Description	The PAG is one of the key elements of public involvement in the SFM process. The Mackenzie PAG provides guidance, input and evaluation during development of the SFMP. It is also instrumental in maintaining links to current local values and forest resource uses within the DFA. Therefore, it is important that the signatories have a positive and meaningful working relationship with the PAG, where Canfor is able to respond to all issues and concerns the PAG may have during the process. This indicator will use an average of the PAG meeting evaluation forms to determine the level of satisfaction of the PAG with the public participation process. At the local level, people who use or otherwise value the forest resources within the DFA should have insight and involvement into the SFM process. This is particularly applicable in British Columbia where the majority of the forest is publicly owned. The need for public involvement is fundamental and in order to gain the support of the public and develop effective working relationships with the PAG, Canfor needs to be responsive to the satisfaction level of the PAG. Both the PAG and Canfor can recognize the benefits of a well-developed public process. Canfor gains insight into local values and objectives and the PAG participants learn about the SFM process and the overall goals of sustainable development.
Means of Achieving	At the end of each Public Advisory Group meeting, participating licensees will provide all Public Advisory Group members in attendance a feedback form (survey) to assess their

Objective & Target	satisfaction with the meeting and associated process. The survey content and process will be that described in the Public Advisory Group's Terms of Reference. All survey questions will have a 1-5 scoring assessment (1 being very poor, 2 being poor, 3 being average, 4 being good and 5 being very good). One question is in the PAG meeting evaluation form to address this indicator which asked participants "Your overall satisfaction with PAG process?" This indicator is specific to responses to question 11. A list of questions on the meeting evaluation forms and charts summarizing the questions and answers from meeting evaluations are in the PAG Records binder which is among the Plan's supporting documents.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Forecasting for this indicator is that the trend (established through monitoring) for satisfaction will be maintained or increased. Modeling is not applicable to this indicator as it is a process indicator.
Target	100%
Basis for the Target	The target is to achieve 100% of the PAG to be satisfied with the public participation process. Using the survey ranking system, this translates to a "5", or "very good" score for all PAG meetings. Using the current survey methodology, 100% satisfaction would be reflected in a rating of "5", or "very good". The variance of -20% is a reflection of the reality that it is very difficult to achieve full satisfaction in a group of diverse interests. This would translate to a satisfaction rating of 4.0 out of 5. The variance still requires that over two-thirds of the PAG should be satisfied with the PAG process.
Monitoring & Measurement Periodic	Meeting evaluations will be conducted after each PAG meeting. The results will be made available before or during the next meeting. The average of the summary of the PAG meeting evaluation forms will be used to determine this indicator percent. It will be determined annually for all meetings between April 1st to March 31st and reported in the annual SFMP report.
Annual	
Variance	-20%

6.1.2a Input into Forest Planning

SFMP Indicator Statement	6.1.2a The number of opportunities for public and/or stakeholders to provide meaningful input into forest planning.
CSA Core Indicator(s)	6.1.2: Evidence of efforts to promote capacity development and meaningful participation in general. 6.1.3: Availability of summary information on issues of concern to the public. 5.1.2: Evidence of open and respectful communications with forest dependent businesses, forest users and local communities to integrate non-timber resources into forest management planning. When significant disagreement occurs, efforts towards conflict resolution are documented.
SFM Criterion	5.Economic and social benefits.

	6. Society's responsibility
Element(s)	5.1 Timber and non-timber benefits 6.1 Fair and effective decision-making
Value(s) and Objective(s)	*Value 5.1:* Timber and non-timber values within the DFA. *Objective 5.1:* Manage the forest sustainably to produce a mix of timber and non-timber benefits. Support a diversity of timber and non-timber forest products and forest-based services. *Value 6.1:* Fair and effective decision-making *Objective 6.1:* Demonstrate that the SFM public participation process is designed and functioning to the satisfaction of the participants and that there is general public awareness of the process and its progress.
Strategies Description	Forestry activities can impact a wide section of the public and individual stakeholders within the DFA. This indicator was designed to monitor Canfor's success at providing effective opportunities to residents and stakeholders to express concerns and be proactively involved in the planning process. This involvement may include the identification of areas of interest, definition of the nature of their interest in the land base, and any specific forestry activity that may impact their specific interests. This process ensures that when forestry activities are planned, information is exchanged in an effective and timely manner, so as to resolve potential conflicts before they occur. This process will help to identify the public values, interests and uses of the forest that will be considered within the signatories planning framework. Stakeholders include the following sectors; trappers, guide outfitters, water licence holders, range tenure holders, woodlot owners, private land owners, mineral claim holders, other licensees, and specific government agencies. Opportunities for input into forest planning will be offered to stakeholders where their tenured area coincides with Canfor's planned activities.
Means of Achieving Objective & Target	Participating licensees are committed to work with members of the PAG on forest management issues and to improve the effectiveness of the public processes through capacity development. Licensees will provide informational/educational opportunities for PAG participants on an annual basis as part of regularly held meetings. In addition, there are many opportunities for the public and stakeholders to express forestry-related concerns and to be involved in the planning process; including input into, • Forest Stewardship Plan (FSP) public reviews, • FSP amendments, • Stakeholder referrals, • Pesticide Management Plan reviews, • Field tours, • Newsletters, • Meetings, • Open houses, • Trade shows, • Information sessions, and • Websites.

	This indicator will summarize the number of opportunities for the public and stakeholders to provide input into Forest planning. Each opportunity will count as 1 towards the target. Only stakeholders that have overlapping tenure with the applicable activity will be communicated with.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Forecasting for this indicator is that the public will be given six opportunities to provide input into the planning processes. Modeling is not applicable to this indicator as it is a process indicator.
Target	6
Basis for the Target	The current target is based on a general estimate of the number of opportunities given to the public to express forestry related concerns and be involved in the planning process.
Monitoring & Measurement Periodic	Canfor will track the number of opportunities for the public and stakeholders to express forestry-related concerns and be involved in planning processes. Canfor will be required to review and summarize this information, with the total number of opportunities for the DFA included in the annual SFMP report for the operating year of April 1st to March 31st.
Annual	
Variance	-2

6.1.2b Public and Stakeholder Concerns

SFMP Indicator Statement	6.1.2b The number of operational concerns raised by the public and/or stakeholders that are considered and incorporated into operational and/or tactical plans.
CSA Core Indicator(s)	6.1.2: Evidence of efforts to promote capacity development and meaningful participation in general. 6.1.3: Availability of summary information on issues of concern to the public. 5.1.2 Evidence of open and respectful communications with forest-dependent businesses, forest users and local communities to integrate non-timber resources into forest management planning. When significant disagreement occurs, efforts towards conflict resolution are documented.
SFM Criterion	5. Economics and social benefits 6. Society's responsibility
Element(s)	5.1 Timber and non-timber benefits 6.1 Fair and effective decision-making.
Value(s) and Objective(s)	*Value 5.1:* Timber and non-timber values within the DFA. *Objective 5.1:* Manage the forest sustainably to produce a mix of timber and non-timber benefits. Support a diversity of timber and non-timber forest products and forest-based services.

	Value 6.1: Fair and effective decision-making *Objective 6.1:* Demonstrate that the SFM public participation process is designed and functioning to the satisfaction of the participants and that there is general public awareness of the process and its progress.
Strategies Description	Canfor solicits feedback for their public forest management plans in the DFA. As mentioned in previous indicators, public involvement is an important aspect of SFM as it promotes inclusiveness in how Crown forests are managed. Considering a diverse range of opinions and concerns will result in operational forest management decisions that consider views other than those of the forest industry. A forest industry that respects public and stakeholder input will maintain the support of the public, creating a more economically stable and open forest economy.
Means of Achieving Objective & Target	Operational concerns from the public may be provided in many ways, including written letters, e-mails, or faxes. There may also be written comments made during an in-person or telephone meeting between a staff member and the person providing comment. This indicator will compare the number of operational concerns that have been acted on relative to the total number of operational concerns raised. Operational plans are generally FSPs. Tactical plans can include AIAs, operating plans, and block and road referrals.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	It is Canfor's intent to meet the target, and it is anticipated this goal will be met. The percent of timely responses to written concerns directly affects social values and indirectly affects economic values of SFM. Public and stakeholder input into the SFM process are required to adequately consider other resource values within the DFA.
Target	100%
Basis for the Target	Public and stakeholder input is an important aspect of the SFM process. Therefore, it is paramount to ensure that operational concerns are considered and incorporated into operational plans. If the target is not met in the future, strategies will be developed to improve practices, or targets will be adjusted to better reflect practices in the DFA. A variance of 10% is established to recognize that not all operational concerns brought forth by the public and stakeholders can be incorporated into the planning process.
Monitoring & Measurement Periodic	A review of the number of operational concerns received by the public and stakeholders versus the number of operational concerns acted on will be analyzed on an annual basis.
Annual	
Variance	-10%

6.1.2c SFM educational opportunities

SFMP Indicator Statement	6.1.2c The number of SFM educational opportunities and interactions provided.
Indicator	6.1.2: Evidence of efforts to promote capacity development and meaningful participation in general.
SFM Criterion	6. Society's responsibility
Element(s)	6.1. Fair and effective decision-making
Value(s) and Objective(s)	*Value 6.1:* Fair and effective decision-making *Objective 6.1:* Demonstrate that the SFM public participation process is designed and functioning to the satisfaction of the participants and that there is general public awareness of the process and its progress.
Strategies Description	This indicator was designed to monitor Canfor's success at providing educational opportunities in sustainable forest management. SFM relies on residents and stakeholders making informed decisions on forest management. To achieve this, it is incumbent on Canfor to ensure the public are sufficiently informed about SFM to make the choices we request of them. The indicator is intended to ensure that Canfor provides the required opportunities for residents and stakeholders to learn about SFM. Such opportunities may include field tours, training programs, open houses, public forums, presentations regarding aspects of SFM, etc.
Means of Achieving Objective & Target	The participating licensee will maintain their involvement in educational outreach initiatives. Examples of educational outreach initiatives include: • Maintaining an open and active public advisory group, • Field tours, and open houses, • Notification/referrals to stakeholders, • School classroom visits, • Continual improvement projects, • Knowledge transfer sessions, • Participation in trade shows, • Regional District presentations, and • Forestry tours. The participating licensee will work with the PAG (and others) to identify more opportunities over time.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Forecasting for this indicator will be that at least two SFM educational opportunities and interactions provided will be provided annually. Modeling is not applicable to this indicator as it is a process indicator.
Target	2
Basis for the Target	Target was determined by PAG consensus. Target was based on current. Canfor recognizes that at the initial stages of development, more than two opportunities may be required,

	however, as the SFM Plan develops, it is likely that less opportunity will be required on an annual basis as the PAG and other stakeholders become more familiar with the concept of sustainable forest management.
Monitoring & Measurement Periodic	The number of educational opportunities or interactions with the public, stakeholder, and First Nations will be summarized for each reporting period.
Annual	
Variance	0

6.1.2d People reached through educational outreach

SFMP Indicator Statement	6.1.2d The number of stakeholders and members of the public who took part in an educational opportunity.
CSA Core **Indicator(s)**	6.1.2: Evidence of efforts to promote capacity development and meaningful participation in general.
SFM Criterion	6. Society's responsibility
Element(s)	6.2 Fair and effective decision-making.
Value(s) and Objective(s)	*Value 6.1:* Fair and effective decision-making *Objective 6.1:* Demonstrate that the SFM public participation process is designed and functioning to the satisfaction of the participants and that there is general public awareness of the process and its progress.
Strategies Description	Canfor is committed to working with directly affected stakeholders and members of the public on forest management issues and have a well-established history of participation in community meetings, including local planning processes. The sharing of knowledge and contributes to informed, balanced decisions and plans acceptable to the majority of public. When informed and engaged, members of the public can provide local knowledge and support that contributes to socially and environmentally responsible forest management.
Means of Achieving Objective & Target	The participating licensee will maintain their involvement in educational outreach initiatives. Examples of educational outreach initiatives include: • Maintaining an open and active public advisory group, • Field tours, and open houses, • Notification/referrals to stakeholders, • School classroom visits, • Continual improvement projects, • Knowledge transfer sessions, • Participation in trade shows, • Regional District presentations, and • Forestry tours. The participating licensee will work with the PAG (and others) to identify more opportunities over time.

Current Status, Predicted Results or Outcome	
Forecast	*Forecasting does not apply to this indicator.*
Target	50
Basis for the Target	50 or greater people to whom educational opportunities have been provided by the Participants or their representatives (variance of -10 people). Targets for this indicator were established through PAG consensus.
Monitoring & Measurement Periodic	This indicator will be reported out on an annual basis. Reporting will be based upon number of educations opportunities presented and the numbers of people attending each event as confirmed by attendance records, signup sheets or best estimates of numbers by the presenter. The indicator will be considered to have been met when the number of people provided with a learning opportunity has equaled or exceeded 50 in the course of the reporting year. Canfor will maintain their involvement in educational outreach initiatives (e.g., maintaining an open and active public advisory group, hosting field tours and open houses, providing notification/referrals with educational content to stakeholders, conducting school classroom presentations, participation in trade fairs, publication of informative articles and responding to public inquiries). Canfor will record attendance level at each meeting or tour (public and stakeholders), estimate readership for articles published/posted to the web, count the number of public enquiries responded to, count the number of stakeholders provided information and count the number of students provided information. Expected results of implementation of this indicator are an educated and informed public with a broad understanding of forestry that can provide local input and support on matters pertaining to forest planning and operations.
Annual	
Variance	-10

6.1.3a Access to SFM Information

SFMP Indicator Statement	6.1.3a The number of opportunities provided annually for access to SFM related documents.
CSA Core Indicator(s)	6.1.3: Availability of summary information on issues of concern to the public.
SFM Criterion	6. Society's responsibility
Element(s)	6.1 Fair and effective decision-making
Value(s) and Objective(s)	*Value 6.1:* Fair and effective decision-making

	Objective 6.1: Demonstrate that the SFM public participation process is designed and functioning to the satisfaction of the participants and that there is general public awareness of the process and its progress.
Strategies Description	With this indicator, we intend to monitor our effort to ensure effective and comprehensive distribution of the SFMP, annual reports, and audit results for the Mackenzie DFA. In order to gain trust and confidence in the SFMP process, it must be an open and transparent process. By ensuring access to the Plan, annual reports, and audit results, the results of our efforts in achieving sustainable forestry and continuous improvement can be clearly seen and monitored by the public, stakeholders, and First Nations. In this manner, the public, stakeholders and First Nations can hold Canfor accountable for achieving the desired results and have confidence that forest resources are being managed sustainably.
Means of Achieving Objective & Target	The PAG Terms of Reference document developed on January 31, 2006 provides for an opportunity for the PAG to review the SFM Plan and that annual reports and audit results also be prepared and presented to the PAG. In addition, there is a website through which the Plan, annual report, and audit results may be accessed by the public. Other opportunities to review SFM related documents include newsletters, open houses, trade shows, and public meetings. These documents are updated periodically as required.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	This indicator is not easy to forecast as it is dependent on implementation and future improvement of this SFMP. Distribution and access to the SFMP, annual reports and audit results may influence the success of the SFMP. If there was no distribution or access to the SFMP, annual reports, or audit results the social acceptance of the SFMP may be weakened. The public, stakeholders, and First Nations would be unable to monitor our success in achieving the targets or our efforts to improve. In the absence of proof, confidence and trust in the SFMP will erode and acceptance of the Plan or the SFMP process will decline. With low acceptance comes an unwillingness of the public, stakeholders, and First Nations to provide input into the Plan. Without seeking the input of a diverse range of public sector interests, it may appear that the plan is overly dominated by the forest industry. In the future, the evolution of the plan may rely on the concerns, knowledge and experience found within these public-sector interests. Their representatives will be able to provide a different perspective of SFM and assist in updating the plan to reflect a wide variety of views in the DFA. A PAG that has provided an opportunity for public sector participation has met the need to encourage a wide range of participation in SFM. Due to the importance of the distribution and access of the SFM Plan, annual reports, and audit results in ensuring the public's, stakeholder's, and First Nations' confidence, trust, and acceptance of the SFMP and the SFM process, Canfor is committed to achieving the target of 3.
Target	3
Basis for the Target	Targets for this indicator were established through PAG consensus.
Monitoring & Measurement Periodic	Review of the SFM Plan, annual reports, or audit results with the PAG will be noted in the PAG meeting summary. Meeting summaries are sent to all PAG representatives, alternates, and observers as well as all stakeholders who have expressed interest in receiving PAG documents.

Annual	
Variance	0

6.1.3b Communication of planned Deactivation Projects

SFMP Indicator Statement	6.1.3b Percentage of off-block road deactivation projects that are communicated with applicable First Nations and Stakeholders.
CSA Core Indicator(s)	6.1.3 Availability of summary information on issues of concern to the public
SFM Criterion	6. Society's responsibility
Element(s)	6.1 Fair and effective decision-making
Value(s) and Objective(s)	*Value 6.1:* Fair and effective decision-making *Objective 6.1:* Demonstrate that the SFM public participation process is designed and functioning to the satisfaction of the participants and that there is general public awareness of the process and its progress.
Strategies Description	The forest is utilized by a variety of users. Access to the forest resource is important to First Nations, stakeholders, and the general public. Deactivation of off-block access roads can limit or remove access to the forest for other users. Where Canfor needs to deactivate off-block roads, communication of their intention is required. Our assumption with this indicator is simply that – by increasing communication regarding deactivation plans among stakeholders, we can increase the efficiency of access to resources. For the purpose of this indicator, stakeholders include trappers, guides, private land owners, and woodlots. First Nations will also be communicated with where their consultative boundary overlaps the planned deactivation projects.
Means of Achieving Objective & Target	Currently, off-block deactivation is coordinated to some extent between the major licensees, BCTS, and MFLNRO. However, because the major licensees and BCTS have discreet operating areas in the TSA, coordination is less onerous as operations seldom overlap. Canfor will send letters to overlapping stakeholders and First Nations. Public notification may take place in the form of a newspaper ad detailing the planned deactivation projects with a reasonable estimate of the timing of the project.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Modeling is not applicable to this indicator as it is a process indicator.
Target	100%

Basis for the Target	Targets for this indicator were established through PAG consensus.
Monitoring & Measurement Periodic	Communications with First Nations, stakeholders, and the public applicable to this indicator will be monitored and tracked in Canfor's databases.
Annual	
Variance	-10%

6.2.1a Accidents

SFMP Indicator Statement	6.2.1a Number of lost time accidents in woodlands operations.
CSA Core Indicator(s)	6.2.1 Evidence of co-operation with DFA-related workers to improve and enhance safety standards, procedures, and outcomes in all DFA-related workplaces and affected communities; 6.2.2 Evidence that a worker safety program has been implemented and is periodically reviewed and improved
SFM Criterion	6. Society's responsibility
Element(s)	6.2 Safety
Value(s) and Objective(s)	*Value 6.2:* Commitment to safety *Objective 6.2*: Demonstrate that the organization is providing and promoting safe working conditions for its employees and contractors.
Strategies Description	Health and safety of forest workers and members of the public is an important quality of life objective that is essential to SFM. Canfor considers employee and public safety as a primary focus of all forestry related operations. Evidence of this high priority can be seen in various company mission statements and individual FMS policies. This indicator was developed to track and report out on the number of lost time workplace accidents that occur within Canfor's woodlands division. Operations conducted outside the woodlands division and field operations have been excluded from this indicator; however Canfor promotes safety in all aspects of forest management operations. Two types of workplace accidents are the most common within the forest industry including lost time accidents (LTA) or incidents where medical aid or treatment was necessary but no loss of work time was experienced by the employee. Through this indicator, only LTA will be tracked and monitored.
Means of Achieving Objective & Target	Forest operations retain their safety program certification.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecast	This indicator is not easy to quantifiably forecast over a defined time frame because it is operational in nature. The number of company related, forestry management operation accidents each year relates directly to social values within the DFA. If more than the target amount of company woodlands LTAs occurred each year social values including quality of life would likely decrease throughout the DFA. Lost time accidents are usually directly related to safety issues in the workplace. If an employee's risk of being injured on the job increased, there would be less incentive to do the required work. Increased risk in the workplace would likely decrease the overall quality of life in the DFA and community stability would also likely decrease. For the Licensee, WCB and other related costs due to accidents in the workplace would likely increase. This would result in a potential decrease of economic values because full economic returns would not be realized from the forest resource. Canfor is committed to maintaining worker and public safety as a high priority and will work towards achieving the stated target for this indicator. In the future, Canfor anticipates that the number of company related forestry management operation accidents each year will remain at or below the target.
Target	0
Basis for the Target	The target for this indicator was established so that Canfor would operate toward a goal of no woodlands lost time accidents. A variance of 0 accidents is applied to stress the importance placed on safety in the work place and to demonstrate that no work place accident is acceptable.
Monitoring & Measurement Periodic	Canfor's woodlands operation has a safety committee that is responsible for ensuring that standards are in place to promote safe work practices. All accidents are reported to a member of the safety committee once they occur and this is how LTAs will be tracked and monitored for reporting purposes. Monitoring and reporting the number of workplace LTAs will help Canfor identify problems with procedures and increase overall awareness in order to prevent future injuries and LTAs.
Annual	
Variance	0

6.2.1b Signage

SFMP Indicator Statement	6.2.1b The percentage of operational activities that have the appropriate safety signage in place during the activity, and removed following the completion.
CSA Core Indicator(s)	6.2.1 Evidence of co-operation with DFA-related workers to improve and enhance safety standards, procedures, and outcomes in all DFA-related workplaces and affected communities.
SFM Criterion	5. Society's responsibility
Element(s)	6.2. Safety
Value(s) and Objective(s)	*Value 6.2:* Commitment to safety *Objective 6.2:* Demonstrate that the organization is providing and promoting safe working conditions for its employees and contractors.

Strategies Description	People value being informed of most activities that take place on public lands including those associated with industrial forestry. Signage establishes a standard for safety and otherwise helps inform public about the nature and extent of industrial activity. Conversely, if signage is not kept current, credibility of the signs declines resulting in a potential safety hazard. With this indicator we will monitor our commitment to making information about our activities current and available to those traveling the roads and trails of the Mackenzie DFA.
Means of Achieving Objective & Target	Signage is posted as required by Canfor. Canfor's FMS Harvest Inspection Form refers to posting of adequate signage, including removal following completion.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Forecasting for this indicator is that signage on FSRs and main haul roads will be kept current. Modeling is not applicable to this indicator as it is a process indicator.
Target	100%
Basis for the Target	Targets for this indicator were established through PAG consensus.
Monitoring & Measurement Periodic	Canfor has a Forest Management System through which we track and report out on the posting and removal of signs. The signage requirement will be reported in the annual SFMP report for the operating year April 1st to March 31st.
Annual	
Variance	-20%

6.2.2 Safety Policies

SFMP Indicator Statement	6.2.2 Implementation and maintenance of certified safety program.
CSA Core Indicator(s)	6.2.2 Evidence that a worker safety program has been implemented and is periodically reviewed and improved
SFM Criterion	6. Society's responsibility
Element(s)	6.2 Safety
Value(s) and Objective(s)	*Value 6.2:* Commitment to safety *Objective 6.2:* Demonstrate that the organization is providing and promoting safe working conditions for its employees and contractors.
Strategies Description	Written policies ensure workers have proper training and guidance prior to commencing work. SOPs and safety policies have interviews/checks at some stage to confirm effectiveness.
Means of Achieving	Forest operations retain their safety program certification.

Objective & Target	
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Forecasting of this indicator is that Canfor will achieve 100% compliance with written safety policies. This is a process indicator and modeling is not applicable.
Target	1 Safety Policy
Basis for the Target	The target agreed to by the PAG will be compliance with safety policies as evidenced through safety audits and certification as a SAFE company. Safety audits reveal whether safety policies are required, if existing policies are being implemented and if the policies are effective. The results of the annual Safety Audits will be used to determine Canfor's compliance with the indicator.
Monitoring & Measurement Periodic	The data required to monitor this indicator is the written policy, proof it was administered to the workers, proof that the worker understands the policy, and proof of certification as a SAFE Company. The frequency of monitoring will be annual. Records to satisfy this indicator will be stored within the respective signatory's office, as per their document control procedures. The most recent analysis of the data will be contained within the SFMP Annual Report.
Annual	
Variance	0

7.1.1 Understanding of the nature of Aboriginal title and rights

SFMP Indicator Statement	7.1.1 FMG employees will receive First Nations Awareness training as per the FMG training Matrix.
CSA Core Indicator(s)	7.1.1: Evidence of a good understanding of the nature of Aboriginal title and rights
SFM Criterion	7: Aboriginal and treaty rights
Element(s)	7.1: Aboriginal and Treaty rights
Value(s) and Objective(s)	*Value 7.1:* Rights of Aboriginal peoples *Objective 7.1:* Recognize and respect the unique rights and values of Aboriginal Peoples.
Strategies Description	Section 35 of the Constitution Act states "The existing aboriginal and treaty rights of Aboriginal Peoples of Canada are hereby recognized and affirmed". Some examples of the rights that Section 35 has been found to protect include hunting, fishing, trapping, gathering,

	sacred and spiritual practices, and title. SFM requirements are not in any way intended to define, limit, interpret, or prejudice ongoing or future discussions and negotiations regarding these legal rights and do not stipulate how to deal with Aboriginal title and rights, and treaty rights. The first step toward respecting Aboriginal title and rights, and treaty rights is compliance with the law. Section 7.3.3 of the CSA Z809-16 Standard reinforces legal requirements for many reasons, including demonstrating that Aboriginal title and rights, and treaty rights have been identified and respected. The reality in demonstrating respect for Aboriginal title and rights, and treaty rights can be challenging in Canada's fluid legislative landscape and therefore it is important to identify these legal requirements as a starting point. It is important for companies to have an understanding of applicable Aboriginal title and rights, and treaty rights, as well as the Aboriginal interests that relate to the DFA. Both the desire of licensees to comply with laws and open communication with local First Nations requires that company staff members have a good understanding of Aboriginal title and rights and treaty rights.
Means of Achieving Objective & Target	The Licensee invests in cultural awareness and skill development by ensuring that appropriate Forest Management Group employees have received Aboriginal awareness training. Training is to occur as part of a training/orientation program for appropriate new employees, as outlined in each company's training matrix and the job function and responsibilities of each employee. Refresher training to occur every 5 years or sooner if training materials or Aboriginal law substantially change.
Current Status, Predicted Results or Outcome	In 2012 FMG developed a standardized slideshow which goes over elements of aboriginal awareness, and Canfor's commitments and obligations. Previous to that most employees had different forms of training.
Forecast	Forest operations that respect Aboriginal title and rights and reflect the timber and non-timber interests of local Aboriginals.
Target	100%
Basis for the Target	Canfor has a "Training Matrix" which stipulates which employees within the Forest Management Group (FMG) require this training. The target is that 100% of those who require the training as per the matrix, will receive the training.
Monitoring & Measurement Periodic	This indicator will be reported out on an annual basis and will apply to all full time and temporary staff employed during the reporting year. Acceptable training for meeting this indicator will be determined by Canfor and maybe varied by what level of understanding is required for the position being assessed.
Annual	
Variance	-10%

7.1.2 First Nations input into Forest Planning

SFMP Indicator Statement	7.1.2 The number of opportunities for First Nations to provide meaningful input into forest planning where active forest operations are within their respective traditional territories.

CSA Core Indicator(s)	7.1.2: Evidence of ongoing open and respectful communications with Aboriginal communities to foster meaningful engagement, and consideration of the information gained about their Aboriginal title and rights through this process. Where there is communicated disagreement regarding the organization's forest management activities, this evidence would include documentation of efforts towards conflict resolution. 7.2.1: Evidence of efforts to promote capacity development and meaningful participation for Aboriginal individuals, communities and forest-based companies. 7.2.2: Evidence of understanding and use of Aboriginal knowledge through the engagement of willing Aboriginal communities, using a process that identifies and manages culturally important resources and values.
SFM Criterion	7. Aboriginal relations
Element(s)	7.1 Aboriginal and treaty rights 7.2 Respect for Aboriginal forest values, knowledge, and uses
Value(s) and Objective(s)	*Value 7.1:* Aboriginal and treaty rights. *Objective 7.1:* Recognize and respect Aboriginal title and rights. Understand and comply with current legal requirements related to Aboriginal title and rights, and treaty rights. *Value 7.2:* Aboriginal peoples values, knowledge, and traditional uses *Objective 6.2:* Respect traditional Aboriginal forest values, knowledge, and uses as identified through an Aboriginal input process.
Strategies Description	This indicator was designed to list and report out on all documented opportunities provided to First Nations people to be involved in forest management planning processes. Incorporation of First Nations people and their unique perspective into the forest planning process is an important aspect of SFM. This indicator will contribute to respecting the social, cultural and spiritual needs of the people who traditionally and currently use the DFA for the maintenance of traditional aspects of their lifestyle. The Mackenzie SFM PAG is a process designed to identify public values and objectives within the DFA. Within the PAG process, First Nations has been identified as an important sector for representation.
Means of Achieving Objective & Target	Canfor currently has individual working relationships with local First Nations in the DFA and three specific First Nations have had representation at the Public Advisory Group table. All of these First Nations communities have had the opportunity for participation and input in the forest planning. Opportunities provided to First Nations to actively participate in forest planning include; referrals of operational plans, open houses at the First Nations offices, trade shows, formal operational meetings, and PMP meetings. Forest planning can include information sharing for both operational and tactical plans. Operational plans are currently referred to First Nations during the FSP process. Tactical plans that may be referred to First Nations include AIAs, operating plans, block and road referrals, and annual operating maps. Active forest operations are considered to be current harvesting, road construction, and mainline deactivation projects, planned vegetation management projects, as well as forest planning of new blocks and roads.
Current Status, Predicted	Refer to the most recent annual report for a table summarizing the current status for this indicator.

Results or Outcome	
Forecast	Forecasting for this indicator is that the number of opportunities given to First Nations people to become involved in the planning process will be sustained at a level of 2 opportunities per First Nation or greater over time, as the First Nations people become more involved with the SFM process. Modeling is not applicable to this indicator as it is a process indicator.
Target	≥ 2 per First Nation
Basis for the Target	First Nation communities have been reluctant to participate in these planning processes, due to the sensitivity surrounding treaty negotiations, the extent of travel, or lack of resources. However, the current target is set to ensure that Canfor continues to provide at least 2 opportunities per First Nation for involvement per year. This target was based on the opportunities that arose from the SFM PAG process as well as from the FSP process.
Monitoring & Measurement Periodic	FSPs prepared under the premise of this SFMP will provide First Nations communities within the DFA an opportunity to actively participate in forest planning. This type of public involvement is generally initiated through a request to provide input prior to the submission of the FSP. If First Nations communities express an interest in the FSP planning area, subsequent opportunities are made to ensure communication around identified areas of concern occurs and is fully documented. Efforts to solicit input from First Nations through the PAG process are also documented.
Annual	
Variance	0

7.2.1 Contract Opportunities for First Nations

SFMP Indicator Statement	7.2.1 The number of contract opportunities with First Nations within the DFA.
CSA Core Indicator(s)	7.2.1: Evidence of efforts to promote capacity development and meaningful participation for Aboriginal individuals, communities and forest-based companies. 5.2.3: Level of direct and indirect employment. 5.2.1 Level of participation and support in training and skills development the local area.
SFM Criterion	5. Economic and social benefits 7. Aboriginal Relations
Element(s)	5.2. Communities and sustainability 7.2 Respect for Aboriginal forest values, knowledge, and uses
Value(s) and Objective(s)	*Value 5.2:* Sustainable communities *Objective 5.2:* Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics. *Value 7.2:* Aboriginal peoples values, knowledge, and traditional uses

	Objective 7.2: Respect traditional Aboriginal forest values, knowledge, and uses as identified through an Aboriginal input process.
Strategies Description	This indicator is intended to monitor the impacts of forest industry and government activities on the ability of First Nations to access forestry related economic opportunities. At present, this indicator is not intended to assess how successful First Nations are at taking advantage of the opportunities. Canfor has explored forestry related opportunities with First Nations in the past and provides opportunities for all eligible bidders including First Nations to bid on projects. Capacity amongst the First Nations to take advantage of opportunities will likely have to be addressed in order for available opportunities to be acted upon. This indicator tracks the existence of opportunities available.
Means of Achieving Objective & Target	Canfor has worked on agreements with some of the First Nations outside of the SFM/CSA process.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Forecasting for this indicator is that the number of contracts entered into with First Nations will be reported. Modeling is not applicable to this indicator as it is a process indicator.
Target	>5
Basis for the Target	Targets are established based on the amount of opportunities that will be provided to First Nations to bid on forestry related contracts.
Monitoring & Measurement Periodic	This is a process indicator and monitoring will consist of reporting out on the indicator. The status and trend for this indicator will be summarized and reported in the SFMP Annual Report.
Annual	
Variance	-2

7.2.2 First Nations Concerns

SFMP Indicator Statement	7.2.2 The percentage of operational concerns raised by First Nations that are considered and incorporated into operational and/or tactical plans.
CSA Core Indicator(s)	7.2.2: Evidence of understanding and use of Aboriginal knowledge through the engagement of willing Aboriginal communities, using a process that identifies and manages culturally important resources and values. 7.2.3 Level of management and/or protection of areas where culturally important practices and activities occur. 7.1.2: Evidence of best efforts to obtain acceptance of management plans based on Aboriginal communities having a clear understanding of the plans.
SFM Criterion	7. Aboriginal relations

Element(s)	7.2 Respect for Aboriginal forest values, knowledge, and uses
Value(s) and Objective(s)	*Value 7.1:* Rights of Aboriginal peoples *Objective 6.1:* Recognize and respect the unique rights and values of Aboriginal Peoples. *Value 7.2:* Aboriginal peoples values, knowledge, and traditional uses *Objective 7.2:* Respect traditional Aboriginal forest values, knowledge, and uses as identified through an Aboriginal input process.
Strategies Description	Ensuring issues of operational concern raised by First Nations as a result of forest management decisions are evaluated by Canfor demonstrates respect for their unique perspective and historical connection with the forest. Recognition of First Nations forest values, knowledge, and uses is an important component of sustainable forest management. Monitoring issues of concern raised by First Nations with respect to the forest operations is the intent of this indicator. This indicator will compare the number of operational concerns that have been acted on relative to the total number of first nations operational concerns raised. This indicator contributes to respecting the social, cultural heritage and spiritual needs of people who traditionally and currently use the DFA for the maintenance of traditional aspects of their lifestyle. Monitoring how issues raised by First Nations are addressed reflects Canfor's commitment to SFM.
Means of Achieving Objective & Target	Concerns from First Nations generally arise during the planning processes and are included in the "Comments" section of the FSP along with Canfor's response to the concern and any strategies that will be employed to address the concern. Failure to adhere to the operational plan would be considered an Incident under Canfor's FMS and is tracked in that manner. Canfor currently tracks the number of issues and response to First Nations' concerns, as well as the timeliness of responses using a communication framework entitled "Creating Opportunities for Public Interest Process" (COPI). The framework assists in establishing goals that support good communication, defining how the communications process will operate, defining who will be responsible, and measuring system performance through the use of key performance indicators. Operational plans are generally FSPs. Tactical plans can include AIAs, operating plans, and block and road referrals.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	Forecasting for this indicator is that the 100% percent of issues raised by First Nations peoples are evaluated and responded to in a timely manner and it is anticipated this goal will be met. The exact level of success is not easily predicted as it relies on unpredictable factors such as human error. Modeling is not applicable to this indicator as it is a process indicator.
Target	100%
Basis for the Target	The indicator's target of 100% demonstrates Canfor's commitment to addressing issues raised by First Nations during the planning process. A variance of 10% is established to recognize that not all operational concerns brought forward by First Nations can be incorporated into the planning process.

Monitoring & Measurement Periodic	All communications will be documented within Canfor's databases, which will enable tracking of all communication and responses. A summary of the percentage compliance with the procedures will be reported on an annual basis for the operating period of April 1 to March 31.
Annual	
Variance	-10%

8.1.1 Reportable Spills

SFMP Indicator Statement	8.1.1 The number of EMS reportable spills.
CSA Core Indicator(s)	None
SFM Criterion	3 Soil and water
Element(s)	3.1 Soil quality and quantity 3.2 Water Quality and Quantity
Value(s) and Objective(s)	*Value 3.1:* Healthy and abundant soil resource *Objective 3.1:* Conserve soil resources by maintaining soil quality and quantity. *Value 3.2:* Healthy aquatic ecosystems *Objective 3.2:* Conserve water resources by maintaining water quality and quantity.
Strategies Description	The Hazardous Waste Regulation of the Environmental Management Act requires any spill in excess of the reportable level for that substance is immediately reported by the person involved or an observer to the Provincial Emergency Program (PEP) by telephoning 1-800-663-3456 or 387-5956. Table 11 outlines the volumes reportable under the Environmental Management Act:

Table 11. Reportable spill substances and volumes.

Substance	Legally Reportable Quantity Spilled*	Canfor EMS Reportable Quantity Spilled*
Petroleum Products	100 L	50 L
Antifreeze (undiluted)	5 L	5 L
Battery acid	10kg	10kg
Grease	100 L	50 L
Paints and solvents	100 L	50 L
Pesticides	1 kg	1 kg

*Spill: any concentrated spill greater than the quantity indicated in table, or any amount spilled into or immediately adjacent to a stream, lake or running water.

	This indicator is intended to monitor the number of spills that occur from forest operations and evaluate the success of indicators to reduce such spills. The use of heavy equipment for forest operations can result in accidental petroleum/ antifreeze release into the environment. As these materials can be toxic to plants, animals, fish and downstream domestic and agriculture users, their proper containment contributes to sustainable forest management. By tracking spill occurrence, guidelines and procedures can be adjusted to improve weaknesses in their handling and transportation.
Means of Achieving Objective & Target	Canfor currently has procedures in place for reducing and reporting spills. FMS checklists and monitoring procedures require the proper storage, handling, and labelling of controlled products. Such indicators include proper storage tank construction, the use of shut off valves, availability of spill kits, and the construction of berms where required. FMS procedures also include the steps to be taken in the event of a spill. Previous to the SFM planning process there was inconsistencies in spill tracking and it is difficult to determine what historical practices have been. However, as a result of this SFMP, the number of reportable spills will be monitored and reported in the future.
Current Status, Predicted Results or Outcome	Refer to the most recent annual report for a table summarizing the current status for this indicator.
Forecast	The indicator target is expected to be achieved, but the exact degree of success is not easy to quantifiably forecast, as the success of meeting the target is at least partially subject to the unpredictability of machinery. A reportable spill event is a major release of toxic materials into the environment and the subsequent damage to plants, animals, fish and downstream domestic and agriculture users could be extensive and costly to rehabilitate. The loss of such materials at a level higher than 5 reportable spills a year represents a significant failure in the management of petroleum and/ or antifreeze, and represents serious flaws in current practices. While 5 or less reportable spills annually may be the result of unavoidable accidents, more than 5 reportable spills would probably represent human error and suggest procedures need to be improved. It is the intent of this indicator to monitor the success of current procedures and to reduce human errors to an absolute minimum.
Target	0
Basis for the Target	The establishment of the target was a result of the regulatory requirements and FMS already in place. In addition to the legal requirements for 100% compliance, the target also recognizes the danger these substances pose to soil and water resources. However, despite the efforts made to control these materials, people and machinery are fallible and spills may still occur. For these reasons a variance of 5 or less reportable spill incidents per year has been established. Canfor will continue to implement their FMS programs for spill prevention and if targets are not being met they will take a coordinated approach to determine procedures to do so.
Monitoring & Measurement Periodic	Monitoring procedures are outlined in Canfor's standard operating procedures and Fuel Management Guidelines. The use of FMS checklists is designed to ensure handling and storage of chemicals, petroleum products, and other controlled substances is as per regulations and the FMS requirements. If a reportable spill occurs corrective and preventative actions will be identified to improve consistency. Canfor will track spill events in their FMS databases.

Annual	
Variance	<5

5.8 Monitoring and Reporting

The position/person responsible for ensuring the information needed is gathered and placed in the appropriate information management system will be identified in the Responsibility Matrix. The Responsibility Matrix will also indicate who is responsible for reporting on the various indicators. A monitoring plan will be developed and implemented for each indicator. The monitoring plan will identify;

- The indicator
- The threshold/ targets for the indicator
- The measurement unit to be used
- The spatial/geographic scale to be used
- How frequent the data is to be collected
- The source of the data
- Knowledge gaps
- The estimated cost of monitoring

6.0 TACTICAL LEVEL PLANNING

This section describes the aspects of SFM Planning that occur at the tactical planning level for the DFA, as outlined in the SFM Framework document. The objective of the tactical level is to establish a detailed forest management strategy or scenario that is sustainable for a range of forestry related values. This level localizes planning to meet the broad goals developed in the strategic planning level.

Tactical planning includes defining the forest area and its present conditions as well as identifying and selecting values to be maintained in a sustainably managed forest. At this level of planning, inventories are prepared and future forest conditions are forecasted. If current conditions do not meet the goals of sustainability, a range of alternative strategies are designed and forecast to assess their effectiveness in meeting sustainability targets and goals. The strategy that best meets the goals of sustainability is selected in consultation with the stakeholders.

It is at this level that the DFA specific decision support tools for planning are implemented. The decision support tools include: scenario design, forecasting, natural disturbance strategies, multi-criteria analysis (MCA), and trade-off analysis. The results of the implementation of these tools are used to assess the sustainability of current conditions and to design an alternative sustainability scenario, if necessary.

Tactical level assessments and planning will identify strategies and best management practices that are considered sustainable. The operational level is the place where those practices are described and implemented to meet sustainability targets. Operational level plans such as Forest Development Plans (FDPs), Forest Stewardship Plans (FSPs), and internal site plans are currently used for this purpose in the DFA. The indicators and targets detailed in Section 5.2 provide direction for the development of sustainability practices that are included within the SFM Plan and future FSPs.

The process by which tactical level planning is undertaken includes:

- Assessing the current conditions, those that are external and those that are controllable by the signatories;
- Implementing the multi-criteria analysis and assessing sustainability values;
- Forecasting out current conditions under alternative scenarios; and
- Assessing the outcome against sustainability targets to develop a preferred scenario in an adaptive management framework.

6.1 Assessment of Current Conditions

The following provides an assessment of the current conditions for the Mackenzie DFA to determine if the current management strategies are sustainable (i.e. if the current practices and rules will result in the desired future ecological and socio-economic conditions for the DFA over the long term).

This process by which assessment is undertaken includes:

- Identifying external impacts and constraints spatially where possible;
- Identifying and incorporating natural disturbance;
- Identifying/describing current practices;
- Linking the practices to indicators.

The information outlined in this section influences the MCA process, the forecasting, and the final determination of sustainability at this point in time – the preferred scenario

6.1.1 External Impacts

At this point, external impacts are limited to three non-replaceable forest license (NRFLs) holders and a forestry license to cut holder in the TSA which may operate within the DFA. These Licensees are:

Mackenzie Fibre Management Corp.	150,000m^3(Conifex portion)
Kwadacha Natural Resource Agency;	53,404 m^3
Tsay Keh Dene Band;	53,404 m^3
Norbord Inc.	50,000 m^3 (deciduous leading)
Total:	306,808 m^3

Because the volume is apportioned on the TSA and not the DFA, it was determined that the best alternative was to determine a proportional cut that would likely occur within the DFA. Based on volume, the proportional amount of volume attributable to the DFA was determined to be 898,730 m^3. This was the volume that was incorporated into the current and forecasted analyses.

This is a significant amount of volume and poses a threat to landscape level indicators. At this time a Licensee Working Group is being explored with intentions of having all Licensees in the TSA working on this together and ensuring that all information is reported and analyzed accordingly.

6.1.2 Natural Disturbance Regime

Natural disturbance plays an important role on all forest values at the stand and at the landscape level. Within the SFM Framework, natural disturbance is considered an input to forest management, not a driver. For this reason, natural disturbance plays a role in the assessment of current practices.

In order to understand the effects of natural disturbance on the DFA, the first step is to identify natural disturbance agents that have historically, and currently affect the ecosystems being managed by Canfor. In order to integrate natural disturbance regimes into SFM, parameters and assumptions are to be made about the potential impact of natural disturbance regimes on resource levels.

Natural disturbance regimes for such agents as fire, insects and disease, are summarized below but the specific details can be found in the Development of a Natural Disturbance Strategy for Sustainable Forest Management which describes the Historic Fire Trends and Data gaps as well as historic trends in insect and disease activity for the Mackenzie DFA.

Fire

Fire, has a significant impact on forest ecology and the resulting landscape. Fire damage is consistently recorded in the Mackenzie TSA by the MFLNRO&RD's Wildfire Management Branch. The lowest amount of area affected was in 2007 at 38 ha, and the largest amount of area affected was in 2006 at 9361 ha. The majority of damage occurs in June, July, and August. In BC, lightening is the cause of 50% of forest fires (Ministry of Forest and Range 2008). Human-caused fires account for the other 50% and usually start close to communities, where they are reported quickly and dealt with quickly (Ministry of Forest and Range 2008, Natural Resources Canada 2007). Fire damage is not equal across tree types, conifers burn 5 to 10 times faster than deciduous trees as a result of resin in the bark and needles whereas deciduous trees are considered more resistant to fire after leaf flush. Fire disturbance can be frequent in boreal forest types because of the combustible nature of the trees and its warm, dry climate which permits severe fire weather. Fires in the boreal forest typically kill most trees (Natural Resources Canada 2007).

Insects and Disease

Aerial overview surveys conducted by the MFLNRO&RD between 1999 and 2007 detected a variety of forest health agents including bark beetles, defoliators, abiotic damage, and animal damage. Despite the fact that the province is currently experiencing a mountain pine beetle epidemic of historical proportions, it is the western balsam bark beetle that has the greatest hectares of incidence over that time period.

Table 12. 1999-2007 Mackenzie TSA Aerial Overview Results

	Hectares of Incidence[10]								
Forest Health Factor	1999	2000	2001	2002	2003	2004	2005	2006	2007
Western Balsam Bark Beetle	446915	282223	53021	221214	410987	559083	613746	358028	183085
Mountain Pine Beetle	1355	674	1529	6003	969	13703	104211	270540	215326
Spruce Beetle	1	4543	2511	28202	133244	4005	40	N/A	2
Large Aspen Tortrix	N/A	N/A	N/A	N/A	68936	32359	4295	1172	781
Two-year Cycle Budworm	378560	0	2091	N/A	44170	N/A	N/A	N/A	N/A
Windthrow	N/A	N/A	N/A	137	N/A	N/A	N/A	N/A	N/A
Fire	N/A	N/A	2753	904	N/A	N/A	2165	9360	38

Although the western balsam bark beetle has the greatest incidence in the TSA over the past six years, it is the mountain pine beetle that has captured the greatest attention, largely because of the commercial value of the trees being attacked, the widespread incidence of the infestation, and the exponential growth of the attack.

6.1.3 Current Management Practices

The assessment of current management practices is two-fold: 1) an articulation of the current management regime by describing the standard operating practices and regulations followed in

[10] Source: Forest Health Strategy and Tactical Plan, Mackenzie TSA, March 2008

the Mackenzie DFA; and 2) the determination of how these practices impact the sustainability of forestry related values in the management area.

Once the Practices Matrix is completed, this section will summarize the current management practices and create linkages between the practices to the indicators. Linking current practices to each indicator provides information as to how practices are affecting sustainability targets through time and space. This assessment will also identify the level of risk to each indicator if current practices continue.

6.1.4 Forecasting

Forecasting is an explicit statement of the expected future condition, through time, of an indicator. It is a critical step in assessing SFM. Input layers (i.e. indicator maps, natural disturbance regimes, etc.), along with rule-sets (i.e. current management practices), are used to forecast forest conditions over time using a simulation model. The projections are used to compare the indicators to sustainability targets using current practices over time in order to assess the level of risk to each indicator.

Indicators in the current plan as well as potential indicators selected by the Mackenzie DFA Public Advisory Group are reviewed by technical experts for their suitability and credibility for measuring and forecasting. A forecasting strategy for each of these indicators will be developed, which includes spatial, temporal and analytical methods.

6.1.5 Multi-Criteria Analysis – Assessment of Sustainability

The Multi-Criteria Analysis (MCA) is an assessment of how well the current management strategy meets the targets identified for the indicators of sustainability. The MCA process consists of two components: technical and public. It assists in determining if current conditions, assumptions, and practices forecasted over time, are sustainable for the range and balance of values. If the assessment shows that current conditions are sustainable, then an operational plan is developed and/or modified for the DFA, highlighting any required changes as a result of the strategies developed in the SFM Plan.

Canfor and Mackenzie Fibre have approved Forest Stewardship Plan. The strategies outlined in the FSP are consistent with those described within the SFM Plan. If the assessment shows that current management scenario is not sustainable then alternative scenarios may be developed in order to meet sustainability objectives. A MCA provides input into the development of alternative scenarios.

The MCA that was undertaken for this SFM Plan focused on soliciting input into the development of scenarios as well as assessing the suitability of the forecasted results. A questionnaire was used to determine the PAG's priorities by assessing values attributed to both the criterion and indicator levels. The questionnaire can be found in the PAG Records files.

Technical MCA

The technical MCA requires that the most up to date indicators and management practices be used. Technical specialists use this information as summarized in management scenarios to determine if:

- sustainability levels are clearly sustainable;
- sustainability levels are clearly unsustainable, or
- sustainability levels are marginal and whether that state is improving, relatively steady or declining over the forecast period.

For this SFM Plan, the technical analysis was completed by a contractor under the Forest Investment Account Land-Base Investment Program which was administered by Canfor as per the terms of the Memorandum of Understanding.

Public MCA

The public MCA is meant to identify what stakeholders feel are the most important criteria within a DFA. Each member of the public advisory group was asked to rank value of the criteria (Value Assessment), the sustainability risk of each of the criteria (Sustainability Risk Assessment), and to distribute 100 points amongst the criteria.

The use of public weighting schemes to prioritize certain criteria/indicators is helpful where trade-offs may be required, and where decision-makers need a rationale and objective basis for choosing between different stakeholder priorities. This process can lead to increased stakeholder inclusion and support in resource management decisions (Sheppard, Meitner).

Alternative management scenarios may be required if the initial baseline forecast shows that key indicators are not being met under current operational practices. If the alternative scenarios and innovative design still do not lead to sustainability across the indicators, trade-offs may have to be considered. Input from the public on their tolerance for trade-offs of indicators would be solicited in addition to the MCA. Ultimately, the decision-makers for a management unit take the input from the MCA and Trade-off Analysis, if applicable, as part of the decision-making process. Understanding the public's priorities, their tolerance for risk, and the input from technical specialists can assist managers in refining targets, practices, and/or the overall management scenario.

To solicit criteria priorities from PAG members, each member of the PAG was asked to independently go through the following steps:

Step 1. Rank each of the 9 criteria from 1 (the one which is the most important to your sector) to 9 (the one which is the least important to your sector). Each number can be used only once, that is, only one criterion can be ranked with a 1 (most important), only one criterion can be ranked with a 2 (second most important), etc.

Step 2. Distribute 100 points as the PAG member sees fit across the criteria that they believe are the most important. Points can be allocated to a single criterion, distributed evenly across all criteria, or weight the indicators by putting more points to some criteria. Once distributed the total points must equal 100.

Step 3. Rank each of the 9 criteria from 1 (the element that you fear is at most risk of not being achieved or accomplished) to 9 (the element that you are least worried about or, to put it another way, most confident will be achieved or accomplished).

The following figures (Figure 12 – Figure 16) summarize the results of the MCA process for the Mackenzie DFA PAG. For all figures the following applies: Criterion 1 – biological richness; Criterion 2 – productivity; Criterion 3 – carbon; Criterion 4 – economic forest industry; Criterion 5 – economic non-timber; Criterion 6 – diversified economy; Criterion 7 – public participation; Criterion 8 – First Nations; Criterion 9 – quality of life. The number of responses was 11 of 20 PAG representatives.

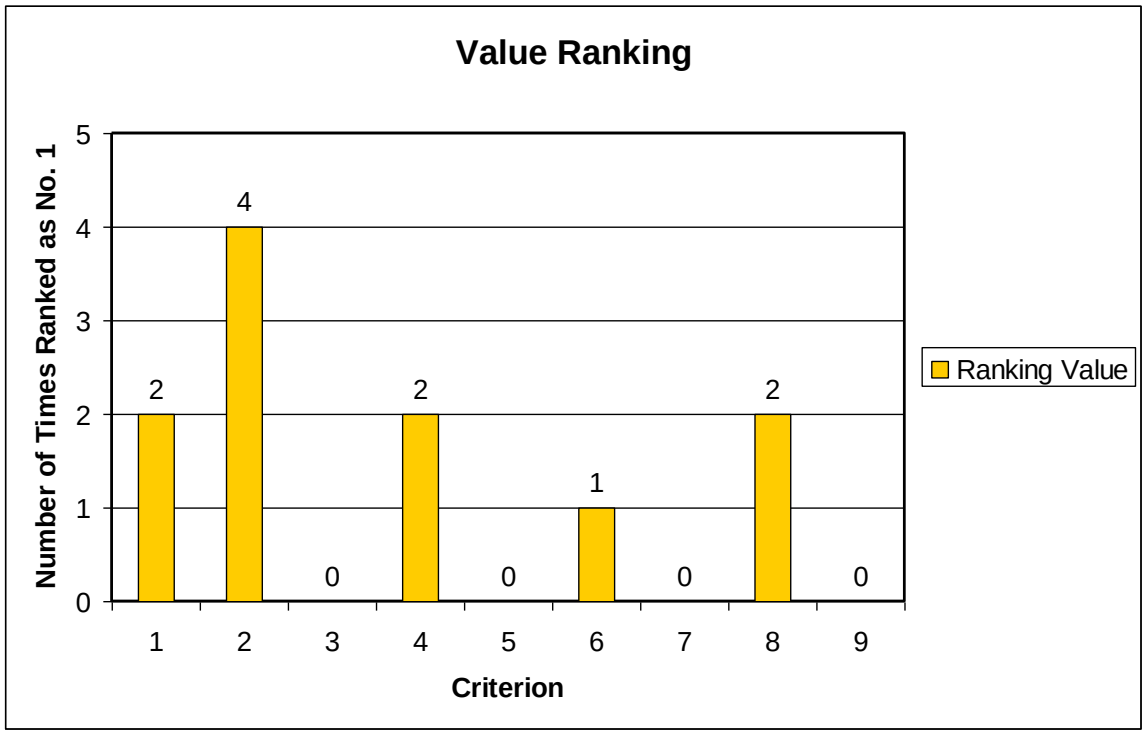


Figure 12. Criteria value ranking.

Figure 12 shows the number of times PAG members ranked a criterion as being most important to their sector (i.e. ranked as No. 1). This shows that PAG members ranked Criterion 2 – productivity – as being most important more often than any other criterion.

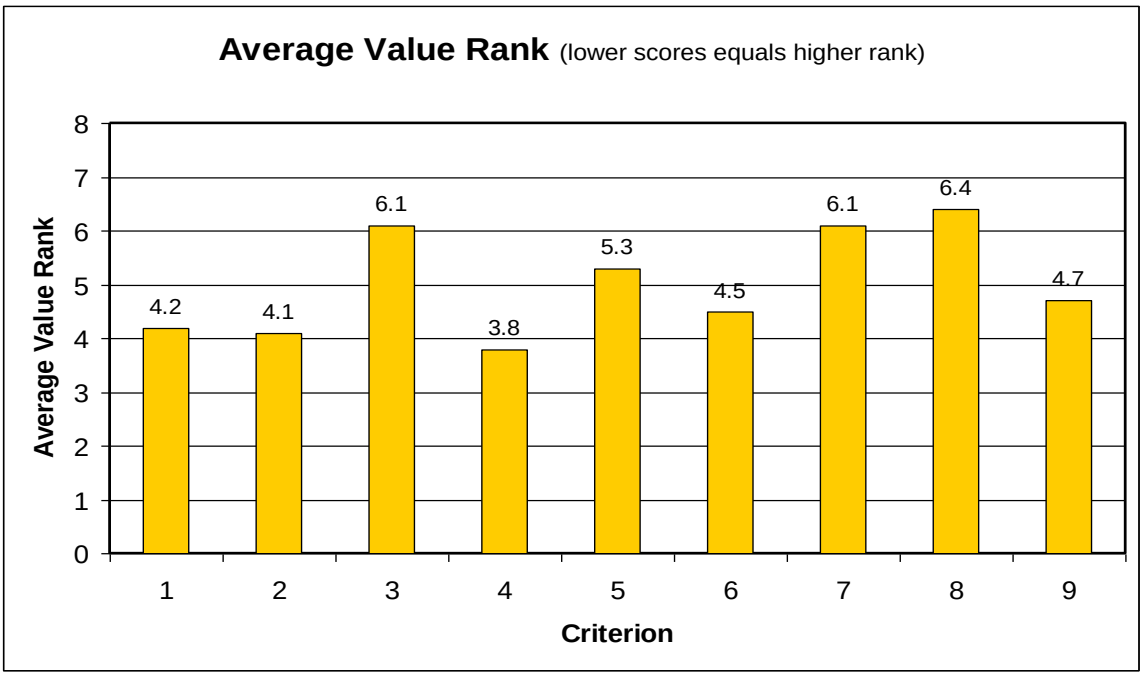


Figure 13. Average criterion ranking.

Figure 13 show the average ranking for each of the criteria. Since ranking is from 1 to 9, 1 being the highest ranking of value and 9 the lowest, a lower score indicates a higher priority ranking. This figure indicates that criteria 1, 2, and 4 (biodiversity, forest productivity, and economic forest industry respectively) have a high priority for the PAG, whereas criteria 3, 7 and 8 have the lowest priority.

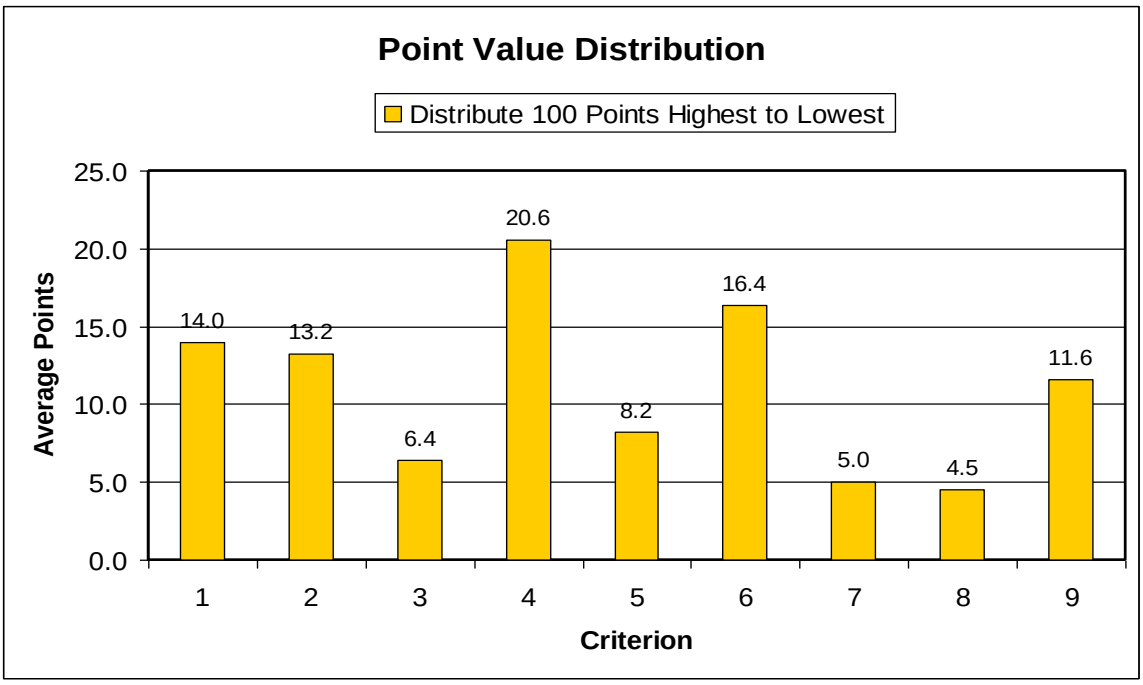


Figure 14. Average point distribution.

How the PAG distributed the points is shown in Figure 14. Once again, it shows that Criterion 4 has a high importance, along with Criterion 6, whereas Criteria 3, 7, and 8 have a lower importance.

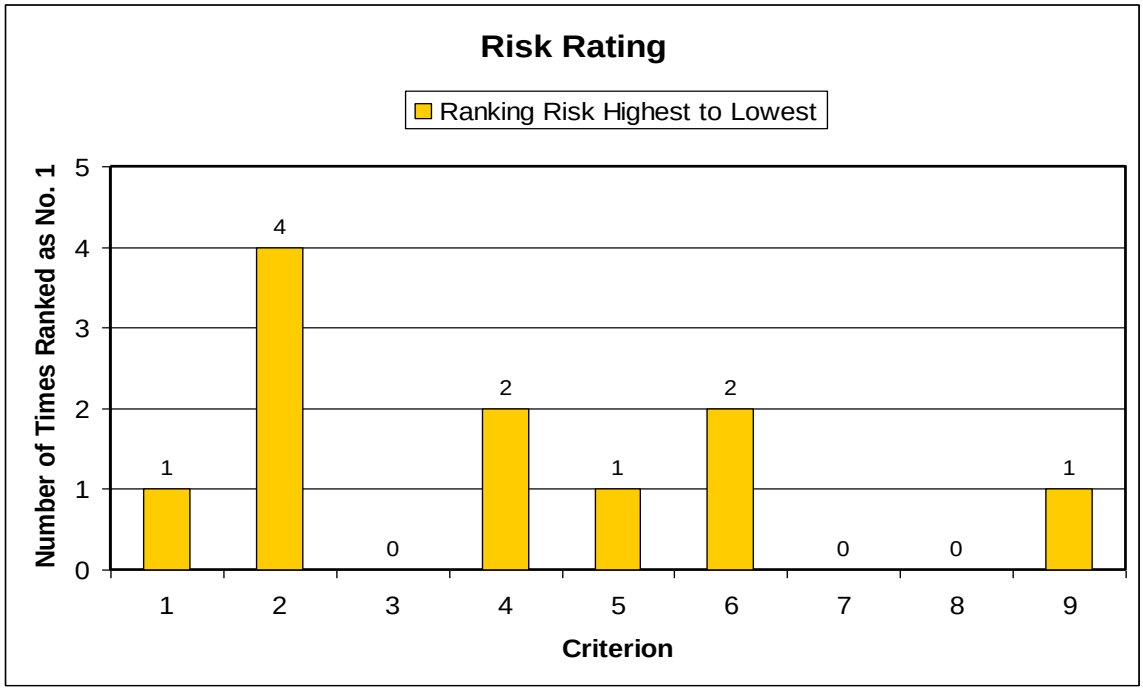


Figure 15. Criterion risk ranking.

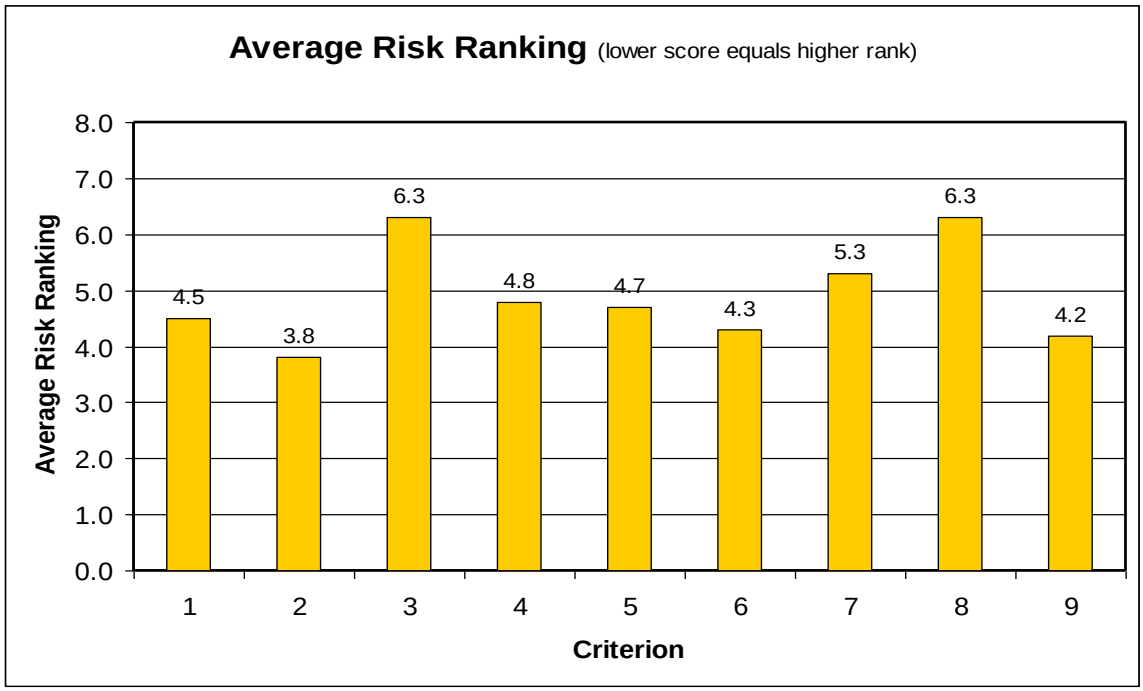


Figure 16. Average risk ranking.

Figures 16 and 17 show the how the PAG ranked the relative risk to a particular criterion not being achieved or accomplished. These figures indicate that the PAG feels that Criterion 2 has the greatest risk of not being achieved whereas Criteria 3 and 8 are ranked as having a low risk.

Interpretation of the analysis indicates that Criterion 2 is considered high priority and importance by the PAG, and the greatest risk of not being accomplished. Also ranked highly were Criteria 1 and 4. This indicates that the PAG believes that healthy, productive ecosystems, biodiversity, and an economically sustainable forest industry are of greatest importance. The ranking of Criterion 2 as of highest importance is a recognition of the important role that healthy, productive ecosystems have in sustaining both biodiversity and an economically sustainable forest industry.

Despite this, Figure 14 shows that points were distributed amongst all criteria, indicating a desire to sustain the full range of SFM values within the DFA and that all criteria are important to some degree.

6.1.6 Default Approach to Assessing Current Practices

The Mackenzie DFA has not been able to complete the above processes of assessment of current management practices for a number of logistical reasons. As a result, the "default" to assess current management practices is to use the most current TSR data package, analysis report, rationale, and other recent DFA analysis. These are used to develop a "base case" against which other scenarios are compared to determine the potential impact of the scenarios.

6.2 Design of Sustainability Scenarios

Alternative scenarios were undertaken as part of the SFM planning process. They have been used to test the current management strategy for how sustainable it is, to test alternative approaches, and as a part of forecasting some of the indicators. The information is also used to determine scenarios that are operationally feasible, publicly acceptable and technically appropriate for the DFA's criteria and indicators. The process of evaluating a scenario involves examining forecasts for each indicator's response to the implementation of the strategy, and determining the degree to which targets are met. This process requires that DFA resource managers understand the interactions and linkages between the indicators to know when changing a strategy to improve one particular indicator may then improve or negatively impact another.

In some cases, changing a practice may lead to sustainability and in others changing a target or threshold for a particular indicator may be required. The analysis may lead to tradeoffs amongst indicators. As new data becomes available and as the public and managers gain more insight into resource management, more robust scenarios will be developed for future iterations of the SFM Plan.

6.2.1 Design of Alternative Scenarios

Forecasting, undertaken for each scenario, allows the forest manager and the PAG to analyze various scenarios (i.e. management decisions) based on the projected future forest condition. Input for the development of scenarios came from:

- Mackenzie DFA PAG,
- Current management practices and assumptions,
- MCA questionnaire,
- Canfor and BCTS (former SFM partner),
- Technical specialists experienced in analysis and forecasting.

The scenarios listed below describe quantitative outputs using indicators capable of being modeled. Scenarios were purposely designed to be plausible. In other words, the implementation of a given scenario would not necessarily preclude the achievement of one or more criteria or indicators as would be the case if, for example, a "no harvest" scenario was forecast. A "no harvest" scenario would potentially result in the inability to achieve economic indicators and is therefore not a reasonable alternative. The scenarios that were developed and presented to the PAG were:

Scenario 1: Base Case
Scenario 2: Habitat Richness Emphasis
Scenario 3: Species Composition
Scenario 4: Caribou Recovery Emphasis

Scenario 5: Non-Timber Economic Emphasis
Scenario 5A: Manual brushing
Scenario 6: Worst Case Forest Health on Mature Stands Emphasis
Scenario 6A: Unsalvaged Losses
Scenario 7: Worst Case Forest Health on Regenerating Stands Emphasis

Details of each of the scenarios, underlying assumptions, and the results of the comparative analysis are in Appendix C. The results of the forecasting process was presented and reviewed by the PAG. A comparison of the relative long-term implications is provided in Table 14. Results of the forecasting exercise indicate that the developed scenarios had a relatively small impact on long-term timber harvesting at current levels, with Scenario 2 (Biodiversity Emphasis) having the greatest impact and Scenario 5 (Non-timber Economic Emphasis) have virtually no impact (Appendix C – Figure 1).

A final report on the development, methods, assumptions, and results used in the forecasting exercise is pending.

6.2.2 Preferred Scenario

PAG representatives and alternates in attendance were asked to select their first, second, and third choices from all of the forecast scenarios presented. A weighting of 3 points was assigned to each #1, 2 points for each #2, and 1 point for each # 3. The results indicate that scenarios 2 and 6A were ranked highest with scenarios 4, 3, and 5A also receiving points. After discussion with the PAG, it was agreed that a combination of scenarios 2, 3, 4, and 6A could be implemented without any undue affect on other indicators. Individually, none of these scenarios has a significant impact on short-term harvest levels, although there is an impact on medium and long-term harvest levels. It is not yet known what the cumulative effect would be of implementing all three scenarios. Impacts, if any, will be monitored and strategies adjusted and presented to the PAG if unexpected impacts are encountered.

Table 13. Long-term impacts of scenarios on selected indicators.

Scenario:	1	2	3	4	5	5A	6	6A	7
Indicator	Base Case	Habitat Richness	Species Composition	Caribou Recovery	Non-Timber Economic	Manual Brushing	Worst Case MPB	Worst Case MPB plus beetles	Worst Case Health, young stands
Timber Harvest	o	--	--	- or o	o	-	-	--	-
Old Forest	o	+	o	o	o	o	o	- or o	o
Old Interior Forest	o	+	o	o	o	o	o	- or o	o
Ungulates	o	+ or o	o	+	o	o	o	o	o
Patches	o	o	o	o	o	o	o	o	o
Scenic Areas	o	+ or o	o	o	+	+	o	o	o
Wildlife Tree Retention	o	+	o	o	o	o	o	o	o
Species Diversity	o	+ or o	+	o	o	o	o	o	o
Jobs	o	--	--	- or o	o	- or o	-	--	-

o = neutral impact + = positive impact - = negative impact

The number of symbols indicates the relative degree of impact.

6.2.3 Trade-off Analysis

Analysis of the preferred scenario did not highlight any major conflicts between indicators; therefore a formal trade-off analysis was not required. As outstanding projects are completed, new data becomes available. Subsequently, as new alternatives are developed a formal trade-off analysis may be required. The decision to undertake a trade-off analysis will be discussed with the PAG at that time.

7.0 OPERATIONAL LEVEL PLANNING

The operational planning level reflects the "on-the-ground" imprint of the implementation of the strategies identified through tactical level activities. The operational plan essentially translates these strategies into site-specific practices and forest management activities in the context harvesting, silviculture and road building. As such, forestry activities will be implemented and adjusted over time to meet sustainability targets.

Operational implementation allows licensees to harvest sustainably where and when markets and efficiencies dictate, within the confines of the tactical plan and in a manner broadly consistent with the strategic level plan.

Operational plans generally span a 20-year time period. From that, annual scheduling of operations is completed, usually covering a five-year planning horizon. The operational planning level adheres to all required legislation but acts more as a reporting function than as a mechanism to approve operations.

The collection of the data to satisfy the majority of specific monitoring plans is also completed at this level. The assessment of monitoring information is described in the Adaptive Management Section (8.0) of this SFMP.

7.1 Sustainability Practices

The challenge for operational plans is to provide unambiguous instructions for forest practices. Vague statements often lead to unintended or deliberate misinterpretation. However, highly prescriptive plans tend to constrain the flexibility and professional judgment that is often necessary to achieve desired outcomes, particularly when one considers the diversity of social, economic and ecological values across this province. Plans need to be an appropriate mix of unambiguous, yet flexible, prescriptions and guidelines, and still be easily assessable and enforceable. The Forest Stewardship Plan needs be reflective of this mix. Sustainability practices for forest management, applicable at the local level, will provide the guidance for the specific site conditions and assist in designing plans and procedures to contribute to meeting sustainability targets.

Sustainability practices are developed at the tactical level but implemented at the operational level. The development of sustainability practices at the tactical level provides a longer-term plan that clearly link strategic planning with operational options. The operational level is where the results of the practices are evaluated (via monitoring programs) against the strategic goals.

Resource professionals and managers need to develop sustainability practices that reflect the requirements set out at the strategic and tactical levels. These practices include:

- Harvesting
- Silviculture
- Roads & Road Building
- Rehabilitation/Restoration

Forecasting indicates that current practices are sustainable. Current practices of the signatories are detailed in their respective Standard Operating Procedures (SOPs) or similar documents.

7.2 Operational Plans/Schedules

The FSP is considered an operational component of the SFM Plan. The FSP is designed to provide operational flexibility while adhering to legislative requirements and other Higher Level Plans.

The FSP process allows for input by stakeholders into operational activities. Concerns or comments are recorded, tracked, and addressed prior to finalizing the plan. Current copies of approved and/or proposed FSPs may be viewed at Canfor and Mackenzie Fibre's offices during business hours.

Canfor Operational Plan Summary
Canfor operations are based on an identified supply of timber, stemming from a 20-year forecast of available volume. The FSP is the sole government approved operational plan under which licensees operate in accordance with the Forest and Range Practices Act (FRPA).

Canfor's FSP was approved by the MLNRO on February 26, 2007 and was amended and extended on February 12, 2012. Under FRPA, it is no longer required to identify the location and approximate size and shape of proposed blocks. Instead, areas that are identified for operations are included in a Forest Development Unit (FDU), within which the licensee has the discretion to locate blocks. In exchange for this operational flexibility, licensees must detail in their FSP how it will achieve a variety of objectives. These include objectives in respect to:

- Old Growth Management Areas,
- Soils,
- Wildlife,
- Riparian Areas,
- Landscape-level and Stand-level Biodiversity,
- Visual Quality and Scenic Areas,
- Cultural Heritage Resources,
- Recreation,
- Wildlife Habitat Areas and Ungulate Winter Ranges,
- Lakeshore Management Zones, and,
- Community and Fisheries Sensitive Watersheds.

In addition, the spread of invasive plants, natural range barriers, and stocking standards are also included in the FSP.

In recent years, Canfor has consolidated their operations in their southern operating areas in response to the mountain pine beetle outbreak. As the outbreak spread into the TSA from the south and west, Canfor responded by moving their harvesting operations into these areas in order to concentrate on harvesting beetle-attacked stands as well as those stands susceptible to mountain pine beetle attack. By doing so it is hoped that the spread of the outbreak can be minimized while capturing the economic value of the dead and/or dying timber. Operations in their northern operating areas is confined to silvicultural and road maintenance activities.

8.0 ADAPTIVE MANAGEMENT

Adaptive Management (AM) recognizes change as a constant factor so it is necessary to understand the root causes of what has, and may be changing. This requires learning how the economic, social and ecological systems change and reconfigure in response to human attempts to manage these systems.

The desired concept of sustainability is described through management goals and objectives, with the associated uncertainties and risks translated into learning objectives. A structured monitoring process is used to generate results, which are then evaluated in terms of their validity, relevance and significance. Through the evaluation process, monitoring information is combined with values, experience, training and intuitive thinking in order to achieve shared knowledge and derive meaning that is useful in developing recommendations for adaptations to management practices, the overall plan, etc.

To be successful, AM also requires decision-makers to acknowledge that uncertainty is a given.

Therefore, SFMP's need to recognize the reality of uncertainty and work within it, rather than eliminate it. This has implications in how the problems are defined and the mandate given to those who are responsible for addressing the problems.

A comprehensive AM approach has been developed to address the needs of a corporate forest company in relation to SFM. The resultant AM framework consists of:

- Corporate level strategies for developing and maintaining the necessary corporate culture to support effective use of AM;
- Program level approaches for incorporating AM principles into strategic, tactical and operational planning processes to create the necessary context for successful use of AM at the project-level. For example, the mobilizing force for implementing SFM policies, and;
- Project level assessment of opportunities/benefits/costs for utilizing various AM approaches on a project-by-project basis.

Continuous improvement, as exemplified in an AM Framework, is built in to the SFM system. The initial steps include:

- Monitoring
- Evaluation and analysis
- Reporting
- Adjustment

The following sections will detail how the steps will work together to instigate the continuous improvement loop of the SFM Planning process.

8.1 Monitoring Plan

Once the C&I and their related indicators have been established by the technical experts, forest practitioners and the PAG and technical experts, monitoring plans will be established for each indicator.

8.2 Evaluation & Analysis

As monitoring information is warehoused in the information management system, it will be evaluated for completeness and accuracy and then analyzed against the targets and thresholds developed for the DFA.

8.3 Reporting

A summary of the analyses of the monitoring information will have to be reported to the PAG, the technical specialists used in the initial SFMP development and to various government agency managers.

8.4 Adjustment

As part of the AM/continual improvement loop, the analysis and reporting steps may lead to necessary adjustments. Adjustments may be made to practices, indicators or targets, depending on the analysis. Adjustments may be undertaken through the PAG process or through current government processes.

8.5 Strategic Review

Management Review of plans, policies or strategies is not a new component of forest management. What may be new is the content of what will be reviewed: performance indicators as defined by the SFM system. Or the fact that the review is annual and has a formal process for the review, reporting and resulting decisions about a portion or all of the SFMP.

Management review of the SFM Plan will be conducted in accordance with Canfor's FMS. The management review will discuss, among other things, performance indicators and targets pertaining to the SFM Plan and strategic priorities. Required improvements will be determined including an appropriate action plan, prioritized, documented, and implemented. These actions will also be tracked in accordance with Canfor's FMS.

The SFM Plan will also be reviewed at least annually by the PAG. The PAG review will include;

- Strategic direction of the plan (i.e. whether the plan continues to reflect the values of the public),
- Updates to the plan,
- Achieved levels of performance indicators and targets,
- Proposed actions to address required improvements,
- Any other required improvements to the SFM Plan such as;
    - Updates to the plan or related processes (such as monitoring),
    - Addition, deletion, or modification of indicators and targets,

9.0 INFORMATION MANAGEMENT

Over time, information management has become an increasingly essential component of resource management, and it becomes even more important with the science-based, integrated nature of the SFM Framework. A variety of information needs to be warehoused in easily accessible formats including scientific background data and reports, resource inventory data, forecasting results, key uncertainties, risks, implementation reports and monitoring/evaluation outcomes. Corporate planning and operations staff and, in some cases, personnel from several levels of government and stakeholders need access to the system to input and extract information. A cooperative, multi-user information management system supports the shared learning and resultant knowledge approach of adaptive management, and the hierarchical structure of the Framework.

The development of new data and the amalgamation of existing data into the SFM hierarchical planning framework and operational implementation require time and effort. IMS standards are outlined to reflect the unique characteristics of the data, analysis and reporting needs of the SFMP, and the IMS partners in the DFA.

An effective information management system includes the following characteristics:

- Standardized data formats for existing and new data;
- Multi-agency and corporate management through a designated group; and
- A powerful data warehouse structure

9.1 Data Standards

Much of the data generated in conjunction with the SFM Plan is generic across the industry and definitions and/or indicators follow industry standards. Examples of this may be the measurement of area to one-tenth of a hectare, the measurement of volume in cubic metres, or the definition of a lost-time accident. Data standards for more specialized or specific work, such as resource inventories, will follow provincial standards unless a variance to these standards is documented and agreed to by the Province. Links to these standards can be found at http://www.for.gov.bc.ca/hcp/fia/landbase/.

Standards for data developed through monitoring and quantifying indicators or targets are specified in the monitoring plan for each indicator. Reporting data will be in a standardized format as outlined in the Current Status Table.

9.2 Data Management

Data that is not required to be shared will be managed in accordance with Canfor's business processes.

9.3 Data Storage

Canfor has approached information storage from three directions;

1. Scientific data and reports, and resource inventory data –The information will be stored in accordance with Canfor's procedures. Data, reports, and inventories

arising from publicly funded work (e.g. Forest Investment Account) will also be stored in the appropriate, publicly-accessible repository.

2. SFM support documents – documents that support the SFM Plan, but are not included in the plan will be stored on Canfor's servers. Such documents may include PAG documents. Hard copies of documents will be stored in accordance with Canfor's FMS.
3. SFM documents – documents that are an integral part of the SFM Plan (i.e. the plan and associated appendices) will be stored on an external, publicly-accessible website. Hard copies of documents will be stored in accordance with Canfor's FMS.

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