



A SUSTAINABLE FOREST MANAGEMENT PLAN FOR THE MACKENZIE DEFINED FOREST AREA

January 2010

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

Mackenzie DFA Sustainable Forest Management Plan

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 BC Timber Sales (BCTS) (hereinafter referred to as “the signatories”) intend to achieve certification to Canadian Standards Association (CSA) Z809-02 Sustainable Forest Management Standard. Responsibilities and commitments of the signatories to the SFMP focus on achieving the goal of sustainable forest management (SFM) which in turn will satisfy the performance requirements for certification.

As signatories to this plan, Canfor and BCTS believe in conducting business in a fashion that protects the environment while ensuring sustainable development of forests. Their commitments 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, the signatories outline commitments to sustainable forest management by providing:

Mackenzie DFA Sustainable Forest Management Plan

- 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 values and statements of criteria, indicators, 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 the signatories, 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.

Mackenzie DFA Sustainable Forest Management Plan

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:

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SIGNATURES

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



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Mackenzie DFA Sustainable Forest Management Plan

Mackenzie DFA Sustainable Forest Management Plan

TABLE OF CONTENTS

EXECUTIVE SUMMARY	I
ACKNOWLEDGEMENTS.....	III
SIGNATURES.....	V
TABLE OF CONTENTS	VII
LIST OF APPENDICIES.....	X
LIST OF TABLES.....	X
LIST OF FIGURES.....	XI
1.0 INTRODUCTION.....	13
2.0 DEVELOPMENT OF THE SFMP	14
2.1 Purpose and Context	14
2.2 CSA Requirements	15
3.0 BACKGROUND TO THE SFMP	15
3.1 Signatories to the SFMP	15
3.1.1 Signatory Background	15
3.1.2 Commitments to SFM by Canfor	15
3.1.3 Commitments to SFM by BCTS	17
3.1.4 Joint Commitments to SFM by the Signatories.....	20
3.2 The Plan Area.....	21
3.2.1 General Area Description	21
Biophysical Description	21
Communities and Socio-Economic Description.....	22
3.2.2 The Mackenzie DFA.....	23
3.3 Existing Processes within the Mackenzie DFA.....	27
3.3.1 Public Processes.....	27
3.3.2 Other Planning Processes.....	28
3.4 First Nations.....	29
3.4.1 Tsay Keh Dene	30
3.4.2 Kwadacha Nation	30
3.4.3 McLeod Lake Indian Band.....	30
3.4.4 Takla Lake Band	31
3.4.5 Nak'azdli First Nations.....	31
3.4.6 Halfway River First Nation	31
3.4.7 West Moberly First Nations	31
3.4.8 Saulneau First Nations	31

Mackenzie DFA Sustainable Forest Management Plan

3.4.9 Treaty 8.....	32
3.5 Structure and Responsibility for Implementing SFM.....	32
3.5.1 Public Involvement.....	32
3.5.2 First Nations Involvement.....	33
3.5.3 Responsibilities	33
Ownership Responsibilities.....	33
Shared Responsibilities and User Rights.....	36
Regulations.....	37
SFMP Steering Committee Responsibilities	38
Public Advisory Group Responsibilities	38
Manager and Employee Responsibilities	38
3.6 SFMP Links to Federal and Provincial Documents.....	38
4.0 ESTABLISHING THE FOUNDATION FOR SFM PLANNING.....	41
4.1 Stakeholder Analysis	41
4.2 Practices Analysis.....	42
4.3 Inventory Analysis and Knowledge Gaps.....	42
4.4 Decision Support Tools.....	43
5.0 STRATEGIC LEVEL PLANNING.....	44
5.1 Values, Objectives, Indicators, and Targets	44
5.2 Indicators and Targets	45
Indicator #1 Old Forests.....	45
Indicator #2 Interior Forest.....	48
Indicator #3 Biodiversity Reserve Effectiveness.....	50
Indicator #4 Productive Forest Representation	52
Indicator #5 Patch Size.....	54
Indicator #6 Coarse Woody Debris	56
Indicator #7 Wildlife Trees	57
Indicator #8 Riparian Area Management Effectiveness.....	59
Indicator #9 Sedimentation.....	61
Indicator #10 Stream Crossings.....	63
Indicator #11 Peak Flow Index.....	65
Indicator #12 Road Re-vegetation.....	67
Indicator #13 Road Environmental Risk Assessments.....	68
Indicator #14 Species within the DFA	70
Indicator #15 Sites of Biological Significance	72
Indicator #16 Soil Conservation.....	74
Indicator #17 Terrain Management	76
Indicator #18 Reportable Spills.....	78
Indicator #19 Site Index	81
Indicator #20 Site Conversion	83
Indicator #21 Permanent Access Structures	84
Indicator #22 Communication of planned Deactivation Projects.....	86
Indicator #23 Regeneration Delay.....	87
Indicator #24 Free Growing	89

Mackenzie DFA Sustainable Forest Management Plan

Indicator #25 Prioritizing harvest of damaged stands	90
Indicator #26 Harvest Volume	92
Indicator #27 Waste and Residue	95
Indicator #28 First-order Wood Products.....	96
Indicator #29 Local Investment.....	98
Indicator #30 Contract Opportunities for First Nations.....	100
Indicator #31 Range Management Effectiveness	101
Indicator #32 Satisfaction (PAG)	102
Indicator #33 Representation (PAG)	104
Indicator #34 Input into Forest Planning.....	105
Indicator #35 Public and Stakeholder Concerns.....	107
Indicator #36 Access to SFM Information	109
Indicator #37 SFM educational opportunities	110
Indicator #38 Heritage Conservation.....	111
Indicator #39 First Nation input into Forest Planning	113
Indicator #40 First Nations Concerns	115
Indicator #41 Visual Quality	116
Indicator #42 Resource Features	118
Indicator #43 Safety Policies.....	119
Indicator #44 Accidents.....	120
Indicator #45 Signage.....	122
5.3 Monitoring and Reporting.....	124
6.0 TACTICAL LEVEL PLANNING	124
6.1 Assessment of Current Conditions.....	125
6.1.1 External Impacts	125
6.1.2 Natural Disturbance Regime	126
Fire.....	126
Insects and Disease.....	126
6.1.3 Current Management Practices	127
6.1.2 Indicator Mapping.....	127
6.1.3 Forecasting	128
6.1.4 Multi-Criteria Analysis – Assessment of Sustainability.....	128
Technical MCA	128
Public MCA.....	129
6.1.6 Default Approach to Assessing Current Practices	133
6.2 Design of Sustainability Scenarios	133
6.2.1 Design of Alternative Scenarios.....	134
6.2.2 Preferred Scenario	134
6.2.3 Trade-off Analysis	136
7.0 OPERATIONAL LEVEL PLANNING	136
7.1 Sustainability Practices	137
7.2 Operating Plans/Schedules.....	137
8.0 ADAPTIVE MANAGEMENT	139
8.1 Monitoring Plan.....	140

Mackenzie DFA Sustainable Forest Management Plan

8.2 Evaluation & Analysis	140
8.3 Reporting	140
8.4 Adjustment.....	140
8.5 Strategic Review	141
9.0 INFORMATION MANAGEMENT	141
9.1 Data Standards.....	142
9.2 Data Management	142
9.3 Data Storage.....	142
10.0 LITERATURE CITED	144

LIST OF APPENDICIES

- Appendix A – LSC MOU between Canfor and BCTS
- Appendix B – SFMP Public Advisory Group / TOR / DFA map
- Appendix C – Species within the DFA
- Appendix D – A comparative analysis of alternate strategies
- Appendix E – Maps
- Appendix F – Sustainable forest criteria and indicator matrix
- Appendix G – Glossary of terms and abbreviations

LIST OF TABLES

Table 1: Employment and Income within the DFA.....	23
Table 2. A summary of land classification in the Mackenzie DFA.	24
Table 3. A summary of operating areas within the Mackenzie DFA.	27
Table 4. Active planning processes on-going in the Mackenzie TSA.....	28
Table 5. Area of operations within the Mackenzie DFA.	34
Table 6. Mackenzie TSA Apportionment compared to projected DFA harvest.....	36
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.	40
Table 8. A summary of existing resource inventories and assessments that have been conducted on the Mackenzie Defined Forest Area.	43

Mackenzie DFA Sustainable Forest Management Plan

Table 9: Productive Forest Ecosystem by BEC	53
Table 10 Patch size categories for resource management zones.....	55
Table 11. Reportable spill substances and volumes.	79
Table 12. Predicted site index (PSI) versus inventory site index (Inv. SI) for selected biogeoclimatic zones/subzones in the Mackenzie TSA	82
Table 13. 1999-2007 Mackenzie TSA Aerial Overview Results	126
Table 14. Long-term impacts of scenarios on selected indicators.....	136

LIST OF FIGURES

Figure 1. The continual improvement model for SFM (CSA 2008). The steps that define an adaptive management approach should be incorporated within this model.	14
Figure 2. Species distribution in the timber harvesting land base in the Mackenzie DFA.....	25
Figure 3. Age class distribution in the non-harvestable and timber harvesting land base in the Mackenzie DFA.	26
Figure 4. Areas over which BC Timber Sales and Canadian Forest Products Ltd. conduct forest development operations within the Mackenzie Defined Forest Area in north-central British Columbia.	35
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.....	41
Figure 7. Old forest across the DFA versus target and relative contribution from NHLB and THLB, base case.	47
Figure 8. Old forest in the Akie LU Grouping ESSF BEC zone, enhanced biodiversity emphasis option (BEO).....	48
Figure 9. Old interior forest (ha) in the Mackenzie DFA at present and in 20 years versus target.	50
Figure 10. 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).	60
Figure 11. Peak flow index calculations (BC Min. of Forests).	66

Mackenzie DFA Sustainable Forest Management Plan

Figure 12. Forecasted harvest of timber in the Mackenzie Defined Forest Area of north-central British Columbia.	94
Figure 13. Criteria value ranking.....	130
Figure 14. Average criterion ranking.....	131
Figure 15. Average point distribution.	131
Figure 16. Criterion risk ranking.....	132
Figure 17. Average risk ranking.....	132

1.0 INTRODUCTION

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 recently 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 Z809-02 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.

2.0 DEVELOPMENT OF THE SFMP

2.1 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, 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, criteria, indicators, and targets support implementation sustainable forest management at the local level. The CSA set forth CSA Standard Z809-02 that defines the requirements and provides guidance for implementing SFM on a Defined Forest Area.

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 (e.g., Forest Investment Account). 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. .

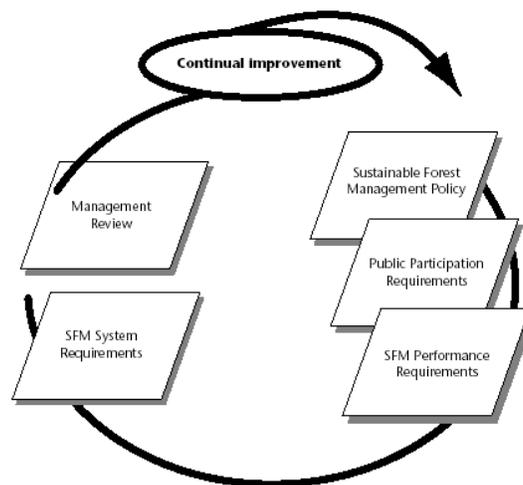


Figure 1. The continual improvement model for SFM (CSA 2008). The steps that define an adaptive management approach should be incorporated within this model.

Mackenzie DFA Sustainable Forest Management Plan

2.2 CSA Requirements

This SFMP serves as the primary guidance by translating commitments to SFM into management actions and documents the manner in which Canfor and BCTS adhere to the CSA recommended requirements for certification. The signatories 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 documentation of this was presented during the registration audit.

3.0 BACKGROUND TO THE SFMP

3.1 Signatories to the SFMP

Each party that is signatory to the SFMP is committed to the development, implementation, and maintenance of SFM on the Mackenzie DFA. Commitments to SFM on the part of the signatories are supported by a Memorandum of Understanding (MOU; Appendix A). The signatories to this SFMP are:

- Canfor – Mackenzie Division
- BCTS – Prince George Business Area

3.1.1 Signatory Background

Based in Vancouver, BC, Canfor is the largest producer 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 700,000 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 m³/yr.

BCTS is an independent organization within the Ministry of Forests and Range (MoFR) created to develop timber for auction, to establish market price, and to capture the value of the asset for the public. BCTS has 12 business areas and an operational presence in 33 locations across the province. The organization is a key component of provincial government's plan to revitalize the BC forest economy. BCTS currently manages approximately 20 percent of the provincial AAC. The AAC for BCTS on the Mackenzie DFA is 768,886 m³/yr.

3.1.2 Commitments to SFM by Canfor

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

Mackenzie DFA Sustainable Forest Management Plan

As a preparatory step to CSA SFM certification Canfor has adopted an environmental management system (EMS) 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 EMS is essential to ensure the fulfillment of all CSA SFM requirements.

Forestry Principles

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

- **Ecosystem Management** – We will use the best available science to develop an understanding of ecological responses to natural and human-caused disturbances. We will incorporate this knowledge into higher level and operational plans by applying ecosystem management principles to achieve desired future forest condition.
- **Scale** – We will define objectives over a variety of time intervals (temporal scales), and at spatial scales of stand, landscape and forest.
- **Adaptive Management** – We will use adaptive management to continually improve forest ecosystem management. This will require the development and application of collaborative research and monitoring programs.
- **Old Growth** – We will include old growth and old growth attributes as part of our management strategies and philosophy in the forests where we operate.
- **Timber Resource** – We will ensure a continuous supply of affordable timber in order to carry out its business of harvesting, manufacturing and marketing forest products. Canfor will strive to maximize the net value of the fibre extracted for sustained economic benefits for employees, communities and shareholders.
- **Forest Land Base** -- We advocate the maintenance of the forestland base as an asset for the future.
- **Health and Safety** – We will operate in a manner that protects human health and safety.
- **First Nations** -- We will pursue business partnerships and cooperative working arrangements with First Nations to provide mutual social, cultural, and economic benefits and to address mutual interests.
- **Communities** – We will engage members of the public, communities and other stakeholders in the delivery of the Forest Principles. The process will be open, transparent and accountable.
- **Accountability** – We will be accountable to the public for managing forest to achieve present and future values. We will use credible,

Mackenzie DFA Sustainable Forest Management Plan

internationally recognized, third party verification of our forestry operations as one way of demonstrating our performance.

Environmental Policy (April 2008)

Canfor is 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 to our sustainable forest management planning activities
- Promote environmental awareness throughout our operations
- Conduct regular audits of our forest and environmental management system
- Communicate our sustainable forest management and environmental performance to our Board of Directors, shareholders, employees, customers, and other interested parties

Canfor's commitments to SFM are available and communicated publicly.

Canfor's Forestry principles may be viewed at:

<http://www.canfor.com/sustainability/certification/iso.asp>

Environmental Policy may be viewed at:

<http://www.canfor.com/sustainability/corporate/policy.asp>

A summary of Canfor's EMS may be viewed at:

<http://www.canfor.com/sustainability/manufacturing/ems.asp>

3.1.3 Commitments to SFM by BCTS

BC Timber Sales (BCTS) is a stand-alone organization within the Ministry of Forests and Range. BCTS was created to develop Crown timber for public auction to establish market price and cost benchmarks, and capture the value of the timber asset for the public. BCTS is responsible for managing 20 percent of the provincial Crown allowable annual cut, or approximately 16.5 million cubic metres of timber. All of BCTS' operating areas within the Mackenzie DFA have implemented an Environmental Management System (EMS) and are certified under the International Organization for Standardization ISO 14001 standard.

BCTS shares the Ministry's vision of *"diverse and sustainable forest and range values for BC"* and its mission to *"protect, manage and conserve forest and range values"*

Mackenzie DFA Sustainable Forest Management Plan

*through a high-performing organization*¹. These shared values, along with BCTS' own Vision Statement, Environmental Policy and Sustainable Resource Management Policy demonstrate BCTS – Prince George Business Area's commitment to Sustainable Forest Management (SFM) for the Mackenzie Defined Forest Area (DFA). These commitments are communicated and available to the public at the links noted.

In the fall of 2005, BCTS, Prince George Business Area, accepted an invitation to join with Canfor – Mackenzie to develop a Sustainable Forest Management Plan for their operations within the Mackenzie Timber Supply Area (TSA). The completion, implementation and maintenance of this SFMP further demonstrate BCTS' commitment to sustainable forest management and help BCTS achieve their vision.

Vision Statement

The vision of BCTS is to be an *“effective timber marketer generating wealth through sustainable resource management”*.

In achieving our mandate, we:

- believe unsafe is unacceptable;
- are respected managers of public forests;
- have engaged, skilled, motivated and proud employees;
- have a relentless focus on results;
- continually seek learning, and efficient, effective and innovative business practices; and
- are an integral part of the B.C. economy, providing value to our customers, stakeholders and the Province.

Environmental Policy (August, 2009)

The British Columbia Ministry of Forests and Range, BC Timber Sales Program (BCTS) manages and administers timber harvesting and related forest management activities on BCTS timber sale licences and related tenures on Crown forestland throughout British Columbia.

- Comply with all relevant environmental legislation, regulations and the other requirements to which we subscribe.
- Strive for excellence in forest management by continually improving the performance of resource management activities and practices.

¹ Vision Statement and Mission Statement, Ministry of Forests and Range, 2006/07-2008/09 Service Plan, <http://www.bcbudget.gov.bc.ca/2006/sp/for/Vision,MissionandValues5.htm>.

Mackenzie DFA Sustainable Forest Management Plan

- **Maintain** a framework that sets and reviews environmental objectives and targets and promotes the prevention of pollution associated with BCTS forestry activities.
- **Monitor** and evaluate key BCTS forestry operations.
- **Communicate** BCTS business activities and policies to all staff and make them available to the public.



BC Timber Sales

SUSTAINABLE FOREST MANAGEMENT POLICY

BC Timber Sales is committed to managing and administering forest management activities on our operations through effective measures that ensure *sustainable forest management (SFM)*.

It is the policy of BC Timber Sales to:

Conduct our forest management activities to comply with relevant legislation, regulations, policies and other requirements to which we subscribe.

Provide public participation opportunities.

Confer with, and provide opportunities for participation by, Aboriginal Peoples.

Respect and recognize Aboriginal title and rights, and treaty rights.

Maintain an organizational culture where all staff proactively participate in providing conditions and safeguards for the health and safety of staff, clients and the public.

Honour all international agreements and conventions to which Canada is a signatory.

Improve knowledge of the forest and SFM, monitor advances in science and technology, and incorporate these advances where applicable.

Promote awareness of SFM to our clients and the public.

Strive for excellence in forest management by continually improving the performance of resource management activities and practices.

A handwritten signature in black ink, appearing to read "Jim Sutherland".

Jim Sutherland, RPF
Director of Forestry
BC Timber Sales

February 5, 2010

Mackenzie DFA Sustainable Forest Management Plan

BCTS' Sustainable Resource Management Policy outlines their commitment to manage their operations through effective measures that ensure sustainable resource management. The policy may be viewed at:

<http://www.for.gov.bc.ca/ftp/TPG/external/!publish/SFMS/SRMP.pdf>

BCTS' Environmental Policy may be viewed at:

http://www.for.gov.bc.ca/ftp/TPG/external/!publish/EMS2/Folder%20-%20Manual/EMS_Policy.pdf

3.1.4 Joint Commitments to SFM by the Signatories

Canfor and BCTS support business practices that protect and enhance the environment for the use of current and future generations. They are committed to the goals of SFM and to a process that will continually improve their environmental performance and stewardship. As signatories to this plan, Canfor and BCTS will adhere to the following principles:

- 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 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 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 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.

Mackenzie DFA Sustainable Forest Management Plan

3.2 The Plan Area

3.2.1 General Area Description

The Mackenzie DFA is situated in the northeast interior of BC wholly within the Mackenzie TSA. Spanning approximately 6.1 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.

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.

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.

Forests are primarily mixed stands with the predominant commercial species being Engelmann spruce (*Picea engelmannii*), white spruce (*Picea glauca*)², lodgepole pine (*Pinus contorta*) and subalpine fir (*Abies lasiocarpa*)³. 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.

² 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.

³ Although the fir in the DFA is subalpine fir, it is commonly referred to as "balsam", but it is not balsam fir (*Abies balsamea*).

Mackenzie DFA Sustainable Forest Management Plan

- 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.

Communities and Socio-Economic Description

The Mackenzie TSA is sparsely populated with approximately 95% of the total estimated population of 6,360 (BC Gov 2000) situated in the community of Mackenzie. The remaining population is located in small communities including Germansen Landing, Manson Creek, Fort Ware and Tsay Keh or in a few dispersed rural settlements.

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, the Kemess South Mine, trapping 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

Mackenzie DFA Sustainable Forest Management Plan

Ingenika Band), the Kwadacha Nation (formerly the Fort Ware Band), the Takla Lake Band, the Nak'azdli First Nation, the, the McLeod Lake Band, the Gitksan Nation, the Wet'suwet'en Nation and members of the Treaty 8 Tribal Council (West Moberly First Nations, Saulteau First Nations, 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 have members of the Noostel Keyoh residing within the TSA.

The AAC for the TSA is approximately 3,000,000 m³/yr. The AAC is apportioned to Canfor's Mackenzie Division, Abitibi Consolidate Company of Canada, BCTS and First Nations. Timber revenues to government in the form of stumpage, federal and provincial taxes approximate \$105 million annually.

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 important economic players, the signatories can potentially influence local policies that would encourage economic diversity in their communities.

Table 1: Employment and Income within the DFA

Employment Sector	Number Employed	Percent	Total Income (millions)	Percent
Forestry	2022	66.9%	\$97.0	80.4%
Mining and processing	12	0.4%	\$0.2	0.2%
Fishing and Trapping	15	0.5%	\$0.0	0.0%
Agriculture and Food	23	0.8%	\$0.0	0.0%
Tourism	261	8.6%	\$4.7	3.9%
High Tech.	17	0.6%	\$0.0	0.0%
Public Sector	576	19.1%	\$16.9	14.0%
Construction	50	1.7%	\$1.5	1.2%
Other	45	1.5%	\$0.4	0.3%
TOTAL	3021		\$120.7	

Source: BC Stats

3.2.2 The Mackenzie DFA

The Mackenzie DFA occupies the southwest and east central portions of the Mackenzie TSA and covers approximately 2.12 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 2.12 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).

Mackenzie DFA Sustainable Forest Management Plan

Table 2. A summary of land classification in the Mackenzie DFA⁴.

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
Exclusions			
Land Not BCFS	33,297	33,297	
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	219,821	112,820	
Reductions (NHLB)			
Balsam marginal	21,709	13,373	
Spruce marginal	35,491	26,431	
Pine marginal	6,216	3,512	
Deciduous marginal	40,910	33,634	
Deciduous Far	74,780	42,664	
Problem Forest	235,326	66,155	
Low volume	121,890	44,549	
Low productivity	43	35	
WHA	49,745	7,925	
UWR	8,093	6,681	
WTP (spatial)	73,679	35,821	
WTP (non-spatial)	151,803	71,236	
Riparian			
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

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*), poplar⁵

⁴ Based on data used for forest modelling exercise, DFA boundary adjustments were finalized later.

⁵ Both balsam poplar (*Populus 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”

Mackenzie DFA Sustainable Forest Management Plan

(*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”⁶ 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.

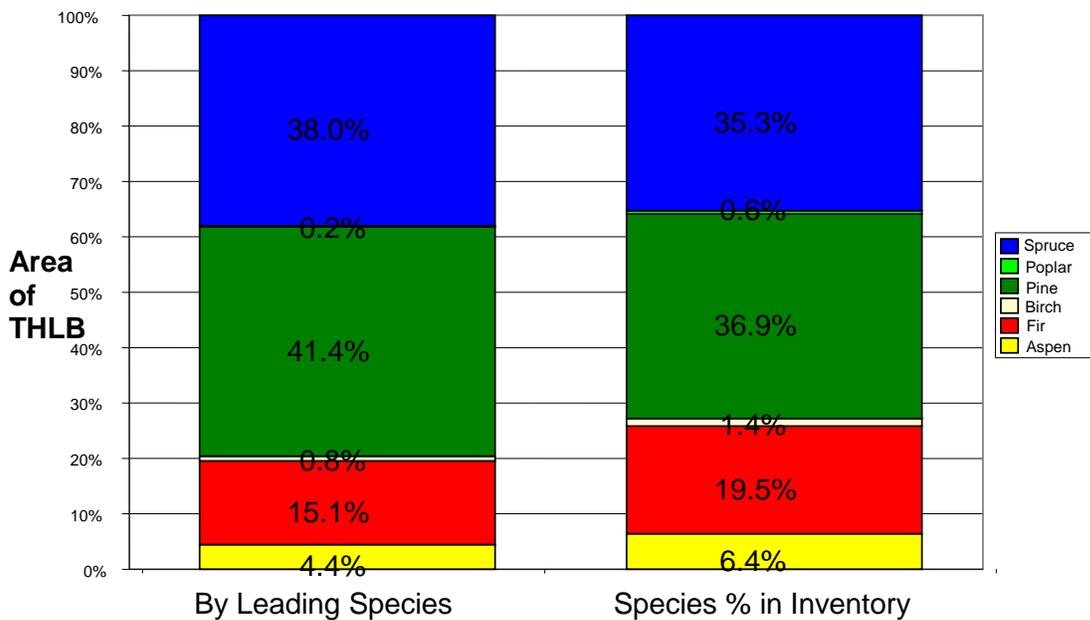


Figure 2. Species distribution in the timber harvesting land base in the Mackenzie DFA.

⁶ Old is defined as per the “Biodiversity Guidebook” and the Mackenzie LRMP

Mackenzie DFA Sustainable Forest Management Plan

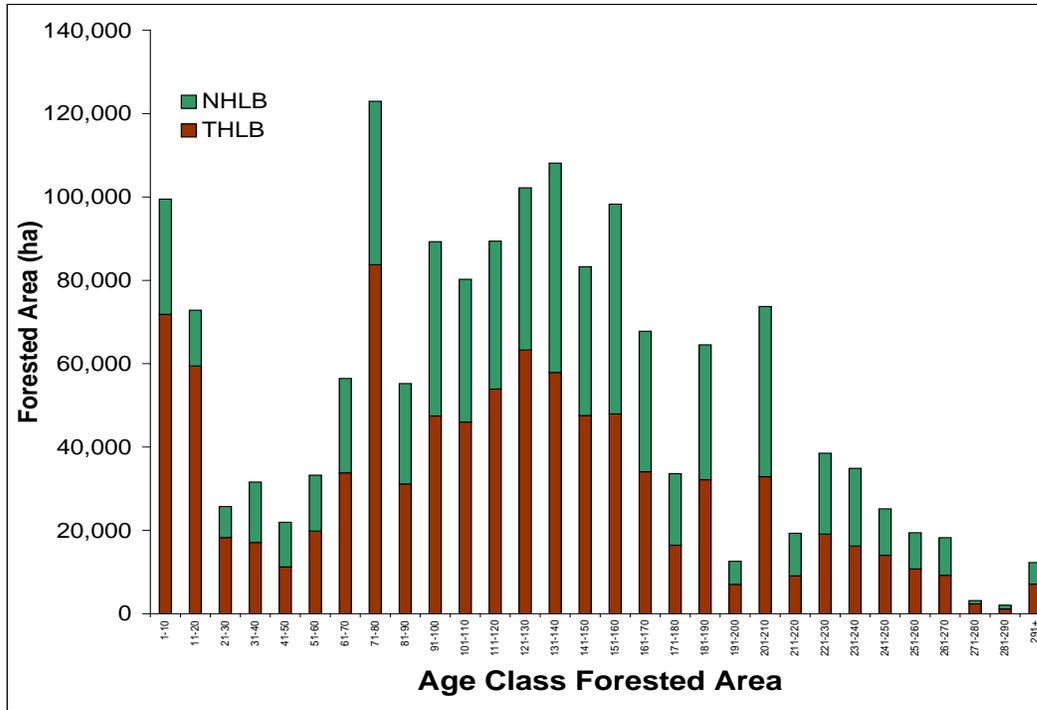


Figure 3. Age class distribution in the non-harvestable and timber harvesting land base in the Mackenzie DFA.

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:

- 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.

Mackenzie DFA Sustainable Forest Management Plan

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
		31	South Germansen / Upper Manson	General / Special
		32	Jackfish	Special
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

*Denotes shared RMZ with another Mackenzie DFA Operating Area

#Denotes shared RMZ with Abitibi Operating Area

3.3 Existing Processes within the Mackenzie DFA

3.3.1 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

Mackenzie DFA Sustainable Forest Management Plan

Gov 2000) and more operational plans such as Forest Stewardship Plans developed by both Canfor and BCTS.

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 meets periodically to ensure that the evolution and implementation of the LRMP remains consistent with the original intent.

In keeping with legal requirements, Canfor's Mackenzie Division and BC Timber Sales Prince George Business Area make their Forest Stewardship Plans (FSP) available for public review and comment. Canfor and BCTS also regularly contact and interact with individual stakeholders that may be affected by their operations.

3.3.2 Other Planning Processes

In addition to the LRMP, there are several other planning processes for the Mackenzie TSA on-going (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 retention such as OGMAs	The process is on-going and is anticipated to continue into the future. Spatially-defined OGMAs are being developed in identified priority LUs.
Northern Caribou Recovery Implementation Group	Development of a Recovery Plan for northern caribou herds. This process will allow the province to meet its	A finalized Recovery Action Plan is to be submitted for economic and social impact assessment in fiscal

Mackenzie DFA Sustainable Forest Management Plan

	obligations as a signatory of the National Accord for the Protection of Species at Risk in Canada.	2006/07.
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.
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.
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.
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.
Forest Investment Account Land Base Investment	Coordinate spending on non-obligation forest resource investments in consideration of the Mackenzie Strategic Resource management Plan (2001-2006)	Annually updated through the Land Base Investment Rationale.
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.

3.4 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.

Mackenzie DFA Sustainable Forest Management Plan

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.

3.4.1 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 totalling 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 was 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.

3.4.2 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, however negotiations were suspended in 2003 and have yet to resume.

3.4.3 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

Mackenzie DFA Sustainable Forest Management Plan

pursuing a self government agreement under the BC treaty process and is currently at Stage 2 of that process.

3.4.4 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.

3.4.5 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.

3.4.6 Halfway River First Nation

The Halfway River First Nation, along with the West Moberly First Nations and Sauteau 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.

3.4.7 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.

3.4.8 Sauteau First Nations

The Sauteau First Nations traditional territory within the Mackenzie TSA mirrors that of the West Moberly First Nation. Similarly, the Sauteau 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.

Mackenzie DFA Sustainable Forest Management Plan

3.4.9 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.

Six Treaty 8 First Nations - Doig River, Fort Nelson, Halfway River, Prophet River, Saulteau and West Moberly - are members of the Treaty 8 First Nations Chiefs, which are negotiating set aside issues at a common negotiations table.

These 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.

3.5 Structure and Responsibility for Implementing SFM

3.5.1 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 Z809-08. 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 undertaken by the signatories was composed of: the Mackenzie SFMP Steering Committee consisting of representatives of signatories of this plan; and a public advisory group (PAG) consisting of members recommended by a

Mackenzie DFA Sustainable Forest Management Plan

Stakeholder Analysis⁷ conducted by the SFMP Steering Committee. The PAG is referred to as the Mackenzie DFA Public Advisory Group (See Appendix B).

3.5.2 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. Signatories of this plan respect 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,
- 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 provided in PAG Records binder that demonstrates efforts to encourage First Nations involvement.

3.5.3 Responsibilities

Ownership Responsibilities

Canfor's forestry operations on the Mackenzie DFA are managed under a Renewable Forest License Tenure (Forest License A15384) granted by MoFR 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. Canfor's management of operations must be conducted within provincial forestry legislation and policy.

As an independent organization within MoFR, BCTS is responsible for development and issuance of multiple Forest Licenses under authority of the Forest Act of BC. In conducting its business operations, BCTS meets all legal forestry requirements including silviculture obligations and maintains conformance with all applicable statutes and regulations. The area associated with the operations of Canfor and BCTS within the DFA are show in Table 5. Figure 4 illustrates the extent of operations for Canfor and BC Timber Sales within the DFA as well as the location of areas excluded from the DFA.

⁷ Stakeholder Analysis is a supporting document to the SFM Plan and is maintained by the signatories.

Mackenzie DFA Sustainable Forest Management Plan

Table 5. Area of operations within the Mackenzie DFA⁸.

Mackenzie SFMP Signatories	Signatory DFA (gross ha.)	% of Total DFA
B.C. Timber Sales, P.G. Business Area	838,043	39.9%
Canfor, Mackenzie Division	1,255,994	59.8%
(Parks and Protected Areas)	6,629	0.3%
Total Mackenzie DFA	2,100,666	100%

Areas excluded from the DFA include woodlot licence 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 MoFR, the Ministry of Environment (MoE) and Ministry of Agriculture and Lands (MoAL). MoFR, through its district office in Mackenzie, enforces all legal requirements associated with commercial forestry activities on all tenures within the forest district. MoFR 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.

⁸ Based on the final Licensee Operating area coverage produced February 2007 after negotiations completed on delineation of operating areas for BC Timber Sales

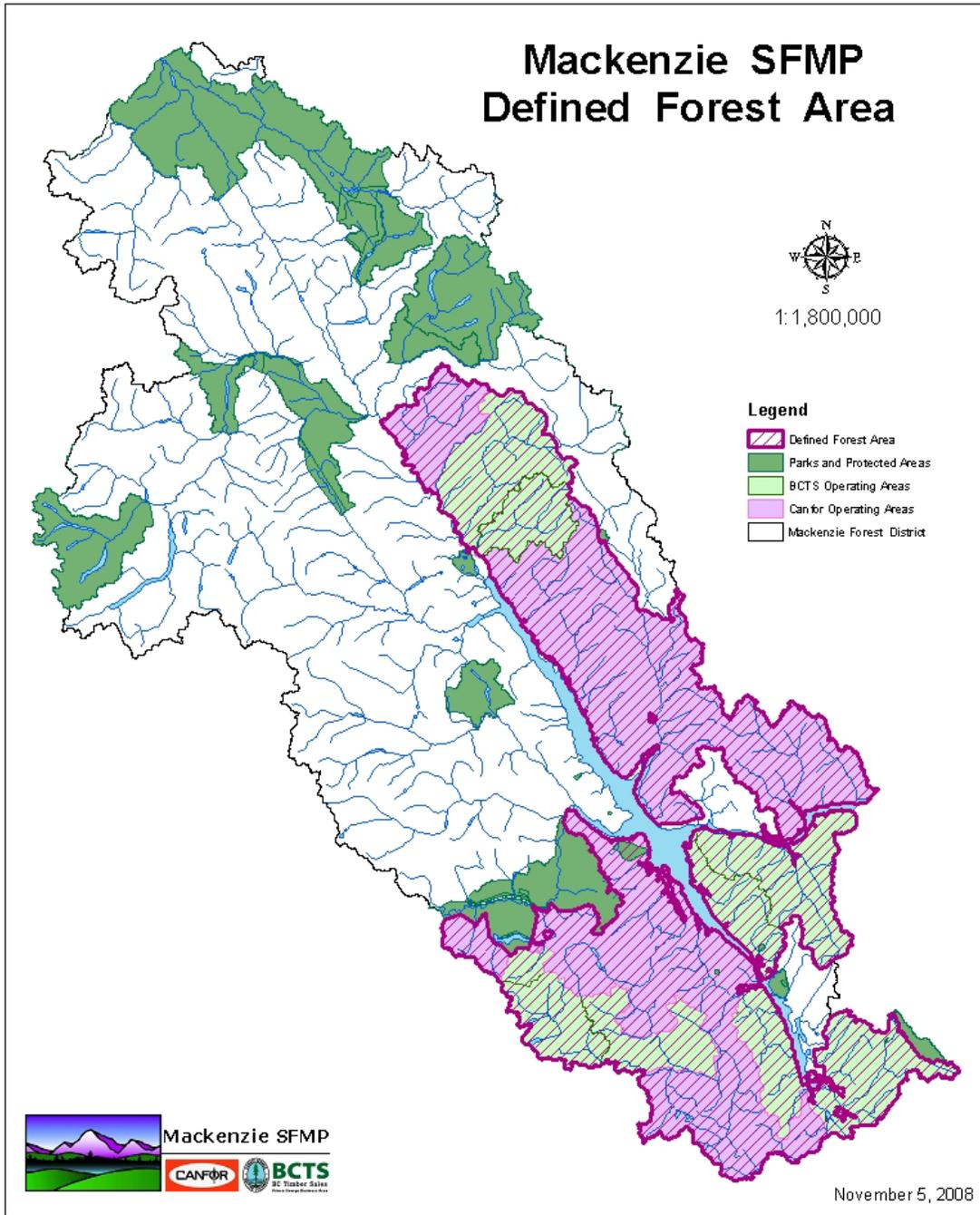


Figure 4. Areas over which BC Timber Sales and Canadian Forest Products Ltd. conduct forest development operations within the Mackenzie Defined Forest Area in north-central British Columbia.

Mackenzie DFA Sustainable Forest Management Plan

On publicly owned land, responsibility and accountability for adherence to provincial and federal legislation and objectives, rests with the BC Provincial Government including MoFR, the Ministry of Environment (MoE) and Ministry of Agriculture and Lands (MoAL). MoFR, through its district office in Mackenzie, enforces all legal requirements associated with commercial forestry activities on all tenures within the forest district. MoFR 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.

Shared Responsibilities and User Rights

Canfor operates under a volume-based tenure and BCTS is responsible for making available Timber Sale Licences in the Mackenzie Forest District. An operating area agreement allows the organizations to operate in distinct areas of the TSA with some degree of autonomy. The signatories have 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 the signatories. Other users may include:

- Abitibi Consolidated Company of Canada;
- Non-renewable license holders (Tsay Keh Dene, McLeod Lake Indian Band, and Kwadacha First Nations);
- Woodlot license holders;
- Holders of license of occupation;
- Third party licenses to cut;
- Land leases;
- Mineral and energy tenures;
- Special use permits; and
- First Nation reserves.

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

Forest License	TSA Apportionment (m ³)	%	Projected DFA Harvest (m ³)	%
Signatories				
Canadian Forest Products Ltd.:	1,082,904	34.9	1,082,904	54.5
BC Timber Sales (m ³ advertised)	768,885	24.8	768,885	38.9
Non-Signatories				
<i>Abitibi Consolidated Company of Canada</i>	932,500	33.5	0	0.0
Kwadacha Natural Resource Agency	53,404	1.7	33,624 ⁹	1.7
<i>Tsay Keh Dene Band.</i>	53,404	1.7	33,624 ¹¹	1.7
<i>Ainsworth Lumber Co. Ltd. (Deciduous)</i>	50,000	1.6	31,481	1.6
<i>Small Scale Salvage licensees (estimate)</i>	55,000 ¹⁰	0.7	35,228	1.8
TOTAL	3,102,905	100	1,963,329	100

⁹ Proportional estimate, process described in section 6.1.1 of this plan.

¹⁰ Salvage licences to cut projected for the Mackenzie TSA during 2006/07 year, district correspondence.

Mackenzie DFA Sustainable Forest Management Plan

The recently completed process of designating operating areas for BCTS to manage development within allowed for some flexibility in the transition period. As a result Abitibi has retained approved and proposed harvesting within the DFA. These operations currently are covered under the Finlay Forest DFA, which is certified to the CAN CSA Z809-02 standard. These transitional areas will likely be harvested within the next few years. Abitibi will be managing, on an ongoing basis, silviculture and other permit obligations for several years. The relationships forged by sharing operating areas will persist into the future. BCTS, in turn, has retained approved development, outside the DFA, in areas traditionally managed by Abitibi. These blocks will be sold and harvested in the next couple of years.

Although there is no legal recourse to limit use, the signatories can and do cooperate with other industrial users, such as the mining and energy sectors, in regards to roads and road use. Although activity in the energy sector has not historically been significant, there has been an increase in recent years. The mining sector has also picked up considerably, although the only large-scale active mining enterprise in the TSA is the Kemess mine.

To the extent possible, the signatories and other industrial users use existing infrastructure to access resources, within terrain and/or safety constraints. This relationship is facilitated by Road Use Agreements among industrial road users assigning responsibilities for road use and maintenance amongst the permitted holder of the road and other road users. In this manner, the holder of the road permit can reduce their liability for a road without deactivating it, precluding the need for reactivation by other industrial users.

Regulations

Section 4 of Canfor's Forest Management System 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

Mackenzie DFA Sustainable Forest Management Plan

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.

Although the life span of the Steering Committee is indefinite, the life span of the Memorandum of Understanding guiding the Steering Committee is 4 years. Details on the responsibilities of the Mackenzie SFMP Steering Committee are outlined in the Mackenzie SFMP PAG Terms of Reference (Appendix B), the Memorandum of Understanding (Appendix A), and Table 7.

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; and
- basic operating rules for the public involvement process.

Complete details on the responsibilities of Mackenzie DFA Public Advisory Group are provided in the Appendix B.

Manager and Employee Responsibilities

Effective implementation of the SFMP requires that the responsibilities of the signatories be clearly and unequivocally stated. In addition to the responsibilities outlined in each signatory's individual commitments to SFM and the stated joint commitments to SFM, the signatories also commit to the roles and responsibilities for the management and staff of their respective operations outlined in Table Responsibilities of management and staff pertaining to individual indicators/measures is detailed in the signatories' respective Responsibility Matrices.

3.6 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

Mackenzie DFA Sustainable Forest Management Plan

forestry initiatives such that the requirements of CSA SFM certification are met. The SFMP is implemented through operational plans. Figure 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 avenues to develop SFMP's and provide the financial support fundamental to applying and improving SFM.

Operational Plans are the key 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.

Mackenzie DFA Sustainable Forest Management Plan

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 & BCTS	
	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 & BCTS	
	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 & BCTS	
	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

Mackenzie DFA Sustainable Forest Management Plan

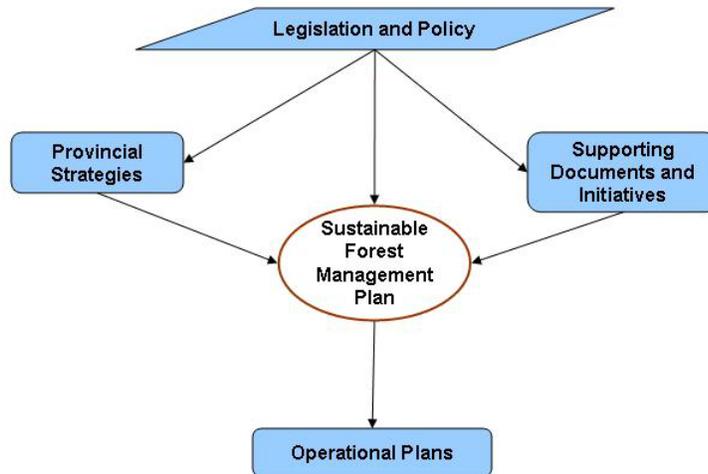


Figure 5. A schematic depiction of the linkages between the Sustainable Forest Management Plan for the Mackenzie Defined Forest Area, government led legislation, strategies, initiatives, and operational plans.

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.

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.

Mackenzie DFA Sustainable Forest Management Plan

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 the SFMP Steering Committee. These land management practices may function as inputs to spatially explicit landscape simulation models that will quantify and forecast the long-term impact of current management practices on indicators identified for the Mackenzie DFA. In the absence of such an analysis, the SFMP Steering Committee 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.

Mackenzie DFA Sustainable Forest Management Plan

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

MoFR 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;

Mackenzie DFA Sustainable Forest Management Plan

- 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; and
- a riparian assessment model.

5.0 STRATEGIC LEVEL PLANNING

5.1 Values, Objectives, Indicators, and Targets

The PAG needed to identify one or more DFA specific *values* for each element. For each value at least one *objective* had to be defined that described the future condition of that value. Also, each value required one or more *indicator(s)* identified for it. Once an indicator was identified, it in turn needed a *target*. 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."

Mackenzie DFA Sustainable Forest Management Plan

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.

Canfor, BCTS, and the PAG have established indicators and targets. 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 Z809-02. 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.

Indicators are variables chosen to represent each criterion and therefore need to be measurable and to have a strong association with the criterion. 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.

5.2 Indicators and Targets

Indicator #1 Old Forests

Indicator Statement	Target and Variance
Percent of blocks and roads harvested that meet the prescribed old growth targets.	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.1: Ecosystem Diversity</p>
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Mackenzie DFA Sustainable Forest Management Plan

Value: Well balanced and functioning ecosystems that support natural processes
Objective: Maintain landscapes that support the natural diversity, variety and pattern of ecosystems

SFM Criterion 2: Ecosystem condition and productivity

CSA SFM Element 2.1: Forest ecosystem resilience

Value: Resilient ecosystems

Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.

What is this indicator and why is it important?

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.

How are targets established?

The targets for old forest are taken from the approved Mackenzie TSA Biodiversity Order.

Current condition:

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 and BC Timber Sales have been working with the Integrated Land Management Bureau on a project to establish spatial OGMA's in priority landscape units south of the peace arm of Williston Lake. This project was finalized in the fall of 2009, but has not yet been legally designated. Once these OGMA's are legally established, the signatories will incorporate 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.

Forecasting and probable trends of indicator:

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 7). 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,

Mackenzie DFA Sustainable Forest Management Plan

due to natural variation and existing forest characteristics, it may not be possible to achieve targets on all LU Groups because of succession losses.

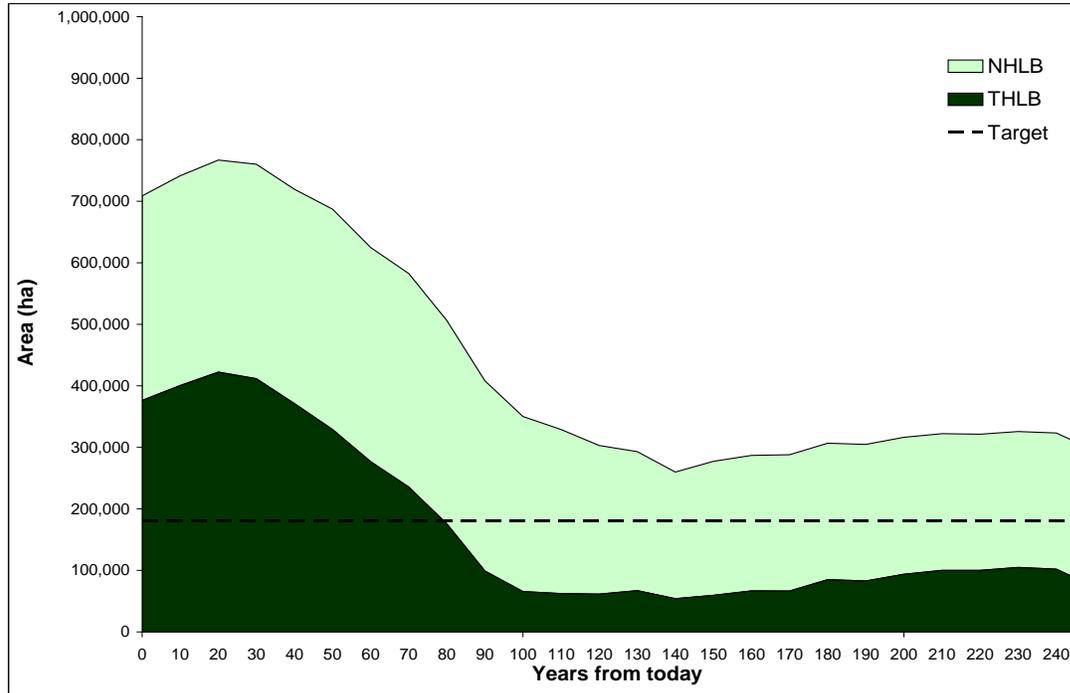


Figure 7. Old forest across the DFA versus target and relative contribution from NHLB and THLB, base case.

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.

Monitoring and reporting:

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 forest cover information. Tabular and map-based results are presented for seral conditions, given the 5-year harvest projections. The information is then achieved 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 of the respective signatories.

Mackenzie DFA Sustainable Forest Management Plan

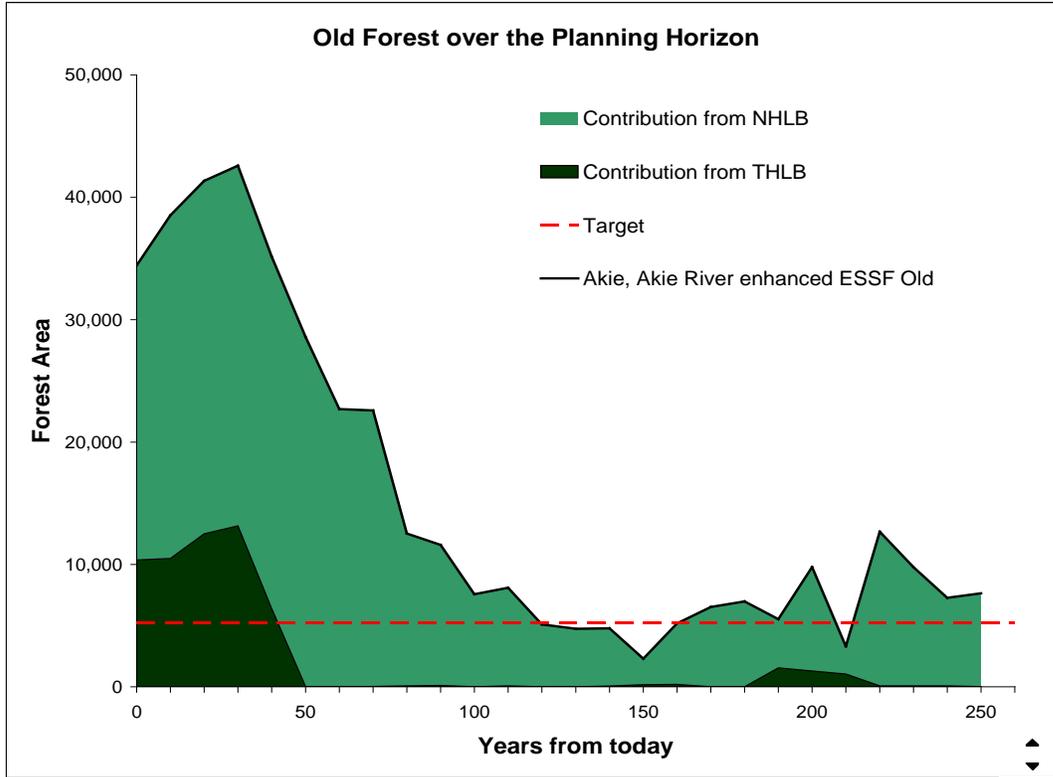


Figure 8. Old forest in the Akie LU Grouping ESSF BEC zone, enhanced biodiversity emphasis option (BEO).

Indicator #2 Interior Forest

Indicator Statement	Target and Variance
Percent of blocks and roads harvested that meet the prescribed interior old targets.	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.1: Ecosystem Diversity Value: Well balanced and functioning ecosystems that support natural processes Objective: Maintain landscapes that support the natural diversity, variety and pattern of ecosystems</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.1: Forest ecosystem resilience Value: Resilient ecosystems Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.</p>

Mackenzie DFA Sustainable Forest Management Plan

What is this indicator and why is it important?

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 (see Indicator #1) 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.

How are targets established?

The targets for interior old are taken from the approved Mackenzie TSA Biodiversity Order.

Current condition:

We used a buffered distance (200 m), from edges of existing openings and younger age classes, to estimate old interior forest conditions within the Mackenzie DFA. Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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.

Monitoring and reporting:

The signatories will convene as required to update the current and future amount of old interior forest and the licensee apportionment (update harvested blocks, newly planned blocks, aging of forest, and licensee operating area changes). The signatories will assess current and anticipated future performances of the signatories in meeting old interior forest targets and proposed recruitment strategies if targets cannot be met as required.

Mackenzie DFA Sustainable Forest Management Plan

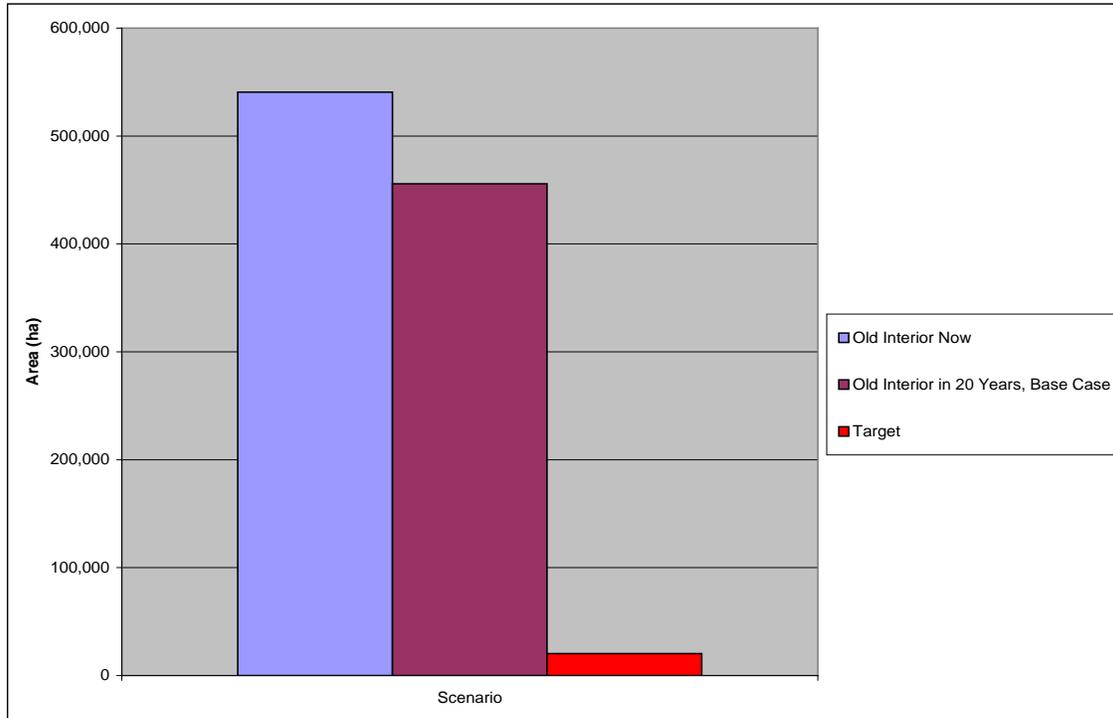


Figure 9. Old interior forest (ha) in the Mackenzie DFA at present and in 20 years versus target.

Indicator #3 Biodiversity Reserve Effectiveness

Indicator Statement	Target and Variance
Percentage of blocks and roads harvested that are not within legally established protected areas, ecological reserves, or OGMAs.	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.1: Ecosystem Diversity Value: Well balanced and functioning ecosystems that support natural processes Objective: Maintain landscapes that support the natural diversity, variety and pattern of ecosystems</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.1: Forest ecosystem resilience Value: Resilient ecosystems Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.</p>
<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.4: Protected Areas and sites of biological and cultural significance Value: Unique and important sites within the DFA.</p>

Mackenzie DFA Sustainable Forest Management Plan

Objective: 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.

What is this indicator and why is it important?

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.

How are targets established?

A target of 100% harvesting or road construction not within 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.

Current Condition:

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. EMS checklists and active supervision of road construction and harvesting are currently used to ensure operational plans are implemented correctly in the field. There currently are no government-sanctioned, spatially defined OGMAs in the DFA at this time, although work is on-going amongst all Licensees in the Mackenzie TSA, BCTS, MoFR, and the Integrated Land Management Bureau (ILMB) to spatially define OGMAs on a priority Landscape Unit basis.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

Licensees have established a target of zero tolerance for trespasses within protected areas and OGMA's and at this time that target is expected to be met. This indicator is not easy to quantifiably forecast, however, it is important to identify what the accepted targets mean to Sustainable Forest Management. To forecast this indicator, a "what if" scenario analysis can be used to help identify the importance of the stated target to overall SFM within the DFA.

a) What if a target of <10ha of unauthorized forestry related activities was established?

Mackenzie DFA Sustainable Forest Management Plan

In the terms of landscape level biodiversity, 10 ha or less would represent a very small area to be harvested or disturbed by road construction. However, ecologically it could be quite serious. The area disturbed could be an extremely rare plant community or important habitat for a Species at Risk. Unauthorized road construction could create access to previously inaccessible sites that could suffer from poaching, all terrain vehicle use, and other human activities.

Monitoring and reporting:

Monitoring will occur with ongoing supervision of forestry operations, as a component of EMS inspections, and analysis of spatial coverages. The Licensees will ensure the protected areas and OGMA's coverage will be updated on an annual basis.

Indicator #4 Productive Forest Representation

Indicator Statement	Target and Variance
Percent productive forest by BEC variant represented within the Non-harvestable land base.	<u>Target:</u> As per table #9 <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.1: Ecosystem Diversity Value: Well balanced and functioning ecosystems that support natural processes Objective: Maintain landscapes that support the natural diversity, variety and pattern of ecosystems</p>
<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.2: Species Diversity Value: Diversity of species throughout the DFA Objective: Maintain species diversity through time, including habitats for known occurrences for species at risk.</p>
<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.3: Genetic Diversity Value: Genetic diversity throughout the DFA Objective: Conserve genetic diversity by maintaining the variation of genes within species and ensuring that reforestation programs are free of genetically modified organisms.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.1: Forest ecosystem resilience Value: Resilient ecosystems Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>

Mackenzie DFA Sustainable Forest Management Plan

What is this indicator and why is it important?

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.

How are targets established?

Targets for each BEC variant are presented below.

Current condition:

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%

Mackenzie DFA Sustainable Forest Management Plan

Forecasting and probable trends of indicator:

Targets are expected to change as further analysis is completed as part of the Mackenzie Timber Supply Review. It is anticipated that the area of NHLB will continue to adequately address the intent of this indicator.

Monitoring and reporting:

A copy of the results of the analysis detailing the percent productive forest by BEC variant represented within the non-harvestable land base will be made included in the SFM Plan’s annual report.

Indicator #5 Patch Size

Indicator Statement	Target and Variance
Percentage of blocks and roads harvested that meet the prescribed patch size target ranges or are trending towards the target range.	<u>Target:</u> 100% <u>Variance:</u> -30%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.1: Ecosystem Diversity Value: Well balanced and functioning ecosystems that support natural processes Objective: Maintain landscapes that support the natural diversity, variety and pattern of ecosystems</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.1: Forest ecosystem resilience Value: Resilient ecosystems Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>

What is this indicator and why is it important?

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 cutblock. 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

Mackenzie DFA Sustainable Forest Management Plan

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 led 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.

How are targets established?

The targets come directly from the Mackenzie LRMP. Certain factors will limit how effective Steering Committee members 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 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.

RMZ	NDT	Patch size distribution		
General + Special	1	<40 ha	40-80 ha	80-250 ha
	2	<40 ha	40-80 ha	80-250 ha
	3	<40 ha	40-250 ha	250-1000 ha
Enhanced	1	<40 ha	40-80 ha	80-250 ha
	2	<40 ha	40-80 ha	80-250 ha
	3	<40 ha	40-250 ha	250-5000 ha
Caribou Management Strategy Areas	2	<40 ha	40-250 ha	250-5000 ha
	3	<40 ha	40-250 ha	250-5000 ha

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. The variance is only permissible for the harvest of damaged timber resulting from forest Health outbreaks.

Current condition:

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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.

Monitoring and reporting:

Mackenzie DFA Sustainable Forest Management Plan

Forest cover information is updated every 5 years in preparation for timber supply analysis. Forest cover inventory information with updates from Licensees based on harvesting activities will be analysed periodically to ensure forest management is trending towards patch size targets identified in the Mackenzie LRMP.

Indicator #6 Coarse Woody Debris

Indicator Statement	Target and Variance
The percentage of blocks and roads harvested that exceed coarse woody debris requirements	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.1: Forest ecosystem resilience Value: Resilient ecosystems Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>
<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.1: Soil quality and quantity Value: Healthy and abundant soil resource Objective: Conserve soil resources by maintaining soil quality and quantity.</p>
<p>SFM Criterion 4: Role in global ecological cycles CSA SFM Element 4.1: Carbon uptake and storage Value: Carbon cycling Objective: Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem.</p>

What is this indicator and why is it important?

Coarse woody debris (CWD) as a habitat element provides: 1) nutrients for soil development, 2) structure in streams to maintain channel stability, 3) food and shelter for animals and invertebrates, and 4) growing sites for plants and fungi,. 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. We use this indicator following harvesting to quantify CWD retained in blocks, wildlife tree patches, riparian areas, and in areas of unsalvaged timber. Within the NHLB we assume that natural processes will result in the maintenance of appropriate levels of CWD.

How are targets established?

The interim 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

Mackenzie DFA Sustainable Forest Management Plan

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 pending availability of more data.

Current condition:

The Ministry of Forests Coarse Woody Debris Database contains some baseline information for the province. Unfortunately there are a limited number of samples within the Mackenzie DFA. CWD is not operationally monitored within the Mackenzie DFA but limited information is available from other sources (e.g. [Sulyma, 2006](#)).

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

Forecasting of this indicator could be possible using models however, only a limited amount of data is available. It is anticipated that the level of CWD in both the NHLB and THLB will meet targets.

Monitoring and reporting:

Post-harvest CWD levels will be measured as a standard component of either the silviculture survey 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, we have 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.

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.

Indicator #7 Wildlife Trees

Indicator Statement	Target and Variance
Percentage of cutblocks that meet or exceed wildlife tree patch requirements.	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.1: Ecosystem Diversity Value: Well balanced and functioning ecosystems that support natural processes Objective: Maintain landscapes that support the natural diversity, variety and pattern of ecosystems</p>
<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.3: Genetic Diversity Value: Genetic diversity throughout the DFA Objective: Conserve genetic diversity by maintaining the variation of genes within</p>

Mackenzie DFA Sustainable Forest Management Plan

species and ensuring that reforestation programs are free of genetically modified organisms.

SFM Criterion 2: Ecosystem condition and productivity

CSA SFM Element 2.1: Forest ecosystem resilience

Value: Resilient ecosystems

Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.

SFM Criterion 2: Ecosystem condition and productivity

CSA SFM Element 2.2: Forest ecosystem productivity

Value: Productive ecosystems

Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.

What is this indicator and why is it important?

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 cutblock. 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.

How are targets established?

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.

Mackenzie DFA Sustainable Forest Management Plan

Current condition:

Stand level retention, including wildlife tree patches, is managed by each signatory in the DFA on a site-specific basis. 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. 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 cutblock. 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.

Forecasting and probable trends of indicator:

Meeting stand-level retention requirements is a legal obligation of the signatories; 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.

Monitoring and reporting:

This indicator has a signatory specific target. As such, information for stand level retention is found in Site Plans and the signatories' respective information tracking systems. Block-specific requirements will be measured using the respective signatories EMS. 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.

Indicator #8 Riparian Area Management Effectiveness

Indicator Statement	Target and Variance
The percentage of forest operations consistent with riparian management area requirements as identified in operational plans and/or site plans.	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

SFM Criterion 1: Biological Diversity
CSA SFM Element 1.1: Ecosystem Diversity
Value: Well balanced and functioning ecosystems that support natural processes
Objective: Maintain landscapes that support the natural diversity, variety and pattern of ecosystems
SFM Criterion 3: Soil and Water

Mackenzie DFA Sustainable Forest Management Plan

CSA SFM Element 3.2: Water quality and quantity

Value: Healthy aquatic ecosystems

Objective: Conserve water resources by maintaining water quality and quantity.

What is this indicator and why is it important?

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, Sections 47-49. The RRZ, if required, is immediately adjacent to the stream and is a no-harvest zone. RRZs are identified in cutblocks 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.

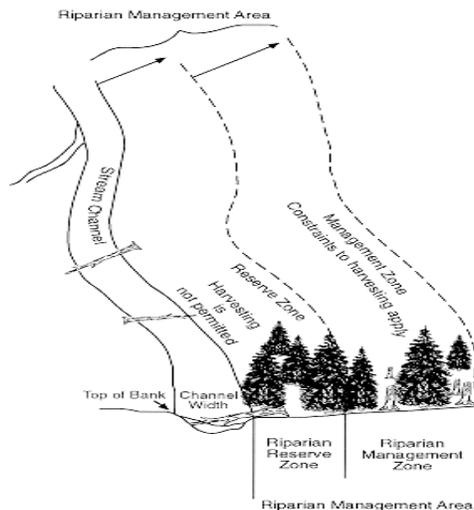


Figure 10. Riparian management area showing the application of a management zone and a reserve zone along the stream channel.

(<http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/riparian/rmafig01.htm>).

How are targets established?

The target is a legal requirement. The target value of 100% 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.

Mackenzie DFA Sustainable Forest Management Plan

All streams, wetlands, and lakes in or immediately adjacent to planned harvest areas will be classified prior to development. RRZs that meet or exceed the target will be clearly marked in the field. Management practices will be prescribed to protect RRZs from significant windthrow where needed.

Current condition:

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.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

Carrying out activities specified in an Operational Plan and/or Site Plan is a legal obligation of the signatories, modeling does not apply to this indicator. Forecasting for this indicator is that, once developed, 100% of riparian management area requirements are adhered to.

Monitoring and reporting:

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 will be entered into an incident tracking database.

Indicator #9 Sedimentation

Indicator Statement	Target and Variance
The percentage of identified unnatural sediment occurrences where mitigating actions were taken.	<u>Target:</u> 100% <u>Variance:</u> -5%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 3: Soil and Water</p> <p>CSA SFM Element 3.1: Soil quality and quantity</p> <p>Value: Healthy and abundant soil resource</p> <p>Objective: Conserve soil resources by maintaining soil quality and quantity.</p>
<p>SFM Criterion 3: Soil and Water</p> <p>CSA SFM Element 3.2: Water quality and quantity</p> <p>Value: Healthy aquatic ecosystems</p> <p>Objective: Conserve water resources by maintaining water quality and quantity.</p>

What is this indicator and why is it important?

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

Mackenzie DFA Sustainable Forest Management Plan

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.

How are targets established?

The signatories recognize the potential damage sedimentation can inflict on water bodies and are 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. The signatories 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.

Current condition:

Sedimentation occurrences are detected by forestry personnel during stream crossing inspections, road inspections, silviculture activities, and other general activities. In addition, Company 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.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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. Correcting unnatural sedimentation problems for all known occurrences is important to conserve water quality objectives. A “what if” scenario analysis will identify the importance of the target for this indicator to SFM within the DFA. This indicator and the following “what if” scenario will help to substantiate the proposed target:

a) What if only 50% of known unnatural sedimentation occurrences received any corrective actions?

Ignoring half of the events where water bodies received sedimentation caused by forestry activities would be a willful disregard of sustainable forestry. Fish populations could be damaged by a decrease in water quality and destroyed spawning beds. Other aquatic organisms such as amphibians could suffer from the higher concentration of soil particles suspended in the water. In addition to the environmental degradation, social values would be impacted, as sedimentation is often an obvious and disturbing feature in the landscape. Failure to correct sedimentation problems could result in altered stream flows would be perceived as the careless disregard for forest and non-forest resources and should be avoided at every opportunity.

Mackenzie DFA Sustainable Forest Management Plan

The signatories are 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.

Monitoring and reporting:

All field personnel are responsible for detecting sedimentation occurrences, regardless of the location in the DFA. When sedimentation is detected, the signatory that is responsible for the crossing, road, or cutblock will be notified. The responsible signatory will then take corrective actions and document the occurrence in their EMS database. The percentage of unnatural known sedimentation occurrences will be tracked, as well as the steps taken to rehabilitate damage.

Indicator #10 Stream Crossings

Indicator Statement	Target and Variance
Percentage of stream crossings appropriately designed and properly installed and/or removed.	<u>Target:</u> 100% <u>Variance:</u> -5%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.1: Soil quality and quantity Value: Healthy and abundant soil resource Objective: Conserve soil resources by maintaining soil quality and quantity.</p>
<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.2: Water quality and quantity Value: Healthy aquatic ecosystems Objective: Conserve water resources by maintaining water quality and quantity.</p>

What is this indicator and why is it important?

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.

Mackenzie DFA Sustainable Forest Management Plan

How are targets established?

The indicator was assigned a target of 100% based on an assessment of current and past management practices. The target demonstrates the signatories' 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.

Current condition:

Streams and crossing structures are both currently identified during operational plan preparation. Pework forms are completed for all projects, including stream crossings, as part of EMS/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.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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. A "what if" scenario analysis will identify the importance of the target for this indicator to SFM within the DFA. This indicator and the following "what if" scenario will help to substantiate proposed targets:

What if only 50% of stream crossings were installed or removed properly?

If only 50% of stream crossings were installed and removed properly, both water quality and safety could be severely compromised. Excessive amounts of sediment could enter many important fish bearing streams, disrupting spawning and reducing water depths. Crossings are also designed to allow safe vehicle passage over water features. Crossings that are not installed correctly could pose a threat to both the public and to forest industry workers using the crossings.

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.

Monitoring and reporting:

The percentage of stream crossings installed and removed consistent with design standards, contractual standards, legal requirements, and/or erosion control plans, along

Mackenzie DFA Sustainable Forest Management Plan

with inspection results and proposed mitigation measures will be tracked in the signatories' respective EMS databases.

Indicator #11 Peak Flow Index

Indicator Statement	Target and Variance
Percent of watersheds containing approved or proposed development with Peak Flow Index calculations completed.	<u>Target:</u> 100% <u>Variance:</u> 0%

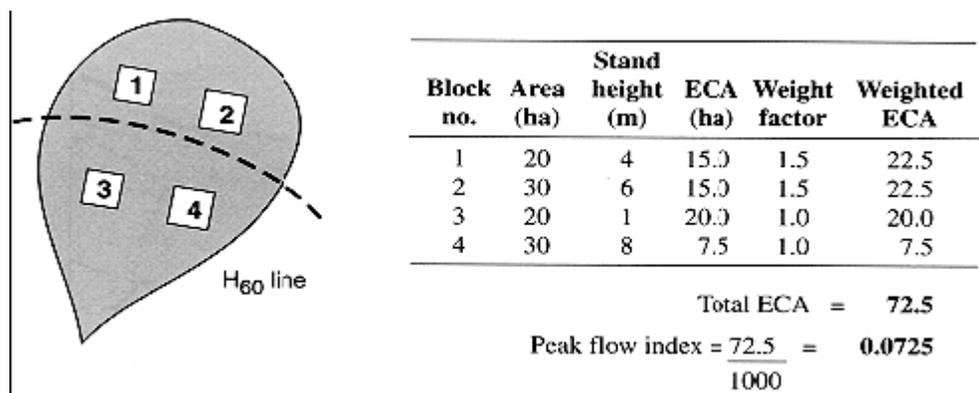
CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.1: Soil quality and quantity Value: Healthy and abundant soil resource Objective: Conserve soil resources by maintaining soil quality and quantity.</p>
<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.2: Water quality and quantity Value: Healthy aquatic ecosystems Objective: Conserve water resources by maintaining water quality and quantity.</p>

What is this indicator and why is it important?

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.

Figure 11 shows how the peak flow index is calculated for a hypothetical watershed.



Mackenzie DFA Sustainable Forest Management Plan

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 regrowth. 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.

How are targets established?

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.

Current condition:

Peak flow index calculations, watershed sensitivity analysis and PFI risk ratings have been completed for all active watersheds.

Forecasting and probable trends of indicator:

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.

Monitoring and reporting:

With PFI risk ratings calculated for all active watersheds, the signatories 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 GENUS, or similar systems, will be maintained to provide up to date planning information.

Mackenzie DFA Sustainable Forest Management Plan

Indicator #12 Road Re-vegetation

Indicator Statement	Target and Variance
Percentage of road construction or deactivation projects where prescribed re-vegetation occurs within 12 months of disturbance.	<u>Target:</u> 100% <u>Variance:</u> -10%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.1: Soil quality and quantity Value: Healthy and abundant soil resource Objective: Conserve soil resources by maintaining soil quality and quantity.</p>
<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.2: Water quality and quantity Value: Healthy aquatic ecosystems Objective: Conserve water resources by maintaining water quality and quantity.</p>
<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.3: Genetic Diversity Value: Genetic diversity throughout the DFA Objective: Conserve genetic diversity by maintaining the variation of genes within species and ensuring that reforestation programs are free of genetically modified organisms.</p>

What is this indicator and why is it important?

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.

How are targets established?

Targets for this indicator were established through PAG consensus. Proposed FSPs also contain objectives for revegetation of disturbed sites. Timber Sales Licences issued by BCTS generally have a term of less than 1 year but in some cases may have a term of 2 or more years to complete harvesting. This may prove to be challenging, operationally, for licensees to complete revegetation within 12 months. The variance in the target should provide enough flexibility to deal with these situations.

Current condition:

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 Genus database. Similarly, BC Timber Sales is managing the completion of revegetation as an on-the-ground decision and, as such, has seen inconsistent application of contractual and timber sale licence requirements.

Mackenzie DFA Sustainable Forest Management Plan

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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. A “what if” scenario analysis will identify the importance of the target for this indicator to SFM within the DFA. This indicator and the following “what if” scenario will help to substantiate the proposed target:

- a) What if only 50% of prescribed re-vegetation occurred on road construction or deactivation projects within 12 months of disturbance?

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.

Monitoring and reporting:

The percentage of forest operations consistent with the road re-vegetation requirements will be reported in the annual SFMP report.

Indicator #13 Road Environmental Risk Assessments

Indicator Statement	Target and Variance
Percentage of planned roads that have an environmental risk assessment completed.	<u>Target:</u> 100% <u>Variance:</u> -10%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.1: Soil quality and quantity Value: Healthy and abundant soil resource Objective: Conserve soil resources by maintaining soil quality and quantity.</p>
<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.2: Water quality and quantity Value: Healthy aquatic ecosystems Objective: Conserve water resources by maintaining water quality and quantity.</p>

Mackenzie DFA Sustainable Forest Management Plan

What is this indicator and why is it important?

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.

How are targets established?

The target for this indicator was established through PAG consensus.

Current condition:

The completion of environmental risk assessments on roads is completed by field staff during road layout and is inputted into the signatories’ respective databases. 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.

BCTS has not done environmental risk assessments at the layout stage. An environmental risk assessment is completed for each timber sale licence and road construction contract prior to works commencing. Thus, all roads have a risk assessment over them prior to construction. These risk assessments determine the minimum number of inspections for each timber sale or road project. All of BCTS roads have been designed and professional geotechnical reviews have been completed if signs of instability are found or the slopes are over 60%.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

It is difficult to predict the success of achieving the targets for completing environmental risk assessments on roads. However, it is important to identify what the accepted targets mean to SFM. In order to forecast this indicator, a “what if” scenario analysis can be used to help identify the importance of the stated target to overall SFM within the DFA. The following “what if” scenario consists of one scenario as the current target is set at 100%:

a) What if only 50% of roads had an environmental risk assessment completed on them?

If only half of the roads had environmental risk assessments, there would be a significant possibility that areas of high risk are overlooked. This could potentially result in roads being constructed that are not to required standards. Roads that are not constructed to required standards may pose a risk to water quality, aquatic ecosystems, and riparian habitat through excessive erosion and sedimentation. It may also pose a safety risk to road users. By completing risk assessments, the signatories are able to ensure that

Mackenzie DFA Sustainable Forest Management Plan

required standards for road construction are met and focus attention on areas of higher risk, thus detecting and addressing problems earlier than might occur if risk assessments are not completed and inspections are scheduled haphazardly.

Monitoring and reporting:

The signatories' respective 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.

Indicator #14 Species within the DFA

Indicator Statement	Target and Variance
Percentage of blocks and roads harvested that adhere to management strategies for Species at Risk, Ungulate Winter Ranges, and other local species of importance.	<u>Target:</u> 100% <u>Variance:</u> -5%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.2: Species Diversity Value: Diversity of species throughout the DFA Objective: Maintain species diversity through time, including habitats for known occurrences for species at risk.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>

What is this indicator and why is it important?

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 C includes species from the following sources:

1. Species at Risk Act
2. Legally established Ungulate Winter Ranges
3. Local species of importance.

Mackenzie DFA Sustainable Forest Management Plan

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.

How are targets established?

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.

Current condition:

Development and implementation of management strategies for Species at Risk requires knowledge of how many forest dependant species inhabit a managed area. While the concept of biodiversity includes all organisms of a particular region, assessing forest dependant 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.

Forecasting and probable trends of indicator:

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. However, it is important to identify what the accepted targets mean to SFM. Conservation of these species will maintain species diversity within the DFA. Therefore, the use of a "what if" scenario is beneficial in identifying anticipated future trends for the indicator. As the indicator currently has a target of 100%, one other scenario should be identified:

a) What if only 50 % of forest operations were consistent with management strategies for species as identified in operational plans, tactical plans and/or site plans?

Mackenzie DFA Sustainable Forest Management Plan

If only 50% of forest operations were consistent with the management strategies for species as identified in operational plans, tactical plans and/or site plans, there could be significant ecological, economic and social impacts. Many species are vulnerable to disturbance or destruction of even small degrees. Ecologically, the loss or decline of any species would reduce species diversity in the DFA. It would also reduce forest productivity by failing to maintain ecosystem conditions that are capable of supporting naturally occurring species. In addition to these ecological and economic impacts, societal values may be reduced if only 50% of forest operations were consistent with management strategies for species as identified in operational plans, tactical plans and/or site plans. These species hold intrinsic worth for many people and any activity that threatens their status will meet with disapproval.

The above “what if” scenario helps to identify some of the potential future impacts of not achieving the stated targets for this indicator. Therefore, the signatories 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.

Monitoring and reporting:

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 C will be reviewed on an annual basis to ensure that it captures all legally protected species within the DFA.

Indicator #15 Sites of Biological Significance

Indicator Statement	Target and Variance
Percentage of blocks and roads harvested that adhere to management strategies for sites of biological significance.	<u>Target:</u> 100% <u>Variance:</u> -10%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.2: Species Diversity Value: Diversity of species throughout the DFA Objective: Maintain species diversity through time, including habitats for known occurrences for species at risk.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>
<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.4: Protected Areas and sites of biological and cultural significance</p>

Mackenzie DFA Sustainable Forest Management Plan

Value: Unique and important sites within the DFA.

Objective: 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.

What is this indicator and why is it important?

Sites of biological significance include areas that are critical for wildlife habitat, sensitive sites, and unusual or rare forest conditions or communities. Below is a list of sites of biological significance that may occur within the DFA:

- Stick nest such as a raptor nest;
- mineral licks;
- valuable snags for wildlife;
- large unique overstory trees;
- coarse woody debris (see indicator 6);
- plant communities at risk (see indicator 14);
- witches broom used by wildlife;
- rock outcrop areas;
- denning sites; and,
- avalanche chutes;

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 biological significance. Many types of sites of biological 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 biological importance is critical to the management and protection of these sites. Appropriate personnel include key signatory staff and consultants that are directly involved in operational forest management activities. Having appropriate personnel trained to identify sites of biological 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 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.

Mackenzie DFA Sustainable Forest Management Plan

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 biological significance will allow licensees to ensure their knowledge is used appropriately to protect these sites in the DFA.

How are targets established?

A target of 100% of blocks that have sites of biological 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, EMS 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 the signatories will implement new procedures to meet objectives.

Current condition:

The signatories currently have systems in place to evaluate the consistency of forest operations with operational plans. Inspections occur during forestry activities to ensure consistency with Site Plans, legislation, and EMS programs. Once operations are complete a final inspection is performed to evaluate consistency with operational plans. Any management strategies identified in operational plans for Sites of Biological Significance are monitored concurrently with other activities.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

Carrying out activities specified in an Operational Plan and/or Site Plan is a legal obligation of the signatories, modeling does not apply to this indicator. Forecasting for this indicator is that 100% of management strategies for sites of biological significance are adhered to.

This loss of biological diversity is inconsistent with sustainable forest management. In addition to a potential loss of biological diversity, there are other potential impacts to SFM. Society may suffer unquantifiable spiritual losses if it felt it was witnessing the destruction of sites of biological significance. The signatories realize the potential losses to the ecological, economic, and societal values from a failure to manage sites of biological significance properly could be unacceptable.

Monitoring and reporting:

Monitoring will occur with ongoing supervision of forestry operations and as a component of EMS inspections.

Indicator #16 Soil Conservation

Indicator Statement	Target and Variance
The percentage of forest operations consistent with	<u>Target:</u> 100%

Mackenzie DFA Sustainable Forest Management Plan

soil conservation standards as identified in operational plans and/or site plans.	Variance: 0%
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CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.1: Forest ecosystem resilience Value: Resilient ecosystems Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>
<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.1: Soil quality and quantity Value: Healthy and abundant soil resource Objective: Conserve soil resources by maintaining soil quality and quantity.</p>

What is this indicator and why is it important?

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.

How are targets established?

The target for this indicator was set at 100% in order to maintain soil productivity and the signatories will strive to meet this standard.

Current condition:

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

Mackenzie DFA Sustainable Forest Management Plan

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. EMS prework forms require equipment operators to be aware of soil conservation indicators outlined in the site plans. Once an activity is complete the final EMS 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

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

Carrying out activities specified in an Operational Plan and/or Site Plan is a legal obligation of the signatories, 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.

Monitoring and reporting:

Data sources for calculating and monitoring this indicator include Site Plans and completed EMS prework 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.

Indicator #17 Terrain Management

Indicator Statement	Target and Variance
The percentage of forest operations consistent with terrain management requirements as identified in operational plans and/or site plans.	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.1: Forest ecosystem resilience Value: Resilient ecosystems Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>

Mackenzie DFA Sustainable Forest Management Plan

SFM Criterion 3: Soil and Water

CSA SFM Element 3.1: Soil quality and quantity

Value: Healthy and abundant soil resource

Objective: Conserve soil resources by maintaining soil quality and quantity.

What is this indicator and why is it important?

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.

How are targets established?

The signatories will continue to 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 the signatories' 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.

Current condition:

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

Mackenzie DFA Sustainable Forest Management Plan

- 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 harvesting 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, the signatories have 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 the signatories' respective EMS.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

Carrying out activities specified in an Operational Plan and/or Site Plan is a legal obligation of the signatories, 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.

Monitoring and reporting:

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.

Indicator #18 Reportable Spills

Indicator Statement	Target and Variance
The number of EMS reportable spills.	<u>Target:</u> 0 <u>Variance:</u> <5

Mackenzie DFA Sustainable Forest Management Plan

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.1: Forest ecosystem resilience Value: Resilient ecosystems Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>
<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.1: Soil quality and quantity Value: Healthy and abundant soil resource Objective: Conserve soil resources by maintaining soil quality and quantity.</p>
<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.2: Water quality and quantity Value: Healthy aquatic ecosystems Objective: Conserve water resources by maintaining water quality and quantity.</p>

What is this indicator and why is it important?

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 17 outlines the volumes reportable under the Environmental Management Act:

Table 11. Reportable spill substances and volumes.

Substance	Legally Reportable Quantity Spilled*	BCTS EMS Reportable Quantity Spilled*	Canfor EMS Reportable Quantity Spilled*
Petroleum Products	100 L	25 L	20 L
Antifreeze (undiluted)	5 kg	5 L	5 L
Battery acid	5kg	5kg	5kg
Grease	100 L	25 L	20 L
Paints and solvents	100 L	25 L	20 L
Pesticides	5 kg	1 kg	5 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.

Mackenzie DFA Sustainable Forest Management Plan

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.

How are targets established?

The establishment of the target was a result of the regulatory requirements and EMSs 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. Signatories will continue to implement their EMS programs for spill prevention and if targets are not being met they will take a coordinated approach to determine procedures to do so.

Current condition:

All signatories currently have procedures in place for reducing and reporting spills. EMS 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. EMS plans also include the indicators to be taken in the event of a spill.

The spill events below the legally reportable amounts are tracked differently by each of the signatories. 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.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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. However, it is important to identify what the accepted target means to SFM. Reducing the number of reportable spills will protect soil and water resources during forest operations and 100% compliance is an obvious objective. The use of a “what if” scenario is beneficial in identifying future trends if the target for this indicator was not in place. As the target for this indicator is set at 100%, with a variance of 5 or less reportable spills annually, the analysis of one other potential scenario is useful:

a) What if there were more than 5 reportable spills of petroleum or antifreeze a year?

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

Mackenzie DFA Sustainable Forest Management Plan

higher than 5 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.

Monitoring and reporting:

Monitoring procedures are outlined in the standard operating procedures of the signatories' respective EMSs. The use of EMS checklists is designed to ensure handling and storage of chemicals, petroleum products, and other controlled substances is as per regulations and the EMS requirements. If a reportable spill occurs corrective and preventative actions will be identified to improve consistency. Signatories will track spill events in their EMS databases.

Indicator #19 Site Index

Indicator Statement	Target and Variance
The percentage of standards units declared free growing that have measured site index values at or greater than pre-harvest site index.	<u>Target:</u> 100% <u>Variance:</u> -5%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.1: Forest ecosystem resilience Value: Resilient ecosystems Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>

What is this indicator and why is it important?

Sustaining forest ecosystem productivity requires determining and designing forest practices that will maintain key soil resources so that harvesting does not cause continual degradation of site quality over time. Managing for the highest productive capability was identified as a key strategy in the LRMP.

Site index is an expression of the forest site quality of a stand, defined as the height of the dominant or codominant trees in a stand at a specified age. Site index equations are calculated for individual species using mensuration data. It is commonly used as an indicator of site productivity as it infers that trees or stands with greater growth at a given age have access to more key resources required for biomass production. The higher the site index for a given species in a given region, the higher the productivity or the quality of the site. Site index is sensitive to changes in ecological variables including soil nutrients, soil moisture, and others.

Mackenzie DFA Sustainable Forest Management Plan

This indicator provides a relative comparison of a post-harvest average site index (at free growing) compared to the pre-harvest site index (as represented by inventory estimates) in the THLB.

How are targets established?

The strategy for establishing the target for this indicator is to use data describing the current condition of pre-harvest SI. As the data is collected and the database for both pre- and post-harvest SI at the block level is built, the targets will be revisited.

Current condition:

In 2004 and 2005, Canfor undertook a site index adjustment project in the TSA (J.S. Thrower, 2006). Results of this project indicate that site indices on managed stands are significantly higher than previously believed because previous estimates were based on unmanaged stand characteristics. The table below shows the results of this project for the more common BEC zones/subzones. The Inventory site index by subzone and leading species will be used to represent the pre-harvest site index condition.

Table 12. Predicted site index (PSI) versus inventory site index (Inv. SI) for selected biogeoclimatic zones/subzones in the Mackenzie TSA

Subzone	Pine				Spruce			
	PSI (m)	Inv. SI (m)	Diff. (m)	Diff. (%)	PSI (m)	Inv. SI (m)	Diff. (m)	Diff. (%)
SBS mk1	19.9	15.7	4.2	27	21.1	13.6	7.5	56
SBS mk2	22.0	16.9	5.1	30	22.0	14.2	7.9	55
SBS wk1	21.5	19.2	2.3	12	22.1	15.7	6.4	41
SBS wk2	21.4	16.8	4.6	27	22.7	14.0	8.7	62
BWBS dk1	18.8	15.0	3.7	25	17.8	12.3	5.5	45
ESSF mv3	16.5	14.1	2.4	17	16.7	10.3	6.4	62
ESSF mv4	16.1	13.9	2.2	16	15.9	10.3	5.6	54

The project indicates that on average, site index on managed pine stands is 24% higher than current inventory estimates, and 56% higher on spruce stands.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

Site index is a fundamental value used in the modeling of growth and yield of stands to forecast future stand volume and timber supply. It is assumed that site index of a stand will not change over time, with or without disturbance. As such, site index indicators are not explicitly forecasted or projected, but are built into planning scenarios as part of timber supply projections. However, as noted above, management of stands can increase site index. Based upon this, it is believed that the target of post-harvest site index exceeding that of the pre-harvest site index will be achieved as unmanaged stands become managed stands until second rotation is reached.

Mackenzie DFA Sustainable Forest Management Plan

Monitoring and reporting:

The data that is required to monitor this indicator is post-harvest site index (SI) by block during free growing silviculture surveys on previously harvested areas within the THLB. Pre-harvest data will be obtained as part of inventory information by the planning and/or operations forester. The monitoring and analysis of post-harvest SI will occur annually through the individual licensees' silviculture survey program. The pre-harvest SI by subzone and leading species in each block will be compared to the recorded post-harvest SI.

Indicator #20 Site Conversion

Indicator Statement	Target and Variance
Area of THLB converted to non-forest land use through forest management activities.	<u>Target:</u> <5% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>
<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.1: Soil quality and quantity Value: Healthy and abundant soil resource Objective: Conserve soil resources by maintaining soil quality and quantity.</p>
<p>SFM Criterion 4: Role in global ecological cycles CSA SFM Element 4.1: Carbon uptake and storage Value: Carbon cycling Objective: Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem.</p>
<p>SFM Criterion 4: Role in global ecological cycles CSA SFM Element 4.2: Forest land conversion Value: Minimize forest land conversion Objective: Protect forest land from deforestation or conversion to non-forests, where ecologically appropriate.</p>

What is this indicator and why is it important?

In addition to maintaining the resources necessary for sustaining the resiliency of forest ecosystems, a stable land base within which productive capability is assessed is also required. In order to assess the maintenance of the productive capability of the land base, this indicator specifically tracks the amount of productive land base loss due to various non-forest uses. Removal of the productive land base occurs as a result 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.

Mackenzie DFA Sustainable Forest Management Plan

Conversion of the THLB 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 correspondingly reduced.

How are targets established?

The target is established based on the current assumptions in TSR2 for the TSA. The SFM Plan accounts for a 5% reduction in the THLB allowing for future road construction.

Current condition:

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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) are assumed 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 signatories. .

Monitoring and reporting:

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 the respective signatories' offices, as per their document control procedures.

Indicator #21 Permanent Access Structures

Indicator Statement	Target and Variance
The percentage of gross cutblock area occupied by total permanent access structures.	<u>Target:</u> <5% <u>Variance:</u> 1%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 3: Soil and Water CSA SFM Element 3.1: Soil quality and quantity Value: Healthy and abundant soil resource Objective: Conserve soil resources by maintaining soil quality and quantity.</p>
<p>SFM Criterion 4: Role in global ecological cycles CSA SFM Element 4.1: Carbon uptake and storage Value: Carbon cycling Objective: Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem.</p>
<p>SFM Criterion 4: Role in global ecological cycles CSA SFM Element 4.2: Forest land conversion</p>

Mackenzie DFA Sustainable Forest Management Plan

Value: Minimize forest land conversion

Objective: Protect forest land from deforestation or conversion to non-forests, where ecologically appropriate.

What is this indicator and why is it important?

This indicator measures the amount of area developed as permanent access structures (PAS) within cutblocks, 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, as a result 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 as a whole.

How are targets established?

The current target of 5% has been determined from current base line data as indicated previously. The signatories expect that current PAS will be maintained and potentially decrease in the future and have used the current status as the target for this indicator.

Current condition:

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

The < 5% target is anticipated to be achieved by all signatories. 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. Therefore, the use of a “what if” scenario is beneficial in identifying anticipated future trends for a indicator such as this. As this target identifies a value equal to or less than 5.0%, one other scenario should be identified:

a) What if considerably more than 5.0% of the average annual cutblock area was occupied by permanent access structures?

Impacts to all three aspects of SFM (ecological, economic, and social) could be expected if considerably more than 5.0% of the annual cutblock area within the THLB was in permanent access. Since permanent access structures remove productive forest area from the THLB, the 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 from an increase in 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. It is not possible to have a forest industry without permanent access structures. However, this “what if” scenario analysis implies that a balance of values can be achieved through sustaining a minimal level of permanent access within the DFA.

Mackenzie DFA Sustainable Forest Management Plan

The signatories are committed to achieving the identified target that, for now, is the maximum percentage.

Monitoring and reporting:

All road planning and construction information is maintained within the signatories' respective databases such as GENUS. 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.

Indicator #22 Communication of planned Deactivation Projects

Indicator Statement	Target and Variance
Percentage of off-block road deactivation projects that are communicated with applicable First Nations and Stakeholders.	<u>Target:</u> 100% <u>Variance:</u> -10%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.1: Timber and non-timber benefits Value: Multiple benefits Objective: Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.</p>
<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.2: Communities and sustainability Value: Sustainable communities Objective: Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.</p>
<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.5: Information for decision-making Value: Fair and effective decision-making Objective: Provide relevant information and educational opportunities to interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems.</p>

What is this indicator and why is it important?

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 the signatories need to deactivate off-block roads, communication of their intention is required.

Our assumption with this indicator is simply that – by increasing communication regarding signatory deactivation plans among stakeholders, we can increase the efficiency of access to resources.

Mackenzie DFA Sustainable Forest Management Plan

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.

How are targets established?

Targets for this indicator were established through PAG consensus.

Current condition:

Currently, off-block deactivation is coordinated to some extent between the major licensees, BCTS, and MoFR. However, because the major licensees and BCTS have discreet operating areas in the TSA, coordination is less onerous as operations seldom overlap.

The signatory's will send letters to overlapping stakeholders and First Nations. Public notification will take place in the form of a newspaper ad detailing the planned deactivation projects with a reasonable estimate of the timing of the project.

Refer to the most recent annual report for a table summarizing the current status for this indicator

Forecasting and probable trends of indicator:

Modeling is not applicable to this indicator as it is a process indicator.

Monitoring and reporting:

Communications with First Nations, stakeholders, and the public applicable to this indicator will be monitored and tracked in the signatory's respective databases.

Indicator #23 Regeneration Delay

Indicator Statement	Target and Variance
Percent of standard units declared stocked prior to the regeneration date consistent with operational plans.	<u>Target:</u> 100% <u>Variance:</u> -5%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.1: Forest ecosystem resilience Value: Resilient ecosystems Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.</p>
<p>SFM Criterion 2: Ecosystem condition and productivity CSA SFM Element 2.2: Forest ecosystem productivity Value: Productive ecosystems Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.</p>
<p>SFM Criterion 4: Role in global ecological cycles CSA SFM Element 4.1: Carbon uptake and storage Value: Carbon cycling</p>

Mackenzie DFA Sustainable Forest Management Plan

Objective: Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem.

What is this indicator and why is it important?

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 two years, where planting is prescribed and five years where the stand is expected to reforest naturally. 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.

How are targets established?

The target for this indicator is established at 100% in order to ensure that all harvested areas within the DFA are reforested within specified timelines. Achievement of regeneration delay is an integral part of all silviculture management activities so it is vital to have an overall performance target of 100%.

Current condition:

A regeneration survey is completed after planting to ensure adequate stocking of harvested blocks.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

This is a legal obligation of the signatories; 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.

Monitoring and reporting:

Silviculture obligations such as regeneration delay dates for each harvested stand are recorded and maintained in each Steering Committee member's databases. Each cutblock 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 Ministry of Forests that will update the status of the cutblock 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.

Mackenzie DFA Sustainable Forest Management Plan

Indicator #24 Free Growing

Indicator Statement	Target and Variance
Percent of standards units declared Free Growing prior to the late free growing assessment date.	<u>Target:</u> 100% <u>Variance:</u> -5%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

SFM Criterion 2: Ecosystem condition and productivity

CSA SFM Element 2.1: Forest ecosystem resilience

Value: Resilient ecosystems

Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.

SFM Criterion 2: Ecosystem condition and productivity

CSA SFM Element 2.2: Forest ecosystem productivity

Value: Productive ecosystems

Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.

What is this indicator and why is it important?

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 obligations 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.

How are targets established?

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 cutblocks reach the free to grow standard the area reverts back 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.

Current condition:

Silviculture obligations, including a free growing standard, for all harvested areas of Crown land have been legally in place since October 1987. A review of signatories' free

Mackenzie DFA Sustainable Forest Management Plan

growing areas revealed that all stands under obligation are currently meeting the defined free growing time period designated within the Site Plan. However, small areas within a limited number of blocks are currently at risk of not meeting prescribed late free growing dates. As such, these areas will be assessed and corrective actions will be implemented where possible in order to ensure the stands will reach free to grow status by the amended free growing dates.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

This is a legal obligation of the signatories; 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.

Monitoring and reporting:

Silviculture obligations such as free growing dates for each harvested stand are recorded and maintained in each signatory's databases. Each cutblock 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 licensee 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.

Once free to grow status has been achieved, a report is submitted to the Ministry of Forests that updates the status of the cutblock 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.

Indicator #25 Prioritizing harvest of damaged stands

Indicator Statement	Target and Variance
Percentage of area (ha) harvested that are damaged or considered a high risk to stand damaging agents.	<u>Target:</u> 100% <u>Variance:</u> -20%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

SFM Criterion 2: Ecosystem condition and productivity
CSA SFM Element 2.1: Forest ecosystem resilience
Value: Resilient ecosystems
Objective: Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.
SFM Criterion 2: Ecosystem condition and productivity

Mackenzie DFA Sustainable Forest Management Plan

CSA SFM Element 2.2: Forest ecosystem productivity

Value: Productive ecosystems

Objective: Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.

SFM Criterion 4: Role in global ecological cycles

CSA SFM Element 4.1: Carbon uptake and storage

Value: Carbon cycling

Objective: Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem.

SFM Criterion 5: Economic and social benefits

CSA SFM Element 5.1: Timber and non-timber benefits

Value: Multiple benefits

Objective: Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.

What is this indicator and why is it important?

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 Bark Beetle, which has killed millions of mature, commercially viable lodgepole pine. 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 uninfested 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.

How are targets established?

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 Licensees stand damaging agent prioritization. The signatories will refer to the most current Forest Health Strategy for the Mackenzie TSA.

Current condition:

Canfor and BCTS target damaged stands in a similar manner. Each year the volume of damaged timber is assessed within the DFA by the Ministry of Forests and Range. 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

Mackenzie DFA Sustainable Forest Management Plan

out on the Licensees' and BCTS' success in ensuring areas with stand damaging agents have been assessed and have been prioritized for harvest if required and thereby minimizing value losses.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

By targeting damaged stands forest managers are able to 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. Use of a “what if” scenario is beneficial in helping to identify anticipated future trends for an indicator such as this. As the stated target for this indicator is 100%, one other potential scenario will be analyzed:

a) What if only 50% of areas with stand damaging agents are prioritized for harvest?

Failure to prioritize 50% of areas with stand damaging agents for harvest means forest managers are allowing significant areas to either lose economic value, or to allow existing problems to become much worse. For example, by choosing to harvest green, undamaged stands while other stands are affected or dead, the opportunity to prevent further spread of the stand damaging agent is lost. Dead, unsalvaged stands will start to decay, losing economic value that could have been realized if they were prioritized for harvesting. 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.

Monitoring and reporting:

Each year a Forest Health Strategy is prepared for the Mackenzie TSA for use by licensees, BC Timber Sales, and the Mackenzie Ministry of Forests to prioritize and coordinate activities to address the forest health factors impacting the forests in the TSA.

Indicator #26 Harvest Volume

Indicator Statement	Target and Variance
Actual harvest volume compared to the apportionment across the DFA over each 5 year cut control period.	<u>Target:</u> 100% <u>Variance:</u> +/-10%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.1: Timber and non-timber benefits</p>

Mackenzie DFA Sustainable Forest Management Plan

<p>Value: Multiple benefits Objective: Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.</p>
<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.2: Communities and sustainability Value: Sustainable communities Objective: Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.</p>
<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.3: Forest community well-being and resilience Value: Community health Objective: Encourage, co-operate with, and help to provide opportunities for economic diversity within the community.</p>

What is this indicator and why is it important?

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 a number of 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 42% 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.

How are targets established?

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 the signatories are committed to fulfill 100% of their timber harvesting obligations.

Current condition:

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. In the case of BC Timber Sales, they are mandated to offer timber sale licenses matching the allocated AAC. Each truckload of wood is assessed and

Mackenzie DFA Sustainable Forest Management Plan

accounted for at an approved Ministry of Forests and Range (MOFR) scale site. The MOFR 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. BC Timber Sales tracks volume for timber sale licenses issued based on volume cruised, and compares this to its AAC allocation.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

The actual volume harvested by the Licensees and sold by BCTS will be directly related to the forecasted volume over time as per the Mackenzie SFM Indicator Forecasting project. The results of the harvest levels forecasting under current Base Case assumptions are shown in Figure 12.

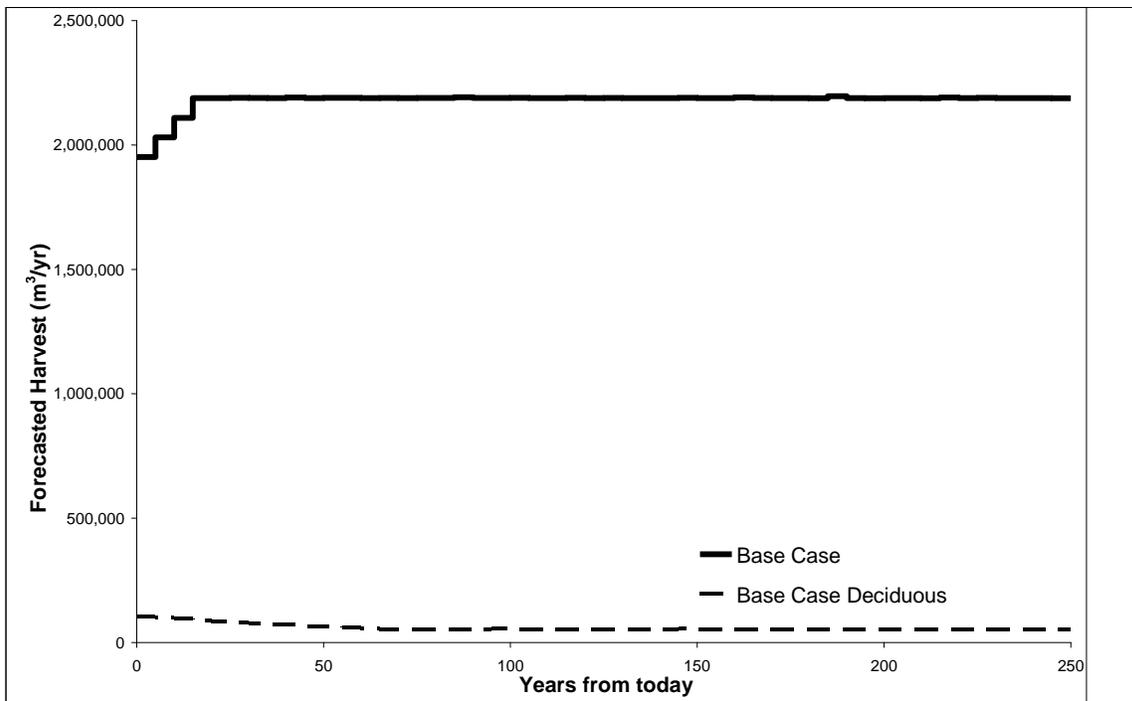


Figure 12. Forecasted harvest of timber in the Mackenzie Defined Forest Area of north-central British Columbia.

The current annual allowable cut in the Mackenzie DFA is 1,950,520 m³/year as estimated during the forecasting and scenario design project. As seen in the harvest volume forecast figure, the short-term harvest level increases 5% every five years until it levels off at about 2,200,000 m³/year. Additional forecasting of this indicator will occur during future indicator supply analyses, which are anticipated to be at five-year intervals.

Monitoring and reporting:

The volume of timber actually harvested within the DFA will be determined annually by a review of MOFR timber scale billing summaries for the period of January 1st to December 31st each year, on an annual basis. BC Timber Sales will track the volume

Mackenzie DFA Sustainable Forest Management Plan

sold annually relative to their apportionment. The signatories will report out on the volume harvested (Canfor) or sold (BCTS) 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.

Indicator #27 Waste and Residue

Indicator Statement	Target and Variance
Percentage of blocks and roads harvested where estimated waste and residue is below allowable levels.	<u>Target:</u> 100% <u>Variance:</u> -5%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.1: Timber and non-timber benefits Value: Multiple benefits Objective: Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.</p>
<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.2: Communities and sustainability Value: Sustainable communities Objective: Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.</p>
<p>SFM Criterion 4: Role in global ecological cycles CSA SFM Element 4.1: Carbon uptake and storage Value: Carbon cycling Objective: Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem.</p>

What is this indicator and why is it important?

The purpose of this indicator is to ensure that the use of wood fibre is maximized given reasonable consideration of fibre quality and milling efficiency, Government has set targets on allowable waste and residue for forest harvesting operations. This indicator simply allows us to monitor compliance with already established standard targets under the assumption that these targets adequately minimize any loss of economic potential from undue waste and residue of wood fibre.

How are targets established?

Waste and Residue targets are established by Government through the Provincial Logging Residue and Waste Measurement Procedures Manual (BC MoFR, 2005). The target was agreed to by PAG consensus.

Current condition:

Assessments of harvested blocks for levels of residue and waste are required under the *Forest Act, Sec 103.1*. The signatories currently sample every block harvested or a sub-sample of blocks harvested, in accordance with methods approved by the Ministry of Forests and Range for levels of waste and residue. Levels of waste and residue are reported to the MoFR and, if required, payment made on any excess levels.

Mackenzie DFA Sustainable Forest Management Plan

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

This is a legal obligation of the signatories, modeling does not apply to this indicator, although it is anticipated that failure to achieve targets would negatively impact economic and social values. Forecast for this indicator is that 100% of blocks will be compliant with waste and residue standards.

Monitoring and reporting:

The percentage of forest harvest operations that meet regulated waste and residue standards on a per hectare basis. Percentage will be based on blocks assessed for waste and residue as it is impossible to determine compliance until the block is assessed. All assessments must be completed to Ministry of Forests and Range standards.

Indicator #28 First-order Wood Products

Indicator Statement	Target and Variance
The number of first order wood products produced from trees harvested from the DFA.	<u>Target:</u> 5 <u>Variance:</u> -2

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.1: Timber and non-timber benefits Value: Multiple benefits Objective: Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.</p>
<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.2: Communities and sustainability Value: Sustainable communities Objective: Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.</p>
<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.3: Forest community well-being and resilience Value: Community health Objective: Encourage, co-operate with, and help to provide opportunities for economic diversity within the community.</p>

What is this indicator and why is it important?

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

Mackenzie DFA Sustainable Forest Management Plan

- 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.

How are targets established?

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, the signatories expect to produce the same number and diversity of first order forest products within the DFA. However the signatories do 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.

Current condition:

Canfor currently produces a variety of forest products with different grades and sizes of dimensional lumber being the primary products. BCTS is limited to providing saw & pulp logs for sale through an open competitive bid process. 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.

Forecasting and probable trends of indicator:

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. However, it is important to identify what the accepted target means to SFM. The number of first order forest products produced within the DFA affects economic and social values within the DFA. Therefore, the use of a "what if" scenario is beneficial in

Mackenzie DFA Sustainable Forest Management Plan

identifying anticipated future trends. As this indicator currently has a target set at 5, one other scenario should be identified:

a) What if significantly less than five first order wood products were produced within the DFA?

If significantly less than five different first order wood products were produced within the DFA economic diversity within the Mackenzie area could decrease. Timber harvested from the DFA may not achieve full returns of revenue because local utilization of harvested logs would likely decrease. Employment would also likely decrease within the DFA, which could in turn reduce the quality of life. In light of the mountain pine beetle infestation, this indicator is increasingly important. 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, the signatories are committed to achieving 5 different first order wood products produced in the DFA.

Monitoring and reporting:

In order to track and evaluate this indicator, the signatories will report on the number of first order wood products produced.

Indicator #29 Local Investment

Indicator Statement	Target and Variance
The percent of money spent on forest operations and management in the DFA provided from local suppliers.	<u>Target:</u> 30% <u>Variance:</u> -5%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.1: Timber and non-timber benefits Value: Multiple benefits Objective: Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.</p>
<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.2: Communities and sustainability Value: Sustainable communities Objective: Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.</p>
<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.3: Forest community well-being and resilience Value: Community health Objective: Encourage, co-operate with, and help to provide opportunities for economic diversity within the community.</p>

Mackenzie DFA Sustainable Forest Management Plan

What is this indicator and why is it important?

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 signatory's woodlands departments, excluding stumpage. Harvesting and road building costs, where applicable, will be included in the total.

How are targets established?

The indicator will be monitored and analyzed for trends reflecting their commitment to supporting local businesses.

Current condition:

A query of the financial data stored within the signatories' individual 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.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

Forecasting for this indicator will be that the signatories 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.

Monitoring and reporting:

This indicator will be monitored and reported from the signatories' accounting systems. The signatories will conduct a financial query of expenditures for suppliers and contractors within the local communities compared to the total dollars spent on woodlands operations.

Mackenzie DFA Sustainable Forest Management Plan

Indicator #30 Contract Opportunities for First Nations

Indicator Statement	Target and Variance
The number of contract opportunities with First Nations within the DFA.	<u>Target:</u> >5 <u>Variance:</u> -2

CSA-SFM criteria, elements, values and objectives relative to this indicator:

SFM Criterion 5: Economic and social benefits

CSA SFM Element 5.2: Communities and sustainability

Value: Sustainable communities

Objective: Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.

SFM Criterion 6: Societies responsibility

CSA SFM Element 6.3: Forest community well-being and resilience

Value: Community health

Objective: Encourage, co-operate with, and help to provide opportunities for economic diversity within the community.

What is this indicator and why is it important?

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.

BCTS provides opportunities for all eligible bidders including First Nations. Canfor has explored forestry related opportunities with First Nations in the past. 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.

How are targets established?

Targets are established based on the amount of opportunities that will be provided to First Nations to bid on forestry related contracts.

Current condition:

All BCTS bids are open to eligible bidders, including First Nations and there currently is no system in place for identifying the First Nations status of bidders. Canfor has worked on agreements with some of the First Nations outside of the SFM/CSA process.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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.

Mackenzie DFA Sustainable Forest Management Plan

Monitoring and reporting:

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.

Indicator #31 Range Management Effectiveness

Indicator Statement	Target and Variance
The percentage of forest operations consistent with range requirements as identified in operational plans and/or site plans.	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.1: Timber and non-timber benefits Value: Multiple benefits Objective: Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.</p>
<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.5: Information for decision-making Value: Fair and effective decision-making Objective: Provide relevant information and educational opportunities to interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems.</p>

What is this indicator and why is it important?

The livestock industry has been an important part of British Columbia's economy for over a century. Historically, ranchers have used Crown range resources as a source of feed for their animals. Conservation of identified range resources will help to assure their availability to future generations and aid in diversifying the local economy. Range resources can include grazing or hay cutting permits, or areas with potential for these ventures. Range managers and forest managers share the forest for their particular purposes, and must work cooperatively in order to achieve sustainable development and management of its resources. The indicator is designed to ensure that operational plans with identified range requirements have those requirements implemented on the ground. Maintenance of range resources is an important aspect of sustainable forest management because it contributes to the social and economic needs of people who traditionally and currently use the DFA for purposes other than forestry. This indicator will help to ensure that various range values are conserved for current and future generations

How are targets established?

The target is a legal requirement. The target value of 100% has been established to reflect this and because the identification, conservation and co-management of range resources are consistent with Sustainable Forest Management. Forest operations will have to implement operational and/or site plan requirements for range management objectives to meet the social and economic needs of other users of Crown land.

Mackenzie DFA Sustainable Forest Management Plan

Current condition:

The Ministry of Forests and Range regulates range use under the Forest and Range Practices Act. The principal operational plan used to manage Crown range has been the Range Use Plan. Range Use Plans are developed by range users approved by government and contain management specifics governing the range resource. The Forest Development Plan/ Forest Stewardship Plan contain general management strategies to mitigate negative impacts to range where harvesting is proposed within range tenures. Site level specific detail is contained within subsequent Site Plans.

Once a strategy to conserve range resources is included within a Site Plan document, there is a legal obligation for the Licensee or BCTS to implement and adhere to the strategy. Harvesting and silviculture inspections ensure that strategies are implemented as stated in the operational plan.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

Carrying out activities specified in an Operational Plan and/or Site Plan is a legal obligation of the signatories, modeling does not apply to this indicator. Forecasting for this indicator is that, once developed, 100% of range requirements are adhered to.

Monitoring and reporting:

Information that is collected during EMS checklist reviews and harvesting inspections is stored in the signatories' respective databases and other filing systems. 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 so that issues can be tracked and mitigated as required.

Indicator #32 Satisfaction (PAG)

Indicator Statement	Target and Variance
The average overall percent of the PAG's satisfaction with PAG meeting process.	<u>Target:</u> 100% <u>Variance:</u> -20%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.4: Fair and effective decision-making Value: Fair and effective decision-making Objective: 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.</p>
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What is this indicator and why is it important?

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

Mackenzie DFA Sustainable Forest Management Plan

resource uses within the DFA. Therefore, it is important that the signatories have a positive and meaningful working relationship with the PAG, where the signatories are 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, the Licensees need to be responsive to the satisfaction level of the PAG. Both the PAG and the Licensees can recognize the benefits of a well-developed public process. The signatories gain insight into local values and objectives and the PAG participants learn about the SFM process and the overall goals of sustainable development.

How are targets established?

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.

Current condition:

Following all PAG meetings to date, PAG participants completed meeting evaluations. 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 questions M10, M11, and M12 combined. 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.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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.

Monitoring and reporting:

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.

Mackenzie DFA Sustainable Forest Management Plan

Indicator #33 Representation (PAG)

Indicator Statement	Target and Variance
Percentage of the public sectors as defined in the Terms of Reference (ToR) invited to participate in the PAG process.	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

SFM Criterion 6: Societies responsibility

CSA SFM Element 6.4: Fair and effective decision-making

Value: Fair and effective decision-making

Objective: 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.

What is this indicator and why is it important?

The Mackenzie PAG is comprised of a variety of representatives that have various defined interests, values or specific uses of the forest resource within the DFA. An important component of the PAG is the representatives from the various public sectors as defined in the Terms of Reference (see Appendix B, "PAG Terms of Reference - February 20, 2007, for a list of these sectors).

Their involvement in the PAG process is crucial for the success of the SFMP as they represent a broad range of interests, both commercial and non-commercial, within the DFA. They also possess experience and expertise that the signatories can draw on in achieving the SFMP objectives. Their participation will enhance the co-operation between the forest industry and other parties interested in the management of public lands in the DFA to meet the social, economic, and ecological goals of sustainable forest management.

This indicator is designed to evaluate the success in encouraging this cooperation by tracking the percent of the public sectors, as defined in the Terms of Reference that are invited to participate in the PAG process. The PAG cannot force participation by any organization, but it can provide the opportunity to do so through such invitations.

How are targets established?

The target percent was established to reflect the importance the signatories place on the participation of the public sector in the PAG process. Those public sectors eligible for participation as defined in the Terms of Reference will continue to be invited to all future PAG meetings.

Current condition:

The process for inviting representative from the defined public sectors for participation in the PAG is detailed in the PAG ToR.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Mackenzie DFA Sustainable Forest Management Plan

Forecasting and probable trends of indicator:

This indicator is not easy to forecast as it is dependent on implementation and future improvement of this SFMP. However, it is important to identify what the accepted target means to SFM. The percentage of public sectors, as defined in the Terms of Reference, invited to participate in the PAG process may influence the success of the SFMP. Therefore, the use of a “what if” scenario is beneficial in identifying anticipated future trends for a indicator such as this. As this indicator currently has a target set at 100%, one other scenario should be identified:

a) What if 50% of the public sectors, as defined in the Terms of Reference, were invited to participate in the PAG progress?

If only half of the eligible public sectors were invited to participate in the PAG progress, the social acceptance of the SFMP may be weakened. 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 in providing the opportunity for the public sectors, as defined in the Terms of Reference, to participate in the PAG process, the signatories are committed to achieving the target of 100%.

Monitoring and reporting:

The number of invitations made to the public sectors to participate in the PAG progress will be compared to the number of public sectors outlined in the Terms of Reference.

Indicator #34 Input into Forest Planning

Indicator Statement	Target and Variance
The number of opportunities for public and/or stakeholders to provide meaningful input into forest planning.	<u>Target:</u> 6 <u>Variance:</u> -2

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.1: Timber and non-timber benefits Value: Multiple benefits Objective: Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.</p>
<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.4: Fair and effective decision-making Value: Fair and effective decision-making Objective: 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.</p>

Mackenzie DFA Sustainable Forest Management Plan

SFM Criterion 6: Societies responsibility

CSA SFM Element 6.5: Information for decision-making

Value: Fair and effective decision-making

Objective: Provide relevant information and educational opportunities to interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems.

What is this indicator and why is it important?

Forestry activities can impact a wide section of the public and individual stakeholders within the DFA. This indicator was designed to monitor the signatory'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 forest sectors; trappers, guide outfitters, water licence holders, range tenure holders, woodlot owners, private land owners, other licensees, and specific government agencies. Opportunities for input into forest planning will be offered to stakeholders where their tenured area coincides with the signatories planned activities.

How are targets established?

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.

Current condition:

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.

Mackenzie DFA Sustainable Forest Management Plan

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

Forecasting for this indicator is that the public will be given six opportunities to provide input into the planning processes of the signatories. Modeling is not applicable to this indicator as it is a process indicator.

Monitoring and reporting:

Each signatory will track the number of opportunities for the public and stakeholders to express forestry-related concerns and be involved in planning processes. Each Licensee and BCTS 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.

Indicator #35 Public and Stakeholder Concerns

Indicator Statement	Target and Variance
The number of operational concerns raised by the public and/or stakeholders that are considered and incorporated into operational and/or tactical plans.	<u>Target:</u> 100% <u>Variance:</u> -10%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.1: Timber and non-timber benefits Value: Multiple benefits Objective: Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.</p>
<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.4: Fair and effective decision-making Value: Fair and effective decision-making Objective: 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.</p>
<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.5: Information for decision-making Value: Fair and effective decision-making Objective: Provide relevant information and educational opportunities to interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems.</p>

What is this indicator and why is it important?

All signatories solicit 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.

Mackenzie DFA Sustainable Forest Management Plan

How are targets established?

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.

Current condition:

Operational concerns from the public may be provided in many ways, including written letters, e-mails, or faxes to the signatories. 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 cutblock and road referrals.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

It is the intent of all signatories to meet the target, and it is anticipated this goal will be met. However, it is important to identify what the accepted target means to SFM. The percent of timely responses to written concerns directly affects social values and indirectly affects economic values of SFM. Therefore, the use of a “what if” scenario is beneficial in identifying anticipated future trends for an indicator such as this. As this indicator has a stated target of 100%, one other potential scenario should be developed:

a) What if there were only 50% of operational concerns received from the public and stakeholders were incorporated into operational plans?

If there were only 50% of operational concerns received from the public and stakeholders were incorporated into operational plans, adequate attention would not be made to valuable public input. Public and stakeholder input into the SFM process is required to adequately consider other resource values within the DFA. If only 50% of concerns were addressed, public participation into SFM could decrease and impacts to other resource values such as cultural heritage, agriculture, non-timber forest resources and biological richness could potentially occur. If these other forest values are not fully realized, economic values could also potentially decrease.

The above “what if” scenario analysis implies that a balance of values can be achieved through maintenance of full response to identified public concerns.

Monitoring and reporting:

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.

Mackenzie DFA Sustainable Forest Management Plan

Indicator #36 Access to SFM Information

Indicator Statement	Target and Variance
The number of opportunities provided annually for access to SFM related documents.	<u>Target:</u> 3 <u>Variance:</u> 0

CSA-SFM criteria, elements, values and objectives relative to this indicator:

SFM Criterion 6: Societies responsibility
CSA SFM Element 6.4: Fair and effective decision-making
Value: Fair and effective decision-making
Objective: 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.

SFM Criterion 6: Societies responsibility
CSA SFM Element 6.5: Information for decision-making
Value: Fair and effective decision-making
Objective: Provide relevant information and educational opportunities to interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems.

What is this indicator and why is it important?

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 the signatories accountable for achieving the desired results and have confidence that forest resources are being managed sustainably.

How are targets established?

Targets for this indicator were established through PAG consensus.

Current condition:

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, the signatories each have 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.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

This indicator is not easy to forecast as it is dependent on implementation and future improvement of this SFMP. However, it is important to identify what the accepted target means to SFM. Distribution and access to the SFM Plan, annual reports and audit

Mackenzie DFA Sustainable Forest Management Plan

results may influence the success of the SFMP. Therefore, the use of a “what if” scenario is beneficial in identifying anticipated future trends for a indicator such as this. As this indicator currently has a target set at 1, one other scenario should be identified:

a) What if there was no access or distribution of the SFM Plan, annual reports, or audit results?

If there was no distribution or access to the SFM Plan, 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 SFM Plan 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 are to ensuring the public’s, stakeholder’s, and First Nations’ confidence, trust, and acceptance of the SFMP and the SFM process, the signatories are committed to achieving the target of 1.

Monitoring and reporting:

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.

Indicator #37 SFM educational opportunities

Indicator Statement	Target and Variance
The number of SFM educational opportunities and interactions provided.	<u>Target:</u> 2 <u>Variance:</u> 0

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.4: Fair and effective decision-making Value: Fair and effective decision-making Objective: 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.</p>
<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.5: Information for decision-making Value: Fair and effective decision-making</p>

Mackenzie DFA Sustainable Forest Management Plan

Objective: Provide relevant information and educational opportunities to interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems.

What is this indicator and why is it important?

This indicator was designed to monitor the signatories' 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 the signatories to ensure the public are sufficiently informed about SFM to make the choices we request of them. The indicator is intended to ensure that the signatories provide 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.

How are targets established?

Target was determined by PAG consensus. Target was based on current practices of the signatories. The signatories recognize 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.

Current condition:

It is anticipated that educational opportunities will come in the form of open houses, public presentations, PAG meetings, the Mackenzie Trade Fair, and field tours of the signatory's operations.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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.

Monitoring and reporting:

The number of educational opportunities or interactions with the public, stakeholder, and First Nations will be summarized for each reporting period.

Indicator #38 Heritage Conservation

Indicator Statement	Target and Variance
Percentage of forest operations consistent with the Heritage Conservation Act.	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

SFM Criterion 6: Societies responsibility
CSA SFM Element 6.1: Aboriginal and Treaty rights
Value: Rights of Aboriginal peoples

Mackenzie DFA Sustainable Forest Management Plan

Objective: Recognize and respect aboriginal title and rights, and treaty rights.

SFM Criterion 6: Societies responsibility

CSA SFM Element 6.2: Respect for aboriginal forest values, knowledge, and uses

Value: Aboriginal peoples values, knowledge, and traditional uses

Objective: Respect traditional aboriginal values, knowledge, and uses as identified through the aboriginal input process.

What is this indicator and why is it important?

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.

How are targets established?

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. The signatories will continue to take indicators to ensure forest operations are consistent with cultural heritage requirements as identified in operational plans.

Current condition:

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.

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.

Mackenzie DFA Sustainable Forest Management Plan

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.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

This is a legal obligation of the signatories, 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.

Monitoring and reporting:

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 EMS checklist reviews and harvesting inspections and is stored in the signatories' respective databases such as GENUS.

Indicator #39 First Nation input into Forest Planning

Indicator Statement	Target and Variance
The number of opportunities for First Nations to provide meaningful input into forest planning where active forest operations are within their respective traditional territories.	<u>Target:</u> >= 2 per First Nation <u>Variance:</u> 0

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.1: Aboriginal and Treaty rights Value: Rights of Aboriginal peoples Objective: Recognize and respect aboriginal title and rights, and treaty rights.</p>
<p>SFM Criterion 6: Societies responsibility CSA SFM Element 6.2: Respect for aboriginal forest values, knowledge, and uses Value: Aboriginal peoples values, knowledge, and traditional uses Objective: Respect traditional aboriginal values, knowledge, and uses as identified through the aboriginal input process.</p>

What is this indicator and why is it important?

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.

Mackenzie DFA Sustainable Forest Management Plan

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.

How are targets established?

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 the signatories continue 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.

Current condition:

The signatories currently have 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 that are currently referred to First Nations as in the FSP process. Tactical plans that may be referred to First Nations include AIAs, operating plans, cutblock 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 cutblocks and roads.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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.

Monitoring and reporting:

FSPs prepared under the premise of this SFMP will provide First Nations communities within the DFA with 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.

Mackenzie DFA Sustainable Forest Management Plan

Indicator #40 First Nations Concerns

Indicator Statement	Target and Variance
The percentage of operational concerns raised by First Nations that are considered and incorporated into operational and/or tactical plans.	<u>Target:</u> 100% <u>Variance:</u> -10%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

SFM Criterion 6: Societies responsibility

CSA SFM Element 6.1: Aboriginal and Treaty rights

Value: Rights of Aboriginal peoples

Objective: Recognize and respect aboriginal title and rights, and treaty rights.

SFM Criterion 6: Societies responsibility

CSA SFM Element 6.2: Respect for aboriginal forest values, knowledge, and uses

Value: Aboriginal peoples values, knowledge, and traditional uses

Objective: Respect traditional aboriginal values, knowledge, and uses as identified through the aboriginal input process.

What is this indicator and why is it important?

Ensuring issues of operational concern raised by First Nations as a result of forest management decisions are evaluated by the signatories 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 the signatories' commitment to SFM.

How are targets established?

The indicator's target of 100% demonstrates the signatories' 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.

Current condition:

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 EMS and is tracked in that manner.

Mackenzie DFA Sustainable Forest Management Plan

Canfor currently does not formally track the number of issues and response to First Nations' concerns, nor is there a mechanism to track the timeliness of responses. Canfor will develop a communication framework similar to the "Creating Opportunities for Public Interest Process" management system currently in use in Prince George. 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.

BCTS tracks communications utilizing an Outlook referral tracking system. All commitments arising from communications that are of an operational nature (ties to blocks and roads) are maintained within the Genus Planning Module.

Operational plans are generally FSPs. Tactical plans can include AIAs, operating plans, and cutblock and road referrals.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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.

Monitoring and reporting:

All communications will be documented within Canfor's and BC Timber Sales'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.

Indicator #41 Visual Quality

Indicator Statement	Target and Variance
The percentage of harvesting and road building operations consistent with visual quality requirements as identified in operational, tactical and/or site plans.	<u>Target:</u> 100% <u>Variance:</u> 0%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.1: Timber and non-timber benefits Value: Multiple benefits Objective: Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.</p>
<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.2: Communities and sustainability Value: Sustainable communities Objective: Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community</p>

Mackenzie DFA Sustainable Forest Management Plan

economics.

What is this indicator and why is it important?

Forests can provide intangible benefits in addition to their economic and ecological values. The perceived beauty of certain areas in the DFA is one of these benefits and must be considered in forest management. Protection and maintenance of visual quality helps give assurance that these values will be available for current and future generations. A Visual Quality Objective (VQO) is a resource management objective established by the MoFR District Manager, or contained in a higher level plan that reflects the desired level of visual quality. It is based on the physical characteristics and social concern for the area. The five categories of VQOs commonly used are:

- 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 indicator is designed to ensure that those operational plans with identified strategies to conserve visual quality have those strategies implemented on the ground. The maintenance of visual quality in scenic areas is an important aspect of sustainable forest management because this indicator contributes to overall landscape condition and social acceptance of industrial forestry. Monitoring the success of the requirements of the operational, tactical and/or site plans to meet VQOs will help to ensure that visual quality is conserved for future generations.

How are targets established?

The target was established through PAG consensus. The target for this indicator has been established at 100% because the identification and conservation of visual quality is important to various stakeholders within the Mackenzie DFA. The signatories will continue to prescribe management activities to achieve VQOs where required.

Current condition:

Visually sensitive areas are defined as viewscapes that have been identified through a previous planning process. During Forest Stewardship Plan preparation, scenic areas are identified on a map and if harvesting operations are planned for an area that contains VQOs, information will be further identified in a Site Plan. Visual Impact Assessments (VIAs) help determine block shape, location and internal retention options. At the site level, strategies are included in the Site Plan to minimize visual impacts.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

This is a legal obligation of the signatories, forecasting does not apply to this indicator, although it is anticipated that 100% of harvest operations will be consistent with visual quality objectives as identified in operational plans, tactical plans and/or site plans. The exact level of success is not easily predicted as conditions vary from one site to another

Mackenzie DFA Sustainable Forest Management Plan

and circumstances, such as forest health and fire, may arise that prevent the requirements from being achieved.

Monitoring and reporting:

The indicator will be monitored through EMS inspections and performance will be recorded in an EMS databases such as GENUS. The percentage will be included in the annual SFMP report for the operating period of April 1st to March 31st.

Indicator #42 Resource Features

Indicator Statement	Target and Variance
Percentage of blocks and roads harvested that coincide with identified resource features that are managed or protected.	<u>Target:</u> 100% <u>Variance:</u> -10%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.2: Species Diversity Value: Diversity of species throughout the DFA Objective: Maintain species diversity through time, including habitats for known occurrences for species at risk.</p>
<p>SFM Criterion 1: Biological Diversity CSA SFM Element 1.4: Protected Areas and sites of biological and cultural significance Value: Unique and important sites within the DFA. Objective: 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.</p>

What is this indicator and why is it important?

Resource features are site-specific elements that have a unique importance because specific ecological factors exist in combination at one place and don't often occur similarly elsewhere. Examples are caves, Karst, or culturally modified trees but in general can be declared through regulation as any of the following:

- Karst;
- A range development;
- Crown land used for research;
- Permanent sample sites;
- A cultural heritage resource;
- An interpretive forest site or trail;
- A recreational site or trail; or
- A recreational feature.

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. Our intent with this indicator is to monitor our commitment to manage and protect regulated resource features.

How are targets established?

Targets for this indicator were established through PAG consensus. The target for this indicator has been established at 100% because the maintenance of known resource

Mackenzie DFA Sustainable Forest Management Plan

features is important to various stakeholders within the Mackenzie DFA. The signatories will continue to manage or protect resource features as they become known.

Current condition:

The signatories currently plan and design their activities and/or cutblocks so as to manage or protect adequately resource features when they become known. Once a resource feature 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 the respective signatories' EMS.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

This indicator is a legal obligation of the signatories 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.

Monitoring and reporting:

The indicator will be monitored through EMS inspections and performance will be recorded in an EMS databases such as GENUS. The percentage will be included in the annual SFMP report for the operating period of April 1st to March 31st.

Indicator #43 Safety Policies

Indicator Statement	Target and Variance
Written safety policies in place and full implementation are documented.	<u>Target:</u> 2 <u>Variance:</u> 0

CSA-SFM criteria, elements, values and objectives relative to this indicator:

<p>SFM Criterion 5: Economic and social benefits CSA SFM Element 5.2: Communities and sustainability Value: Sustainable communities Objective: Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.</p>

What is this indicator and why is it important?

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.

How are targets established?

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

Mackenzie DFA Sustainable Forest Management Plan

are effective. The results of the annual Safety Audits will be used to determine the signatories' compliance with the indicator.

Current condition:

Each signatory has a written safety policy in place which is reviewed by the safety committee a minimum of once every year and revised as necessary and approved by management. If an incident occurs the cause of the incident is determined and recommendations are put forward. These recommendations may result in a change to a specific policy. Annual audits will be conducted and Action Plans developed for any item that requires attention detailing the person responsible for the item and the deadline for completion.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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.

Monitoring and reporting:

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.

Indicator #44 Accidents

Indicator Statement	Target and Variance
Number of lost time accidents in woodlands operations.	<u>Target:</u> 0 <u>Variance:</u> 0

CSA-SFM criteria, elements, values and objectives relative to this indicator:

SFM Criterion 5: Economic and social benefits

CSA SFM Element 5.2: Communities and sustainability

Value: Sustainable communities

Objective: Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.

What is this indicator and why is it important?

Health and safety of forest workers and members of the public is an important quality of life objective that is essential to SFM. All signatories consider 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 EMS policies. This indicator was developed to track and report out on the number of lost time workplace

Mackenzie DFA Sustainable Forest Management Plan

accidents that occur within Canfor's woodlands division and the field operations of BCTS. Operations conducted outside the woodlands division and field operations have been excluded from this indicator; however the signatories currently promote 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.

How are targets established?

The target for this indicator was established so that all signatories 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.

Current condition:

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

This indicator is not easy to quantifiably forecast over a defined time frame because it is operational in nature. However, it is important to identify what the accepted target means to SFM. The number of company related, forestry management operation accidents each year relates directly to social values within the DFA. Therefore, the use of a "what if scenario" is beneficial in identifying anticipated future trends for a indicator such as this. As this indicator states a target of zero, one other scenario should be analysed:

a) What if more than the target amount of company related forestry management operation accidents occurred each year?

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. Licensee members are committed to maintaining worker and public safety as a high priority and will work towards achieving the stated target for this indicator.

The "what if scenario" illustrates that a variety of social values and certain economic values could potentially be affected if the target for this indicator were not achieved. In the future, the signatories anticipate that the number of company related forestry management operation accidents each year will remain at or below the target.

Monitoring and reporting:

Each signatory'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

Mackenzie DFA Sustainable Forest Management Plan

be tracked and monitored for reporting purposes. Monitoring and reporting the number of workplace LTAs will help signatories identify problems with procedures and increase overall awareness in order to prevent future injuries and LTAs.

Indicator #45 Signage

Indicator Statement	Target and Variance
The percentage of operational activities that have the appropriate safety signage in place during the activity, and removed following the completion.	<u>Target:</u> 100% <u>Variance:</u> -20%

CSA-SFM criteria, elements, values and objectives relative to this indicator:

SFM Criterion 5: Economic and social benefits

CSA SFM Element 5.2: Communities and sustainability

Value: Sustainable communities

Objective: Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.

What is this indicator and why is it important?

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.

How are targets established?

Targets for this indicator were established through PAG consensus.

Current condition:

Signage is posted as required by the signatories. Canfor's EMS Harvest Inspection Form refers to posting of adequate signage, including removal following completion.

Currently the signage requirements (truck turning/active hauling) are not specifically enforced or enforceable when BCTS staff conducts conformance inspections.

Enhancements to SFMS have been recommended and will be considered during planned and periodic change.

Refer to the most recent annual report for a table summarizing the current status for this indicator.

Forecasting and probable trends of indicator:

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.

Mackenzie DFA Sustainable Forest Management Plan

Monitoring and reporting:

Each of the signatories has an Environmental Management System through which they will 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.

5.3 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: indicator mapping, 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.

Mackenzie DFA Sustainable Forest Management Plan

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;
- Identifying and incorporating natural disturbance,
- Identifying/describing current practices;
- Linking the practices to indicators and indicators through indicator mapping¹¹.

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 licenses (NRFLs) holders in the TSA which may operate within the DFA. These NRFLs are:

Kwadacha Natural Resource Agency;	53,404 m ³
Tsay Keh Dene Band;	53,404 m ³
Ainsworth Lumber Co. Ltd.	50,000 m ³ (deciduous leading)
Total:	106,808 m³

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 98,730 m³. This was the volume that was incorporated into the current and forecasted analyses.

It is recognized that the potential for other external impacts to occur in the future exists. When and if such impacts arise, these will be analyzed for their affect and influence on assumptions and the ability of the signatories to achieve their targets.

¹¹ Indicator mapping has not been completed for all measures included in the Mackenzie SFM Plan at the time of writing.

Mackenzie DFA Sustainable Forest Management Plan

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 the signatories of this SFMP. 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 has been recorded in the Mackenzie TSA in five (5) of the past nine (9) years. The lowest amount of area affected was in 2007, 38 ha and the largest amount of area affected was 2006, 9,361 ha. The majority of damage occurs in June, July, and August. In BC lightning 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 Ministry of Forests and Range (MoFR) 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 13. 1999-2007 Mackenzie TSA Aerial Overview Results

Mackenzie DFA Sustainable Forest Management Plan

Forest Health Factor	Hectares of Incidence ¹²								
	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 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 the indicators of each indicator provides information as to how practices are affecting sustainability targets through time and space. This assessment will also identify what level of risk there is to each indicator if current practices are continued over time.

6.1.2 Indicator Mapping

Indicator mapping is a tool that assesses the current levels of resources to be sustained in the DFA and shows how the resources on the landbase are spatially contributing to meeting sustainability targets.

The SFM Framework assumes that the entire landbase (whether managed or unmanaged) contributes to meeting ecological, economic and social goals of sustainability. Where possible, indicators/indicators will be spatially mapped demonstrating current levels of resources as represented by the indicators/indicators. The landbase is delineated into THLB and NHLB designations to assess the contribution of both managed and unmanaged areas to meeting sustainability targets. The intention is to assess how much of the targets are met by the NHLB and determine what level of contribution is required from the THLB.

Indicator mapping has not been initiated for the Mackenzie DFA. When it is determined that it is required, the results will be incorporated into the SFM Plan at that time. Once indicators have been mapped, their linkage to current practices will be reviewed and

¹² Source: Forest Health Strategy and Tactical Plan, Mackenzie TSA, March 2008

Mackenzie DFA Sustainable Forest Management Plan

summarized. An analysis of how well current practices are helping in achieving targets for the THLB will be summarized and reported out on in the annual report.

6.1.3 Forecasting

Forecasting is an explicit statement of the expected future condition, through time, of an indicator/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/indicators to sustainability targets using current practices over time in order to assess the level of risk for each indicator. Local level indicators and indicators currently in the process of being selected by the Mackenzie DFA Public Advisory Group and reviewed by technical experts for their suitability and credibility for measuring and forecasting. The next step in the process will be to develop a forecasting strategy for each of these (including spatial, temporal, analytical methods used etc.).

6.1.4 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/indicators of sustainability. The MCA process consists of two components: technical and public. It assists in determining if current conditions, assumptions, and practices as 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.

Both signatories have submitted Forest Stewardship Plans and are currently awaiting approval. 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 fully sustainable then alternative scenarios may be developed in order to meet sustainability objectives. An MCA provides input into the development of alternative scenarios.

For this iteration of the SFM Plan, the MCA that was undertaken focused on both 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 at the respective signatories' offices.

Technical MCA

The technical MCA requires that the most up to date on each of the indicators and on 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.

Mackenzie DFA Sustainable Forest Management Plan

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 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 were 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 rational 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 13 – Figure 17) 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.

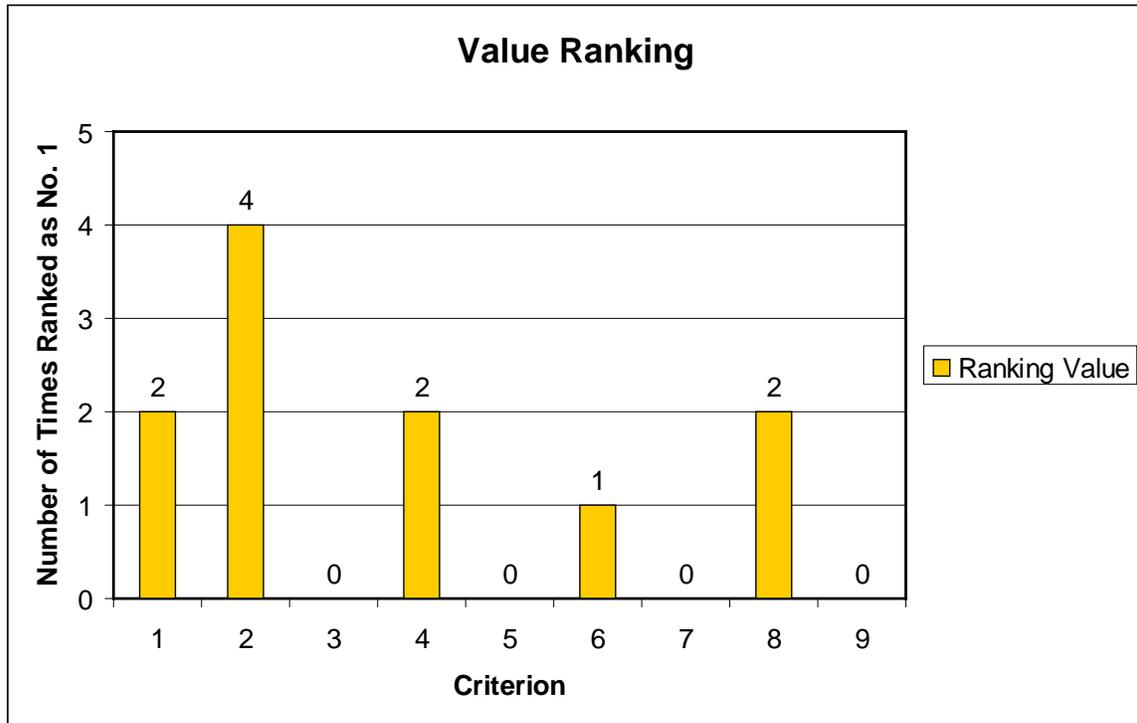


Figure 13. Criteria value ranking.

Figure 13 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 14 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.

Mackenzie DFA Sustainable Forest Management Plan

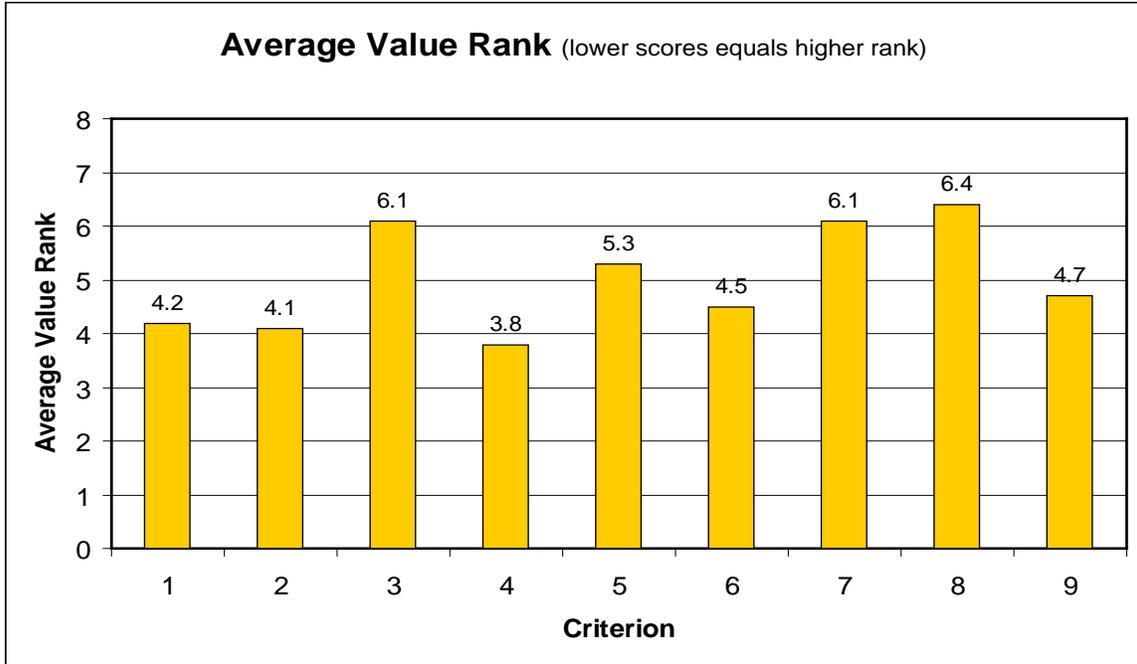


Figure 14. Average criterion ranking.

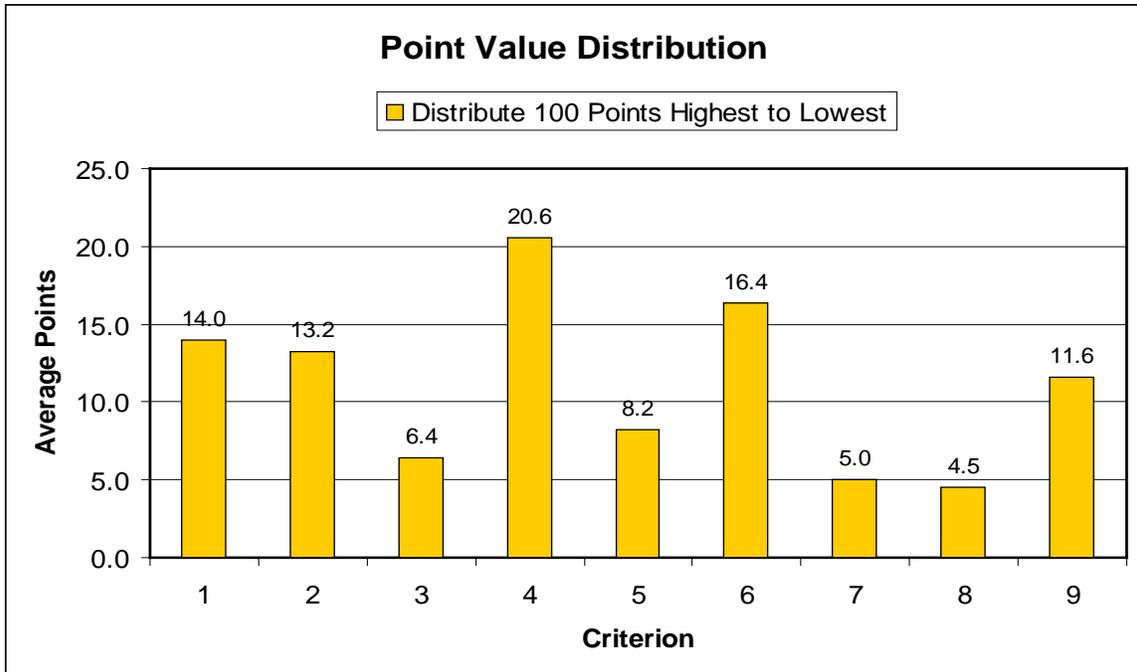


Figure 15. Average point distribution.

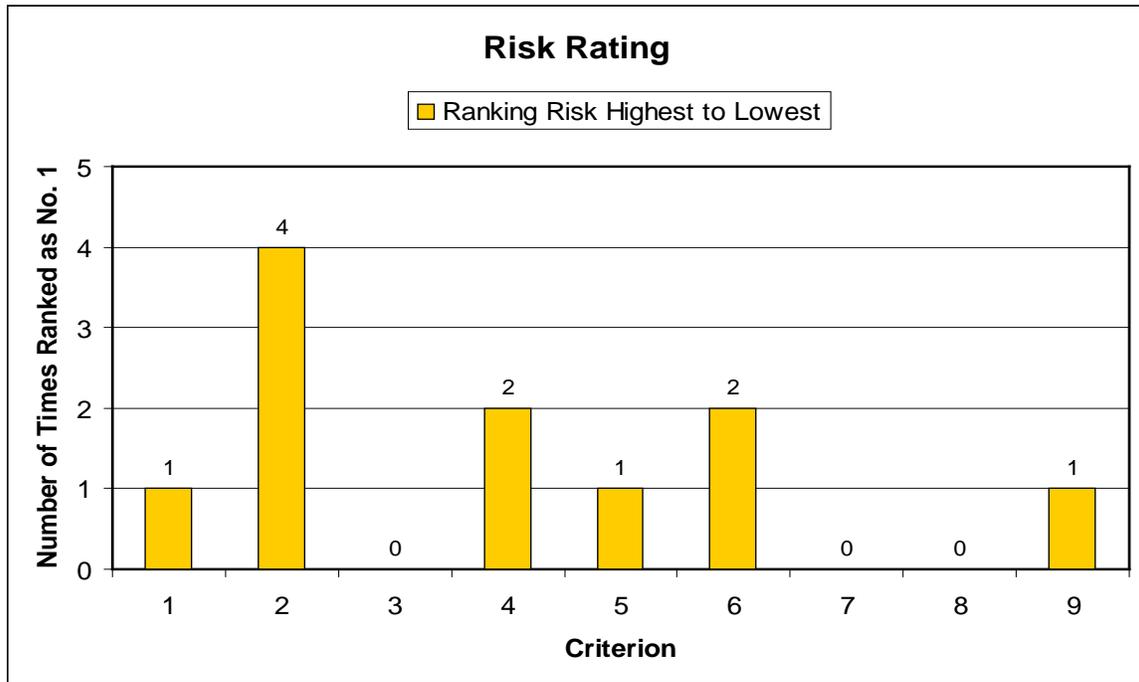


Figure 16. Criterion risk ranking.

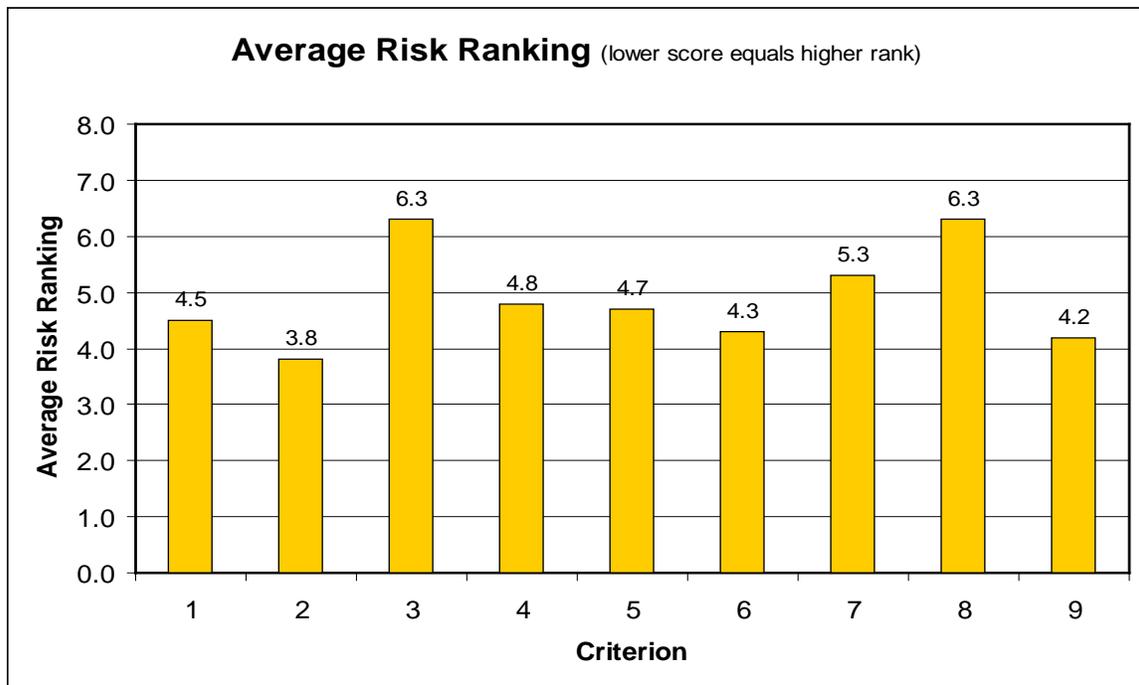


Figure 17. Average risk ranking.

Mackenzie DFA Sustainable Forest Management Plan

How the PAG distributed the points is shown in Figure 15. 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.

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 seen by the PAG as being of a high importance and priority, and also seen as at 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 is 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 15 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 technical appropriate for the DFA's criteria, indicators 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.

Mackenzie DFA Sustainable Forest Management Plan

6.2.1 Design of Alternative Scenarios

Forecasting, undertaken for each scenario, allows the forest manager and the PAG to analyse 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,
- 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, that is 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 necessarily 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 D. 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 31. 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 D – Figure 1).

A final report on the development, methods, assumptions, and results used in the forecasting exercise is pending. The final report will be available on or before March 31, 2007.

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 number 3 was assigned. 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

Mackenzie DFA Sustainable Forest Management Plan

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 known yet what the cumulative effect of implementing all three scenarios. Impacts, if any, will be monitored and strategies adjusted and presented to the PAG if unexpected impacts are encountered.

Mackenzie DFA Sustainable Forest Management Plan

Table 14. Long-term impacts of scenarios on selected indicators.

Indicator	Scenario: 1 Base Case	2 Habitat Richness	3 Species Composition	4 Caribou Recovery	5 Non-Timber Economic	5A Manual Brushing	6 Worst Case MPB	6A Worst Case MPB plus beetles	7 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, and 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 the tactical level activities. The operational level plan essentially translates these strategies into site-specific practices and forest management activities such as harvesting, silviculture and road building to be implemented and adjusted 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.

Mackenzie DFA Sustainable Forest Management 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 to 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 such documents.

7.2 Operating 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 has public components that allow for input by stakeholders into operational activities. Concerns or comments are recorded, tracked, and addressed prior to finalizing

Mackenzie DFA Sustainable Forest Management Plan

the plan. Current copies of approved and/or proposed FSPs may be viewed at the signatories' respective 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 Ministry of Forests and Range on February 26, 2007. 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.

BCTS Operational Plan Summary

BC Timber Sales is responsible for all planning and administration of Timber Sale Licences issued to registrants with the Timber Sales Program. BCTS was previously known as the Small Business Forest Enterprise Program (SBFEP) and administered under the authority of the District Manager. The Prince George Business Area of BC Timber Sales came into existence on April 1, 2003 and became responsible for the former operations of the SBFEP in the Mackenzie Forest District.

Originally, the SBFEP and later BCTS attempted to plan and propose new development in conjunction with Canfor's and Abitibi's development. As a result of this planning approach some BCTS blocks were located in proximity of major licensee blocks and a common infrastructure shared. In other cases BCTS took the initiative to develop other

Mackenzie DFA Sustainable Forest Management Plan

small drainages that were previously un-developed. BCTS had also purchased approved blocks in the past to meet its targets for putting volume up for sale. Although part of the Ministry of Forests, BCTS was subjected to all the same processes required by government of major forest tenures. For the foreseeable future new development will need to focus on salvaging beetle damaged timber while planning for and managing the other resources and interests and values on the land.

BC Timber Sales' FSP was submitted to the Mackenzie Forest District Manager for approval on November 20, 2006 and is anticipated to be approved prior to March 31, 2007. Under FRPA the provincial government has established the core values that must be addressed with results or strategies consistent with these core values. Our FSP established FDUs over our new operating areas as well as areas where we have proposed development outside those areas. Under the FSP, parties with an interest on the land covered by the FDU have been given an opportunity to identify their interests. BCTS will develop blocks and roads in the FDU while making efforts to manage impacts to those interests. The approach will be to focus development in areas that target pine leading stands that have been attacked by mountain pine beetle. Consultation will be undertaken with First Nations on future development with our FDUs.

BCTS has established through this SFMP a broader set of values that will be managed. Our performance in maintaining these values expressed as indicators and indicators will be tracked over time and re-evaluated for effectiveness and appropriateness.

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. To do so requires learning how the economic, social and ecological systems change and reconfiguration in response to human attempts to manage them.

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 that reality and work within it, rather than planning to eliminate uncertainty. This has implications for not only how the problems are defined, but also the mandate given to those who are responsible for addressing the problems.

Mackenzie DFA Sustainable Forest Management Plan

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.

Mackenzie DFA Sustainable Forest Management Plan

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 the signatories' EMS. 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 the signatories' EMS.

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 of 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 (IMS) 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 IMS includes the following characteristics:

- Standardized data formats for existing and new data;

Mackenzie DFA Sustainable Forest Management Plan

- 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 amongst the signatories will be managed in accordance with each signatories' respective business processes. However, as much of the data does need to be shared, particularly in the development stage of the SFM Plan, the signatories have developed a SharePoint site that enables the signatories to share documents in real time. Access to the SharePoint site is at the discretion of the Steering Committee. The SharePoint site notifies the Steering Committee whenever any changes, edits, or revisions are made to any of the documents hosted on the site, allowing the signatories to have access to the most recent documents at any time.

9.3 Data Storage

The signatories have approached information storage from three directions;

1. Scientific data and reports, and resource inventory data – such information will be shared amongst the signatories' in accordance with the Memorandum of Understanding. The information will be stored in accordance with the signatories' respective 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 the signatories' SharePoint site. Such documents may include PAG documents. Hard copies of documents will be stored in accordance with the respective signatories' EMS.
3. SFM documents – documents that are an integral part of the SFM Plan (i.e. the plan and associated appendices) will also be stored on the SharePoint site. In addition, these documents will also be stored on an external, publicly-

Mackenzie DFA Sustainable Forest Management Plan

accessible website. Hard copies of documents will be stored in accordance with the respective signatories' EMS.

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Mackenzie DFA Sustainable Forest Management Plan

APPENDIX A

LCS MOU BETWEEN CANFOR AND BCTS

Mackenzie DFA Sustainable Forest Management Plan



Mackenzie Sustainable Forest Management Plan (MK SFMP) Steering Committee Memorandum of Understanding

Background

A partnership between *BC Timber Sales (BCTS)* and *Canadian Forest Products Ltd. (Canfor)* was formed in order to work together to develop a Sustainable Forest Management Plan (SFMP) for their combined operations in the Mackenzie TSA.

Participation in the development of the MK SFMP will require BCTS and Canfor (the partners) to work within a public process to develop SFM Indicators Measures and Targets. The partners will use the SFM Indicators Measures and Targets to monitor progress, publicly report, and promote continuous improvement of the MK SFMP.

Goals

The MK SFMP partners agree to the following goals:

1. To jointly develop an SFMP (covering the operating areas of the partners within the Mackenzie Forest District) that meets the requirements of the CSA SFM standard (Z809-02).

Note: Each of the partners will decide for themselves the brand and timing of certification, if any. The SFM Plan will be developed using the CSA Z809-02 standard.

2. To work collaboratively over the term of the plan to fulfill the MK SFMP commitments including, data collection and monitoring, participating in public processes, producing public reports, and continuous improvement.

Term

The term of this agreement is 4 years, expiring on October 31, 2010. The agreement may be amended from time to time to accommodate change as directed by the steering committee.

Business Case

Although the initial reason for the MK SFMP is to promote SFM certification there are other value added benefits. The significant benefits of the MK SFMP are described below:

1. Maintain market access through SFM certification of wood chip and log supply;
2. Streamlining government and industry planning processes;
3. Enhancing local public acceptance of our practices; and
4. Leveraging value from our collective effort.

Maintain market access through SFM certification of log and chip supply

Time Inc. announced that by 2006 they will require > 80% of their Canadian pulp supply to be SFM certified. Several pulp mills, each possibly supplied by the partners, have made commitments to their customers to supply SFM certified pulp and have, in turn, asked their suppliers to deliver SFM certified chips. Other influential customers such as *The Home Depot* and *Centex Homes* are also considering such third-party certification requirements for solid wood products. Supporting the MK

Mackenzie DFA Sustainable Forest Management Plan

SFMP will provide a significant component of SFM certification under either the CSA or the SFI standards.

Streamlined government and industry planning processes

Streamlining the planning processes by providing for a collaborative central plan will reduce costs, reduce confusion, and increase effectiveness of forest management practices across many "shared" landscapes. The recent advent of results-based forest legislation (FRPA) will provide opportunities for companies to collaborate on innovative solutions, which can reduce our costs and provide much more flexibility to access the timber resource. However, these opportunities can only be accessed provided the forest industry can demonstrate cumulative impacts of forest practices across a given landscape.

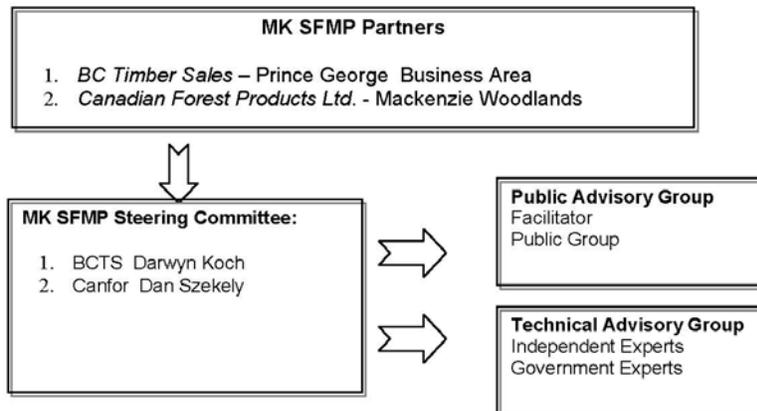
Enhancing public acceptance of our practices

The MK SFMP will promote meaningful public involvement by providing a process that is inclusive and transparent, and where accountabilities are clear. The MK SFMP process will provide confidence in forest management at the local community level. If there is no venue for public discussion of forest management then resource managers will bear the brunt of public dissatisfaction with unresolved issues.

Leveraging value from our collective effort

Organizations interested in SFM certification (particularly CSA) will have a fixed cost to produce and maintain an SFMP. It makes sense to join together at this time to collaborate towards a common SFM Plan and share the fixed cost over time. This is the most cost effective solution.

MK SFMP Organizational Structure



Steering Committee (SC) members may be changed at the discretion of each of the partners as required. The partners will also keep alternates aware and current of the process and progress of the SC in achieving the desired goals.

Mackenzie DFA Sustainable Forest Management Plan

Basic Principles

The partners are agreeing to follow these basic principles:

Time Frame

Target completion date for the development of the SFM Plan including Measures and Targets development, forecasting, and monitoring and reporting protocols is **October 31, 2006**.

Agreement between the partners

All decisions related to the development and maintenance of the SFM plan will be by consensus of both partners. If consensus cannot be reached then the issue will be dealt with using the Dispute Resolution mechanism outlined below.

Indicators

Existing publicly developed Indicators and Measures will be used where possible. Where additional Indicators or Measures are required to meet the standard, efforts will focus on currently available and practical data / research. We will agree on a set of draft Indicators and Measures to take to the public.

Funding

The cost estimate for development of the MK SFMP is \$240,000, including facilitation of the PAG and resource analysis. It is anticipated that most of the development costs will be funded through the licensee's Forest Investment Accounts (FIA)¹. All costs that are not FIA eligible will be shared according to the 50% even split formula.

Where practicable and permissible under the terms of the respective FIA Land Base Investment Program (LBIP) agreements, development of the SFMP will be shared according to the 50% even split formula. Where this is not possible because of disparities within the funding allocation of the licensees;

1. The partner with the lesser FIA allocation will provide funding to the greatest extent possible through their allocation,
2. The partner with the greater FIA allocation will provide the remainder of the required funding, or provide funding to the greatest extent possible through their allocation, whichever is less,
3. In recognition that the partner with greater FIA allocation will have provided a greater amount of the required funds, the partner with the lesser FIA allocation will give consideration to transferring FIA funding to the partner with the greater FIA allocation at some future date.

Facilitator

A facilitator will be hired to co-ordinate and run public meetings, provide support and information to public members as needed and arrange for technical experts as required.

New Partners

This agreement may be amended by the Steering Committee at any time to accommodate a licensee (replaceable or non-replaceable) operating in the Mackenzie Forest District wishing to join in the partnership later.

Roles

The partners agree to the following structure and roles:

¹ Although this document refers specifically to the Forest Investment Account, other similar programs may also be used should the FIA Program be discontinued during the term of this agreement.

Mackenzie DFA Sustainable Forest Management Plan

Steering Committee

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 this agreement, continuous improvement, and any other business related to the MK SFMP.

Public Advisory Group (PAG)

The Steering Committee will form a PAG and retain a facilitator to manage the meetings and complete a Terms of Reference. The role of the PAG is to provide the Steering Committee with public input on the Indicators, Measures and Targets that will form the basis of the MK SFMP consistent with the terms of the CSA Standard (Z809-02).

Technical Advisory Group (TAG)

The Steering Committee will ask experts to assist in the development of the MK SFMP. Experts may be used to assist directly in the development of Indicators, Measures and Targets, present technical concepts to the PAG, or analyze and forecast information. Experts from government agencies or the private sector may be involved in the MK SFMP at the request of the Steering Committee. The use of experts will be consistent with the terms of the CSA Standard (Z809-02).

Third Party Contracts

The partners acknowledge that where one of the partners holds a contract with a third party pertaining to SFM Plan development, that partner is executing the contract on behalf of all signatories to this Agreement. Partners will give due consideration to other signatories in the execution of the contract without bias or undue influence. Any deliverables arising from a third party contract will be made freely accessible to all partners, including progress and monitoring reports.

Documentation, Record Keeping and Reports

While it is the intent of this process to minimize the time and effort required for each of the partners to achieve the desired outcome, it is recognized that each partner will seek certification at their own discretion. As such, it will be required that each partner maintains their own records and reports to meet the required standard and facilitate the audit process. The partners therefore agree that any records and/or reports arising from the SFM Plan development will be distributed to all signatories to this agreement. To facilitate this, the partners agree that documents, records, and reports will be maintained on a Ministry of Forests Sharepoint site (<https://sharepoint.forests.gov.bc.ca/MKSFMP-SC>.) Access to the Sharepoint site is to be granted only at the discretion and agreement of the Steering Committee.

The purpose of the Sharepoint site is to:

1. Facilitate the sharing and exchange of documents, records, and reports,
2. Provide a mechanism to ensure that document control meets the requirements of each partner's management system,
3. Ensure that each partner is using the most current documents, records, or reports in the implementation of the SFM Plan,
4. Provide a mechanism whereby each partner is notified of any changes made to a document, record, or report.

Mackenzie DFA Sustainable Forest Management Plan

The partners also agree that whenever a document, report, or record is reviewed by any party outside of the Steering Committee or immediate members of their respective organizations (i.e. has been presented to the Public Advisory Group, internally audited, or externally audited) such a document, record, or report becomes an official version and is to be archived in a manner consistent with the terms of each partner's management system once it has become obsolete.

Notwithstanding proprietary data, products, or processes (see below), the partners acknowledge that as much of the Work is to be funded under FIA, any records and/or reports arising from the Work are in the public domain and must be freely accessible to all parties and the public. The partners agree that upon submission to the required repository, all partners will:

- 1) Receive a copy of the submission concurrently with submission to the required repository or,
- 2) Be notified within two days of the submission and the repository to which it was submitted.

The partners agree that the results of Work not funded under FIA will be distributed to all partners within fourteen days of the completion of such Work.

Dispute Resolution

Disputes that may arise between the partners will be referred to mediation and, if not resolved through mediation, will be referred to arbitration. A party to a dispute may commence proceedings to resolve the dispute by delivering to the other party(s) to this Agreement a notice of dispute specifying the nature of the dispute and requesting mediation. The parties must then agree upon a mediator. If the parties cannot agree upon a mediator within seven days of the dispute notice being delivered then a mediator may be appointed by an independent third party agreed to by the parties.

If a mediator cannot bring a resolution to the dispute within seven days of being agreed upon or appointed, or upon earlier written notice by the mediator to the parties that the dispute is not likely to be resolved through mediation, a party may commence arbitration proceedings by delivering a notice of arbitration to the other party(s). The parties must then agree upon an arbitrator. If the parties cannot agree upon an arbitrator within seven days of the dispute notice being delivered then an arbitrator may be appointed by an independent third party agreed to by the parties. Any decision arising from the mediation process or arbitration process will be binding to this Agreement.

Communications

During the term of this agreement, the partners recognize that good communication is essential for the success in achieving the desired results. Components have been identified for communication internal to the Public Advisory Group, external to the public, and internal to the Mackenzie Sustainable Forest Management Steering Committee.

Internal to PAG

- a) The Mackenzie Sustainable Forest Management Steering Committee (SC) will ensure meeting minutes are distributed following each meeting.
- b) The SC will keep a reference copy of the PAG meeting minutes.
- c) The SC will provide the PAG with information as it applies to the function and business of the PAG. Confidential business information such as financial or human resource information may be deemed sensitive or proprietary and may not be released.
- d) The SC will provide the PAG an opportunity to comment annually on the groups Terms of Reference, the Mackenzie SFM plan, and the Mackenzie SFM annual report.

Mackenzie DFA Sustainable Forest Management Plan

External to Public

- a) The SC will provide a digital copy of the Mackenzie SFM plan and the Mackenzie SFM annual report on their external websites (if available).
- b) The SC will evaluate on an annual basis communication opportunities to promote awareness of sustainable forest management and to share information with the Public Advisory Group and the local public. Opportunities would include such items as open houses, workshops, tours, newsletters, posters, emails, website, newspaper ads, newspaper articles, press releases, fact sheets, brochures, trade shows, and signage.
- c) The SC will support and evaluate opportunities to partner with other community organizations/groups that promote SFM (i.e. McGregor Model Forest Association, Mackenzie LRMP, other licensees).

Internal to SFM-SC

- a) The SC will annually review and keep current the MK SFMP Memorandum of Understanding for implementing the SFM plan and PAG process.
- b) The SC will meet frequently to ensure progress towards the SFM plan and underlying commitments are followed through on.
- c) Progress towards the SFM commitments in the Mackenzie SFM will be reported annually in accordance with the signatories existing Management System and/or Standard Procedures. In addition, PAG and general public feedback on SFM progress will be communicated to the partner's senior Managers.

Products and Product Use

Should the exchange of proprietary data, products, or processes be required (the Products), the partners agree that:

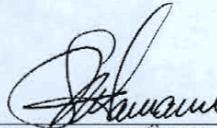
- 1) The partner from whom the Products were obtained has and retains full ownership of the Products and all copies of the Products in either digital and/or hardcopy format.
- 2) The partner from whom the Products were obtained hereby grants the other partner(s) non-exclusive rights to use the Products as described in this Agreement and in accordance to the terms and conditions of this Agreement.
- 3) The other partner(s) shall use the Products for the sole and exclusive purpose of executing their commitments as agreed to under this Agreement.
- 4) The other partner(s) shall not use the Products except as provided in this Agreement.
- 5) The other partner(s) shall not duplicate the Products except for the following:
 - a. The other partner(s) may make copies for backup purposes, or
 - b. The other partner(s) may make copies for the legitimate purpose of executing their commitments as agreed to under this Agreement.
- 6) The other partner(s) acknowledges that the partner from whom the Products were obtained is the sole and rightful owner of any copies or duplicates developed by the other partner(s), in either a digital or hardcopy format, and are to be returned to the partner from whom the Products were obtained.

Mackenzie DFA Sustainable Forest Management Plan

- 7) The other partner(s) acknowledges that the partner from whom the Products were obtained is the sole and rightful owner of any product that might arise as a result of any modification or manipulation of the data, either spatial or tabular.
- 8) The other partner(s) shall return all original and/or copies or duplicates of the Product to the partner from whom the Products were obtained within thirty (30) days of termination of this agreement or, at the partner from whom the Products were obtained discretion, be destroyed or otherwise be rendered unusable.
- 9) Upon return and/or destruction of the Products, the other partner(s) will supply the partner from whom the Products were obtained with written confirmation that all original and/or copies or duplicates and/or modifications and/or manipulations of the Product have been returned and/or destroyed or otherwise been rendered unusable, signed by an Authorized Signatory of the other partner(s).

Signatures

BC Timber Sales
Prince George Business Area

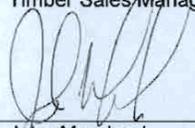


Ian Hamann, P. Eng. R.P.F.
Timber Sales Manager

Nov. 06, 2006

Signature / Date

Canadian Forest Products Ltd.
Mackenzie Woodlands



John Moreland
Woodlands Manager

Jan 02/07

Signature / Date

Mackenzie DFA Sustainable Forest Management Plan

Record of Revisions

Date	Section	Change	Acknowledgements
Sept. 12, 2006	Record of Revisions	Added "Record of Revisions" section	Canfor SC Rep.
Sept. 12, 2006	Documentation, Record Keeping and Reports	Added section pertaining to posting and maintenance of documents on the Sharepoint site.	SFG Rep.
Nov. 1, 2006	Background & throughout document	Amended reference to licensees to be inclusive of BCTS by using term "the partners". Updated reference to "SFM-SC" to "SC"	BCTS SC Rep
December 1, 2008	MK SFMP Organizational Structure	Change the steering committee members, update footer.	BC Timber Sales SC Rep

Mackenzie DFA Sustainable Forest Management Plan

APPENDIX B

MACKENZIE SFMP PUBLIC ADVISORY GROUP

Mackenzie DFA Sustainable Forest Management Plan

Mackenzie SFMP Public Advisory Group (as of March 31, 2009)

Sector:	Representative	Alternate
Academia		
Agriculture/Ranching	Ken Reiersen	
Contractors – Forestry		
Environment/ Conservation	Vi Lambie	Ryan Bichon
First Nations		
General Public	Tom Briggs	
Germansen Landing	Nancy Perreault	
Labour – CEP		
Labour – PPWC		
Local Government	Stephanie Killam	Warren Waycheshen
McLeod Lake Indian Band	Keinan Carty	Lionel Chingee
Mining/Oil & Gas	Tom Michael	
Noostel Keyoh	Jim Besherse	Sadie Jarvis
Public Health & Safety	MaryAnne Arcand	Keith Playfair
Recreation – Commercial		
Recreation – Non-commercial	Vida Tattrie	Aaron Snively
Recreation – Non-commercial (motorized)	Mike Broadbent	
Saulteau First Nation	Chief Harley Davis	Monica Rice
Small Business – Germansen Landing	Janet Besherse	Don Jarvis
Small Business – Mackenzie	Bruce Bennett	
Small Community	Mary Reiersen	
Trapping	Lawrence Napier	Josef Kollbrand
West Moberly First Nation	Teena Demeulemeester	Max Desjarlais
Woodlot	Ron Crosby	



Mackenzie SFMP



BCTS
BC Timber Sales
Prince George Business Area



Mackenzie Sustainable Forest Management Plan

Public Advisory Group

Terms Of Reference

October 28, 2008

Mackenzie DFA Sustainable Forest Management Plan

1. Background

1.1 Purpose of Sustainable Forest Management Plan

As society has been increasingly affirming a wider set of values that forests can provide, the forest industry has witnessed a distinct change in the philosophy of forest management. Though timber may still be the primary economic value from the forests, a wider range of economic, environmental and social values is being demanded.

Forest management now involves the sustainable management of a much larger spectrum of values and at the same time ensuring that the benefits we enjoy from the forests today do not impact on the ability of subsequent generations to enjoy benefits from the forests in the future. This concept is commonly referred to as "Sustainable Forest Management" (SFM). Sustainable Forest Management (SFM) refers to being economically sustainable on public land, respecting the social needs of the public, and sustaining viable ecosystems. The objective of SFM is to concurrently balance the sustainability of forestry-related ecological, social and economic values for a defined area.

SFM has gained acceptance at the international, national, and local levels. Furthermore, SFM has attracted the attention of buyers of forest products who are increasingly demanding that the industry demonstrate that products are derived from forests managed on a sustainable basis. As a result, forest certification has emerged as a dominant factor in the forest industry in order to provide assurances to buyers of wood products that the management of forests meets identified standards that are considered critical for SFM. As British Columbia forest companies have evolved and have become dependent on the global marketplace for the export of forest products, the issues of sustainable forest management and forest certification have become paramount.

Canadian Forest Products Ltd., in partnership with other licensees, academics, resource specialists, government agency staff, interested parties, and other related organizations has designed an integrated framework for sustainable forest management across its divisions. This Sustainable Forest Management (SFM) Framework has become a credible alternative to current forest management planning in the interior of British Columbia.

The primary purposes of Canadian Forest Products Ltd. and BC Timber Sales Prince George Business Area are to:

- a. Rely on the SFM Framework as the conceptual forest management strategy for the certification effort in Mackenzie;
- b. Jointly develop an Sustainable Forest Management Plan (SFMP) within the geographic area of the Mackenzie Forest District to meet the SFM standard requirements (Z809-02) developed by the Canadian Standards Association (CSA);
- c. Support a public advisory process to:
 - Identify and select indicators, measures and targets, based on the SFM framework and any other criteria relevant to the DFA;
 - Develop, assess, and select alternative strategies;
 - Review the SFMP;
 - Design monitoring programs, evaluate results and recommend improvement; and
 - Discuss and resolve any issues relevant to SFM in the DFA;
- d. Work together to fulfill the SFMP commitments including data collection and monitoring, participating in public processes, producing public reports, and continuous improvement.

The SFMP may be used by Canadian Forest Products Ltd. and BC Timber Sales Prince George Business Area to prepare for eventual certification under the Canadian Standards Association's (CSA) SFM Standard (Z809-02).

Mackenzie DFA Sustainable Forest Management Plan

This SFMP is intended to be consistent with all existing legislation and other strategic plans.

1.2 Mackenzie SFMP Steering Committee

The current Mackenzie SFMP Steering Committee for the Mackenzie SFMP consists of representatives from BC Timber Sales Prince George Business Area (BCTS) and Canadian Forest Products Ltd. (Canfor).

1.3 Defined Forest Area

The SFMP applies to only the Defined Forest Area (DFA). A DFA is a specified area of forest, including land and water. The DFA for this SFMP is within the Mackenzie Forest District, excluding areas such as private lands, woodlots, Williston Reservoir, Indian reserves, Large Parks and Treaty 8 Lands¹. The DFA boundaries are shown on the map provided in Appendix A.

1.4 Public Advisory Group

The Public Advisory Group (PAG) for the Mackenzie SFMP is comprised of individuals representing the interests listed in section 6.1.1, who voluntarily participate in the PAG process. As outlined in these terms of reference, the PAG will specifically work under the Defined Goals (section 2) as an open, transparent and accountable process. The Mackenzie SFMP Steering Committee and the PAG recognize and agree that Aboriginal participation in the public participation process will not prejudice Aboriginal and Treaty rights.

1.5 Legislation

The Mackenzie SFMP Steering Committee and the PAG shall ensure that the indicators, measures and targets are consistent with current relevant government legislation, regulations and policies. The Mackenzie SFMP Steering Committee and the PAG must also respect the findings of any formal public participation processes that have developed values, objectives, indicators, or targets relating to the CSA SFM elements at a landscape or regional level in the area in which the DFA is situated.

2. Defined Goal

The goal of the Mackenzie SFMP is to demonstrate commitment to sustainable forest management for the DFA. The Mackenzie SFMP Steering Committee, with input from the PAG, will be responsible for developing and implementing the SFMP.

The PAG will have the opportunity to work with the Mackenzie SFMP Steering Committee to:

- a. Identify and select indicators, measures and targets, based on the SFM framework and any other criteria relevant to the DFA;
- b. Develop, assess, and select alternative strategies;
- c. Review the SFMP;
- d. Design monitoring programs, evaluate results and recommend improvement; and
- e. Discuss and resolve any issues relevant to SFM in the DFA.

¹ Refers to fee simple and reserve lands

Mackenzie DFA Sustainable Forest Management Plan

3. Timelines

Key dates for developing the SFMP:

	<u>To be completed by:</u>	<u>Completed on:</u>
a. Invitations sent to potential participants and newspaper ads published	January 15, 2006	Letters - January 10, 2006 Ads - January 17 & 24, 2006
b. Public Open House	January 21, 2006	January 23, 2006
c. Initial Public Advisory Group meeting	January 28, 2006	January 31, 2006
d. PAG input into the CSA matrix	June 2006	May 9, 2006
e. Strategic scenario analysis	September 2006	October 17, 2006
f. Review of draft SFMP by PAG	October 2006	October 2006
g. SFM Certification Audits	November 2006	November 2006 – February 2007
h. Review of Final SFMP by PAG	April 29, 2008	April 29, 2008

Following the completion of the SFMP, it is estimated that the PAG meeting schedule would include 2-3 meetings per year (as required) beginning in 2007.

4. Communication

4.1 Between the PAG and Mackenzie SFMP Steering Committee

- a. The Mackenzie SFMP Steering Committee will ensure that the PAG meeting summaries are distributed to the PAG within one week
- b. The Mackenzie SFMP Steering Committee will strive to provide background and technical information to the PAG as related to the PAG's defined role, including information related to the DFA and SFM requirements. Confidential business information of the Mackenzie SFMP Steering Committee such as financial or human resource information may be deemed sensitive or proprietary and may not be released.
- c. The Mackenzie SFMP Steering Committee will respond to all recommendations from the PAG. The Mackenzie SFMP Steering Committee will indicate how they applied the recommendations or provide reasons for not applying them. The meeting summary will capture the reasons for not implementing any PAG recommendations, whole or in part.
- d. The Mackenzie SFMP Steering Committee will provide a copy of the SFMP and annual reports to the PAG.
- e. The Mackenzie SFMP Steering Committee may caucus prior to responding to the PAG.

4.2 With the Public

- a. The Mackenzie SFMP Steering Committee will make copies of the SFMP and annual reports available to the public.
- b. When communicating to the media and external parties about the SFMP and PAG process, the PAG and the Mackenzie SFMP Steering Committee will speak only on behalf of their own personal perspectives, will be respectful of each other, and avoid characterizing their comments as representing the PAG or the Mackenzie SFMP Steering Committee. They will also inform the PAG and Mackenzie SFMP Steering Committee of their communication with the media.
- c. The PAG and Mackenzie SFMP Steering Committee may invite the media to attend meetings as observers with advance notification to the PAG and Mackenzie SFMP Steering Committee.

Mackenzie DFA Sustainable Forest Management Plan

5. Resources

5.1 Travel Expenses

- a. Air travel from Tsay Keh and Fort Ware will be reimbursed for PAG representatives (or in their absence, their alternates). When necessary, mileage between these villages to catch flights to attend Mackenzie PAG meetings will be reimbursed.
- b. Mileage to and from PAG meetings for those PAG representatives (or in their absence, their alternates) traveling more than 25 kilometers each way to the meeting site will be reimbursed per kilometer at the provincial government rate. Mileage for those PAG representatives (or in their absence, their alternates) traveling between Tsay Keh or Kwadacha to/from Mackenzie will be reimbursed at the discretion of the Mackenzie SFMP Steering Committee. PAG representatives (or in their absence, their alternates) traveling from outside the Mackenzie Forest District must obtain approval for travel expenses from the Mackenzie SFMP Steering Committee before the meeting.
- c. Overnight accommodation for PAG representatives and alternates traveling to PAG meetings will be reimbursed if pre-approved by the Mackenzie SFMP Steering Committee. As a general principle, accommodation should be economical.
- d. Expense forms with copies of receipts for the above must be submitted to Canfor-Mackenzie within two weeks following the PAG meeting.

5.2 Meeting Expenses

- a. The Mackenzie SFMP Steering Committee will provide meeting rooms, meals, refreshments, a facilitator, and a scribe.
- b. The Mackenzie SFMP Steering Committee will provide adequate material and other resources to assist the PAG in understanding the relevant concepts.

6. Responsibilities

6.1 Public Advisory Group

6.1.1 Membership Structure

The PAG reflects a range of interests in the DFA. Members of each identified sector will select one representative and one alternate to participate in the PAG. Each representative and alternate will be allowed to represent only one of the sectors listed in Appendix B.

In addition to members of the public participating in the PAG, Aboriginal peoples have a unique legal status and may possess special knowledge concerning Sustainable Forest Management based on their traditional practices and experience. Each of the local First Nations listed below will be encouraged to invite their members to participate in the Mackenzie SFMP PAG. Members of each of the local First Nations attending PAG meetings will be invited to select a representative and alternate to participate in the PAG:

- Kwadacha First Nation
- McLeod Lake Band
- Nak'azdi First Nation

Mackenzie DFA Sustainable Forest Management Plan

- Saulneau First Nations
- Takla Lake First Nation
- Tsay Keh Dene
- West Moberly First Nations

6.1.2 Selection of the PAG

- a. The Mackenzie SFMP Steering Committee will recruit potential local PAG representatives and alternates through mailed invitations to individuals, an open house, posters, and advertisements through local media.
- b. Interested parties and the Mackenzie SFMP Steering Committee will review the potential membership at the initial PAG meeting. The Mackenzie SFMP Steering Committee will compile all names of potential representatives. Potential representatives for each interest area will discuss and agree as to who will stand as representative(s) and alternate(s). If they are unable to select a representative or alternate for the interest area, then the Mackenzie SFMP Steering Committee will recommend a solution.
- c. Once the PAG is established, the PAG and the Mackenzie SFMP Steering Committee can recommend changes in PAG structure, list of interests, and potential members.
- d. The Mackenzie SFMP Steering Committee, in consultation with the PAG, approves appointments and replacement of PAG representatives and alternates.

6.1.3 Responsibilities of PAG Representatives

PAG representatives are responsible for:

- a. Providing input related to the Defined Goals (defined in Section 2);
- b. Being prepared, informed and ready for meetings;
- c. Requesting of the Mackenzie SFMP Steering Committee an advisor to provide information when the PAG considers this necessary;
- d. Acting as a liaison between the PAG and others from the interest area they are representing;
- e. Assuming responsibility towards reaching consensus on recommendations to the Mackenzie SFMP Steering Committee;
- f. Attending meetings. It is recognized that PAG representatives may miss some meetings due to the nature of their work or other activities;
- g. Informing their alternate and the facilitator if unable to attend a PAG meeting. If a PAG representative misses more than two consecutive meetings without a valid reason and without notifying his/her alternate and the facilitator, the Mackenzie SFMP Steering Committee may, based on consultation with the PAG, replace or remove that representative;
- h. Ensuring that the alternate is informed, up-to-date and prepared prior to the alternate participating in a PAG meeting. This includes providing the alternate with a past meeting summary in a timely, effective fashion; and
- i. Providing their input on upcoming agenda items when they are aware that they will be absent from a PAG meeting. They may provide their information to another PAG member or the Mackenzie PAG Steering Committee to present at the PAG meeting or forward it in writing to the facilitator who will then provide to the Mackenzie PAG Steering Committee or a specified PAG member to present at the meeting.

Mackenzie DFA Sustainable Forest Management Plan

6.1.4 Responsibilities of PAG Alternates

An alternate may be appointed for each PAG representative. The PAG alternate is responsible for:

- a. Attending PAG meetings on behalf of the representative. When doing so, the alternate agrees to work according to the Terms of Reference; and
- b. Coming informed, up-to-date, and prepared for discussions and decision-making based on briefings by the representative when attending on behalf of the representative.

6.2 Mackenzie SFMP Steering Committee

The Mackenzie SFMP Steering Committee is responsible for:

- a. Providing and clarifying information to the PAG as related to the Defined Goals. Where possible, this material will be provided in advance of the meeting;
- b. Providing the PAG with necessary and reasonable human, physical, financial, information and technological resources;
- c. Where possible, informing the PAG (via the agenda) of any advisor attending a meeting;
- d. Not participating in reaching consensus on recommendations by the PAG;
- e. Considering and responding to the recommendations of the PAG;
- f. Making decisions regarding sustainable forest management and certification; and
- g. Preparing the PAG meeting agendas and summaries.

6.3 Advisors

The Mackenzie SFMP Steering Committee will invite advisors, as required, to provide technical information and advice to the PAG. These advisors could be from government agencies, professional organizations, academia, consulting firms, or other sources. Advisors are responsible for:

- a. Providing and/or clarifying technical or legal information as requested; and
- b. Not participating in reaching consensus on recommendations by the PAG.

6.4 Observers

The public is welcome to participate in discussions at PAG meetings. They may not participate in reaching consensus on recommendations by the PAG.

6.5 Facilitator

The PAG facilitator is responsible for:

- a. Ensuring that PAG meetings address the agreed-upon agenda items;
- b. Starting and ending meetings at the times stated in the agenda;
- c. Managing and implementing the Terms of Reference, including the appropriate participation of the PAG, the Mackenzie SFMP Steering Committee, advisors, and observers;
- d. Enabling equitable opportunity by all PAG representatives (or in their absence, their alternates) to participate in the meetings;
- e. Working to clarify interests and issues, and help the PAG build recommendations;
- f. Not participating in reaching consensus on recommendations by the PAG;

Mackenzie DFA Sustainable Forest Management Plan

- g. Distributing the agenda prior to each PAG meeting; and
- h. Distributing the PAG meeting summaries following each PAG meeting.

7. Conflict of Interest

The PAG recognizes that a conflict of interest could occur if there is a potential for a representative (or his or her alternate) to personally and directly benefit from specific recommendations from the PAG. Therefore, if a PAG representative or alternate has a perceived or real conflict of interest that could result in a potential exclusive personal economic benefit in relation to his or her input to the Defined Goals, that representative or alternate, other PAG representatives and alternates, or a member of the Mackenzie SFMP Steering Committee must state the potential conflict. The PAG and the Mackenzie SFMP Steering Committee will then decide on what actions are needed.

Potential actions could include asking the representative or alternate to:

- a. Serve as an observer for the relevant specific issue(s) and recommendation(s);
- b. Take a leave from the PAG (length of term to be defined); or
- c. Carry on with normal participation.

8. Operating Guidelines

8.1 Meetings Guidelines

All participants in this process agree to:

- a. Arrive on time;
- b. Be prepared for each meeting;
- c. Follow the speakers list;
- d. Be respectful;
- e. Be concise; and
- f. Stay on topic.

8.2 Meeting Agenda and Schedule

The meeting agenda and schedule may change if agreed to by the PAG and Mackenzie SFMP Steering Committee.

8.2.1 Meeting Agenda

- a. Meeting agendas will address the needs of the SFMP and CSA requirements.
- b. The PAG may provide input to meeting agendas during each meeting.
- c. The agenda will include proposed objectives for the meeting.

8.2.2 Meeting Schedule

- a. The PAG and Mackenzie SFMP Steering Committee will agree upon meeting dates.
- b. Meetings will be held as needed to monitor and review the SFMP.

Mackenzie DFA Sustainable Forest Management Plan

9. Decision Making and Methodology

- a. Anyone attending PAG meetings may participate in the discussions. However, only representatives will participate in making decisions, that is, recommendations to the Mackenzie SFMP Steering Committee.
- b. The PAG agrees to work by consensus. Consensus is defined as no PAG representative substantially disagreeing on an issue and being willing to proceed to the next step. The PAG will work to identify the underlying issues, seek compromise, identify alternatives, and clarify information. The PAG shall make every effort to achieve consensus in a positive and respectful manner, and commits to arriving at the best solution possible.
- c. The PAG will not revisit past decisions unless the PAG representatives agree to do so.
- d. A quorum for any meeting of the PAG shall be greater than 50% of the average number of PAG representatives attending the past five (5) meetings.

10. Dispute Resolution Mechanism

10.1 Process Issues

The facilitator will resolve process issues.

10.2 Technical Issues

- a. Where an impasse is reached, the representation(s) with the outstanding issue shall offer solutions or options for resolution.
- b. If the impasse remains, the generally agreed-upon decision, along with the dissenting view(s), will be forwarded to the Mackenzie SFMP Steering Committee.

11. Review and Revisions

The PAG and Mackenzie SFMP Steering Committee will review and agree upon the Terms of Reference at least annually.

Approved:

Public Advisory Group

Date: January 31, 2006

Mackenzie SFMP Steering Committee

Date: January 31, 2006

Revised:

Public Advisory Group

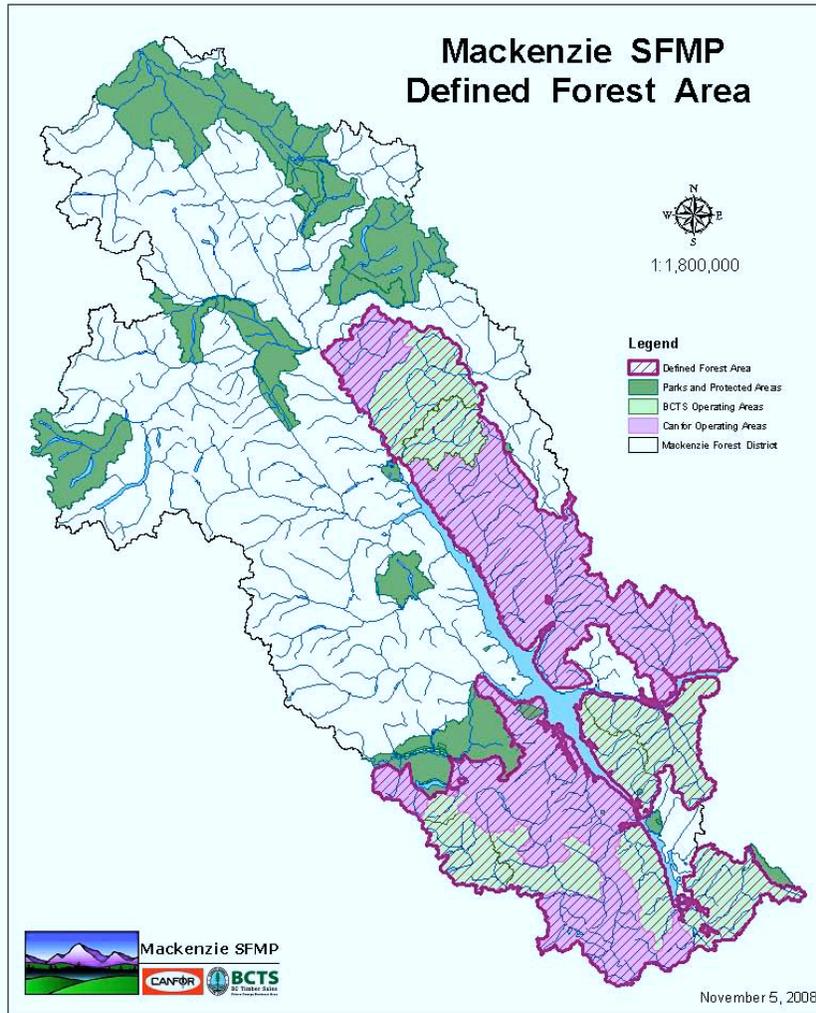
Date: October 28, 2008

Mackenzie SFMP Steering Committee

Date: October 28, 2008

Mackenzie DFA Sustainable Forest Management Plan

Appendix A Map of the Defined Forest Area (DFA)



Mackenzie DFA Sustainable Forest Management Plan

Appendix B Public Advisory Group Sectors

Academia
Agriculture/Ranching
Contractors – Forestry
Environment/ Conservation
First Nations²
General Public
Germansen Landing
Labour – CEP
Labour – PPWC
Local Government
McLeod Lake Indian Band
Mining/Oil & Gas
Noostel Keyoh
Public Health & Safety
Recreation – Commercial
Recreation – Non-commercial
Saulteau First Nation
Small Business – Germansen Landing
Small Business – Mackenzie
Small Community
Trapping
West Moberly First Nation
Woodlot

Approved:

Public Advisory Group	Date: January 31, 2006
Mackenzie SFMP Steering Committee	Date: January 31, 2006

Revised:

Public Advisory Group	Date: October 28, 2008
Mackenzie SFMP Steering Committee	Date: October 28, 2008

² This sector is open to allow participation of any First Nations person wishing to contribute

Mackenzie DFA Sustainable Forest Management Plan

APPENDIX C

SPECIES WITHIN THE DFA

TABLE UPDATED ON JAN 1, 2010

Mackenzie DFA Sustainable Forest Management Plan

Mammals occurring within the DFA applicable to the Indicator.

Species	Source	Management Strategies			
		Canfor	Source	BCTS	Source
Northern Myotis	Species at Risk	N		Y	In-house strategies
Fisher	Species at Risk	Y	In-house strategies	Y	In-house strategies
Wolverine	Species at Risk	Y	In-house strategies	Y	In-house strategies
Grizzly Bear	Species at Risk	Y	In-house strategies	Y	In-house strategies
Bighorn Sheep	Species at Risk	Y	In-house strategies	Y	In-house strategies
Northern Caribou	Species at Risk U-7-009 (Pine Pass) U-7-007 (LEWR)	Y	In-house strategies, UWR order, and Northern Caribou recovery plan	Y	In-house strategies, UWR order, and Northern Caribou recovery plan
Mountain Caribou	Species at Risk U-7-001 (Kennedy Siding)	Y	UWR order	Y	In-house strategies, UWR order
Elk	U-7-005 (Peace Arm) U-7-008 (Ingenika)	Y	UWR order	Y	UWR order
Stone sheep	U-7-006 (Peace Arm)	Y	UWR order	Y	UWR order
Mountain Goat	U-7-004 (Peace Arm)	Y	UWR order	Y	UWR order
Moose, elk, and Mountain goat	U-7-017 (Akie)	Y	GAR order	Y	GAR order
Beaver & Muskrat Houses or Dens	Wildlife Act (Sec 9)	N		N	Section 9 of the Wildlife Act prohibiting damage to a house or den.
Marten	LRMP	N		N	
Moose	LRMP	N		N	

Birds occurring within the DFA applicable to the Indicator.

Species	Source	Management Strategies			
		Canfor	Source	BCTS	Source
American Bittern	Species at Risk	Y	In-house strategies	Y	In-house strategies
Band-tailed Pigeon	Species at Risk	N		Y	In-house strategies
Barn Swallow	Species at Risk	Y	In-house strategies	Y	In-house strategies
Bobolink	Species at Risk	Y	In-house strategies	Y	In-house strategies
Broad-winged Hawk	Species at Risk	Y	In-house strategies	Y	In-house strategies
Common Nighthawk	Species at Risk	N		Y	In-house strategies
Great Blue Heron	Species at Risk	Y	In-house strategies	Y	In-house strategies
Long-billed Curlew	Species at Risk	Y	In-house strategies	Y	In-house strategies
Olive-sided flycatcher	Species at Risk	N		Y	In-house strategies
Rusty Blackbird	Species at Risk	Y	In-house	Y	In-house strategies

Mackenzie DFA Sustainable Forest Management Plan

			strategies		
Sandhill crane	Species at Risk	Y	In-house strategies	Y	In-house strategies
Sharp-tailed Grouse	Species at Risk	Y	In-house strategies	Y	In-house strategies
Short Eared Owl	Species at Risk	Y	In-house strategies	Y	In-house strategies
Eagles (nests)	Wildlife Act (Sec 34)	Y	In-house strategies	Y	In-house strategies
Osprey (nests)	Wildlife Act (Sec 34)	Y	In-house strategies	Y	In-house strategies
Gyrfalcon (nests)	Wildlife Act (Sec 34)	Y	In-house strategies	Y	In-house strategies
Peregrin Falcon (nests)	Wildlife Act (Sec 34)	Y	In-house strategies	Y	In-house strategies
Great Heron (nests)	Wildlife Act (Sec 34)	Y	In-house strategies	Y	In-house strategies
Burrowing Owl (nests)	Wildlife Act (Sec 34)	Y	In-house strategies	Y	In-house strategies
Northern Gowhawks	?	N		Y	In-house strategies
Trumpeter Swan	LRMP	N		N	

Amphibians occurring within the DFA applicable to the Indicator.

Species	Source	Management Strategies			
		Canfor	Source	BCTS	Source
Western Toad	Species at Risk	Y	In-house strategies	Y	In-house strategies

Invertebrates occurring within the DFA applicable to the Indicator.

Species	Source	Management Strategies			
		Canfor	Source	BCTS	Source
Albert's Fritillary	Species at Risk	N		Y	In-house strategies
Beaverpond Baskettail	Species at Risk	Y	In-house strategies	Y	In-house strategies
Forcipate Emerald	Species at Risk	N		Y	In-house strategies
Jutta Arctic	Species at Risk	N		Y	In-house strategies
Magdalena Alpine	Species at Risk	N		Y	In-house strategies
Mead's Sulphur	Species at Risk	Y	In-house strategies	Y	In-house strategies
Mormon Fritillary	Species at Risk	N		Y	In-house strategies
Pygmy Fossaria	Species at Risk	N		Y	In-house strategies
Rocky Mountain Capshell	Species at Risk	Y	In-house strategies	Y	In-house strategies
Old World Swallowtail	Species at Risk	N		Y	In-house strategies
Quebec Emerald	Species at Risk	Y	In-house strategies	Y	In-house strategies
White-veined Arctic	Species at Risk	N		Y	In-house strategies

Fish occurring within the DFA applicable to the Indicator.

Species	Source	Management Strategies			
		Canfor	Source	BCTS	Source
Arctic Grayling	Species at Risk	Y	FSP riparian strategies/In-house strategies	Y	FSP riparian strategies

Mackenzie DFA Sustainable Forest Management Plan

White Sturgeon	Species at Risk	Y	FSP riparian strategies	Y	FSP riparian strategies
Bull Trout	Species at Risk	Y	FSP riparian strategies/In-house strategies	Y	FSP riparian strategies
Cutthroat Trout	Species at Risk	Y	FSP riparian strategies	Y	FSP riparian strategies
Rainbow Trout	LRMP	Y	FSP riparian strategies	Y	FSP riparian strategies
Lake Trout	LRMP	Y	FSP riparian strategies	Y	FSP riparian strategies

Vascular Plants occurring within the DFA applicable to the Indicator.

Species	Source	Management Strategies			
		Canfor	Source	BCTS	Source
Abbreviated Bluegrass	Species at Risk	N		Y	In-house strategies
Alpine Draba	Species at Risk	N		Y	In-house strategies
American Sweet Flag	Species at Risk	Y	In-house strategies	Y	In-house strategies
Artic Dock	Species at Risk	N		Y	In-house strategies
Artic Rush	Species at Risk	Y	In-house strategies	Y	In-house strategies
Austrian Draba	Species at Risk	Y	In-house strategies	Y	In-house strategies
Bald Sedge	Species at Risk	Y	In-house strategies	Y	In-house strategies
Birdfoot Buttercup	Species at Risk	N		Y	In-house strategies
Bog Adders Mouth Orchid	Species at Risk	Y	In-house strategies	Y	In-house strategies
Bog Rush	Species at Risk	Y	In-house strategies	Y	In-house strategies
Boreal Moonwort	Species at Risk	N		Y	In-house strategies
Canada Anemone	Species at Risk	N		Y	In-house strategies
Coast Mountain Draba	Species at Risk	N		Y	In-house strategies
Crested Wood Fern	Species at Risk	Y	In-house strategies	Y	In-house strategies
Cryptic Paw	Species at Risk	Y	In-house strategies	Y	In-house strategies
Dainty Moonwort	Species at Risk	N		Y	In-house strategies
Davis Locoweed	Species at Risk	Y	In-house strategies	Y	In-house strategies
Dotted Saxifrage	Species at Risk	N		Y	In-house strategies
Dwarf Clubrush	Species at Risk	N		Y	In-house strategies
Fernalds False Manna	Species at Risk	Y	In-house strategies	Y	In-house strategies
Five Leaved Cinquefoil	Species at Risk	N		Y	In-house strategies
Gray Leaved Draba	Species at Risk	N		Y	In-house strategies
Hallers Apple Moss	Species at Risk	N		Y	In-house strategies
Hornemanns Willowherb	Species at Risk	N		Y	In-house strategies
Hudson Bay Sedge	Species at Risk	N		Y	In-house strategies
Least Moonwort	Species at Risk	N		Y	In-house strategies
Little Fescue	Species at Risk	N		Y	In-house strategies
Marsh Muhly	Species at Risk	N		Y	In-house strategies
Maydells Locoweed	Species at Risk	N		Y	In-house strategies
Meadow Arnica	Species at Risk	Y	In-house strategies	Y	In-house strategies
Meadow Willow	Species at Risk	N		Y	In-house strategies

Mackenzie DFA Sustainable Forest Management Plan

Mountain Moonwort	Species at Risk	N		Y	In-house strategies
Northern Bog Bedstraw	Species at Risk	Y	In-house strategies	Y	In-house strategies
Northern Daisy	Species at Risk	N		Y	In-house strategies
Pale Poppy	Species at Risk	N		Y	In-house strategies
Pink Agoseris	Species at Risk	N		Y	In-house strategies
Plains Butterweed	Species at Risk	Y	In-house strategies	Y	In-house strategies
Pointed Broom Sedge	Species at Risk	Y	In-house strategies	Y	In-house strategies
Prairie golden Beam	Species at Risk	Y	In-house strategies	Y	In-house strategies
Purple Leaved Willowherb	Species at Risk	N		Y	In-house strategies
Pygmy Waterlilly	Species at Risk	Y	In-house strategies	Y	In-house strategies
Riverbank Anemone	Species at Risk	Y	In-house strategies	Y	In-house strategies
Rocky Mountain Sandwort	Species at Risk	N		Y	In-house strategies
Siberian Polypody	Species at Risk	Y	In-house strategies	Y	In-house strategies
Slender Spike Rush	Species at Risk	N		Y	In-house strategies
Slender-Leaf Sundew	Species at Risk	N		Y	In-house strategies
Small White Waterlilly	Species at Risk	Y	In-house strategies	Y	In-house strategies
Small Flowered Lousewort	Species at Risk	Y	In-house strategies	Y	In-house strategies
Small Fruited Willowherb	Species at Risk	N		Y	In-house strategies
Snow Pearlwort	Species at Risk	N		Y	In-house strategies
Sprengels Sedge	Species at Risk	Y	In-house strategies	Y	In-house strategies
Three Lobed Daisy	Species at Risk	N		Y	In-house strategies
Tundra Milk Vetch	Species at Risk	N		Y	In-house strategies
Water Bur Reed	Species at Risk	Y	In-house strategies	Y	In-house strategies
Water Marigold	Species at Risk	Y	In-house strategies	Y	In-house strategies
Western Dogbane	Species at Risk	Y	In-house strategies	Y	In-house strategies
Western Jacobs Ladder	Species at Risk	N		Y	In-house strategies
Western Moonwort	Species at Risk	N		Y	In-house strategies
White Adders Mouth Orchid	Species at Risk	Y	In-house strategies	Y	In-house strategies
Whitebark Pine	Species at Risk	Y	In-house strategies	Y	In-house strategies
White Wintergreen	Species at Risk	Y	In-house strategies	Y	In-house strategies

Plant Communities at risk occurring within the DFA applicable to the Indicator.

Species	Source	Management Strategies			
		Canfor	Source	B C T S	Source
ARTIC_RUSH-NUTTALLS ALKALIGRASS-SEABLITE	Species at	Y	In-house	Y	In-house

Mackenzie DFA Sustainable Forest Management Plan

	Risk		strategies		strategies
BALSAM_POPLAR/BLACK_COTTONWOOD- SPRUCES /RED-OSIER_DOGWOOD	Species at Risk	Y	In-house strategies	Y	In-house strategies
BALTIC_RUSH-FIELD_SEDGE	Species at Risk	Y	In-house strategies	Y	In-house strategies
BEBBS_WILLOW-BLUEJOINT_REEDGRASS	Species at Risk	Y	In-house strategies	Y	In-house strategies
BLACK_SPRUCE-LODGEPOLE_PINE/KALMIAS/PEAT- MOSSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
BUCKBEAN-SEASIDE_ARROW_GRASS	Species at Risk	Y	In-house strategies	Y	In-house strategies
BUCKBEAN-SLENDER_SEDGE	Species at Risk	Y	In-house strategies	Y	In-house strategies
COMMON_CATTAIL_MARSH	Species at Risk	Y	In-house strategies	Y	In-house strategies
COMMON_SPIKE_RUSH	Species at Risk	Y	In-house strategies	Y	In-house strategies
DOUGLAS_FIR- HYBRID_WHITE_SPRUCE/ELECTRIFIED_CATS_TAIL MOSS	Species at Risk	Y	In-house strategies	Y	In-house strategies
DOUGLAS_FIR-HYBRID_WHITE_SPRUCE/FALSEBOX	Species at Risk	Y	In-house strategies	Y	In-house strategies
DOUGLAS_FIR- HYBRID_WHITE_SPRUCE/KNIGHTS_PLUME	Species at Risk	Y	In-house strategies	Y	In-house strategies
DOUGLAS_FIR- HYBRID_WHITE_SPRUCE/THIMBLEBERRY	Species at Risk	Y	In-house strategies	Y	In-house strategies
DOUGLAS_FIR-LODGEPOLE_PINE/CLAD_LICHENS	Species at Risk	Y	In-house strategies	Y	In-house strategies
DOUGLAS_FIR- SUBAPLINE_FIR/BLACK_HUCKLEBERRY	Species at Risk	Y	In-house strategies	Y	In-house strategies
DOUGLAS_FIR/DOUGLAS_MAPLE/STEP_MOSS	Species at Risk	Y	In-house strategies	Y	In-house strategies
FEW_FLOWERED_SPIKE_RUSH/HOOK_MOSSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
HARD-STEMMED_BULRUSH_DEEP_MARSH	Species at Risk	Y	In-house strategies	Y	In-house strategies
HUDSON_BAY_CLUBRUSH/RUSTY_HOOK_MOSS	Species at Risk	Y	In-house strategies	Y	In-house strategies
HYBRID_WHITE_SPRUCE- PAPER_BIRCH/DEVILS_CLUB	Species at Risk	Y	In-house strategies	Y	In-house strategies
HYBRID_WHITE_SPRUCE/FOAM_LICHENS	Species at Risk	Y	In-house strategies	Y	In-house strategies
HYBRID_WHITE_SPRUCE/HARDHACK	Species at Risk	Y	In-house strategies	Y	In-house strategies
HYBRID_WHITE_SPRUCE/HARDHACK- PRICKLY_ROSE	Species at Risk	Y	In-house strategies	Y	In-house strategies
HYBRID_WHITE_SPRUCE/HARDHACK/OAK_FERN	Species at Risk	Y	In-house strategies	Y	In-house strategies
HYBRID_WHITE_SPRUCE/HORSETAILS- WESTERN_MEADOWRUE	Species at Risk	Y	In-house strategies	Y	In-house strategies
HYBRID_WHITE_SPRUCE/OSTRICH_FERN	Species at Risk	Y	In-house strategies	Y	In-house strategies
HYBRID_WHITE_SPRUCE/PINEGRASS/STEP_MOSS	Species at Risk	Y	In-house strategies	Y	In-house strategies
LODGEPOLE_PINE-BLACK_SPRUCE/RED- STEMMED_FEATHERMOSS	Species at Risk	Y	In-house strategies	Y	In-house strategies
LODGEPOLE_PINE-CLAD_LICHENS- JUNIPER_HAIRCAP_MOSS	Species at Risk	Y	In-house strategies	Y	In-house strategies
LODGEPOLE_PINE/BLACK_HUCKELBERRY-	Species at Risk	Y	In-house strategies	Y	In-house strategies

Mackenzie DFA Sustainable Forest Management Plan

VELVET_LEAVED_BLUEBERRY	Risk		strategies		strategies
LODGEPOLE_PINE/BLACK_HUCKLEBERRY/REINDEER_LICHENS	Species at Risk	Y	In-house strategies	Y	In-house strategies
LODGEPOLE_PINE/DWARF_BLUEBERRY/PEAT_MOSSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
LODGEPOLE_PINE/FEW_FLOWERED_SEDGE/PEAT_MOSSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
LODGEPOLE_PINE/KRUCKEBERGS_HOLLY_FERN-INDIANS_DREAM	Species at Risk	Y	In-house strategies	Y	In-house strategies
LODGEPOLE_PINE/LABRADOR_TEA-VELVET_LEAVED_BLUEBERRY	Species at Risk	Y	In-house strategies	Y	In-house strategies
LODGEPOLE_PINE/VELVET_LEAVED_BLUEBERRY/C-LAD_LICHENS	Species at Risk	Y	In-house strategies	Y	In-house strategies
LODGEPOLE_PINE/WATER_SEDGE/PEAT_MOSSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
MACMALLAS_WILLOW/BEAKED_SEDGE	Species at Risk	Y	In-house strategies	Y	In-house strategies
MAT_MUHLY-ARTIC_RUSH-NEVADA_BLUEGRASS	Species at Risk	Y	In-house strategies	Y	In-house strategies
MOUNTAIN_ALDER/COMMON_HORSETAIL	Species at Risk	Y	In-house strategies	Y	In-house strategies
MOUNTAIN_ALDER/RED_OSIER_DOGWOOD/LADY_FERN	Species at Risk	Y	In-house strategies	Y	In-house strategies
NARROW_LEAVED_COTTON_GRASS-SHORE_SEDGE	Species at Risk	Y	In-house strategies	Y	In-house strategies
NUTTALLS_ALKALIGRASS/FOXTAIL_BARLEY	Species at Risk	Y	In-house strategies	Y	In-house strategies
PACIFIC_WILLOW/RED_OSIER_DOGWOOD/HORSETAILS	Species at Risk	Y	In-house strategies	Y	In-house strategies
SCHEUCHZERIA/PEAT_MOSSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
SCRUB_BIRCH/SEDGES/PEAT_MOSSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
SHORE_SEDGE-BUCKBEAN/HOOK_MOSSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
SHORE_SEDGE-BUCKBEAN/PEAT_MOSSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
SITKA_WILLOW/SITKA_SEDGE	Species at Risk	Y	In-house strategies	Y	In-house strategies
SLENDER_SEDGE/COMMON_HOOK_MOSS	Species at Risk	Y	In-house strategies	Y	In-house strategies
SPRUCES-SUPALPINE_FIR/SKUNK_CABBAGE	Species at Risk	Y	In-house strategies	Y	In-house strategies
SUBAPLINE_FIR/ALDERS/HORSETAILS	Species at Risk	Y	In-house strategies	Y	In-house strategies
SWAMP_HORSETAIL-BEAKED_SEDGE	Species at Risk	Y	In-house strategies	Y	In-house strategies
TIMBER_OATGRASS/REINDEER_LICHEN	Species at Risk	Y	In-house strategies	Y	In-house strategies
TUFTED_CLUBBRUSH/GOLDEN_STAR_MOSS	Species at Risk	Y	In-house strategies	Y	In-house strategies
TUFTED_HAIRGRASS_COMMUNITY	Species at Risk	Y	In-house strategies	Y	In-house strategies
WESTERN_HEMLOCK-WESTERN_REDCEDAR/CLAD_LICHENS	Species at Risk	Y	In-house strategies	Y	In-house strategies
WESTERN_HEMLOCK/FALSE_AZALEA/CLAD_LICHENS	Species at Risk	Y	In-house strategies	Y	In-house strategies
WESTERN_HEMLOCK/VELVET_LEAVED_BLUEBERRY-FALSEBOX	Species at Risk	Y	In-house strategies	Y	In-house strategies

Mackenzie DFA Sustainable Forest Management Plan

WESTERN_HEMLOCK/WOOD_HORSETAIL/PEAT_MO SSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
WESTERN_REDCEDAR/DEVILS_CLUB/OSTRICH_FE RN	Species at Risk	Y	In-house strategies	Y	In-house strategies
WESTERN_REDCEDAR/FALSEBOX	Species at Risk	Y	In-house strategies	Y	In-house strategies
WESTERN_REDCEDAR/PRINCES_PINE/ELECTRIFIE D_CATS_TAIL_MOSS	Species at Risk	Y	In-house strategies	Y	In-house strategies
WESTERN_REDCEDAR/SKUNK_CABBAGE/PEAT_MO SSES	Species at Risk	Y	In-house strategies	Y	In-house strategies
WHITE_SPRUCE/BLACK_HUCKLEBERRY/STEP_MOS S	Species at Risk	Y	In-house strategies	Y	In-house strategies
WHITE_SPRUCE/RED_SWAMP_CURRANT/OAK_FER N	Species at Risk	Y	In-house strategies	Y	In-house strategies
WHITE_SPRUCE/RED_SWAMP_CURRANT/TALL_BLU EBELLS	Species at Risk	Y	In-house strategies	Y	In-house strategies

Mackenzie DFA Sustainable Forest Management Plan

APPENDIX D

A COMPARATIVE ANALYSIS OF ALTERNATIVE STRATEGIES

A total of nine alternative strategies were developed, forecast, and analysed, including a base case scenario using current management practices. These strategies are:

Scenario 1: Base Case

Assumes current management practices as per TSR 2, with the following additions based on current DFA processes;

- Mountain pine beetle outbreak to continue until 2010
- Natural disturbance on NHLB
- Conditions and/or restrictions of all current draft and approved ungulate winter ranges (UWR) apply
- Harvesting priority is given to pine-leading stands

Scenario 2: Habitat Richness Emphasis

This is an attempt to simulate the impact of old growth management areas (OGMA) on the DFA. This scenario is based on;

- Apply old seral targets as a THLB reduction – 58% of reductions to come from the THLB. Apply a THLB reduction for each LU_BEC group old seral requirement.
- Apply interior old targets as a THLB reduction – 58% of reductions to come from the THLB. Apply a THLB reduction for each LU_BEC group old interior requirement.
- WTP retention increased to 20% in current PI stands

Scenario 3: Species Composition

This scenario assumes that Balsam analysis units regenerate to 50% planted spruce and 50% natural balsam, that Spruce Medium analysis units regenerate to 80% planted spruce and 20% natural balsam, and that Spruce Poor analysis units regenerate to 70% planted spruce and 30% natural balsam.

Scenario 4: Caribou Recovery Emphasis

This scenario sees the application of the draft Caribou Recovery Action Plan (McNay, et al, 2006). This includes the following management considerations for the Scott and Wolverine caribou herds;

- Preferred Habitat Pine Lichen Winter Range and Post Rut Range – within each herd area, harvest 50% ± 10% on a 140 year rotation, then no harvesting in preferred area for 70 years. Must complete harvest within 20 years from the first harvest.
- Preferred Habitat for High Elevation Winter Range– within each herd area, maintain at least X% of the herd area >120 years and >15 metres. $X\% = (\text{lower natural range of variability} / \text{potential range area}) * 100$. Potential range area listed in Table 4 (pg 26) of Recovery Action Plan.

Mackenzie DFA Sustainable Forest Management Plan

- Preferred Calving and Summer Range – within each herd area, maintain at least X% of the herd area. $X\% = (\text{lower natural range of variability} / \text{potential range area}) * 100$. Potential range area listed in Table 4 (pg 26) of Recovery Action Plan.

Scenario 5: Non-Timber Economic Emphasis

This scenario emphasizes the management for visual quality in both scenic areas and non-scenic areas and the application of a visually effective green-up requirement within 200 metres for the following roads the Thutade FSR and the old road through Manson Creek to Germansen Lake.

Scenario 5A: Manual brushing

Manual brushing (i.e. no herbicide use) to increase berry production and increase jobs is the focus of this scenario. The underlying assumption behind this scenario is that expenditures on brushing will remain static, resulting in lower productivity on managed stands as less area is brushed annually. This, in turn, increases rotation age.

Scenario 6: Worst Case Forest Health on Mature Stands Emphasis

This scenario applies the mountain pine beetle epidemic criteria to 2020 as per the Provincial Level Projection of the Current Mountain Pine Beetle Outbreak, April 2006.

Scenario 6A: Unsalvaged Losses

This scenario compounds Scenario 6 by adding an increase in spruce and balsam bark beetle outbreaks and in fire. Unsalvaged losses are doubled after they have been pro-rated to the DFA.

Scenario 7: Worst Case Forest Health on Regenerating Stands Emphasis

The scenario is intended to illustrate the effects of forest health problems on regenerated stands. For pine leading analysis units, the operational adjustment factor (OAF) is increased to 20%.

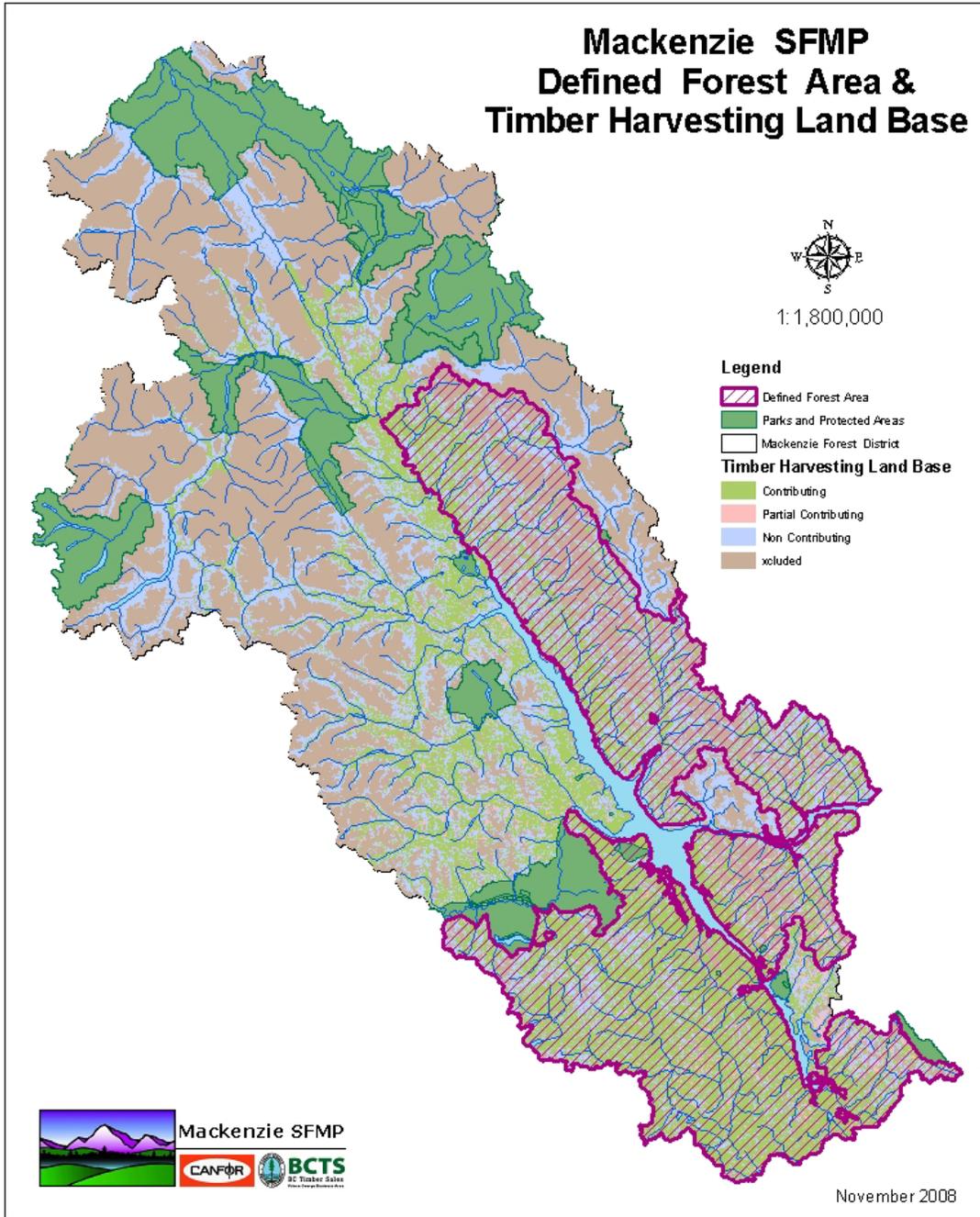
Mackenzie DFA Sustainable Forest Management Plan

APPENDIX E

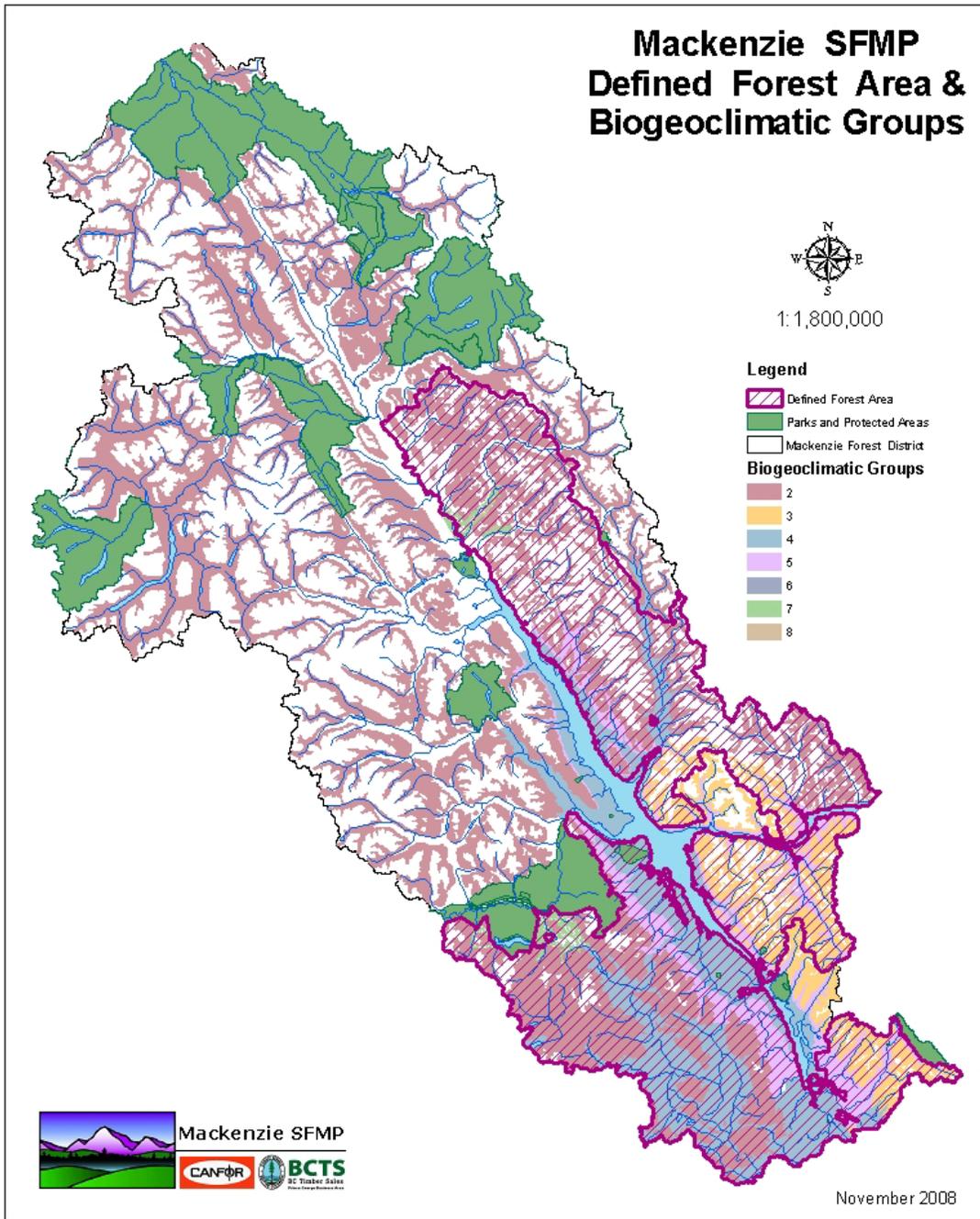
MAPS

This Appendix contains maps of the DFA and other associated indicator maps.

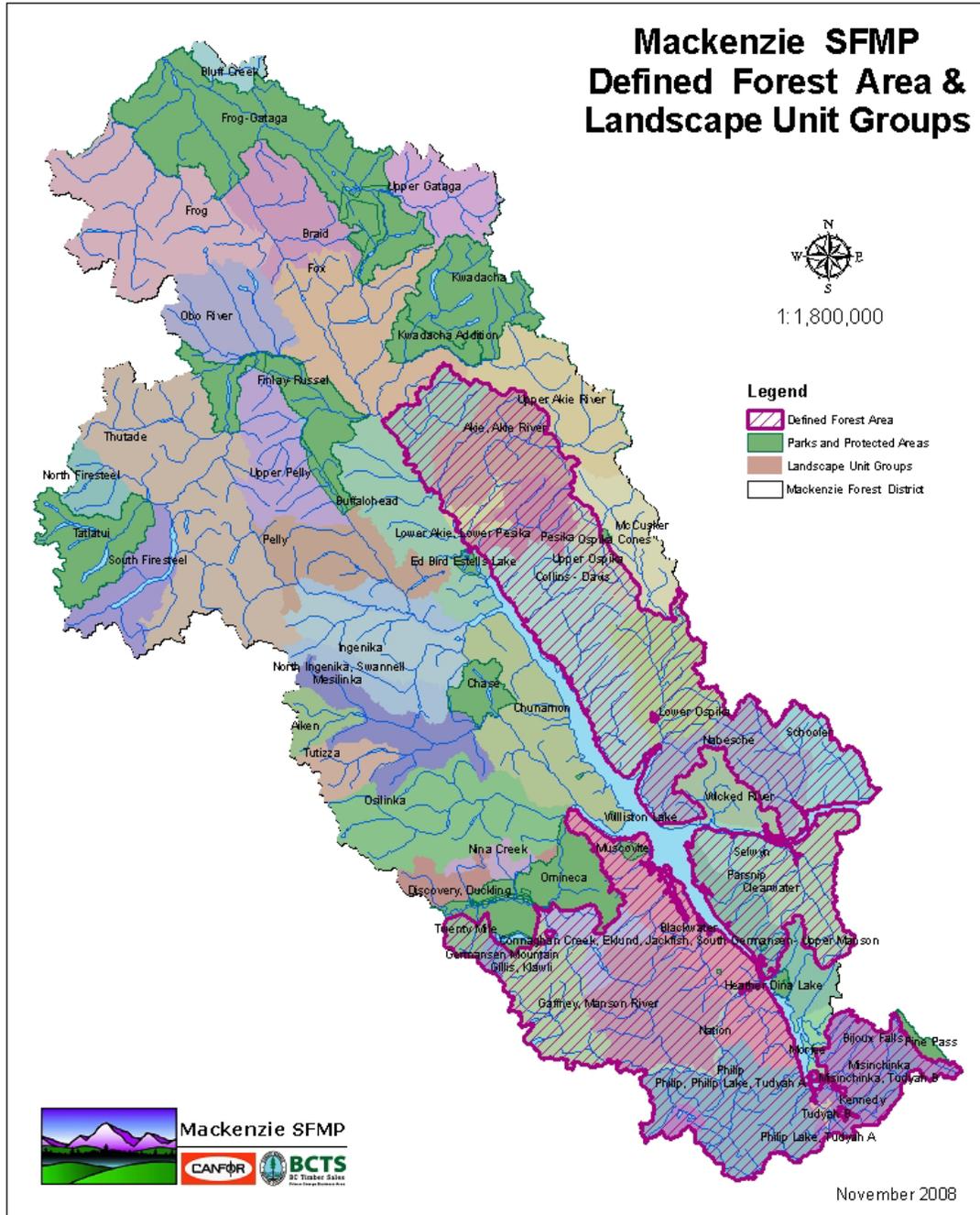
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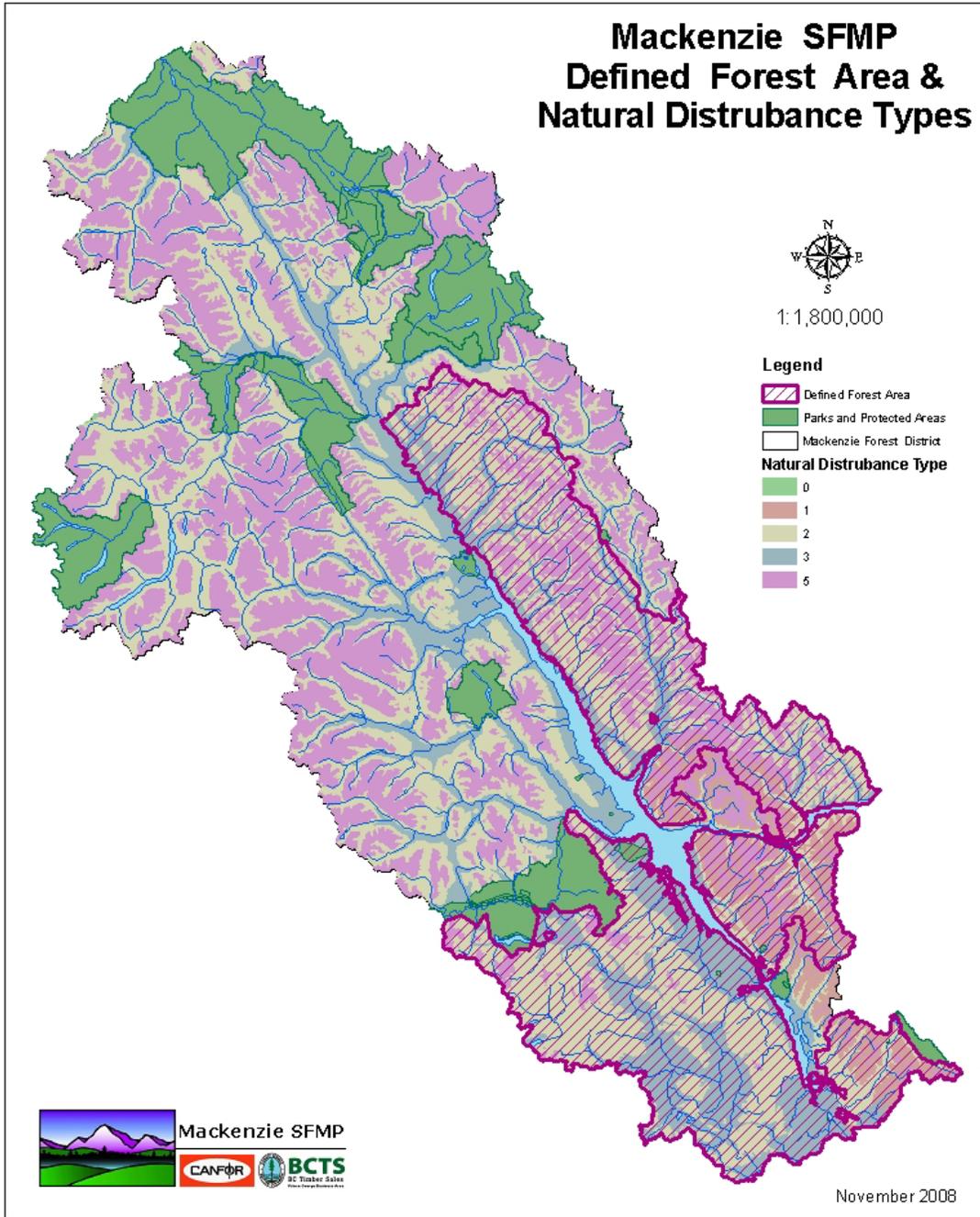
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Mackenzie DFA Sustainable Forest Management Plan



Mackenzie DFA Sustainable Forest Management Plan



APPENDIX F

**SUSTAINABLE FOREST CRITERIA AND INDICATOR
MATRIX**

Mackenzie DFA Sustainable Forest Management Plan

CANFOR – BCTS MACKENZIE DEFINED FOREST AREA SUSTAINABLE FOREST MANAGEMENT PLAN - FOREST CRITERIA AND INDICATOR MATRIX Current to January 1, 2010

CCFM Criterion	CSA SFM Element	Value	Objective	Indicator	Target	Variance	Comments	PAG Recommendation
1. Conservation of Biological Diversity	1.1 Ecosystem Diversity	Well balanced and functioning ecosystems that support natural processes	Maintain landscapes that support the natural diversity, variety and patterns of ecosystems	#1. Percent of blocks and roads harvested that meet the prescribed old growth targets.	100% Targets as per the Mackenzie TSA Biodiversity Order.	0%	Intended to reflect targets as established in Order. The old will be reported by landscape unit group and then by BEC group. The intent is to only report out for landscape unit groups that have harvesting or road building activities completed during the particular reporting period.	Consensus - Mar. 26, 09
				#2. Percent of blocks and roads harvested that meet the prescribed interior old targets.	100% Targets as per the Mackenzie TSA Biodiversity Order.	0%	Intended to reflect targets as established in Order. The interior old will be reported by landscape unit group and then by BEC group. The intent is to only report out for landscape unit groups that have harvesting or road building activities completed during the particular reporting period.	Consensus - Mar. 26, 09
				#3. Percentage of blocks and roads harvested that are not within legally established protected areas, ecological reserves, or OGMA's.	100%	0%	Changed to reflect blocks and roads harvested relative to legally established old growth management areas, protected areas, and ecological reserves.	Consensus - June 24, 09

Mackenzie DFA Sustainable Forest Management Plan

				#4. Percent productive forest by BEC variant represented within the Non-harvestable land base.	To be established	To be established	Preliminary targets are included in the 2008-09 Annual Report. These targets will be further reviewed and discussed with the PAG during a meeting in the 2009-10 fiscal year.	LSC to present targets and revised indicator to the PAG prior to March 31, 2010.
				#5. Percentage of blocks and roads harvested that meet the prescribed patch size target ranges or are trending towards the target range.	100%	-30%	Targets will be based on target ranges from the biodiversity guidebook. Patch will be reported by landscape unit group and NDT. The intent is to only report out for landscape unit groups that have harvesting or road building activities completed during the particular reporting period.	Consensus - May 26, 09. PAG would like to see the rationale for the variance, and under what circumstances the variance would be used, added to the indicator write up in the SFMP.
				#7. Percentage of cutblocks that meet or exceed wildlife tree patch requirements.	100%	0%	Legal or requirements specified in operational and/or site plan. Measured annually.	Consensus - Mar. 28, 06
				#8. The percentage of forest operations consistent with riparian management area requirements as identified in operational plans and/or site plans.	100%	0%	Measured annually.	Consensus - Mar. 28, 06
	1.2 Species Diversity	Diversity of species throughout the DFA	Maintain species diversity through time, including habitats for known occurrences for species at risk.	#4. Percent productive forest by BEC variant represented within the Non-harvestable land base.	To be established	To be established	Preliminary targets are included in the 2008-09 Annual Report. These targets will be further reviewed and discussed with the PAG during a meeting in the 2009-10 fiscal year.	LSC to present targets and revised indicator to the PAG prior to March 31, 2010.

Mackenzie DFA Sustainable Forest Management Plan

				#14. Percentage of blocks and roads harvested that adhere to management strategies for Species at Risk, Ungulate Winter Ranges, and other local species of importance.	100%	-5%	The write up for the indicator will reference a table listing all the species that fall under SAR, UWR, or other species local to the DFA that are deemed valuable. A commitment for training of staff will also be built into the indicator write up in the plan.	Consensus - May 26, 09.
				#15. Percentage of blocks and roads harvested that adhere to management strategies for sites of biological significance.	100%	-10%	The write up for the indicator will reference a table listing all the sites of biological significance applicable to the DFA. A commitment for training of staff will also be built into the indicator write up in the plan.	Consensus - June 24, 09. More clarification is required in the write up of the indicator to detail the specific characteristics of each of the sites of biological significance.
				#42. Percentage of blocks and roads harvested that coincide with identified resource features that are managed or protected.	100%	-10%	will report out the total number of blocks and roads harvested, the number of those that have applicable resource features, and the number of those that are managed or protected.	Consensus - Oct. 14, 09.
	1.3 Genetic Diversity	Genetic diversity throughout the DFA	Conserve genetic diversity by maintaining the variation of genes within species and ensuring that reforestation programs are free of genetically modified organisms.	#4. Percent productive forest by BEC variant represented within the Non-harvestable land base.	0 ha	0	OGMAs to be established in Mackenzie TSA. Draft OGMAs are to be managed as if established.	Consensus - Mar. 28, 06

Mackenzie DFA Sustainable Forest Management Plan

				#7. Percentage of cutblocks that meet or exceed wildlife tree patch requirements.	100%	0%	Legal or requirements specified in operational and/or site plan. Measured annually.	Consensus - Mar. 28, 06
				#12. Percentage of road construction or deactivation projects where prescribed re-vegetation occurs within 12 months of disturbance.	100%	-10%	This will meet the LRMP requirement for reduction of noxious weeds. Revegetation may include grass seeding, willow cuttings, etc.	Consensus - Mar. 28, 06
	1.4 Protected areas and sites of biological and cultural significance	Unique and important sites within the DFA	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.	#3. Percentage of blocks and roads harvested that are not within legally established protected areas, ecological reserves, or OGMA's.	100%	0%	Changed to reflect blocks and roads harvested relative to legally established old growth management areas, protected areas, and ecological reserves.	Consensus - June 24, 09
				#15. Percentage of blocks and roads harvested that adhere to management strategies for sites of biological significance.	100%	-10%	The write up for the indicator will reference a table listing all the sites of biological significance applicable to the DFA. A commitment for training of staff will also be built into the indicator write up in the plan.	Consensus - June 24, 09. More clarification is required in the write up of the indicator to detail the specific characteristics of each of the sites of biological significance.
				#42. Percentage of blocks and roads harvested that coincide with identified resource features that are managed or protected.	100%	-10%	will report out the total number of blocks and roads harvested, the number of those that have applicable resource features, and the number of those that are managed or protected.	Consensus - Oct. 14, 09.

Mackenzie DFA Sustainable Forest Management Plan

2. Ecosystem condition and productivity	2.1 Forest ecosystem resilience	Resilient ecosystems	Conserve ecosystem resilience by maintaining both ecosystem processes and ecosystem condition.	#1. Percent of blocks and roads harvested that meet the prescribed old growth targets.	100% Targets as per the Mackenzie TSA Biodiversity Order.	0%	Intended to reflect targets as established in Order. The old will be reported by landscape unit group and then by BEC group. The intent is to only report out for landscape unit groups that have harvesting or road building activities completed during the particular reporting period.	Consensus - Mar. 26, 09
				#2. Percent of blocks and roads harvested that meet the prescribed interior old targets.	100% Targets as per the Mackenzie TSA Biodiversity Order.	0%	Intended to reflect targets as established in Order. The interior old will be reported by landscape unit group and then by BEC group. The intent is to only report out for landscape unit groups that have harvesting or road building activities completed during the particular reporting period.	Consensus - Mar. 26, 09
				#3. Percentage of blocks and roads harvested that are not within legally established protected areas, ecological reserves, or OGMA's.	100%	0%	Changed to reflect blocks and roads harvested relative to legally established old growth management areas, protected areas, and ecological reserves.	Consensus - June 24, 09
				#4. Percent productive forest by BEC variant represented within the Non-harvestable land base.	To be established	To be established	Preliminary targets are included in the 2008-09 Annual Report. These targets will be further reviewed and discussed with the PAG during a meeting in the 2009-10 fiscal year.	LSC to present targets and revised indicator to the PAG prior to March 31, 2010.

Mackenzie DFA Sustainable Forest Management Plan

				#5. Percentage of blocks and roads harvested that meet the prescribed patch size target ranges or are trending towards the target range.	100%	-30%	Targets will be based on target ranges from the biodiversity guidebook. Patch will be reported by landscape unit group and NDT. The intent is to only report out for landscape unit groups that have harvesting or road building activities completed during the particular reporting period.	Consensus - May 26, 09. PAG would like to see the rationale for the variance, and under what circumstances the variance would be used, added to the indicator write up in the SFMP.
				#6. The percentage of blocks and roads harvested that exceed coarse woody debris requirements	100%	0%	Legal or requirements specified in operation plan. Measured annually.	Consensus - Feb. 28, 06
				#7. Percentage of cutblocks that meet or exceed wildlife tree patch requirements.	100%	0%	Legal or requirements specified in operational and/or site plan. Measured annually.	Consensus - Mar. 28, 06
				#16. The percentage of forest operations consistent with soil conservation standards as identified in operational plans and/or site plans.	100%	0%	Measured annually. Operational plan requirements are specific to each block based on soil hazard assessment.	Consensus - Feb. 28, 06
				#17. The percentage of forest operations consistent with terrain management requirements as identified in operational plans and/or site plans.	100%	0%	Measured annually. Operational plan requirements are specific to each block based on terrain stability indicators.	Consensus - Feb. 28, 06
				#18. The number of EMS reportable spills.	0	<5	Measured annually. Report on spills and actions taken. EMS as per Canfor and BCTS (and listed in SFMP). Add definition of running water and applicability to standing water. Variance is combined between Canfor and BCTS.	Consensus - Mar. 14, 06

Mackenzie DFA Sustainable Forest Management Plan

				#19. The percentage of standards units declared free growing that have measured site index values at or greater than pre-harvest site index.	100%	-5%	Standard units are declared, not blocks. The table in the SFMP indicating average pre-harvest site index values for both pine and spruce leading stands will continue to be used as a benchmark.	Consensus - Dec. 15, 09
				#23. Percent of standard units declared stocked prior to the regeneration date consistent with operational plans.	100%	-5%	Measured annually.	Consensus - Dec. 15, 09
				#24. Percent of standards units declared Free Growing prior to the late free growing assessment date.	100%	-5%	Measured annually.	Consensus - Dec. 15, 09
				#25. Percentage of area (ha) harvested that are damaged or considered a high risk to stand damaging agents.	100%	-20%	The most current and available Ministry of forests annual forest Health report can be used to specify which stand damaging agents are the most important to target.	Consensus - June 24, 09
	2.2 Forest ecosystem productivity	Productive ecosystems	Conserve forest ecosystem productivity and productive capacity by maintaining ecosystem conditions that are capable of supporting naturally occurring species.	#4. Percent productive forest by BEC variant represented within the Non-harvestable land base.	To be established	To be established	Preliminary targets are included in the 2008-09 Annual Report. These targets will be further reviewed and discussed with the PAG during a meeting in the 2009-10 fiscal year.	LSC to present targets and revised indicator to the PAG prior to March 31, 2010.

Mackenzie DFA Sustainable Forest Management Plan

				#5. Percentage of blocks and roads harvested that meet the prescribed patch size target ranges or are trending towards the target range.	100%	-30%	Targets will be based on target ranges from the biodiversity guidebook. Patch will be reported by landscape unit group and NDT. The intent is to only report out for landscape unit groups that have harvesting or road building activities completed during the particular reporting period.	Consensus - May 26, 09. PAG would like to see the rationale for the variance, and under what circumstances the variance would be used, added to the indicator write up in the SFMP.
				#6. The percentage of blocks and roads harvested that exceed coarse woody debris requirements	100%	0%	Legal or requirements specified in operation plan. Measured annually.	Consensus - Feb. 28, 06
				#7. Percentage of cutblocks that meet or exceed wildlife tree patch requirements.	100%	0%	Legal or requirements specified in operational and/or site plan. Measured annually.	Consensus - Mar. 28, 06
				#14. Percentage of blocks and roads harvested that adhere to management strategies for Species at Risk, Ungulate Winter Ranges, and other local species of importance.	100%	-5%	The write up for the indicator will reference a table listing all the species that fall under SAR, UWR, or other species local to the DFA that are deemed valuable. A commitment for training of staff will also be built into the indicator write up in the plan.	Consensus - May 26, 09.
				#15. Percentage of blocks and roads harvested that adhere to management strategies for sites of biological significance.	100%	-10%	The write up for the indicator will reference a table listing all the sites of biological significance applicable to the DFA. A commitment for training of staff will also be built into the indicator write up in the plan.	Consensus - June 24, 09. More clarification is required in the write up of the indicator to detail the specific characteristics of each of the sites of biological significance.

Mackenzie DFA Sustainable Forest Management Plan

				#16. The percentage of forest operations consistent with soil conservation standards as identified in operational plans and/or site plans.	100%	0%	Measured annually. Operational plan requirements are specific to each block based on soil hazard assessment.	Consensus - Feb. 28, 06
				#17. The percentage of forest operations consistent with terrain management requirements as identified in operational plans and/or site plans.	100%	0%	Measured annually. Operational plan requirements are specific to each block based on terrain stability indicators.	Consensus - Feb. 28, 06
				#18. The number of EMS reportable spills.	0	<5	Measured annually. Report on spills and actions taken. EMS as per Canfor and BCTS (and listed in SFMP). Add definition of running water and applicability to standing water. Variance is combined between Canfor and BCTS.	Consensus - Mar. 14, 06
				#19. The percentage of standards units declared free growing that have measured site index values at or greater than pre-harvest site index.	100%	-5%	Standard units are declared, not blocks. The table in the SFMP indicating average pre-harvest site index values for both pine and spruce leading stands will continue to be used as a benchmark.	Consensus - Dec. 15, 09
				#20. Area of THLB converted to non-forest land use through forest management activities.	<5%	0%	Refinement of the target will be done pending analysis.	Consensus - Mar 14, 06
				#23. Percent of standard units declared stocked prior to the regeneration date consistent with operational plans.	100%	-5%	Measured annually.	Consensus - Dec. 15, 09

Mackenzie DFA Sustainable Forest Management Plan

				#24. Percent of standards units declared Free Growing prior to the late free growing assessment date.	100%	-5%	Measured annually.	Consensus - Dec. 15, 09
				#25. Percentage of area (ha) harvested that are damaged or considered a high risk to stand damaging agents.	100%	-20%	The most current and available Ministry of forests annual forest Health report can be used to specify which stand damaging agents are the most important to target.	Consensus - June 24, 09
3. Soil and Water	3.1 Soil quality and quantity	Healthy and abundant soil resource	Conserve soil resources by maintaining soil quality and quantity	#6. The percentage of blocks and roads harvested that exceed coarse woody debris requirements	100%	0%	Legal or requirements specified in operation plan. Measured annually.	Consensus - Feb. 28, 06
				#9. The percentage of identified unnatural sediment occurrences where mitigating actions were taken.	100%	-5%	Mitigating actions may include referral to appropriate party. Measured annually.	Consensus - Mar. 28, 06
				#10. Percentage of stream crossings appropriately designed and properly installed and/or removed.	100%	-5%	Measured annually	Consensus - Mar. 28, 06
				#11. Percent of watersheds containing approved or proposed development with Peak Flow Index calculations completed.	100%	0%		Consensus - Apr. 11, 06
				#12. Percentage of road construction or deactivation projects where prescribed re-vegetation occurs within 12 months of disturbance.	100%	-10%	This will meet the LRMP requirement for reduction of noxious weeds. Revegetation may include grass seeding, willow cuttings, etc.	Consensus - Mar. 28, 06

Mackenzie DFA Sustainable Forest Management Plan

				#13. Percentage of planned roads that have an environmental risk assessment completed.	100%	-10%	Measured annually	Consensus - Mar. 28, 06
				#16. The percentage of forest operations consistent with soil conservation standards as identified in operational plans and/or site plans.	100%	0%	Measured annually. Operational plan requirements are specific to each block based on soil hazard assessment.	Consensus - Feb. 28, 06
				#17. The percentage of forest operations consistent with terrain management requirements as identified in operational plans and/or site plans.	100%	0%	Measured annually. Operational plan requirements are specific to each block based on terrain stability indicators.	Consensus - Feb. 28, 06
				#18. The number of EMS reportable spills.	0	<5	Measured annually. Report on spills and actions taken. EMS as per Canfor and BCTS (and listed in SFMP). Add definition of running water and applicability to standing water. Variance is combined between Canfor and BCTS.	Consensus - Mar. 14, 06
				#20. Area of THLB converted to non-forest land use through forest management activities.	<5%	0%	Refinement of the target will be done pending analysis.	Consensus - Mar 14, 06
				#21. The percentage of gross cutblock area occupied by total permanent access structures.	<5%	1%	Averaged annually.	Consensus - Feb 28, 06

Mackenzie DFA Sustainable Forest Management Plan

	3.2 Water quality and quantity	Healthy aquatic ecosystems	Conserve water resources by maintaining water quality and quantity.	#8. The percentage of forest operations consistent with riparian management area requirements as identified in operational plans and/or site plans.	100%	0%	Measured annually.	Consensus - Mar. 28, 06
				#9. The percentage of identified unnatural sediment occurrences where mitigating actions were taken.	100%	-5%	Mitigating actions may include referral to appropriate party. Measured annually.	Consensus - Mar. 28, 06
				#10. Percentage of stream crossings appropriately designed and properly installed and/or removed.	100%	-5%	Measured annually	Consensus - Mar. 28, 06
				#11. Percent of watersheds containing approved or proposed development with Peak Flow Index calculations completed.	100%	0%		Consensus - Apr. 11, 06
				#12. Percentage of road construction or deactivation projects where prescribed re-vegetation occurs within 12 months of disturbance.	100%	-10%	This will meet the LRMP requirement for reduction of noxious weeds. Revegetation may include grass seeding, willow cuttings, etc.	Consensus - Mar. 28, 06
				#13. Percentage of planned roads that have an environmental risk assessment completed.	100%	-10%	Measured annually	Consensus - Mar. 28, 06

Mackenzie DFA Sustainable Forest Management Plan

				#18. The number of EMS reportable spills.	0	<5	Measured annually. Report on spills and actions taken. EMS as per Canfor and BCTS (and listed in SFMP). Add definition of running water and applicability to standing water. Variance is combined between Canfor and BCTS.	Consensus - Mar. 14, 06
4. Role in global ecological cycles	4.1 Carbon uptake and storage	Carbon cycling	Maintain the processes that take carbon from the atmosphere and store it in the forest ecosystem.	#6. The percentage of blocks and roads harvested that exceed coarse woody debris requirements	100%	0%	Legal or requirements specified in operation plan. Measured annually.	Consensus - Feb. 28, 06
				#20. Area of THLB converted to non-forest land use through forest management activities.	<5%	0%	Refinement of the target will be done pending analysis.	Consensus - Mar 14, 06
				#21. The percentage of gross cutblock area occupied by total permanent access structures.	<5%	1%	Averaged annually.	Consensus - Feb 28, 06
				#23. Percent of standard units declared stocked prior to the regeneration date consistent with operational plans.	100%	-5%	Measured annually.	Consensus - Dec. 15, 09
				#25. Percentage of area (ha) harvested that are damaged or considered a high risk to stand damaging agents.	100%	-20%	The most current and available Ministry of forests annual forest Health report can be used to specify which stand damaging agents are the most important to target.	Consensus - June 24, 09

Mackenzie DFA Sustainable Forest Management Plan

				#27. Percentage of blocks and roads harvested where estimated waste and residue is below allowable levels.	100%	-5%	Measured annually. Number of inspections indicating compliance.	Consensus - May 9, 06
	4.2 Forest land conversion	Minimize forest land conversion	Protect forest land from deforestation or conversion to non-forests, where ecologically appropriate.	#20. Area of THLB converted to non-forest land use through forest management activities.	<5%	0%	Refinement of the target will be done pending analysis.	Consensus - Mar 14, 06
				#21. The percentage of gross cutblock area occupied by total permanent access structures.	<5%	1%	Averaged annually.	Consensus - Feb 28, 06
5. Economic and social benefits	5.1 Timber and non-timber benefits	Multiple benefits	Manage the forest sustainably to produce an acceptable and feasible mix of timber and non-timber benefits.	#22. Percentage of off-block road deactivation projects that are communicated with applicable First Nations and Stakeholders.	100%	-10%	Off-block road deactivations include bridge or major culvert removals, and where 2 WD drive access is restricted as a result of road permit deactivation projects.	Consensus - June 24, 09
				#25. Percentage of area (ha) harvested that are damaged or considered a high risk to stand damaging agents.	100%	-20%	The most current and available Ministry of forests annual forest Health report can be used to specify which stand damaging agents are the most important to target.	Consensus - June 24, 09
				#26. Actual harvest volume compared to the apportionment across the DFA over each 5 year cut control period.	100%	+/-10%	Reported annually. Measured on anniversary of cut control period.	Consensus - May 9, 06

Mackenzie DFA Sustainable Forest Management Plan

				#27. Percentage of blocks and roads harvested where estimated waste and residue is below allowable levels.	100%	-5%	Measured annually. Number of inspections indicating compliance.	Consensus - May 9, 06
				#28. The number of first order wood products produced from trees harvested from the DFA.	5	-2	Measured annually.	Consensus - Apr 26, 06
				#29. The percent of money spent on forest operations and management in the DFA provided from local suppliers.	30%	-5%	This resulting indicator statement will reflect the total amount of investment in the local area which will include Mackenzie, McLeod Lake, Germanson Landing, Manson Creek, Tsay Keh Dene, and Fort Ware.	Consensus - Oct 14, 09
				#31. The percentage of forest operations consistent with range requirements as identified in operational plans and/or site plans.	100%	0%	Measured annually	Consensus - May 9, 06
				#34. The number of opportunities for public and/or stakeholders to provide meaningful input into forest planning.	6	-2	This indicator will summarize the number of opportunities for stakeholders to provide input into Forest planning; including, referral of operational plans, open houses, trade shows, meetings, referral of PMPs, etc. Each opportunity will count as 1 towards the target.	Consensus - Oct 14, 09

Mackenzie DFA Sustainable Forest Management Plan

				#35. The number of operational concerns raised by the public and/or stakeholders that are considered and incorporated into operational and/or tactical plans.	100%	-10%	This indicator will compare the number of operational concerns that have been acted on relative to the total number of operational concerns raised.	Consensus - Oct 14, 09
				#41. The percentage of harvesting and road building operations consistent with visual quality requirements as identified in operational, tactical and/or site plans.	100%	0%	Measured annually.	Consensus - Feb 20, 07
	5.2 Communities and sustainability	Sustainable communities	Contribute to the sustainability of communities by providing diverse opportunities to derive benefits from forests and by supporting local community economics.	#22. Percentage of off-block road deactivation projects that are communicated with applicable First Nations and Stakeholders.	100%	-10%	Off-block road deactivations include bridge or major culvert removals, and where 2 WD drive access is restricted as a result of road permit deactivation projects.	Consensus - June 24, 09
				#26. Actual harvest volume compared to the apportionment across the DFA over each 5 year cut control period.	100%	+/-10%	Reported annually. Measured on anniversary of cut control period.	Consensus - May 9, 06
				#27. Percentage of blocks and roads harvested where estimated waste and residue is below allowable levels.	100%	-5%	Measured annually. Number of inspections indicating compliance.	Consensus - May 9, 06

Mackenzie DFA Sustainable Forest Management Plan

				#28. The number of first order wood products produced from trees harvested from the DFA.	5	-2	Measured annually.	Consensus - Apr 26, 06
				#29. The percent of money spent on forest operations and management in the DFA provided from local suppliers.	30%	-5%	This resulting indicator statement will reflect the total amount of investment in the local area which will include Mackenzie, McLeod Lake, Germanson Landing, Manson Creek, Tsay Keh Dene, and Fort Ware.	Consensus - Oct 14, 09
				#30. The number of contract opportunities with First Nations within the DFA.	>5	-2	The premise of this indicator that contract opportunities are no guarantee of awarding a contract to First nations. The First Nations contractor must meet the minimum requirements for each contract opportunity; offer a comparable product, at a competitive rate.	Consensus - Dec. 15, 09
				#41. The percentage of harvesting and road building operations consistent with visual quality requirements as identified in operational, tactical and/or site plans.	100%	0%	Measured annually.	Consensus - Feb 20, 07
				#43. Written safety policies in place and full implementation are documented.	2	0	Measured annually. One per organization.	Consensus - May 9, 06
				#44. Number of lost time accidents in woodlands operations.	0	0	Measured annually. Includes Canfor and BCTS staff.	Consensus - May 9, 06

Mackenzie DFA Sustainable Forest Management Plan

				#45. The percentage of operational activities that have the appropriate safety signage in place during the activity, and removed following the completion.	100%	-20%	Operational activities include harvesting, road building, road side brushing, hand falling, etc. The level of appropriate safety related signage is designated in LSC safety company policies.	Consensus - Oct. 14, 09.
6. Societies responsibility	6.1 Aboriginal and Treaty rights	Rights of Aboriginal peoples	Recognize and respect aboriginal title and rights, and treaty rights.	#38. Percentage of forest operations consistent with the Heritage Conservation Act.	100%	0%	Measured annually.	Apr 25, 06 Indicator accepted - with 2 dissentions.
				#39. The number of opportunities for First Nations to provide meaningful input into forest planning where active forest operations are within their respective traditional territories.	>2 per First Nation	0	This indicator will summarize the number of opportunities for First Nations to actively participate in Forest planning; including, referral of operational plans, open houses at band offices, trade shows, formal meetings, PMPs, etc. "Active" includes all current logging, road building, silviculture activities, and forest planning.	Consensus - Dec. 15, 09
				#40. The percentage of operational concerns raised by First Nations that are considered and incorporated into operational and/or tactical plans.	100%	-10%	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. Operational plans include FSPs and SPs. Tactical plans include operating plans relating to forest development referrals of blocks and roads.	Consensus - Dec. 15, 09

Mackenzie DFA Sustainable Forest Management Plan

	6.2 Respect for aboriginal forest values, knowledge, and uses	Aboriginal peoples values, knowledge, and traditional uses	Respect traditional aboriginal values, knowledge, and uses as identified through the aboriginal input process.	#38. Percentage of forest operations consistent with the Heritage Conservation Act.	100%	0%	Measured annually.	Apr 25, 06 Indicator accepted - with 2 dissentions.
				#39. The number of opportunities for First Nations to provide meaningful input into forest planning where active forest operations are within their respective traditional territories.	>2 per First Nation	0	This indicator will summarize the number of opportunities for First Nations to actively participate in Forest planning; including, referral of operational plans, open houses at band offices, trade shows, formal meetings, PMPs, etc. "Active" includes all current logging, road building, silviculture activities, and forest planning.	Consensus - Dec. 15, 09
				#40. The percentage of operational concerns raised by First Nations that are considered and incorporated into operational and/or tactical plans.	100%	-10%	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. Operational plans include FSPs and SPs. Tactical plans include operating plans relating to forest development referrals of blocks and roads.	Consensus - Dec. 15, 09
	6.3 Forest community well-being and resilience	Community health	Encourage, co-operate with, and help to provide opportunities for economic diversity within the community.	#41. Actual harvest volume compared to the apportionment across the DFA over each 5 year cut control period.	100%	+/-10%	Reported annually. Measured on anniversary of cut control period.	Consensus - May 9, 06

Mackenzie DFA Sustainable Forest Management Plan

				#42. The number of first order wood products produced from trees harvested from the DFA.	5	-2	Measured annually.	Consensus - Apr 26, 06
				#43. The percent of money spent on forest operations and management in the DFA provided from local suppliers.	30%	-5%	This resulting indicator statement will reflect the total amount of investment in the local area which will include Mackenzie, McLeod Lake, Germanson Landing, Manson Creek, Tsay Keh Dene, and Fort Ware.	Consensus - Oct 14, 09
				#30. The number of contract opportunities with First Nations within the DFA.	>5	-2	The premise of this indicator that contract opportunities are no guarantee of awarding a contract to First nations. The First Nations contractor must meet the minimum requirements for each contract opportunity; offer a comparable product, at a competitive rate.	Consensus - Dec. 15, 09
	6.4 Fair and effective decision-making	Fair and effective decision-making	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.	#32. The average overall percent of the PAG's satisfaction with PAG meeting process.	100%	-20%	To be measured after each meeting, based on the average result of question M12 from the PAG meeting evaluation form. Satisfaction is defined as a rating of 4 or better. Results to be provided at the following meeting.	Consensus - Feb. 14, 06

Mackenzie DFA Sustainable Forest Management Plan

				#33. Percentage of the public sectors as defined in the Terms of Reference (ToR) invited to participate in the PAG process.	100%	0%	Measured annually. Includes also those sectors that may have been removed from the TOR (lack of representation).	Consensus - Feb. 14, 06
				#34. The number of opportunities for public and/or stakeholders to provide meaningful input into forest planning.	6	-2	This indicator will summarize the number of opportunities for stakeholders to provide input into Forest planning; including, referral of operational plans, open houses, trade shows, meetings, referral of PMPs, etc. Each opportunity will count as 1 towards the target.	Consensus - Oct 14, 09
				#35. The number of operational concerns raised by the public and/or stakeholders that are considered and incorporated into operational and/or tactical plans.	100%	-10%	This indicator will compare the number of operational concerns that have been acted on relative to the total number of operational concerns raised.	Consensus - Oct 14, 09
				#36. The number of opportunities provided annually for access to SFM related documents.	3	0	Opportunities would include newsletters, open houses, trade shows, public meetings, websites, and other opportunities to provide SFM related information with the public, stakeholders, or First Nations. Documentation related to SFM includes; the current SFMP, audit results, annual reports, and PAG meeting minutes.	Consensus - Dec. 15, 09
				#37. The number of SFM educational opportunities and interactions provided.	2	0	Measured annually.	Consensus - Feb. 14, 06

Mackenzie DFA Sustainable Forest Management Plan

	6.5 Information for decision-making	Fair and effective decision-making	Provide relevant information and educational opportunities to interested parties to support their involvement in the public participation process, and increase knowledge of ecosystem processes and human interactions with forest ecosystems.	#22. Percentage of off-block road deactivation projects that are communicated with applicable First Nations and Stakeholders.	100%	-10%	Off-block road deactivations include bridge or major culvert removals, and where 2 WD drive access is restricted as a result of road permit deactivation projects.	Consensus - June 24, 09
				#31. The percentage of forest operations consistent with range requirements as identified in operational plans and/or site plans.	100%	0%	Measured annually	Consensus - May 9, 06
				#34. The number of opportunities for public and/or stakeholders to provide meaningful input into forest planning.	6	-2	This indicator will summarize the number of opportunities for stakeholders to provide input into Forest planning; including, referral of operational plans, open houses, trade shows, meetings, referral of PMPs, etc. Each opportunity will count as 1 towards the target.	Consensus - Oct 14, 09

Mackenzie DFA Sustainable Forest Management Plan

				#35. The number of operational concerns raised by the public and/or stakeholders that are considered and incorporated into operational and/or tactical plans.	100%	-10%	This indicator will compare the number of operational concerns that have been acted on relative to the total number of operational concerns raised.	Consensus - Oct 14, 09
				#36. The number of opportunities provided annually for access to SFM related documents.	3	0	Opportunities would include newsletters, open houses, trade shows, public meetings, websites, and other opportunities to provide SFM related information with the public, stakeholders, or First Nations. Documentation related to SFM includes; the current SFMP, audit results, annual reports, and PAG meeting minutes.	Consensus - Dec. 15, 09
				#37. The number of SFM educational opportunities and interactions provided.	2	0	Measured annually.	Consensus - Feb. 14, 06

Mackenzie DFA Sustainable Forest Management Plan

APPENDIX G

GLOSSARY OF TERMS AND ABBREVIATIONS

Updated to October 15, 2006

A

AAC Apportionment: the distribution of the AAC for a TSA among timber tenures by the Minister in accordance with Section 10 of the Forest Act.

Abiotic factors: the non-living components of the environment, such as air, rocks, soil, water, peat, and plant litter.

Aboriginal (Source CSA): “‘aboriginal peoples of Canada’ [which] includes Indian, Inuit, and Métis peoples of Canada” (Constitution Act, 1982, Subsection 35 (2)).

Aboriginal Resource site/unit (Source CSA): an investigated unit identified by the aboriginal communities/bands that provides resources for food or culture uses (e.g. ceremonies). Each site is described by its band, location and resource type, use and quality on a monthly basis. This information is confidential and not released without a band's permission.

Aboriginal Rights (Source CSA): “rights that some Aboriginal peoples of Canada hold as a result of their ancestors’ long-standing use and occupancy of the land”.

Note: “The rights of certain Aboriginal peoples to hunt, trap, and fish on ancestral lands are examples of Aboriginal rights. Aboriginal rights vary from group to group depending on the customs, practices, and traditions that have formed part of their distinctive cultures”. (*The State of Canada’s Forests 2001/2002*).

Aboriginal title (Source CSA): “a legal term that recognizes the interest of Aboriginals in the land. It is based on their long-standing use and occupancy of the land as descendants of the original inhabitants of Canada” (*The State of Canada’s Forests 2001/2002*).

Accreditation (Source CSA): the procedure by which the Standards Council of Canada (SCC) gives formal recognition that a registrar (certifier) is deemed competent to carry out specific tasks.

Active floodplain: the level area with alluvial soils adjacent to streams that is flooded by stream water on a periodic basis and is at the same elevation as areas showing evidence of flood channels free of terrestrial vegetation, recently rafted debris or fluvial sediments newly deposited on the surface of the forest floor or suspended on trees or vegetation, or recent scarring of trees by material moved by flood waters.

Adaptive management: adaptive management rigorously combines management, research, monitoring, and means of changing practices so that credible information is gained and management activities are modified by experience.

Adaptive management (Source CSA): a learning approach to management that recognizes substantial uncertainties in managing forests and incorporates into decisions experience gained from the results of previous actions

Additive effects: effects on biota of stress imposed by one mechanism, contributed from more than one source (e.g., sediment-related stress on fish imposed by sediment derived from stream bank sources and from land surface sources). (See also cumulative effects).

Administrative law: the branch of the law which deals with the actions of government vis a vis the public.

Administrative review: an appeal of a determination under Sections 78 to 85 of the Forest & Range Practices Act.

Advanced regeneration: trees that have become established naturally under a mature forest canopy and are capable of becoming the next crop after the mature crop is removed.

Adverse slope: an uphill incline for hauling or skidding of logs or other loads.

Aerial photography: photos taken from the air at regular, spatial intervals and used in photo interpretation to provide much information about forests and landforms.

Mackenzie DFA Sustainable Forest Management Plan

Afforestation: the establishment of trees on an area that has lacked forest cover for a very long time or has never been forested.

Age class: any interval into which the age range of trees, forests, stands, or forest types is divided for classification. Forest inventories commonly group trees into 20-year age classes.

Aggradation: accumulation of sediment in a stream channel on an alluvial fan or on a floodplain. Also applied to sediment accumulation on slopes.

Aggregated retention: retaining trees in patches throughout a cutblock or cutting unit.

Airtanker: a fixed-wing aircraft fitted with tanks and equipment for dropping suppressants or retardants.

Alienation: any land that has had its "right-to-use" transferred from the Crown through grant, lease, or permit or has a special interest noted, as in reserves. Land so designated may be permanent or temporary.

All-aged stand: see uneven-aged stand.

Allowable Annual Cut (AAC): The allowable rate of timber harvest from a specified area of land. The chief forester sets AACs for timber supply areas (TSAs) and tree farm licences (TFLs) in accordance with Section 8 of the Forest Act.

Amortization: a procedure by which the capital cost of projects, such as roads or bridges, is written off over a specified period of time as the timber volumes developed by the projects are harvested and extracted.

Anadromous: fish that breed in fresh water but live their adult life in the sea. On the Pacific coast, anadromous fish include all the Pacific salmon, steelhead trout, some cutthroat trout and Dolly Varden char, lampreys and eulachons.

Analysis unit: the basic building blocks around which inventory data and other information are organized for use in forest planning models. Typically, these involve specific tree species or type groups that are further defined by site class, geographic location or similarity of management regimes.

Animal Unit Month (AUM): the amount of forage required for one month by an average animal of the genus Bos (i.e., a cow) aged 6 months or older.

Aquatic habitat: habitat where a variety of marine or freshwater flora and fauna occur for long periods throughout the year. Examples include tide pools, estuaries, bogs, ponds and potential underwater diving areas.

Archaeological site: a location that contains physical evidence of past human activity and that derives its primary documentary and interpretive information through archaeological research techniques. These resources are generally associated with both the pre-contact and post-contact periods in British Columbia. These resources do not necessarily hold direct associations with living communities.

Artificial regeneration: establishing a new forest by planting seedlings or by direct seeding (as opposed to natural regeneration).

Aspect: the direction toward which a slope faces.

Auditor (Source CSA): a person qualified to undertake audits. Note: For SFM registration audits, auditors are qualified according to the requirements set out in CAN-P-14B and CAN-P-1518.

Available timber (see also Operable timber): timber which is available for harvest after due recognition of constraints to protect the environment and other forest uses.

Available volumes: the portion of total inventory volumes that is available for harvesting after all management constraints on timber harvesting have been considered, including definition of the timber harvesting land base, age of tree merchantability, deferrals and any other priorities or constraints on timber harvesting.

Average long term yield: the annual average of the total yield over the next 200 years minus unsalvaged losses. This figure is generally greater than the long run sustained yield due to the influence of cutting old growth timber in the first few decades.

Avoidable waste: the volume of timber left on the harvested area that should have been removed in accordance with the utilization standards in the cutting authority. It does not include the volume of timber that could not be removed because of physical impediments, safety considerations, or other reasons beyond the control of the licensee. Avoidable waste volumes are billed monetarily, as well as for cut control.

Azimuth: the horizontal angle or bearing of a point measured from the true (astronomic) north. Used to refer to a compass on which the movable dial (used to read direction) is numbered in 360. (See: Bearing and Compass).

Mackenzie DFA Sustainable Forest Management Plan

B

Backlog: a Ministry of Forests term applied to forest land areas where silviculture treatments such as planting and site preparation are overdue. Planting is considered backlog if more than 5 years have elapsed since a site was cleared (by harvesting or fire) in the interior and more than 3 years on the coast of British Columbia.

Backlog area: an area from which the timber was harvested, damaged or destroyed before October 1, 1987 and that in the district manager's opinion is insufficiently stocked with healthy well spaced trees of a commercially acceptable species.

Backpack sprayer: spray unit with plastic containers on a backpack frame. Used by individual operator to apply chemicals, such as herbicides.

Backspar trail: a bladed or non-bladed pathway over which mobile backspar equipment travels.

Bank full height: that elevation which characterizes the cross-sectional area of the active stream channel.

Bareroot seedling: stock whose roots are exposed at the time of planting (as opposed to container or plug seedlings). Seedlings are grown in nursery seedbeds and lifted from the soil in which they are grown to be planted in the field.

Basal area (Source FRPA): (a) for the purposes of stocking standards, the cross-sectional area per hectare of the crop trees, and (b) for the purposes of retention of basal area in a riparian management zone, the cross-sectional area per hectare of standing trees, whether living or dead. .

Base case: the current socioeconomic conditions related to the existing forest land management strategy and the expected socioeconomic conditions if the strategy remains unchanged.

Baseline information: information collected to provide a standard against which future measurements can be compared.

Basic silvicultural practices: maintenance of the productivity of forest sites, restocking of denuded forest lands with commercial tree species within three years for areas west of the Coast Range and five years for areas in the Interior, protection against damage by fire, insects and diseases to predetermined standards.

Basic silviculture: harvesting methods and silviculture operations including seed collecting, site preparation, artificial and natural regeneration, brushing, spacing and stand tending, and other operations that are for the purpose of establishing a free growing crop of trees of a commercially valuable species and are required in a regulation

Bearing: a direction on the ground or on a map defined by the angle measured from some reference direction: this may be true (geographic) north, magnetic north, or grid north.

Bed load: particulates that are transported along the channel bottom in the lower layers of streamflow by rolling and bouncing.

Benefit/cost analysis: a technique for comparing alternate courses of action by an assessment of their direct and indirect outputs (benefits) and inputs (costs). Benefits and costs are usually defined in economic and social terms.

Biodiversity (biological diversity)(Source FRPA): the biological diversity of plants, animals and other living organisms in all their forms and levels of organization, including the biological diversity of genes, species and ecosystems

Biodiversity (biological diversity) II (Source CSA): "the variability among living organisms from all sources, including inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems" (Environment Canada, *Canadian Biodiversity Strategy*).

Biogeoclimatic Classification system (BEC): A classification system which was adopted by the British Columbia Ministry of Forests in the 70's as a method to classify and manage sites on an ecosystem-specific basis. The combination of vegetation, geology, and climate concepts form the basis for division of Biogeoclimatic Zones in British Columbia.

Biogeoclimatic unit: part of the biogeoclimatic ecosystem classification system. The recognized units are a synthesis of climate, vegetation and soil data and defined as classes of geographically related ecosystems that are distributed within a vegetationally inferred climatic space.

Mackenzie DFA Sustainable Forest Management Plan

Biogeoclimatic zone: The highest level of classification and represent areas of broad macroclimate. They are generally named after dominant tree species and a descriptor of the general climate or region. In British Columbia, there are 14 biogeoclimatic zones identified. Examples include the ESSF - Engelmann Spruce Subalpine Fir zone and BWBS - Boreal White and Black Spruce Zone.

Biological control: the use of biotic agents such as insects, nematodes, fungi, and viruses for the control of weeds and other forest pests.

Biological herbicide: a naturally occurring substance or organism which kills or controls undesirable vegetation. Preferred over synthetic chemicals because of reduced toxic effect on the environment.

Biological legacies: features which remain on a site or landscape after a natural disturbance. These legacies include live and dead trees, coarse woody debris, soil organic matter, plants, fungi, micro-organisms and seeds.

Biomass: the dry weight of all organic matter in a given ecosystem. It also refers to plant material that can be burned as fuel.

Biosphere: that part of the earth and atmosphere capable of supporting living organisms.

Biota: all living organisms of an area, taken collectively.

Birddog aircraft: an aircraft carrying the person (air attack officer) who is directing fire bombing action on a wildfire.

Bladed trail: a constructed trail that has a width greater than 1.5 m and a mineral soil cutbank height greater than 30 cm.

Blowdown (windthrow): uprooting by the wind. Also refers to a tree or trees so uprooted.

Blue-listed species: see sensitive/vulnerable species.

Bole: trunk of a tree.

Bonus bid: means a bid

- (a) Tendered in order to acquire the right to harvest timber under an agreement under this Act,
- (b) Calculated on a dollar value per cubic metre of competitive species and forest products harvested and measured in compliance with the agreement, and
- (c) Payable from time to time in accordance with the agreement

Botanical forest products: prescribed plants or fungi that occur naturally on Crown forest land. There are seven recognized categories: wild edible mushrooms, floral greenery, medicinal products, fruits and berries, herbs and vegetables, landscaping products and craft products.

Breast height: the standard height, 1.3 m above ground level, at which the diameter of a standing tree is measured.

Broadcast burning: a controlled burn, where the fire is intentionally ignited and allowed to proceed over a designated area within well-defined boundaries, for the reduction of fuel hazard after logging or for site preparation before planting. Also called slash burning.

Browse: shrubs, trees and herbs that provide food for wildlife.

Brush rake: a blade with teeth at the bottom, attached to a cat or skidder, used in mechanical site preparation. It penetrates and mixes soil and tears roots.

Brushing: a silviculture activity done by chemical, manual, grazing, or mechanical means to control competing forest vegetation and reduce competition for space, light, moisture, and nutrients with crop trees or seedlings.

Bucking: cutting a felled tree into specified log lengths for yarding and hauling; also, making any bucking cut on logs.

Buffer strip: a strip of land (often including undisturbed vegetation) where disturbance is not allowed or is closely monitored to preserve or enhance aesthetic and other qualities along or adjacent to roads, trails, watercourses and recreation sites.

Buffer zone: see Pesticide buffer zone.

Mackenzie DFA Sustainable Forest Management Plan

C

Cable logging: a yarding system employing winches, blocks, and cables.

Cambium: a single layer of cells between the woody part of the tree and the bark. Division of these cells results in diameter growth of the tree through formation of wood cells (xylem) and inner bark (phloem).

Campfire: a fire, not bigger than 1 m in height and 1 m in diameter, built for the purpose of cooking or providing warmth.

Canadian Forest Fire Weather Index (FWI) System: A subsystem of the Canadian Forest Fire Danger Rating System. The components of the FWI System provide numerical ratings of relative fire potential in a standard fuel type (i.e. a mature pine stand) on level terrain, based solely on consecutive observations of four fire weather elements measured daily at noon (1200 hours local standard time or 1300 hours daylight saving time) at a suitable fire weather station; the elements are dry bulb temperature, relative humidity, wind speed, and precipitation. The system provides a uniform method of rating fire danger across Canada.

Canopy: the forest cover of branches and foliage formed by tree crowns.

Canopy closure: the progressive reduction of space between crowns as they spread laterally, increasing canopy cover.

Capability mapping: a habitat interpretation for a species which describes the greatest potential of a habitat to support that species. Habitat potential may not be reflected by the present habitat condition or successional stage.

Carbon balance: the concentration of carbon released into the atmosphere compared to the amounts stored in the oceans, soil and vegetation.

Carrying capacity: the average number of livestock and/or wildlife that can be sustained on a management unit, compatible with management objectives for the unit. It is a function of site characteristics, management goals, and management intensity.

Catchment basin: a hole dug adjacent to a culvert inlet to allow coarser particles to settle out.

CCFM: Canadian Council of Forest Ministers

Certificate of registration (registration certificate) (Source CSA): the official document issued by a registrar to an organization upon successful completion of the registration process, including the registration audit.

Certification/registration (Source CSA): the result of a successful registration audit to this Standard, whereby the registrar issues a certificate of registration and adds the organization's registration to a publicly available list maintained by the registrar. The certification process is described in Annex A.

Certified pesticide applicator: an individual certified (through examination) by the Pesticide Management Branch to use or supervise the use of pesticides in a specific management category.

Certifier (registrar) (Source CSA): an independent third party that is accredited by the Standards Council of Canada as being competent to register organizations with respect to nationally and internationally recognized standards.

Chain: a measuring tape, often nylon, 50 m or 75 m in length, used to measure distances. This term is derived from an old unit of measurement: (80 Ch=1 mile).

Characteristic visual landscape: the naturally appearing landscape within a scene or scenes being viewed.

Chlorosis: blanched or yellowish coloring in plants caused by nutrient or light deficiency.

Choker: a noose of wire rope used for skidding or yarding logs. See Highlead system.

Christmas tree permit: a legal document that authorizes the holder to harvest, or grow and harvest, Christmas trees on Crown land.

Class A streams: see Fisheries stream Class A.

Classified areas: areas based on provincial criteria and classification systems which will be identified and mapped according to the Regulations and Field Guides of the Forest Practices Code: riparian management areas, lakeshore management areas, and wildlife habitat areas. These areas, established by a district manager in consultation with a

Mackenzie DFA Sustainable Forest Management Plan

designated B.C. Environment official, guide operations on a site-specific basis and require a combination of forest practices.

Cleaning: a release treatment made in a stand not past the sapling stage to free the favoured trees from less desirable species of the same age that overtop them or are likely to do so.

Clearcut: an area of forest land from which all merchantable trees have recently been harvested.

Clearcutting: the process of removing all trees, large and small, in a stand in one cutting operation.

Clearcutting silvicultural system: a system in which the crop is cleared from an area at one time and an even-aged, replacement stand is established. It does not include clearcutting with reserves. Clearcutting is designed so that most of the opening has full light exposure and is not dominated by the canopy of adjacent trees (this produces an open area climate). The minimum size of a clearcut opening is generally considered to be 1 ha.

Clearcutting with reserves: a variation of the clearcut silvicultural system in which trees are retained, either uniformly or in small groups, for purposes other than regeneration.

Climax forest: a forest community that represents the final stage of natural forest succession for its environment.

Clinometer: a simple instrument for measuring vertical angles or slopes. In forestry, used to measure distance and tree heights.

Clone: a plant which is genetically identical to the parent plant. Produced asexually, e.g., from cuttings or suckers.

Close utilization: maximum stump height of 30 cm; minimum top dib of 10 cm. See: Utilization standards.

Closed canopy: the description given to a stand when the crowns of the main level of trees forming the canopy are touching and intermingled so that light cannot reach the forest floor directly.

Coarse filter approach: an approach to maintaining biodiversity that involves maintaining a diversity of structures within stands and a diversity of ecosystems across the landscape. The intent is to meet most of the habitat requirements of most of the native species. (see also Fine filter approach).

Coarse Woody Debris (CWD): sound and rotting logs and stumps that provide habitat for plants, animals, and insects and a source of nutrients for soil development.

Codominant: in stands with a closed canopy, those trees whose crowns form the general level of the canopy and receive full light from above, but comparatively little from the sides. In young stands, those trees with above average height growth.

Commercial thinning: a silviculture treatment that 'thins' out an overstocked stand by removing trees that are large enough to be sold as products such as poles or fence posts. It is carried out to improve the health and growth rate of the remaining crop trees.

Community watersheds: watersheds that have a drainage area no greater than approximately 500 km², and that are licensed for community water use by the Water Management Branch of the Ministry of Environment, Lands and Parks. They include municipal and other waterworks and water user communities. Water user communities, as defined in the Water Act, have six or more licensed water users (registered with the Water Management Branch) extracting water from the same source. The district manager, in agreement with a designated Environment official, may identify other watersheds as community watersheds.

Compartment: a geographic unit defined for the purposes of forest administration and inventory. The boundaries follow permanent physical features or legal demarcation where appropriate.

Compass: instrument used to determine the direction of magnetic north. See Bearing and Azimuth.

Competing vegetation: vegetation that seeks and uses the limited common resources (space, light, water, and nutrients) of a forest site needed by preferred trees for survival and growth.

Compliance (Source CSA): the conduct or results of activities in accordance with legal requirements.

Component (Source CSA): an individual section of the SFM system, e.g., policy, planning, implementation and operation, checking and corrective action, or management review.

Composition: the proportion of each tree species in a stand expressed as a percentage of either the total number, basal area or volume of all tree species in the stand.

Mackenzie DFA Sustainable Forest Management Plan

Cone rake: a device for collecting cones from a standing tree. It is lowered, usually from a helicopter, over the crown of a tree. Cones or cone-bearing branches are removed and retrieved by the machine.

Conformance (Source CSA): meeting non-legal requirements such as policies, work instructions, or standards (including this Standard).

Conifer: cone-bearing trees having needles or scale-like leaves, usually evergreen, and producing wood known commercially as 'softwoods'.

Conifer release: to 'release' established coniferous trees from a situation in which they have been suppressed by thinning out undesirable trees and shrubs which have overtopped them. Carried out to improve the growth of the coniferous trees released. See Brushing.

Conk: a hard, fruiting body containing spores of a wood-decaying fungus.

Consensus option: a management option that has a broad base of community and interest group support.

Consequences, potential: a component of risk rating. Potential consequences are the detrimental events that could result from a hazard event.

Conservation: management of the human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations. It includes the preservation, maintenance, sustainable utilisation, restoration and enhancement of the environment.

Conservation biology: the discipline that treats the content of biodiversity, the natural processes that produce it and the techniques used to sustain it in the face of human-caused environmental disturbance.

Container seedling: seedling grown in small container in a controlled environment. See: Plug and bareroot seedling.

Continual improvement (Source CSA): the ongoing process of enhancing SFM performance, resulting from experience and the incorporation of new knowledge in line with the organization's SFM policy and from the application of the SFM requirements.

Contour map: a topographic map which portrays relief by means of lines which connect points of equal elevation.

Contractual framework: where forest practices are primarily regulated by contracts.

Control points: a system of points with established positions or elevations, or both, which are used as fixed references in positioning map features.

Conventional ground skidding: any combination of rubber-tired or tracked skidding equipment.

Conventional logging: any combination of mechanical or hand felling and rubber-tired or tracked skidding equipment. In the interior, cable logging is not considered conventional; on the coast, it is.

Coordinated Resource Management Plan (CRMP): a specific type of sub-unit plan. To date it has been used mainly for managing Crown and alienated grazing lands. This plan involves consultation with resource agencies and resource users in establishing objectives in the management and development of a specific area.

Coppice (coppicing): the tendency of certain tree and brush species (such as red alder and bigleaf maple) to produce a large number of shoots when a single or few stems are mechanically removed but the root system left intact.

Cord: 128 cubic feet of stacked round wood (whole or split, with or without bark) containing wood and airspace, with all the pieces of similar length and lined up on approximately the same direction. Example: a pile of firewood 4'x4'x8'.

Corduroy: logs placed transversely along a road, usually with branches intact, and covered with fill material, to "float" the road over soft subsoils.

Corrective action (Source CSA): action to eliminate the cause of a detected nonconformity or other undesirable situation. **Note:** *There can be more than one cause for a nonconformity. Corrective action is taken to prevent recurrence, whereas preventive action is taken to prevent occurrence.*

Corridor: a band of vegetation, usually older forest, which serves to connect distinct patches on the landscape. Corridors are part of the Forest Ecosystem Network (FEN) and by providing connectivity permit the movement of plant and animal species between what would otherwise be isolated patches.

Mackenzie DFA Sustainable Forest Management Plan

Critical wildlife habitat: part or all of a specific place occupied by a wildlife species or a population of such species and recognized as being essential for the maintenance of the population.

Critical winter range: forested habitat, usually stands of mature or old-growth conifers, which provides deer and elk with resources critical to survival during severe winters.

Criterion: A category of conditions or processes by which sustainable forest management may be assessed; characterized by a set of related indicators which are monitored periodically to assess change (Santiago Declaration in Montreal Process 1995). Criteria are meant to be broad management objectives that are proven through the repeated, long-term measurement of associated indicators.

Crop tree: a tree in a young stand or plantation selected to be carried through to maturity until an interim or final harvest.

Cross-ditch: a ditch excavated across the road at an angle and at a sufficient depth, with armoring as appropriate, to divert both road surface water and ditch water off or across the road.

Cross-drain culvert: a culvert used to carry ditch water from one side of the road to the other.

Crown: the live branches and foliage of a tree.

Crown class: see Codominant, Dominant, Intermediate or Overtopped.

Crown closure: the condition when the crowns of trees touch and effectively block sunlight from reaching the forest floor.

Crown density: the amount, compactness or depth of foliage of a tree crown.

Crown Forested Land Base (CFLB): The land base contributing to old growth and wildlife tree retention targets includes all Crown forest, including tree farm license land and any private land associated with a tree farm license. The forested portions of, provincial parks, protected areas, ecological reserves and federal parks as noted above should also be included in the Crown forested land base. (This is slightly different from the TSR process, as parks and protected areas would be removed from the Crown forested land base).

Crown land: land that is owned by the Crown. Referred to as federal Crown land when it is owned by Canada, and as provincial Crown land when owned by a province.

Cruise: the systematic measurement of a forested area designed to estimate to a specified degree of accuracy the volume of timber it contains, by evaluating the number and species of trees, their sizes and conditions.

CSA: Canadian Standards Association

Cull: trees or logs or portions thereof that are of merchantable size but are rendered unmerchantable by defects.

Culmination age: the age at which the stand, for the stated diameter limit and utilization standard, achieves its maximum average rate of volume production (the Mean Annual Increment, or MAI) is maximized.

Cultural diversity: the variety and variability of human social structures, belief systems and strategies for adapting to biological situations and changes in different parts of the world.

Cultural heritage resources: archaeological sites, First Nations traditional use sites, and structural features and landscape features of cultural or historic significance. As defined in the Forest Act, a cultural heritage resource is an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to the Province, a community or an aboriginal people.

Culture: the sum of ways of living built up by a group of human beings, which is transmitted from one generation to another.

Culvert: a transverse drain pipe or log structure covered with soil and lying below the road surface.

Cumulative effects: effects on biota of stress imposed by more than one mechanism (e.g., stress in fish imposed by both elevated suspended sediments concentrations in the water and by high water temperature).

Cut: the excavation required to lower the natural ground line to the desired road profile.

Cut-and-fill: system of bench construction on hillslopes to produce road rights-of-way and landings whereby convex slopes are excavated and concave slopes (gullies) are filled; also, excavation of the upslope side of the right-of-way, and fill on the down slope side. (so called half-bench construction).

Mackenzie DFA Sustainable Forest Management Plan

Cut bank: the excavated bank from a ditch line to the top of the undisturbed slope of a road.

Cut control: a set of rules and actions specified in the Forest Act that describes the allowable variation in the annual harvest rate either above or below the allowable annual cut approved by the chief forester.

Cut period: the interval between major harvesting operations in the same stand.

Cutblock: a specific area, with defined boundaries, authorized for harvest.

Cutblock adjacency requirements: integrated resource management requirements that specify the desired spatial relationships among cutblocks.

Cut slope: the face of an excavated bank required to lower the natural ground line to the desired road profile.

Cutting authority: as defined in the Forest Practices Code of British Columbia Cutblock and Road Review Regulation a cutting permit or an application for a cutting permit or a timber sale licence or a timber sale licence that has been advertised.

Cutting cycles: the planned, recurring interval of time between successive cuttings in a crop or stand.

Cutting permit: a legal document that authorizes the holder to harvest trees under a licence issued under the Forest Act.

Cutting plan: a plan for harvesting the timber from an area defined within a cutting permit. This plan must be approved by the Forest Service before operations may begin.

D

Damaged timber: timber that has been affected by injurious agents such as wind (as in the case of blowdown), fire, insects, or disease.

Danger tree: a live or dead tree whose trunk, root system or branches have deteriorated or been damaged to such an extent as to be a potential danger to human safety.

DBH (diameter at breast height): the stem diameter of a tree measured at breast height, 1.3 m above the ground.

Deactivation: measures taken to stabilize roads and logging trails during periods of inactivity, including the control of drainage, the removal of sidecast where necessary, and the re-establishment of vegetation for permanent deactivation.

Debris flows: mixture of soil, rock, wood debris and water which flows rapidly down steep gullies; commonly initiate on slopes greater than 30 %, but may run out onto footsteps of low gradient.

Debris initiation and transport hazard: the relative risk of gully wall failure and/or debris movement in gully channels, as tempered by the stream runout distance.

Deciduous: perennial plants which are normally leafless for some time during the year.

Declination (magnetic): the angle between true (geographic) north and magnetic north (direction of the compass needle). Declination varies from place to place and can be 'set' on a compass for a particular location.

Deferred area: an area specified in a higher level plan where timber harvesting or other forest development activities have been postponed for a period of time or that the district manager has determined should not be harvested or otherwise developed until a higher level plan for the area is completed.

Deficit forest: a forest in which existing stands cannot provide enough harvest volume to maintain the harvest at the level of long run sustained yield until the stands created when existing stands are cut become available for harvest. See also Surplus forest.

Defined forest area (DFA) (Source CSA): a specified area of forest, including land and water (regardless of ownership or tenure) to which the requirements of this Standard apply. The DFA may or may not consist of one or more contiguous blocks or parcels.

Defoliator: an agent that damages trees by destroying leaves or needles.

Mackenzie DFA Sustainable Forest Management Plan

Deforestation: clearing an area of forest on a non-temporary basis for another use. Clearcutting (even with stump removal), if shortly followed by reforestation for forestry purposes, is not deforesting.

Deforestation II (Source CSA): “clearing an area of forest for another long-term use” (*The State of Canada’s Forests 2001/2002*).

Degradation: the diminution of biological productivity or diversity.

Deleterious substance: any substance that, if added to water, would degrade or alter the quality of the water so that it becomes deleterious to fish or fish habitat, or becomes unsuitable for human consumption or any other purpose for which it is legally licensed (such as irrigation and livestock watering).

Depletion: an income tax allowance reflecting the purchase price paid for merchantable timber, usually on fee simple land. Also, a term used to refer to the process of harvesting your growing stock.

Designated area: an identifiable geographic unit of the forest land base that requires a specific combination of forest practices too adequately protect important resource values.

Designated heritage trail: a heritage trail designated under the Heritage Conservation Act.

Designated official: not a defined term in the Forest & Range Practices Act. However, commonly used to refer to a person designated by name or title to be a designated energy, mines and petroleum resources official, designated environment official, or designated forest official.

Designated skid road/skid trail: a pre-planned network of skid roads or skid trails, designed to reduce soil disturbance and planned for use in subsequent forestry operations in the same area. Multiple passes by tracked or rubber-tired skidders or other equipment are anticipated.

Designated wilderness: see Wilderness area.

Desired future stand condition: a description of the characteristics of the future stand.

Desired plant community: a plant community that produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding the land use plan or plan objectives established for an ecological site. The desired plant community must be consistent with the site's capability to produce the desired vegetation through management, land treatment, or a combination of the two.

Determination: any act, omission, decision, procedure, levy, order or other determination made under the Forest & Range Practices Act or the Regulations or Standards made under that act by an official or a senior official.

Detrimental soil disturbance: changes caused by forest practices in the physical, chemical, or biological properties of the soil, including the organic forest floor and the mineral soil extending from the surface to the depth at which the unweathered parent material is encountered. Such changes may result in a loss of productive growing site, reduced site productivity, or adverse impacts on resource values.

Development: the advancement of the management and use of natural resources to satisfy human needs and improve the quality of human life. For development to be sustainable it must take account of social and ecological factors, as well as economic ones, of the living and non-living resource base, and of the long-term and short-term advantages and disadvantages of alternative actions.

Development objectives: the short-term (often 5-year) planning objectives for a specific management area.

Development plan: a specific plan outlining harvesting, road construction, protection, and silviculture activities over the short-term (often 5 years) in accordance with the approved forest management plan.

Dewatering: condition in stream channel when all the water flow occurs within the permeable streambed sediments, so no surface water is left; common in small streams with considerable accumulations of gravel.

DFA: Defined forest area

DFA-related worker (Source CSA): any individual employed by the organization to work for wages or a salary who does not have a significant or substantial share of the ownership in the employer’s organization and does not function as a manager of the organization.

Diameter limit: the removal of trees from a stand, based on the criterion of diameter. Generally, trees of less than a predetermined diameter are left unharvested.

Mackenzie DFA Sustainable Forest Management Plan

Diameter tape: a graduated tape based on the relationship of circumference to diameter which provides direct measure of tree diameter when stretched around the outside of the tree, usually at breast height. See DBH.

DIB (diameter inside bark): the diameter of a tree or log excluding bark thickness.

Dibble: a tool used to make holes in the ground for planting tree seedlings.

Difficult site: forest sites with environmental conditions that are unfavourable for tree establishment and growth.

Direct seeding: the application of tree seed to a denuded area to regenerate it with commercially valuable species.

Disc trencher: a machine designed for mechanical site preparation. It provides continuous rows of planting spots rather than intermittent patches as provided by patch scarifiers. Consists of scarifying steel discs equipped with teeth.

Discretionary authority: the power to make a decision where the choice of whether to make a decision is that of the decision maker.

Dispersed retention: retaining individual trees scattered throughout a cutblock.

District manager: the manager of a Forest Service district office, with responsibilities as outlined in the Forest Act, Ministry of Forests Act, and Range Act.

Disturbance: a discrete event, either natural or human-induced, that causes a change in the existing condition of an ecological system.

Ditch block: a blockage that is located directly downgrade of a cross-drain culvert or cross-ditch and designed to deflect water flow from a ditch into a cross-drain culvert.

DOB (diameter outside bark): the diameter of a tree or log including bark thickness.

Dominant: trees with crowns extending above the general level of the canopy and receiving full light from above and partly from the side; taller than the average trees in the stand with crowns well developed.

Dot grid: a transparent sheet of film (overlay) with systematically arranged dots, each dot representing a number of area units. Used to determine areas on maps, aerial photos, plans, etc.

Down-rated bridges: bridges whose carrying capacity has been reduced.

Drag scarification: a method of site preparation that disturbs the forest floor and prepares logged areas for regeneration. Often carried out by dragging chains or drums behind a skidder or tractor.

Drainage basin: area of the earth's surface from which surface drainage all flows to a single outlet stream (a watershed in North America).

Drainage structures: include metal and wooden culverts, open-faced culverts, bridges, and ditches.

Drainage system: a system designed to control the flow of water within a road prism.

Drawdown: the process of reducing allowable annual cuts to a sustainable level.

Duff: the layer of partially and fully decomposed organic materials lying below the litter and immediately above the mineral soil. It corresponds to the fermentation (F) and humus (H) layers of the forest floor. When moss is present, the top of the duff is just below the green portion of the moss.

Dust palliatives: chemicals or compounds applied to road surfaces to reduce dust created by traffic.

E

Ecological balance: a state of dynamic equilibrium within a community of organisms in which genetic, species and ecosystem diversity remain relatively stable, subject to gradual changes through natural succession.

Ecological classification: an approach to categorizing and delineating, at different levels of resolution, areas of land and water having similar characteristic combinations of the physical environment (such as climate, geomorphic processes, geology, soil and hydrologic function), biological communities (plants, animals, microorganisms and potential natural communities) and the human dimension (such as social, economic, cultural and infrastructure).

Mackenzie DFA Sustainable Forest Management Plan

Ecological health: both the occurrence of certain attributes that are deemed to be present in a healthy, sustainable resource, and the absence of conditions that result from known stresses or problems affecting the resource.

Ecological integrity: the quality of a natural unmanaged or managed ecosystem in which the natural ecological processes are sustained, with genetic, species and ecosystem diversity assured for the future.

Ecological reserve: areas of Crown land which have the potential to satisfy one or more of the following criteria:

- areas suitable for scientific research and educational purposes associated with studies in productivity and other aspects of the natural environment;
- areas which are representative of natural ecosystems;
- areas in which rare or endangered native plants or animals may be preserved in their natural habitat; and
- areas that contain unique geological phenomena.

Ecological units: areas of land with similar biological, geological, and climatic environments.

Ecologically suitable species: coniferous or deciduous tree species that are naturally adapted to a site's environmental conditions, including the variability in these conditions that may occur over time.

Economically operable: forest stands for which log prices exceed harvesting costs, including profit and return to capital.

Ecoregion classification: the ecoregion classification system is used to stratify B.C.'s terrestrial and marine ecosystem complexity into discrete geographical units at five different levels. The two highest levels, Ecodomains and Ecodivisions, are very broad and place B.C. globally. The three lowest levels, Ecoprovinces, Ecoregions and Ecosctions, are progressively more detailed, narrow in scope and relate segments of the province to one another. They describe areas of similar climate, physiography, oceanography, hydrology, vegetation and wildlife potential.

Ecosystem: a functional unit consisting of all the living organisms (plants, animals, and microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be of any size—a log, pond, field, forest, or the earth's biosphere—but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation, for example, forest ecosystem, old-growth ecosystem, or range ecosystem.

Ecosystem II (Source CSA): a dynamic complex of plants, animals, and micro-organisms and their non-living environment, interacting as a functioning unit. Note: "The term 'ecosystem' can describe small-scale units, such as a drop of water, as well as large-scale units, such as the biosphere" (Environment Canada, Canadian Biodiversity Strategy).

Ecosystem integrity: the soundness or wholeness of the processes and organisms composing the ecosystem.

Ecosystem management: the use of an ecological approach to achieve productive resource management by blending social, physical, economic and biological needs and values to provide healthy ecosystems.

Ecosystem productivity: the ability of an ecosystem to produce, grow or yield products - whether trees, shrubs or other organisms.

Ecotone: a transition area between two adjacent ecological communities usually exhibiting competition between organisms common to both.

Edatope: refers to a specific combination of soil moisture regime and soil nutrient regime.

Edge: the outer band of a patch that has an environment significantly different from the interior of the patch.

Edge/area ratio: length of forest edge per cutblock area.

Edge effect: habitat conditions (such as degree of humidity and exposure to light or wind) created at or near the more-or-less well-defined boundary between ecosystems, as, for example, between open areas and adjacent forest.

Element: an identifiable component, process or condition of an ecosystem.

Element II (Source CSA): a concept used to define the scope of each CCFM SFM criteria. Each CCFM SFM criterion contains several elements. The CSA SFM elements were derived from the national-scale elements developed by the CCFM for more specific local applications. The elements serve to elaborate and specify the scope of their associated criterion.

End haul: to move excavated material from one section of the road to another or to a disposal site, during road construction or modification.

Endangered species: see Threatened or endangered species.

Mackenzie DFA Sustainable Forest Management Plan

Endemic species: a species whose natural occurrence is confined to a certain region and whose distribution is relatively limited.

Entrainment: mobilization, by flowing water, of sediment or organic debris from the bed or banks of a stream channel.

Entrenched: a legislative requirement which previously may only have been required by contract or policy.

Environment (Source CSA): the surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and the interrelations of these elements.

Environmental rehabilitation: measures undertaken to remedy environmental damage done to the land.

Environmentally sensitive areas (ESAs): areas requiring special management attention to protect important scenic values, fish and wildlife resources, historical and cultural values, and other natural systems or processes. ESAs for forestry include potentially fragile, unstable soils that may deteriorate unacceptably after forest harvesting, and areas of high value to non-timber resources such as fisheries, wildlife, water, and recreation.

Erosion: The wearing away of natural (earth) and unnatural (embankment, slope protection, structure, etc.) surfaces by actions of external forces. Generally refers to the wearing away of the earth's surface by flowing water. *From "Certified Professional in Erosion and Sediment Control Exam Workbook", Jan 28 2005 Glossary Amendment*

Erosion control plan: Generic measures to put into place to limit the possibility of sediment entering a stream. Specific plans may be required on high risk.

Even-aged: a forest stand or forest type in which relatively small (10-20 year) age differences exist between individual trees. Even-aged stands are often the result of fire, or a harvesting method such as clearcutting or the shelterwood method.

Even-aged silvicultural system: a silvicultural system that is designed to regenerate and maintain an even-aged stand. Clearcutting, seed tree, and shelterwood are even-aged systems.

Even-aged stand: a stand of trees consisting of one or two age classes. Even-aged stands are often the result of fire, or a harvesting method such as clearcutting or shelterwood.

Even flow: in harvest scheduling, the requirement that the harvest level in each period be equal to the harvest level in the preceding period.

Evergreen: never entirely without green foliage, leaves persisting until a new set has appeared.

Excavated trail: a constructed trail that has a width greater than 1.5 m and a mineral soil cutbank height greater than 30 cm.

Extension services: assistance provided to woodland operators. May include help with the preparation of forest management plans, cutting permits, marking trees for selective cutting, and guidance in carrying out slash disposal, site preparation, planting, etc.

Existing visual condition: the present level of landscape alteration caused by resource development activities and expressed in terms of the visual quality objective categories.

F

Falldown effect: a decline in timber supply or harvest level associated with the transition from harvesting the original stock of natural mature timber over one rotation to harvesting at a non declining level (typically equal to the annual increment) after conversion to a forest with a balanced age class structure.

Feller-buncher: a harvesting machine that cuts a tree with shears or a saw and then piles it.

Felling and bucking: the process of cutting down standing timber and then cutting it into specific lengths for yarding and hauling.

Fertilization: the addition of fertilizer to promote tree growth on sites deficient in one or more soil nutrients. Also used to improve the vigour of crop trees following juvenile spacing or commercial thinning.

Mackenzie DFA Sustainable Forest Management Plan

Fill: material used to raise the desired road profile above the natural ground line.

Fill bank: the fill material used to shape a road from the outer edge of the travelled portion to its intersection with the existing ground profile.

Fill-in planting: planting required to supplement poorly stocked natural regeneration or to replace seedlings that have died on previously planted sites.

Fill slope: the face of an embankment required to raise the desired road profile above the natural ground line.

Fine filter approach: an approach to maintaining biodiversity that is directed toward particular habitats or individual species that might fall through the coarse filter. These habitats may be critical in some way and the species threatened or endangered.

Fire danger: an assessment of both fixed and variable factors of the fire environment, which determine the ease of ignition, rate of spread, difficulty of control, and the fire impact.

Fire hazard: the potential fire behaviour for a fuel type, regardless of the fuel type's weather-influenced fuel moisture content or its resistance to fireguard construction. Assessment is based on physical fuel characteristics, such as fuel arrangement, fuel load, condition of herbaceous vegetation, and presence of elevated fuels.

Fire impact(s): the immediately evident effect of fire on the ecosystem in terms of biophysical alterations (e.g., crown scorch, mineral soil erosion, depth of burn, fuel consumption).

Fireline: that portion of the fire upon which resources are deployed and actively engaged in suppression action. In a general sense, the working area around a fire.

Fire management: the activities concerned with the protection of people, property and forest areas from wildfire and the use of prescribed burning for the attainment of forest management and other land use objectives, all conducted in a manner that considers environmental, social and economic criteria.

Fire retardant: a substance that by chemical or physical action reduces flammability of combustibles.

Fire risk: the probability or chance of fire starting determined by the presence and activities of causative agents.

Fire season: the period(s) of the year during which fires are likely to start, spread and do damage to values-at-risk sufficient to warrant organized fire suppression; a period of the year set out and commonly referred to in fire prevention legislation. In B.C. the fire season is considered to extend from April 1 to October 31.

Fire suppressant: an agent directly applied to burning fuels to extinguish the flaming and smouldering or glowing stages of combustion.

Fire suppression: all activities concerned with controlling and extinguishing a fire following its detection. Synonymous with fire control.

Fire Weather Index (FWI): Canadian Forest Fire Weather Index System

Firebreak: see Fuelbreak.

Fireguard: a strategically planned barrier, either manually or mechanically constructed, intended to stop a fire or retard its rate of spread and from which suppression action is carried out to control a fire; the constructed portion of a control line.

First Nations rights: for the purposes of this document the First Nations rights are to be understood to be the same as Aboriginal rights and two terms may be used interchangeably.

First order stream: stream originating in a seepage zone or spring, with no entering tributaries; the most headward channels in the drainage network.

First Order Wood Product: means wood cut and prepared primarily for processing into wood pulp, paper, paper products, lumber, compressed board or any product manufactured from wood fibre, including Christmas trees, sawmill chips, pulpwood chips, fuel chips and any wood fibre intended for use in heat or power generation.

First pass: the first of two or more planned entries over a specific period of time (usually one rotation) to harvest timber.

Fish-bearing waters: lakes, streams, and ponds that have resident fish populations.

Fisheries-sensitive zones: side and back channels, valley wall ponds, swamps, seasonally flooded depressions, lake littoral zones and estuaries that are seasonally occupied by over-wintering anadromous fish.

Mackenzie DFA Sustainable Forest Management Plan

Fisheries stream class A: streams or portions of streams that are frequented by anadromous salmonids and/or resident game fish or regionally significant fish species; or streams that have been identified for fishery enhancement in an approved fishery management plan.

Fixed area plot sampling method: a controlled cruise method where small plots of a fixed size are used to sample a portion of a forest area to obtain information (such as tree volume) that can be used to describe the whole area.

Flood discharge criteria: the volume of flood that a bridge or culvert must be designed to accommodate.

Floodplain: a level, low-lying area adjacent to streams that is periodically flooded by stream water. It includes lands at the same elevation as areas with evidence of moving water, such as active or inactive flood channels, recent fluvial soils, sediment on the ground surface or in tree bark, rafted debris, and tree scarring.

Fluvial processes: all processes and events by which the configuration of a stream channel is changed; especially processes by which sediment is transferred along the stream channel by the force of flowing water.

Flyrock: rock displaced by blasting and propelled beyond recoverable limits.

Foliar analysis: chemical evaluation of the status of plant nutrients or the plant-nutrient requirements of a soil by the analysis of leaves or needles.

Forage: grasses, herbs and small shrubs that can be used as feed for livestock or wildlife.

Ford: a dip constructed in the roadbed at a stream crossing, instead of a culvert or bridge. The streambed must be of erosion-resistant material, or such material must be placed in contact with the streambed.

Forecast (Source CSA): an explicit statement of the expected future condition of an indicator.

Forest: (from Forestry Canada- a glossary of forestry terms) A plant community predominantly of trees and other woody vegetation growing more or less closely together.

Forest II (Source CSA): an ecosystem dominated by trees and other woody vegetation growing more or less closely together, its related flora and fauna, and the values attributed to it.

Forest Appeals Commission (FAC): the Forest Appeals Commission is the independent appeal body established under the Forest & Range Practices Act to hear appeals from certain enforcement determinations.

Forest condition (Source CSA): the state of the forest ecosystem as determined by a range of variables associated with forest structure, composition, and processes.

Forest cover: forest stands or cover types consisting of a plant community made up of trees and other woody vegetation, growing more or less closely together.

Forest cover map: a map showing relatively homogeneous forest stands or cover types, produced from the interpretation of aerial photos and information collected in field surveys. Commonly includes information on species, age class, height class, site, and stocking level.

Forest cover type: a descriptive term used to group stands of similar characteristics and species composition (due to given ecological factors) by which they may be differentiated from other groups of stands.

Forest development plan: an operational plan guided by the principles of integrated resource management (the consideration of timber and non timber values), which details the logistics of timber development over a period of usually five years. Methods, schedules, and responsibilities for accessing, harvesting, renewing, and protecting the resource are set out to enable site-specific operations to proceed.

Forest Development Review Committee (FDRC): the group made up of government organizations, stakeholders, licensees, and the general public that is responsible for reviewing development plans.

Forest ecology: the relationships between forest organisms and their environment.

Forest Ecosystem Network (FEN): a planned landscape zone that serves to maintain or restore the natural connectivity within a landscape unit. A forest ecosystem network consists of a variety of fully protected areas, sensitive areas, classified areas, and old-growth management areas.

Forest fire: any wildfire or prescribed fire that is burning in forest, grass, alpine or tundra vegetation types.

Mackenzie DFA Sustainable Forest Management Plan

Forest floor: layers of fresh leaf and needle litter, moderately decomposed organic matter, and humus or well-decomposed organic residue.

Forest floor displacement hazard: a ranking of the potential adverse impacts on forest productivity resulting from removal of the accumulated organic matter that constitutes the forest floor. It is determined in accordance with procedures set out in the Ministry of Forests' publication "Hazard Assessment Keys for Evaluating Site Sensitivity to Soil Degrading Processes Guidebook," as amended from time to time.

Forest health: a forest condition that is naturally resilient to damage; characterized by biodiversity, it contains sustained habitat for timber, fish, wildlife, and humans, and meets present and future resource management objectives.

Forest health agents: biotic and abiotic influences on the forest that are usually a naturally occurring component of forest ecosystems. Biotic influences include fungi, insects, plants, animals, bacteria, and nematodes. Abiotic influences include frost, snow, fire, wind, sun, drought, nutrients, and human-caused injury.

Forest health treatments: the application of techniques to influence pest or beneficial organism populations, mitigate damage, or reduce the risk of future damage to forest stands. Treatments can be either proactive (for example, spacing trees to reduce risk of attack by bark beetles) or reactive (for example, spraying insecticides to treat outbreaks of gypsy moth).

Forest interior conditions: conditions found deep within forests, away from the effect of open areas. Forest interior conditions include particular microclimates found within large forested areas.

Forest inventory: an assessment of forest resources, including digitized maps and a database which describes the location and nature of forest cover (including tree size, age, volume and species composition) as well as a description of other forest values such as soils, vegetation and wildlife features.

Forest land (Assessment Act): land which has as its highest and best use the growing and harvesting of trees, including land which is being managed in accordance with a forest management plan approved under regulations, but does not include a farm.

Forest land (Ministry of Forests): provincial forests and other unalienated Crown lands for which the Ministry of Forests is responsible, including both forested lands and non-forested lands such as tundra, wetlands, rangelands, deserts, rock, and ice.

Forest land (B.C. Assessment Authority): land having as its highest and best use the growing and harvesting of trees.

Forestland (Source CSA): land supporting forest growth or capable of doing so, or, if totally lacking forest growth, bearing evidence of former forest growth and now in disuse.

Forest landscape: a portion of the land that the eye can see in one glance and in which the forest is the most dominant element.

Forest licence: a forest licence allows orderly timber harvest over a portion of a sustained yield management unit, and the timely reforestation of harvested areas according to a strategic resource management plan prepared by the Forest Service for each timber supply area. The licence has a term of 15 to 20 years, generally replaceable every five years (some are non-replaceable) and operating areas that shift over time. Once an area is harvested and reforested the licensee moves to another part of the timber supply area. A forest licence specifies an annual allowable cut, requires a management and working plan, and specified management activities.

Forest management: the practical application of scientific, economic and social principles to the administration and working of a forest for specified objectives. Particularly, that branch of forestry concerned with the overall administrative, economic, legal and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection and forest regulation.

Forest management cycle: the phases that occur in the management of a forest including harvesting, site preparation, reforestation, and stand tending.

Forest management plan: a general plan for the management of a forest area, usually for a full rotation cycle, including the objectives, prescribed management activities and standards to be employed to achieve specified goals. Commonly supported with more detailed.

Forest mensuration: the measurement of volume, growth and development of individual trees and stands, and the various products obtained from them.

Forest officer: a person employed by the B.C. Ministry of Forests who is designated by the minister, chief forester, or regional manager to be a forest officer, through name or title.

Mackenzie DFA Sustainable Forest Management Plan

Forest operations: All mechanical actions which include: road, harvesting and silviculture activities.

Forest planning model: an analytical model (usually computer-based) that successively harvests and grows collections of forest stands over a period of several decades according to specific data and management assumptions.

Forest practice: (1) Any activity that is carried out on forest land to facilitate the use of forest resources, including but not limited to timber harvesting, road construction, silviculture, grazing, recreation, pest control, and wildfire suppression.

Forest practice (FRPA): (2) means each of the following activities carried out by the government or by a holder of an agreement under the *Forest Act* on private land subject to a tree farm licence, community forest agreement or a woodlot licence or on Crown forest land

- (a) timber harvesting, road construction, road maintenance, road use, road deactivation, silviculture treatments, including grazing for the purposes of brushing, botanical forest product collecting and fire use, control and suppression;
- (b) any other activity that is carried out by the government or by the holder of an agreement under the *Forest Act*

Forest Practices Board (FPB): the Forest Practices Board is the "public watchdog" agency established under the Forest & Range Practices Act to audit the activities of both the forest industry and the government.

Forest Practices Code (FPC): the Forest Practices Code is a term commonly used to refer to the Forest Practices Code of British Columbia Act, the regulations made by Cabinet under the act and the standards established by the chief forester. The term may sometimes be used to refer to field guides as well. It should be remembered that unlike the act, the regulations and standards, field guides are not legally enforceable.

Forest profile: the range of forest conditions that exists across the landscape, including such factors as timber species, quality, condition and age, location, elevation, topography, accessibility, and economic viability.

Forest renewal: the renewal of a tree crop by either natural or artificial means.

Forest Service road: a road constructed, modified or maintained by the minister under the provisions of the Forest Act or declared a Forest Service road. Forest Service roads are used to provide access to managed forest land.

Forest tree breeding: the genetic study of trees to solve some specific problem or to produce a specially desired product.

Forest tree improvement: the control of parentage combined with other silvicultural activities (such as site preparation or fertilizing) to improve the overall yield and quality of products from forest lands.

Forest type: a group of forested areas or stands of similar composition (species, age, height, and stocking) which differentiates it from other such groups.

Forest type labels: the symbols which are used to code information about forest types on a forest cover map, such as site, disturbance, age and height class, species, stocking.

Forest type lines: lines on a map or aerial photo outlining forest types.

Forest yield: see Allowable Annual Cut.

Forest yield regulation: the administrative and technical process which facilitates yield control (regulation), often narrowly interpreted as a process that ensures regular and sustained forest yields.

Forested Plant Community: A unit of vegetation with a relatively uniform species composition and physical structure that includes a forest canopy. Forested plant communities tend to have characteristic environmental features such as bedrock geology, soil type, topographic position, climate, and energy, nutrient and water cycles.

Forester: a person engaged in the profession of forestry. In some countries the term is restricted to those who received formal post-secondary education in forestry or who possess the equivalent qualifications. A forester may or may not be a Registered Professional Forester, which is a legally-recognized title.

Forestry: the science, art and practice of managing and using for human benefit the natural resources that occur on and in association with forest lands.

Fragmentation: the process of transforming large continuous forest patches into one or more smaller patches surrounded by disturbed areas. This occurs naturally through such agents as fire, landslides, windthrow and insect attack. In managed forests timber harvesting and related activities have been the dominant disturbance agents.

Mackenzie DFA Sustainable Forest Management Plan

Free-growing: young trees that are as high or higher than competing brush vegetation with one metre of free-growing space surrounding their leaders. As defined by legislation, a free growing crop means a crop of trees, the growth of which is not impeded by competition from plants, shrubs or other trees. Silviculture regulations further define the exact parameters that a crop of trees must meet, such as species, density and size, to be considered free growing.

Free-growing assessment: the determination for whether young trees have attained free- growing status.

Free use permits: an agreement entered into under Part 3, Division 9 of the Forest Act, which provides for the cutting and utilization of Crown timber for very specific purposes, free of stumpage assessment.

Freshet: high stream flow, usually confined to the stream channel and caused by a regularly recurring hydrological phenomenon (e.g., the snowmelt freshet) (regional term).

Fruiting body: the reproductive part of a fungus that contains or bears spores. Also known as a conk.

Fry: the young stage of fishes (i.e., less than one year old), particularly after the yolk sac has been absorbed.

Fuelbreak: an existing barrier or change in fuel type (to one that is less flammable than that surrounding it), or a wide strip of land on which the native vegetation has been modified or cleared, that act as a buffer to fire spread so that fires burning into them can be more readily controlled. Often selected or constructed to protect a high value area from fire.

Fuel management: the planned manipulation and/or reduction of living or dead forest fuels for forest management and other land use objectives (such as hazard reduction, silvicultural purposes, wildlife habitat improvement) by prescribed fire, mechanical, chemical or biological means and/or changing stand structure and species composition.

Fuelwood: trees used for the production of firewood logs or other wood fuel.

Full bench cut: forming the roadway entirely in cut.

Full-tree harvesting: a tree harvesting process that includes removing the trunk, branches and in some instances the roots from a forested site. In Canada this process is used to control root diseases.

G

Genetic diversity: variation among and within species that is attributable to differences in hereditary material.

Genetically improved seed and/or vegetative propagules: seed or propagule that originate from a tree breeding program and that have been specifically designed to improve some attribute of seeds, seedlings, or vegetative propagules selection.

Genotype: the entire genetic constitution, or the sum total of genes of an organism, in contrast to the phenotype.

Geographic information system (GIS): a computer system designed to allow users to collect, manage and analyze large volumes of spatially referenced information and associated attribute data.

Geotextile filter fabric: a synthetic material placed on the flat, under road fill, with the primary functions of layer separation, aggregate confinement, and distribution of load.

Girdling: to kill a tree by severing or damaging the cambium layer and interrupting the flow of food between the leaves and the rest of the tree. A method of 'brushing' carried out using a hatchet or special tool to cut through the bark and cambium of the tree.

Goal: goals provide general purpose and direction. They are the end result of ultimate accomplishment toward which an effort is directed. They generally should reflect perceived present and future need. They must be capable of being effectively pursued.

Grading: classifying timber, lumber or logs according to quality or end-use.

Grapple yarder: a machine used in harvesting to bring logs into a landing. The grapple closes like teeth around the log and is controlled by the machine operator.

Grazing lease: a lease of Crown land issued for grazing purposes under the Land Act.

Mackenzie DFA Sustainable Forest Management Plan

Grazing schedule: sets out the class and number of livestock that can use an area described in the schedule, the dates the livestock can use the area and other prescribed information.

Grazing season: a period during which livestock may graze on Crown land under a grazing licence or grazing permit.

Green tree retention: the reservation of live trees of a specific species and size from harvesting, to achieve a site-specific objective.

Greenbelt: an extensive area of largely undeveloped or sparsely occupied land associated with a community set aside to contain development, preserve the character of the countryside and community and provide open space.

Greened-up : a cutblock that supports a stand of trees that has attained the green-up height specified in a higher level plan for the area, or in the absence of a higher level plan for the area, has attained a height that is 3 m or greater, and if under a silvicultural prescription, meets the stocking requirements of that prescription, or if not under a silviculture prescription, meets the stocking specifications for that biogeoclimatic ecosystem classification specified by the regional manager.

Gross total volume: volume of the main stem of the tree including stump and top. Volume of the stand including all trees.

Ground-based systems: logging systems that employ ground-based equipment such as feller-bunchers, hoe chuckers, skidders, and forwarders.

Ground truthing: the use of a ground survey to confirm the findings of an aerial survey or to calibrate quantitative aerial observations.

Groundwater: water below the level of the water table in the ground; water occupying the sub-surface saturated zone.

Group selection: see Selection silvicultural system.

Growing stock: the sum of all trees in a forest or specified part of it.

Grubbing and retention: removal of stumps, roots, embedded logs, organics, and unsuitable soils before or concurrently with subgrade construction.

Guidebooks: part of the Forest Practices Code but not included in the legislation (Exception: Fish Stream Crossing Guidebook). Guidebooks support the Regulations and Standards by stipulating detailed tolerances and evaluation criteria and by providing recommended procedures, processes, and results. Guidebooks may also contain new guidelines and recommendations which are still being tested or are awaiting formal approval. Specifications provided by guidebooks become legally enforceable when inserted in plans, prescriptions, and contracts.

Guideline: an optional practice or new practice not currently in the Forest Practices Code. Although guidelines are generally voluntary, the implication is that practitioners will use these concepts and principles in meeting their resource objectives.

Gully assessment procedure: a procedure for determining gully sediment and debris transport potential, and suggested management strategies.

H

Habitat: the place where an organism lives and/or the conditions of that environment including the soil, vegetation, water, and food.

Habitat enhancement: any manipulation of habitat that improves its value and ability to meet specified requirements of one or more species.

Habitat management: management of the forest to create environments which provide habitats (food, shelter) to meet the needs of particular organisms.

Hack and squirt: a method of conifer release and juvenile spacing where the bark of a tree is cut (hack) and herbicides are injected (squirt) to kill the tree.

Hardwoods: trees which are generally deciduous, broad leafed species such as oak, alder or maple.

Harvest cut: the felling of the mature crop of trees either as a single clearcut or a series of regeneration cuttings.

Mackenzie DFA Sustainable Forest Management Plan

Harvest forecast: the flow of potential timber harvests over time. A harvest forecast is usually a measure of the maximum timber supply that can be realized, over time, for a specified land base and set of management assumptions.

Harvest pattern: the spatial distribution of cutblocks and reserve areas across the forested landscape.

Harvest rate: the rate at which timber is harvested, commonly expressed as an (AAC).

Harvest schedule: a document listing the stands to be harvested year or period, usually showing types and intensities of harvests for each stand, as well as a timetable for regenerating currently non-productive areas.

Harvesting: the practice of felling and removing trees or the removal of dead or damaged trees from an area.

Harvesting method: the mix of felling, bucking, and yarding (skidding) systems used in logging a stand of timber.

Harvesting prescription: detailed plan on how, when, and where timber will be harvested from an area.

Harvesting system: the mix of felling, bucking and yarding systems used in logging a stand of timber.

Hauling: a general term for the transportation of logs from one point to another, usually from a landing to the mill or shipping point.

Hazard: a state that may result in an undesired event, the cause of risk. Hazard can apply to the probability of tree mortality or damage by an insect or disease and also represents material or fuel that will ignite and burn.

Hazardous or danger tree: a tree or any component of a tree that has sufficient structural infirmity to be identified as having a high risk of falling and causing personal or property damage.

Hazards, potential: a component of risk rating. Potential hazards are the detrimental events that could result from inappropriate harvesting practices.

Healthy ecosystem: an ecosystem in which structure and functions allow the maintenance of biodiversity, biotic integrity and ecological processes over time.

Heartwood: the inner core of a woody stem composed of nonliving cells and usually differentiated from the outer wood layer (sapwood) by its darker colour. See Cambium.

Height class: any interval into which the range of tree heights is divided for classification and use, commonly 3 m, 5 m, or 10 m classes.

Height/diameter curve: a graphic representation of the relationship between individual tree heights and diameters used to determine tree volumes in localized areas.

Helitack: initial attack on wildfires involving the use of helicopters and trained crews, deployed as a complete unit.

Helitanker: a helicopter equipped with a helitank - a specially designed tank used for transporting and dropping suppressants or retardants.

Helitorch: a specialized drip torch, using a gelled fuel, slung and activated from a helicopter.

Herbicide: chemical substances or living organisms (called bioherbicides) used to kill or control vegetation such as brush, weeds, and competing or undesirable trees.

Heritage areas: sites of historical, architectural, archaeological, paleontological, or scenic significance to the province.

Heritage trail: a trail having cultural significance by reason of established aboriginal use or use by early immigrants.

Highgrading: the removal of only the best trees from a stand, often resulting in a residual stand of poor quality trees.

High hazard (forest health): physical characteristics (including tree species, composition, age, and size) and biogeoclimatic factors that make a forest highly susceptible to attack by damaging agents.

High sensitivity areas: areas having special concerns, issues, or the potential for negative impacts on resource values, including any soils with high hazard or very high hazard for compaction, erosion, mass wasting, or displacement.

High value stream: as defined in the Forest Practices Code of British Columbia Cutblock and Road Review Regulation a high value fish-bearing stream and a stream in a community watershed.

Mackenzie DFA Sustainable Forest Management Plan

Higher level plan: strategic or operational plans that provide direction to any lower level of plans, prescriptions or forest practices.

Higher level plans include:

- a plan formulated pursuant to Section 4(c) of the Ministry of Forests Act,
- a management plan as defined in the Forest Act,
- an objective for a resource management zone,
- an objective for a landscape unit or sensitive area,
- an objective for a recreation site, recreation trail or interpretive forest site, and
- a plan or agreement declared to be a higher level plan by the minister or the lieutenant governor.

Plans which might be declared to be a higher level plan by the minister or the lieutenant governor include plans such as Land Resource Management Plans and Local Resource Use Plans.

Highlead system: logging system that uses cables rigged to a spar high above the ground so that one end of the logs can be lifted during yarding.

Hip chain: a device used to measure distance by means of an anchored filament wrapped around a wheel that revolves as you walk (handy for measuring distances on your own).

Historical variation: the range of the spatial, structural, compositional and temporal characteristics of ecosystem elements during a period specified to represent "natural" conditions.

Hoe-chucking: a logging system that uses an excavator or hoe to yard logs to the roadside and/or landing.

Human dimension: an integral component of ecosystem management that recognizes people are part of ecosystems, that people's pursuits of past, present, and future desires, needs and values (including perceptions, beliefs, attitudes and behaviours) have and will continue to influence ecosystems and that ecosystem management must include consideration of the physical, emotional, mental, spiritual, social, cultural and economic well-being of people and communities.

Human impact or influence: a disturbance or change in ecosystem composition, structure or function caused by humans.

Humus: a general term for the more or less decomposed plant and animal residues in the lower organic soil layer.

Hydrology: the science that describes and analyzes the occurrence of water in nature, and its circulation near the surface of the earth.

Hydroseeding: the application of seed in a water slurry that contains fertilizer, a soil binder and/or mulch.

Hypsometer: a simple instrument, often a stick or other straight edge, used to measure the heights of trees on the basis of similar angles.



Immature: trees or stands that have grown past the regeneration stage, but are not yet mature.

Immature timber: stands of timber where the age of the leading species in a stand is less than the specified cutting age. Cutting ages are established to meet forest management objectives. Usually stands with lodgepole pine and whitebark pine or a deciduous species as the leading species are considered as immature timber when the stand age is less than 81 years. Otherwise, all stands having conifers other than lodgepole pine and whitebark pine as the leading species are immature when the stand age is less than 121 years.

Impact assessment: a study of the effect of resource development on other resources.

Improvement cutting: the removal of trees of undesirable species, form or condition from the main canopy of the stand to improve the health, composition and value of the stand.

Increment: the increase in diameter, basal area, height, volume, quality or value of individual trees or stands during a given period.

Increment borer: a tool used to extract a core of wood from a living tree for the purpose of studying the annual growth rings of the tree.

Mackenzie DFA Sustainable Forest Management Plan

Increment core: that part of the cross section of a tree extracted by an increment borer. Used to determine tree age and growth pattern.

Incremental silviculture: a Ministry of Forests term that refers to the treatments carried out to maintain or increase the yield and value of forest stands. Includes treatments such as site rehabilitation, conifer release, spacing, pruning, and fertilization. Also known as intensive silviculture. See Basic silviculture.

Independent (impartial) (Source CSA): free from bias. Note: A registrar is not considered independent (impartial) if, in the two years preceding an audit, it or any of its personnel, subcontractors, or related bodies provide or have provided assistance or consulting services to the organization being audited and, as a result of the audit, certified (see definition of Related body).

Indicator: A measure of an aspect of the criterion; a quantitative or qualitative variable which can be measured or described and which, when observed periodically, demonstrates trends (Santiago Declaration in Montreal Process 1995). Indicators are used in monitoring the effectiveness of activities, in terms of outcomes, as opposed to compliance monitoring in a rule-based approach.

Indicator species: species of plants used to predict site quality and characteristics.

Industrial operation: operations such as land clearing, timber harvesting, timber processing, mechanical site preparation and other silvicultural treatments, mining, and road construction.

Initial attack: the action taken to halt the spread or potential spread of a fire by the first fire fighting force to arrive at the fire.

Initial mature inventory: that portion of the existing total mature forest inventory which is available for harvest. This portion reflects all management constraints that are necessary to protect the environment and other forest uses and varies with the constraints identified for each option.

Inner gorge: a stream reach or portion of stream that is bounded by steep hillslopes (> 40% sideslope) and terminates upslope into more gentle topography.

Inoperable lands: lands that are unsuited for timber production now and in the foreseeable future by virtue of their: elevation; topography; inaccessible location; low value of timber; small size of timber stands; steep or unstable soils that cannot be harvested without serious and irreversible damage to the soil or water resources; or designation as parks, wilderness areas, or other uses incompatible with timber production.

Insloping: shaping the road surface to direct water onto the cut side of the road. Integrated resource management (IRM): the identification and consideration of all resource values, including social, economic, and environmental needs, in land use and development decision making. It focuses on resource use and land use and management, and is based on a good knowledge of ecological systems, the capability of the land, and the mixture of possible benefits.

Integrated resource use: a decision making process whereby all resources are identified, assessed and compared before land use or resource management decisions are made. The decisions themselves, whether to approve a plan or carry out an action on the ground, may be either multiple or single use in a given area. The application of integrated resource management results in a regional mosaic of land uses and resource priorities which reflect the optimal allocation and scheduling of resource uses.

Intensive silviculture: See Incremental silviculture.

Interested party (Source CSA): an individual or organization interested in and affected by the activities of the management of a DFA.

Interior: the geographic area east of the Cascade Mountains, as officially delineated by the Cascade Mountains Administrative Line through British Columbia from Washington state to Alaska, including the portions of the Kalum Forest District and Cariboo Forest Region lying west of the line, but excluding the lower Fraser River area south of Hell's Gate (south of Boston Bar), taking in the Coquihalla, Silverhope, and Skagit River drainages lying east of the line.

Interior conditions: at a point where edge effects no longer influence environmental conditions within a patch, interior conditions are achieved. For coastal B.C. forests, the edge effect is generally felt for a distance equivalent to 2 to 4 times average tree height into the stand. The effects usually involve light intensity, temperature, wind, relative humidity and snow accumulation and melt. See Edge effect.

Intermediate: intermediate trees have crowns below, but still extending into, the general level of the canopy and receive a little direct light from above but none from the sides.

Mackenzie DFA Sustainable Forest Management Plan

Interpretive forest site: a designated forest site and ancillary facilities developed by the Ministry of Forests to interpret, demonstrate, or facilitate the discussion of the natural environment, forest practices, and integrated resource management.

Inter-tree distance: the distance between tree boles, usually used in the context of thinning. Recommended guidelines for inter-tree distances are established for different thinning programs depending on site variables, the species and age of trees, and management objectives.

Inventory, forest: a survey of a forest area to determine such data as area, condition, timber, volume and species for specific purposes such as planning, purchase, evaluation, management or harvesting.

ISO 14001 (Source CSA): an internationally recognized environmental management system standard published in 1996 and revised in 2004 by the International Organization for Standardization. The ISO 14001 Standard has been approved as a National Standard of Canada by the Standards Council of Canada.

J

Joint administration: a term referring to the joint powers of the Ministry of Forests, Ministry of Environment and the Ministry of Energy, Mines and Petroleum Resources to enforce the Forest Practices Code. It is also used to refer to the involvement of the Ministry of Forests and the Ministry of Environment in certain aspects of strategic and operational planning.

Judicial review: a review of a decision by a court authorized and conducted under the Judicial Review Procedure Act primarily concerned with the fairness of the procedures used to make a decision, whether or not the decision maker was acting within his or her jurisdiction, and errors of law.

Juvenile spacing: a silvicultural treatment to reduce the number of trees in young stands, often carried out before the stems removed are large enough to be used or sold as a forest product. Prevents stagnation and improves growing conditions for the remaining crop trees so that at final harvest the end-product quality and value is increased. Also called precommercial thinning.

K

Key area: a relatively small area selected because of its location, use, or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the overall acceptability of current grazing management.

Key species: forage species that must, because of their high degree of use, be considered in the management program.

Keystone species: a species that plays an important ecological role in determining the overall structure and dynamic relationships within a biotic community. A keystone species presence is essential to the integrity and stability of a particular ecosystem.

L

Ladder fuels: fuels that provide vertical continuity between the surface fuels and crown fuels in a forest stand, thus contributing to the ease of torching and crowning.

Lake: a naturally occurring static body of water greater than 2 m in depth and greater than 1 ha in size, or a licensed reservoir.

Lakeshore management area: the lands directly adjacent to a lake, in which forest practice standards are designed to maintain the unique combination of fish, wildlife, water, and recreation values that occur on and around lakes.

Mackenzie DFA Sustainable Forest Management Plan

Land and Resource Management Plan (LRMP): a strategic, multi-agency, integrated resource plan at the subregional level. It is based on the principles of enhanced public involvement, consideration of all resource values, consensus-based decision making, and resource sustainability.

Land-use planning: the process by which decisions are made on future land uses over extended time periods, that are deemed to best serve the general welfare.

Landform: a landscape unit that denotes origin and shape, such as a floodplain, river terrace, or till plain.

Landing: an area modified by equipment that is designed for accumulating logs before they are transported.

Landing pile or cull pile: an area of piled slash, logging residue, and stumps, created as a result of harvesting operations and the construction of roads and landings.

Landscape: the fundamental traits of a specific geographic area, including its biological composition, physical environment and anthropogenic or social patterns.

Landscape ecology: the study of the distribution patterns of communities and ecosystems, the ecological processes that affect those patterns and changes in pattern and process over time.

Landscape inventory: see Visual landscape inventory.

Landscape level: a watershed, or series of interacting watersheds or other natural biophysical (ecological) units, within the larger Land and Resource Management Planning areas. This term is used for conservation planning and is not associated with visual landscape management and viewscape management.

Landscape sensitivity: a component of the landscape inventory that estimates the sensitivity of the landscape based on: the visual prominence of importance of features; conditions that affect visual perception; and social factors that contribute to viewer perceptions.

Landscape unit: a planning area, up to 100 000 ha in size, based on topographic or geographic features such as a watershed or series of watersheds. They are established by the Ministry of Forests' district manager in consultation with a designated B.C. Environment official to ensure Crown land in a provincial forest and private land in a tree farm licence or woodlot licence are managed and used in accordance with Section 2 of the Forest Practices Code of British Columbia Act.

Landscape unit objectives: objectives established for a landscape unit to guide forest development and other operational planning. Landscape objectives are established by the Ministry of Forests' district manager and a designated B.C. Environment official.

Large Organic Debris (LOD): entire trees or large pieces of trees that provide channel stability or create fish habitat diversity in a stream channel.

Large woody debris: a large tree part, conventionally a piece greater than 10 cm in diameter and 1 m in length.

Leader: the length of tree stem from the top of the tree down to the first set of branches, representing one year of growth and reflecting the tree's vigour and the site's growing potential.

Leave trees: all trees, regardless of species, age, or size, remaining on a harvested area as a result of a predetermined silviculture prescription to address a possible range of silviculture or resource needs.

Legally Reportable Spill: a release or discharge into the environment of a substance in an amount equal to or greater than quantity spilled. *From Jan 28 2005 Glossary Amendment*

Substance	Quantity Spilled*
Gasoline, diesel, engine oil, hydraulic oil	100 L
Antifreeze (undiluted)	5 L
Battery acid	5kg
Grease	100 L
Paints and solvents	100 L

*Amounts taken from provincial Spill Reporting Regulation, Jan 1, 2005.

Licence to cut: an agreement under the Forest Act allowing a person who purchases or occupies land, and who does not otherwise have the right to harvest Crown timber from the land, to cut and/or remove timber on the land.

Mackenzie DFA Sustainable Forest Management Plan

Licensee: means a party required to prepare a forest development plan under the *Forest Practices Code of B.C. Act* or a forest stewardship plan under the *Forest and Range Practices Act*. From "Order Establishing Landscape Biodiversity Objectives for the Prince George Timber Supply Area – October 20, 2004" Jan 28 2005 Glossary Amendment

Lightning detection system: a network of electronic field sensors linked to a central computer to detect, triangulate, plot the location of and record cloud-to-ground lightning flashes in real time over a predetermined area.

Limiting factor: a factor present in an environment in such short supply that it limits growth or some other life process.

Linear developments: straight line industrial development that is typical of power lines, highways, gas lines, and seismic activities.

Litter layer: the layer of organic debris, mainly bark, twigs, and leaves, on the forest floor.

Littoral zone: the shore zone between the high and low water mark.

Livestock: as defined in the Range Act means animals of the genus Bos, horses, mules, asses, sheep and goats, but does not include wildlife designated under the Wildlife Act, exotic game animals, buffalo, swine or poultry but does include llamas.

Local Resource Use Plan (LRUP): a plan approved by a district manager for a portion of a timber supply area or tree farm licence that provides management guidelines for integrating resource use in the area. Such a plan may become a higher level plan if declared to be so by the Ministers or Cabinet.

Log boom: floating logs tied together in rafts to be towed by boat to their destination.

Logging: see Harvesting.

Logging (cutting) plan: a map, along with a written plan, describing the road building, harvesting, and other related operations that are submitted for a forest officer's approval to ensure that the applicable standards and obligations stated in the Pre-Harvest Silviculture Prescription and the harvesting agreement are met.

Logging trail: a narrow, temporary path used by harvesting equipment.

Long Run Sustainable Yield (LRSY): the long run sustainable yield for any Timber Supply Area (TSA) is equal to the culmination of mean annual increment weighted by area for all productive and utilizable forest land types in that TSA including all not satisfactorily restocked, disturbed stocking doubtful, and potentially usable non-commercial cover.

Long term (Source CSA): in the context of making forecasts regarding forest structure and composition, at a minimum, twice the average life expectancy of the predominant trees in a DFA, up to a maximum of 300 years.

Lopping: chopping branches, tops and small trees after felling into lengths such that the resultant slash will lie close to the ground.

Lopping and scattering: lopping the slash created after felling and spreading it more or less evenly over the ground without burning.

Loss factors: reductions made to gross timber volumes to allow for decay, waste, and breakage.

Low Ground Pressure (LGP) machines: machines that exert a total ground pressure of less than 43.4 KPa (6.3 pounds per square inch).

M

Major culvert: a stream culvert having a pipe diameter of 2000 mm or greater, or a maximum design discharge of 6 m³/sec or greater.

Managed forest land: forest land that is being managed under a forest management plan utilizing the science of forestry.

Management plan: a management plan or management and working plan approved under a tree farm licence, woodlot licence, pulpwood agreement or forest licence. Contains inventory and other resource data.

Mackenzie DFA Sustainable Forest Management Plan

Management area: stands or forest types that require similar management practices and can be grouped for treatment as a management unit.

Management assumptions: approximations of management objectives, priorities, constraints and other conditions needed to represent forest management actions in a forest planning model.

Management option: a prescription of management activities over time that will achieve specified management objectives.

Management plan: detailed long-term plan for a forested area. Contains inventory and other resource data.

Management unit plan: the third level of planning in the Ministry of Forests hierarchical planning system. A plan prepared for a Timber Supply Area which takes into account regional goals and land use interactions. Management unit plans provide a basis for Forest Service programs. The annual allowable cut for the management unit is calculated on the basis of the management unit plan.

Management zone: the outer portion of a riparian management area situated adjacent to a stream, lake, or wetland and established to conserve and maintain the productivity of aquatic and riparian ecosystems when harvesting is permitted.

Map folio: a series of maps bound together, often produced as overlays of information, e.g., soils, fish, water, forest, and wildlife.

Marine-sensitive zones: herring spawning areas, shellfish beds, marsh areas, aquaculture sites, juvenile salmonid rearing areas, and adult salmon holding areas.

Mass wasting: movement of soil and surface materials by gravity.

Mature: trees or stands that are sufficiently developed to be harvestable.

Mature timber: stands of timber where the age of the leading species in a stand is greater than the specified cutting age. Cutting ages are established to meet forest management objectives. Usually stands with lodgepole pine or a deciduous species as the leading species are classified as mature timber when the stand age is greater than 80 years. Otherwise, all stands having conifers other than lodgepole pine and whitebark pine as the leading species are mature when the stand age is greater than 120 years.

Maximum density: the maximum allowable stand density above which stands must be spaced to a target density of well-spaced acceptable stems to achieve free-growing status.

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

Measure: represent the actual "things" or land-based resources that are tracked over time and space. They provide the on-the-ground link to indicators, criteria and values, and signal the trend for each resource

Mechanical site preparation: any activity that involves the use of mechanical machinery to prepare a site for reforestation.

Mechanized access and use: refers to access and use by, for example, mountain bikes and other bicycles, hang gliders, and other human-powered mechanized equipment. Associated facilities include aircraft landing facilities, boat docks, and heliports.

Mechanized stand tending treatment: any stand tending activity that involves the use of mechanical machinery to treat a stand.

Memorandum of understanding (MOU): an agreement between ministers defining the roles and responsibilities of each ministry in relation to the other or others with respect to an issue over which the ministers have concurrent jurisdiction.

Merchantable timber: a tree or stand that has attained sufficient size, quality and/or volume to make it suitable for harvesting.

Merchantable volume: the amount of sound wood in a single tree or stand that is suitable for marketing under given economic conditions.

Meridian line: a north-south reference line often appearing on maps. Meridian lines are also etched into the bearing plate on a compass.

Mackenzie DFA Sustainable Forest Management Plan

Microclimate: generally the climate of small areas, especially insofar as this differs significantly from the general climate of the region. Stands often create microclimates.

Microsite: a small area which exhibits localized characteristics different from the surrounding area. For example, the microsites created by a rock outcrop with thin soils, or the shaded and cooled areas created on a site by the presence of slash.

Mineral soil: soil consisting predominately of, and having its properties determined by, inorganic matter. Usually contains less than 20 per cent organic matter.

Minimum utilization standard: included in every licence authorizing the harvesting of timber, a standard which is expressed as a maximum stump height, diameter at stump height, and top diameter and which can vary by species and timber supply area (and supply blocks within timber supply areas).

Mixed stand: a stand composed of two or more tree species.

Modified burning zone: a zone within or adjacent to a smoke-sensitive area that requires special considerations and burning techniques, even under favourable conditions, to maintain air quality within a smoke-sensitive area.

Monoculture: in general, even-aged, single-species forest crops.

Mortality: death or destruction of forest trees as a result of competition, disease, insect damage, drought, wind, fire and other factors (excluding harvesting).

Motorized access and use: refers to access and use by, for example, float planes, helicopters, fixed-wing aircraft, motorboats, motor bikes, all-terrain vehicles, snowmobiles, and motorized equipment.

Multiple use: a system of resource use where the resources in a given land unit serve more than one user. Multiple use can be effected in three ways:

- different uses of adjacent sub-areas which together form a composite multiple use area;
- the alternation in time of different uses on the same areas; and
- more than one use of an area at one time.

In multiple use planning, where differing resource uses are conducted at the same time on the same area and conflicts between users will occur, one resource is determined to be the dominant use and all other secondary uses are integrated only in-so-far as they are compatible with the first. Often multiple use planning sacrifices the production of the individual resources in favour of the over-all mix of resource uses that brings the greatest social and economic benefits.

Multiple Use Sustained Yield Calculation (MUSYC): a linear programming forest planning model developed by the United States Forest Service. MUSYC is currently used as the British Columbia Forest Service's standard forest planning model for carrying out TSA timber supply computer analysis.

Mycorrhiza: a rootlet of a higher plant modified through integral association with a fungus to form a constant structure which differs from either component but is attached to the root system and functions somewhat as a rootlet. It is usually considered to be beneficial to the associated plant.

N

Natural boundary: the visible high water mark of any lake, stream, or other body of water where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed of the lake, river stream, or other body of water a character distinct from that of the banks, both in vegetation and in the nature of the soil itself.

Natural disturbance regimes: the historic patterns (frequency and extent) of fire, insects, wind, landslides and other natural processes in an area.

Natural Disturbance Types (NDT): Land areas which can be characterized by different natural disturbance regimes. Stand-initiating disturbances are those processes that largely terminate the existing forest stand and initiate secondary succession in order to produce a new stand. The disturbance agents are mostly wildfires, windstorms and, to a lesser extent, insects and landslides. Five NDTs have been defined and mapped for British Columbia. They are:

- NDT1 – ecosystems with rare stand-initiating events,
- NDT2 – ecosystems with infrequent stand-initiating events,
- NDT3 – ecosystems with frequent stand-initiating events,

Mackenzie DFA Sustainable Forest Management Plan

NDT4 – ecosystems with frequent stand-maintaining fires, and
NDT5 – alpine tundra and subalpine parkland.

Natural Forest Area: means an area in the mountain pine beetle infested units which is in a stage of transition and could be in one or more of the following stages: old forest; dying forests; dead forests; or, young natural forests (which have not been harvested). From “Order Establishing Landscape Biodiversity Objectives for the Prince George Timber Supply Area – October 20, 2004” Jan 28 2005 Glossary Amendment

Natural justice: a set of procedures designed to ensure that decisions are made fairly.

Natural range barrier: a river, rock face, dense timber or any other naturally occurring feature that stops or significantly impedes livestock movement to and from an adjacent area.

Natural regeneration: the renewal of a forest stand by natural seeding, sprouting, suckering, or layering seeds may be deposited by wind, birds or mammals.

Natural resource: means land, water and atmosphere, their mineral, vegetable and other components, and includes flora and fauna on or in them.

Naturally resistant seed sources: tree species or provenances that have been shown to exhibit increased resistance to some specific pest, over that of the species or provenance that would normally be used in artificial regeneration in a particular situation.

Natural stream flow: unrestricted stream flow that accommodates fish passage.

Net down procedure: The process of identifying the net land base, which is the number of hectares of forest land which actually contribute to the allowable annual cut. The process involves "netting down" the TSA gross area to the TSA gross forest area then to the TSA net forest area. Areas and/or volumes are sequentially deleted or reduced from the gross land base for a number of considerations, including: private ownership, non-forest or non-productive, environmentally sensitive, unmerchantable and inaccessible.

Net land base: see Net down procedure.

Net present value (NPV): a stand's present worth before harvesting once costs associated with its establishment and tending have been subtracted.

Net volume: volume of the main stem excluding stump and top as well as the defective and decayed wood of trees or stands.

New forestry: a philosophy or approach to forest management that has as its basic premise the protection and maintenance of ecological systems. In new forestry the ecological processes of natural forests are used as a model to guide the design of the managed forest.

Non-designated wilderness: Areas within the provincial forest that have been zoned as wilderness through approved integrated resource management plans including regional land-use plans and Land and Resource Management Plans (LRMPs).

Non-forest land: land not primarily intended for growing or supporting a forest.

Non-timber resource values: values within the forest other than timber which include but are not limited to biological diversity, fisheries, wildlife, minerals, water quality and quantity, recreation and tourism, cultural and heritage values, and wilderness and aesthetic values.

Non-timber resources: resources other than timber, such as recreation, aesthetics, wildlife, fish, forage, range, water, and soils.

Normal forest: an outdated concept, drawing on the idea of a norm or standard forest structure against which existing forest structures can be compared. A normal forest is a forest composed of even-aged fully-stocked stands representing a balance of age classes such that for a specified rotation period, one age class can be harvested in each year. At the end of the rotation, the stands that were harvested first in the cycle would be ready for harvesting again.

Not Satisfactorily Restocked (NSR): productive forest land that has been denuded and has failed, partially or completely, to regenerate either naturally or by planting or seeding to the specified or desired free growing standards for the site.

No-work zones: areas in which equipment and people are not allowed during forestry operations, usually for safety or ecological reasons.

Mackenzie DFA Sustainable Forest Management Plan

Noxious weeds: any weed so designated by the Weed Control Regulations and identified on a regional district noxious weed control list.

Nurse log: a larger and decomposing fallen log which acts as a germination substrate for tree species establishing in the understory. Such logs provide moisture, nutrients and often some degree of elevation above other potentially competing vegetation on the forest floor.



Objective: the end result(s) that must be achieved through management at any given administrative level. Objectives are quantified and indicate time and agency responsibility.

Objective II (Source CSA): a broad statement describing a desired future state or condition of a value.

Old Forest: means > 140 year old stands*, from available forest inventory sources, for all natural disturbance units with the exception of:

- the Moist Interior – plateau sub-unit – all biogeoclimatic variants; and,
- the Omineca Valley – SBSdk, SBSdw3, BWBSdk1, SBSmc2, SBSmk1; and,
- the McGregor Plateau – SBSmk1 and SBSmh;
- where old forests will be considered to be those stands >120 years.

*In the ICH units, it is realized that the definition of old forest requires more discussion and a process will be developed in 2005 to deal with this issue. From “Order Establishing Landscape Biodiversity Objectives for the Prince George Timber Supply Area – October 20, 2004” Jan 28 2005 Glossary Amendment

Old growth: old growth is a forest that contains live and dead trees of various sizes, species, composition, and age class structure. Old-growth forests, as part of a slowly changing but dynamic ecosystem, include climax forests but not sub-climax or mid-seral forests. The age and structure of old growth varies significantly by forest type and from one biogeoclimatic zone to another.

Old-growth attributes: structural features and other characteristics of old-growth forests, including: large trees for the species and site; wide variation in tree sizes and spacing; accumulations of large dead standing and fallen trees; multiple canopy layers; canopy gaps and understory patchiness; elements of decay such as broken or deformed tops or trunks and root decay; and the presence of species characteristic of old growth.

Old-growth management areas: areas which contain, or are managed to replace, specific structural old-growth attributes and which are mapped out and treated as special management areas.

Old Interior Forest: means an area of “old forest” or “natural forest area” which buffered from younger age classes or disturbance. The baseline analysis for this objective used 200m as the buffered distance to calculate the amount of old interior forest. From “Order Establishing Landscape Biodiversity Objectives for the Prince George Timber Supply Area – October 20, 2004” Jan 28 2005 Glossary Amendment

Operable forest: that portion of the production forest that, under current market conditions, can be harvested at a profit.

Operable land: all lands that are not considered inoperable lands (see Inoperable lands).

Operable timber: see also Timber operability. Available timber that can be economically logged with present harvesting methods after consideration of access, timber quality and market price.

Operability line: a line drawn on a map to differentiate between areas that are operable and those that are not, given status quo harvesting and reforestation technology. Inoperable areas are not economically viable to harvest without seriously impairing the site or other resource values. The operability line is used to determine the operable land base in long-run, sustained yield calculations.

Operating area: geographic sub-units of timber supply areas that have been assigned to individual major licensees for the purposes of long-term planning. The boundaries are subject to change as the timber profile within a timber supply area changes over time.

Operational cruise: an estimate, to a specified degree of accuracy, of the volume of timber on an area to be harvested.

Operational plan: means a forest stewardship plan, woodlot licence plan, range use plan or range stewardship plan..

Mackenzie DFA Sustainable Forest Management Plan

Option: a set of assumptions representing a possible management direction. Options are constructed as a normal part of a planning process in order to provide a framework for analysis and to facilitate management decision-making.

Organic soil: soil containing a high proportion (greater than 20 or 30 percent) of organic matter.

Organization (Source CSA): a company, corporation, firm, enterprise, authority, or combination thereof, whether incorporated or not, public or private, that has its own functions and administration and that, for the purposes of this Standard, applies for certification. Note: For organizations with more than one operating unit (for example, a division), a single operating unit may be defined as an organization.

Orthophoto: a completely rectified copy of an original photograph. All variations in scale and displacements, due to relief, have been eliminated, hence the name ortho (correct) photography. Orthophoto and orthophoto map are synonymous, an orthophoto is, very simply, a photo map.

Outslope: to shape the road surface to direct water away from the cut slope side of the road.

Overlanding: placing road construction fill over organic soil, stumps and other plant materials, corduroy or geotextiles, any of which is required to support the fill.

Overlay: a transparent sheet (either clear or mylar matte film material) accompanying a map, on which information, colouring, or symbols are entered so that when the overlay is placed on the map the effect is identical to having entered the overlay information on the map, itself.

Overmature: in even-aged management, those trees or stands past the mature stage.

Overstorey: that portion of the trees in a forest of more than one storey forming the upper or uppermost canopy layer.

Overtopped: trees with crowns entirely below the general level of the crown cover receiving little or no direct light from above or from the sides.

Overtopping: vegetation higher than the favoured species, as in brush or deciduous species shading and suppressing more desirable coniferous trees.

P

Partial cutting: a general term referring to silvicultural systems other than clearcutting, in which only selected trees are harvested. Partial cutting systems include seed tree, shelterwood, selection, and clearcutting with reserves.

Pass: in timber harvesting, one of a planned sequence of harvesting operations designed to harvest a management unit over an extended period of time in discrete phases, so that the size of individual cutblocks and the total area harvested in any one pass does not exceed prescribed limits.

Patch: a stand of similar-aged forest that differs in age from adjacent patches by more than 20 years. When used in the design of landscape patterns, the term refers to the size of either a natural disturbance opening that led to even-aged forests or an opening created by cutblocks. *From the "Biodiversity Guidebook (Sept 1995)" and released as part of the Feb 18 2005 Glossary Amendment*

Patch cutting: a silvicultural system that creates openings less than 1 hectare in size and is designed to manage each opening as a distinct even-aged opening.

Patch logging: a modification of the clearcutting system whereby patches of from about 5 to 200 hectares are logged as single settings and separated for as long as practicable (preferably until the regeneration is adequately shading the forest floor) by living forest. This secures the optimum dispersal of seed and avoids the high fire hazard represented by large continuous areas of slash.

Pathological rotation age: the maximum rotation age through which a stand of trees may be grown without significant volume loss from disease. The stand age at which annual volume loss from disease equals annual volume increment.

Peace officer: a person employed for the preservation and maintenance of public peace, typically a police officer, police constable, mayor, sheriff or sheriff officer, warden, corrections officer, or any other permanent employee of a penitentiary, prison, or correctional centre.

Mackenzie DFA Sustainable Forest Management Plan

Performance-based logging: "performance-based logging" means approval of future logging activities contingent upon a company's current practices. Until a company is in compliance with the Forest Practices Code the Government may refuse to enter into a new or replacement agreements, approve new logging plans, and issue new cutting permits.

Periodic harvest (periodic cut): the removal of several years' accumulated AAC in one year or other period.

Permanent access structure: a structure, including a road, bridge, landing, gravel pit or other similar structure, that provides access for timber harvesting, and is shown expressly or by necessary implication on a forest development plan, access management plan, logging plan, road permit or silviculture prescription as remaining operational after timber harvesting activities on the area are complete.

Permanent Access Structure: an un-rehabilitated road, excavated or bladed trail, landing, pit, or quarry, which no longer contributes to the Timber Harvesting Land base (THLB). *From Jan 28 2005 Glossary Amendment*

Permanent bridge: a bridge having all its major components constructed of steel, concrete, or pressure-treated timber.

Personnel (Source CSA): management, contractors, and DFA-related workers employed by the organization.

Pest: any forest health agent designated as detrimental to effective resource management.

Pest incidence: a measurement of the presence and magnitude of pests within a given area.

Pesticide: any substance or mixture of substances (other than a device) intended for killing, controlling, or managing insects, rodents, fungi, weeds, and other forms of plant or animal life that are considered to be pests as defined under the B.C. Pesticide Control Act.

Pesticide buffer zone: a strip of land between the 10 m pesticide-free zone and the pesticide treatment area for preventing entry of pesticides or pesticide residues by drift, runoff, or leachate into the pesticide-free zone.

Phenotype: an organism as observed by its visible characteristics, resulting from the interaction of its genotype with the environment.

Phloem: a layer of tree tissue just inside the bark that conducts food from the leaves to the stem and roots. See Cambium.

Pioneer plants: a succession term for plants capable of invading bare sites, such as a newly exposed soil surface, and persisting there, i.e., 'colonizing' until supplanted by invader or other succession species.

Pitch tubes: a tubular mass of resin that forms on the surface of bark at bark-beetle entrance holes.

Planned grazing system: a system approved by the regional manager or district manager respecting the use of land for grazing and the dispersal of livestock over land.

Planning: the determination of the goals and objectives of an enterprise and the selection, through a systematic consideration of alternatives, of the policies, programs and procedures for achieving them. An activity devoted to clearly identifying, defining, and determining courses of action, before their initiation, necessary to achieve predetermined goals and objectives.

Planning horizon: the time period which will be considered in the planning process.

Planning term: the term of the actual plan before it must be updated.

Plant community: an assemblage of plants occurring together at any point in time, thus designating no particular ecological status.

Plant harvesting: the collection of plant life including, but not limited to, bark, berries, boughs, branches, burls, cones, conks, ferns, flowers, grasses, herbs, fungi, lichens, mosses, mushrooms, roots, sedges, shrubs, sprays and twigs.

Planting: establishing a forest by setting out seedlings, transplants or cuttings in an area.

Plot: a carefully measured area laid out for experimentation or measurement.

Plug: a seedling grown in a small container under carefully controlled (nursery) conditions. When seedlings are removed from containers for planting, the nursery soil remains bound up in their roots. See Bareroot seedling.

Mackenzie DFA Sustainable Forest Management Plan

Plus tree: a phenotype judged (but not proven by test) to be unusually superior in some quality or qualities such as an exceptional growth rate relative to the site, desirable growth habit, high wood quality, exceptional apparent resistance to disease and insect attack or to other adverse locality factors.

Point sampling: a method of selecting trees for measurements and of estimating stand basal area at a sample location or point sample. Also called plotless cruising, angle count method, Bitterlich method. A 360 degree sweep is made with an angle gauge about a fixed point and the stems with breast height diameters appearing larger than the fixed angle subtended by the angle gauge are included in the sample.

Policies: statements on how the authority is to achieve its goals and objectives with regard to a specific subject area or class of subject areas, e.g., a policy for development on floodplains.

Polygon: a closed geometric entity used to graphically represent area features with associated attributes.

Potentially unstable soil area: any area where there is a moderate to very high likelihood of slope failure following conventional road construction or timber harvesting.

Precommercial thinning: see Juvenile spacing.

Pre-harvest silviculture assessment (or survey): the survey carried out on a stand prior to logging to collect specific information on the silvicultural conditions such as planting survival, free-growing status, stocking, etc. See: Silviculture survey.

Pre-Harvest Silviculture Prescription (PHSP): a document that applies site-specific field data and develops forest management prescriptions for areas in advance of logging. Replaced under the Forest Practices Code by Silviculture Prescriptions.

Prescribed burning: the knowledgeable application of fire to a specific unit of land to meet predetermined resource management objectives.

Prescription: a course of management action prescribed for a particular area after specific assessments and evaluations have been made.

Preservation: the action of reserving, protecting or safeguarding a portion of the natural environment from unnatural disturbance. It does not imply preserving an area in its present state, for natural events and natural ecological processes are expected to continue. Preservation is part of, and not opposed to, conservation.

Preventive action (Source CSA): action to eliminate the cause of a potential nonconformity or other undesirable situation. Note: There can be more than one cause for a potential nonconformity. Preventive action is taken to prevent occurrence, whereas corrective action is taken to prevent recurrence.

Prime mover: heavy equipment used to tow other machines such as disc trenchers for site preparation.

Prism: an optical instrument used as an angle gauge, consisting of a thin wedge of glass which establishes a fixed (critical) angle of projection in a point sample.

Private woodlot owner (Source CSA): an individual, or a group of individuals, who privately owns forestland. For the purposes of this Standard, private woodlots are those recognized as "woodlots" by the woodlot owner association in each province.

Problem forest type: non-merchantable forest types, including: stands of unfavourable stocking (i.e., dense small trees), low productivity sites and decadent stands with high waste and breakage.

Procedure: a particular way of accomplishing an objective; generally refers to the method rather than the result. Procedures are usually developed to describe the methods for implementing policy.

Proclamation date: the date on which a statute has legal effect.

Production forest: the forest used for production of various commodities, for example timber.

Productive forest land: forest land that is capable of producing a merchantable stand within a defined period of time.

Productivity (Source CSA): the natural ability of a forest ecosystem to capture energy, support life forms, and produce goods and services.

Professional engineer, professional geoscientist: a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia.

Mackenzie DFA Sustainable Forest Management Plan

Professional forester: see Registered professional forester.

Protected areas: areas such as provincial parks, federal parks, wilderness areas, ecological reserves, and recreation areas that have protected designations according to federal and provincial statutes. Protected areas are land and freshwater or marine areas set aside to protect the province's diverse natural and cultural heritage.

Protected Areas (Source CSA): an area protected by legislation, regulation, or landuse policy to control the level of human occupancy or activities. Note: "Categories of protected areas include protected landscapes, national parks, multiple use management areas, and nature (wildlife) reserves" (The State of Canada's Forests 2001/2002). *From March 16 2005 Glossary Amendment and CSA*

Protection forest: forest maintained on steep, unstable slopes to prevent accelerated erosion.

Protocol agreements: an agreement between two or more ministries or two or more areas of the same ministry stating the role of each party in relation to the other or others with respect to an issue, or issues over which the parties have concurrent jurisdiction.

Provenance: the geographical area and environment to which the parent trees and other vegetation are native, and within which their genetic constitution has been developed through natural selection.

Provincial forest: forest land designated under Section 5 of the Forest Act. The Lieutenant Governor in Council may designate any forest land as a provincial forest. The uses of provincial forests include timber production, forage production, forest recreation, and water, fisheries and wildlife resource purposes.

Provincial forest inventory: a description of the quantity and quality of forest trees, non-wood values, and many of the characteristics of the land base compiled from statistical data for the forest lands of the province.

Pruning: the manual removal, close to or flush with the stem, of side branches, live or dead, and of multiple leaders from standing, generally plantation-grown trees. Pruning is carried out to improve the market value of the final wood product by producing knot-free wood for the improvement of the tree or its timber.

Public: the entire population of British Columbia, including all organizations, companies, and groups.

Public hearing: a hearing formally advertised and convened to afford any person who deems their interest in property to be affected by a proposal an opportunity to be heard by the Forest Service. The Forest Service is not required to follow the tenor of the statements made at the hearing. A public hearing must be convened in respect of tree farm licence applications.

Public highway: a highway for which public money has been spent and which is dedicated to public use by a plan deposited in the Land Titles Office for the district in which the road is situated.

Public involvement: the procedures for obtaining and considering the views of the general public in planning and decision-making processes.

Pulpwood agreement: a pulpwood agreement allows the holder of a wood-fibre processing facility to harvest Crown pulp timber, if sufficient quantities of raw material are not available to the holder from other sources. An agreement covers a 25-year term, may be replaceable every ten years and applies to a large area in one or more timber supply areas. Harvesting authority is provided through a timber sale licence where the licensee is responsible for all operational planning, development, basic silviculture and forest protection.

Q

Quasi-judicial: a decision made by a government official or tribunal which involves the application of policy to a particular set of facts requiring the exercise of discretion and the application of the principles of natural justice.

R

Range development: any practice, treatment or structure designed to achieve plant community, production and integrated resource management goals.

Mackenzie DFA Sustainable Forest Management Plan

Range enhancement: any treatment, development, or structure designed to achieve or maintain the desired plant community.

Range of variability: the spectrum of conditions possible in ecosystem composition, structure and function considering both temporal and spatial factors.

Range type: a defined area with specific physical characteristics, which differs from other areas in its ability to produce distinctive kinds and amounts of vegetation and in its response to management.

Range use plan: an operational plan that describes the range and livestock management measures that will be implemented to ensure that range resources are protected and that the management objectives for other identified resource values are achieved.

Rangelands: a broad category of land characterized by native plant communities that are often associated with grazing. Rangelands are managed by ecological rather than agronomic methods.

Rate-of-cut: the proportion of the watershed area allowed to be cut each year.

Reach: a length of stream channel, (lake or inlet) exhibiting, on average, uniform hydraulic properties and morphology.

Reconnaissance: the field examination of a proposed road location to determine its feasibility and possible impact on other resources, and to lay out the proposed centreline.

Recreation: any physical or psychological revitalization through the voluntary pursuit of leisure time. Forest recreation includes the use and enjoyment of a forest or wildland setting, including heritage landmarks, developed facilities, and other biophysical features.

Recreation feature: a biological, physical, cultural or historic feature that has recreational significance or value.

Recreation feature objective: a resource management objective which reflects how a recreational feature or features will be managed, protected, or conserved.

Recreation feature significance: the quality, uniqueness, and availability of a recreation feature as classified in the recreation inventory.

Recreation features inventory: one component of the Recreation Inventory. The identification, classification, and recording of the types and locations of biophysical recreation and cultural features, existing and potential recreation activities, feature significance and feature sensitivity.

Recreation inventory: the identification, classification and recording of recreation features, visual landscapes, Recreation Opportunity Spectrum (ROS), recreation features of rivers and specific point locations of recreation sites, trails, caves etc.

Recreation Opportunity Spectrum (ROS): a mix of outdoor settings based on remoteness, area size, and evidence of humans, which allows for a variety of recreation activities and experiences. The descriptions used to classify the settings are on a continuum and are described as: rural, roaded resource, semi-primitive motorized, semi-primitive non- motorized, and primitive.

Recreation Opportunity Spectrum objectives: resource management objectives in approved integrated resource management plans, reflecting the desired Recreation Opportunity Spectrum setting to provide for specific types of recreation opportunities and experiences.

Recreation resource: a recreation feature, a scenic or wilderness feature or setting that has recreational significance or value or a recreation facility.

Recreation site: a site and its ancillary facilities developed by the B.C. Ministry of Forests for recreation or to protect a recreation resource.

Recreation trail: a trail and its ancillary facilities developed by the B.C. Ministry of Forests for recreation or to protect a recreation resource.

Recreation value: see Recreation resource.

Red-listed species: see Threatened or endangered species.

Referral: the process by which applications for permits, licences, leases, etc., made to one government agency by an individual or industry are given to another agency for review and comment.

Mackenzie DFA Sustainable Forest Management Plan

Reforestation: the natural or artificial restocking (i.e., planting, seeding) of an area with forest trees. Also called forest regeneration.

Regeneration: the renewal of a tree crop through either natural means (seeded on-site from adjacent stands or deposited by wind, birds, or animals) or artificial means (by planting seedlings or direct seeding).

Regeneration delay: the maximum time allowed in a prescription, between the start of harvesting in the area to which the prescription applies, 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.

Regeneration survey: carried out to determine the initial restocking of a site. It is used to describe the number of trees on a site that have reached acceptable standards.

Regional plan: the second level of planning in the Ministry of Forests hierarchical planning system. The regional forestry plan contains forest management alternatives based on a detailed analysis of timber supply within the region. Regional priorities for integrated use are identified and taken into account in setting production goals for timber, range, and forest recreation.

Regional Resource Management Committee (RRMC): a committee comprised of senior regional representatives of government agencies responsible for or affected by resource management decisions who meet in each of the six regions in British Columbia on a regular or periodic basis to consider resource management problems.

Regionally important species: the regionally identified sensitive/vulnerable (blue-listed) species and those species not at risk but which require identification and protection of habitat critical at specific periods of their life cycle, and which are thus essential to the maintenance of their populations (e.g., moose, deer, and mountain goat).

Registered Professional Forester (RPF): a person registered under the Foresters Act, who performs or directs works, services, or undertakings that require specialized knowledge, training, and experience in forestry.

Registrar/certifier (Source CSA): an independent third party that is accredited by the Standards Council of Canada as being competent to register organizations with respect to nationally and internationally recognized standards.

Registration applicant (Source CSA): an organization that has applied to an accredited registrar for certification to this Standard.

Registration audit (Source CSA): a systematic and documented verification process used to obtain and evaluate evidence objectively in order to determine whether the organization meets the SFM requirements set out in this Standard.

Registration/certification (Source CSA): the result of a successful certification process in conformance with this Standard, whereby the registrar issues a certificate of registration and adds the organization's certification to a publicly available list maintained by the registrar (see Annex A).

Reinventory: the complete restratification of an area on recent, mid-scale aerial photographs based on extensive field work.

Related body (Source CSA): a body linked to the registrar/certifier by common ownership or directors, contractual arrangement, a common name, informal understanding, or other means such that the related body has a vested interest in the outcome of an audit or has the potential ability to influence the outcome of an audit.

Release: freeing a tree or group of trees from more immediate competition by cutting or otherwise eliminating growth that is overtopping or closely surrounding them.

Remediation: measures undertaken in respect to an area of land to remedy contravention of the Forest Practices Code.

Remote Automatic Weather Station (RAWS): a weather station at which the services of an observer are not required. A RAWS unit measures selected weather elements automatically and is equipped with telemetry apparatus for transmitting the electronically recorded data via radio, satellite or by a landline communication system at predetermined times on a user-requested basis.

Remote sensing: any data or information acquisition technique that utilizes airborne techniques and/or equipment to determine the characteristics of an area.

Reportable erosion event: a natural or man-made disturbance to the forest land base which is causing or will likely cause substantial environmental impacts, or which is a threat to life or property.

Reportable Spills: Any amount of the above substances released into a stream, lake, wetland or moving water is reportable. *From Jan 28 2005 Glossary Amendment*

Mackenzie DFA Sustainable Forest Management Plan

Reserve: an area of forest land that, by law or policy, is not available for harvesting. Areas of land and water set aside for ecosystem protection, outdoor and tourism values, preservation of rare species, gene pool, wildlife protection etc, and includes old growth management areas, parks and protected areas". *From Jan 28 2005 Glossary Amendment*

Reserve zone: the inner portion of a riparian management area situated adjacent to a stream, lake, or wetland and established to conserve and maintain the productivity of aquatic and riparian ecosystems when harvesting is not permitted.

Reserved trees: trees specifically reserved from harvesting and often referenced in Pre Harvest Silviculture Prescriptions or cutting authorities or by map notations.

Reserves: the retention of live or standing dead trees, pole size or larger, on site following harvest for purposes other than regeneration. Reserves can be uniformly distributed as single trees or left in small groups, and they can be used with any silvicultural system.

Residual basal area: the basal area per hectare of acceptable trees left standing after harvest.

Residual stand structure: the age class or height structure of the stand or remaining trees after harvesting.

Residuals (residual trees): trees left standing after harvesting.

Residue: the volume of timber left on the harvested area which meets or exceeds the size requirements but is below the log grade requirements of the minimum utilization standards in the cutting authority. It is part of the allowable annual cut for cut control.

Resilience: the ability of an ecosystem to maintain diversity, integrity and ecological processes following disturbance.

Resistance to control: the relative ease of establishing and holding a fireguard and/or securing a control line as determined by the difficulty of control and resistance to fireguard construction.

Resource features: localized resource values or sites of special interest, such as caves, raptor-nesting trees, mineral licks, heritage sites, and recreation trails.

Resource folio: a collection of resource capability and forest inventory maps, other resource data, interpretations, and management objectives for each resource sector. General prescriptions are developed to achieve the stated integrated use of objectives. A resource folio forms the basis for the timber licensee's development plan or working plan.

Resource industry: an industry based on the primary resources obtained from agriculture, fisheries, forestry or mining.

Resource Management Zone (RMZ): an area established by the chief forester in accordance with any policy direction from Cabinet or designated ministers. Resource management zones are used to implement broad land use policy, as provided in land and resource management plans or other Cabinet-level directives. An RMZ might include a major travel corridor which has scenic values or an area managed for intensive timber production such as Crown land in a provincial forest and private land in a tree farm licence or woodlot licence that must be managed and used in accordance with the requirements of Section 2 of the Forest Practices Code of British Columbia Act.

Resource Management Zone objectives: provide strategic direction on a regional or subregional scale (1:100 000 to 1:250 000 map scale). The chief forester is authorized by the Ministers of the Ministry of Forests, Ministry of Environment, and Ministry of Energy, Mines and Petroleum Resources to establish RMZs and associated objectives, in consultation with other resource agencies.

Resource values: products or commodities associated with forest lands and largely dependent on ecological processes. These include, but are not limited to, water quality and quantity, forage, fish, wildlife, timber, recreation, energy, minerals, and cultural and heritage resources.

Restoration: the return of an ecosystem or habitat to its original community structure, natural complement of species and natural functions.

Retention: retaining or saving a portion of the original stand in a cluster or clump. Retention visual quality objective: a visual landscape strategy derived from landscape analysis which applies to areas of high landscape value (for example, continuously forested or steep slopes facing important viewpoints or recreation use areas, foreground areas adjacent to important viewpoints or recreation use areas, and certain shorelines). Forest management activities may be present, but should not be noticed by the average viewer. Some visual change may be discernible, but should not be recognized as being different from existing natural features in the landscape.

Right-of-way: the strip of land over which a power line, railway line, road, etc., extends.

Mackenzie DFA Sustainable Forest Management Plan

Riparian: an area of land adjacent to a stream, river, lake or wetland that contains vegetation that, due to the presence of water, is distinctly different from the vegetation of adjacent upland areas.

Riparian Management Area (RMA): a classified area of specified width surrounding or adjacent to streams, lakes, riparian areas, and wetlands. The RMA includes, in many cases, adjacent upland areas. It extends from the top of the streambank (bank full height) or from the edge of a riparian area or wetland or the natural boundary of a lake outward to the greater of: 1) the specified RMA distance, 2) the top of the inner gorge, or 3) the edge of the flood plain. Where a riparian area or wetland occurs adjacent to a stream or lake, the RMA is measured from the outer edge of the wetland.

Riparian management zone: the area within and adjacent to riparian and other wetlands required to meet the structural and functional attributes of riparian ecosystems.

Riprap: an apron of coarse rock installed over the fillslope to prevent erosion.

Risk: the probability of an undesirable event occurring within a specified period of time. With regard to insect populations, risk involves components to evaluate the likelihood of an outbreak, the likelihood of trees being attacked (susceptibility) or the likelihood of trees being damaged (vulnerability). In fire prevention, risk involves those things or events that cause fires to start (including the physical igniting agents and people).

Risk rating (assessment): the process of identifying the degree of risk that timber harvesting imposes on adjacent and downslope social, economic, and forest resource values. The severity of each potential hazard and the magnitude of the potential consequences that correspond to each hazard provide the overall risk associated with harvesting a site.

Road deactivation: measures taken to stabilize roads and logging trails during periods of inactivity, including the control of drainage, the removal of sidecast where necessary, and the re-establishment of vegetation for permanent deactivation.

Road location line: the marked location of proposed roads.

Road permit: an agreement entered into under Part 8 of the Forest Act to allow for the construction or modification of a forest road to facilitate access to timber planned for harvest.

Road prism: the area of the ground containing the road surface cut slope and fill slope.

Rotation: the planned number of years between the formation or regeneration of a tree crop or stand and its final cutting at a specified stage of maturity. Can be based on physical, biological, pathological or economic criteria.

Rotation age: the age at which a stand is considered mature and ready for harvesting.

Roundwood: sections of tree stems, with or without bark. Includes logs, bolts, posts, and pilings.

RPF: see Registered Professional Forester.

Rules: informal working term for draft forest practices requirements proposed for the Forest Practices Code. Following review and public input, Rules may be incorporated into the Forest Practices Code of British Columbia Act or in Regulations under the Act.

S

Salmonid: a fish of the fish family Salmonides; for example salmon, trout and chars.

Salvage harvesting: logging operations specifically designed to remove damaged timber (dead or in poor condition) and yield a wood product. Often carried out following fire, insect attack or windthrow.

Sanitation treatment: tree removal or modification operations designed to reduce damage caused by forest pests and to prevent their spread.

Sapling: a loose term for a young tree no longer a seedling but not yet a pole, about 1 - 2 m high and 2 - 4 cm DBH, typically growing vigorously and without dead bark or more than an occasional dead branch. Also, a young tree having a DBH greater than 1 cm but less than the smallest merchantable diameter.

Sapwood: the light-coloured wood that appears on the outer portion of a cross-section of a tree. See Cambium.

Scaling: the measuring of lengths and diameters of logs and calculating deductions for defect to determine volume.

Mackenzie DFA Sustainable Forest Management Plan

Scalping: site preparation method which exposes favourable mineral soil for tree seedlings to be planted in.

Scarification: a method of seedbed preparation which consists of exposing patches of mineral soil through mechanical action.

SCC: Standards Council of Canada

Scenic area: any visually sensitive area or scenic landscape identified through a visual landscape inventory or planning process carried out or approved by the district manager.

Screefing: removal of herbaceous vegetation and soil organic matter to expose a soil surface for planting.

Second growth: a forest or stand that has grown up naturally after removal of a previous stand by fire, harvesting, insect attack or other cause.

Second pass: the next entry to harvest timber after green-up (or other recovery objective) occurs.

Secondary channel: subordinate channel in a stream reach with more than one channel; minor channel in a floodplain.

Sediment: Fragmentary material that originates from the weathering of rocks and is transported by, suspended in, or deposited by water. From "Certified Professional in Erosion and Sediment Control Exam Workbook", Jan 28 2005 Glossary Amendment

Sedimentation: Gravitational deposit of transposed material in flowing or standing water (i.e. the deposition of eroded material). From "Certified Professional in Erosion and Sediment Control Exam Workbook", Jan 28 2005 Glossary Amendment

Sediment occurrence: Deposition of sediment into a stream as a result of failed drainage structures/erosion control measures or improper or lacking erosion control measures.

Seedlot: a quantity of cones or seeds having the same species, source, quality and year of collection.

Seed orchard: a plantation of specially selected trees that is managed for the production of genetically improved seed.

Seed source: the locality where a seedlot was collected. If the stand from which collections were made was exotic, the place where its seed originated is the original seed source.

Seed tree silvicultural system: an even-aged silvicultural system in which selected trees (seed trees) are left standing after the initial harvest to provide a seed source for natural regeneration. Seed trees can be left uniformly distributed or in small groups. Although regeneration is generally secured naturally, it may be augmented by planting. Seed trees are often removed once regeneration is established or may be left as reserves.

Seed trees: trees selected to be left standing to provide seed sources for natural regeneration. Selection is usually on the basis of good form and vigour, the absence of serious damage by disease, evidence of the ability to produce seed, and wind firmness.

Seedbed: in natural regeneration, the soil or forest floor on which seed falls; in nursery practice, a prepared area over which seed is sown.

Seedling: a young tree, grown from seed, from the time of germination to the sapling stage, having a DBH equal or less than 1 cm.

Seedlots: seed from a particular collection event, either from a single tree collection or a pooling of seed from many trees.

Seepage zone: an area on a hillslope or at the slope base where water frequently or continuously springs to the surface.

Seismic line: a constructed trail used for seismographic exploration.

Selection silvicultural system: a silvicultural system that removes mature timber either as single scattered individuals or in small groups at relatively short intervals, repeated indefinitely, where the continual establishment of regeneration is encouraged and an uneven-aged stand is maintained. As defined in the Forest Practices Code of British Columbia Operation Planning Regulation, group selection removes trees to create openings in a stand less than twice the height of mature trees in the stand.

Selective logging: removal of certain trees in a stand as defined by specific criteria (species, diameter at breast height, or height and form). It is analogous to high grading. Not to be confused with the selection silvicultural system.

Mackenzie DFA Sustainable Forest Management Plan

Semi-permanent bridge: a bridge having a substantial proportion of its components constructed of steel, concrete, or timber that has been pressure-treated with a suitable preservative.

Senior official: a senior official means:

- a district manager or regional manager,
- a person employed in a senior position in the Ministry of Forest, Ministry of Environment, or the Ministry of Energy, Mines and Petroleum Resources, who is designated by name or title to be a senior official for the purposes the Act by the minister of that ministry.

Sensitive areas: small areas designated to protect important values during forest and range operations. These areas, established by a Ministry of Forests district manager in consultation with a designated B.C. Environment official, guide operations on a site-specific basis and require a combination of forest practices. Sensitive areas will be mapped by resource agencies, and include regionally significant recreational areas, scenic areas with high visual quality objectives, and forest ecosystem networks.

Sensitive areas objectives: to adequately manage, protect, and conserve the resources of the area. Sensitive areas may be designated under the Forest Practices Code of British Columbia Act, through a planning process, or by the Ministry of Forests district manager and designated B.C. Environment official (for example, forest ecosystem networks and the setting of visual quality objectives for sensitive scenic areas).

Sensitive resource area: an identifiable geographic unit of the forest land base that requires a specific combination of forest practices to adequately protect important resource values.

Sensitive slopes: any slope identified as prone to mass wasting.

Sensitive soils: forest land areas that have a moderate to very high hazard for soil compaction, erosion, displacement, mass wasting or forest floor displacement.

Sensitive/vulnerable species: species identified as "blue listed" by the Ministry of Environment, these are indigenous species that are not threatened but are particularly at risk.

Sensitive watershed: a watershed that is used for domestic purposes or that has significant downstream fisheries values, and in which the quality of the water resource is highly responsive to changes in the environment. Typically, such watersheds lack settlement ponds, are relatively small, are located on steep slopes, and have special concerns such as extreme risk of erosion.

Seral stage: any stage of development of an ecosystem from a disturbed, unvegetated state to a climax plant community.

Settlement pond: larger than a catchment basin and preferably with lower velocity waterflows that enable suspended sediment to settle before the flow is discharged into a creek.

SFM: Sustainable forest management

SFM performance (Source CSA): the assessable results of SFM as measured by the level of achievement of the targets set for a DFA.

SFM policy (Source CSA): a statement by the organization of intentions and principles in relation to SFM, which provides a framework for objectives, targets, practices, and actions.

SFM requirements (Source CSA): the public participation, performance, and system requirements found in Clauses 4, 5, 6, and 7.

SFM system (Source CSA): the structure, responsibilities, practices, procedures, processes, and time frames set by a registrar for implementing, maintaining, and improving SFM.

Shade tolerance: the capacity of a tree or plant species to develop and grow in the shade of, and in competition with, other trees or plants.

Shearing: in Christmas tree culture, to prune the branches to make dense foliage and give the tree a conical shape.

Shelterwood silvicultural system: a silvicultural system in which trees are removed in a series of cuts designed to achieve a new even-aged stand under the shelter of remaining trees.

Short-term operational plans (Source CSA): annual or five-year plans.

Sidecast: moving excavated material onto the downslope side of a temporary access structure, excavated or bladed trail, or landing during its construction.

Mackenzie DFA Sustainable Forest Management Plan

Sills: a single structural member used as a foundation to transfer the loads from the bridge superstructure to the supporting soil.

Silvics: the study of the life history, requirements and general characteristics of forest trees and stands in relation to the environment and the practice of silviculture.

Silvicultural system: a process that applies silviculture practices, including the tending, harvesting, and replacing of a stand, to produce a crop of timber and other forest products. The system is named by the cutting method with which regeneration is established. The six classical systems are seed tree, shelterwood, selection, and clearcut.

Silviculture: the art and science of controlling the establishment, growth, composition, health and quality of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes to meet the diverse needs and values of landowners and society on a sustainable basis.

Silviculture prescription: a site-specific integrated operational plan, designated in the Forest Practices Code, to carry out one or a series of silviculture treatments.

Silviculture regime: a series of site-specific silviculture treatments planned over time.

Silviculture survey: a sampling procedure to determine silvicultural conditions such as planting survival, free-growing status, stocking, etc., leading to management decisions. See: Pre-Harvest Silviculture Assessment.

Silviculture treatment: any silviculture activity on forest stands to meet stand-specific objectives.

Silviculture treatments: activities that ensure the regeneration of young forests on harvested areas and enhance tree growth and improve wood quality in selected stands.

Single tree selection: see Selection silvicultural system.

Site: an area described or defined by its biotic, climatic, and soil conditions in relation to its capacity to produce vegetation; the smallest planning unit.

Site class: the measure of the relative productive capacity of a site for a particular crop or stand, generally based on tree height at a given age and expressed as either good, medium, poor or low.

Site index: an expression of the forest site quality of a stand, at a specified age, based either on the site height, or on the top height, which is a more objective measure.

Site Plan: a plan prepared in accordance with Division 2 of the Forest & Range Practices Act and which must meet the content requirements of Part 3 Section 34 of the Forest Planning and Practices Regulation.

Site preparation: the treatment of the soil and ground vegetation to prepare the soil surface as a favourable seedbed for either naturally or artificially disseminated seed or for planted seedlings.

Site productivity: the inherent capabilities of a site to produce or provide the commodities or values for which the area will be managed in accordance with Section 4 of the Ministry of Forests Act, that is, timber, forage, recreation, fisheries, wildlife, and water.

Site rehabilitation: the conversion of the existing unsatisfactory cover on highly productive forest sites to a cover of commercially valuable species.

Site sensitivity: an assessment of the susceptibility of a site to soil-degrading processes, such as soil compaction, erosion, mass wasting, and forest floor displacement.

Site-specific: pertaining to a specific planning unit.

Sites of Biological Significance: Sites which support red & blue listed plant communities and rare ecosystems and include features such as bald eagle or osprey nests, mineral licks, species at risk habitats and others provided by government

Situation Report (SITREP): an itemized list and/or written account, usually issued on a daily basis, detailing the status of various fire-related activities. A SITREP generally contains information on fire occurrence and area burned to date, fire suppression resources committed to going fires and resources on standby, number of fires in the various stages of control, fire danger class, fire weather forecast and forest closures (if any).

Skid road: a bladed or backhoe-constructed pathway where stumps are removed within the running surface as necessary. Skid roads are suitable only for tracked or rubber-tired skidders bringing trees or logs from the felling site to a landing.

Mackenzie DFA Sustainable Forest Management Plan

Skid trail: a random pathway travelled by ground skidding equipment while moving trees or logs to a landing. A skid trail differs from a skid road in that stumps are cut very low and the ground surface is mainly untouched by the blades of earth moving machines.

Skidder: a wheeled or tracked vehicle used for sliding and dragging logs from the stump to a landing.

Skidding: the process of sliding and dragging logs from the stump to a landing, usually applied to ground-based as opposed to highlead operations.

Skyline: a type of cable logging system in which a skyline is stationary and a carriage moves along it carrying logs above the ground, from the felling site to the landing.

Slash: the residue left on the ground as a result of forest and other vegetation being altered by forest practices or other land use activities.

Slide: a mass movement process in which slope failure occurs along one or more slip surfaces and in which the unit generally disintegrates into a jumbled mass en route to its depositional site. A debris flow or torrent flow may occur if enough water is present in the mass.

Slope failure: see Slide.

Slope processes: all processes and events by which the configuration of the slope is changed; especially processes by which rock, surficial materials and soil are transferred downslope under the dominating influence of gravity.

Slope stability: susceptibility of a slope to erosion and slides.

Slump: a mass movement process in which slope failure occurs on a usually curved slip surface and the unit moves downslope as an intact block, frequently rotating outward. Slumps appear as discrete block movements, often in place, whereas slides usually break up and travel downslope.

Small Business Forest Enterprise Program (SBFEP): this program permits the Ministry of Forests to sell Crown timber competitively to individuals and corporations who are registered in the SBFEP.

Small-scale forestry: in general, non-industrial forestry operations. In B.C., small-scale forestry operations are carried out by woodlot licensees, Indian bands, municipalities and private landowners.

Smoke management: the scheduling and conducting of a prescribed burning program under predetermined burning prescriptions and firing techniques that will minimize the adverse effects of the resulting smoke production in smoke-sensitive areas.

Smoke-sensitive area: an area that has been identified in which smoke accumulations may cause a safety or public health hazard, or may unreasonably deny aesthetic enjoyment to the public.

Snag: a standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

Softwoods: cone-bearing trees with needle or scale-like leaves such as Douglas-fir, western red cedar and ponderosa pine.

Soil: the naturally occurring, unconsolidated mineral or organic material at the surface of the earth that is capable of supporting plant growth. It extends from the surface to 15 cm below the depth at which properties produced by soil-forming processes can be detected. The soil-forming processes are an interaction between climate, living organisms, and relief acting on soil and soil parent material. Unconsolidated material includes material cemented or compacted by soil-forming processes. Soil may have water covering its surface to a depth of 60 cm or less in the driest part of the year.

Soil displacement hazard: a soil displacement hazard as determined in accordance with procedures set out in the Ministry of Forests' publication "Hazard Assessment Keys for Evaluating Site Sensitivity to Soil Degrading Processes Guidebook," as amended from time to time.

Soil disturbance: disturbance caused by a forest practice on an area covered by a silviculture prescription or stand management prescription including areas occupied by excavated or bladed trails of a temporary nature, areas occupied by corduroyed trails, compacted areas, and areas of dispersed disturbance.

Soil disturbance hazard: an assessment of the susceptibility of a soil to adverse impacts on its productive capability due to soil compaction, soil puddling, surface erosion, mineral soil displacement, mass wasting, or forest floor displacement.

Soil erosion: the wearing away of the earth's surface by water, gravity, wind, and ice.

Mackenzie DFA Sustainable Forest Management Plan

Soil pit: an excavation into the mineral soil of sufficient depth to allow assessment of variability in soil physical properties within a defined area of land.

Soil productivity: the capacity of a soil, in its normal environment, to support plant growth.

Soil verification pit: an excavation into the mineral soil of sufficient depth to allow assessment of the soil properties used to evaluate soil

productivity and sensitivity to forest management-related disturbances. This generally requires an excavation 90 cm deep unless a watertable, compact soil, or bedrock is encountered closer to the soil surface, in which case the depth to one of these layers is the minimum depth of pit required.

Spacing: the removal of undesirable trees within a young stand to control stocking, to maintain or improve growth, to increase wood quality and value, or to achieve other resource management objectives.

Special forest products: The following are designated to be special forest products under section 1 of the *Forest Act*. Christmas trees, firewood, mining timbers, stakes and sticks, cants, posts and rails (split and round), shake and shingle bolts, blocks and blanks, and shakes.

Special sale area: see Regulated unit.

Species: a singular or plural term for a population or series of populations of organisms that are capable of interbreeding freely with each other but not with members of other species. Includes a number of cases:

- endemic species: a species originating in, or belonging to, a particular region. Both "endemic" and "indigenous" are preferred over "native."
- exotic species: a species introduced accidentally or intentionally to a region beyond its natural range. "Exotic" is preferred over "alien," "foreign" and "non-native."
- subspecies: a subdivision of a species. A population or series of populations occupying a discrete range and differing genetically from other subspecies of the same species.

Species at risk:

- a) any wildlife species that, in the opinion of the Deputy Minister of Environment, Lands and Parks, or a person authorized by that deputy minister, is threatened, endangered, sensitive or vulnerable,
- b) any threatened and endangered plants or plant communities identified by the Deputy Minister of Environment, or any person authorized by that deputy minister, as requiring protection and
- c) regionally important wildlife as determined by the Deputy Minister of Environment, Lands and Parks or a person authorized by that deputy minister.

Species at Risk in the DFA: Provincial identified wildlife, endangered and threatened species as identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC's - Federal), animal species and forested plant communities listed as red and blue by the B.C. Conservation Data Center (CDC) and plant species listed as red by the CDC. *From March 16 2005 Glossary Amendment*

Species composition: the percentage of each recognized tree species comprising the forest type based upon the gross volume, the relative number of stems per hectare or basal area.

Species conversion: a change from one tree species to another.

Species guild: Any group of species that exploit the same class of environmental resources in a similar way. (e.g. nectar feeders, desert lizards, terrestrial salamanders, insectivorous birds.)

Spot burning: a modified form of broadcast burning in which only the larger accumulations of slash are fired and the fire is confined to these spots.

Spring: a flow of ground water emerging naturally onto the earth's surface and used as a domestic water source within a community watershed. The watershed area of a spring is defined as the total recharge area of the spring.

Stabilized road width: the width of the traveled portion of the road that has been surfaced with material of sufficient strength and quantity to support the intended traffic.

Stagnant: of stands whose growth and development have all but ceased due to poor site and/or excessive stocking.

Stand: a community of trees sufficiently uniform in species composition, age, arrangement, and condition to be distinguishable as a group from the forest or other growth on the adjoining area, and thus forming a silviculture or management entity.

Stand composition: the proportion of each tree species in a stand expressed as a percentage of the total number, basal area or volume of all tree species in the stand.

Mackenzie DFA Sustainable Forest Management Plan

Stand conversion: changing the species composition of a stand to more desirable tree species which are less susceptible to damage or mortality from certain insects or diseases.

Stand density: a relative measure of the amount of stocking on a forest area. Often described in terms of stems per hectare.

Stand development: the part of stand dynamics concerned with changes in stand structure over time.

Stand dynamics: the study of changes in forest stand structure over time, including stand behaviour during and after disturbances.

Stand level: the level of forest management at which a relatively homogeneous land unit can be managed under a single prescription, or set of treatments, to meet well-defined objectives.

Stand model: a computer model that forecasts the development of a forest stand, usually in terms of stand attributes such as mean diameter or height.

Stand strategy: a documented plan of stand treatments to achieve management objectives during the life of a particular stand.

Stand structure: the distribution of trees in a stand, which can be described by species, vertical or horizontal spatial patterns, size of trees or tree parts, age, or a combination of these.

Stand table: a summary table showing the number of trees per unit area by species and diameter class, for a stand or type. The data may also be presented in the form of a frequency distribution of diameter classes.

Stand tending: a variety of forest management treatments, including spacing, fertilization, pruning, and commercial thinning, carried out at different stages during a stand's development.

Stand types: see Stand, Stand structure.

Standard: the required level or measure of practice established by authority of the Forest Practices Code and referenced in legislation.

Standard II (Source CSA): a document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines, or specifications for activities or their results, aimed at the achievement of the optimum degree of consistency in a given context. Note: Standards should be based on the consolidated findings of science, technology, and experience and should be aimed at the promotion of optimum community benefits.

Standing: status held by a person or group which allows the person or group to challenge or appeal a particular decision.

Statutory framework: where forest practices are primarily regulated by legislation.

Stewardship: caring for land and associated resources and passing healthy ecosystems to future generations.

Stocking: a measure of the area occupied by trees, usually measured in terms of well-spaced trees per hectare, or basal area per hectare, relative to an optimum or desired level.

Stocking class: a numeric code representing a range of stems per hectare, sometimes estimated by crown closure on aerial photographs, e.g. stocking class 1 is mature with 76+ stems/ha of > 27.5 cm DBH; class 2 is mature with < 76 stems/ha; class 0 is immature.

Stocking plan: a plan that provides objectives and strategies for land allocation and/or resource management, including regional plans, subregional plans, and local resource plans.

Stocking standard: the required range of healthy, well-spaced, acceptable trees.

Stocking survey: the determination of the stocking of an area of both well-spaced and total trees; also used to generate an inventory label.

Strategic plan: a plan that provides objectives and strategies for land allocation and/or resource management, including regional plans, subregional plans, and local resource plans.

Strategy: a broad non-specific statement of an approach to accomplishing desired goals and objectives.

Strategy II (Source CSA): a coordinated action set designed to meet established targets.

Mackenzie DFA Sustainable Forest Management Plan

Stream: a watercourse, having an alluvial sediment bed, formed when water flows on a perennial or intermittent basis between continuous definable banks.

Stream bank: the rising ground bordering a stream channel.

Stream channel: the streambed and banks formed by fluvial processes, including deposited organic debris.

Stream class: the British Columbia Coastal Fisheries/Forestry Guidelines defines three stream classes:

- Stream Class A includes streams or portions of streams that are frequented by anadromous salmonids and/or resident sport fish or regionally significant fish species; or streams identified for fishery enhancement in an approved fishery management plan; stream gradient is usually less than 12 percent.
- Stream Class B includes streams or portions of streams populated by resident fish not currently designated as sport fish or regionally significant fish; stream gradient is usually 8-20 percent.
- Stream Class C includes streams or portions of streams not frequented by fish; stream gradient is usually greater than 20 percent.

Stream culvert: a culvert used to carry stream flow in an ephemeral or perennial stream channel from one side of the road to the other.

Stream gradient: the general slope, or rate of vertical drop per unit of length of a flowing stream.

Streambed: the bottom of the stream below the usual water surface.

Streamside Management Zone (SMZ): the land, together with the vegetation that supports it, immediately in contact with the stream and sufficiently close to have a major influence on the total ecological character and functional processes of the stream. (see also Riparian Management Area)

Stumpage: is the fee that individuals and firms are required to pay to the government when they harvest Crown timber in British Columbia. Stumpage is determined through a complex appraisal of each stand or area of trees that will be harvested for a given timber mark. A stumpage rate (\$ per m³) is determined and applied to the volume of timber that is cut (m³). Invoices are then sent to individuals or firms

Subgrade: the material movement necessary to construct the roadway, excluding surfacing.

Substructure: the part of a bridge that supports the superstructure and carries all the applied lateral and vertical loads; includes caps, sills, piles, and posts, each comprising elements known as abutments and piers.

Subsurface drainage: water flow through permeable soil or rock beneath the surface of the land.

Sub-unit plan: the fourth level of planning in the Ministry of Forests hierarchical planning system. The aggregation of a number of courses of action in map and written form designed to achieve sub-unit objectives. Normally centered on watersheds.

Succession: the gradual supplanting of one community of plants by another, the sequence of communities being termed a sere and each stage seral.

Suitability mapping: a habitat interpretation that describes the current potential of a habitat to support a species. Habitat potential is reflected by the present habitat condition or successional stage.

Superstructure: the part of a bridge found above or supported by the caps or sills, including the deck, girders, stringers, and curbs.

Supply block: an area of Crown land that is relatively homogeneous with respect to forest characteristics, access development and management concerns. Supply blocks are the next smaller timber management unit within a Timber Supply Area.

Surface soil erosion: means for an area where a forest practice has been carried out, the movement of soil particles from the area by wind, gravity or water at a rate that is greater than that which would have occurred had the forest practice not been carried out.

Surplus forest: a forest in which existing stands can provide more harvest volume than is needed to maintain the harvest at the level of long run sustained yield until the stands created when the existing stands are cut become available for harvest. See also deficit forest.

Sustainability: the concept of producing a biological resource under management practices that ensure replacement of the part harvested, by regrowth or reproduction, before another harvest occurs.

Mackenzie DFA Sustainable Forest Management Plan

Sustainable development: preservation and protection of diverse ecosystems-the soil, plants, animals, insects and fungi while maintaining the forest's productivity.

Sustainable forest management: management regimes applied to forest land which maintain the productive and renewal capacities as well as the genetic, species and ecological diversity of forest ecosystems.

Sustainable forest management (SFM) (Source CSA): 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" (*The State of Canada's Forests 2001/2002*).

Sustained yield: a method of forest management that calls for an approximate balance between net growth and amount harvested.

Switchback: a horizontal road curve used for surmounting the grade of a step hill, usually with a small radius (15-10 m) and curving 180 degrees.

System road: a permanent road required for long-term management of the forest.

T

Tactical plan: non-legal operating plans that highlight short term development proposals.

Target (Source CSA): a specific statement describing a desired future state or condition of an indicator. Targets should be clearly defined, time-limited, and quantified, if possible.

Target stocking standards: the number of well-spaced acceptable trees per hectare that will, in normal circumstances, produce an optimum free-growing crop; the standards at which silviculture treatments are aimed.

Temporary access structure: a structure that would be a permanent access structure except that it is not shown on a forest development plan, access management plan, logging plan, road permit or silviculture prescription as remaining operational after the completion of timber harvesting activities.

Temporary bridge: a bridge having most of its major components constructed of untreated wood.

Temporary tenures: non-alienated lands on which the timber is alienated to private interests, but where the Crown retains ownership of the lands. These lands include timber licences, timber leases and timber berths as well as pulp licences and pulp berths, including those now in tree farm licences under Schedule "A."

Tending: any operation carried out for the benefit of a forest crop or an individual thereof, at any stage of its life. It includes operations both on the crop itself and on competing vegetation but not site preparation or regeneration cuttings.

Tenure: the holding, particularly as to manner or term (i.e., period of time), of a property. Land tenure may be broadly categorized into private lands, federal lands, and provincial Crown lands. The Forest Act defines a number of forestry tenures by which the cutting of timber and other user rights to provincial Crown land are assigned.

Tenure (Source CSA): the terms under which a forest manager or owner possesses the rights, and assumes the responsibilities, to use, harvest, or manage one or more forest resources in a specified forest area for a specified period of time. **Note:** Private ownership of forestland is the strongest form of tenure, as the rights and obligations rest solely with the forest owner. Forest tenures of public land in Canada fall into two main categories: area-based and volume-based. Area-based tenures not only confer timber-harvest rights but also usually oblige the tenure holder to assume forest management responsibilities. Volume-based tenures normally give the holder the right to harvest specific volumes of timber in areas specified by the landowner or manager, but can also oblige holders to assume forest management responsibilities.

Tenure holder: an individual, group, or company that holds a licence agreement as defined in Section 10 of the Forest Act or Section 3 of the Range Act.

Tenure management plan: a plan that relates to the management, development and use, by the holder of a licence or permit granted under the Range Act, of the Crown range to which the licence or permit applies, including the management and use, affecting Crown range, of the following land: to which a licence or permit is made appurtenant, land which is subject to an agreement under section 17 of the Range Act, and unfenced land used for grazing purposes in common with Crown range to which a licence or permit applies.

Mackenzie DFA Sustainable Forest Management Plan

Terrain: the physical features of a tract of land.

Terrain hazard assessment: an assessment or characterization of unstable or potentially unstable slopes on forested lands. A determination of the relative potential of landslide initiation and the type of landslide that may occur on different types of terrain, based on the data obtained from a review of available maps, photos, site data, and field observations.

Terrain stability risk: a combined assessment of both the likelihood of landslide initiation and an order of magnitude estimate of the amount of landslide debris that might enter a stream or of the potential lengths of scour of a stream by a landslide.

Thinning: a cutting made in an immature crop or stand primarily to accelerate diameter increment but also, by suitable selection, to improve the average form of the trees that remain.

Threatened or endangered habitats: ecosystems that are:

- restricted in their distribution over a natural landscape (e.g., freshwater wetlands within certain biogeoclimatic) or are restricted to a specific geographic area or a particular type of local environment; or
- ecosystems that were previously widespread or common but now occur over a much smaller area due to extensive disturbance or complete destruction by such practices as intensive harvesting or grazing by introduced species, hydro projects, dyking, and agricultural conversion.

Threatened or endangered species: species identified as red listed by the Ministry of Environment; these are indigenous species that are either threatened or endangered.

Timber: trees, whether standing, fallen, living, dead, limbed, bucked or peeled.

Timber cruising: the collection of field data on forests commonly by the measurement and recording of information in sample plots. Includes the measurement and estimation of volumes of standing trees.

Timber harvesting land base (THLB): This is the area within each management unit that is available for commercial timber production, and it is based on economic, environmental, social and cultural considerations. This is the Crown forested land base that contributes to the AAC, as defined in the Timber Supply Review, for a Timber Supply Area (TSA) or Tree Farm License (TFL)

The timber harvesting land base does not include protected lands or areas such as riparian reserves or lands that support important wildlife habitat, recreational activities or cultural features. It also does not include stands of trees with little economic value if, for example, there is no market for the predominant species or the area is too remote or difficult to access because of the rugged, mountainous terrain.

Timber licence: area-based tenures which revert to the government when merchantable timber on the area has been harvested and the land reforested. Many of these licences have been incorporated into tree farm licences.

Timber management prescriptions: recommended forest management practices, usually pertaining to the sub-unit and operational levels of planning.

Timber mark: a hammer indentation made on cut timber for identification purposes.

Timber operability (see also Operable timber): in a planning context, the term refers to the economic suitability of timber for harvesting. Parameters to consider in assessing operability include: terrain, timber quality, timber size, operating season, labour costs, development costs, and transportation costs. In the Environmental Protection Area program, operability refers to freedom from harvesting constraints which include environmental protection and other forest uses.

Timber sale licence: an agreement entered into under Part 3, Division (3) of the Forest Act. A timber sale licence usually defines a specific volume of timber to be harvested from a specific area. In special circumstances, an allowable annual cut (AAC) is specified. Allows the orderly harvest of relatively small volumes of timber by:

- operators with small cuts;
- operators registered under the Small Business Forest Enterprise Program or others with temporary cutting rights;
- and
- holders of pulpwood agreements.

Timber supply: the available timber categorized by species, end-use, and relative value.

Timber supply analysis: an assessment of future timber supplies over long planning horizons (more than 200 years) by using timber supply models for different scenarios identified in the planning process.

Timber Supply Area (TSA): an area defined by an established pattern of wood flow from management units to the primary timber-using industries.

Mackenzie DFA Sustainable Forest Management Plan

Timber Supply Block (TSB): a division of a timber supply area.

Timber supply model: an analytical model (usually computer-based) that simulates the harvest and growth of collections of forest stands over several decades according to specific data and management assumptions.

Timber utilization: the dimensions and quality of timber that is actually cut and removed from an area.

Tolerance: the ability of an organism or biological process to subsist under a given set of environmental conditions. The range of these under which it can subsist, representing its limits of tolerance, is termed its ecological amplitude. For trees, the tolerance of most practical importance is their ability to grow satisfactorily in the shade of and in competition with other trees.

Top height: the average height of the hundred trees of largest diameter per hectare.

Top management (Source CSA): persons with decision-making authority regarding SFM policy, resource allocation, and planning in the DFA.

Topographic break: a distinct change in the slope of the land.

Topography: the physical features of a geographic area, such as those represented on a map, taken collectively; especially, the relief and contours of the land.

Total chance planning: early planning over an entire development area for the best overall realization of all objectives identified by broader planning.

Total resource plan: a plan for long-term forest management over an entire area, such as a watershed. The plan identifies known resource values, capabilities and sensitivities; confirms or refines management objectives for those values; and establishes detailed management guidelines by which to achieve those objectives on the ground.

Trade-off: a management decision whereby there is a reduction of one forest use in favour of another, such as a reduced timber yield in favour of improved wildlife habitat. In some cases, a management decision favouring one use in one location, is offset by a reverse decision favouring another use in another location.

Treatment prescription: operational details required for carrying out individual silviculture activities such as site preparation and planting.

Treatment season: the season or year the planned treatment activity will be carried out.

Treatment unit: the geographic unit of productive forest land area designated in a prescription for a specific silviculture activity or series of treatments.

Tree Farm Licence (TFL): TFLs are privately managed Sustained Yield Units. TFLs are designed to enable owners of Crown-granted forest lands and old temporary tenures or the timber licences which replace them, to combine these with enough unencumbered Crown land to form self-contained sustained yield management units. These licences commit the licensee to manage the entire area under the general supervision of the Forest Service. Cutting from all lands requires Forest Service approval through the issuance of cutting permits. TFLs should not be confused with Certified Tree Farms under the Taxation Act, though some Certified Tree Farm land (Crown-granted) may comprise a part of the TFL. A TFL has a term of 25 years.

Tree Length: The average height of co-dominant tree within a stand. *From March 8, 2005 Glossary Amendment*

Tree-length harvesting system: a method of harvesting that includes felling a tree, cutting of the top and delimiting it before transport to a mill.

TSA plan: the overall forest management plan developed for a TSA. The TSA Plan establishes the overall direction for the management of the timber, range and recreation resources under Forest Service jurisdiction in the TSA.

Turnout: a widening in the roadway where a vehicle may pull or park to allow other vehicles to pass safely.



Underplanting: planting young trees under the canopy of an existing stand.

Mackenzie DFA Sustainable Forest Management Plan

Understorey: any plants growing under the canopy formed by other plants, particularly herbaceous and shrub vegetation under a tree canopy.

Uneven-aged silvicultural system: a silvicultural system designed to create or maintain and regenerate an uneven-aged stand structure. Single-tree and group selection are uneven-aged silvicultural systems.

Uneven-aged stand: a stand of trees containing three or more age classes. In a balanced uneven-aged stand, each age class is represented by approximately equal areas, providing a balanced distribution of diameter classes.

Unmanaged forest land: forest land that is not subject to management under a forest management plan.

Unmerchantable: of a tree or stand that has not attained sufficient size, quality and/or volume to make it suitable for harvesting.

Unrecovered timber: timber as described in the Provincial Logging Residue and Waste Management Procedures Manual.

Unrecovered volume: timber that is within the cutting specifications of the minimum utilization standards of the cutting authority and not removed from the area.

Unsalvaged losses: the volume of timber destroyed by natural causes such as fire, insect, disease or blowdown and not harvested, including the timber actually killed plus any residual volume rendered non-merchantable.

Unstable or potentially unstable terrain: an area where there is a moderate to high likelihood of landslides.

Uplands: terrain not affected by water table or surface water or else affected only for short periods so that riparian (hydrophilic) vegetation or aquatic processes do not persist.

Urban forestry: the cultivation and management of trees and forests for their present and potential contributions to the physiological, sociological and economic well-being of urban society.

Utilization (of forage and browse): the level of forage and browse use on a site. For herbaceous species, it is measured as a percentage of the current year's growth removed; for browse species, it is measured as a percentage of stem ends removed.

Utilization standards: the dimensions (stump height, top diameter, base diameter, and length) and quality of trees that must be cut and removed from Crown land during harvesting operations.



Value: Standards or principles considered valuable or important in life – ecological, economic and social – in the SFM Framework (Oxford Dictionary 1994).

Value II (Source CSA): 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.

Values-at-risk: the specific or collective set of natural resources and man-made improvements/developments that have measurable or intrinsic worth and that could or may be destroyed or otherwise altered by fire in any given area.

Variable area plot sampling method: a method of timber cruising commonly used for industrial timber cruising in which sampling area (plot size) varies with tree diameter.

Variable retention (dispersed, aggregate): a relatively new silvicultural system that follows nature's model by always retaining part of the forest after harvesting. Standing trees are left in a dispersed or aggregated form to meet objectives such as retaining old growth structure, habitat protection and visual quality. Variable retention retains structural features (snags, large woody debris, live trees of varying sizes and canopy levels) as habitat for a host of forest organisms. There are two types of variable retention:

- Dispersed retention - retains individual trees scattered throughout a cutblock,
- Aggregate (group) retention - retains trees in clumps or clusters.

The main objectives of variable retention are to retain the natural range of stand and forest structure and forest functions. With retention systems, forest areas to be retained are determined before deciding which areas will be cut. This system offers a range of retention levels. The system also provides for permanent retention of trees and other structures after

Mackenzie DFA Sustainable Forest Management Plan

regeneration is established. Variable retention can be implemented with a range of harvesting systems and can be combined with traditional silvicultural systems such as shelterwood or selection.

Vegetative lot: a quantity of vegetative material or vegetative propagules having the same species, source and year of collection.

Vegetative material: plant parts or tissues used to produce vegetative propagules through asexual means.

Vegetative propagules: plants produced through asexual means.

Vehicle side-tracking: the lateral displacement of vehicles on a curve caused by the length of the vehicle manoeuvring through the turn; the wider path that the rear of a vehicle takes when negotiating a curve.

Ventilation Index (VI): a term commonly used in air pollution meteorology. The VI is a numerical value relating to the potential of the atmosphere to disperse airborne pollutants from a stationary source (such as smoke from a prescribed fire). It is calculated by multiplying the mixing height by the average wind speed in the mixed layer.

Very unstable terrain: terrain units classified as being in Terrain Class V in the coastal terrain stability classification, or as having a very high mass wasting hazard according to the Mass Wasting Hazard Assessment Key for interior sites. For these areas there is a high likelihood that slope failures will follow harvesting or conventional road building.

Veteran: in growth and yield, a tree that is at least 30 years older than the age of the main stand. In multi-layered or complex-layered stands, a tree that is at least 100 years older than the oldest sample tree of the main stand.

Viewshed: a physiographic area composed of land, water, biotic, and cultural elements which may be viewed and mapped from one or more viewpoints and which has inherent scenic qualities and/or aesthetic values as determined by those who view it.

Visual Absorption Capability (VAC): the relative capacity of a landscape to absorb land-use alterations and still maintain its visual integrity.

Visual green-up: see Green-up.

Visual impact assessment: an evaluation of the visual impact of resource development proposals on forest landscape.

Visual landscape analysis: the process of recommending visual quality objectives based on the visual landscape inventory and social factors.

Visual landscape inventory: the identification, classification, and recording of the location and quality of visual resources and values.

Visual landscape management: the identification, assessment, design, and manipulation of the visual features or values of a landscape, and the consideration of these values in the integrated management of provincial forest and range lands.

Visual quality: the character, condition, and quality of a scenic landscape or other visual resource and how it is perceived, preferred, or otherwise valued by the public.

Visual Quality Objective (VQO): an approved resource management objective that reflects a desired level of visual quality based on the physical and sociological characteristics of the area; refers to the degree of acceptable human alteration to the characteristic landscape.

Visual sensitivity: a component of the visual landscape inventory that estimates the sensitivity of the landscape based on the visual prominence or importance of features, conditions that affect visual perception, and social factors that contribute to viewer perceptions.

Visually sensitive areas: viewsheds that are visible from communities, public use areas, and travel corridors, including roadways and waterways, and any other viewpoint so identified through referral or planning processes.

Volume table: a table showing the estimated average tree or stand volume based on given tree measurements, usually diameter and height.

Vulnerable species: see Sensitive/vulnerable species.

Mackenzie DFA Sustainable Forest Management Plan

W

Waste: the volume of timber left on the harvested area that should have been removed in accordance with the minimum utilization standards in the cutting authority. It forms part of the allowable annual cut for cut-control purposes.

Waste area: a pre-approved site for disposal of excavations.

Waterbar: a shallow ditch dug across a road at an angle to prevent excessive flow down the road surface and erosion of road surface materials. A small excavation across a road to collect and divert roadway surface water flow.

Water management: the planned development, distribution and use of water resources.

Water quality: the physical, chemical and biological properties of water.

Water resources: the supply of water in a given area or basin interpreted in terms of availability of surface and underground water.

Watercourse: a natural stream or source or supply of water, whether usually containing water or not, such as a lake, river, creek, spring, ravine swamp, and gulch.

Watershed: an area of land that collects and discharges water into a single main stream through a series of smaller tributaries.

Watershed assessment: evaluates the present state of watersheds and the cumulative impact of proposed development on peak flows, suspended sediment, bedload, and stream channel stability within the watershed.

Watershed integrity: refers to a stable overall physical condition of the watershed (bedrock, landforms, soils, drainage ways) within which transfers of energy, matter and, especially of water occur. It is prerequisite for the security of forest and stream ecosystems.

Watershed management: the planned use of drainage basins in accordance with predetermined objectives.

Weeding: a release treatment in stands during the seedling stage that eliminates or suppresses undesirable vegetation regardless of crown position.

Wetland: a swamp, marsh or other similar area that supports natural vegetation that is distinct from adjacent upland areas.

Wilderness: an area of land generally greater than 1000 ha that predominantly retains its natural character and on which the impact of man is transitory and, in the long run, substantially unnoticeable.

Wilderness area: a part of the provincial forest designated by order in council as a wilderness area.

Wildfire: an unplanned or unwanted natural or human-caused fire, or a prescribed fire that threatens to escape its bounds.

Wildland urban interface: a popular term used to describe an area where various structures (most notably private homes) and other human developments meet or are intermingled with forest and other vegetative fuel types.

Wildlife: raptors, threatened species, endangered species, game, and other species of vertebrates prescribed as wildlife by regulation.

Wildlife habitat areas: units of habitat recommended for the maintenance, enhancement, or restoration of red-listed wildlife, threatened, and endangered habitats, and those species identified as being regionally important.

Wildlife management: the application of scientific and technical principles to wildlife populations and habitats to maintain such populations (particularly mammals, birds and fish) essentially for recreational and/or scientific purposes.

Wildlife trees: dead, decaying, deteriorating, or other designated trees that provide present or future habitat for the maintenance or enhancement of wildlife.

Wildling: a seedling naturally reproduced outside of a nursery, used in reforestation.

Mackenzie DFA Sustainable Forest Management Plan

Windrow: an accumulation of slash, branchwood and debris on a harvested cutblock created to clear the ground for regeneration. Also refers to an accumulation of fill or surfacing material left on the road shoulder as a result of grading operations.

Windthrow: see Blowdown.

Winter range: a range, usually at lower elevation, used by migratory deer, elk, caribou, moose, etc., during the winter months and typically better defined and smaller than summer range.

Wolf tree: a dominant tree, which is often a remnant from a previous stand, having a broad crown and many limbs.

Woodlot: the wooded portion of a private property upon which small-scale forestry operations are carried out.

Woodlot licence: an agreement entered into under Part 3, Division 8 of the Forest Act. It is similar to a Tree Farm Licence but on a smaller scale, and allows for small-scale forestry to be practiced in a described area (Crown and private) on a sustained or perpetual yield basis.

Working plan: See Management and Working Plans.

X

No definitions to-date

Y

Yarding (yarding systems): in logging, the hauling of felled timber to the landing or temporary storage site from where trucks (usually) transport it to the mill site. Yarding methods include cable yarding, ground skidding, and aerial methods such as helicopter and balloon yarding.

Yield Analysis: the study of forest yield over time using mathematical models and inventory data.

Yield curve: a representation of stand volume, usually as a function of stand age, in graphical or tabular form.

Young Forest: means forested areas which are between 0 and 20 years old. *From "Order Establishing Landscape Biodiversity Objectives for the Prince George Timber Supply Area – October 20, 2004" Jan 28 2005 Glossary Amendment*

Z

No definitions to-date

Abbreviations

The following abbreviations are used in this document:

AAC – Annual Allowable Cut

AT – Alpine Tundra

BEC – Biogeoclimatic Ecosystem Classification

BC – British Columbia

BCTS – BC Timber Sales

BWBS – Boreal White and Black

FRPA – BC Forest Range and Practices Act

FSP – Forest Stewardship Plan

ISO – International Standards Organization

LRMP – Land and Resource Management Plan

Mackenzie DFA Sustainable Forest Management Plan

Spruce	MCA – Multi-Criteria Analysis
Canfor – Canadian Forest Products Ltd.	MoFR –Ministry of Forests and Range
CCFM – Canadian Council of Forest Ministers	MOU – Memorandum of Understanding
CSA – Canadian Standards Association	PAG – Public Advisory Group
DFA – Defined Forest Area	SBS – Sub-Boreal Spruce
EMS – Environmental Management System	SFM – Sustainable Forest Management
ESSF – Engelmann Spruce - Subalpine Fir	SFMP – Sustainable Forest Management Plan
FDP – Forest Development Plan	SWB – Spruce Willow Birch
FPC – BC Forest Practices Code	TOR – Terms of Reference
	TSA – Timber Supply Area

Sources of Definitions

Definitions given here are a compilation of general terms used in Ministry of Forests reports, Brochures and correspondence.

They are intended for staff, students, general public and interest groups. Definitions provided in an official document, such as an Act or Regulation, shall apply in those instances.

<http://www.for.gov.bc.ca/hfd/library/documents/glossary/>

Definitions have been based on a variety of resource material documented in the bibliography at the end of this document.

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